2024

Telecoms Annual Report

Bundesnetzagentur

Foreword

Dear Reader,

Last year was yet another eventful year. Much of the news from around the world has been unsettling for many of us, and the situation does not seem to be easing.

This is the place for good news, though, where I am proud to tell you about the Bundesnetzagentur's achievements. Let me mention just two of our activities in 2024 that will hopefully make you want to read on.

Last year we announced that we would be taking on the role of Digital Services Coordinator (DSC), and on 15 May 2024 we assumed this responsibility and became the central supervisory body for digital platforms in Germany. We have always traditionally had oversight of analogue networks. But there is more to modern infrastructure today, with data services and online platforms. We communicate online, we shop online, and we want to have safe products. Unfortunately, though, some of the content that appears online is illegal and even criminal. The aim of the EU's Digital Services Act (DSA) is to stop this happening. The work of our motivated and experienced staff involves building up contacts with neighbouring DSCs, supporting the European Commission and establishing infrastructure here in Germany. It also involves liaising with media authorities, data protection authorities and the Bundeskriminalamt. Our work will play an important part in putting a stop to illegal content, goods and services online.

Illegal behaviour remains a major issue in traditional telecommunications segments as well. In 2024 we received 154,624 complaints about number misuse, which was nearly 10,000 more than the year before. Each and every case has a victim, with members of the public being tricked and losing money. Once again, most of the complaints – this year about 60% – were about unwanted messages. Family emergency scams are still very popular among fraudsters, alongside costly call queues, fake hotlines and number manipulation. As part of our efforts to combat number misuse, we cut off around 6,500 telephone numbers. We also issued bans for around 1,100 numbers to prevent the collection of charges billed to consumers when, for instance, hackers cracked their routers or telephone systems and ran up costs for calls.

The measures we take are effective, but we can only act if consumers actually get in touch and tell us about the fraud. Thanks to our complaints service, this flow of information works well. And we are quietly confident that it will stay this way in the future, too.

Klaus Müller,
President of the Bundesnetzagentur

Contents

Market trends

The number of homes passed by fibre to the home/fibre to the building (FTTH/FTTB) increased in 2024 by 3.9mn against the previous year to reach 21.8mn.

The volume of data transmitted on the basis of broadband connections in fixed networks continues to increase, with 149bn GB used overall in 2024. Mobile data volumes likewise continue to grow, reaching 9,592mn GB in 2024, up from 9,118mn GB in 2023.

Telecommunications markets as a whole

External revenue

According to the Bundesnetzagentur's preliminary calculations, external revenue in the German telecommunications market increased to €61.1bn in 2024, a year-on-year increase of 2.2% (2023: €59.8bn). This continues the upward trend seen throughout the previous years.

Deutsche Telekom AG saw its external revenue rise in 2024 by 6.6% against the previous year to €27.4bn. The external revenue of competitors is projected to decrease by 1.2% to €33.7bn. On the basis of these figures, the competitors' share of total external revenue in the telecommunications market was 55% in 2024, down from 57% in the previous year, and Deutsche Telekom AG's was 45%, up from 43% in the previous year.

A breakdown by market segment shows that the largest share is attributable to the fixed network. Accounting for a projected 51% (€31.26bn), the market share of this segment in 2024 was more than that of mobile services at 45% (€27.46bn).

Other external revenue accounted for 4% (€2.42bn) and includes revenue from satellite networks (broadband internet, telephony and TV) and revenue from virtual voice communication services based on publicly assigned numbering resources but delivered over the internet (eg cloud telephony). Also included is further revenue reported by Deutsche Telekom AG

as external revenue in Germany which counts towards total external revenue in the telecommunications market but is not classified as revenue from fixed and mobile networks, as well as revenue of joint ventures not treated as external group revenue due to the regulatory classification of these companies as a single company.

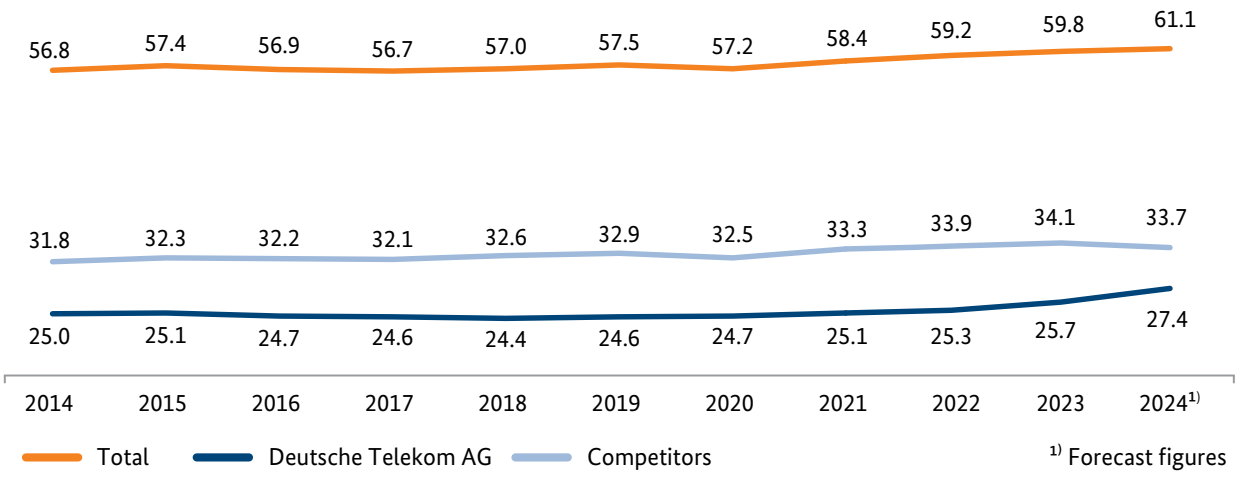
There are two categories of fixed network: xDSL/FTTx networks and HFC networks. By far the largest proportion of external revenue from the fixed network in 2024, 82% (€25.63bn), was for xDSL/FTTx networks, whilst the share for HFC networks was 18% (€5.63bn).

xDSL/FTTx networks

In the xDSL/FTTx networks segment, external revenue amounted to €25.63bn in 2024, according to currently available data. This corresponds to an increase of around 2% against 2023 (€25.07bn).

There was little change in 2024 to the breakdown of external revenue into retail services, wholesale services and other external revenue. Revenue

External revenue in the telecommunications market
(€bn)



External revenue by sector

	2022		2023		2024[1)]	
	€bn	%	€bn	%	€bn	%
External revenue on the telecommunications market	**59.2**	**100**	**59.8**	**100**	**61.1**	**100**
External revenue in fixed networks	30.87	52	31.02	52	31.26	51
External revenue in mobile networks	27.53	47	27.60	46	27.46	45
Other external revenue	0.78	1	1.21	2	2.42	4

1) Forecast figures

via retail is generated from services for private, commercial and public sector final consumers, and accounted for a projected share of 84%, the same as in the previous year. Wholesale services for fixed network and mobile operators and pure service providers outside of the Deutsche Telekom AG group took a share of 15% (2023: 16%). These services include wholesale products for voice traffic and telephony, broadband and internet, and infrastructure services. Other external revenue remained stable against the previous year at 1%.[1]

HFC networks

HFC network operators registered a projected decrease in revenue from €5.95bn in 2023 to €5.63bn in 2024. By far the largest proportion of this, around 95%, was for revenue via retail, the same as in the previous year. Preliminary calculations put the share of external revenue for wholesale at 2%, the same as in 2023. The wholesale business is of little significance compared with the xDSL/FTTx segment. Other external revenue accounted for 3%, down from 4% in the previous year.[2]

1 Deviation in the total amount is due to rounding.

2 Deviation in the total amount is due to rounding.

External revenue from mobile services

	2022		2023		2024[1)]	
	€bn	%	€bn	%	€bn	%
Total	**27.53**	**100**	**27.60**	**100**	**27.46**	**100**
Network operators	22.55	82	22.75	82	22.65	82
Service providers/MVNOs	4.98	18	4.85	18	4.81	18

1) Forecast figures

Mobile networks

External revenue from mobile networks reached a projected €27.46bn in 2024, a slight decrease from the previous year (2023: €27.60bn). This can be broken down into approximately 70% via retail (excluding terminal equipment), 7% via wholesale, 19% via terminal equipment and 4% via other. The shares in 2023 were 68%, 8%, 20% and 3% respectively.[3]

The distribution of external revenue from mobile services varies considerably between network operators and service providers/mobile virtual network operators (MVNOs). As in the previous two years, the Bundesnetzagentur expects the lion's share of total revenue (82%) for mobile services in 2024 to be attributable to network operators. Service providers/MVNOs are projected to take a market share of 18%.[4]

Investments in fixed assets

Investments in fixed assets in the telecommunications market reached €15.3bn in 2024, according to currently available data, as companies continue driving the rollout of optical fibre and mobile infrastructure.

Competitors invested a projected €10.0bn in 2024 compared with €9.5bn in 2023. Deutsche Telekom AG's investments decreased from €5.4bn in 2023 to around €5.3bn in 2024.[5]

The companies were mostly investing in new broadband network infrastructure. This includes investments to expand coverage and/or upgrade connection performance. These investments together accounted for about 81% of total investments in 2024. Approximately 9% went towards the maintenance of existing broadband network infrastructure and around 10% was used for other purposes, such as investments in subscriber terminal equipment, the expansion of data centres and investments in customer support.[6]

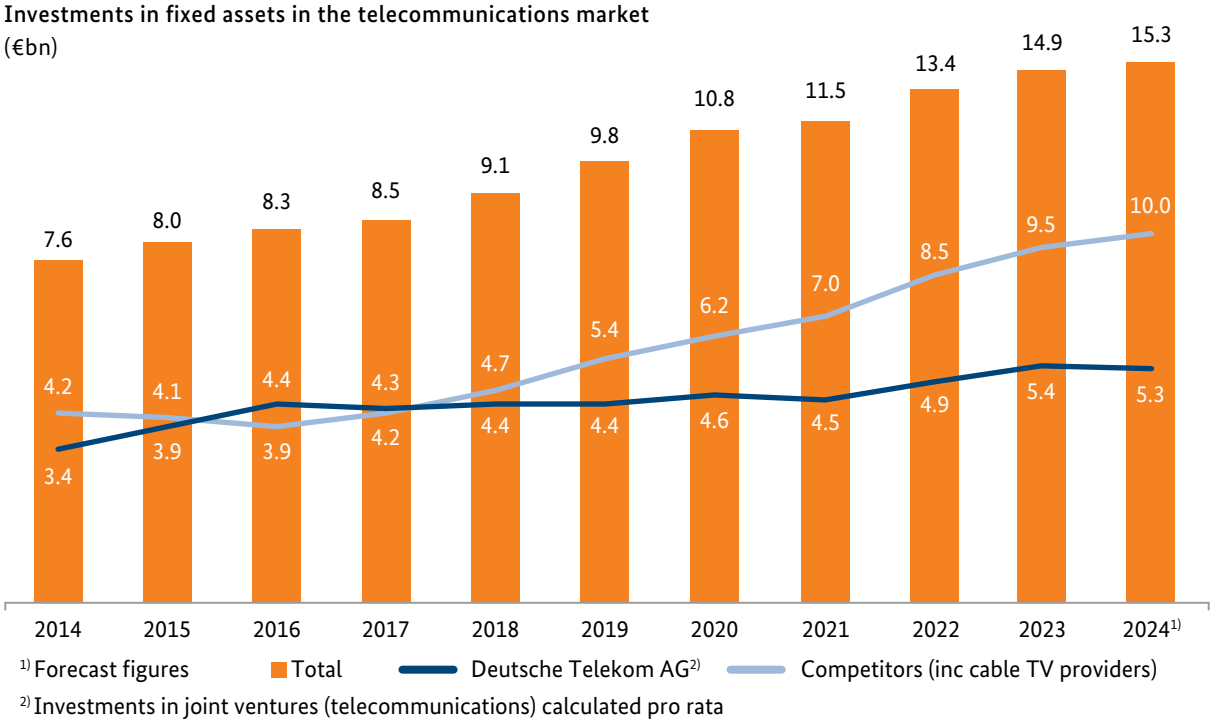
3 Deviation in the total amount is due to rounding.

4 1&1 Mobilfunk GmbH has operated its own public mobile network since 8 December 2023 but also remains active as an MVNO. Its external revenue is still included in full under service providers/MVNOs for 2023 and 2024.

5 Investments by the joint ventures Glasfaser NordWest GmbH & Co. KG and Glasfaser-Plus GmbH were included under Deutsche Telekom AG at the rate of 50% and 100% respectively. Glasfaser NordWest GmbH & Co. KG is a 50:50 joint venture founded by Telekom Deutschland GmbH and EWE AG in 2020. GlasfaserPlus GmbH is a company founded by Telekom Deutschland GmbH in 2020. In 2021 Telekom Deutschland GmbH partnered up with the IFM Global Infrastructure Fund advised by Australian infrastructure investor, IFM Investors. Glasfaser NordWest GmbH & Co. KG and GlasfaserPlus GmbH operate as wholesale-only enterprises, meaning they are active exclusively in the wholesale market with no interaction with retail customers.

6 When interpreting the data, it should be noted that the assignment of investments to the categories "existing broadband network infrastructure", "new broadband network infrastructure" and "other" may have been subject to different interpretation by the companies surveyed in order to collect information for this report. In addition, not all companies were able to provide a breakdown of their data. These companies are not included in the calculation of shares.

Investments in fixed assets in the telecommunications market
(€bn)



From the time the market was opened up in 1998 through to the end of 2024, companies invested a total of almost €230bn in fixed assets in the telecommunications market. Of this amount, 55% (€126.8bn) is attributable to competitors and 45% (€103.0bn) to Deutsche Telekom AG.

The investments described above relate to acquired and internally generated fixed assets. Fixed assets can additionally be leased, ie the lessor grants the lessee the right to use an asset. Companies reporting under IFRS 16 are required to recognise leased right-of-use assets on the statement of financial position. In the telecommunications sector, right-of-use assets typically relate to leased network infrastructure, base station sites or data centres.

Sale and leaseback arrangements are a special form of leasing in which an asset is sold and then subsequently leased back. In mobile communications, sale and leaseback is mainly used by mobile network operators in connection with the sale of passive network infrastructure. Deutsche Telekom and Vodafone sold and leased back passive mobile network infrastructure and capitalised the associated right-of-use assets in 2023; Telefónica Deutschland did likewise in the two years prior.

The rights of use for newly acquired leased fixed assets in the telecommunications sector were valued at about €1.6bn in 2024 and about €4.4bn in 2023.

Employees

127,700 people were employed in Germany by companies in the telecommunications market at the end of 2024, which is 3.5% less than in 2023 (132,400). Deutsche Telekom AG reduced its headcount by 4,000 to 74,700, whilst the number of people employed by competitors fell by 700 to 53,000 at the end of 2024.

Fixed network

Broadband connections

The number of contract-based broadband connections increased to around 38.6mn by the end of 2024.[7]

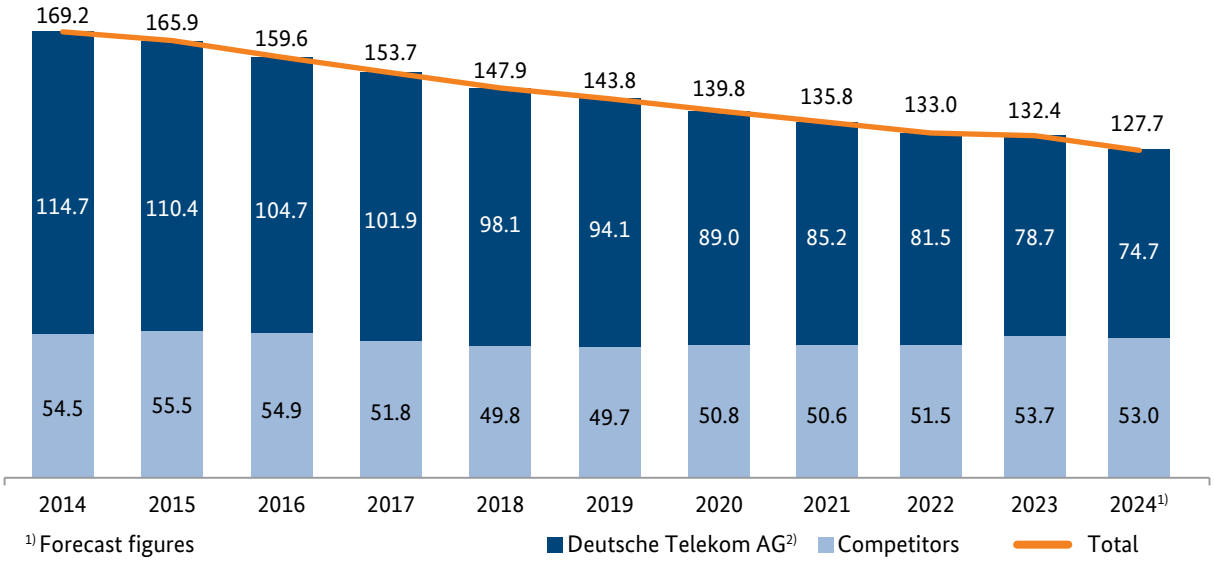
The majority of broadband connections, about 61% or 23.6mn, continue to be based on various DSL technologies.[8]

Together, all other technologies accounted for approximately 15.0mn connections. Most of these were based on HFC networks (around 8.5mn). Approximately 5.3mn were based on fibre-to-the-home (FTTH) or fibre-to-the-building (FTTB). Around 0.9mn connections were fixed wireless broadband comprising LTE/5G

7 Broadband connections include all connections with a bandwidth of at least 144 kilobits per second (Kbps). The Bundesnetzagentur bases this threshold on the requirements defined by the European Commission in its latest broadband report (COCOM).

8 Including hybrid connections (combined use of DSL and LTE/5G).

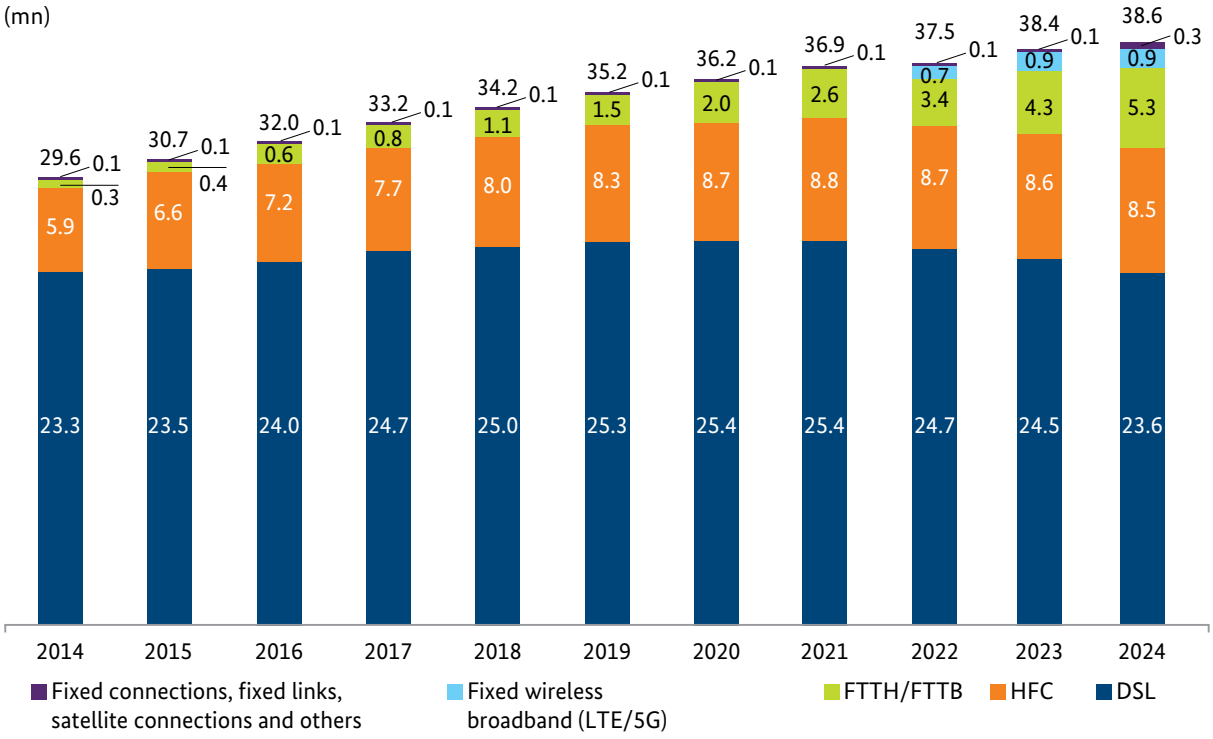
Employees in the telecommunications market
(thousands)



[1)] Forecast figures

[2)] Employees in joint ventures (telecommunications) calculated pro rata

Active fixed broadband connections
(mn)



connections for fixed-location use.[9] Roughly 0.3mn connections were broadband wireless access (fixed links), fixed connections or satellite connections.

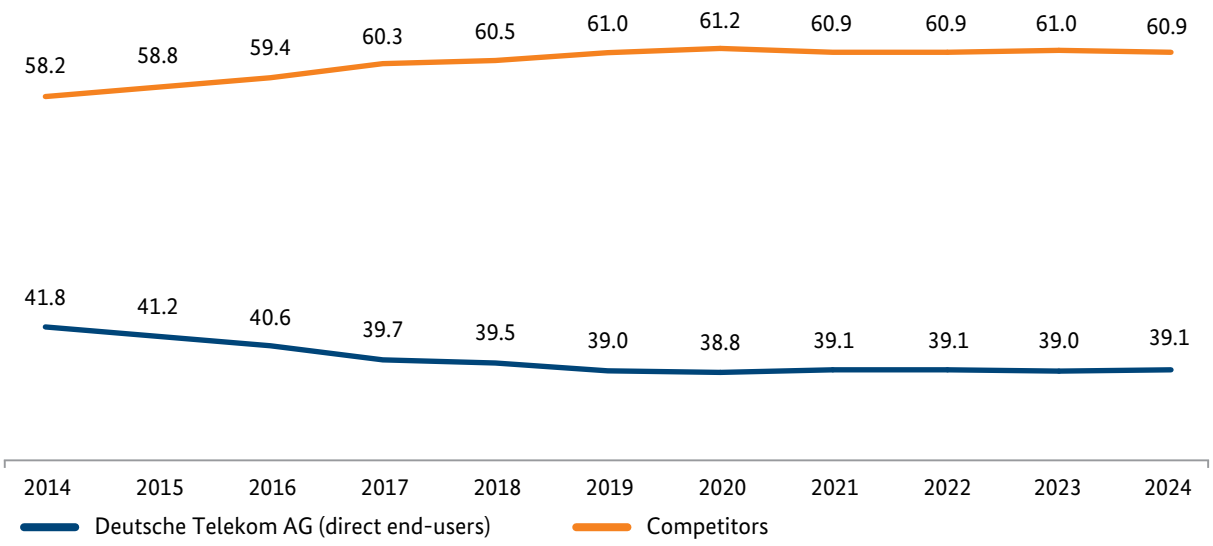
The moderate year-on-year growth in broadband connections was mainly due to a steep rise in connections based on FTTH/FTTB. This more than compensated for the losses in DSL and HFC. An increase in the number of fixed connections (dedicated lines) was also reported.

Fibre products are generally replacing DSL in many areas, as well as HFC.

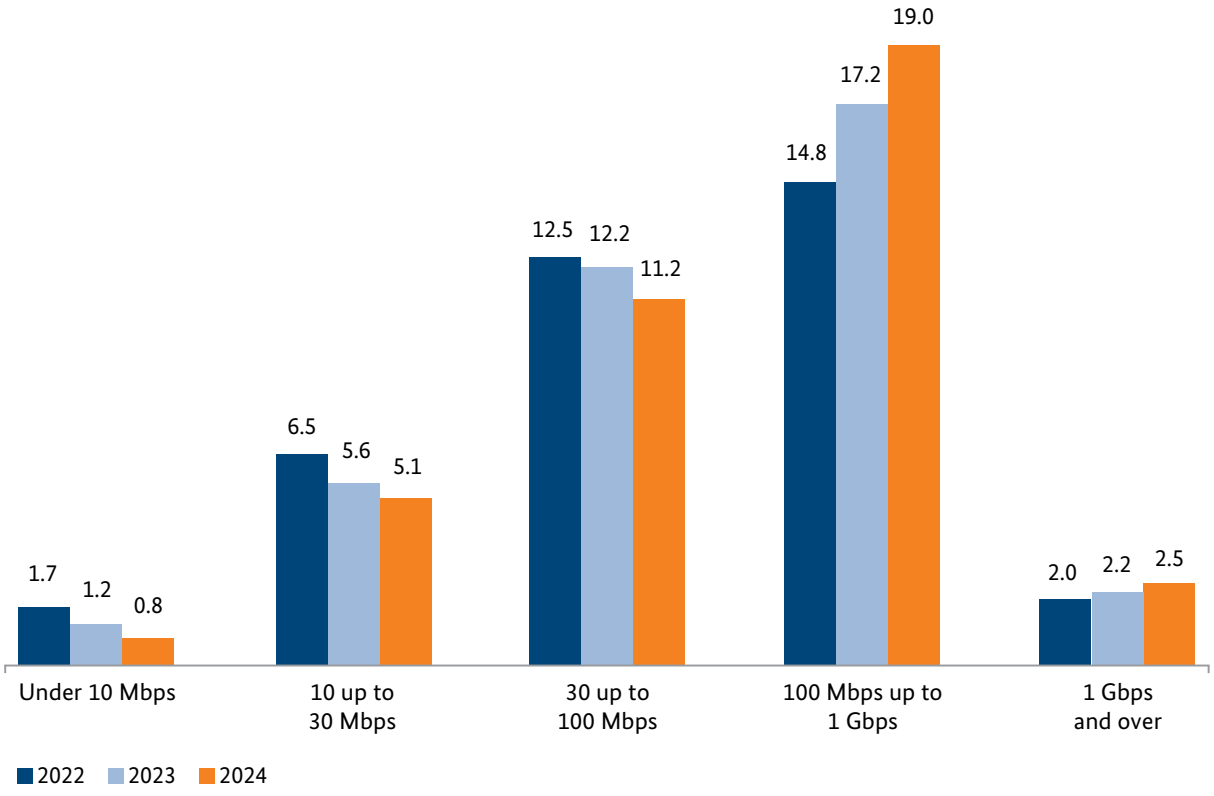
As far as marketing to end-users was concerned, Deutsche Telekom AG's competitors maintained their market share of all retail broadband connections of around 61% at the end of 2024.

9 Includes fixed wireless broadband since 2022. Prior to this, these connections were reported under mobile services.

Share of fixed broadband
(%)



Advertised maximum download speeds of active fixed broadband connections
(mn)



Transmission rates

In the broadband market, demand remains strong for connections with fast nominal transmission speeds. Some 21.5mn broadband connections were available with an advertised top transmission rate of at least 100 megabits per second (Mbps) at the end of 2024. This amounted to about 56%, or 38.6mn, of all broadband connections sold in fixed networks. Roughly 2.5mn connections had an advertised speed of at least 1 gigabit per second (Gbps).

Some 0.8mn connections still had a maximum nominal data rate of under 10 Mbps at the end of 2024.

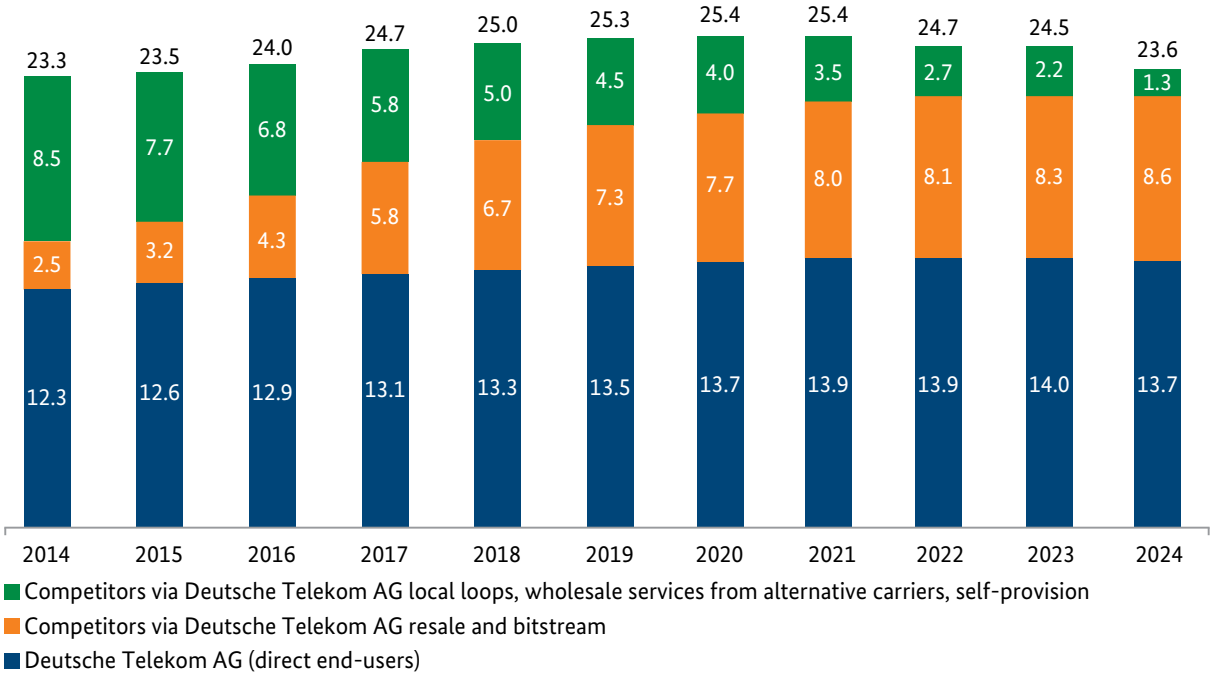
Over the last three years, demand has been shifting increasingly towards connections with higher nominal transmission speeds to replace low bandwidth connections.

DSL connections

At the end of 2024 some 23.6mn DSL connections were operational. Around 13.7mn of these were attributable to direct end-users of Deutsche Telekom AG and around 9.9mn to competitors, which primarily marketed DSL connections to end-users on the basis of the specific wholesale products of Deutsche Telekom AG or alternative carriers. Based on these figures, Deutsche Telekom AG's competitors had achieved a DSL market share of around 42% by the end of 2024.

At around 20.5mn connections, very high data rate DSL (VDSL) technology accounted for approximately 87% of all DSL connections at

Active DSL connections
(mn)



the end of 2024. About 8.7mn VDSL connections were provided by the competitors compared to Deutsche Telekom AG's total of around 11.8mn direct VDSL customers.

Vectoring technology is the main reason for the wide spread of VDSL. It can be used to provide transmission rates of up to 250 Mbps.

VDSL is also of key importance at the wholesale level. Demand for specific VDSL wholesale products from Deutsche Telekom AG remains high, with bitstream wholesale products seeing particularly strong growth. Deutsche Telekom AG's layer 2 bitstream product was the main cause of this increase. It has been offered by Deutsche Telekom AG alongside its established layer 3 bitstream product since the end of 2016 and is another alternative for providing end-user access. There were around 4.7mn connections based on layer 2 bitstream access at the end of 2024 (2023: approximately 4.4mn).[10]

The number of competitor-operated connections based on Deutsche Telekom AG's high-bit-rate, unbundled local loops, wholesale services provided by other carriers and self-provision continued to fall due to their limited usage possibilities amidst the ongoing rollout of vectoring technology.

Broadband connections via HFC networks

These hybrid networks comprising fibre and coaxial cables now frequently offer download speeds of up to 1 Gbps. At the end of 2024 there were around 8.5mn connections via HFC infrastructure. This continues the gradual downward trend that began in 2022 following a long period of steady growth.

10 Bitstream and resale include a small number of wholesale services for fibre-to-the-home/fibre-to-the-building.

Broadband connections via FTTB/FTTH

Thanks to their outstanding technical properties and almost unlimited transmission rates, optical fibres are considered to be the perfect medium for transporting data.

The number of homes passed by FTTH or FTTB for end-users grew to 21.8mn at the end of 2024, an increase of 3.9mn on the previous year.[11] Homes passed refers to fibre infrastructure that already reaches end-users, ie an FTTH/FTTB dedicated optical fibre cable or bundle directly passes their property (at a maximum distance of 20m). As well as active connections, the figures for homes passed include inactive FTTH/FTTB end-user connections that are available but are not yet operational under a corresponding contract, as well as end-users directly passed by FTTH/FTTB. Further investment is required to complete the connection to these end-users. In areas where several telecommunications companies are rolling out local infrastructure in parallel, the homes passed may have been counted more than once due to the method of data collection.

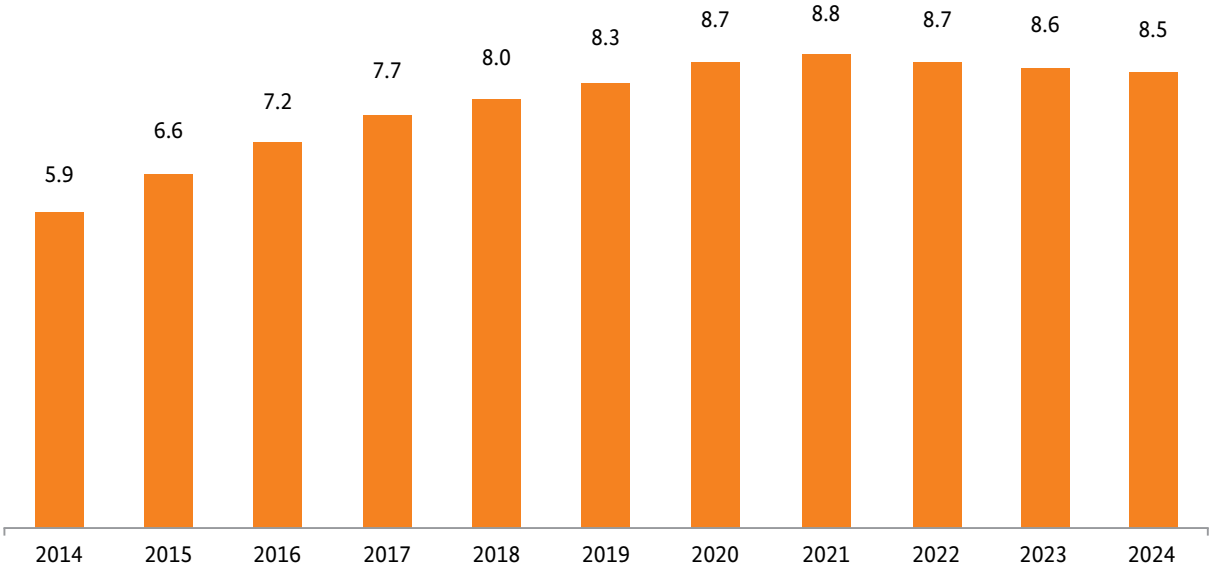
At the end of 2024 there were 8.6mn active and inactive FTTH and FTTB connections (homes connected). These connections are already complete and can be made operational at very short notice with no need for further investment in installation work.

