RTR

# RTR TELEKOM MONITOR
# ANNUAL REVIEW
# 2016

# RTR Telekom Monitor

*Annual Review 2016*

# Contents

# Preface

## Dear readers,

With the Annual Review 2016 of the RTR Telekom Monitor we again present an extended quarterly edition with the focus on year-on-year comparisons and two additional sections containing international comparisons and indices that show the performance of Austria in relation to other EU/EEA countries.

### Continuing importance of mobile communications

It is no coincidence that the section on mobile communications comes first in the RTR Telekom Monitor. Also in 2016, the importance of mobile communications in Austria is undiminished: 87.7% of call minutes came from the mobile network, revenues from mobile communications accounted for some 64.5% of total revenues (EUR 4.028 billion) generated by the telecom sector. Mobile data volumes also continued to develop dynamically in 2016: Mobile upload and download data volumes climbed from about 300,000 terabytes in 2015 to more than 570,000 terabytes, which is an increase of 90%.

### 5G roll-out is important for Austria as ICT location

While 4G is truly gaining momentum (with the number of 4G SIM cards soaring by about 500% year on year), the development of the next generation of mobile communications – 5G – is the next item on the agenda. To be able to respond to this challenge a national tour de force and the pooling of forces would be necessary. The still incumbent federal government had accorded great importance to the expansion of 5G infrastructure and had stated in the government programme that it was intended to make Austria the pioneer in 5G worldwide.

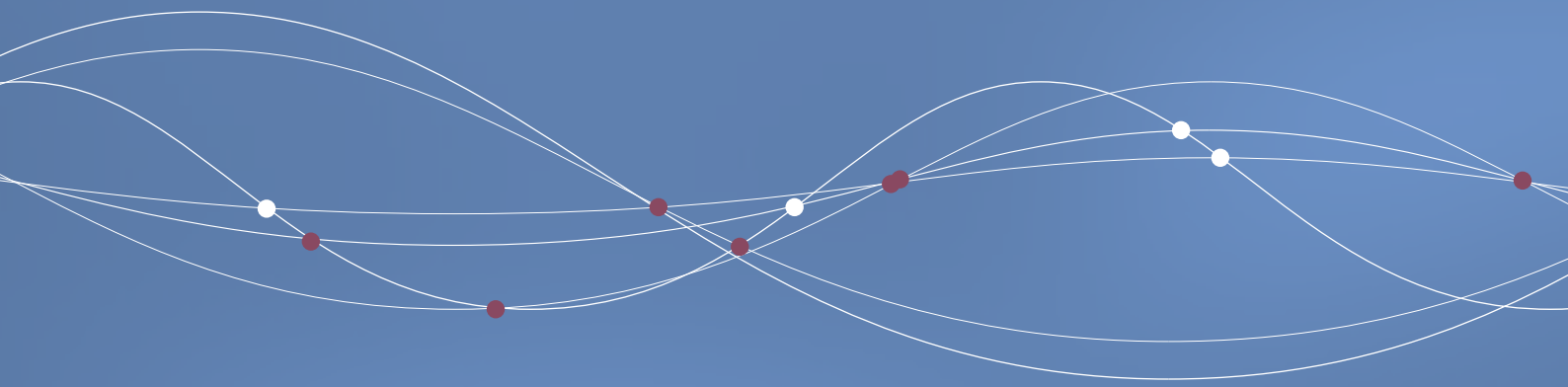
Unfortunately, this development is now at risk of slowing down and suffering delays even though, especially with 5G roll-out, every month counts. The planned awards of frequencies for mobile communications cannot take place as long as the required legal changes have not been made. Availability of frequencies, however, is the very basis for 5G development. In December 2016, RTR published a preliminary schedule for the frequency awards in the RTR Spectrum Release Plan. Yet, it is essential that the necessary political decisions be taken.

### New since 2016: RTR data available as open data

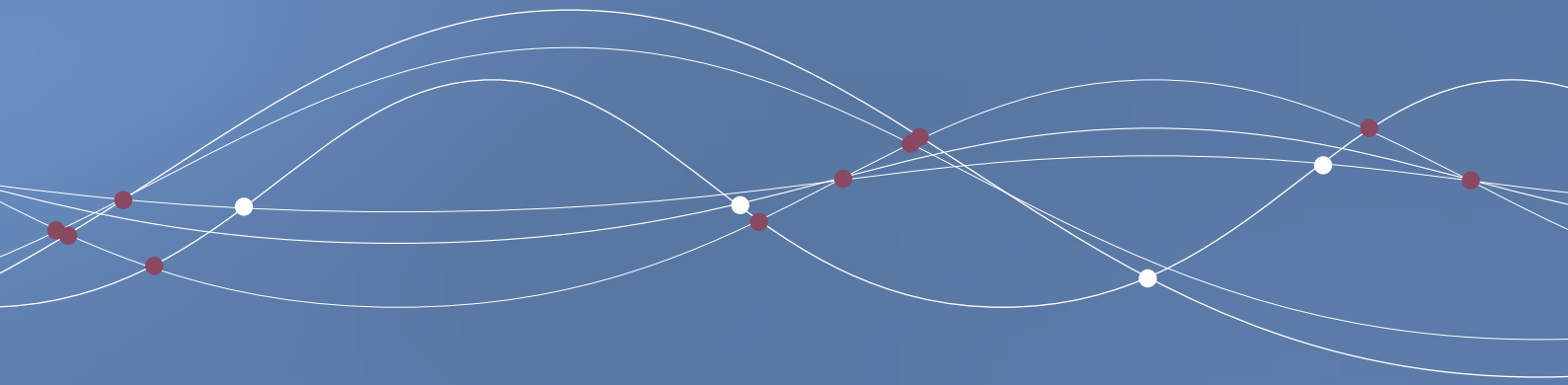
Since 2016, the data of the RTR Telekom Monitor – just as many other data collected by RTR – have also been available as open data. The open data offering is available at https://www.rtr.at/de/inf/RTROpenData and at the Open Government data portal data.gv.at.

**Johannes Gungl**

*CEO Telecommunications and Postal Services*
*Austrian Regulatory Authority for Broadcasting and Telecommunications (RTR)*