11 Deviations from Bundesnetzagentur data published in the Broadband Atlas and elsewhere are due mainly to the following differences in the methods used to collect and process data:

a) The results described in this section are based on the absolute values for FTTH/FTTB end-user connections and homes passed as reported by the companies for all of Germany. By contrast, the data on FTTH/FTTB end-user lines provided by the companies for the Broadband Atlas is based on individual address points or address-specific coverage areas. This address-based data is overlaid with data on households to determine coverage for specific households and business locations (see also the methodology report on the Broadband Atlas).

b) The results in this section are based on categorisation by the companies into active end-users, inactive end-users and homes passed, whereas the Broadband Atlas does not distinguish between homes connected and homes passed.

Active broadband connections via HFC networks
(mn)



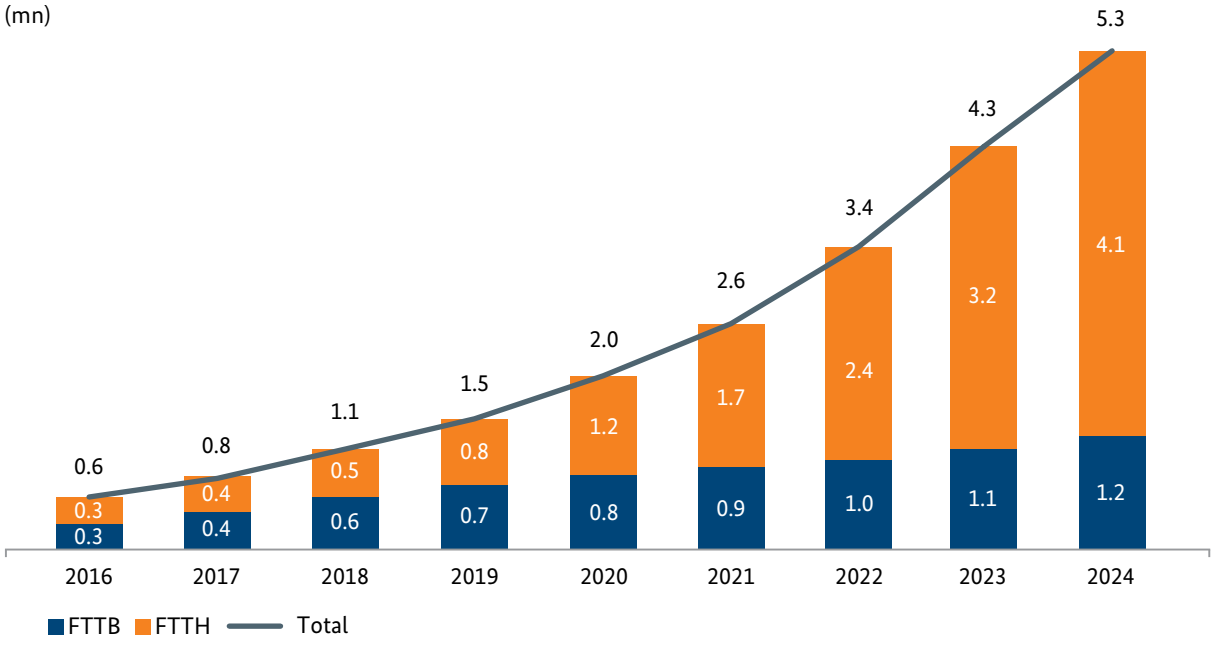
The number of active fibre connections for private, commercial and public sector end-users increased to 5.3mn at the end of 2024, around 1mn more than at the end of the previous year. These were split between about 4.1mn FTTH connections (77%) and about 1.2mn FTTB connections (23%). The share of FTTH connections has been greater than that of FTTB connections since 2019.

The growth in demand drove up the share of homes activated among total active fixed broadband connections from 11.2% in 2023 to 13.7% by the end of 2024. However, the prevalence of these connections is still low, largely due to the high level of existing coverage with-high speed infrastructure (VDSL vectoring and HFC networks). The FTTH/FTTB share of broadband connections is expected to grow sharply in the coming years to meet rising demand for higher speeds. The take-up rate, which is the share of homes passed with an active connection (homes activated), was about 24% at the end of 2024.

Number of end-users covered or passed by FTTH/FTTB

	2022	2023	2024
Number of end-users covered or passed by FTTH/FTTB (homes passed)	13.1 mn	17.9 mn	21.8 mn
of which active and inactive FTTH/FTTB end-user connections (homes connected)	6.4 mn	7.3 mn	8.6 mn
of which active FTTH/FTTB end-user connections (homes activated)	3.4 mn	4.3 mn	5.3 mn
Take-up rate (homes activated/homes passed)	26%	24%	24%

Active broadband connections via FTTH/FTTB
(mn)



Satellite broadband connections

Around 83,000 customers were using satellite internet access from virtually any location at the end of 2024 (2023: 30,000). Despite the increase, demand remained low due to the availability of more cost-effective alternative access options, often with higher maximum transmission speeds. However, satellite internet connections can help to provide full broadband coverage in regions where other technologies are not, or not sufficiently, available.

Data volume

The volume of data transmitted on the basis of broadband connections in fixed networks continues to rise, with consumers using around 149bn GB in 2024.[12] This corresponds to an average of approximately 322 GB per connection per month and a steep increase against the previous year.

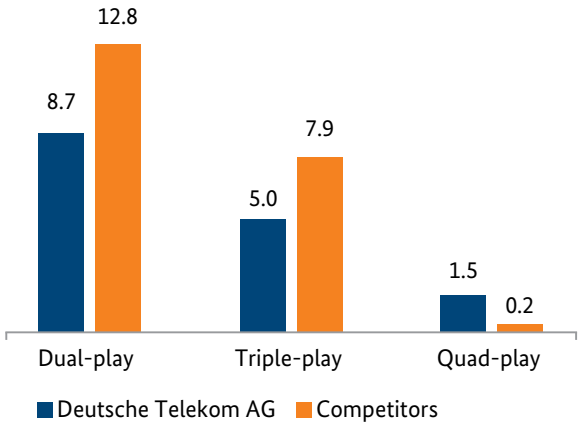
12 In contrast to streaming figures, the traffic volumes shown do not include data traffic from Deutsche Telekom AG's closed-network internet-based TV (IPTV) service.

Bundled products

Bundled products that, in addition to a broadband connection, include at least one other telecommunications service (fixed-network telephony, TV or mobile services) in a single contract are offered as standard by companies in their marketing to end-users. Sometimes these services cannot be purchased separately or are more expensive individually. Bundled products without a broadband connection are less common.

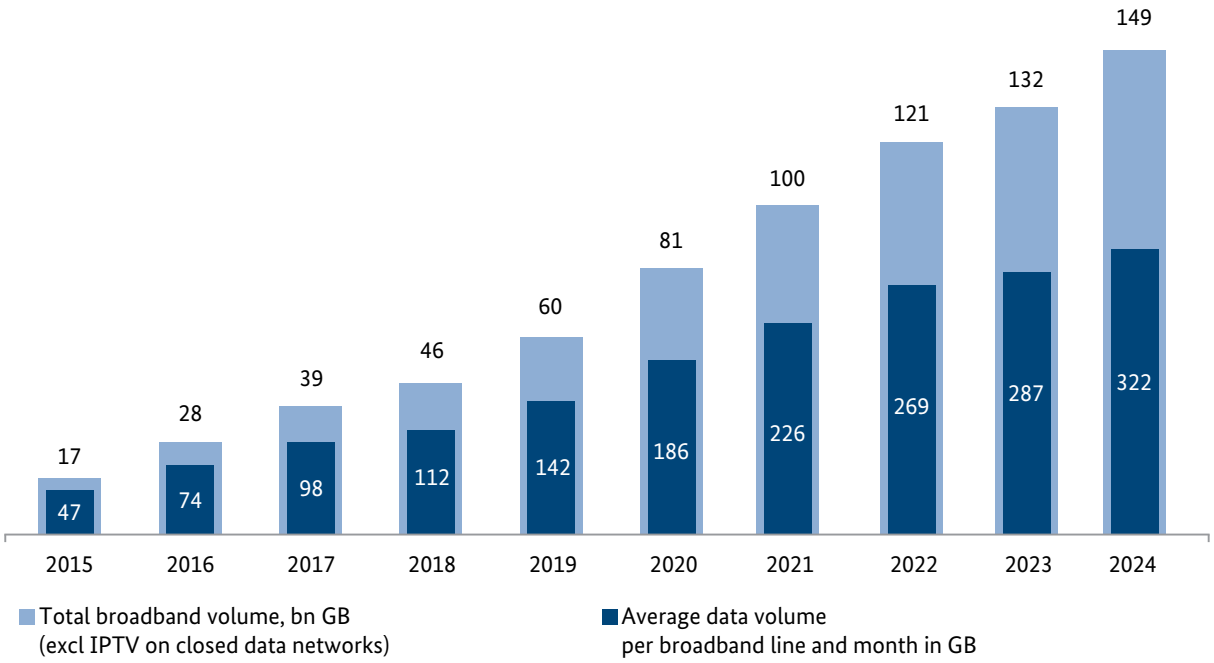
Consumers who have already entered into a fixed-network and mobile contract with a provider can usually take advantage of discounts and exclusive offers by bundling the two contracts in special advantage programmes. By offering such measures, providers seek primarily to increase customer loyalty to their products.

Bundle tariffs in fixed networks in 2024
(mn)



At the end of 2024 Deutsche Telekom AG and its competitors had around 36.1mn contracts with bundle tariffs and advantage programmes. Bundled products with two services were still the most common of these, accounting for approximately 21.5mn customers. The majority of these dual-play products consist of an IP-based telephone service in addition to a broadband

Data volume in fixed networks



connection. A smaller share of customers had bundles consisting of fixed network telephony, mobile or TV services.

Around 12.9mn customers had triple-play bundles at the end of 2024. Approximately 76% of these consisted of a broadband connection and telephone service and an additional TV service, whilst roughly 24% had a mobile component instead of the TV service.

At the same time, around 1.7mn customers were using quad-play bundles and advantage programmes consisting of four fixed-network and mobile services.

Voice communication connections

The number of voice communication connections in the fixed networks has been largely stable over the past eight years, averaging 38.5mn connections per year. Total connections in 2024 were 38.4mn, down from 38.7mn in the previous year.

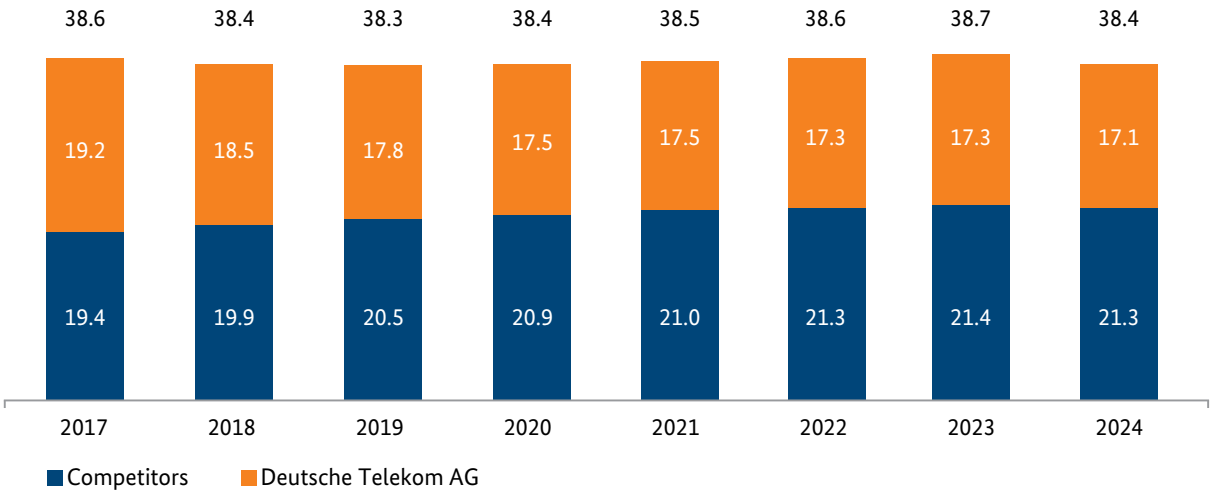
The competitors to Deutsche Telekom AG accounted for 21.3mn voice communication connections, a slight decline from 21.4mn in the previous year. The number of Deutsche Telekom AG voice communication connections fell to 17.1mn from 17.3mn in 2023. This corresponds to a share of 55% of all voice communication connections in 2024 for competitors and 45% for Deutsche Telekom AG, proportions that were the same as in the previous year.

Conventional fixed-network telephony using analogue and ISDN[13] connections has moved almost completely to Voice over Internet Protocol (VoIP). At the end of 2024 the majority of voice communication connections (38.39mn) were based on IP technology and the number of analogue/ISDN connections accounted for a negligible proportion.

In addition to IP-based voice communication connections, the companies also sell internet-based virtual connections that use publicly

13 Integrated Services Digital Network

Voice communication connections
(mn)



assigned numbering resources. Virtual connections include SIP trunks[14] and cloud telephony, and require a broadband connection. About 0.2mn virtual connections were in operation in 2024 (these are not included under IP-based voice communication connections.)

Call minutes in fixed networks

The volume of call minutes from fixed networks to fixed networks within Germany, to German mobile networks and to international fixed and mobile networks fell to 57bn in 2024, continuing the downward trend of the past few years. The rate of decline slowed to 11% in 2024 compared to 20% in 2023 and 14% in 2022.

Approximately 29bn of the total call minutes in 2024 can be attributed to Deutsche Telekom AG, which is a drop of 12% from the 33bn minutes the year before. The call volume handled by competitors decreased by around 10%, from 31bn minutes in 2023 to about 28bn minutes in 2024. At 49% (2023: 48%), the competitors' share was less than that of Deutsche Telekom AG at 51% (2023: 52%).

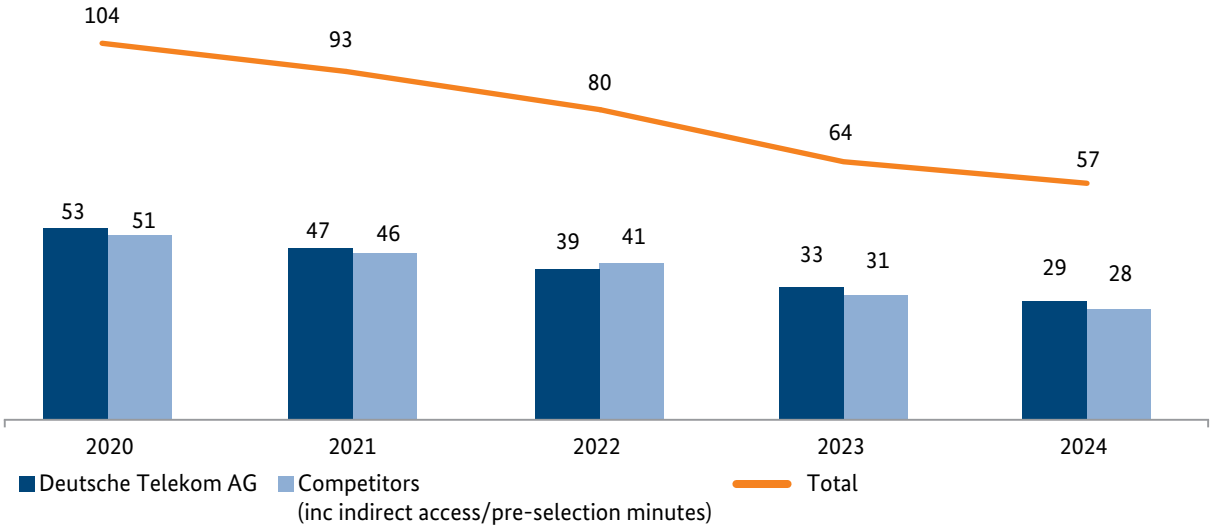
As in previous years, direct traffic accounted for the majority of competitors' call minutes, around 27.4bn (98%) in 2024. Indirect access and carrier pre-selection calls accounted for a total of approximately 0.6bn minutes, or about 2%, of all calls handled by competitors in 2024 (around 1% of total calls). A decrease in pre-selection in the Deutsche Telekom AG network means that indirect access again exceeded pre-selection call volumes in 2024. With the discontinuation of the indirect access and pre-selection services as of 31 December 2024, these fixed-network calls will now be made via direct connections.

Of the total 57bn minutes of calls made in 2024, around 48bn were within the national fixed networks. About 8bn minutes were made to the national mobile networks and around 1bn to foreign fixed and mobile networks. The competitors had a share of about 50% of these national fixed-network minutes, 48% in national mobile networks and 52% of the international minutes.

Fewer than 1bn call minutes were made via virtual voice communication connections in 2024.

14 SIP trunks are voice communication connections usually consisting of multiple voice channels (trunks) and based on the Session Initiation Protocol (SIP).

Outgoing call minutes in fixed networks
(bn)



Mobile services

Actively used SIM profiles

Data collected by the Bundesnetzagentur suggests that there were 109.2mn active SIM profiles at the end of 2024[15]. This does not include profiles for machine-to-machine (M2M) data communications. Statistically speaking, each resident has around 1.3 SIM profiles. SIM profiles are defined as active if they have been used for communication in the last three months or if an invoice has been generated for the SIM profile in this period.

The share of SIM profiles attributable to network operators compared to that of service providers and MVNOs (mobile virtual network operators) was slightly larger in 2024 than in the previous year. The network operators accounted for 79% of the profiles (86.6mn) and the service providers/MVNOs for 21% (22.6mn). 1&1 Mobilfunk GmbH is driving this shift with the gradual migration of SIM profiles to its own network following 1&1's market entry as a mobile network operator (MNO). With contracts there was once again a small change of two percentage points from prepaid to postpaid SIM profiles. At the end of 2024, 73% (79.7mn) of SIM profiles were on postpaid contracts and 27% (29.5mn) on prepaid contracts.

Some 73.7mn SIM profiles were being used for M2M at the end of 2024, an increase of approximately 17% against 2023 (62.8mn).

The number of SIM profiles in active use in long term evolution (LTE) networks was 89.7mn at the end of 2024, up by around 2% year on year. Some 37.4mn of these end-users use 5G non-standalone (5G NSA), an increase of 90% against the previous year. This technology makes the connection via a 4G/5G radio access network and transports the data over a 4G core network.

Voice communication is increasingly being made using the internet-based service Voice over LTE

15 The SIM profile is a set of parameters comprising an IMSI, an authentication key and other associated data that enables devices to authenticate against and gain access to a mobile network. Includes all profiles for all SIM technologies (eg physical SIM cards, eSIMs).

(VoLTE). This is IP-based and offers much better call quality, faster connections and more efficient use of bandwidth. The number of active users with a VoLTE-capable device in combination with a suitable mobile contract rose from 68.8mn at the end of 2023 to 75.0mn at the end of 2024

Actively used SIM profiles of MVNOs

The Bundesnetzagentur began assigning phone numbers for mobile services to mobile virtual network operators (MVNOs) in 2013. MVNOs do not operate their own radio network infrastructure on the basis of licensed spectrum. Seven companies on the German market use this business model.

At the end of 2024 about 1.7mn end-users were using SIM profiles from number blocks originally assigned to the MVNOs. These are not included under "Use and distribution of active SIM profiles".

Besides the SIM profiles they were originally assigned, the MVNOs mainly use SIM profiles from number blocks assigned to the mobile network operators. The MVNOs have around 10.3mn active SIM profiles overall. About 9.9mn (96%) were logged in to the LTE network at the end of 2024. Some 5.4mn of these end-users use 5G non-standalone (5G NSA), an increase of approximately 4.0mn within one year. Around 8.1mn active users had a VoLTE-capable device in combination with a suitable mobile contract at the end of 2024.

Registered SIM profiles

The total number of SIM profiles registered in Germany is significantly higher than the total number of SIM profiles in active use. One reason for this is that second and third devices or other spare SIM profiles are not in constant use.

At the end of 2024 the mobile network operators reported a total of 201.3mn registered SIM profiles.[16] This is an increase of around 16mn profiles compared with 2023. SIM profiles used for M2M are included in this figure.

16 No standard definition applies to the total number of SIM profiles disclosed by the network operators. Each company decides for itself how to count SIM profiles and when adjustments are required.

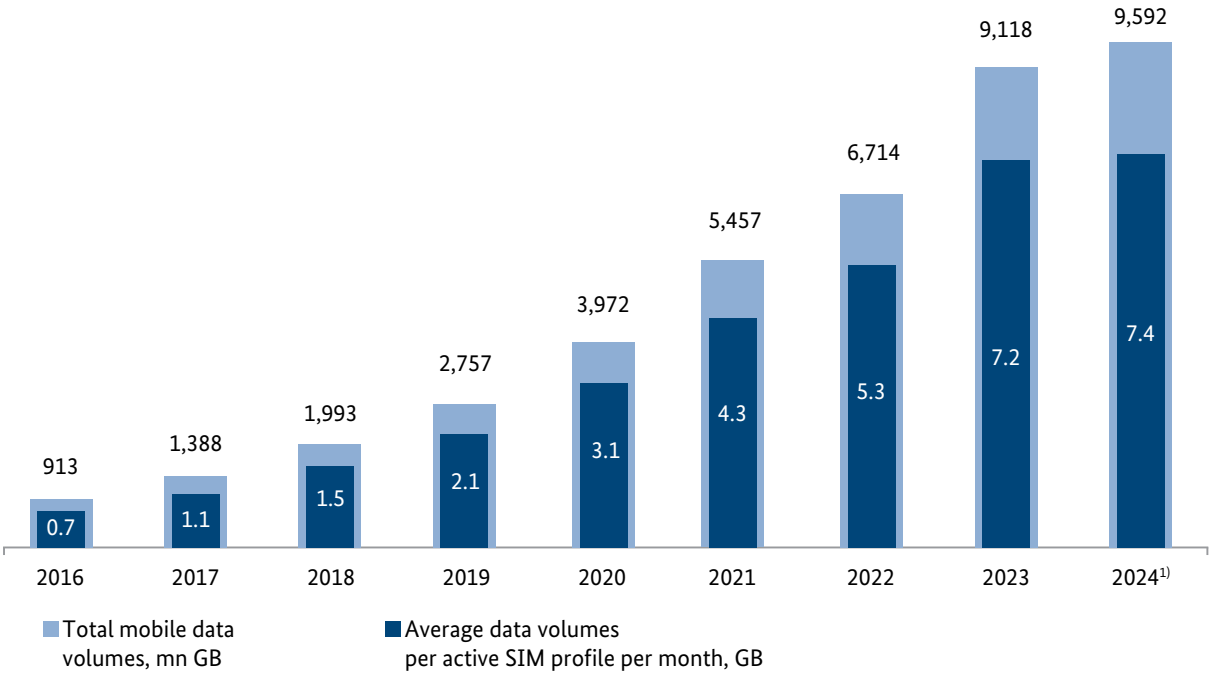
Use and distribution of active SIM profiles

		2022		2023		2024	
		mn	%	mn	%	mn	%
Total excluding M2M		**104.4**		**105.4**		**109.2**	
Penetration (SIM profiles/inhabitant[1])		**-**	**126**	**-**	**126**	**-**	**131**
Business:	Network operators (MNOs)	80.5	77	81.0	77	86.6	79
	Service providers/MVNOs	23.9	23	24.5	23	22.6	21
Contract type:	Postpaid	72.5	69	75.0	71	79.7	73
	Prepaid	31.9	31	30.5	29	29.5	27
SIM profiles used for M2M		58.3	-	62.8[2]	-	73.7	-
LTE subscribers (excluding M2M)		74.5	-	88.2	-	89.7	-
of which 5G subscribers (NSA)		10.6	-	19.7	-	37.4	-
VoLTE users		61.2	-	68.8	-	75.0	-

1) Source population figures: Federal Statistical Office based on the 2022 census.

2) Improved analysis of inactive SIM profiles for a network operator's M2M use.

Mobile data volumes



1) Excluding data traffic via stationary wireless broadband services

Total volume and usage figures

Mobile broadband

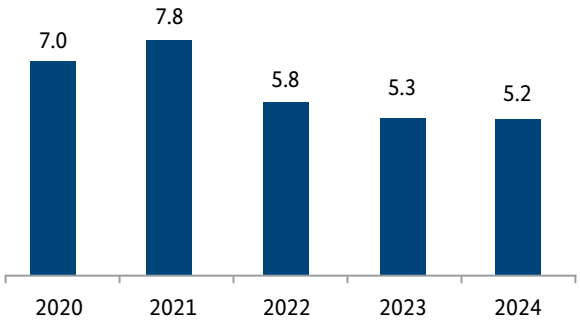
Mobile data volumes are continuing to increase. Current data collected by the Bundesnetzagentur suggests that 9,592mn GB of data were transmitted in 2024, up from 9,118mn GB in 2023. This corresponds to an increase of around 5%. The relatively small rise compared to previous years is mainly due to the 2022 reclassification of data traffic from fixed wireless broadband services to the fixed network, but for which the companies first provided comprehensive data in 2024. The vast majority (88%) of data traffic took place via LTE, whilst 10% was via 5G and 2% via GSM (2G).

The average data volume used per active SIM profile per month rose by about 3% year on year in 2024 to 7.4 GB.

SMS messages

Use of the short message service (SMS) had been in decline since it peaked in 2012 at 59.8bn, as more and more people acquired internet-capable smartphones and instant messaging services were introduced. Following a short-term rise in 2021 to 7.8bn messages, the trend resumed its downward trajectory, dropping to 5.2bn in 2024. Each active SIM profile sent an average of about four messages a month.

SMS messages sent
(bn)



Call minutes

147.8bn minutes of outgoing calls were made via mobile networks in Germany in 2024, an average of 115 minutes of calls a month per active SIM profile.

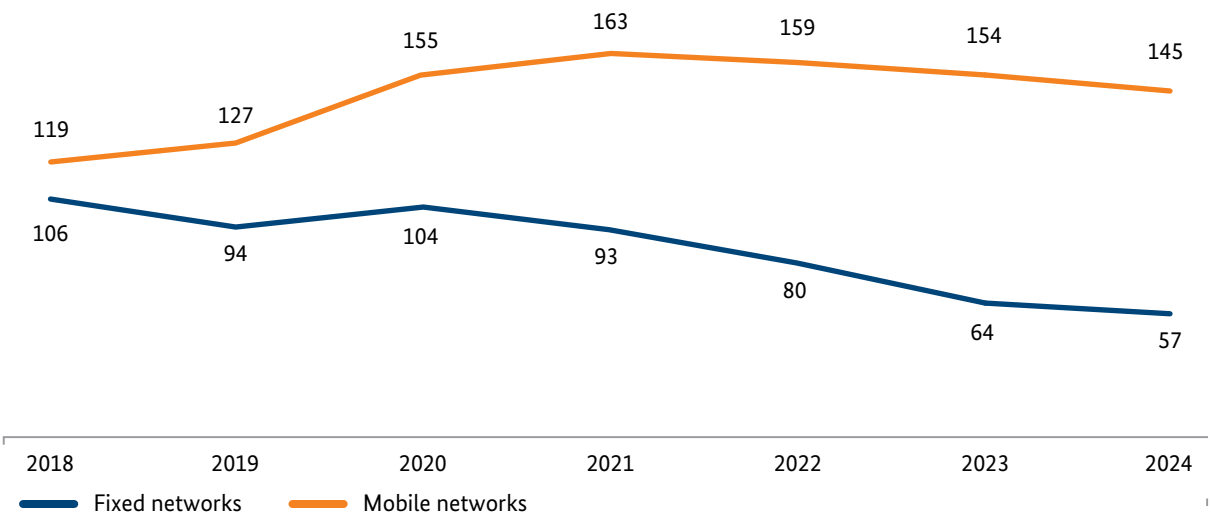
The overall decline in mobile telephony was once again almost 4% in 2024. One explanation for this is the growing use of new alternative communications services, mainly messaging and video calls, over the past few years. A total of 381bn outgoing voice and video call minutes were made using NI-ICS in 2024.

The breakdown of mobile voice traffic has varied only slightly in recent years. Around 42% of call minutes in 2024 (2023: around 43%) were within the same operator network (on-net), approximately 36% (2023: 35%) were calls to other national mobile networks (off-net) and around 20% were terminated in the national fixed network, the same as in the previous year.

Outbound and inbound mobile voice minutes

	2022	2023	2024
	Minutes (bn)	Minutes (bn)	Minutes (bn)
Outgoing traffic from mobile networks	**159.28**	**153.49**	**147.80**
To German fixed networks	33.51	30.70	28.89
To the same mobile operator network	66.78	65.37	62.56
To other mobile operator networks	54.88	53.73	53.41
To foreign networks (fixed/mobile)	2.60	1.74	1.55
Other traffic	1.51	1.95	1.39
Incoming traffic to mobile networks	**138.49**	**133.68**	**129.86**
From German fixed networks	12.95	11.23	9.92
From the same mobile operator network	65.37	63.52	60.08
From other mobile operator networks	57.45	56.08	56.35
From foreign networks (fixed/mobile)	2.32	2.14	1.66
Other traffic	0.40	0.71	1.85

Outgoing call minutes in fixed and mobile networks
(bn)



The number of inbound call minutes terminated within mobile networks in 2024 decreased by around 3% to 129.9bn minutes. Roughly 46% of the call minutes were from the same operator network and 43% from other national mobile networks.

Mobile call volumes by far exceed the volume of calls in the fixed networks (around 57bn minutes). Around 2.5 times as many call minutes were generated through the mobile network as were generated through landlines. This was mainly due to mobility, improved voice quality, continuous availability and the pricing of mobile services. Video and internet telephony (Voice over Internet Protocol) minutes were not included.

International roaming

The volume of data generated abroad increased by about 23% from 347.4mn GB in 2023 to 429.0mn GB in 2024. This increase is due to the spread of online communications services and the increased use of over-the-top (OTT) content services, such as streaming services. The number of outgoing call minutes abroad decreased by around 5% from 3,422mn in 2023 to 3,246mn in 2024. The number of SMS messages sent abroad was down by almost 30% from 212mn in 2023 to 150mn in 2024.

International roaming

	2022	2023	2024
Volume of data generated abroad (mn GB)	261.7	347.4	429.0
Outgoing call minutes abroad (mn)	3,746	3,422	3,246
SMS sent abroad (mn)	179	212	150

Infrastructure

The expansion of the mobile communication networks relies heavily on the installation of additional radio base stations. According to data provided by the network operators, the number of these interfaces between the wireless and wire-based network rose by around 4% in 2024 to 222,474, mainly due to the expansion of the 5G networks. The number of LTE base stations in operation increased by almost 1% to 88,373. The number of 5G base stations grew by 14% from 49,571 at the end of 2023 to 56,558 at the end of 2024. In addition, 3,233 small cell sites provide supporting capacity at locations of high user concentration by densifying the network in city centres, affecting both the speed of data throughput and the data quality (such as high-resolution streaming). The steep drop of almost 39% year on year in the number of small cell sites is due to the continuing expansion and modernisation of the core mobile network.

Rollout of 5G networks continues to be partly based on the existing 4G infrastructure via a solution known as 5G non-standalone (5G NSA). Current 5G networks use a type of 5G NSA known as Dynamic Spectrum Sharing (DSS), allowing bands to be used for both 4G and 5G at the same time. Base stations with DSS were mostly counted as both 4G and 5G base stations. Roughly 92% of 5G-capable base stations use DSS technology.

Further progress was made last year with the rollout of 5G standalone (SA) through the connection of existing radio sites to 5G core networks. The use of the network infrastructure and spectrum exclusively for 5G will enable the technology to reach its full potential, not least the high speeds and low latency required for real-time applications.

In practice, a physical antenna site usually contains radio base stations of different mobile communication standards. The number of antenna sites (88,906 at the end of 2024) is therefore lower than the number of radio base stations (222,474 at the end of 2024). Infrastructure operated jointly by more than one network operator, a practice known as site sharing, is counted multiple times in the physical site data.

Most of the antenna sites are connected via fibre or fixed links. At the end of 2024 about 56% of the sites were connected via fibre and about 45% via fixed links. Some sites are connected via both, which explains why the total is greater than 100%. The number of fibre-connected sites was up around 6% year on year. A small number of sites are still connected via copper-based transmission paths.

Radio base stations

	2022		2023		2024	
		%		%		%
Total	**203,241**	**100**	**214,677**	**100**	**222,474**	**100**
5G	41,945	21	49,571	23	56,558	25
LTE/4G	85,054	42	87,905	41	88,373	40
UMTS/3G	111	0	0	0	-	-
GSM/2G	76,131	37	77,201	36	77,543	35

Key figures and competitors' shares

The following table summarises selected key figures and competitors' shares in the telecommunications market for the period from 2022 to 2024.

Key figures and competitors' shares in the telecommunications market			
Key figures	**2022**	**2023**	**2024**
External revenue (€bn)	59.2	59.8	61.1 [1)]
Investments (€bn)	13.4	14.9	15.3 [1)]
Employees (thousand)	133.0	132.4	127.7 [1)]
Total active fixed broadband connections (mn)[2)]	37.5	38.4	38.6
- DSL	24.7	24.5	23.6
- HFC	8.7	8.6	8.5
- FTTH/FTTB	3.4	4.3	5.3
- Other	0.8	1.0	1.2
Total voice communication connections in fixed networks (mn)	38.6	38.7	38.4
Active SIM profiles (mn)	104.4	105.4	109.2
Mobile penetration rate (active SIM profiles/inhabitant) (%)[3)]	125.6	126.3	130.6
Competitors' shares (%)	**2022**	**2023**	**2024**
External revenue	57	57	55 [1)]
Fixed broadband connections	61	61	61
DSL connections	44	43	42
Voice communication connections in fixed networks	55	55	55

[1)] Forecast figures
[2)] Totals may deviate from rounded cumulative figures.
[3)] Number of inhabitants according to Federal Statistical Office

Gigabit Register

Measures to consolidate the broadband atlas and the infrastructure atlas platforms into a central information system, the gigabit register, continued in 2024. The focus for the broadband atlas was on technical adaptations including migration to a private open-source cloud. The infrastructure atlas underwent a major relaunch accompanied by a number of functional improvements.

The single information point of the Federation (ZIS) is responsible for the gigabit register. The tasks were delegated to the Bundesnetzagentur in accordance with section 78(2) sentence 2 TKG on 1 January 2023. The Bundesnetzagentur already maintained the vast majority of applications prior to consolidation of the platforms under the gigabit register.

The Bundesnetzagentur also took over operation of the entire broadband atlas, established 2005, on 1 January 2023.

Concept

The German government's gigabit register, maintained by the Bundesnetzagentur, went online in 2022 at gigabitgrundbuch.bund.de. The platform simplifies fixed-network and mobile rollout planning for companies and generally increases transparency on the availability of broadband networks.

Services

The gigabit register comprises six information services serving different target groups.

Services accessible to all users:

- Broadband atlas: the central transparency and information tool for current fixed and mobile broadband coverage in Germany.
- Mobile communications monitoring: a map displaying transparent data about each provider's actual mobile coverage across the country.
- Broadband speed checker: map showing the results of end-users' fixed and mobile connection speed tests.
- Dead spot map: displays gaps in mobile coverage based on the results from users of the dead spot app.

Services only accessible to those involved in broadband rollout:

- Infrastructure atlas: the central information and planning tool for gigabit rollout projects.
- Analysis platform: an analysis tool for public administration with information on broadband coverage and infrastructure for decision makers from central government and the federal states.

The efficient rollout of digital infrastructure in Germany needs a sound and transparent basis of data, without which it is impossible to identify sharing potential, prepare investment decisions and plan effective national and regional support measures. To this end, the current geographic information systems have been consolidated in a central portal.

These components will be supplemented by a planning platform designed specifically for companies on the telecommunications market involved in rollout. The platform will hold information on existing and planned infrastructure and will enable companies to better explore potential for infrastructure sharing and co-deployment. The platform will be based on the Bundesnetzagentur‘s existing infrastructure atlas. It is planned to include information on publicly owned property suitable for mobile rollout.

Gigabit Register IT project

The gigabit register IT project was set up in 2023 to handle the technical migration, operation and ongoing development of the broadband atlas and analysis platform services. Together with the infrastructure atlas, these are the gigabit register's largest IT platforms.

In the initial step the systems were migrated from the Amazon Web Services Cloud to a private open-source cloud and the first technical and functional improvements rolled out (eg upgraded address search, easier creation of fixed network funding statistics, a link to the potential analysis). The successful migration opens the door to further developments and measures to improve and stabilise the system in 2025. Plans include a differentiated presentation of 5G coverage on the mobile map, a redesigned web interface with accessible colours, responsive design for optimal viewing on smartphones and tablets, and steps to stabilise and enhance data collation.

Broadband Atlas

Concept

The broadband atlas is operated by the Bundesnetzagentur's single information point of the Federation (ZIS) and is Germany's main information tool for current fixed and mobile broadband coverage in Germany. The atlas is updated twice yearly and is available to all interested parties free of charge.

The interactive maps show which speeds and connection technologies are available for data transmission. The maps can be navigated to display any location in Germany to the level of place name and address, with the most granular information displayed at the level of the individual raster cells. Broadband availability is shown as a percentage of the households depicted, aggregated in raster cells of 100m by 100m. Unpopulated areas without households are shown in the mobile coverage view in terms of general coverage only. An information panel displays settings and filters along with a chart showing the percentage of broadband availability. It is also possible to contrast current with historical data. The providers are listed by the technology reported for the location at the raster cell level.

History

Whilst the broadband atlas was founded in 2005, the requirement to collect data has only existed since 2022. Prior to this, the information came from data provided voluntarily by telecommunications companies to the then operators of the broadband atlas. The new TKG of 1 December 2021 for the first time created a legal basis for the provision of data on broadband rollout, whereupon the Bundesnetzagentur took over responsibility for operating the broadband

atlas after a short handover period. It now receives data on fixed networks from almost 380 telecommunications companies. The number of companies covered by the reporting requirement is significantly higher, but some deliver either no data at all or unusable or implausible data and are therefore not included in the database. Mobile coverage data collected by the mobile network operators is also included.

Data on the fixed network

According to the broadband atlas, by mid-2024 FTTH/FTTB infrastructure reached 36.8% (2023: 29.8%) of households. 76.5% (2023: 73.6%) of households across all technologies can access gigabit connections, most of which are based on upgraded HFC networks. Standard speeds, which are often the most popular choice even in the presence of faster connections, are available almost everywhere. For instance, connections with at least 50 megabits per second (Mbps) are available to 96.5% (2023: 95.9%) of households and with at least 100 Mbps to 93.7% (2023: 92.9%) of households.

Data on the mobile network

The map of mobile coverage is based on data collected biannually by the Bundesnetzagentur from the mobile network operators, who deliver data for each raster cell (100m by 100m) on the different technologies (2G, 4G, 5G) available. The Bundesnetzagentur has set minimum thresholds on reception quality for each technology. Measurements must be taken from the end-user's perspective, ie at 1.5m above ground level, and further technical parameters have been defined regarding signal quality, mainly for 4G and 5G. The values are predictions of outdoor reception provided by the network operators.

Infrastructure Atlas

Background

The infrastructure atlas is the central information and planning tool for gigabit rollout in Germany. It contains data on the location of network operators' infrastructure available for sharing, such as fibre cabling, ducts, carrier infrastructure and access points, as well as information about civil works, contact details for infrastructure owners, and information on availability and funding. This helps to speed up rollout planning and decision making in the pre-project phase, and save costs during rollout through the sharing of existing infrastructure. The infrastructure atlas is not public. The data is only accessible to authorised users for a limited time and for a limited area. Companies involved in the rollout and regional administrative bodies can apply for access.

The information from the infrastructure atlas has been used in over 17,000 projects since 2009 and the requirement to provide data now covers more than 4,000 owners of infrastructure.

Obligations under the new TKG/regular infrastructure atlas updates

The conditions for providing and accessing the data and the obligations for data providers were revised in 2022 following the entry into force of the new TKG on 1 December 2021. Almost all of the more than 4,000 data providers had adopted the changes in full by the end of 2024.

A large number of the data providers were meeting the obligation to deliver regular updates by the 1 July 2024 deadline. The data is gradually being processed and imported into the infrastructure atlas. By infrastructure type, between 76% and 95% of the data on different telecommunications infrastructure had been updated by the end of 2024. The full database update is expected to take until mid-2025.

Technical development of the Infrastructure Atlas

New conditions for accessing the data in the infrastructure atlas took effect on 10 April 2024 with publication in the Bundesnetzagentur's Official Gazette. The changes made it possible for new infrastructure atlas functions to be implemented over the course of the year.

Since 17 April 2024 the web GIS application has included a detailed display, updated quarterly, of available duct capacities and civil engineering of Telekom Deutschland GmbH to a scale of 1:1,000 on the basis of regulatory order BK3i-19/020. Telecommunications companies who are interested in sharing this infrastructure can view the interactive map to see at a click if the required number and size of ducts are available for fibre rollout along a planned route.

Further improvements were rolled out in June. The infrastructure atlas now looks and feels much more modern with new map symbols and an updated colour scheme. The system was optimised to allow the maps to load twice as fast as before.

All elements of the interactive maps are now included down to a scale of 1:1,000 to help make detailed planning easier for users.

New types of infrastructure were added to the maps to show the availability of data providers' properties and carrier structures for small-scale mobile rollout projects. New attributes added to the data model enable users to see at a click information on the height, cable depth and electricity supply for certain types of infrastructure. Properties can also now be given a plot designation as a unique descriptor.

Use of the infrastructure atlas

All active data providers had registered as users of the infrastructure atlas by the end of 2024 and used the portal to submit data. Since its launch in spring 2022, around 4,600 (+1,100 in 2024) people have registered at isa.bundesnetzagentur.de and use the platform's tools and services to access and deliver data.

Users filed 1,301 applications to access data in 2024, which was slightly more than in the previous year and still at a high level.

Analysis platform

Concept

The analysis platform is an information and analysis tool for public administration with restricted access. Decision makers from central government and the federal states have sole access to detailed information on fixed and mobile coverage, public funding and infrastructure. The platform increases transparency for public administration and contributes to efficient (public) rollout planning.

The analysis platform uses the same data as the broadband atlas, enhanced with information on areas underserved by mobile services, known as white and grey spots, as well as funding projects and market consultation procedures in the mobile sector. Statistical information on broadband infrastructure is also available. Fixed network information down to the level of individual addresses is available to specific user groups. The platform allows users to analyse and compare broadband coverage for certain administrative regions and download the results.

Usage

There were 71 access profiles by the end of December 2024, the same as in the previous year, although only 12 were in active use (the remainder blocked due to three months of inactivity). Of the profiles in active use, around 80% are used for state-level access and 20% by analysts at federal level. Each federal state has now been assigned to at least one profile. Users work for federal and state ministries, public sector digital agencies or dedicated broadband rollout offices, and publicly funded project organisations.

From the small number of access applications received, around half were rejected due to not meeting requirements. Access for registered users is password-protected with multi-factor authentication.

Internet and digitalisation

Digitalisation is impacting all network sectors. The Bundesnetzagentur's role is as both regulator and enabler of the digital transformation, facilitating new business models, creating new markets and adopting new regulations. These tasks are now bundled centrally in the new Digital Department (9), created in 2024.

Implementation of EU data regulations

Data Act

The Data Act (EU 2023/2854) entered into force on 11 January 2024 and will largely come into effect on 12 September 2025. Together with the Data Governance Act, it forms a key pillar of the European Commission's data strategy. The Data Act aims to improve the availability of data within the EU by breaking up data silos. It introduced new rules on the conditions under which data can be accessed, used and transmitted, mainly in the IoT sector. The Data Act also contains provisions that make it easier to switch between providers of data processing services (eg cloud services), reduce the costs of switching and establish interoperability between these services to prevent vendor lock-in effects.

A primary objective of the Data Act is to foster a competitive European data market that ensures fairness in the allocation of the value of data, with the aim of encouraging innovation and data-driven value creation. The Data Act benefits mainly start-ups and small and medium-sized enterprises (SMEs) by providing diverse opportunities to actively participate in the data economy and develop new business models.

The Federal Ministry for Economic Affairs and Climate Action (BMWK) and the Federal Ministry for Digital and Transport (BMDV) are currently spearheading efforts to draft the national implementing act for the Data Act. According to the draft act, the Bundesnetzagentur will in future act as the central supervisory authority for the Data Act's implementation and cooperate with other authorities. A clear framework for this envisaged cooperation will also be included. The Bundesnetzagentur has acquired highly complex expertise in fields relating to the data economy over the past few years and has been supporting the legislative process for adopting the Data Act in Germany since the start.

Data Governance Act

The Data Governance Act (DGA, EU 2022/868) is a further key pillar of the European data strategy. It entered into force on 23 June 2022 as a European Regulation and went into effect for all Member States on 24 September 2023.

The DGA is a cross-sectoral regulatory tool with the aim of bolstering trust in data exchange and strengthening the mechanisms for increasing data availability. The newly created provisions should reduce technical obstacles to data exchange so that the untapped potential of the data economy can be unleashed. With this in mind, the DGA essentially regulates four areas:

- rules for the re-use of protected data that is owned by public sector bodies;
- establishment of a notification and supervisory procedure for the provision of services by data intermediation services;
- framework for the voluntary registration of entities that collect and process data made available for altruistic purposes;
- creation of a European Data Innovation Board (EDIB).

The EDIB met four times in 2024. Members debated several topics including standardisation in the context of the European Trusted Data Framework, and uniform GDPR-compliant consent forms. An EDIB subgroup on competent authorities was also formed, and in 2024 mainly discussed aspects of implementation and interpretation of the DGA.

The DGA sets out that one or multiple competent authorities assume the tasks of monitoring and enforcing the DGA. According to the draft national implementing act, the Bundesnetzagentur will in future be responsible for data intermediation services (chapter III) and data altruism organisations (chapter IV). The Federal Statistical Office will be responsible for assisting public sector bodies that decide to make administrative data available for re-use, and will also act as a single information point (chapter II).

A project group is currently dealing with matters of DGA implementation and preparing for a potential assumption of tasks. In the interests of stakeholders, the Bundesnetzagentur intends to take on the new tasks as quickly as possible after the legislative procedure is concluded. The registration tool will be made available online immediately once the DGA comes into effect.

Data Use Act

The German Data Use Act (DNG), which regulates the use of public sector data, entered into force in 2021. Its key objective is to simplify the availability of public sector data and improve the options for using the data. In accordance with section 10 DNG, the usage is normally free of charge. Public sector bodies that are required to generate sufficient revenue to cover a substantial part of their costs relating to the performance of their public tasks may wish to be exempted from the principle of gratuitousness, in which case they can notify the Bundesnetzagentur of the invocation of the exemption. The Bundesnetzagentur maintains a list of the public sector bodies making use of the exemption, which it publishes on its website (section 10(4) DNG).

In 2022 the European Commission enacted the implementing regulation laying down a list of

specific high-value datasets and the arrangements for their publication and re-use (EU 2023/138). The regulation requires particularly high-value datasets in future to be made available free of charge. Following an initial transition period, the implementing regulation has applied in full since 9 June 2024. This rendered inapplicable the exemptions from the principle of gratuitousness for data use invoked by public sector bodies. The Bundesnetzagentur is currently compiling a new list of public sector bodies who wish to charge fees for data from 9 June 2024 in accordance with the implementing regulation.

Several public sector bodies applied for inclusion on the Bundesnetzagentur's list in 2024. The applications are still being evaluated. The public sector bodies will be added to the list with retroactive effect from 9 June 2024, provided they meet all of the legal requirements. The new list will be made available on the Bundesnetzagentur's website.

Implementation of EU regulations on digital services and commerce

Digital Services Act

With the entry into force of the German Digital Services Act (DDG), the Bundesnetzagentur assumed its role as central coordinator for digital services in Germany in May 2024. As Digital Services Coordinator (DSC) the Bundesnetzagentur monitors online services' compliance with the rules of the European Digital Services Act (DSA). The DSC may impose fines when there are systematic violations. Whilst the DSC is part of the Bundesnetzagentur, it remains an independent body and reports on its activities in a separate annual report.

Each Member State is required to designate a national DSC who is responsible for overseeing the providers of digital services and online platforms, and for enforcing the DSA. The national DSC cooperates with its counterparts in other EU countries, as well as with users, online intermediation services, authorities, civil society organisations in Germany and the European Commission. The DSC is the central coordinating body for enforcement of the DSA.

The DSC is committed to making the internet fairer and safer and monitors service providers' compliance with the new DSA rules. In Germany, the DSC is responsible for providers of online intermediation services based in Germany, as well as for providers of online intermediation services based outside of Europe who have appointed a legal representative in Germany. The DSC is also the central point for complaints by online users about violations of the DSA.

Other organisations also support the DSC in its work to ensure a safe and protected online environment. These include trusted flaggers, out-of-court dispute resolution bodies and researchers. On request the DSC can grant approval to out-of-court dispute resolution bodies (Article 21 DSA), certify organisations with trusted flagger status (Article 22 DSA) and grant researchers access to data of very large online platforms and search engines (Article 40 DSA).

The DSC accepts information and removal orders from German judicial and administrative authorities to forward to its counterpart DSCs in other EU countries or to the European Commission. The DSC also draws on the expertise of these authorities when information is required for oversight proceedings or for European Commission proceedings.

Platform-to-business Regulation

The EU regulation on promoting fairness and transparency for business users of online intermediation services and online search engines (P2B Regulation, EU 2019/1150) aims to ensure a fair, predictable, viable and trustworthy online business environment. The regulation was introduced at European level in 2020. Since the entry into force of the German Digital Services Act (DDG) in May 2024, the Bundesnetzagentur has been responsible for enforcing the P2B Regulation in Germany. The Bundesnetzagentur also has the power to grant organisations, associations and public bodies the right to take action before competent national courts. The Bundesnetzagentur marked the start of its new role with a series of information events.

The P2B Regulation contains obligations on information and transparency for providers of online intermediation services and online search engines, as well as rules on internal complaint-handling and out-of-court dispute settlements. It protects business users and business users with company websites. Consumers are only indirectly protected by the regulation.

The Bundesnetzagentur is responsible if business users have their place of establishment or residence in Germany and offer their goods or services through the digital service to consumers located in the EU. The Bundesnetzagentur can issue orders and impose fines of up to €300,000 on providers who contravene the P2B Regulation.

As part of its legal mandate, the Bundesnetzagentur cooperates with domestic and European authorities, including the Digital Services Coordinator (DSC) in Germany, the Bundeskartellamt, other national P2B bodies and the European Commission.

To date, complaints have related mainly to the duty of providers to provide grounds for the restriction, suspension and termination of digital services in accordance with Article 4 in conjunction with Article 3(1) point c) P2B Regulation, and to the transparency obligations regarding ranking pursuant to Article 5 P2B Regulation. A further focus concerned providers' obligations in respect of internal complaint-handling systems and out-of-court mediation pursuant to Article 11 and 12 P2B Regulation. Formal consultations were addressed to the providers in question in the fourth quarter of 2024 and will be evaluated and actioned in the next step.

One application was received in the reporting period for designation as an association with the right to take action before competent national courts pursuant to Article 14 P2B Regulation.

The Bundesnetzagentur provides comprehensive information on the P2B Regulation under the topics section of its website. It also has an online complaints form via which users can submit complaints directly to the Bundesnetzagentur.

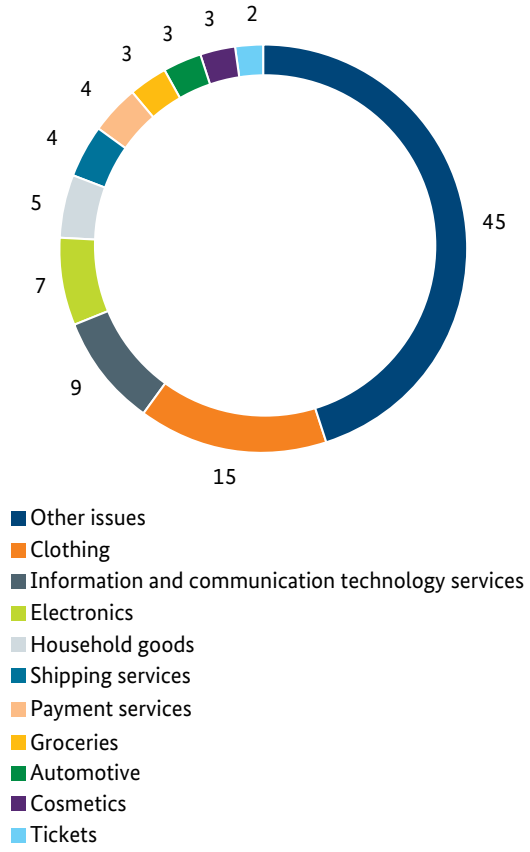
Geo-blocking Regulation

The Geo-blocking Regulation (EU 2018/302) is part of the European Union's strategy to create a digital single market. The Regulation aims to prevent discrimination against customers in the European Union based on their nationality or residence by prohibiting providers from restricting access to their online shops or the purchase of goods on this basis. Consumers are frequently unable to access local versions of an online shop, use certain payment methods from other EU countries or submit orders due to other reasons.

Some sectors are not covered by the scope of the Geo-blocking Regulation, including audiovisual, healthcare, financial, telecommunications and transport services. Likewise, the Regulation does not cover access to electronically supplied services, the main feature of which is the provision of access to or use of copyright-protected works. The Regulation also specifies that a customer buying goods is not entitled to delivery to a location outside the provider's field of activity.

Consumers can submit their complaints to the Bundesnetzagentur online using the Bundesnetzagentur consumer portal and the Federal Portal. In 2024, 167 cases were reported, chiefly in connection with orders for clothing, IT and shipping services, electronic equipment and home appliances. A high number of complaints continue to relate to the provider's refusal to permit the use of certain parcel forwarding services, as well as to electric vehicle charging tariffs and the availability of apps.

Enquiries and complaints related to geo-blocking
(%)



Once again in 2024 the Bundesnetzagentur worked closely with the European Commission, other EU countries' national authorities responsible for the enforcement of the Geo-blocking Regulation as part of the Consumer Protection Cooperation Network, and with the European Consumer Centre Germany (ECC).

IDAS 2.0: new digital opportunities for markets and consumers

Trust in digital transactions is one of the cornerstones of successful digitalisation and its acceptance in our society. The new eIDAS Regulation (EU 2024/1183) in 2024 paves the way for a successful transition to a sovereign digital society. The European Digital Identity Wallet (EUDI) will enable all EU citizens to prove their identity securely using just their smartphone. Users will also be able to verify electronic attributes such as professional credentials or the digital driving licence easily and safely, whilst keeping control over their personal data. Qualified electronic signatures as a binding equivalent to handwritten signatures can also be generated in the wallet at no cost for non-commercial purposes.

The updated eIDAS Regulation expands the existing scope of electronic trust services to cover further relevant applications, introducing new qualified trust services for electronic archiving and electronic ledgers (blockchain).

The Bundesnetzagentur remained actively committed to creating secure, trustworthy digital consumer networks in 2024. It fosters close cooperation and transparency through regular dialogue with industry at specialist events including the Forum on Electronic Trust Services (FEV) and information events for all key stakeholders, such as the eIDAS Summit. As a member of the Board of the Forum of European Supervisory Authorities for trust service providers (FESA), the Bundesnetzagentur supports intensive collaboration Europe-wide and promotes harmonisation in the market.

Similarly, as the single point of contact for trust services and member of the European Digital Identity Cooperation Group, the Bundesnetzagentur facilitates cross-border cooperation and the exchange of information between Member States. It also contributes to writing the rules on electronic trust services through its work on the committees that assist in the making of numerous implementing acts.

Terrorist Content Online Regulation

The Terrorist Content Online Regulation (EU) 2021/784 on addressing the dissemination of terrorist content online (TCO) has applied since 7 June 2022, aiming to tackle the misuse of hosting services to spread terrorist content. The regulation requires hosting service providers to remove terrorist content within one hour of receiving a removal order and if their web space has been used repeatedly to distribute terrorist content they must take specific measures to prevent it in the future. Hosting service providers not based within the European Union but who offer services here must designate a legal representative within the EU.

The Act addressing terrorist content online (TerrOIBG) assigns regulatory tasks to the Bundesnetzagentur and the Bundeskriminalamt. Under the TerrOIBG the Bundeskriminalamt issues orders to hosting service providers requiring them to remove terrorist content. The Bundesnetzagentur monitors implementation of specific measures by the providers in line with Article 5 TCO and imposes sanctions under Article 18 TCO and section 6 TerrOIBG.

The Bundesnetzagentur and Bundeskriminalamt organised an information event in February 2024 to educate hosting service providers on their obligations and the relevant procedures under the TCO. The Bundesnetzagentur published FAQs and further information on its website in late 2024 on how to deal with terrorist content.

The Bundesnetzagentur was involved in ongoing proceedings against one hosting service provider based in Germany in 2024. Removal orders were additionally issued by competent authorities from Spain and France against a hosting service provider with a legal representative based in Germany. The Bundesnetzagentur is deciding on further steps in both cases.

The Bundesnetzagentur coordinates its activities closely with the Bundeskriminalamt.

Protection for users of digital services and connections

Broadband speed checker

For the ninth year in a row, the Bundesnetzagentur has published detailed findings from its broadband speed checker (breitbandmessung.de/ergebnisse). The relevant tests were carried out in the period from 1 October 2023 to 30 September 2024 (the ninth year the broadband speed checker has been in operation). The report covers a total of 276,081 valid tests on fixed broadband connections and 562,305 valid tests on mobile broadband connections.

As against 85.5% in 2022/2023, 86.5% of fixed broadband connection users across all bandwidth categories and providers enjoyed a speed that was at least half their contractually agreed maximum data transmission speed. Some 45.2% of users (as against 43.5% in 2022/2023) enjoyed a connection speed equivalent to or higher than their contractually agreed maximum speed. Once again, the results have improved on the previous year.

The ratio of actual to agreed estimated maximum data speed for mobile broadband connections was once again well below that for fixed broadband connections. The results were broken down for the first time by 4G and 5G due to the extremely high data speeds possible with 5G, which are often well in excess of the agreed estimated maximum in the price plan. This change makes it impossible to compare the results against prior-year figures.

The test results depend on the price plans agreed between the users and their providers. It is therefore not possible to draw conclusions from the results about broadband coverage or the availability of broadband internet access services.

The second Mobilfunkmesswoche NRW (mobile network measurement week calling upon citizens to record the network availability of their mobile network providers with the aim of identifying gaps in mobile network coverage) was held in North Rhine-Westphalia from 18 May to 25 May 2024. Rhineland-Palatinate also held its first-ever measurement week over the same period. Users were able to record the network availability of their mobile providers and report dead spots with the help of the Bundesnetzagentur's broadband speed/dead spot checker app. The aim is to provide a more accurate map of mobile network coverage at a local and state-wide level. Both measurement weeks attracted considerable interest. The Bundesnetzagentur supported the federal states in evaluating the data.

Interoperability

Interoperability obligations in the area of number-independent interpersonal communications services (eg messaging services) aim to stimulate competition by enabling users of different services to communicate across providers.

Under the Digital Markets Act (DMA), which

was adopted at European level and entered into force on 1 November 2022, messaging service providers that are classified as gatekeepers must meet interoperability obligations. The European Commission designated a list of gatekeepers for the first time in September 2023. In the area of messaging, Meta Inc. is designated for its services WhatsApp and Messenger and must allow competitors access to these services to enable cross-provider communication. The services are required to publish a reference offer laying down the technical details and general terms and conditions of interoperability and make the offer available to competitors.

The European Commission evaluates the reference offers in consultation with the Body of European Regulators for Electronic Communications (BEREC). The Bundesnetzagentur contributed to BEREC's opinion with specific comments on Meta's reference offer regarding WhatsApp and the technical approaches and requirements for ensuring interoperability.

Net neutrality and IP interconnection

The Bundesnetzagentur monitors compliance with the EU regulation on open internet access and intra-EU communications (TSM Regulation, EU 2015/2120) to ensure net neutrality. Legal proceedings on IP interconnection and the topic of DNS blocking were both significant in this context in 2024.

The Bundesnetzagentur considers IP interconnection to be a largely functioning market. This is consistent with BEREC's opinion.

The IP interconnection proceedings arose from a dispute between Telekom Deutschland GmbH (Telekom) and Meta Inc. (Meta) over charges for direct interconnection (peering) between their networks. Telekom filed a claim against Meta's network subsidiary Edge Network Services Ltd. for payment of fees. On 14 May 2024 Cologne Regional Court ordered Meta to pay Telekom for using the data transport services provided. Meta is contesting the decision before the Düsseldorf Higher Regional Court.

Following the Cologne court's ruling, Meta announced it would no longer be sending data traffic via direct peering with Telekom and would instead be working with a third-party transit provider. Both companies issued press releases on 25 September 2024, each making mutual accusations of an abuse of market power.

Ultimately no complaints materialised from consumers to the Bundesnetzagentur due to the switch to transit services and therefore no intervention was deemed to be necessary. The Bundesnetzagentur is working on the assumption that sufficient interconnection capacities were available and that consumers experienced no degradation in quality.

Irrespective of the above case, the Bundesnetzagentur once again received numerous complaints in 2024. A common theme reported by users of Telekom connections concerned usability issues with certain services, found to be caused by insufficient peering by Telekom.

The Bundesnetzagentur has been monitoring net neutrality in Germany since 2016. In 2024 it continued to investigate whether providers block certain websites or services or throttle or prioritise access to some services. The Bundesnetzagentur does not itself order blocking but rather examines whether a blocking is in breach of net neutrality provisions. Blocking imposed through statutory,

regulatory or court order is compliant with net neutrality. Several extensions to Council Regulation (EU) 833/2014 took effect in the reporting period, requiring internet access providers to implement DNS blocking to curb the dissemination of content from certain Russian stations. Finally, the Bundesnetzagentur found three recommendations on DNS blocking made by the Online Copyright Clearance System during the reporting period to conform to net neutrality; supporting documents were requested in two further cases.

As in previous years the Bundesnetzagentur published an annual report with comprehensive information on net neutrality in Germany for the period from May 2023 to April 2024.

Roaming and intra-EU calls

The 2022 revised version of the European Union's Roaming Regulation (EU 2022/612) ensures that consumers can continue to enjoy mobile services at domestic prices when travelling within the European Union (roam-like-at-home/RLAH principle). The Bundesnetzagentur monitors compliance with this and other regulations, including the application of fair use policies and the methods of examining the sustainability of the abolition of roaming surcharges.

In 2024 the Bundesnetzagentur reviewed a price plan that automatically charged users a certain tariff option upon login to a network outside of Europe. Users were initially unable to disable the option. The Bundesnetzagentur objected to this practice and urged the provider to conform to regulations. The provider corrected the price plan in question, refunded on request payments already made for the option and implemented an opt-out function. It also improved communication with customers by introducing a clear welcome text message for users when entering countries outside of Europe.

The Bundesnetzagentur likewise took action in 2024 following a complaint that a user was unable to communicate within countries of the European Economic Area (EEA) after reaching the cut-off limit outside of the EU, despite having agreed data allowance available in the respective billing month. In this case the roaming provider cooperated with the Bundesnetzagentur by enabling a differentiated billing of roaming data volume and adjusting billing in line with regulations.

The Bundesnetzagentur continually monitors compliance with the complex rules on reasonable data caps when roaming within the EU (fair use policy). This includes reviewing the price plans of roaming providers based in Germany for conformity. The application of a reasonable fair use limit, mainly in the case of price plans with high data allowances, is based on the regulated wholesale charge for regulated data roaming services. The maximum wholesale charge is being lowered along a glide path until 2032 and in 2024 was capped at €1.55/GB net. Fair use limits will continue to change as the wholesale cap reduces year by year. Whilst providers offer domestic data allowance under the RLAH principle for many of their price plans, reasonable fair use limits are typically agreed for plans with unlimited data allowance.

On the international stage, the Bundesnetzagentur continued to cooperate actively with BEREC on the subject of roaming and was closely involved in preparing a report on M2M communication in conjunction with permanent roaming, as well as an opinion for the European Commission on the review of the Roaming Regulation.

NI-ICS market overview

Legal classification

The 2021 revised version of the Telecommunications Act (TKG) expanded the definition of telecommunications service with the introduction of a new category: interpersonal communications services. These are broken down by number-based (NB-ICS) and number-independent (NI-ICS). The main difference is how they use numbers. NI-ICS are prohibited from connecting with publicly assigned numbering resources and from enabling communication with a number in national or international numbering plans. NI-ICS typically include messaging (including internet and video telephony), video calling and email services, provided they meet the criteria set out in the TKG.[1] The regulatory obligations for NI-ICS relate above all to public safety, customer protection and market monitoring.

NI-ICS market data survey 2024

The new TKG extended the Bundesnetzagentur's powers to obtain information to include providers of NI-ICS. On this basis the Bundesnetzagentur carries out a mandatory annual survey covering the providers with the greatest market relevance in Germany to collect market data for the previous calendar year.[2] The central aim of the first survey, carried out at the beginning of 2023, was to analyse the market structure in the telecommunications sector, assess the status of competition and identify trends.

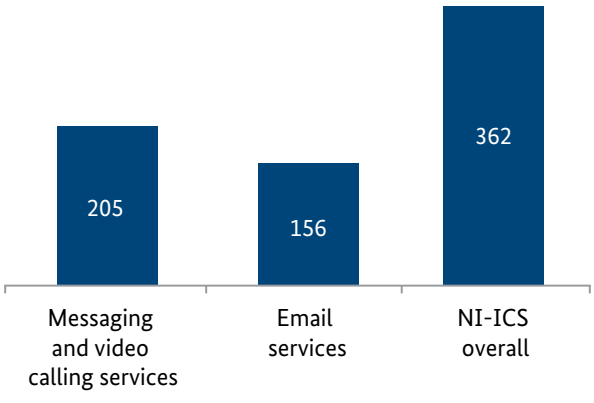
The latest round of the survey identified a total of 45 relevant services delivered by 33 companies. The following figures are based on aggregate market data on the use of NI-ICS in Germany in 2024.[3] The available data – in this case for 2022 to 2024 – is used to describe the situation and trends on the NI-ICS market and to draw comparisons with traditional telecommunications services.[4]

User numbers and multi-homing

In 2024 the messaging and video calling service providers surveyed had an average of 205.35mn monthly active users (2023: 196.01mn), whilst the email service providers surveyed had an average of 156.46mn monthly active users (2023: 171.91mn). The idea behind "monthly active user" (MAN) is to only cover users who have used an NI-ICS at least once in a month to make calls or send text messages, images or videos.[5]

Since users frequently use multiple services simultaneously, an individual user can represent multiple monthly active users (known as multi-homers).

Monthly active users of NI-ICS in Germany in 2024
(mn)



1 See section 3 paras 24, 40 and 61 TKG for the definition of (number-independent) interpersonal communications services: A service normally provided for remuneration which enables direct interpersonal and interactive exchange of information via telecommunications networks between a finite number of persons, whereby the persons initiating or participating in the telecommunication determine its recipient(s).

2 The market relevance of the services was determined on the basis of user numbers.

3 Some of the figures included in the aggregate market data are estimates.

4 Due to the general novelty of the survey it is possible that data will fluctuate in initial years (eg as a result of subsequent corrections), which may affect the comparability of the values across several years.

5 See BEREC (2021): Report on harmonised definitions for indicators regarding over-the-top services, relevant to electronic communications markets, BoR (21) 127.

The numbers for messaging and video calling services do not include the figures for a small number of – presumably medium-sized – services.[6] The user numbers given above are therefore to be seen as minimum figures. Based on an estimate of the missing figures, the Bundesnetzagentur assumes that the whole messaging and video calling services market comprises an additional approximately 39.69mn users.[7] The total number of users in 2024 is therefore estimated to be up to 245.04mn in Germany.

For various reasons users of messaging and video calling services, unlike NB-ICS users, typically use multiple services simultaneously (known as multi-homing).[8] The market data from the survey indicates a multi-homing rate of 3.21 (2023: 3.11) messaging and video calling services per user.[9] Email users, too, often use multiple services at the same time, with a multi-homing rate for email of 2.50 (2023: 2.73) services per user.[10]

NI-ICS providers report using a variety of different approaches to funding. Many use multiple sources simultaneously, whilst 57% say they make money through direct one-off or recurring payments (eg monthly charges). 38% of providers charge for some add-ons and other extra services. Over two thirds of all providers (70%) also utilise indirect forms of funding, such as revenue from advertising/data use, donations or cross-subsidisation.

6 There is still some uncertainty regarding the classification of individual services as NI-ICS. These are not included in the figures.

7 The missing figures for the services were estimated using the user shares for each service based on a representative consumer survey made by the Bundesnetzagentur. See Bundesnetzagentur (2023): Use of online communications services in Germany.

8 VSee, for example, Bundesnetzagentur (2023): Use of online communications services in Germany; RTR (2020): Monitoring of interpersonal communication services with a focus on Instant Messaging, RTR Telecommunications and Postal Division (RTR FB TKP); WIK (2019): The Impact of OTT-1-Services on Communication Behaviour – a consumer perspective, WIK Discussion Paper No. 440.

9 Assuming a user share of around 90% of the total population in Germany (16 years and above), ie a total of approximately 63.9mn users; Destasis population data as of 31 December 2023.

10 Assuming a user share of around 88% of the total population in Germany (16 years and above), ie a total of approximately 62.5mn users; Destasis population data as of 31 December 2023.

Usage figures

The majority of providers of messaging and video calling services offer a bundle of different communication options, mainly including text and voice messaging and voice and video telephony. Many services commonly include further functions, such as delivery and read receipts, status and story posts, emoji reactions or animated GIFs.[11] The scope of these functions depends on how innovative the provider is and on their business model.

Instant messaging is the most frequently used of all functions. Instant messaging enables users to send images, videos, documents, voice messages and emojis as well as text messages. In 2024 users in Germany sent a total of 901.86bn instant messages (2023: 891.35bn).[12] This corresponds to an average of around 366 instant messages per month per monthly active user or about 12 instant messages per day.

The figures below relate to the volume of voice calls made via messaging and video calling services. In 2024, 17.68bn (2023: 15.79bn) outgoing voice calls were made via messaging and video calling services in Germany, up 12% on the previous year. The total call volume grew to 196.69bn minutes from 175.05bn in 2023. This corresponds to about 86 voice calls per year per monthly active user lasting on average 11 minutes per call.

8.81bn (2023: 8.22bn) outgoing video calls were made in 2024, a year-on-year increase of 7%, totalling 183.71bn (2023: 176.36bn) call minutes. This corresponds to about 43 video calls per monthly active user per year and an average duration of 21 minutes per call.

11 See, for example, RTR (2024): More than just Text Messages: The Numerous Functionalities of Messengers.

12 The providers were asked to provide figures based on the point of origin of the communication. This also applies to the other usage indicators in this section.

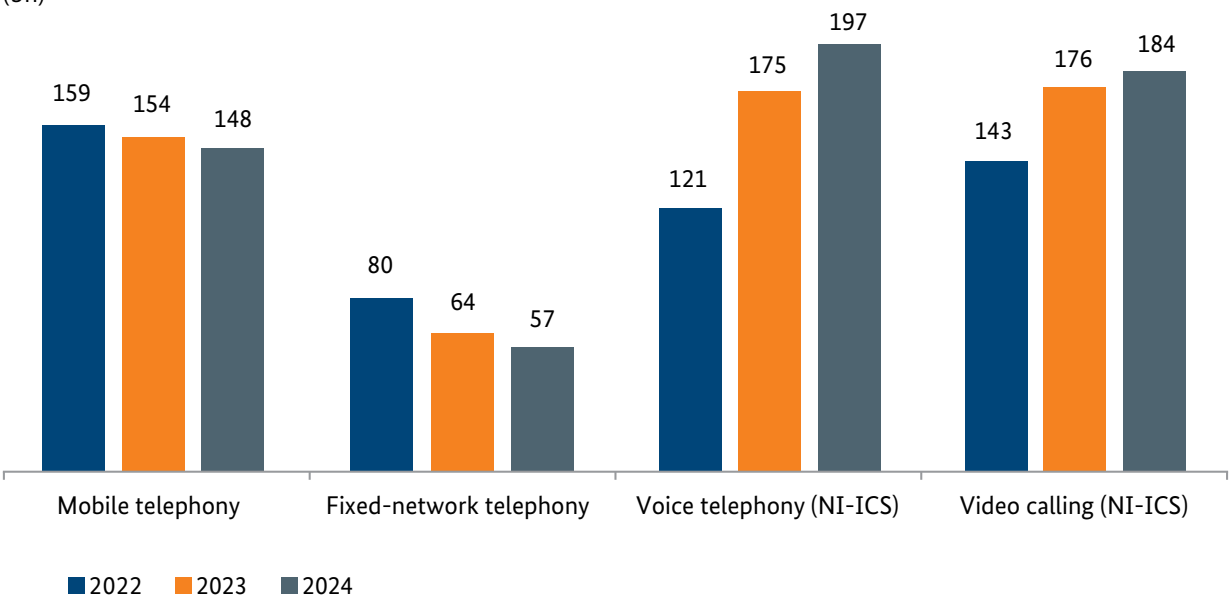
According to the email service providers, the monthly active users in Germany sent a total of 50.09bn emails in 2024 (2023: 53.43bn), a year-on-year decrease of 6%, averaging around 320 emails per monthly active user per year.

Comparison with traditional telecommunications service

The data from the market survey now makes it possible to compare the volumes of calls made via messaging and video calling services with calls made via traditional fixed and mobile telephony. In 2024, 148bn outgoing call minutes were generated in the mobile networks and 57bn minutes in the fixed networks. By contrast, users in Germany generated at least 197bn voice telephony minutes and 184bn video telephony minutes via NI-ICS.

The volume of calls made via traditional voice telephony services continues to decline whilst NI-ICS use continues to rise – although less steeply than in the previous year. Following several years of these contrasting trends, the volume of both voice and video calls via NI-ICS in 2024 is now well above the call volume in both the fixed and mobile networks. Voice and video calls via NI-ICS are growing enormously in popularity, driven even more by advancements in the digital transformation and the associated changes in communication behaviour (mainly the increasing relevance of smartphones, mobile internet and solutions for home working).

Outgoing call minutes
(bn)



Artificial intelligence

Much of 2024 was devoted to extensive preparations and adaptations in readiness for new regulatory challenges, mainly the Artificial Intelligence Act (AI Act, EU 2024/1689) which entered into force on 1 August 2024. The AI Act introduces a comprehensive legal framework on artificial intelligence in the European Union aiming to safeguard respect for fundamental rights whilst also fostering innovation.

The focus in the first half of the year was on finalising the AI Act at the European level and on internal scenario modelling to prepare the Bundesnetzagentur to take on its new regulatory responsibilities. An interdepartmental, cross-disciplinary project group was created in July 2024 to handle the conceptual, content-related and organisational preparations and ensure the Bundesnetzagentur is optimally prepared for its new role. This project group closely supports the development of the national implementing act and the creation of European guidelines.

The AI Act entered into force on 1 August 2024 and will generally apply as of 2 August 2026, although some provisions are set to take effect as early as 2 February 2025. In light of this, the project group is working closely with the competent ministries to draft the national implementing act and the European guidelines, with the goal of safeguarding harmonised rules at both national and European level and ensuring the Bundesnetzagentur can perform its duties effectively.

In addition to cooperating with ministries and European institutions, the Bundesnetzagentur hosts the digital conference DigiKon as a platform for an intensive exchange of views with operators in the AI ecosystem. The Bundesnetzagentur sees the conference as an opportunity to foster networking and dialogue on current digital policy matters between industry, science, public administration and civil society. DigiKon returned to Bonn for the second time in November 2024.

The relationship between data and artificial intelligence provided the headline theme for DigiKon 2024, which kicked off with a keynote on the potential and challenges of AI for the skilled crafts. The 100-plus attendees then had the opportunity to debate with experts from the business and scientific communities in a series of expert talks, breakout sessions and a final panel discussion, and learn about the latest developments helping to promote the use of AI in SMEs. Further key topics included fostering AI innovation through living labs, the innovation potential of the Data Act and Data Governance Act, and standards for trusted AI.

Digitalisation at small and medium-sized enterprises (SMEs)

Empirical monitoring

The Bundesnetzagentur uses regular surveys and other tools to track digitalisation trends in companies, with a particular focus on small and medium-sized enterprises. The first survey in 2024 was conducted together with the German Environment Agency and looked at how digitalisation and environmental sustainability intersect in practice. About 1,700 businesses took part online. The survey found that the two topics are generally treated as separate with little overlap. The second survey examined the use of artificial intelligence and the prerequisites for its use. Bonn Survey Centre (uzbonn GmbH) collected the data for this by telephone from some 800 companies. The findings show that almost one third of the companies surveyed already use AI, whilst one third see it as having potential applications or are

planning to use it, and the remaining third do not see a possible application for AI.

Networking and information

Numerous operators (competence and service centres, digital agencies of the federal states, digital hubs, political interest groups, scientific institutions and more) support SMEs with the digital transformation through a variety of funding initiatives and targeted knowledge transfer. Active networking of these organisations supports the identification of synergies and audience-specific challenges as the basis for developing new measures.

The Bundesnetzagentur has been offering regular online networking events since 2023. In 2024 the main focus was the digital product passport (DPP) and the opportunities and challenges of the circular economy. These events explore the subject matter through the lens of SMEs. All presentations are made available on the Bundesnetzagentur's website at bundesnetzagentur.de/1026958.

All supporting operators also serve as direct points of contact for companies. The Bundesnetzagentur maintains an extensive database with approximately 275 regional and national contacts (bundesnetzagentur.de/Anlaufstellen-Datenbank). The Bundesnetzagentur provides information on its website about active funding initiatives offered by various government departments and examples of digitalisation in SMEs to spur the transformation in this sector (bundesnetzagentur.de/best-practice).

Sustainability

Climate protection and environmentally sustainable action are the major challenges of our time. In 2021 the Federal Constitutional Court recognised the state's duty not to put the freedom and fundamental rights of future generations at risk through climate policy inaction. The European Green Deal sets ambitious targets with the goal of achieving climate neutrality by 2050.

The telecommunications sector plays a key role in emissions reduction. Whilst innovative digital applications and technologies can contribute to creating a sustainable economy (twin transition), at the same time they generate ever-larger data volumes. The transport of huge data volumes and high bandwidths relies on powerful modern telecommunications networks. Optical fibre and 5G are two energy-efficient network technologies that offer significant carbon reductions per gigabyte of data. The goal of migrating to energy-efficient gigabit networks can be found in various initiatives at European level, including the 2024 white paper "How to master Europe's digital infrastructure needs?", and at federal level, such as the government's gigabit strategy. Energy-efficient network technologies also promise to offset rising electricity consumption driven by the increase in data traffic, especially from new, energy-intensive applications and technologies like AI.

An EU code of conduct for the sustainability of telecommunications networks is planned for the end of 2025 which will identify indicators to measure the environmental impact of communication networks and services. The aim is to provide more transparency on the telecommunications sector's environmental footprint. The Bundesnetzagentur has commissioned a study into the comparability of sustainability standards in electronic

telecommunications infrastructure to provide an evidence-driven basis. The findings will be available in the second quarter of 2025.

Gaia-X funding competition

The Gaia-X funding competition is important for the creation of the Gaia-X European data infrastructure project, which brings together representatives from the business and scientific communities and the public sector whose goal it is to develop a digital ecosystem based on European values (including European data protection, digital sovereignty and trust) with support from policy-makers and in cooperation with other European partners.

Since the end of 2021 the funding competition has been backing 11 Gaia-X projects in a variety of sectors to develop intelligent, innovative services and realise data spaces. These serve as hands on examples and best practices for future projects in the Gaia-X ecosystem. The Bundesnetzagentur has been tasked with the specialist and administrative organisation of the funding competition by the Federal Ministry for Economic Affairs and Energy, which has earmarked some €117mn in funding for these projects over around three years.

The competition has led to the development of apps for the healthcare sector (eg medication management, therapeutic success and menstruation tracking), an LLM-powered career assistant and a large European AI voice model (Teuken-7B). Data spaces have already been established successfully in the aerospace, healthcare, education, construction and maritime sectors. Gaia-X interfaces enable transparent and trustworthy access to data and vendor-neutral control of data within the data spaces. The competition has also led to the creation of the first transaction-based European data trustee, EuroDaT. The project findings will be incorporated into the ongoing implementation of use cases. The project terms ended on 31 March 2025.

Data institute

The incredible potential of data to help mainly SMEs and start-ups become more innovative and develop new business models has yet to be exploited sufficiently. The data institute is to drive forward data availability and data standardisation and implement data trustee models and licences. The objective is to make the institute a powerful national operator that will coordinate the data ecosystem, spur innovation and provide evidence-based advice. The data institute will serve as a central point of contact that bundles holistic and interdisciplinary expertise and provides practical methodological skills and solutions.

The Bundesnetzagentur is supporting the founding of the data institute (module 3) and overseeing the financial aspect of the award proceedings, and will also manage the budget following the award.

Consumer protection and service

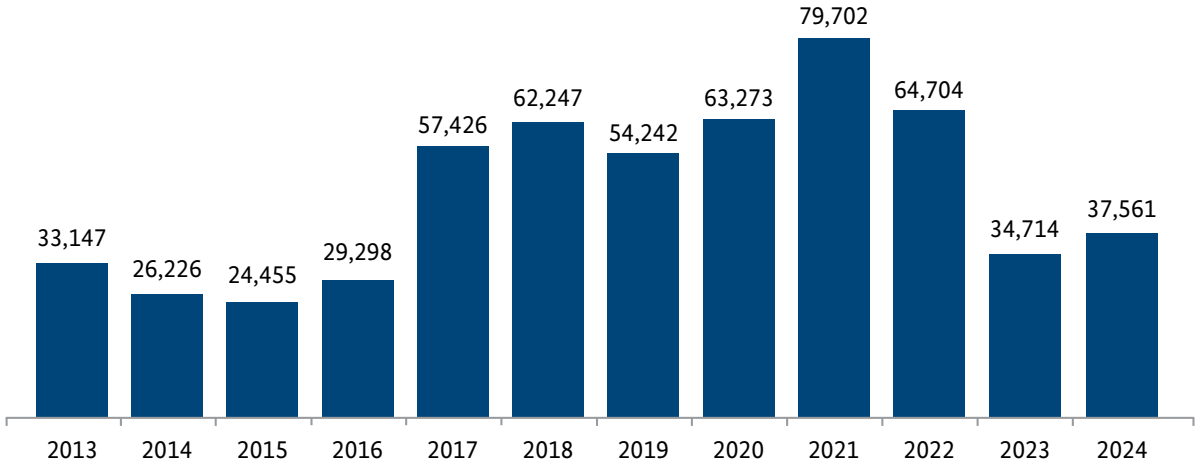
In 2024, the Bundesnetzagentur consistently championed the rights of consumers in the telecommunications market and rigorously continued to track and prosecute unsolicited marketing calls and number misuse. The interests of consumers are also the focus of its market surveillance activities and of the radio monitoring and inspection service's investigation of interference.

Tracking unsolicited marketing calls

The Bundesnetzagentur continues to rigorously track and prosecute unsolicited marketing calls. In total, the Bundesnetzagentur received 37,561 written complaints concerning these calls in 2024. This represents a year-on-year increase of around 8% compared to 2023, when 34,714 written complaints were received regarding unsolicited marketing calls. This increase put an end to the trend of falling complaint figures that had been in evidence since the record high reached in 2021.

In terms of the subject matter, unsolicited marketing calls for prize draws were a frequent subject of complaints received by the Bundesnetzagentur in 2024, along with home improvement products and energy supply contracts. While energy supply and utilities companies continue to account for a high number of complaints, their number has declined recently. At 20% to 30% of all complaints received, this category has almost always accounted for the largest number of complaints in recent years, before falling to just 14% last year. This may also be a result of the major proceedings launched by the Bundesnetzagentur to combat unsolicited marketing calls in the energy sector in recent years. In contrast, the number of complaints

Written complaints about unsolicited marketing calls



pertaining to the home improvement products category increased to more than 6,300, compared with just over 5,300 in 2023. The Bundesnetzagentur believes this is due in part to strong demand for photovoltaic systems, which has spurred a number of unscrupulous providers to make these unsolicited marketing calls.

The Bundesnetzagentur initiated investigations into numerous companies during the reporting period and issued fines in a total of eleven instances. In each of these cases, fine proceedings were initiated in response to complaints numbering from the hundreds to more than 2,000. Fines totalling more than €1.37mn were levied due to unsolicited marketing calls and hidden caller IDs. Appeals have been filed against some of these fines, meaning that a ruling has not yet taken effect in some of these cases.

One of these cases again involved a large fine being imposed on a company because the callers purposefully concealed both the marketing intention of their calls and the identity of the company doing the marketing. Specifically, the callers claimed to be a pharmacists' association, for example, and began many of the telemarketing calls under the false pretences of a health survey. In actual fact, however, it was not a survey. Instead, the company was attempting, by means of pushy salespersons, to sell nutritional supplements like pills for joint pain. In doing so, the company was intentionally focusing its efforts on older consumers and followed up their telemarketing calls by sending them unsolicited merchandise. These were frequently accompanied by claims that the consumer had entered into a subscription contract for long-term supply. Even apart from the recently concluded legal proceedings, it is unfortunately the case that fraudulent contracts continue to be a problem. Consumers regularly complained yet again last year that they had been signed up for contracts or contract options against their will.

When investigating these complaints, the Bundesnetzagentur had particular difficulties in cases where the caller suppressed their phone number during telemarketing calls, meaning that they either concealed it or that they used a spoofed number (caller ID spoofing). Even though these methods are expressly forbidden for telemarketing calls and are subject to a fine, this continues to be a widespread occurrence. It is very difficult for the Bundesnetzagentur to trace these calls, and third parties are frequently

affected in the process. This is always problematic when the callers display a number they have taken from a public telephone directory of someone who is completely unrelated to the person called.

In 2024, in addition to the prosecution of unsolicited telemarketing calls and caller ID suppression during telemarketing calls and the imposition of administrative fines, the Bundesnetzagentur was also active in connection with the recently implemented transparency regulations on telemarketing consent. Under these regulations, telemarketing companies are explicitly required, amongst others, to document and keep consumers' consent to marketing and to submit this to the Bundesnetzagentur on request (section 7a Act Against Unfair Competition (UWG)). The Bundesnetzagentur made a request of various telemarketing companies to present this consent documentation. Some of the companies affected took action to counter this demand and applied to the court for an injunction. In December 2024, the competent district court of Bonn issued a first guideline ruling in this matter in which they rejected the request for an injunction against the submission orders issued by the Bundesnetzagentur and instead fully confirmed the obligation to submit documents as set down in section 7a UWG. There is no right of appeal against the court's decision. This ruling will make it easier for the Bundesnetzagentur to pursue violations of the documentation and storage obligations and more efficiently penalise unauthorised telemarketing in future.

Furthermore, during the reporting period the Bundesnetzagentur created the basis for all files and proceedings pertaining to the imposition of fines for unauthorised telemarketing to be conducted electronically. Starting in 2025 – which is one year before the regular implementation deadline specified in the act for the introduction of electronic case files in the judicial system and further promotion of electronic legal correspondence – all new fine proceedings launched in connection with the aforementioned offences will be conducted as "e-files" in future. The early introduction of this procedure is being undertaken on the basis of the "Ordinance concerning the time of the introduction of electronic case file management in fine proceedings in the scope of business of the Federation" (German Federal Government E-Fine Case Files – Introductory Ordinance (BEBußAktEV)). On 8 October 2024, the Bundesnetzagentur approved the administrative order required for this purpose. In addition, communications with the defence counsel, courts and law enforcement authorities relating to the legal proceedings will take place electronically.

Finally, the Bundesnetzagentur has comprehensively revised its processes concerning consumer communications in the field of unauthorised telemarketing with the aim of informing consumers more efficiently, making them aware of dangers earlier, and letting them know where they can turn for assistance and what actions they can take. This also applies to complaints that the Bundesnetzagentur is unable to pursue itself for legal or factual reason, but for which the Bundesnetzagentur can still assist the complainant in the identification of the channel that is responsible for dealing with the subject of their complaint.

Combating number misuse

The Bundesnetzagentur is the supervisory authority responsible for combating number misuse. It follows up on any breach of number use. Cases pursued in this context frequently concern breaches of the consumer protection provisions of the Telecommunications Act (TKG) and the Act Against Unfair Competition (UWG). A variety of measures can be taken to protect affected parties from disturbances and financial losses.

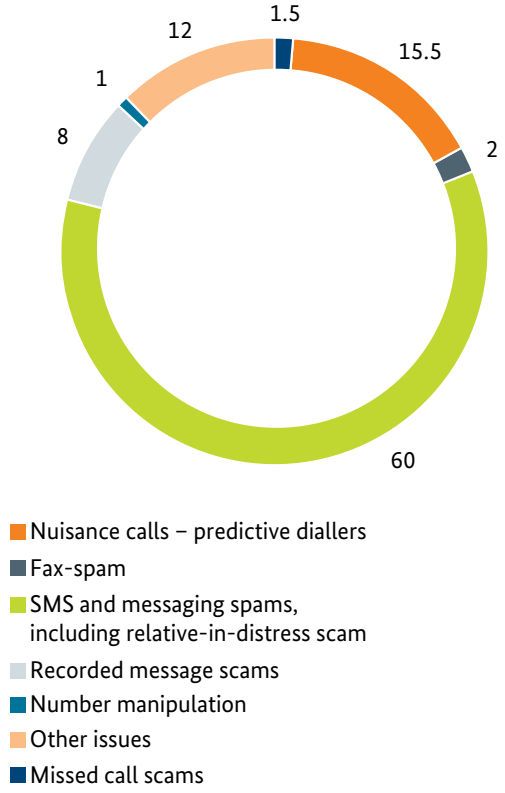
In total, the Bundesnetzagentur received 154,624 written complaints and enquiries about number misuse during 2024. The number of complaints received thus continues to remain at a very high level. It continues to be the case that the majority of consumer complaints about number misuse, at 60%, involved SMS and messaging spam.

In addition to written complaints, the Bundesnetzagentur received 11,966 telephone enquiries and complaints about number misuse and unsolicited marketing calls.

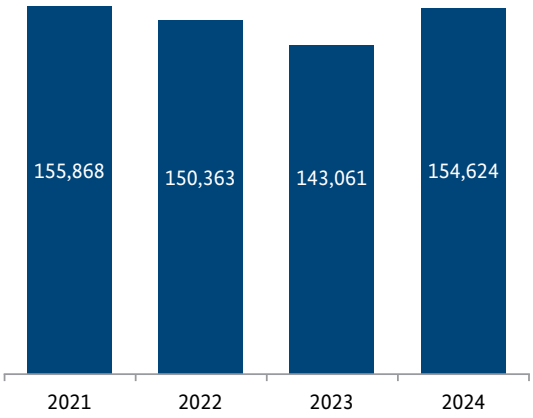
The Bundesnetzagentur works to protect consumers from unsolicited advertising and nuisance calls, charges for call queuing and the unauthorised billing of third-party services and subscriptions. It opened administrative proceedings to investigate the breaches in 2,010 cases, resulting in orders to disconnect 6,490 phone numbers. Bans on billing and collection were issued for 1,073 numbers.

All actions are published (in German) online in a continually updated list at bundesnetzagentur.de/Massnahmenliste

Written complaints about unsolicited marketing calls
(%)



Written complaints and enquiries



Nuisance calls

During the reporting period, the Bundesnetzagentur received a total of 23,643 complaints concerning nuisance calls from call centres. The complaints often concern call attempts where there is a connection but no one speaks on the other end or calls that are attempted multiple times a day without leading to an actual telephone conversation. This is regularly the result of call centres making use of automated predictive diallers.

Depending on the calling practice of call centres, call recipients can be subjected to considerable harassment. In such cases, the Bundesnetzagentur can take various measures, including reprimands, warnings and orders to disconnect the call centre telephone numbers. Before it can do so, it is reliant on complaints containing descriptions of the nuisance call attempts that are as detailed as possible.

This type of calling behaviour takes place prior to telemarketing that is subject to an administrative fine and as such cannot be prosecuted for being attempted. Therefore complaints concerning unreasonable calling behaviour are recorded separately from complaints about telemarketing and statistics on such complaints are reported separately.

In 2024, 55 reprimands were issued. As a result of this process, companies are informed of complaints about their calling behaviour at an early stage, thus giving them the opportunity to make changes.

Router and telephone system hacking/malware

In 2024, the Bundesnetzagentur continued to take strong action against cases of hacking in which third parties unlawfully generate calls that incur charges via routers or telephone systems of end-users. Most cases continue to be reported to the Bundesnetzagentur by telecommunication service providers. The Bundesnetzagentur regularly issues bans on billing and collection to protect the end-users affected. The orders issued by the Bundesnetzagentur provide protection to end-users against financial damages. The ordering of payment bans is another tool that can be used to enable the domestic telecommunication service providers involved to avoid payments of unlawfully generated charges on a lasting basis. Work on halting payment flows and on improving early detection of such cases is also continuing within the sector. Happily, the number of reported incidents is once again lower than in the previous year and is currently at a low level.

Again in 2024, the Bundesnetzagentur received complaints about charges for international calls and text messages to other countries on mobile phone bills. The Bundesnetzagentur's findings suggest that these connections were likewise made either with the help of malware and without the knowledge of the parties affected or by means of SIM swaps that are frequently made possible by phishing. There are various forms of phishing, such as phishing messages sent via SMS messages, social media, or phone calls, each with the intention of obtaining passwords or personal data. In such cases, unidentified fraudsters are enabled, for example, to activate an eSIM card (embedded subscriber identity module) and subsequently generate messages. Often, the telecommunications service providers had already indemnified the end-users affected.

Third-party providers

As a result of procedures set out in October 2019 by the Bundesnetzagentur to protect consumers, third-party services may only be billed via mobile phone bills under certain conditions. Either the customer has to be redirected during the process of paying for a third-party service from the third-party provider's website to the website of a mobile provider (redirect), or the mobile communications company has to implement various defined consumer protection measures (combination model). The number of complaints is relatively low overall, even though it marks a slight increase compared to the previous year. The increase in complaint figures can be put down to billing in the Trusted Partner area, where it appears that phishing has also led to unauthorised billing of third-party services with Trusted Partners. The customers affected in these constellations were indemnified by either the Trusted Partners or the mobile communications providers. The Bundesnetzagentur examines the complaints it receives and contacts the respective mobile providers on these issues.

Number manipulation

During the reporting period, the Bundesnetzagentur continued its task of prosecuting violations of the regulations on telephone number transmission, placing a particular emphasis on identifying the source of these calls. To accomplish this, within the applicable period for storing call data the agency requests that the network operators who provided the connection supply the connection data so that they can trace the origin of the call. The number of complaints for such cases is roughly the same as in the previous year.

In cases where a number was spoofed and it proved possible to identify the number actually used to make the call, the Bundesnetzagentur ordered this originating number to be disconnected due to violations of the regulations on call number transmission. In addition, relevant bans and prohibition orders were also imposed. Furthermore, illegal business models often came to light in the course of these frequently complex cases that also involved the network operators providing the connections. These findings make it possible to eliminate the conditions that allow such illegal activity to occur in the first place.

SMS and messaging spam, including the relative-in-distress scam

In 2024, a majority of consumer complaints were once again in the category of SMS or messaging services, with the Bundesnetzagentur recording a total of 92,693 complaints about unlawful messages sent via SMS or messaging services during the reporting period. This represents 60% of all complaints received.

Of these complaints, messages pertaining to the relative-in-distress scam were the most common at roughly 50,000. The relative-in-distress scam involves situations where recipients receive unsolicited text messages that appear to have been sent by a relative of the recipient – usually a child or grandchild – who has recently started using a new mobile phone number. The text messages urge the recipients to transfer money to help the sender that is posing as a family member out of a dire emergency. The violations of criminal legislation in such cases allow the Bundesnetzagentur to exercise its authority and, pursuant to section 123 TKG, order numbers to be disconnected. The Bundesnetzagentur once again exercised its authority during this reporting period and ordered the disconnection of several thousand mobile phone numbers used for messaging or advertised for the purpose of returning calls.

There continued to be a large number of complaints involving consumers receiving messages in which, under one pretext or another, they are asked to "click" an internet link. Such messages often contained information about alleged security issues with bank access data or the imminent delivery of a parcel. Upon "clicking" the link, the recipients are redirected to a website where they are asked to enter their personal data, in particular their credit card details. To gain the confidence of unsuspecting users, these websites often mimicked the corporate identity of reputed organisations such as credit institutes, savings banks or parcel delivery services. The data was presumably collected for abusive purposes. The sending of these types of text messages often exposes the recipients to unreasonable harassment and consequently constitutes a violation of the provisions of the UWG. In such cases the Bundesnetzagentur regularly orders the sending numbers to be disconnected.

Along with the relative-in-distress and phishing scams, the Bundesnetzagentur also registered an increasing number of CEO fraud scams during the reporting period. In these cases, a company's employees are contacted using a messaging service by someone claiming to be a high-ranking executive in their company. This person then tries to get the target individual to transfer large sums of money, and usually puts them under tremendous time pressure. In order to make their false identity as believable as possible, the fraudsters use photos and other data and information they have managed to obtain. In many cases, the punishable offences committed in these incidents enable the Bundesnetzagentur to impose various measures, and to this end it ordered the disconnection of several mobile phone numbers used for CEO fraud during the reporting period.

By ordering the disconnection of sender numbers, the Bundesnetzagentur ensures that the disconnected numbers can no longer be used to send fraudulent text messages. Likewise, this measure also ensures that unlawfully advertised services can no longer be accessed.

Nuisance recorded message scams

The Bundesnetzagentur registered an increasing number of complaints about calls using recorded message scams during the reporting period, and numerous numbers were disconnected as a result.

Most of these cases involve consumers reporting automated recorded messages informing them of a payment supposedly made by the online payment service PayPal. Consumers also complained of calls purporting to come from nursing care insurance funds in which they are promised the receipt of free care products. Bundesnetzagentur investigations revealed that neither PayPal nor the nursing care insurance funds had been responsible for these calls, the aim of which is presumably to obtain consumers' personal data.

In many cases, these recorded message calls violate the provisions of the UWG, such as due to business acts that are misleading or which constitute unreasonable harassment. It is for this reason that the Bundesnetzagentur responded by ordering the disconnection of the responsible numbers in many cases.

Fax spam

Unsolicited advertisements sent via fax transmission without the express prior consent of the recipient (junk faxes or fax spam) continued to decline during the reporting period, with the number of such complaints falling to 2,736 in 2024. In 2023, 4,416 complaints concerned fax spam, and in 2022 there were 9,161 complaints received. This decline is due not only to the spread of modern electronic means of communication, but also to the Bundesnetzagentur's rigorous actions in this area, where it has ordered the deactivation of numerous numbers.

Pop-ups (with error messages)

The Bundesnetzagentur disconnected a large number of phone numbers in fake warnings and error messages called pop-ups displayed on the computer. This scam warns of viruses and software problems that do not actually exist. The pop-ups display a telephone number that can be contacted for free help. The aim of the scam is to use remote diagnostics to pressure users into expensive, unnecessary or long-term maintenance and repair contracts. The payment methods specified often involve vouchers for online purchases. Once the payment is made, the victim of the scam generally has no means of recovering the amount. Individual cases of financial losses in the upper four-figure range have been reported to the Bundesnetzagentur. This scam is also used for phishing personal data. The numbers shown on the PC are often registered using fake details. On a regular basis, the data of consumers that previously had contact with the supposed support staff are misused for this purpose. The Bundesnetzagentur regularly issues warnings to people not to call numbers displayed on these pop-ups, which frequently give the impression that they are official error warnings being issued by prominent software and hardware companies. The websites of these companies state that their error messages never contain phone numbers.

Fake hotlines

In 2024, the Bundesnetzagentur disconnected multiple telephone numbers under which fake hotlines were operated.

In one such scenario, fake hotlines for airlines and travel portals were advertised. The advertising used websites that were almost indistinguishable from the original websites. The unsuspecting victims were asked to download software to their smartphones that enabled remote access, after which the scammer would try to obtain personal data and account and credit card details. In some cases they initiated payments to unidentified third parties. Individual cases of financial losses of between 200 and 5,000 euros have been reported to the Bundesnetzagentur.

In another scenario, unidentified fraudsters claimed to be well-known used car dealers or manufacturers of construction machinery, sending emails in which vehicles and construction equipment were offered at attractive prices. The email addresses were deceptively similar to the actual domains, and the fraudsters used the brands and company information of the actual providers. However, when it came to the contact details, they used different telephone numbers and email addresses. The goal of this approach is to obtain monetary payments without actually supplying any vehicles or construction equipment.

Other areas and public relations work

As in previous years the Bundesnetzagentur received a large number of complaints in this reporting period that do not fall under any of the above categories.

To the extent possible, the Bundesnetzagentur imposes the consumer protection measures at its disposal, such as disconnecting telephone numbers, in these cases as well. As part of its public relations efforts, the authority regularly provides information about fraudulent groups of cases at an early stage and, where possible, advises consumers on what action they can take.

Right to a basic set of telecommunications services

In an increasingly digital world, access to telecommunications services is a fundamental necessity. The provision of a basic set of telecommunications services is important because it ensures that all citizens can participate in digital life regardless of their place of residence or economic status. Despite the progress made on the broadband rollout and introduction of 5G mobile networks, there are still households in Germany without even the minimum provision of basic telecommunications services.

Increase in the minimum bandwidth

Due to the ongoing digital transformation and society's reliance on digital technologies, it is necessary to regularly review the right to a basic set of telecommunications services to account for growing demand and new technological capabilities. One of the most important measures undertaken in 2024 was the increase in the minimum requirements for the basic set of telecommunications services.

It is the Bundesnetzagentur's remit to regularly review the parameters of the minimum provision of these services to ensure that these are commensurate with current requirements, and it has prepared a review report to this end.[1] To evaluate the parameters of the minimum acceptable level of telecommunication services, four studies were assessed that addressed the capabilities of transmission technologies and people's everyday lives in relation to their participation in social and working life. Particular attention was given to multi-person households in order to account for simultaneous online activity by multiple users (parallel usage scenarios). As a result, the Bundesnetzagentur determined that an increase in the minimum download speed from 10 Mbps to 15 Mbps and an increase in the minimum upload speed from 1.7 Mbps to 5 Mbps were called for. The maximum latency – the time that is required for the transport of individual data packets – was set at 150 ms.[2]

As a result of the Bundesnetzagentur's review report, changes were made to the Telecommunications Minimum Supply Ordinance (Telekommunikations-mindestversorgungsverordnung, TKMV) in agreement with the Federal Ministry for Digital and Transport (BMDV) and the Committee on Digital Affairs of the German Bundestag. The Bundesrat also gave its approval, and the changes to the TKMV went into effect on 31 December 2024.

Increasing the minimum requirements ensures that all citizens can participate in digital life, regardless of where they live, how much they earn, or their social position.

In future, consumers should be informed even more clearly and comprehensively of their right to be supplied with telecommunications services, and of how they can assert these rights. The Bundesnetzagentur's efforts here include the creation of an information brochure and a flyer that will be made available on the Bundesnetzagentur website and through external locations such as legislators' offices, federal states, municipalities, the Federal Gigabit Bureau and consumer protection agencies.

1 Available at bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Grundversorgung/Pruefbericht_2024.pdf

2 For a one-way journey

The contact form on the Bundesnetzagentur website has also been revised to make it easier to use. Superfluous fields that made the process excessively bureaucratic were eliminated and the time needed by users to complete the form was reduced. Another move to increase user friendliness involved improving the texts in the input mask and making sure they were easy to understand.

The Bundesnetzagentur is preparing a one-day forum to evaluate people's experiences when trying to assert their right to the provision of telecommunication services and determine how the process can be refined. Stakeholders – including the federal states and municipalities – will be invited to take part, and the findings will be published on the Bundesnetzagentur website. Preparations for the forum are already underway.

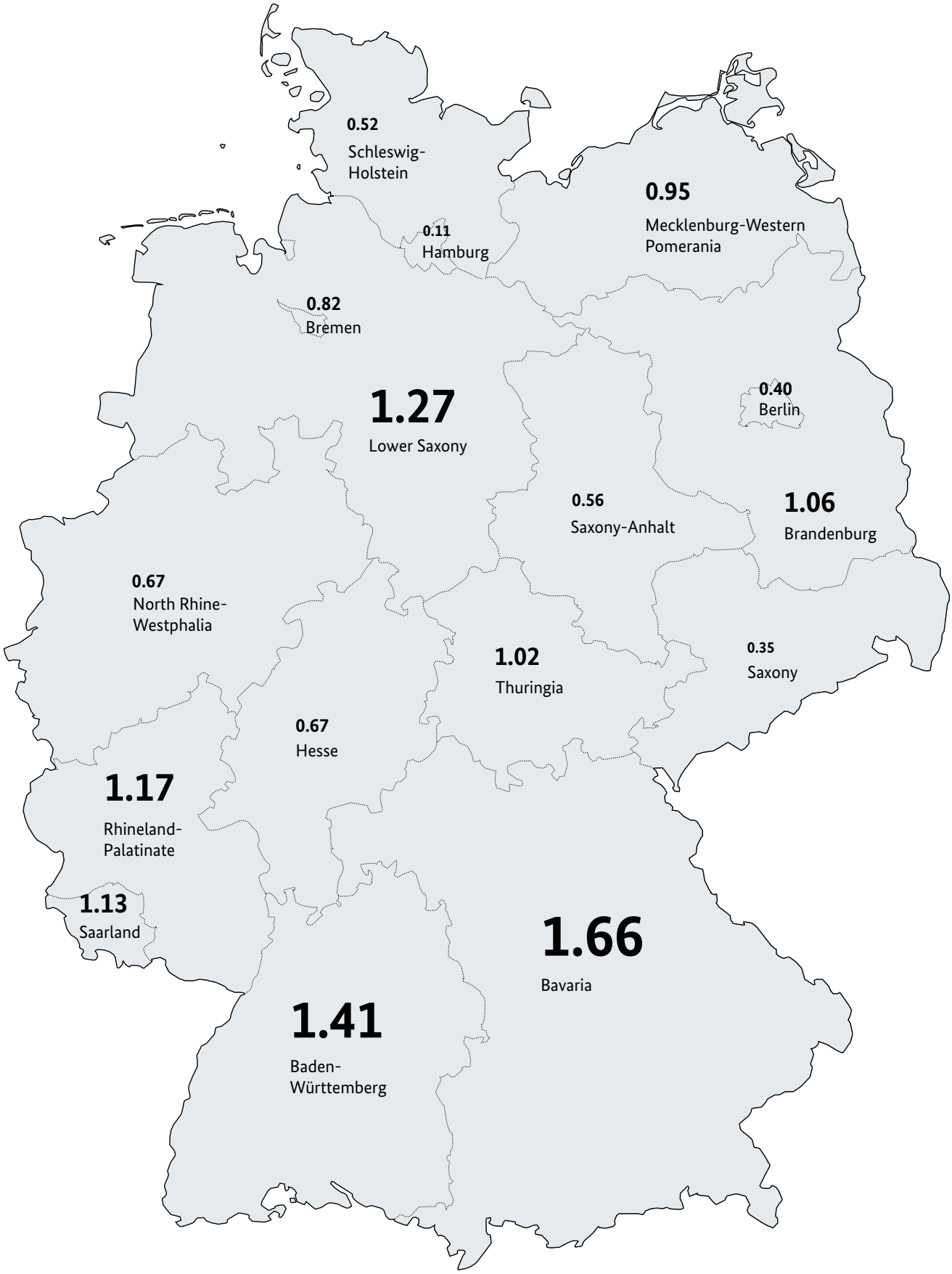
Asserting the right to the provision of telecommunication services

Since 1 December 2021, citizens have been able to turn to the Bundesnetzagentur in order to assert their right to the provision of telecommunication services. Between 1 January 2024 and 31 December 2024, the Bundesnetzagentur received 1,564 enquiries concerning the minimum provision of basic telecommunication services, of which 98% (1,534) of the cases were processed and closed. The enquiries came from consumers, companies, municipal institutions and associations. Reasons for consumers to submit enquiries to the Bundesnetzagentur included a desire for wired service, insufficient broadband offerings, poor connection quality for mobile networks, insufficient infrastructure in new buildings, and supply technologies that were clearly being pushed to their limits. Municipal and local authorities were focused not only on supply issues for their own locations, but also on the right to basic telecommunication services when telecommunications firms refrain from infrastructure expansion.

The number of enquiries received varied markedly at the federal state level. On a per capita basis, the Bundesnetzagentur receives enquires particularly frequently from Bavaria, Baden-Württemberg and Lower Saxony.

Differences in coverage can be due to a multitude of factors. The relative prevalence of rural areas with correspondingly lower population densities, difficult geographic conditions, insufficient economic and financial incentives, and a lack of competition are all reasons why some regions may have worse coverage than others.

Queries about basic telecommunications services by state since 1 December 2021



Procedure, identifying an undersupply of services, commitment decisions

The Bundesnetzagentur carefully examines enquiries about the undersupply of services. When an enquiry is submitted, the person is initially informed of their right to a basic set of telecommunication services and given information on the supply possibilities available at their location. It proved possible to clear up around 95% of the enquires quickly by means of local official investigations. There were also many cases in which the Bundesnetzagentur worked with telecommunications companies to find concrete solutions for potentially undersupplied addresses on a voluntary basis.

Before any identification of an undersupply of services is published, the Bundesnetzagentur conducts careful official investigations, for example a comprehensive examination of the circumstances of the case, as well as on-site measurements by the radio monitoring and inspection service. The Bundesnetzagentur maintains dialogue with the federal states, municipal and local authorities regarding existing – and possible future – assisted areas. In the past, these efforts have allowed households to obtain a more powerful connection that was significantly better than the minimum values required by the TKMV, and to do so quickly, without going through the formal procedure for asserting their right to be supplied with telecommunications services.

In the past year, the Bundesnetzagentur identified 16 cases of undersupply for 16 locations, although in 12 cases no need has yet been identified. The proceedings in which the Bundesnetzagentur identified an undersupply of services can be found on the Bundesnetzagentur website.[3]

If, within a period of one month following the publication of the identification of an undersupply of services, no telecommunications company declares its willingness to provide these services on a voluntary basis, the Bundesnetzagentur makes a commitment decision. In none of the cases in which an undersupply of services was identified did any company submit a voluntary commitment within the meaning of section 160(2) TKG. In March 2024, the Bundesnetzagentur for the first time obligated a telecommunications company to provide a household in Lower Saxony with the minimum level of services at an affordable price. In June 2024, the Bundesnetzagentur imposed obligations for three additional households in Bavaria.

In cooperation with the state of Lower Saxony, an initial pilot project to improve the supply situation in one rural district was launched in the fourth quarter of 2024. To this end, potentially undersupplied households in this rural district in the state of Lower Saxony were contacted and then notified to the Bundesnetzagentur. Bundling multiple households within a single contiguous area in this way makes it easier to find a solution. The aim is to take action without excessive red tape and to accelerate the process. The Bundesnetzagentur worked closely with the federal state to create a standard concept that could be expanded to all federal states following its evaluation.

3 bundesnetzagentur.de/tk-unterversorgung

Market surveillance and affordable prices

The Bundesnetzagentur monitors the minimum acceptable level of telecommunications services. Firstly, whenever a complaint is received from an end user, all supply information for the location is evaluated and made available. Secondly, the Bundesnetzagentur monitors the availability of basic provision throughout Germany, also independently of enquiries. A tool for proactively monitoring the minimum provision of services throughout Germany is currently in development and is to be deployed in 2025. In future, it should be possible to identify all addresses and households in Germany that may not be receiving a sufficient level of provision. A wide range of supply data are to be utilised for this purpose, including data from the single information point of the Federation (ZIS). This means that the Bundesnetzagentur also monitors the minimum acceptable level of telecommunications services independently of any complaints received. End-user complaints demonstrate an actual need for greater supply.

It is also part of the Bundesnetzagentur's remit to monitor the prices of the minimum supply of telecommunications services and the development of these prices. This also includes the connection to the public fixed-line network. In order to determine the affordable price level for minimum supply, the Bundesnetzagentur continuously monitors market offerings. Its determination of affordability is based on those products aimed at consumers.

In 2024, the Bundesnetzagentur collected data to determine the affordable price level for monthly services and for connection fees. As part of this nationwide survey of average prices, the Bundesnetzagentur queried the most frequently booked tariffs rates in Germany.

At the end of 2024, the minimum download speed was increased from 10 Mbps to 15 Mbps and the minimum upload speed was increased from 1.7 Mbps to 5 Mbps. The affordable price for monthly services was also redefined according to the increase in the minimum acceptable level of provision. The affordable price takes into account the standard basic level of provision in the market, and the price for monthly services is currently around €35 per month (gross), compared to the previous price of around €30 per month (gross). The affordable price is based on the average price for comparable products, and the Bundesnetzagentur announced the changes in a press release on 20 December 2024.[4] The increase in the minimum requirements led to the adjustment of the affordable price for monthly services, which continues to be tied to the standard basic level of provision in the market.

4 bundesnetzagentur.de/1042558

Customer protection

Customers of telecommunications service providers tend to approach the Bundesnetzagentur for help when they have not managed to satisfactorily resolve their issue with their provider directly.

The Bundesnetzagentur registered 22,585 individual cases (not including dispute resolution requests) during the reporting period, a rise of roughly 20% compared to each of the previous two years. Nearly two thirds of the cases involved fault repair and internet speed, provider switching, number porting or relocation. The other cases concerned a wide range of contract-related issues such as contract duration, transparency and billing.

The moderate complaint volume overall is reflective of all that has been achieved in the arena of customer protection law. The increase in complaint figures is due in particular to complaints pertaining to fibre connections and services. Here, many citizens appear to believe – generally incorrectly – that there are powers to intervene when fibre connections are not provided, or not provided quickly enough.

The Bundesnetzagentur does not provide contractual or legal advice. Bundesnetzagentur uses the individual cases as the basis for determining whether providers are violating their statutory obligations under the customer protection provisions of the Telecommunications Act (TKG). Should the Bundesnetzagentur identify breaches of customer protection regulations, they can demand that the provider remedy the situation and order additional measures as required. In the interests of "digital public services", the Bundesnetzagentur focuses on supply disruptions and interruptions, striving to ensure that every case where assistance is warranted is rectified as quickly as possible. Even so, the Bundesnetzagentur does not enforce any individual party's monetary claims.

Text and video relay service for people who are deaf or hard of hearing

The Bundesnetzagentur ensures that there is a special text and video relay service available at all times for people who are deaf or hard of hearing. The deaf or hard of hearing individual sets up a video link with a sign language or written language interpreter as desired, and the interpreter then calls the desired hearing recipient and translates the conversation from German sign language or written language into spoken German, and translates the recipient's spoken German into sign language or written language. This service can also be used to place calls to people who are deaf or hard of hearing.

During the reporting period, the Bundesnetzagentur awarded a new four-year contract in an EU-wide tender to Tess Relay-Dienste GmbH. Providers of telecommunications services contribute to the costs on a pro rata basis.

Dispute resolution

The Bundesnetzagentur's telecommunications consumer dispute resolution panel offers customers of telecommunications companies a means of settling disputes out of court. The dispute resolution procedure is free of charge for both telecommunications companies and customers. The aim is to reach a speedy and amicable resolution for both parties.

The telecommunications consumer dispute resolution panel is an official consumer conciliation body under the Act on Alternative Dispute Resolution in Consumer Matters (VSBG). In general, however, this dispute resolution is available to all end-users. In this context, end-user refers to a user who neither operates public telecommunications networks nor provides publicly available telecommunications services. Even so, there are some restrictions due to the provisions of telecommunications legislation. The prerequisites for a dispute resolution procedure are set out in the dispute resolution rules of the telecommunications consumer dispute resolution panel. These state, for instance, that end-users must take the initial step and attempt to settle the issue with the telecommunications company before submitting a request for dispute resolution.

In 2024, the telecommunications consumer dispute resolution panel received 2,534 applications for the initiation of a dispute resolution procedure. This represents the largest number of applications since the dispute resolution panel was called into being in 1999. The number of applications increased by nearly 10% compared to the level in 2023. In addition, the panel received 673 enquiries and requests for assistance, mostly relating to whether the facts presented in particular cases could be resolved through dispute resolution. This makes it clear that affected parties continue to be very interested in alternative dispute resolution possibilities.

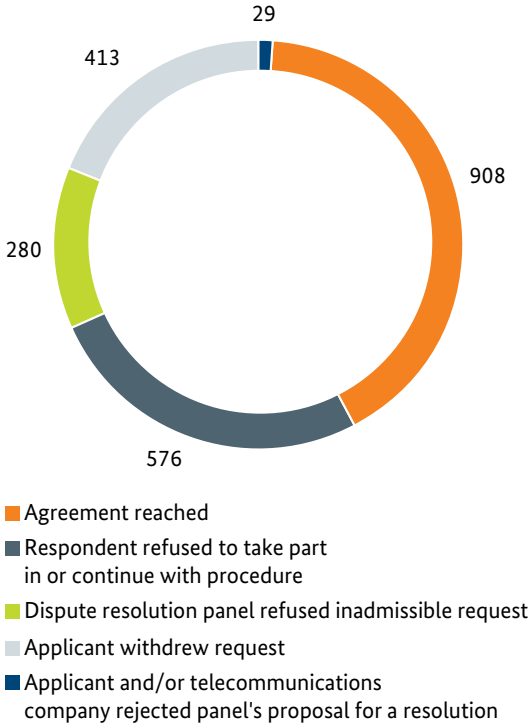
More than one third (35%) of the dispute resolution requests received by the telecommunications consumer dispute resolution panel in 2024 concerned disputes relating to the content or implementation of contracts. These cases varied considerably, with some of the more frequent reasons including which prices had been agreed, when a contract actually begins (upon the conclusion of the contract or when the provision of services begins), when the provider is to make the contractual services available in the event of new connections, and when contracts can be terminated. However, there are also disputes in which it turns out that a contract concluded over the phone is not even legally valid because the consumer had not given their approval following the receipt of the contract summary in text form.

Another frequent subject of applications involved disputes over disruptions (23%). The disruptions – both short-term and long-lasting – involved both mobile and fixed networks. Frequently at issue was the immediate elimination of the disruption by the provider. Another subject of disputes was whether the provider must pay the consumer compensation if the service completely ceased to function.

A considerable share of the applications received concerned disputes about billing complaints and reduced data transmission speeds (12% each). Dispute resolution requests also addressed issues such as relocation, provider switching and disconnection.

The dispute resolution panel handled and closed 2,206 cases in the reporting year. The parties reached an agreement in 908 cases, which corresponds to 41% of the dispute resolution cases that were concluded. In terms of the admissible requests that initiated a dispute resolution procedure, a success rate of 47% was achieved. Frequently, companies offer their customers a resolution once the procedure is underway. In 576 cases, the telecommunications companies implicated in the dispute resolution procedure refused to take part in or to continue the procedure and offered no solution to the issue at hand. In 413 cases, the applicants withdrew their requests, for example because the matter had been resolved swiftly. During the reporting period, the dispute resolution panel rejected 280 resolution requests as inadmissible.

Outcomes of dispute resolution procedures



In accordance with the VSBG, additional information is published in the telecommunications consumer dispute resolution panel's annual activity report, which is available on the Bundesnetzagentur's website.

Market surveillance

The Bundesnetzagentur's market surveillance activities are based on the EU Regulation on market surveillance and compliance of products and the German Market Surveillance Act (MüG), Electromagnetic Compatibility of Equipment Act (EMVG) and Radio Equipment Act (FuAG).

In 2024, the Bundesnetzagentur screened electrical and radio equipment from both online and bricks-and-mortar retailers.

In the scope of the online market surveillance in 2024, a total of 1,425 offerings were identified as non-compliant and taken off the relevant e-commerce platforms, impacting more than 3 million devices. In 2024, the focus was on an internal campaign involving the monitoring of products that were offered on two online platforms outside the EU. In addition to anonymous test purchases and on-screen visual inspections, requests were submitted to the responsible economic operators (who are required to be based in Europe) for compliance documentation. 96% of the products examined during the campaign were found to have formal defects.

In 2024, the Bundesnetzagentur examined around 2,500 device and equipment categories on offer in bricks-and-mortar retail, with the Bundesnetzagentur taking action in 900 cases involving around 1.9 million devices.

Furthermore, the Bundesnetzagentur also intensified its cooperation with the competent regional authorities, in particular in the field of product safety, and with the market surveillance authorities in Germany's neighbouring countries with the aim of removing non-compliant products from the EU single market. A project to rate "wallboxes" was conducted in cooperation with representatives from North Rhine-Westphalia and is currently in the process of being completed.

In 2024, the Bundesnetzagentur was notified by the customs authorities of some 5,500 suspicious consignments. Of these, 92% were particularly conspicuous and had received no clearance for the European market. More than 406,000 products were affected by the import ban.

Citizens can report dangerous radio equipment to the Bundesnetzagentur by using the European Commission's Safety Gate system via the following link: ec.europa.eu/safety-gate/#/screen/home

Continued freedom of choice of terminal equipment for PON fibre-optic networks

In 2024, the Bundesnetzagentur concluded proceedings pertaining to the passive network termination point in passive optical networks (PON). The passive network termination point is the transfer point between the provider's telecommunications network and the end-user's terminal device/home network. The network termination point is considered to be passive if its sole function is to enable a connection to the network, but it neither amplifies nor modifies the transmitted signals. This term is frequently used in conjunction with "router freedom", which enables end-users to select the terminal device (typically an integrated modem and router) of their choice, rather than being forced to use a device provided by the telecommunications provider. As a result, network operators are also required to grant access to third-party devices.

Pursuant to section 73(2) TKG, the Bundesnetzagentur may permit exemptions from the principle of the passive network termination point, and several associations of the telecommunications industry have applied for such an exemption for passive optical access networks. In these fibre-optic networks, the network termination point would be the output of the fibre-optic modem (optical network termination (ONT)). Among the grounds cited by the applicants were the particular sensitivity of fibre-optic networks, in which disruptions might be caused by directly connecting unsuitable terminal devices that would impact the provision of services not only to the access holder, but also to many other users. Furthermore, it was claimed that control of the ONT was necessary to safeguard service quality and network security.

However, the Bundesnetzagentur came to the conclusion that there is at present no objective technical necessity for considering the customer's connection to be part of the telecommunication provider's network. While the Bundesnetzagentur did not deny the existence of the problems depicted by the applicants, it placed them in perspective to the actual occurrence of such disruptions, the countermeasures that have already been developed, and their actual prevalence in the market. In light of the ongoing trend towards the use of terminal devices that integrate the modem, router and other functions that is also evident for fibre-optic connections, the free choice of terminal equipment for PON fibre-optic networks will now be ensured in the same way as it is for VDSL and cable networks.

Interoperability in the area of audiovisual media transmission

After many years in which television reception through cable, satellite and terrestrial systems (DVB-C, -S2, -T2) was the primary purpose of a TV, the current situation is characterised by rapid technical innovations. TVs have now become "connected TVs"; in other words, they also access media content via the internet (streaming). To date, consumers have been using interfaces in which the digital TV programmes and internet-based programmes are separate.

To provide consumers with a user-friendly experience of consistently high-quality regardless of the transmission path, the Bundesnetzagentur has actively supported the development of the DVB-I standard. The focus was on the implications of regulatory requirements for interoperability in the convergence of broadcasting and IP-based transmission. In order to do the best possible job of addressing these issues, the Bundesnetzagentur bundled its wide-ranging expertise into an interdisciplinary working group. The results will be made available for future efforts to revise the legal framework.

The Bundesnetzagentur continues to be very active in national and international bodies dealing with the standardisation of the transmission of broadcasting and other audiovisual media with the objective of promoting interoperability, competition and consumer protection.

Investigating interference – the radio monitoring and inspection service

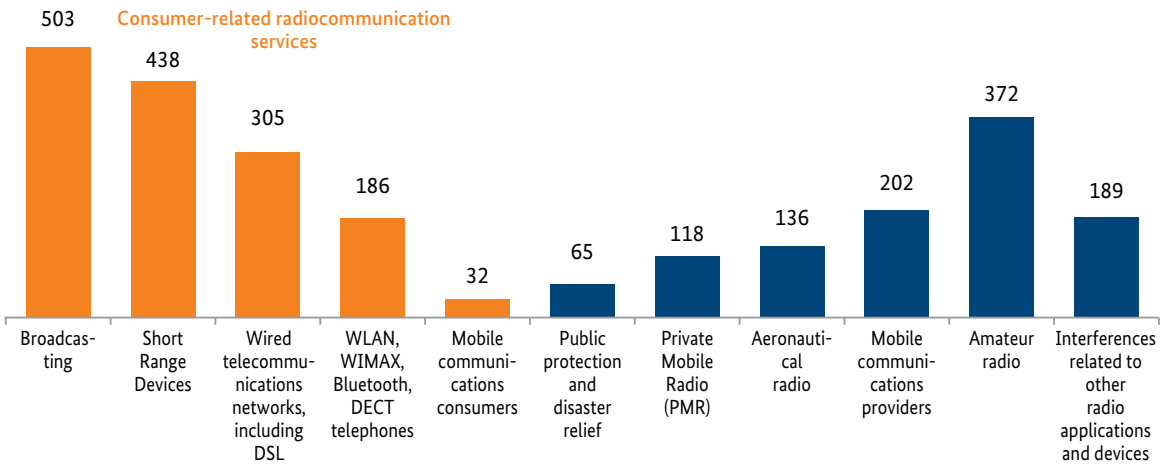
The Bundesnetzagentur's radio monitoring and inspection service is responsible for monitoring and ensuring the disruption-free use of radiocommunications, and one of its primary tasks in this regard is the resolution of cases of radio interference. Here, in addition to disruptions and interference with prioritised radiocommunications services like aeronautical radio, radio communication for civil protection and disaster relief, and maritime and inland waterways services, it also deals with radio interference cases related to everyday radio applications in households such as radio reception, WLAN networks, mobile service, and wireless shutter and garage door openers. By providing this service, the radio monitoring and inspection service makes an important and ever-growing contribution to consumer protection. In 2024, more than 1,400 of those cases concerned people with direct consumer issues, meaning they accounted for one in every two radio interference cases.

In total, the radio monitoring and inspection service resolved over 2,500 cases of electromagnetic incompatibility and radio interference on site in 2024.

As part of the German government's digitalisation initiative, citizens, organisations and companies have been able to report radio interference online since 2023. Since September 2024 it has also been possible to use this digital reporting channel without changing media. This means that customers can directly enter their online interference cases into the radio monitoring and inspection service ticket system for processing.

The radio interference resolution service can be used by institutions, companies and consumers free of charge. This also applies to the parties responsible for radio interference, insofar as they have caused this unintentionally.

Interference volumes by type of service 2024



Rulings, activities and proceedings

In 2024 the Bundesnetzagentur continued its spectrum award proceedings for mobile communications. The "Gigabitforum" will guide the technological transition from copper-based networks to fibre networks. The Federal Ministry for Digital and Transport monitoring unit continued its activities identifying and collecting information on duplicate fibre infrastructure projects.

Spectrum management

Spectrum award proceedings 800 MHz, 1800 MHz and 2600 MHz

Spectrum usage rights in the bands 800 MHz, 1800 MHz and 2600 MHz that are important for mobile communications will be expiring at the end of 2025. Spectrum award proceedings for these bands have now entered the decisive phase.

In September 2023 the Bundesnetzagentur published its framework for an interim decision and conducted a demand survey update. On the basis of this hearing the President's Chamber prepared a draft document for consultation on the extension of spectrum in these bands relevant to mobile communications. The Bundesnetzagentur plans to carry out competitive proceedings at a later point in time.

The spectrum usage rights in the bands at 800 MHz, 1800 MHz and 2600 MHz will expire at the end of 2025 and will be extended another five years on application by the established mobile network operators. The spectrum assignments in the 1800 MHz band expiring at the end of 2033 will be extended to the end of 2036. The aim is to bring the expiry dates of these usage rights in line with other usage rights that are due to expire at a later date. This would enable more spectrum to be made available for award at a later stage, in turn avoiding regulation-induced scarcity. In addition, market developments could be taken into account in later proceedings. A

larger framework for proceedings would offer the companies more opportunities for accessing spectrum.

However, an extension also serves to further improve mobile coverage. The primary objective is to create equivalent standards of living in urban and rural areas in terms of telecommunications services. The extension of the usage rights would thus be accompanied by obligations for the further rollout of the mobile networks. Under consideration in the draft document for consultation is whether to require every assignment holder to provide:

- at least 99.5% of the country with a data rate of at least 50 Mbps;
- at least 99% of households in each federal state in rural communities with a data rate of at least 100 Mbps;
- all federal roads with a data rate of at least 100 Mbps;
- a data rate of at least 50 Mbps for all regional roads and inland waterways of the federal core network, and
- 50 Mbps for all district roads.

Regarding sustainable mobile communications supply along railway lines, the Bundesnetzagentur believes that coordinated action and obligations to cooperate in the expansion are helpful.

After assessing the competitive conditions, the Bundesnetzagentur envisages arrangements for promoting competition to accompany the extension of usage rights. The Bundesnetzagentur considers the imposition of a negotiation requirement on service providers and mobile virtual network operators (MVNOs) to be necessary but reasonable.

With regard to the fourth network operator 1&1 Mobilfunk GmbH, the Bundesnetzagentur is planning to impose negotiation requirements for national roaming and cooperative shared use.

The Bundesnetzagentur has assessed all comments received on the draft document for consultation and will take the issues raised into account in the further course of the proceedings. The aim was to make a balanced decision on the provision of spectrum in good time before the spectrum usage rights expire at the end of 2025. The decision has since been published and is accessible on the Bundesnetzagentur website.[1]

1 bundesnetzagentur.de/mobilesbreitband

Competitive independence 1&1

1&1 Mobilfunk GmbH was enjoined to end its dual role as service producer/mobile virtual network operator (MVNO) on the one hand and – new – mobile network operator on the other. In accordance with the Bundesnetzagentur's determinations, 1&1 Mobilfunk GmbH had to end its sales operations as a service provider/ MVNO by the end of 2023 and then all of its business activities in this field by the end of 2025. 1&1 Mobilfunk GmbH complied with its obligation to discontinue sales at the end of 2023.

This was based on the principle of competitive independence. The principle of competitive independence means that operators of mobile networks may not also act as service providers/ MVNOs for another operator's network. This is because a network operator also acting as a service provider/MVNO in a competitor's network could potentially have an unfair competitive advantage. It could also have an interest in the success of the competitor's network that provides coverage to its own customers.

Decisions of the Cologne Administrative Court on the 5G spectrum award

By its decisions of 26 August 2024 in the proceedings 1 K 8531/18 and 1 K 1281/22 the Cologne Administrative Court called on the Bundesnetzagentur to revise the President's Chamber decision of 26 November 2018 on the award and auction rules (separate decisions III and IV) taking the court's legal interpretation into consideration.

In both of its decisions the administrative court believes that the President's Chamber decision of 26 November 2018 contains significant procedural errors. The specific way in which the procedures were arranged gives rise to reasonable grounds to suspect partiality from all three members of the President's Chamber at that time. The mere appearance of partiality suffices. With regard to political pressure, in particular from the Federal Ministry for Digital and Transport, the procedural design was non-transparent and occasionally yielding. According to the court, the suspicion of partiality was caused by the fact that, prior to the final decision, active communication in the form of telephone calls, emails and in-person meetings had taken place between members of the President's Chamber and the Bundesnetzagentur's specialised department and senior management and working level staff from the Federal Ministry for Digital and Transport. The parties involved in the award proceedings had the impression that there was a political and thus improper "ancillary procedure" for the spectrum auction.

Besides breaching the independence required of the Bundesnetzagentur under EU law and from the point of view of de facto predetermination, the President's Chamber decision also lacks ample consideration, so that a claim for a new decision exists.

The Bundesnetzagentur has appealed both court decisions (complaint against the non-admission of an appeal).

Switching off the 2G mobile networks

Deutsche Telekom is the first network operator to announce that it will shut down its 2G mobile network in Germany by the end of June 2028.

Generally the Bundesnetzagentur awards spectrum on a technology and service-neutral basis. The network operators are responsible for actual use of spectrum with efficient and future-oriented technologies. In order that the limited spectrum available is used to supply broadband mobile communications in a way that spares spectrum and energy, the Bundesnetzagentur considers it necessary to switch off old technologies at the end of their respective life cycle. By switching to new technologies and away from older technologies, the Bundesnetzagentur aims to limit negative effects for users as much as possible. Currently most consumers own a 4G/5G device.

Spectrum assignments in the exclusive economic zone (EEZ)

The EEZ is the marine area seawards of the 12-nautical-mile zone. Under the United Nations Convention on the Law of the Sea, Germany has limited sovereign rights and jurisdiction in its EEZ. To support and further develop the commercial use (including offshore wind energy) of the EEZ, applications for spectrum assignments in the bands for mobile/fixed communications networks (MFCN) may be submitted in accordance with section 91(1) in conjunction with section 229 Telecommunications Act (TKG).

Until now, it has primarily been narrowband mobile communication technologies that have been used in the offshore sector. The much larger capacities in the broadband frequency bands now open up new opportunities for use. The scope of the spectrum also ensures continued technological development on all levels. Another objective is to improve the working and living conditions of the workers on the platforms and service ships.

In 2023 the Bundesnetzagentur published framework conditions for spectrum assignments in the 700 MHz to 3700 GHz frequency bands for mobile broadband in the EEZ. Special arrangements were made because the EEZ is not part of Germany's federal territory. On the basis of these arrangements spectrum is assigned upon request if the applicant demonstrates by way of contract that the (planned) coverage is to a company that operates in the EEZ in question.

In 2024 wind farm projects were for the first time allocated spectrum for the North Sea. Interested market players are currently in discussion with the Bundesnetzagentur regarding spectrum assignments in the Baltic Sea.

Short-term assignments

The Bundesnetzagentur issues short-term assignments for spectrum to be used at sporting, cultural and other media events and for state visits. The spectrum is usually only needed for a few hours or days at a time. Many of the spectrum users are from outside Germany and frequently apply to use spectrum designated in Germany for other purposes. In these cases, the Bundesnetzagentur checks whether the spectrum can be used for a short time without interfering with other, designated uses. This is a complex task if an event is held near the border to another country because the Bundesnetzagentur then needs to coordinate with the neighbouring country.

Several major events of international importance took place in 2024 in which the Bundesnetzagentur's spectrum team was involved. The Bundesnetzagentur is on site at such major events with a team to meet short-term demand for spectrum and to monitor interference-free use by conducting technical tests on site. Major events particularly worth noting are an exhibition game played by the American National Football League (NFL) in Munich, the European Handball Championship and, as a highlight, the UEFA European Championship in the summer. The UEFA European Championship alone saw more than 5,000 spectrum assignments for users from around the world. The Bundesnetzagentur was present without interruption in the International Broadcast Center in Leipzig and in all stadiums.

Experimental radio

New innovative wireless applications do not usually fit into existing regulation. Experimental radio can thus be allowed, for a limited period of time, to deviate from the provisions contained in the Spectrum Ordinance or in the Spectrum Plan.

This flexibility with spectrum assignment makes it possible to develop and test new radio systems in Germany. The fact that there were more than 1,000 applications in 2024 demonstrates that there is a great amount of interest in the research and development of wireless technologies. Experimental radio applications include all wireless applications and the entire regulated spectrum from 8.3 kHz to 3000 GHz, from public mobile radio (eg 6G research) to the development of new small-area radio applications.

Each assignment in experimental radio is a case-by-case decision to ensure the unaffected operation of the existing spectrum use. This normally requires coordination with the holders of the existing assignments.

Satellite communications

Satellite communication is not only a fascinating technology but also a significant part of day-to-day life. From the transmission of television and radio signals, navigation, weather forecasts and air traffic, financial markets and telecommunications to the provision of communications services in remote areas, satellite communication has many applications. It is indispensable in many areas of the modern world and technological advancements continually drive innovation.

The satellites all work according to the same principle: they transmit data and signals at incredible speeds. Satellite communications often play an essential logistical role in floods, tsunamis, earthquakes, peacekeeping missions and preserving domestic and international security.

In the course of 2024, 10 geostationary and 40 non-geostationary satellite systems (including, in addition to orbiting satellites, deep space probes, orbital space tugs and service missions, launch systems and in-orbit manufacturing) were notified by the Bundesnetzagentur as a notifying administration to the International Telecommunication Union (ITU). Moreover, 75 other regulatory processes (eg amendments, notifications, suspensions, extensions, investigations) were carried out with ITU's Radiocommunication Bureau. International satellite coordination was conducted mainly by correspondence and comprised around 4,000 letters in 2024. Bilateral coordination discussions were held in 2024 with China, Spain, the United Kingdom and the United States. A global geostationary network to support links with aircraft and ships has been successfully coordinated and notified through Germany.

Mobile communications monitoring

Mobile communications monitoring uses an interactive map to create transparency about each provider's actual mobile coverage throughout the country. It provides all interested parties in the gigabit register with tailored information on mobile availability.

The network operators collect the necessary data on a quarterly basis and in doing so comply with the uniform requirements of the Bundesnetzagentur. The Bundesnetzagentur validates the network operators' data using data from its broadband and dead spot checker app.

Ongoing development of mobile communications monitoring

New features and content were added to the interactive map of mobile communications monitoring in 2024.

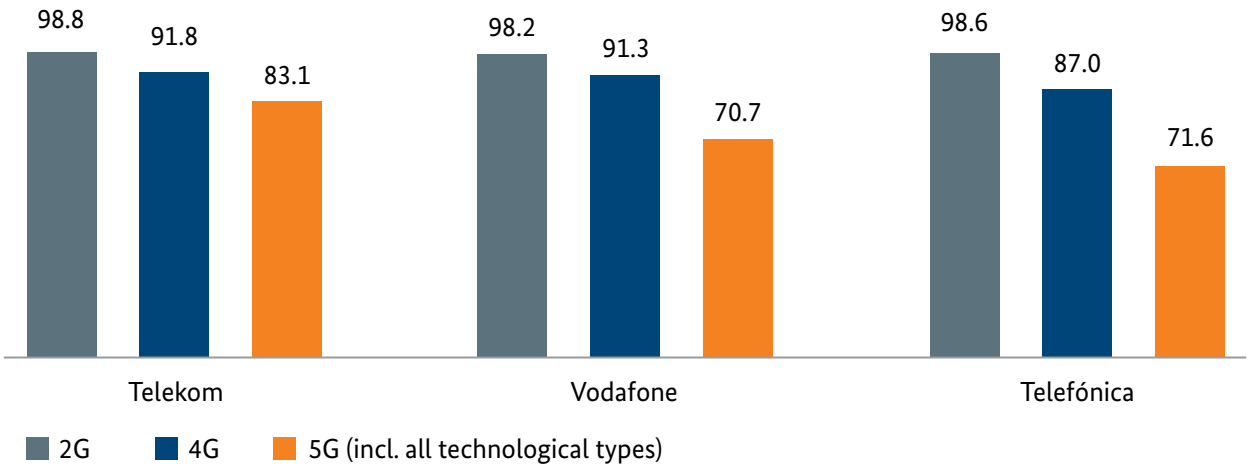
In March the mobile communications coverage of the network operator 1&1 was added to the map, showing 1&1's own 4G and 5G coverage as well as the network that is available through roaming.

Since June the map also shows coverage through the most powerful mobile communication standard 5G standalone (5G SA).

A new "mobile broadband" feature was added to the map in December that can be used to show geographical coverage with 4G, 5G or both technologies.

In addition to the interactive map, the gigabit register also features a new download section with additional data, maps and analyses.

Technology coverage by mobile network operator
(%)



The transport infrastructure report in the download area was replaced in 2024 by a comprehensive set of Excel spreadsheets for analysing mobile coverage by location, households and transport routes. The analysis now features a database with operator-specific and neutral data down to the municipality level.

Mobile network coverage in October 2024

Nearly all of the country has 2G coverage through at least one network operator. As at October 2024, the overall coverage of all mobile network operators was unchanged from the previous year at 99.8%, and 4G coverage was also at the same level as the previous year at 97.5%. The following chart compares the level of the individual network operators' coverage. It shows that all network operators have a very high level of 2G and 4G coverage. The mobile network operator 1&1, which is currently configuring its network, is not represented in the chart below. A subsequent section of this report provides an update on the development status of the new network.

5G network coverage in Germany

The level of 5G coverage nationwide varies between 71% and 83%, depending on the network operator. These figures take all technological variants into consideration.

Today more than 93% of the country has 5G coverage from at least one network operator. An analysis of the 5G data shows dynamic development in the level of 5G coverage in the years since this data was first collected in October 2021. Within three years, 5G coverage increased by around 40 percentage points.

The most powerful 5G variant 5G standalone (5G SA) shows until October 2024 an increase of around six percentage points compared to the same month of the previous year. In terms of percentage, the 5G SA supply is around 93% nationwide, almost identical to the overall 5G supply. In 5G SA, only 5G infrastructure is used in the radio access network and the core network. Mobile customers benefit from the higher data rates. In addition, the delay in signal transmission (latency) is lower than with 5G non-standalone (5G NSA).

In combination with other technologies, 5G SA enables data-hungry real-time applications in mobile communications. These include delay-free video transmission or augmented reality applications that blend the real world with the digital world. In addition, mobile communications technology simplifies the automated exchange between devices and machines (machine-to-machine communication). This is of increasing importance for industry in particular, for example in process automation.

Mobile coverage from 1&1

1&1 has been operating its own mobile network since December 2023. According to the company, as at October 2024, the network it is developing supplied 0.52% of Germany with 5G and 0.44% with 4G. In areas where 1&1 has not developed its own network, it provides coverage to customers through national roaming. Telefónica's network was primarily used for this purpose until August. Since August new 1&1 customers have been using Vodafone's roaming network. The mobile communications monitoring map of the gigabit register currently shows 1&1 coverage including national roaming coverage in Telefónica's network. By autumn 2025 the gradual migration of existing customers into Vodafone's roaming network and a subsequent change of perspective in the interactive map are planned.

Broadband maps and data

The interactive map of mobile communications monitoring makes it easier for users to check whether mobile broadband coverage is available in their region. Since December a new "mobile broadband" filter can show the geographical coverage of 4G, 5G or both technologies.

The view of the map across all network operators shows where there are still white[2] or grey[3] spots in the country. This interactive display replaces the map provided at the beginning of the year in the download section. The new filter shows those regions where complete rollout of the mobile networks is proving difficult, not least because of the topography.

White and grey spots

The Bundesnetzagentur saw a positive development in grey and white spots in 2024. The share of white spots throughout Germany has fallen from around 2.5% to 2.2% and grey spots have decreased by 1.7 percentage points to 14.2%. The share of areas without mobile coverage (dead spots) is 0.2%.

Entry into force of the new Amateur Radio Ordinance

Amateur operators use amateur service for training, for communicating with other amateur operators and for technical studies. Amateur service offers amateur operators a means of conducting radio communication with other amateur operators around the world. In Germany, everyone is permitted to hear amateur radio broadcasts and own amateur radio equipment. However, operating an amateur station transmitter requires special knowledge and a licence to participate in amateur service. Persons who are issued a licence are assigned a personal call sign together with their licence. Amateur operators may build their own transmitting station provided that the station complies with the relevant technical regulations. Amateur operators can prove they have the requisite knowledge by sitting an exam

2 Areas with no 4G or 5G coverage
3 Areas with 4G or 5G coverage from at least one but not all network operators

held by the Bundesnetzagentur or another telecommunications authority whose test certificates are recognised. Germany had 61,311 registered amateur operators at the end of 2024.

A special aspect of amateur service in Germany is that it is not governed by the Telecommunications Act but rather by separate legislation: the Amateur Radio Act. This act, together with the Amateur Radio Ordinance, constitutes the statutory foundation for amateur service in Germany.

The second and third regulation amending the Amateur Radio Ordinance entered into force on 24 June 2024. This new ordinance brought the Amateur Radio Ordinance into line with current technical possibilities and updated international legal frameworks. In addition, it established a new licence class – N – as a low-threshold route to taking up amateur radio as a hobby. In 2024 a total of 571 exams were taken for the new licence class N.

Another innovation is the introduction of club station call signs for members of the public emergency, disaster prevention and rescue services, as well as for emergency radio groups. The club station call signs were requested several times by the authorised bodies and were added to the call sign plan by the Bundesnetzagentur following a thorough examination and weighing of interests. New call sign series have been determined for this purpose.

Further information is available in German on the Bundesnetzagentur website. (bundesnetzagentur.de/amateurfunk)

Limiting previously open-ended spectrum assignments for traditional PMR

A time limit was later imposed on all spectrum assignments that had been open-ended in the area of private mobile radio (PMR). The reasons for this are, firstly, changes in the channel spacing to make more channels available and, secondly, more efficient spectrum usage. This step is aimed at averting spectrum scarcity in various frequency bands. This will particularly affect spectrum assignments that are 20 or more years old. Many assignments are presumably currently no longer being used.

Time limitations were imposed as retroactive ancillary provisions in spectrum assignments by means of general rulings issued to specific persons. Some spectrum uses were set to expire on 31 December 2025 while most were set to expire on 31 December 2028.

Further information is available on the Bundesnetzagentur website. (bundesnetzagentur.de/umstellung-befristung)

Campus networks

For the implementation of new internal networks confined to certain premises, 5G technology is gaining attention and popularity in the 3700 to 3800 MHz frequency band as well as in the 26 GHz band. The Bundesnetzagentur established the assignment procedure for applications in both bands in 2019 and 2021, respectively.

By awarding spectrum for campus networks, the Bundesnetzagentur supports future-oriented applications, eg in the area of autonomous driving and Industry 4.0. Here the smart networking of machines and processes in industry is becoming increasingly important. There is a steady increase particularly in the 3700 to 3800 MHz frequency band, which is in part due to the fact that industries initially developed these applications for themselves and the corresponding equipment became increasingly available on the market. About half of the spectrum assignments are for the areas of telecommunications, IT and services, as well as metals and electronics, and around a third are for the areas of society, research and development.

In the 26 GHz frequency band, demand for spectrum assignments has remained moderate since the application process began. This is mainly due to the lack of technology on the market.

The focus for the further development of frequency bands for campus networks with low and medium power is on the 3800 to 4200 MHz frequency band.

Fixed links

Nowadays fast internet with high data rates is a necessity. Even though this can already be achieved in many cases with optical fibre cables, transmissions through fixed links remain necessary to meet increased demand. In 2024 around 20,500 spectrum assignments were made, of which around 85% were for mobile network operators. To meet the increased demand for high data rates, there has been a sharp increase in the frequency bands where stable transmission of data is possible.

The Bundesnetzagentur supports public agencies on request when they are making construction plans, such as the expansion of wind farms or other construction projects, by identifying expected conflicts with existing fixed links and providing contact details of the operators. Around 5,300 such requests were processed in 2024.

Gigabitforum

The Bundesnetzagentur established the Gigabitforum in March 2021. The experts represented in the Gigabitforum guide the technological transition from copper-based networks to fibre networks. The forum comprises representatives of telecommunications industry associations, providers of telecommunications networks and services, the competent Federal Ministry for Digital and Transport, the federal states and the Wissenschaftliches Institut für Infrastruktur und Kommunikationsdienste GmbH (WIK). The Gigabitforum provides a central platform for dialogue about framework conditions promoting investment and competition for the accelerated migration from copper to fibre networks. The aim is to identify challenges and obstacles for copper to fibre migration as early as possible, jointly discuss options and identify possible solutions for all players in a transparent way.

Copper to fibre migration

More than one third of Germany's population already has access to fibre products. The rollout of fibre networks is adding around four million potentially usable fibre connections each year. This means that the replacement of traditional copper infrastructures and the transition to gigabit-capable networks are becoming more and more important. The Gigabitforum enables an early and ongoing discussion of general migration issues.

From February to August 2024, pilot projects were launched for the migration from copper-based digital subscriber lines (DSL) to new fibre connections in three regions in Thuringia and Hesse. Among other things, these projects focused on, communication with end-users, the cooperation between the telecommunications companies involved, and the processes and IT systems that the rollout will involve. The aim of these pilot projects, which were limited to very small areas, was to gather practical experience of the issues through normal operations. In November 2024 the Gigabitforum evaluated the pilot projects in cooperation with WIK and drew up a report using the findings. The evaluation report on the pilot projects is available in German and can be downloaded from the gigabitforum.de iwebsite under the Projektgruppe Pilotprojekte (project group pilot projects) section.

Key to determining a future switch-off of the traditional copper infrastructure is not only the number of homes passed but in particular the number of homes connected by deploying fibre into and within buildings. The Gigabitforum therefore recommends driving forward the deployment of fibre for homes now and considering legislative amendments to facilitate deployment.

The pilot projects yielded findings relevant to processes within and across companies and identified further areas of action to be developed. The aim in designing the successive migration process, which will have a long-term effect on the entire country, is to ensure that consumers continue to have a choice between high-quality services from various providers at all times. This requires the industry players to drive forward preparations, for instance in their IT systems, at an early stage. It has also become clear that, when delineating switch-off areas, not only are network-related aspects important but also overarching customer communications. In this context, the Gigabitforum is planning to continue its active dialogue with the market in 2025.

Open access

Another focus of the Gigabitforum is on open access, when operators voluntarily open up their fibre networks to other providers of internet access services. The aim is to facilitate the conclusion of agreements on network access in the future. The forum discusses a common understanding of open access principles and reaching a consensus on industry standards that can reduce negotiation costs between telecommunications companies.

A pdf document is available in German (Gigabitforum – Arbeitsauftrag an die Projektgruppe "Open Access") on the gigabitforum.de website under the heading Projektgruppe Open Access (project group open access) with information on achieving this goal through three task packages (Arbeitspakete). Building on the 2023 situation analysis, which identified the status quo of voluntary open access in the market, the project group works to provide reference points for open network access agreements. The agreements are to help overcome obstacles in the negotiations and reduce negotiation costs. The focus is on layer 2 and layer 3 bitstream access, which is the most frequently requested wholesale product according to the market inquiry. On this basis the Gigabitforum is drawing up a non-binding catalogue of possible contractual elements, which should serve to provide the market with a basic framework for open access agreements. In addition, the technical feasibility of fibre local loop access opportunities was examined and discussed.

The Gigabitforum published a report in German (Gigabitforum – Bericht zu den Arbeiten der Projektgruppe Open Access und der Fachgruppe Glasfaser-TAL) on the results of its work to date on this topic in the Projektgruppe Open Access section of gigabitforum.de in November 2024. The report contains many points for the drafting of contracts on which consensus could be reached in the discussion. The report identifies other points that require subsequent bilateral negotiations between the companies and those that have generally remained controversial. The report also provides an overview of the work on a fibre local loop product.

Aiming to support market-wide open access at technical and process level as well, a working group for interfaces and processes is developing a modern interface architecture for the exchange of access products that accommodates the requirements of fibre networks. In December 2024 the working party published its results at ak-spri.de/fit/, which include essential processes in the interplay between access providers and access seekers (eg provision and cancellation). The documents available, including comprehensive documentation on professional and technical processes, enable interested companies to test the interfaces developed in normal operation.

Duplicate fibre infrastructure

The Federal Ministry for Digital and Transport (BMDV) and the Bundesnetzagentur established a monitoring unit in July 2023 to identify and collect information on duplicate fibre infrastructure projects. The Bundesnetzagentur published an interim report on this in April 2024.[4] The aim was to take stock of duplicate infrastructure projects. This corresponds to the implementation of the federal government's gigabyte strategy. The monitoring unit keeps a record of planned and actual duplicate fibre deployment projects. Continual and systematic monitoring helps to create the most precise possible insights into local planning and deployment processes. The published interim report provides an initial overall picture of the cases reported.

The analysis in the interim report was based on 427 cases reported to the monitoring unit up to and including 1 March 2024.

The analysis focused on four aspects that generally have the potential to negatively affect existing deployment or investment plans of competitors who are first to deploy infrastructure. Three aspects looked at the conduct of a company that was second to deploy its infrastructure. The fourth aspect examined whether a first company would withdraw from the deployment partially or completely in reaction to these practices. The aspects analysed were:

- **Development only in lucrative core areas:** The duplicate fibre deployment is limited to lucrative core areas. If the first company plans virtually nationwide development of the rollout area, its original compensatory pricing will be affected by the duplicate fibre deployment.

- **Swift response:** A later competitor responds swiftly to a commercial launch by a telecommunications competitor deploying first. If this happens in the pre-marketing phase of the company acting first, this may result in the first company missing the required sales quota.

- **"Empty" planned duplicate fibre infrastructure projects:** The second company announces a rollout and does not subsequently follow through. Even the mere announcement of a rollout can impact the marketing activities of the first company.

- **Partial or full withdrawal by the company deploying first:** There is evidence that companies abandon their deployment plans if a second competitor company intervenes at an early stage.

To create an overall picture of the situation, the monitoring unit has analysed various forms of competition. In terms of numbers, there is a balance between the cases in which Deutsche Telekom and the cases in which one of its competitors was reported to be duplicating infrastructure. However, the reported cases suggest that Deutsche Telekom, compared with other companies reportedly duplicating infrastructure, has much more frequently responded swiftly to a commercial launch by a competitor acting first or only deploys infrastructure in lucrative core areas. The review is albeit based solely on information from the

4 bundesnetzagentur.de/864760

players participating in the monitoring survey and it is often not possible to fully verify the information. The descriptions also do not allow conclusions to be drawn about the motives or strategies of the companies that have been reported as involved. For this reason the

Bundesnetzagentur asked the most frequently mentioned companies for further information on the day the interim report was published.

The responses received and further incoming case reports were analysed. The monitoring unit's task was and is the empirical collection of information on cases of duplicate fibre infrastructure. It has provided a comprehensive overview of the market situation. Under the TKG, legal assessments and regulatory responses within the framework of market regulation are reserved for the ruling chambers. For this reason the Bundesnetzagentur handed over selected individual cases to its Ruling Chamber 3 at the end of 2024.

At that time there were no specific legal allegations. The ruling chamber's responsibilities include making legal assessments of various situations and, if necessary, consulting with the parties involved to condense unverified reports into legally useful facts. If facts come to light that justify the assumption that intervention by the authority is necessary, the ruling chamber initiates proceedings.

After the interim report was published, another 94 cases were reported to the monitoring unit by 31 December 2024. The most recent data is published on the Bundesnetzagentur website.[5]

Broadband funding

With "Gigabitförderung 2.0" the federal government supports fibre rollout in areas where the rollout would not be possible using an operator's own resources.[6] The aim is to create equal living conditions throughout all of Germany. The legal framework for the support is the gigabit framework arrangement, which requires approval from the European Commission. To meet the requirements of the European Commission, a new version of the framework arrangement stipulates that wholesale prices for access to future state-supported networks must be bindingly set and that they must already be specified for competitive tendering[7]. The prices apply to all state-supported projects approved under the new gigabit framework arrangement. The funding amounts are to be determined by the federal government with the Bundesnetzagentur's involvement.

At the request of the BMDV, the Bundesnetzagentur assumed the conceptual and operational compilation of the funding amounts. This ensured that interplay or consistency issues with wholesale prices from other areas of market regulation were taken directly into account. For the first time, wholesale prices were set for all essential fibre network access products. The prices applied to both active products (bitstream on layer 2 and layer 3) and passive products (dark fibre pairs, ducts and access to the physically unbundled local loops called fibre local loops). Even if only areas receiving future support are directly affected, the industry is also expecting a signalling effect on prices in the private sector. The extent to which a signalling effect develops will be shown by the future market processes in

5 bundesnetzagentur.de/864760

6 bmdv.bund.de/Breitbandausbau

7 bmdv.bund.de/SharedDocs/DE/Anlage/DG/Digitales/gigabit-rahmenregelung.pdf

price negotiations. The aim was to determine the competitive price level that emerges in those areas where operators have rolled out broadband without government support. This measure comes from the idea of providing funding to create comparable living conditions in areas with and without funding from the state. Different price-setting methods were followed in accordance with the requirements of the gigabit framework arrangement. For a benchmarking study the Bundesnetzagentur conducted an industry-wide market survey aimed at contractually agreed wholesale prices for all relevant products and included all companies deploying optical fibre infrastructure (more than 250). The Bundesnetzagentur commissioned WIK-Consult GmbH to carry out a cost study/modelling to determine cost-reflective prices. The study focused on access to fibre local loops. The necessary cost and network structure parameters were also gathered through a market survey. Twelve selected companies that deploy optical fibre were contacted. The companies represented a cross-section of the market and were already familiar with the highly complex questions from previous surveys. Price setting on the basis of charges regulated by the Bundesnetzagentur was examined but ultimately not considered because of the special structure of these charges.

With the exception of wholesale prices for access to fibre local loops, all prices were ultimately determined on the basis of the benchmark, ie using existing market-negotiated prices. The cost modelling designed by WIK was used primarily for the access to the fibre local loops (with the exception of the associated one-off charge). Regardless of the method, the price for each product aimed at a standard price model for the mass market, which is the essential cornerstone of the pricing structure. A report summarising the approach and considerations for determining prices as well as the specific price recommendations has been published on the BMDV website.[8]

The industry's high level of participation in the benchmark survey was key to achieving valid results. In spite of the short time available for all parties involved, the feedback rate was 98%. To assess the benchmark survey, the information provided by the companies was examined for plausibility and, in cases where there was ambiguity, enquiries were sent to the companies. For each wholesale product a price was then determined for the most relevant variant on the market. The price was derived from the average contractually agreed prices in financially self-sufficient areas.

Close contact was maintained with the market during the price determination process. Together with the BMDV the Bundesnetzagentur held information events at the beginning of the benchmark market survey. An interim status of the results as well as the suggested final price were presented in an industry-wide meeting. In addition, various discussions were held with representatives of associations and companies to gain important insights into the deployment practices of the companies. The BMDV published the wholesale prices recommended by the Bundesnetzagentur on its website on 23 December 2024.[9] The prices are thus binding for all companies receiving support from the federal government under the 2024 gigabit framework arrangement.

8 bmdv.bund.de/SharedDocs/DE/Anlage/DG/erlaeuterungen-der-bnetza-zu-den-vorleistungspreisen.pdf
9 https://bmdv.bund.de/SharedDocs/DE/Anlage/DG/vorleistungspreise.pdf

Numbering

Effects of ending offline billing

The German wholesale telecommunications market discontinued offline billing as from 31 December 2024. In offline billing the price for a connection is set by the provider of the called party. The caller's provider receives a calling data record after the end of the call and the caller is billed the connection charges.

Ending offline billing eliminated in particular the call by call and preselection services, where Telekom lines could be used to select or preset alternative providers using a code (010xy). Services for narrowband internet access (online services) and virtual private networks are also affected, and reverse charge call services can no longer be billed as they were previously.

Since 1 December 2024 the (0)900 premium rate services and the 118 numbers for directory enquiry services, both of which were also affected by the change, can be billed directly by the caller's provider in online billing. To this end and on the basis of a legal authorisation, the Bundesnetzagentur has set uniform retail prices across all networks. For (0)900 numbers nine rate categories between €0.49 and €2.99 have been introduced. The pricing allows content providers to show the exact retail price when advertising their services. For many providers of premium rate services the introduction of rate categories means that they have to adjust their telephone number to the desired tariff. In the course of opening the new rate categories, the Bundesnetzagentur reassigned nearly 2,000 (0)900 numbers, giving preferential treatment to assignment holders that wanted to change categories.

First IMSI assignments for mobile applications with three-digit mobile network codes

International mobile subscriber identities (IMSIs) are numbers that are required for registering terminal equipment in mobile networks. Until now IMSIs were assigned to mobile network operators using a two-digit mobile network code (MNC) in blocks of 10bn IMSIs. Since only two digits can be used for the MNC, only 100 blocks with the MNCs from 00 to 99 are available under Germany's mobile country code (MCC), which is 262. Around one third of the 100 IMSI blocks are already permanently assigned.

The relevant International Telecommunication Union (ITU) recommendation, E.212, also allows three-digit MNCs. This made it possible to assign 10 times more blocks, each with 1bn IMSIs. However, the operators of public mobile networks in Germany have spoken out against the mixed use of two and three-digit MNCs.

The Bundesnetzagentur is continually adjusting the regulations on IMSIs so that new needs can be met as they emerge. Given that IMSI blocks are an extremely scarce number resource, the Bundesnetzagentur pays increasingly close attention to their effective use. For example, the MNC 98 is shared by the operators of private mobile networks (campus networks). In addition, the MNC 86 was made available for assigning three-digit IMSIs. By doing this the Bundesnetzagentur responded to the demand for numbers for mobile phone applications where problems with three-digit MNCs do not occur. The Federal Agency for Public Safety Digital Radio (BDBOS) was assigned a three-digit MNC in 2024.

Proceedings of Ruling Chambers 2 and 3

Regulatory orders for market 1 and market 3b concerning Glasfaser NordWest and GlasfaserPlus

On the basis of Determination BK1-20/004 by the President's Chamber of 16 December 2020, Ruling Chamber 3 issued a total of four orders on 16 July 2024 under section 14(2) TKG related to Glasfaser NordWest GmbH & Co. KG and GlasfaserPlus GmbH for market 1 and market 3b respectively.

Ruling Chamber 3 used the obligations imposed on Telekom Deutschland GmbH in 2022 as a basis for drawing up the orders concerning the merged undertakings. Adjustments were made where necessary due to differences in the grid expansion area, the products offered and different actual starting conditions. For example, the obligations imposed on Telekom Deutschland GmbH in connection with copper connections were not transferable to the joint venture because they exclusively deploy optical fibre.

The new regulatory orders only gave Telekom Deutschland GmbH supplementary monitoring obligations vis-à-vis the Bundesnetzagentur (in addition to the current orders in the markets 3a and 3b).

The drafts of the regulatory orders were nationally consulted in spring 2024 and submitted to the European Commission, BEREC and the regulatory authorities of the other Member States for assessment in June 2024.

The decisions further completed the regulatory framework for the fibre sector. Competitors now have uniform and transparent access conditions to the entire optical fibre network of Telekom Deutschland GmbH and its merged undertakings.

Glasfaser NordWest GmbH & Co. KG and GlasfaserPlus GmbH have appealed to the Cologne Administrative Court against the obligations imposed in the above decisions with regard to access to civil engineering. GlasfaserPlus GmbH is also opposed to the obligation to publish a reference offer for layer 2 and layer 3 bitstream access. Both complainants have also applied to the Cologne Administrative Court for interim relief.

The legal actions are related to the appeals lodged by Telekom Deutschland GmbH in 2022 against the regulatory order addressed to it with respect to obligations concerning access to civil engineering. The Cologne Administrative Court had not granted Telekom Deutschland GmbH's application for interim relief against the obligations regarding access to civil engineering. The principal proceedings are dependent on a preliminary ruling pending before the Court of Justice of the European Union on the interpretation of section 26 TKG. It is assumed that the Cologne Administrative Court will decide on the cases together in context.

Full fibre reference offers by GlasfaserPlus and Glasfaser NordWest

Among other things, Glasfaser NordWest GmbH & Co. KG and GlasfaserPlus GmbH (both undertakings are merged with Telekom Deutschland GmbH) were required by the regulatory orders issued on 16 July 2024 for market 1 and market 3b to publish standard offers for layer 2 and layer 3 access to their fibre connections.

Both undertakings presented their reference offers on 16 October 2024 and thus within the statutory three-month period after the regulatory order was issued (section 29(2) TKG).

The layer 2 reference offer (Fiber Broadbrand) essentially corresponds to the contractual agreements concluded by Glasfaser NordWest GmbH & Co. KG and GlasfaserPlus GmbH with various competitors as well as the draft contract submitted in connection with the issuance of the market 1 regulatory order. The reference offers contain many rules that are also the subject of Telekom Deutschland GmbH's reference offer and are currently still being examined in the reference offer procedure of Telekom Deutschland GmbH for fibre broadband.

In terms of content the layer 3 reference offers (IP Fiber Broadband) submitted correspond almost completely to the layer 2 reference offers. However, for layer 3 reference offers, there are different rules for the handover access and transport.

The ruling chamber has initiated review procedures in accordance with section 29 TKG. It will review the reference offers submitted and, if necessary, ask the two undertakings to modify the reference offers as a first step.

Telekom's reference offer for access to civil engineering

On 14 November 2024 the Bundesnetzagentur issued the initial partial decision in the proceedings to review Telekom Deutschland GmbH's reference offer for access to civil engineering (duct access).

By regulatory order BK3i-19/020 for market 1 of 21 July 2022, Telekom Deutschland GmbH was obliged to submit a reference offer for access to civil engineering for the rollout of mass-market ready very high capacity networks at fixed locations. This access is an integral part of the regulatory framework for the new fibre networks and is intended to make it much easier for competitors to deploy. Accordingly, the EECC and the European Commission Recommendation on the regulatory promotion of gigabit connectivity also attach central importance to access to the passive infrastructure of the market-dominant undertaking, which will also ensure sustainable, infrastructure-based competition in the future.

Telekom Deutschland GmbH fulfilled its obligation to submit the draft reference offer on 13 July 2023.

After thoroughly assessing the contract, Ruling Chamber 3 as the competent body concluded in its decision that the draft submitted did not comply with the legal requirements for a reference offer. Thus in an initial partial decision on 17 November 2024 Telekom Deutschland GmbH was required to adjust its offer extensively to enable access seekers to compete in fair competition for end-users and its own users of wholesale services and to balance the interests appropriately.

Telekom Deutschland GmbH was given two months to submit a revised draft to address the deficiencies that were identified. In the second stage of the proceedings, Ruling Chamber 3 will use this revised draft to assess whether the obligations set out in the published decision have been fully implemented and, where necessary, will itself specify in detail the necessary adjustments to be made.

Telekom's rates approval for access to civil engineering

By regulatory order BK3i-19/020 of 21 July 2022, Telekom Deutschland GmbH was obliged to provide access to civil engineering for the rollout of mass-market ready very high capacity networks at fixed locations as from 1 January 2024. The charges were subject to approval under section 39 et seq TKG. In October 2023 Telekom Deutschland GmbH submitted a corresponding rates proposal to Ruling Chamber 3 as the competent body.

In the subsequent proceedings a large number of different connection and leasing charges were reviewed. These charges are levied by Telekom Deutschland GmbH for the use of its civil engineering assets. The positions of Telekom Deutschland GmbH and competitors on the level of charges and the basis for calculating them were extremely controversial, even more so than in other proceedings for charges. The final approval rates for providing access to civil engineering assets lie between these (extreme) figures and are thus significantly lower than originally requested by Telekom Deutschland GmbH.

This was the first time a rates assessment had to take account of the effects on the dominant undertaking's business plan under section 38(5) para 3 TKG. This is to ensure that there is still an incentive for the undertaking to roll out high-speed networks. The rates calculated by Telekom Deutschland GmbH had factored in its potential loss of customers to competitors and the resulting loss of revenue (lost contribution margins). The Bundesnetzagentur followed these considerations in principle but also took into account the costs incurred by Telekom Deutschland GmbH. Markups on costs because of a potential loss of customers are only justified for infrastructure for which Telekom Deutschland GmbH is making particular fibre investments. This is the case with the connections between street cabinets and customers, where Telekom Deutschland GmbH has only just begun to deploy fibre.

By contrast, the main cable segment is already mostly equipped with fibre that was installed by Telekom Deutschland GmbH at the same time that it deployed vectoring. Investments in these connections are safeguarded by a risk premium on the rate of return for fibre networks (known as the "VHCN WACC").

In its comments on the draft decision, the European Commission had criticised the fact that the rates approval was not based strictly on Telekom Deutschland GmbH's costs. However, in the interests of encouraging the rollout of fibre networks German legislators opted for taking account of investment safeguards beyond cost-reflectiveness.

It is not yet possible to say exactly how take-up of duct access will be. The approval is thus initially very short, until the end of 2025. Ruling Chamber 3 will be closely monitoring market trends.

Telekom rates approval for colocation electricity, air conditioning/ventilation and the leasing of space

On 21 May 2024, Telekom Deutschland GmbH submitted a subsequent application for approval of the charges that would expire on 31 July 2024 for co-location electricity, the leasing of air-conditioning systems and for co-location space rentals, including additional services at main distribution frame locations. On 4 November 2024, following a consolidation procedure, Ruling Chamber 3 issued its decision on the charges approval request.

Charges for ongoing electricity consumption, air conditioning/ventilation and the leasing of space have increased slightly compared to the respective pre-approval.

In the course of the approval the real imputed rate of return for existing infrastructure was set at 2.81% (which equates to 4.81% nominally). This was a moderate reduction of both the nominal and the real interest rates compared to the determination from the previous year, in which a nominal interest rate of 5.06% and a real interest rate of 2.96% were approved. The newly calculated interest rates are also reasonable and appropriate as the financial sector is currently stabilising. Due to the large discrepancy remaining between the current interest rate situation on the capital markets and the average assessment of risk-free interest rates over the past five years as set out in the European Commission's WACC Notice, the macroeconomic situation in the country's telecommunications sector also had to be taken into account again when calculating interest rates.

Notification procedure for changing certain charge items for wholesale Ethernet VPN 2.0

On 29 May 2024 Telekom Deutschland GmbH submitted a planned change in certain charge items for provisioning wholesale Ethernet VPN 2.0, which was to go into effect on 1 August 2024. The Bundesnetzagentur examined the charges for indications of anti-competitiveness and did not object to the changes Telekom Deutschland GmbH wanted to make to the charge items (monthly leasing rates for lines of 2 Mbps up to and including 20 Mbps (copper) and the UNI (user-network-interface) and NNI (network-network-interface) 1Gbps (fibre) lines, monthly leasing rates for lines of 2 Mbps up to and including 100 Mbps) as well as the initial notification of the additional services "Change/switch the physical interface on the UNI/NNI line" and "Change/switch the network termination device or its power supply". There were no clear indications either to assume obvious anti-competitive pricing in charges for wholesale products or of a margin squeeze as referred to in section 37(2) para 3 TKG or any other anti-competitive pricing behaviour.

On 7 June 2024 Telekom Deutschland GmbH submitted another planned change in the charge item for wholesale Ethernet VPN 2.0, which was to go into effect on 7 August 2024. The Bundesnetzagentur examined the planned change of the additional service "Laying cable within the customer location" for indications of anti-competitiveness and did not object to the change. There were no clear indications either to assume obvious anti-competitive pricing in charges for wholesale products or of a margin squeeze as referred to in section 37(2) para 3 TKG or any other anti-competitive pricing behaviour.

Reference offers for VPN 2.0

After Ruling Chamber 4 issued a first partial decision on 4 July 2023 requiring Telekom under section 29(3) TKG to change various aspects of its reference offer for VPN 2.0, Telekom Deutschland GmbH submitted a revised reference offer on 4 September 2023. The revised reference offer has since been reviewed in accordance with section 29(5) TKG in a second partial decision examining whether the required amendments have been correctly implemented. If the specifications have not been (adequately) implemented by Telekom Deutschland GmbH, Ruling Chamber 2 itself will make the changes to the reference offer in the second partial decision. The consultation procedure to be conducted in accordance with section 12(1) TKG for drawing up the second partial decision draft began on 19 February 2025. Interested parties had the opportunity to

comment on the second partial decision draft until 19 March 2025. Currently Ruling Chamber 2 is evaluating the comments received and will take them into account when making its final decision. The second and final partial decision is expected in the first half of 2025.

Dispute resolution procedure between Multiconnect GmbH and Telefónica

On 6 September 2023, Multiconnect GmbH requested that a dispute resolution procedure pursuant to section 212(1) TKG be initiated with respect to Telefónica Germany GmbH & Co. OHG at the competent ruling chamber of the Bundesnetzagentur. The parties had previously conducted negotiations on full mobile virtual network operator (MVNO) access to Telefónica Germany GmbH & Co. OHG's mobile network but were unable to reach agreement. In essence, Multiconnect GmbH alleged that Telefónica Germany GmbH & Co. OHG infringed the negotiation requirement set forth in point III.4.15 of the President's Chamber decision of 26 November 2018 by offering Multiconnect GmbH conditions that would be objectively unsuitable to ensuring the conclusion of an agreement. Multiconnect GmbH criticised several aspects of the agreement offer, including wholesale rates, the exclusion of access to 5G and exclusivity provisions, and essentially requested that Telefónica Germany GmbH & Co. OHG be ordered to submit an offer that had been modified accordingly. Telefónica Germany GmbH & Co. OHG rejected these allegations. It maintained that negotiations were conducted without any fixed expectations regarding the results. According to Telefónica Germany GmbH & Co. OHG, the negotiation requirement encompasses the aim of concluding, in the course of private, autonomous negotiations, an agreement on access to the network of a spectrum assignment holder, but is not however suited to serve as the basis for laying down individual terms. Telefónica Germany GmbH & Co. OHG noted that the negotiation requirement is not about some form of access regulation or reference offer procedures.

This dispute resolution procedure (BK2-23/002)

involves important competitive and regulatory issues regarding the content and scope of service provider regulation in the context of the special features of an MVNO access and is unusually complex. Expedited proceedings before the Cologne Administrative Court (1 L 1095/23) were instigated by the respondent due to the number of redactions. Following the first hearing on 4 July 2023 the complainant made comprehensive changes to the applications. A market data survey was required to determine central questions of the facts of the case; another public hearing on its scope was held on 15 December 2023. This information was finally provided in 2024.

The application is currently under review by the competent ruling chamber. The final decision is expected in the first half of 2025.

Leasing rate for SDH carrier leased lines and for Ethernet over SDH carrier leased lines

Since the approvals for its rates were due to expire, Telekom Deutschland GmbH applied on 18 October 2023 for the approval of new leasing rates for classic SDH carrier leased lines (BK2a-23/003) and for Ethernet over SDH carrier leased lines (BK2a-23/004).

Individual proposals were submitted for numerous bandwidths – 2 Mbps, 34 Mbps, 155 Mbps, 16x2 Mbps, 21x2 Mbps, 63x2 Mbps for SDH carrier leased lines and 2.5 Mbps, 5 Mbps, 10 Mbps, 12 Mbps, 50 Mbps, 100 Mbps and 150 Mbps for Ethernet over SDH carrier leased lines.

Since these are point-to-point connections, two access lines (customer location or co-location) and a junction line (locally or between two local networks) must be paid. For these two procedures, Telekom Deutschland GmbH applied for the approval of rates for a total of 108 individual rate items.

In its application, Telekom Deutschland GmbH noted that, due to the platform migration to the successor products Ethernet 2.0 carrier leased lines and VPN 2.0, the majority of the carriers no longer has a need for SDH-based carrier leased lines. However, since a few carriers will still have a remaining inventory of SDH carrier leased lines or Ethernet over SDH carrier leased lines in 2024, it applied for the approval of the rates for SDH carrier leased lines and Ethernet carrier leased lines until 31 December 2024.

Telekom Deutschland GmbH further pointed out that although the total costs for the SDH network are on the decline, the unit costs for the remaining SDH or Ethernet over SDH leased lines are rising significantly as a result of the enormous energy costs for their continued provision.

In decisions of 15 July 2024, the requested charges were partially rejected and a temporary rates approval was granted to be in effect until 30 June 2024 (CFV-SDH) and 31 December 2024 (CFV-Ethernet over SDH) that lowered the rates to the level of the most recently approved rates.

Carrier leased lines as high-quality access products

Since the approvals for its rates were due to expire, Telekom Deutschland GmbH applied on 2 November 2023 for the approval of new leasing rates for leased lines in native Ethernet (Ethernet 2.0 carrier leased lines) for the period beginning 1 April 2024. The application has the number BK2a-23/005.

The rates proposed by Telekom Deutschland GmbH are all higher than the previously approved rates. It attributed these rate differences in particular to the civil engineering rates which, in its view, are currently on the rise. Additionally, it noted that in the area of junction lines, changes in the usage profiles and the development of traffic volumes have a decisive impact on how rates develop.

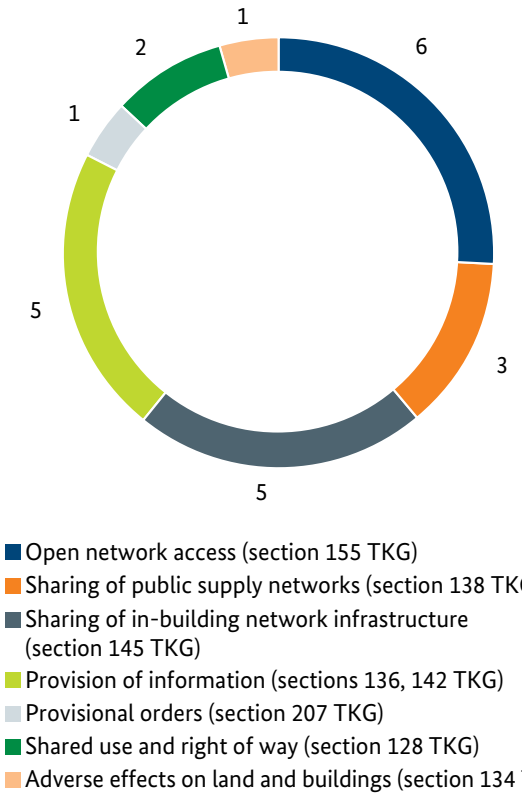
Furthermore, Telekom Deutschland GmbH for the first time applied on the basis of the requirements laid down for the Ethernet 2.0 carrier leased lines reference offer (BK2c-18/004 of 25 November 2022) for approval to charge for the following additional services: 6-hour express fault clearance, changing the network terminating unit, and modifying or replacing the physical interface.

In a decision of 30 April 2024, the leasing rates were all lowered to less than requested, with the exception of the charge for the additional service "express fault repair".

Dispute settlement through the national dispute settlement body under the Digital Networks Act

The national dispute settlement body under the Digital Networks Act (DigiNetzG) was again frequently contacted by market participants in 2024. In addition to seven cases already pending in the reporting period, 23 new requests for dispute resolution were submitted in the course of the year. The new dispute resolution procedures that were initiated in 2024 focused on the granting of open access in the areas receiving support from the state, the sharing of public supply networks and the sharing of in-building network infrastructure.

Breakdown of dispute resolution cases in 2024



Dispute settlement procedure on open access

Once again in 2024, requests for non-discriminatory, open network access to publicly funded telecommunications lines or telecommunications networks on fair and reasonable terms in accordance with section 155 TKG were the substantive focus of disputes before the national dispute settlement body. Four sets of proceedings and proceedings serve as illustrative examples.

The set of proceedings between goetel and Telekom

For example, goetel GmbH (goetel) had filed four requests for dispute resolution against Telekom Deutschland GmbH (Telekom) (BK11-24-005 to -007, BK11-24-016). Goetel had specifically applied for access to Telekom's dark fibre optic pairs and ducts installed with support from state funding in rural districts in Lower Saxony and Hesse. All procedures were concluded with an amicable agreement following oral proceedings..

The set of proceedings between Telekom and the Deutsche Glasfaser & inexio group of undertakings

In another set of proceedings in the period from February to July 2024, the ruling chamber made various decisions requiring Telekom to grant Deutsche Glasfaser Wholesale GmbH (Deutsche Glasfaser) open network access in the form of access to ducts of the publicly funded telecommunications network in various rural districts (BK11-23-007, BK11-23-009, BK11-23-017 and BK11-23-019). Among other things the ruling chamber determined in its decisions which information must be included in offers to be made. Telekom was also prohibited from charging any fees for making an offer.
Telekom has appealed against all of the ruling chamber's decisions in the above proceedings:

- The Cologne Administrative Court rejected Telekom's request to order the suspensive effect of decision BK11-23-007 and the action brought against it and made reference to the decision's legality. The court granted leave to appeal due to the fundamental importance of the case, and Telekom has in the meantime appealed the decision.

- In summary proceedings the Cologne Administrative Court granted suspensive effect of decision BK11-23-009, citing unmet formal conditions for the initiation of a dispute resolution procedure at the time the request for dispute resolution was submitted. A ruling in the main case has not yet been made.

- The proceedings BK11-23-017 and BK11-23-019 are currently underway in the first instance before the Cologne Administrative Court in an early stage of the proceedings.

Telekom submitted another request for dispute resolution in September 2024 (BK11-24-017). There was an arbitrary change of party during the proceedings. Telekom had initially requested that Deutsche Glasfaser Wholesale GmbH be required to grant it access to ducts in the Heidekreis rural district in Lower Saxony on the terms of a wholesale contract or, alternatively, on fair and reasonable terms and at rates to be determined by the ruling chamber. At the hearing in December 2024 the parties agreed that the dispute resolution request was now directed at inexio Informationstechnologie und Telekommunikation GmbH since it owns and operates the infrastructure in dispute. At the same time, the parties entered into negotiations on a mutually-agreed contractual arrangement according to information from the ruling chamber on the factual and legal situation.

Proceedings between Gnauck and Vodafone
In November 2024 in proceedings brought by the company System- und Anlagentechnik Gnauck (Gnauck) against Vodafone GmbH (Vodafone) the ruling chamber ruled that Vodafone must grant Gnauck open and non-discriminatory access to the publicly funded network operated by Gnauck of the municipality of Klipphausen on fair and reasonable terms, in particular with regard to troubleshooting (Decision BK11-24-004). Vis-à-vis Vodafone, the ruling:

- determined charges in line with state aid rules;
- prohibited the charging of an IT implementation levy in the form of a one-off payment because of its effect as a market entry barrier;
- adjusted the fault repair rules to those promised by Vodafone in the funding procedure and offered to its own end-users;
- changed the planned implementation period of several months to a synchronous market access by the disputants.

On the basis of this decision prohibiting retroactivity by the Cologne Administrative Court (1 L 2288/23. page 16) it was not possible to refer to the benchmarking survey currently being conducted. A cost-oriented setting of charges was also not possible because the respondent had not adequately proven and documented its costs despite multiple requests and explicit reference to the consequences of submitting insufficient proof of costs. Because the respondent did not fulfil its obligations to cooperate to the necessary extent, a charge of €0 had to be set for 15 services.

Vodafone is contesting the decision.

Dispute resolution proceedings to obtain information

GasLINE Telekommunikationsnetzgesellschaft deutscher Gasversorgungsunternehmen GmbH & Co. KG (GasLINE) requested information on physical infrastructure at various sections of federal motorways from Autobahn GmbH des Bundes (Autobahn) in five procedures (BK11-24-008 to -012). Autobahn did not provide the requested information on physical infrastructure because it considered that information to pertain to critical infrastructure components. GasLINE withdrew its requests for dispute resolution following public hearings, the issuing of information by the ruling chamber and the provision of the requested information by Autobahn.

In September 2024 the ruling chamber rejected a dispute resolution request in proceedings brought by Mr Rack (RSM Freilassing) against the municipality of Saaldorf-Surheim (BK11-23-014). It found that the request for information lacked sufficient interest in a decision due to the delay and the failure to act in the proceedings.

Dispute resolution proceedings on in-building telecommunications infrastructure

In February 2024 Magdeburg-City-Com GmbH (MDCC) submitted a request for dispute resolution against Telekom (BK11-24-001). The proceedings concerned the sharing of in-building optical fibre infrastructure with prior notification of the conditions for sharing a converted storage building in Magdeburg. MDCC withdrew its request for dispute resolution after the oral proceedings had been held.

In November 2024 MDCC also submitted a request for dispute resolution against Brack

Capital Magdeburg II GmbH, which owns various residential buildings with in-building coaxial network infrastructure. MDCC supplies end-users with telecommunications services on the premises in dispute on the basis of existing individual contracts. The proceedings (BK11-24-019) have been suspended due to ongoing bilateral negotiations.

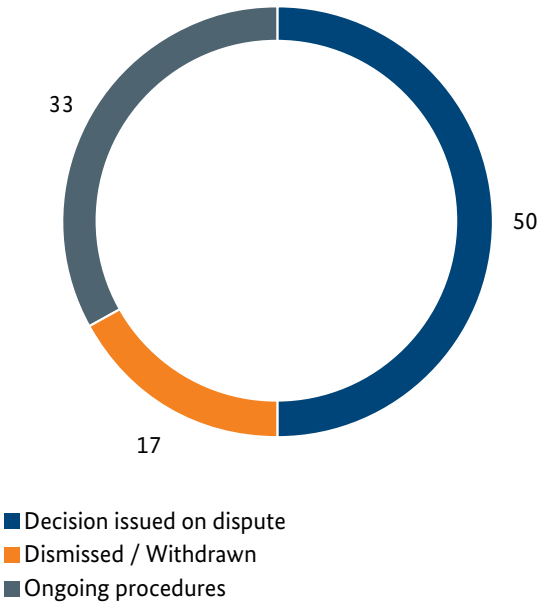
In November 2024 Telekom submitted a request for dispute resolution against Tele Columbus AG (Tele Columbus). Telekom is requesting that Tele Columbus share its optical fibre in buildings specified by Telekom in Jena (BK11-24-020) and Chemnitz (BK11-24-021) on the terms of a wholesale contract offered by Telekom or on fair and reasonable terms to be determined. Tele Columbus rejected Telekom's sharing request because Telekom did not name the specific end-customers and the residential location. These oral proceedings were both scheduled for January 2025.

At the end of November 2024 COMTEC Bautzen GmbH (COMTEC) submitted a dispute resolution request against the housing cooperative Wohnungsgenossenschaft Aufbau Bautzen eG (Wohnungsgenossenschaft Aufbau) (BK11-24-022). COMTEC is requesting the sharing free-of-charge of the in-building coaxial network infrastructure along with the broadband cable system, in each case from the existing distribution cabinets up to and including the connector multimedia outlet in real property of the housing cooperative Wohnungsgenossenschaft Aufbau in Bautzen currently served by COMTEC. Alternatively, sharing should be enabled through a charge to be determined by the ruling chamber. COMTEC would like to provide residential units and tenants with uninterrupted telecommunication and broadcasting services after the housing cooperative Wohnungsgenossenschaft Aufbau terminated a contract with COMTEC at the end of 2024. At the same time COMTEC requested a provisional order (BK11-24-023), which was rejected in a decision of 14 December 2024. The provisional order was denied because COMTEC had been aware of the contract termination since October 2023 but had waited too long and thereby incurred urgency through its own conduct.

Dispute resolution procedures involving shared use

Also in 2024 the ruling chamber had numerous cases of disputes over the "whether" and "how" of shared use of public supply networks.

Dispute resolution procedures involving shared use as per section 138 TKG



The set of proceedings between Telekom and Deutsche Bahn

In 2023 the ruling chamber required DB Netz AG (DB) to submit an offer to Telekom for the sharing of cable ducts (BK11-23-008). Telekom would like shared use of these ducts to cross a railway line over a length of six metres at a level

crossing. In addition, it was determined that a costly on-site examination is not a prerequisite for sharing physical infrastructure. In early 2024 the Cologne Administrative Court confirmed the substantive decisions in summary proceedings and ordered the suspensive effect of DB's legal action only with regard to the warning of an administrative fine contained in the decision.

Telekom considered the offer then made by DB InfraGO AG (DB InfraGO) to be unfair and unreasonable on more than 35 points. In Telekom's view the contractual offer submitted and the usage conditions as well as the charges specified therein do not meet the legal requirements. Thus Telekom requested a thorough examination of the offer in April 2024 (BK11-24-015).

In another dispute resolution procedure Telekom is asking that DB be required to submit an offer to share the access path to the duct to be used (BK11-24-014). The request for dispute resolution was withdrawn following a reference to a formal deficiency in the bilateral preliminary proceedings.

Rack (RSM Freilassing) against the municipality of Ainring and the city of Freilassing
In the dispute resolution proceedings of Mr Rack (RSM Freilassing) against the municipality of Ainring, the ruling chamber definitively required the municipality of Ainring to grant the applicant shared use of in-duct speedpipe bundles for inserting optical fibre cables and to make a corresponding offer for shared use on fair and reasonable terms (BK11-23-016). In other proceedings between the same parties (BK11-23-013) the ruling chamber modified the contractual offer submitted by the respondent during the proceedings and ultimately ordered the sharing of physical infrastructure on fair and reasonable terms.

In dispute resolution procedure BK11-24-013 RSM Freilassing submitted a request for dispute resolution against the City of Freilassing in April 2024 for shared use of physical infrastructure of the city of Freilassing's public supply networks on fair and reasonable terms. The request was rejected as unreasonable because the city of Freilassing submitted an offer for shared use to the applicant during the proceedings (following oral proceedings).

Finally, a dispute resolution request was rejected in September 2024 in other proceedings brought by RSM Freilassing against the municipality of Saaldorf-Surheim (BK11-23-015). The request to grant shared use of physical infrastructure lacked sufficient interest in a decision due to the delay and to a failure to act in the proceedings.

Residential customer against htp
In dispute resolution proceedings in March 2024, the ruling chamber rejected the request to require the parties to use existing physical infrastructure as part of their planned fibre rollout in the disputed area (BK11-24-003). In the opinion of the Bundesnetzagentur there was a lack of the right to make an application and of sufficient interest in a decision.

Telekom against Flughafen München
In the dispute resolution proceedings between Telekom and Flughafen München GmbH the ruling chamber ruled in January 2024 that a right to share physical infrastructure is ruled out if the sharing of specific physical infrastructure has already been contractually agreed (BK11-23-011). Telekom has filed legal action against the ruling chamber's decision.

Vodafone against Flughafen Stuttgart
In other dispute resolution proceedings, Vodafone GmbH requested to share physical infrastructure of Flughafen Stuttgart GmbH's (Flughafen Stuttgart) public supply networks under fair and reasonable terms and rates (BK11-24-018). Vodafone is planning to build three mobile stations on the airport premises and connect them to its telecommunications network to expand 5G mobile coverage at the airport. To this end Vodafone is working with Vantage Towers AG (Vantage), which erects the masts and leases them to Vodafone. A public hearing has already taken place. The question to clarify in the proceedings is whether Vodafone can apply for the shared use of masts that have yet to be erected by Vantage. Among other things it will be necessary to examine how to deal with the group of entitled parties defined by the legislature.

Dispute resolution due to an order for joint laying of cables

In March 2024 the city of Blankenburg requested the ruling chamber to require the company Unsere Grüne Glasfaser GmbH & Co. KG (UGG) and Telekom to jointly, and not separately, lay optical fibre cables in the historical centre of Blankenburg (BK11-24-002). The city's aim was for the streets in the historical centre to be dug up only once and thus reduce the associated negative effects. The dispute resolution request had to be rejected because there is no legal basis to require the first-time installation of optical fibre cables to be carried out jointly. In particular section 128(4) TKG does not provide for such an order, the provision only makes it possible to prohibit an undertaking from laying new telecommunications lines and instead requires it to share the use of existing passive infrastructure. An appeal by the ruling chamber to the parties to the dispute to find an amicable solution taking into account the interests of the city was unsuccessful because one company categorically refused joint laying.

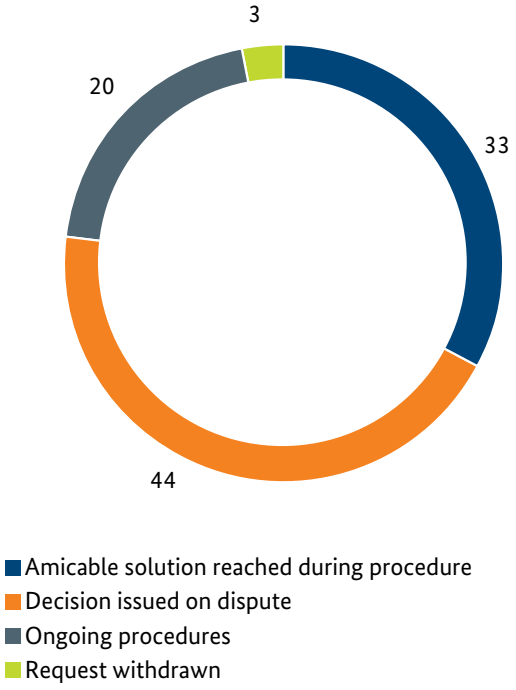
Overview of the conclusion of proceedings

During the reporting period the ruling chamber ruled on a total of 13 proceedings, representing 44% of the proceedings pending in the reporting period. Nearly half of these decisions were appealed.

In 33% of the pending cases the parties to the dispute reached an amicable agreement in the dispute resolution procedure and another 3% of the cases were terminated by the withdrawal of the dispute resolution request.

In some cases it was necessary to involve other authorities such as the Federal Railway Authority and the Federal Office for Information Security.

Breakdown of dispute resolution procedures in 2024
(%)



Public safety/security

Technical safeguards

Protecting the privacy of telecommunications and personal data, protecting systems against faults or interference, and managing the risks to the security of telecommunications networks and services are the key objectives of section 165 TKG.

To achieve these objectives, the Bundesnetzagentur, together with the Federal Office for Information Security (BSI) and the Federal Commissioner for Data Protection and Freedom of Information (BfDI), has outlined details in a catalogue of security requirements. This catalogue provides the basis for security concepts that operators of public telecommunications networks and providers of publicly accessible telecommunications services are required to prepare. The work on updating the catalogue continued through 2024.

In 2024 random checks were carried out at 171 companies on the implementation of their security concept. The checks, which the BSI conducted in accordance with section 165(9) TKG, were evaluated by the Bundesnetzagentur. Additionally, five new and 296 revised security concepts were submitted to the Bundesnetzagentur for review to determine compliance with section 166(1) TKG.

During the reporting period the Bundesnetzagentur received 77 reports of security incidents within the meaning of section 168 TKG.

Implementation of interception measures, provision of information, cooperation with technical investigative measures in the case of mobile terminal equipment, manual information procedure

Under the statutory provisions (for example of the Code of Criminal Procedure (StPO)), anyone providing or cooperating in providing telecommunications services must enable telecommunications to be intercepted and recorded and provide information about user, customer and traffic data. Sections 170 and 174 TKG set out whether and to what extent telecommunications companies must make relevant arrangements. Section 171 TKG requires mobile network operators to cooperate with investigations involving mobile terminal equipment, such as searches for missing persons.

One of the Bundesnetzagentur's tasks is to stipulate the technical details for these requirements in a technical directive (TR TKÜV). Any changes to the TR TKÜV are made in consultation with the authorised bodies and with the participation of industry associations and manufacturers. Adjustments to the TR TKÜV became necessary due to further developments in the technical specification ETSI TS 103 120 for communicating orders from the authorised bodies to the telecommunications companies subject to the obligations. The requirements for email services were also aligned uniformly with ETSI standards. There was also a need to make content and editorial adjustments to other parts of the TR TKÜV. For this purpose the new edition 8.3 of the TR TKÜV was prepared and will enter into force when it is published on 22 January 2025.

Automated information procedures

The automated information procedure enables statutorily authorised bodies (mainly the police, state criminal police, federal agencies, state security authorities and emergency call centres) to request subscriber data including names, addresses and telephone numbers from telecommunications undertakings via the Bundesnetzagentur's automated and highly secure systems 24 hours a day.

Information can now be provided extremely rapidly – if necessary, within a few seconds – thanks to technological improvements. The procedure is therefore used as a trustworthy investigative tool that receives as many as 188,627 requests for names and telephone numbers a day. In 2024 the Bundesnetzagentur's systems processed a total of 26.9 million requests. At present 138 systems as authorised bodies and 130 telecommunications companies as obligated companies take part in the scheme.

Supervisory activities were intensified to further improve the quality of data in the responses of obligated entities.

The interpretative notes on sections 172 and 173 TKG – an initiative for transparency and compliance by the Bundesnetzagentur – were further developed and refined in consultation with the parties concerned. The result, version 1.1, was published in November 2024.

The compliance summit has established itself as a semi-annual event. Solutions for improving data quality are discussed together with industry representatives and individual representatives from the authorised bodies. The summit will be accompanied by outsourced working groups that will focus intensively on specific topics and problems.

Work on revising the requirements for identification procedures in the prepaid mobile sector and the attendant conformity assessment programme continued through 2024 and is scheduled to be completed in 2025. The background to this is the amendment of the Telecommunications Act that is being undertaken for the purpose of the Telecommunications Network Rollout Acceleration Act and expected to be completed in 2025.

Following this, the Customer Data Information Ordinance is to be revised to lay the foundation for drafting a new Technical Directive for the Automated Information Procedure (TR-AAV). As usual, the Bundesnetzagentur will closely involve the parties concerned.

Emergency preparedness

The regulations for disaster preparedness must be adhered to in special exceptional circumstances (obligation of provision) to ensure a minimum provision of basic telecommunications services. In addition, the telecommunications undertakings that are under obligation here have to give precedence to priority users when providing their service or services. The Bundesnetzagentur continued in 2024 to remain in close contact with the obligated telecommunications undertakings to ensure that the statutory requirements for safeguarding and prioritising telecommunications are observed and implemented.

Supplement to the Technical Directive on Emergency Calls

The Bundesnetzagentur lays down the technical details for certain emergency call-specific regulatory matters in a technical directive (TR Notruf). The Bundesnetzagentur mandated the currently valid TR Notruf 2.0 on 22 August 2018. State of the art technology and European requirements now make it necessary to update TR Notruf 2.0. In this context the European provisions stem primarily from Commission Delegated Regulation (EU) 2023/444 of 16 December 2022 and address the equivalence of emergency communications for persons with disabilities (accessibility) and the reliability and accuracy of location information.

The TR Notruf provisions require a comprehensive participation procedure. The associations of telecommunications service providers and operators of telecommunication networks, representatives of operators of public safety answering points appointed by the Federal Ministry of the Interior, Building and

Community, as well as the manufacturers of the technical facilities used in the telecommunications networks and public safety answering points are entitled to participate in accordance with section 164(6) TKG.

The Bundesnetzagentur opened the participation procedure and published a first draft of the TR Notruf 2.1 for consultation on 8 May 2024. The participation procedure is still in progress.

Technical regulation

German Market Surveillance Conference 2024

The German Market Surveillance Conference takes place in Berlin in the autumn of each year. This year the hybrid event was held on 27 and 28 November 2024 under the auspices of the Federal Ministry for Economic Affairs and Climate Action (BMWK) in Berlin.

The Office of the German Market Surveillance Forum (DMÜF), which is part of the Bundesnetzagentur, helped the ministry to prepare and host the conference.

The conference was attended by around 250 participants in person and by 200 online. It offered attendees the opportunity to discuss current market surveillance issues with representatives of the European Commission, various industry associations and the business community.

Particular focus this year was on the future market surveillance of artificial intelligence (AI), the international activities of market surveillance and the connection between Germany's Digital Services Act and cross-border e-commerce.

Radio equipment/EMF protection

The Bundesnetzagentur's site certification procedure ensures that the electromagnetic field (EMF) exposure limits are met at sites where radio equipment is operated. In 2024 a total of 16,661 site certificates were issued, with 4,597 sites being assessed using the field theory-based WattWächter tool.

The approach initiated in 2023 to take into account material attenuation for tile roofs

in the WattWächter process was technically implemented for inclined roof surfaces in the site certification software. This entailed making it possible to enter an inclination angle to the set of calculation parameters for inclined roof surfaces. The functionality of this new feature is currently being tested in trial operation. Successful completion of this approach will extend the application of the possible attenuation classes in the site certification procedure. In addition, the integration of a new version of the WattWächter calculation module in the site certification software was professionally prepared to enable a new approach for taking the environmental factor into account in the site certification procedure. The new approach is expected to simplify the way in which relevant input from a site's environment is taken into account.

The EMF monitoring campaign for the long-term measurement and assessment of local emissions from radio equipment was conducted in 2024 at several sites where radio equipment is operated. The Bundesnetzagentur set up its measuring equipment in the immediate vicinity of the sites. The aim of the long-term measurements was to record the immissions of neighbouring radio equipment and thus to further monitor the results of the expert report commissioned by the Bundesnetzagentur on the environmental factor. The measurement results showed that the expert report's findings remain valid.

Radio interface specifications

In 2024 the Bundesnetzagentur continued its work drawing up radio interface specifications. They are provided by the Bundesnetzagentur in accordance with section 33(1) of the Radio Equipment Act. The specifications contain all the information necessary for manufacturers to carry out the relevant tests of their choice for the essential requirements applicable to their radio equipment. Currently there are 86 radio interface specifications for the various radiocommunication services. They can be viewed on the Bundesnetzagentur website (in German) under Telekommunikation/Technik und Produktsicherheit at bundesnetzagentur.de/schnittstellenbeschreibungen

Technical checks undertaken pursuant to the Radio Interference Suppression Ordinance

In accordance with the legal mandate of sections 3 and 5 of the Radio Interference Suppression Ordinance, the Bundesnetzagentur has carried out numerous technical measurements to check whether there are inadmissible unwanted emissions from cable networks. As a result, the number of such unwanted emissions was significantly reduced.

Furthermore, the cable network infrastructure around the receiving stations on the ground was checked and systematically recorded to be able to assess the risk of aeronautical radio service interference near receiving stations on the ground.

International cooperation

The European regulatory authorities deal with various issues relating to the EU's internal market for telecommunications within BEREC. The Bundesnetzagentur plays an active part in BEREC's work. It also participates in bodies within the ITU and other organisations such as the ECC, the RSPG and ETSI.

BEREC and BEREC Office

The Bundesnetzagentur has participated within the EU's Body of European Regulators for Electronic Communications (BEREC) since BEREC was established in 2009.[1] BEREC's specialist activities are undertaken by working groups dealing with various issues relating to the EU's internal telecommunications market. BEREC's work programme for 2021 to 2025 is based on three strategic priorities: connectivity, sustainable and open digital markets, and empowering end-users and their rights.

The Bundesnetzagentur was actively involved in all of BEREC's projects in 2024. Bundesnetzagentur representatives acted as one of the two co-chairs in three working groups: Fixed Network Evolution, Open Internet, and Remedies and Market Monitoring.

In autumn 2024 Bundesnetzagentur Vice President Dr Daniela Brönstrup became part of BEREC's six-member Mini-Board for the following year. The Mini-Board represents BEREC at the European institutions and vis-à-vis stakeholders. In her function as a member of the BEREC Mini-Board, Daniela Brönstrup is also one of BEREC's representatives within the High-Level Group for the Digital Markets Act, which provides advice to the European Commission.

BEREC's work and discussions at European level in 2024 were largely shaped by the European Commission's White Paper entitled "How to

1 berec.europa.eu

master Europe's digital infrastructure needs?" describing challenges and solutions from the Commission's perspective. Another focus of attention was on the two reports "Much more than a Market" by Enrico Letta and "The future of European competitiveness" by Mario Draghi.

European Commission's White Paper

BEREC published its input in response to the European Commission's White Paper in June 2024.[2] In its response, BEREC underlines the importance of fair competition as the best means of fostering competitiveness, doing away with the need for any additional goals. BEREC welcomes the proposed introduction of a sustainability objective.

BEREC takes a critical view of the European Commission's proposals for harmonisation in the field of spectrum management, which it sees as failing to take adequate account of national circumstances, as well as with respect to a single European access product. In BEREC's view, competition in the national markets is essential for the EU's competitiveness, which is why it sees the proposals to create pan-European telecommunications operators as problematic. BEREC draws attention to the lack of empirical evidence supporting the claim that a concentration of markets would increase overall European competitiveness. National markets should continue to be regulated at a national level. Any changes to the institutional framework should therefore take into account that the structure should be based on the functions.

BEREC is against the proposed shift from ex ante regulation and argues that there are persistent competition problems in (local) wholesale broadband markets; national regulatory authorities therefore need a flexible ex ante regulatory toolbox to address these problems. BEREC also took a critical view of the proposed fixed dates for the copper switch-off and stated that account should be taken of national circumstances and targets.

As regards the universal service, BEREC points out that the objective of the universal service is to provide a minimum set of services (for example email, search engines, internet banking, etc) for all consumers at an affordable price and not to drive forward or guarantee nationwide gigabit coverage. BEREC states that the White Paper fails to address the aspect of consumer protection, apart from the reference to the end-users' perspective in connection with the universal service, and fails to set out a clear position on net neutrality. BEREC points out that the net neutrality rules and BEREC's Net Neutrality Guidelines already provide an approach to addressing any problems.

BEREC welcomes the considerations relating to sustainability and to security and resilience. The considerations about the positive aspects of digitalisation should also take account of the environmental footprint of technologies. BEREC underlines the importance of cooperation between the relevant bodies in the area of security and resilience. Account needs to be taken of all communication channels – terrestrial, non-terrestrial and submarine.

Finally, BEREC draws attention to the lack of an in-depth analysis for many of the statements in the White Paper, for which BEREC offers to contribute its expertise.

2 BoR (24) 100

International roaming and intra-EU calls

In the context of international roaming, BEREC examined the issue of machine-to-machine (M2M) communications in conjunction with permanent roaming.[3] The use of M2M communications is continuously increasing due to technological developments and new business models. Permanent roaming is playing an increasingly important role as many mobile M2M devices do not stay connected to their home networks but are used on the move in, or delivered to, other Member States. In view of this increasing importance, BEREC drew up a report highlighting various aspects such as the necessary wholesale agreements and technological, competitive and numbering issues.

In the third quarter of 2024, BEREC began work on an opinion for the European Commission as part of the preparations for a possible amendment of the Roaming Regulation. In accordance with the Roaming Regulation, the European Commission must take utmost account of BEREC's opinion in its review of the rules. The opinion will present the results of an in-depth analysis of the roaming markets and the revised rules introduced in 2022 on, in particular, the quality of roaming services and transparency when using value-added services. BEREC is due to provide its opinion to the European Commission in the second half of 2025.

End-user rights/consumer protection

The European regulatory framework provides for a regular specific review of end-users' rights that involves BEREC monitoring market and technological developments regarding the different types of electronic communications services and publishing an opinion on these developments and their impact on the application of the provisions for end-user rights in the European Electronic Communications Code (EECC). In its opinion, BEREC also assesses to what extent these provisions meet the objectives set out in the EECC.

The European Commission, taking utmost account of the BEREC opinion, publishes a report on the application of the end-user provisions and submits a legislative proposal to amend the provisions if it considers this to be necessary to ensure that the objectives are met.

BEREC published its second opinion in December 2024, three years after its first opinion.[4] BEREC considers that the end-user provisions are future-proofed. At the same time, BEREC identifies areas where improvements could be made.

BEREC also revised its Guidelines detailing Quality of Service Parameters, originally published in March 2020, and approved the revised guidelines in March 2024 following a public consultation.[5] The guidelines set out quality of service parameters and parameters relevant for end-users with disabilities, together with the applicable measurement methods for these parameters, as well as details of the content and format of the quality of service information to be published and possible quality certification mechanisms. National regulatory authorities can require providers to publish comprehensive information for end-users on the quality of their services, to the extent that they control certain elements of the network, and on measures taken to ensure equivalence in access for end-users with disabilities. National regulatory authorities must take utmost account of the BEREC guidelines.

3 BoR (24) 165

4 BoR (24) 180

5 BoR (24) 42

Right to be supplied with telecommunications services/universal service

BEREC is required to draw up a regular report on best practices to support the defining of adequate broadband internet access in the context of the universal service rules. Universal service aims to ensure access to an affordable, available, adequate broadband internet access service and to voice communications services at a fixed location. The adequate bandwidth must be defined by each Member State in light of national conditions and the minimum bandwidth enjoyed by the majority of consumers in the country and must be capable of delivering a minimum set of services such as email, search engines and internet banking. Member States must take account of the BEREC report when defining the adequate bandwidth. BEREC's second report was published in March 2024 following a public consultation.[6]

Market regulation

BEREC's focus in the field of market regulation is on physical infrastructure access, migration and the copper switch-off, and new regulatory remedies explicitly introduced in the EECC.

The draft report on the regulation of physical infrastructure access that was published for consultation at the end of 2024 describes the regulatory approaches currently in practice in Europe.[7] BEREC's report focuses on the use of physical infrastructure access for the deployment of very high capacity fixed networks. It makes it clear that the degree of complexity of the regulatory regime for physical infrastructure access is increasing and that there are indeed differences between the approaches in practice in Europe. Regulating access within the framework of traditional market regulation gives the national regulatory authorities considerably more flexibility, in particular with respect to pricing, than would be possible under the Gigabit Infrastructure Act (GIA), which is why these instruments are seen as complementary. The Bundesnetzagentur drew on its experience from the latest ruling chamber decision on the regulation of civil engineering assets in its contribution to the report.

BEREC published for public consultation a progress report on migration and the copper switch-off, following on from its 2022 Report on a consistent approach to migration and copper switch-off and showing that moderate progress has been made.[8] Communication with alternative operators and with end-users is described as essential for the success of the process. In addition, the importance of sufficiently long transition periods and the existence of adequate alternative products were highlighted.

6 BoR (24) 40

7 BoR (24) 178
8 BoR (24) 181

BEREC also organised several workshops on experience with the new ex ante regulatory tools introduced in the EECC for commitments, wholesale-only undertakings and commercial agreements review.

Digital sector

BEREC drew up two reports relating to the digital sector: one on cloud and edge computing[9] services and one on the entry of content and application providers into the electronic communications markets[10]. The report on cloud and edge computing presents the services and underlying infrastructure and the impact of technical and market developments on the electronic communications sector. It also examines possible regulatory and competitive implications.

The report on content and application providers was drawn up in light of the increasingly close relation between these providers' services (such as voice calls via WhatsApp) and electronic communications services (such as voice calls). Content and application providers are becoming increasingly more involved in the areas of traditional communication and are making large investments in network infrastructure. BEREC presents the providers' various business models and strategies and their relation with telecommunications operators. It also looks at implications for the market and competition and security aspects.

In addition, the Artificial Intelligence Act (AI Act) entered into force on 1 August 2024. It supports the objective of promoting the EU as a global leader in trustworthy artificial intelligence. It assigns artificial intelligence systems to different risk categories. It focuses on high-risk artificial intelligence systems that can only be placed on the market and put into service in the EU if they comply with strict security and transparency requirements.

Net neutrality and IP interconnection

The national regulatory authorities and BEREC have been monitoring compliance with the EU rules for many years to ensure net neutrality.[11]

In 2024, as in previous years, BEREC published a Report on the implementation of the Open Internet Regulation.[12] This eighth report comes to the conclusion that the national regulatory authorities' monitoring and enforcement activities over the last eight years have led to a consistent and harmonised application of the Open Internet Regulation, which aims to guarantee the freedom to innovate and protect end-users' rights.

BEREC also published a Report on the IP Interconnection ecosystem in 2024.[13] Many aspects and arguments in discussions about internet protocol (IP) interconnection overlap with the debate on payments from large content and application providers to telecommunications operators. BEREC did not identify any indications of market failure that would justify regulatory intervention. The report is based among other things on a comprehensive data collection exercise and a series of workshops with a variety of market players. The report essentially confirms the findings from earlier reports (most recently in 2017) that the IP interconnection market is generally driven by competitive forces and that the internet is still managing to cope with traffic growth, as it has ever since its creation. At the

9 BoR (24) 52
10 BoR (24) 139
11 Verordnung (EU) 2015/2120
12 BoR (24) 134
13 BoR (24) 177

same time, BEREC is aware that there have been a small number of IP interconnection disputes between market players since 2017.

The workshops with market players revealed that disputes typically involve vertically integrated internet access service providers attempting to leverage their termination monopoly and introduce (higher) IP interconnection fees from content providers, for example. BEREC draws attention to cases in the US in which there was evidence that internet access providers had a strategy of causing IP interconnection congestion. BEREC generally considers there to be a balance in the bargaining relation between the various players.

Cybersecurity and resilience

Cybersecurity and resilience issues continued to be particularly relevant and topical in 2024. In this context, the Directive on measures for a high common level of cybersecurity (NIS2 Directive) and the Directive on the resilience of critical entities (CER Directive) are particularly worth mentioning. Both directives were supposed to be transposed into national law by October 2024, but it was not possible to complete the necessary legislative procedures in 2024. The Bundesnetzagentur is continuing to accompany the procedures as the authority responsible for these two subjects.

BEREC organised a stakeholder workshop on network resilience in November 2024 at which representatives of European regulatory authorities, operators and other stakeholders discussed their experiences and the current challenges in this field.[14]

Environmental sustainability

BEREC published a draft report for public consultation at the end of 2024 on the positive effects of infrastructure sharing on environmental sustainability.[15] The joint use of networks provides obvious environmental benefits through decreased infrastructure duplication, energy conservation and reduced material consumption. The joint use of infrastructure can significantly lower carbon emissions, reduce land use and optimise use of resources. At the same time, these positive effects have to be weighed against potential technical and legal risks and potential negative effects for the development of effective competition.

BEREC concludes that the addition of an environmental objective to the regulatory mandate is a favourable development as it would facilitate the inclusion of environmental considerations in regulation.

14 berec.europa.eu/en/events/berec-stakeholder-workshop-on-network-resilience

15 BoR (24) 186

Gigabit Infrastructure Act

The Gigabit Infrastructure Act (GIA) entered into force on 11 May 2024. The aim of the Act is to reduce the costs of deploying very high capacity telecommunications networks and to accelerate deployment by leveraging synergies.

Most of the substantive provisions become applicable on 12 November 2025, 18 months after the Act came into force, and replace the 2014 Broadband Cost Reduction Directive (BCRD). The GIA requires BEREC to draw up guidelines on the coordination of civil works and on access to in-building infrastructure by November 2025. BEREC started work on this immediately and issued a call for input from stakeholders on the relevant topics in the summer.[16] The Bundesnetzagentur's contribution draws on its experience from its activities as a dispute settlement body. The GIA also enables the European Commission to draw up guidelines on access to physical infrastructure in close cooperation with BEREC. The European Commission involved BEREC in its preparatory work in November. The Bundesnetzagentur is also playing an active role in this work.

Satellite communications and submarine cable systems

BEREC held an external workshop in Mainz in May on the usage of satellite technologies in mobile communications.[17] Numerous representatives of the satellite and telecommunications industry, the European Space Agency (ESA), the European Union Agency for Cybersecurity (ENISA), civil society, the media, think tanks and consultancies, and regulatory authorities from Europe (BEREC members) and the US exchanged their views and experience on trends and technologies in the field of satellite communications. Discussions focused on potential regulatory issues associated with non-terrestrial networks in the context of mobile/fixed communication networks (MFCN), such as roaming, numbering, interoperability and non-discrimination, market access and authorisation, emergency calling, competition, consumers, security, environmental sustainability and lawful interception.

In addition to satellite connectivity, BEREC gave its attention to submarine cable systems and the authorisation framework for submarine connectivity.[18] The ownership structures of submarine cable systems have undergone a significant transformation since the market entry of large content access providers like Google and Amazon. Unlike telecommunications operators, these providers are investing in their own submarine cable systems not to provide public electronic communications services but to connect their own data centres. A variety of other players such as cable-laying vessels and landing stations are also active. National provisions regulate the laying and operation of submarine cables. Up until now, telecommunications regulators have had little or nothing to do with regulating submarine cables, with just a few exceptions. BEREC will keep a focus on this topic in view of the increasing importance of submarine cable systems.

16 berec.europa.eu/en/public-consultations-calls-for-inputs/call-for-initial-stakeholder-input-for-the-preparation-of-the-berec-guidelines-on-access-to-in-building-physical-infrastructure-according-to-article-116-of-the-gigabit-infrastructure-act

17 berec.europa.eu/en/events/berec-external-workshop-about-the-usage-of-satellite-technologies-in-mobile-communications

18 BoR (24) 85

Gigabit Connectivity Recommendation

The Gigabit Connectivity Recommendation[19] was published on 6 February 2024.[20] The focus of the Recommendation is still on promoting connectivity[21] but is a significant improvement on the draft published on 23 February 2023 in that numerous (large and small) changes have contributed to greater account being taken of the aim of competition in imposing regulatory remedies such as the non-discrimination obligation, the access obligation, and the price control and costing obligation. The Recommendation has a clearer structure and wording and makes a clearer distinction between different subjects. It takes into account a number of the changes proposed in BEREC's critical opinion (in particular with respect to capital cost calculations): better account is taken of appropriate regulatory obligations, and the Recommendation is not as prescriptive as the draft, resulting in more scope for national regulatory authorities in defining the chosen significant market power (SMP) remedies.[22]

The Recommendation became applicable upon publication in the EU Official Journal, which means that national regulatory authorities must take utmost account of the Recommendation when making decisions on SMP remedies for market 1 under Commission Recommendation (EU) 2020/2245 (when imposing regulatory obligations on SMP operators in the market for wholesale local access provided at a fixed location in accordance with Article 68 et seq of the EECC).[23] The Recommendation does not provide for a transitional period, contrary to BEREC's call in its opinion.[24]

19 C(2024) 523_final, published as Commission Recommendation (EU) 2024/539 in the EU Official Journal of 19 February 2024 and accompanied by a Commission Staff Working Document (SWD(2024) 18 final).

20 digital-strategy.ec.europa.eu/en/library/recommendation-regulatory-promotion-gigabit-connectivity

21 As reflected in the title: Recommendation on the regulatory promotion of gigabit connectivity.

22 BoR (23) 83

23 Directive (EU) 2018/1972

24 See also recital 77.

Independent Regulators Group

The Independent Regulators Group (IRG) was established in 1997 and brings together independent national regulatory authorities from countries within and outside the EU (such as Switzerland and the United Kingdom).[25] IRG is open to a larger group of members than BEREC and, as an independent body, can therefore cover topics outside BEREC's mandate.

IRG is supported by its secretariat in Brussels, which provides a direct link and information flow between the national regulatory authorities and the EU institutions and other stakeholders based there. This proved to be a great support in view of the significant developments in Europe in 2024 (such as the European Commission's White Paper and the European elections).

IRG held various events in 2024 on topics of current interest for the national regulatory authorities' representatives, including workshops on the evolving role of regulators in the digital era[26] and the rollout of very high capacity networks[27]. IRG also provided opportunities for an in-depth exchange of views and experience between and among the regulatory authorities and the various stakeholders, such as its webinar on artificial intelligence (AI) regulation.[28]

25 irg.eu

26 IRG Senior workshop on the evolving role of the regulators in the digital era

27 IRG Training workshop on VHCN Rollout

28 Webinar - AI in Europe and Beyond: AI ACT and worldwide approaches

Standardisation for radio equipment within ETSI

The Bundesnetzagentur continued to play an active part in 2024 in work within the European Telecommunications Standards Institute (ETSI) to promote radiocommunication services in the field of information and communication technology. The aim is to develop modern, open and high-quality standards for radio equipment for a wide range of radio services and applications (including mobile radio, broadcasting, satellite communications, fixed links, aeronautical, maritime and inland waterways, radiodetermination and radionavigation, wireless local area networks (WLANs) and short range devices (SRDs)) and incorporate the regulatory objectives defined in the German Telecommunications Act (TKG) as far as possible in the standardisation process.

The Bundesnetzagentur also continues to make a substantial contribution to work on standardising new radio technologies for reconfigurable radio systems (RRS). The work involves developing standards for flexible radio systems that are capable of adapting to dynamic changes in the operational environment. The technologies include software defined radio (SDR) and cognitive radio (CR).

The European Commission intends to adopt a relevant delegated act in accordance with Article 3(3) point (i) and Article 4 of Directive 2014/53/EU (Radio Equipment Directive). The Commission is currently carrying out an impact assessment, which is due to be completed by mid-2025. In this context ETSI, with the intensive participation of the Bundesnetzagentur, has already developed a large number of technical specifications that could serve as the technical basis for a possible European delegated act.

Recognition of conformity assessment bodies

Conformity assessment before a product is placed on the market includes an assessment of the product's compliance with the essential requirements (such as product-specific standards) and confirmation of compliance by the manufacturer or by certification from a recognised certification body. Manufacturers are responsible for providing proof of compliance within the scope of Directives 2014/30/EU (EMC) and 2014/53/EU (radio equipment).

If conformity assessment is based on harmonised standards, a declaration by a manufacturer that a product complies with the essential requirements of the applicable standards is usually sufficient. The manufacturer may choose to use the expert services of a conformity assessment body, also known as a "notified body" if it is state-approved.

If there are no applicable harmonised European standards or harmonised standards are only partly applied, manufacturers must use the services of a notified body for conformity assessment.

Notified bodies fall within the remit of the Bundesnetzagentur under Germany's Conformity Assessment Body Recognition Ordinance (AnerkV) in conjunction with the Radio Equipment Act (FuAG) and the Electromagnetic Compatibility Act (EMVG). Notified bodies are examined and recognised by the Bundesnetzagentur, notified to the European Commission as part of the notification procedure and listed in the NANDO (New Approach Notified and Designated Organisations) database. The NANDO information system is managed by the European Commission and provides

information to the public on all accreditations and recognitions relating to all European directives and regulations, including certificates of accreditation and other proof of competence. The Bundesnetzagentur is Germany's central agency for entering data into the NANDO database and manages the coordination platform of the designating authorities (KBeB) to facilitate coordination with the authorities and ministries.

The remit was extended in 2024 by the implementation of Commission Delegated Regulation (EU) 2022/30 and Directive (EU) 2022/2380, which supplement and amend the Radio Equipment Directive. Commission Delegated Regulation (EU) 2022/30 lays down requirements relating to cybersecurity and became applicable on 1 August 2024. Directive (EU) 2022/2380 supplements the Radio Equipment Directive with specific requirements for common chargers and entered into force on 28 December 2024.

To support global trade the European Union has signed free trade agreements or Mutual Recognition Agreements with countries such as the US, Canada and Japan, covering the mutual recognition of recognised bodies in the respective economic zones. These agreements make it possible for conformity assessment bodies of a particular economic zone to assess certain products according to the legal requirements of the partner countries or zones. The Bundesnetzagentur is responsible for telecommunications and electromagnetic compatibility.

The list of recognised bodies is available on the Bundesnetzagentur website at: bundesnetzagentur.de/konformitaetsbewertungsstellen

Activities in the field of artificial intelligence (AI)

The EU Artificial Intelligence Act entered into force on 1 August 2024. National implementing legislation is needed in Germany to assign the tasks under the AI Act. At European level, the European Commission adopted a standardisation request for the European standardisation organisations comprising ten topics in the field of artificial intelligence.

The Bundesnetzagentur played an active part in the relevant activities within ETSI, the European Committee for Standardisation (CEN) and the European Committee for Electrotechnical Standardisation (CENELEC). The activities involved developing testing procedures for machine learning models, for example in relation to accuracy, robustness and cybersecurity, to enable reliable conformity assessment for AI systems. The Bundesnetzagentur played a leading role in the work within ETSI's Technical Committee "Methods for Testing and Specification" as well as in the work at international level on developing a standard for classifying AI systems (ISO/IEC 42102 "Taxonomy of AI system methods and capabilities").

The Bundesnetzagentur's activities represent a significant contribution to promoting the aspects of reliability and transparency in AI systems in global standardisation.

International Telecommunication Union Radiocommunication Sector (ITU-R)

Work within ITU-R's study groups and working parties is divided between preparations for the World Radiocommunication Conferences (WRCs) and ITU-R's other tasks. One particular aim of these tasks is to harmonise the use of the spectrum. The Bundesnetzagentur represents Germany's varied interests in the radiocommunications sector together with representatives from industry, research, academia and administration in the related ITU-R activities. ITU-R meetings are usually conducted as hybrid meetings, with decision-making taking place in face-to-face meetings.

Preparations for WRCs

The first activities in preparation for WRC-27 started in 2024. The following agenda items are worth a special mention:

- the use of smaller antennas for the fixed-satellite service in the band at 13.75-14 GHz,
- studies on various (NATO) bands with a view to future sharing with public mobile services,
- support for terrestrial public mobile networks through direct satellite links,
- the protection of radio astronomy and Earth exploration-satellite services.

Overall, a large number of items on the WRC-27 agenda relate to satellite systems, for example for broadband coverage. The detailed preparatory work is undertaken by the individual ITU-R working parties, in particular by WP4A and WP4C for satellite systems.

Preliminary work in progress in preparation for WRC-31 is on improving the conditions for the radionavigation-satellite service in the 5 GHz band, the regulatory assessment of wireless power transmission technology, and possible restrictions to the use of the 10 GHz band by TerraSAR Earth exploration systems.

Study Group 1 – Spectrum management

Study Group 1 deals with all aspects of spectrum management and spectrum monitoring. The following activities in the period under review can be highlighted:

- Working Party 1A: progress in work on recommendations with the characteristics of unwanted emissions and the broadband requirements for wireless power transmission systems for mobile and portable devices;
- Working Party 1B: reports on the economic aspects of spectrum management and methodologies for predicting spectrum availability;
- Working Party 1C: work on the use of drones and small satellites to improve the efficiency and range of spectrum monitoring and the initiative from the Bundesnetzagentur to revise the Spectrum Monitoring Handbook.

Study Group 3 – Radio-wave propagation
Study Group 3 deals with all aspects of radio-wave propagation and radio noise.

Working Party 3J's activities included in particular work on modelling lunar radio-wave propagation, propagation predictions for Moon missions and the use of machine learning for wave propagation studies.

The focus of Working Party 3K's work was on the development of prediction models for short ranges in urban environments. The assessment of propagation loss from building penetration and scattering is important in particular for services at 100 MHz to 100 GHz.

Study Group 4 – Satellite services
Study Group 4 deals with all aspects of satellite services. Of special interest are Working Party 4A's activities relating to coexistence between geostationary and non-geostationary satellites, in particular updating the calculation method for limits for non-geostationary satellites to protect geostationary satellites. Work is also in progress on a handbook for sustainability in space.

Study Group 5 – Terrestrial services
Study Group 5 deals with all aspects of terrestrial services. Working Party 5C's activities relating to the framework for IMT for 2030 and beyond is worth a special mention, with the completion of the first reports and a recommendation with technical conditions relating to the technological trends for the next decade's generation of mobile communications.

Study Group 7 – Science services
Study Group 7 deals with the scientific aspects of spectrum use. Of particular interest are the passive use of spectrum by radio astronomy and weather sensors and the wide range of applications for Earth observation. One important topic in the reporting period was the regulatory framework for the sustainable use of space.

World Telecommunication Standardization Assembly

The Bundesnetzagentur represents Germany's interests in meetings and conferences at the ITU on behalf of the Federal Ministry for Digital and Transport (BMDV) in accordance with section 221 TKG.

At the World Telecommunication Standardization Assembly in October 2024 (WTSA-24) the Bundesnetzagentur was involved in the coordination and agreement of contributions from Europe through the European Conference of Postal and Telecommunications Administrations (CEPT). The Bundesnetzagentur played a key role in the new resolutions relating to digital public infrastructure, artificial intelligence, metaverse standardisation and vehicular communications, enabling German and European interests to be reflected in the resolutions. WTSA-24 was attended by 3,700 delegates, including 36 ministers, from more than 160 countries, which was the highest attendance in the history of the WTSA.

Preparations for the next Plenipotentiary Conference (PP-26), ITU's highest policy-making body, will start soon. The Bundesnetzagentur and the BMDV will jointly draft contributions coordinated at national and European level and present them at the Conference. Resolutions adopted at these conferences have a significant impact on the strategic focus of ITU's activities.

CEPT's Electronic Communications Committee

The Bundesnetzagentur cooperated with other European spectrum management authorities to offer support with numerous technical and regulatory studies and help finalise European spectrum rules (docdb.cept.org/).

The European regulatory framework is developed by the Electronic Communications Committee (ECC) within CEPT. The ECC's tasks include producing ECC Decisions and ECC Recommendations, studies on radio spectrum issues (ECC Reports) and reports from CEPT in response to mandates issued by the European Commission.

Christiane Seifert from the Bundesnetzagentur was elected the new Chair of the ECC in 2024.

One of the points of focus in 2024 was the development of harmonised technical conditions for the use of the 3800-4200 MHz band by broadband systems providing local-area network connectivity. The work, which was partly in response to a mandate from the European Commission, enables private 5G networks for vertical industrial applications, among other things. The conditions for local-area network connectivity enable shared use of the spectrum together with the existing radio applications and services in the band (terrestrial fixed links and satellite communications) and provide protection for applications in adjacent bands (MFCN below 3800 MHz and radio altimeters for the aeronautical radionavigation service above 4200 MHz).

The ECC also drew up a report in response to the permanent mandate from the European Commission relating to SRDs, providing for new applications including security scanners at airports, for example. In addition, a new regulatory framework was developed for numerous innovative high-resolution sensor applications, for example for industrial purposes, in the 116-260 GHz band.

The regulatory framework for the future railway mobile communications system (FRMCS) was also revised to accommodate the latest technology evolution.

Radio Spectrum Committee

The European Commission's Radio Spectrum Committee (RSC) draws up implementing decisions binding on all Member States with the aim of harmonising conditions for the use of radio spectrum.

In 2024, the RSC's work, with significant contributions from the Bundesnetzagentur, included the following.

A new implementing decision for wireless communications systems in the 40.5-43.5 GHz band was adopted on the basis of the ECC's response to its mandate. The decision aims to ensure the future provision of spectrum for wireless systems capable of providing very high data rates in particular at locations with high capacity requirements.

A revision of the implementing decision for mobile communication services on board vessels was also adopted, defining harmonised conditions of use enabling the future use of 5G new radio (NR) technology for mobile communications on board vessels.

Revisions of the implementing decisions for SRDs and ultra-wideband (UWB) applications were also adopted, enabling new and innovative scenarios for the use of UWB, in particular in the industrial, transport and logistics sectors.

A new mandate was issued for CEPT to study the shared use of the 6425-7125 MHz band for the provision of wireless broadband by terrestrial systems capable of providing wireless broadband electronic communications services and by wireless access systems, including radio local area networks. Mandates were also issued to update the regulatory conditions for the FRMCS and for intelligent transport systems (ITS). (See also: ec.europa.eu/digital-single-market/en/radio-spectrum-committee-rsc).

Radio Spectrum Policy Group

The Bundesnetzagentur's activities for the Radio Spectrum Policy Group (RSPG), the high-level advisory group that assists the European Commission with spectrum policy issues, involved supporting the BMDV and providing input for various opinions and reports, including the following:

- RSPG Peer Review Report,
- RSPG Opinion on assessment of different possible scenarios for the use of the frequency bands 1980-2010 MHz and 2170-2200 MHz by the Mobile Satellite Services beyond 2027,
- RSPG Report on the result of the ITU-R World Radiocommunication Conference 2023, and RSPG Opinion on "How to master Europe's digital infrastructure needs?" (radio-spectrum-policy-group.ec.europa.eu/opinions-and-reports_en).

Electromagnetic compatibility standardisation

International standardisation activities in 2024 again centred on the 6-40 GHz band, with the particular aim of achieving radio protection for 5G applications. The focus of the work was on defining adequate limits and appropriate standardised measurement methods.

Activities in the field of electromobility increased, with a view to ensuring protection for radiocommunication services as well as the smooth operation of smart applications such as autonomous driving and smart charging. The primary objectives remain closing the gap in standardisation to include spectrum below 30 MHz and above 1 GHz and incorporating all vehicle operating modes (driving mode, wired and wireless charging) appropriately.

Work is ongoing on developing the standards for wireless electric vehicle charging in the band at 150 kHz to 30 MHz. A special focus at present is on implementing a reliable technical solution for registering electromagnetic interference at large industrial plant locations.

5G-Advanced/6G standardisation

The 3rd Generation Partnership Project (3GPP) is the major driver behind 5G and future 6G standardisation. The Bundesnetzagentur represents Germany's interests in mobile communications standardisation at the 3GPP meetings on behalf of the Federal Ministry for Economic Affairs and Climate Action (BMWK) in accordance with section 221 TKG.

In the reporting period, work on Release 18 was completed while work on Release 19 continued, each with a focus on 5G-Advanced and innovations in areas such as artificial intelligence, satellite mobile communications, the Internet of Things and energy consumption. Work started on Release 20, which is the first Release to cover 6G in connection with a number of basic studies, in addition to 5G-Advanced. A study by 3GPP's SA1 working group on developing the technical requirements for 6G marked the start of the work.

At national level, the Bundesnetzagentur has set up the 6G Exchange Platform (AP6G) as a forum for experts to discuss and agree on specific 6G issues and requirements in preparation for key 3GPP meetings. The overall aim of the platform is to promote networking between research, administration and industry and strengthen Germany's role in international standardisation competition.

Tasks and organisation

The Bundesnetzagentur aims to ensure nationwide fibre, mobile and spectrum coverage. As a federal authority it is also strongly committed to consumer protection. It acts as a mediator in citizens' complaint procedures. The Bundesnetzagentur covers a wide range of constantly increasing responsibilities.

Tasks and structure

The Bundesnetzagentur, originally known as the Regulatory Authority for Telecommunications and Post, was set up on 1 January 1998 as a separate higher federal authority under the Federal Ministry for Economic Affairs and Climate Action. It took over the responsibilities of the former Federal Ministry of Post and Telecommunications and the Federal Office for Post and Telecommunications. In 2005, on being assigned responsibilities under the Energy Industry Act and subsequently the General Railway Act, the Regulatory Authority for Telecommunications and Post was renamed the Bundesnetzagentur für Elektrizität, Gas, Telekommunikation, Post und Eisenbahnen.

First and foremost, the Bundesnetzagentur's remit is to promote competition through regulation in the energy, telecommunications, postal and railway network infrastructures and to guarantee non-discriminatory network and thus market access. Alongside regulatory measures in the energy sector, as the planning authority the Bundesnetzagentur is also responsible for electricity transmission lines crossing national or federal state borders in the context of the energy transition. In the telecommunications and postal sectors it ensures appropriate, adequate and nationwide services and provides regulations for the use of spectrum and numbering resources. Furthermore, the Bundesnetzagentur is the competent authority under the Electronic Signatures Act (SigG).

The Bundesnetzagentur also carries out the function of the national Digital Services Coordinator (DSC) under Germany's Digital Services Act (DDG), which serves to implement the EU's Digital Services Act (DSA).

The Bundesnetzagentur's tasks are complex and highly diverse. They range from cases addressed in quasi-judicial proceedings in regulation areas, reporting requirements and planning authority responsibilities, consumer protection and information activities in the regulated sectors, to the nationwide investigation and processing of spectrum interference complaints.

Below the management level the Bundesnetzagentur comprises ruling chambers and departments. The President's Chamber takes decisions in specific cases, in particular on award proceedings for scarce radio spectrum resources and the imposition of universal service obligations. In the telecommunications sector it determines which markets require regulation and which companies have significant market power in these markets.

On the basis of these determinations, the ruling chambers then decide on the regulatory measures to be imposed on companies with significant market power. This is how decisions on specific details of obligations are reached, for example in the field of network access conditions or ex ante or ex post price reviews. In the postal sector the ruling chamber focuses on (ex ante and ex post) rates approval and the control of anti-competitive practices, including the regulation of access to the postal network. In the energy sector the ruling chambers have decision-making powers on general and individual issues regarding access to electricity and gas networks and network tariffs. The Grand Ruling Chamber for Energy issues determinations laying down nationally applicable uniform methodologies and conditions for network access and for setting the tariffs for network access. The departments perform specialised and central administrative functions. These include economic and legal policy issues in the various areas of regulation and the relevant international coordination, as well as technical aspects of spectrum, standardisation, numbering and public safety. The Bundesnetzagentur is involved in international standardisation bodies, cooperating in the development of next-generation networks and new radio systems.

All of the Bundesnetzagentur's responsibilities have a strong international element. Coordination at European level, in particular, has always been an important aspect of its regulatory activity. This is reflected by the fact that the international activities are mostly concentrated and dealt with in one department.

In the telecommunications sector the Bundesnetzagentur is mainly responsible for the key decisions and objectives that promote investment, innovation and competition for the benefit of all citizens. In the context of Industry 4.0, ideas are being developed to promote the spread of digital technology and internetworking in key future-oriented fields; at the same time economic opportunities offered by the digital revolution and internetworking are being assessed with respect to growth, employment and competitiveness in the national economy.

Consumer protection remains another key focus area in the telecommunications sector. In this regard, particular emphasis is placed on investigating problems that hinder a smooth change of supplier. Furthermore, the Bundesnetzagentur continues to vigorously combat misuse as regards the unlawful use of telephone numbers, anti-competitive behaviour and cold calling. In protecting the consumer, particular attention is given to preventing

the illegal billing of call queues. Another primary function is to ensure transparency of consumer contracts, especially with respect to the bandwidth guaranteed in the contract. The Bundesnetzagentur also maintains a database of sites of fixed transmitters operating above a specified power level. Also of particular importance for consumers are the resolution of radio interference, the dispute resolution procedure and general consumer services. Moreover, the Bundesnetzagentur plays an essential role in ensuring public safety. Its tasks include checking the technical protection measures for critical telecommunications infrastructure, protecting personal data and telecommunications privacy, the technical implementation of interception measures, and implementing and safeguarding information procedures.

In the energy sector it is the Bundesnetzagentur's duty to create and secure the basis for efficient competition in the electricity and gas markets. This is done in particular through unbundling and regulating non-discriminatory access to the energy networks, including tariff regulation. In addition, the statutory decision in 2011 to phase out nuclear power as part of the energy transition and the continued expansion of renewable energy require state measures with respect to the various market players, including monitoring the electricity and gas wholesale markets and intervening where necessary to safeguard security of supply. The Bundesnetzagentur also monitors the development of upstream generation and import markets along with consumer markets. In the event of an electricity or gas deficit situation, the Bundesnetzagentur immediately acts as the federal load distributor, taking on the statutory duty of distributing energy resources.

One of the major tasks for the Bundesnetzagentur in the context of the energy transition is the fast, large-scale expansion of the electricity transmission networks. To achieve this, the Bundesnetzagentur has been given wide-ranging authority in network development planning and in approving network expansion measures. This includes implementing the federal sectoral planning for extra-high voltage lines crossing federal state and national borders and, as of 2013, their planning approval. As part of the statutory planning process, the network development plan is constantly being updated to take account of the latest developments. This also involves network planning and connection in the offshore sector.

In rail regulation the Bundesnetzagentur monitors compliance with the legislation on rail infrastructure access. A core task here is to ensure non-discriminatory use of the rail infrastructure by railway undertakings and other access beneficiaries. The term rail infrastructure includes the infrastructure and services connected with both tracks and service facilities (eg stations, freight terminals). Rates regulation includes the examination of the level and structure of infrastructure charges and of other charges levied by the infrastructure managers.

A nationwide presence is vital for the Bundesnetzagentur to perform its duties. To ensure consistency the work of the Bundesnetzagentur's regional offices, which are the contact point with consumers, businesses and industry, is managed and coordinated by the relevant specialist departments.

The regional offices are mainly responsible for technical matters. They provide information, for example, on compliance with regulations on electromagnetic environmental compatibility and telecommunications. They are also in charge of spectrum assignment, for instance for private

mobile radio systems, for granting site certificates and for sampling equipment under their market surveillance duties. Another important area is the investigation and processing of radio interference using state-of-the-art measuring equipment, monitoring compliance with regulations generally and carrying out radio monitoring and inspection tasks.

Additional executive tasks are carried out by specific regional offices. In particular, this involves activities in number administration, number misuse and cold calling, consumer protection and information, the core energy market data register and the registration of railway infrastructure. They also carry out some human resources management functions for other government bodies and institutions, primarily those falling under the Federal Ministry for Economic Affairs and Climate Action.

The Bundesnetzagentur also opened a new main location in Cottbus in 2021. The 2021 budget provided the Bundesnetzagentur with around 100 new positions to build up this location with interesting and important areas of focus.

Human resources management

Human resources management is a top priority at the Bundesnetzagentur. It is important both to deploy staff optimally and to recruit new qualified staff. This is only possible when human resources management takes account of work requirements and staff skills and preferences in equal measure. Only a combination of pro-active, appropriate staff deployment and motivated employees will allow the Bundesnetzagentur to perform its responsibilities in an efficient way even in times of tight budgets. Aspiring to modern human resources management, the Bundesnetzagentur offers not only corporate health schemes, but also models for balancing work and family life. In this connection, the Bundesnetzagentur was again certified in 2024 by the berufundfamilie Service GmbH in recognition of its long-term commitment for its personnel policies that take both family life and the various stages of life into account. By signing the Diversity Charter the Bundesnetzagentur underscores its commitment towards recognising, appreciating and embracing diversity as one of its core principles.

In recruiting new staff the Bundesnetzagentur requires excellent specialist knowledge as well as the ability to work as part of a team and the ability to structure and address complex new tasks in an interdisciplinary team quickly and with a flair for practical solutions.

Given its diverse areas of activity, the Bundesnetzagentur attaches particular importance to an interdisciplinary work approach. In total the Bundesnetzagentur employs around 3,200 specialists, including legal experts, economists, engineers, technicians, computer scientists and natural scientists as well as professionals from various other fields, to ensure the efficient, proper performance of tasks in all areas.

Retirements and posts created as a result of new tasks have opened up numerous opportunities for new recruits in the fields mentioned above, providing interesting career prospects for new arrivals. The Bundesnetzagentur follows a sustainable human resources development policy that helps to recognise staff members' potential to perform and develop, to maintain that potential while taking into account constantly changing demands, and to foster potential by including individual staff members' career goals. Bundesnetzagentur employees have a wide range of options for obtaining advanced training and advancement qualifications as well as for active involvement in international institutions.

The Bundesnetzagentur has been offering apprenticeships since 1999. In view of the recruitment of future staff and the challenges of demographic change, the training qualifications offered by the Bundesnetzagentur have become ever more diverse. In 2024, a total of 190 trainees and students were employed at the Bundesnetzagentur in various vocational training and study programmes. Vocational training is available for office management trainees, electronic equipment and systems trainees, and for IT trainees in system integration. Within its recruitment scheme at higher intermediate level, the Bundesnetzagentur offers places on training-integrated and practice-integrated dual study programmes for electrical engineering and business informatics students. Moreover, civil servants preparing for the rank of Regierungsinspektor are able to take a university degree in IT in public administration and in the new Digital Administration and Cyber Security programme. Vocational and university training courses are offered at a total of eleven Bundesnetzagentur locations, which especially includes regional offices.

Budget

The Bundesnetzagentur's income and expenditure is budgeted for in the federal budget as part of the departmental budget of the Federal Ministry for Economic Affairs and Climate Action.

The Bundesnetzagentur held an auction in accordance with sections 20 and 21 of the Offshore Wind Energy Act (WindSeeG) that closed for bids on 1 June 2023; the multi-stage bidding procedure determined the successful bidders for sites that have not been centrally pre-investigated for the operation of offshore wind farms from 2030. A total of €1.338mn from the auction proceeds went to the federal government, resulting in additional income in this area.

In 2024 expenditure was used for implementing new legal requirements, setting up and expanding new organisational units and filling vacancies.

Note: At the time this report was published, the federal budget for 2025 had not yet been approved because of the elections for the German Bundestag on 23 February 2025. The target figures for income and expenditure are therefore based on the first draft of the 2025 budget drawn up by the federal government in summer 2024. The 2025 budget will be reworked and approved once the new government has been formed. The approved figures may therefore differ from the target figures in the tables.

Type of income

	Target 2024 €'000	Performance 2024 €'000	Target 2025 €'000
Fees, contributions and other charges in the telecoms sector	50,257	51,421	53,341
Fees and other charges in the postal sector	17	154	9
Fees and other charges in the rail sector	586	133	650
Fees and other charges in the energy sector (electricity, gas, EEG)	13,140	11,752	9,733
Fees and other charges under the Grid Expansion Acceleration Act	35,000	30,058	40,000
Other administrative income, eg fines and rental and sale income	807,045	1,436.592	1,500.735
Administrative income	**906,045**	**1,530.110**	**1,604.468**

Type of expenditure

	Target 2024 €'000	Performance 2024 €'000	Target 2025 €'000
Staff costs	181,015	191,928	202,804
General administrative expenditure, appropriations and special financing expenditure	70,342	76,721	88,736
Investments	15,951	17,387	14,208
Total expenditure	**267,308**	**286,036**	**305,748**

Publisher's details

Publisher
Bundesnetzagentur für Elektrizität, Gas,
Telekommunikation, Post und Eisenbahnen

Press and Public Relations
Tulpenfeld 4, 53113 Bonn
Tel.: +49 228 14-9921
Fax : +49 228 14-8975
pressestelle@bnetza.de

Editing
Press and Public Relations
Responsible for content: Fiete Wulff

Design
Bundesnetzagentur

Photo credits
Front and back covers: 398529840 / Adobe Stock
Page 2: Laurence Chaperon
Page 4, 6: 1331980097 / Adobe Stock
Page 34: 954905586 / Adobe Stock
Page 4, 50: 683073294 / Adobe Stock
Page 4, 72: 1291302580 / Adobe Stock
Page 106: 411985130 / Adobe Stock
Page 122: C. Nemitz / Bundesnetzagentur

Editorial deadline
May 2025

Online
bundesnetzagentur.de

Bundesnetzagentur Annual Report 2025
in accordance with section 196 of the Telecommunications Act

bundesnetzagentur.de

twitter.com/BNetzA

social.bund.de/@bnetza

youtube.com/BNetzA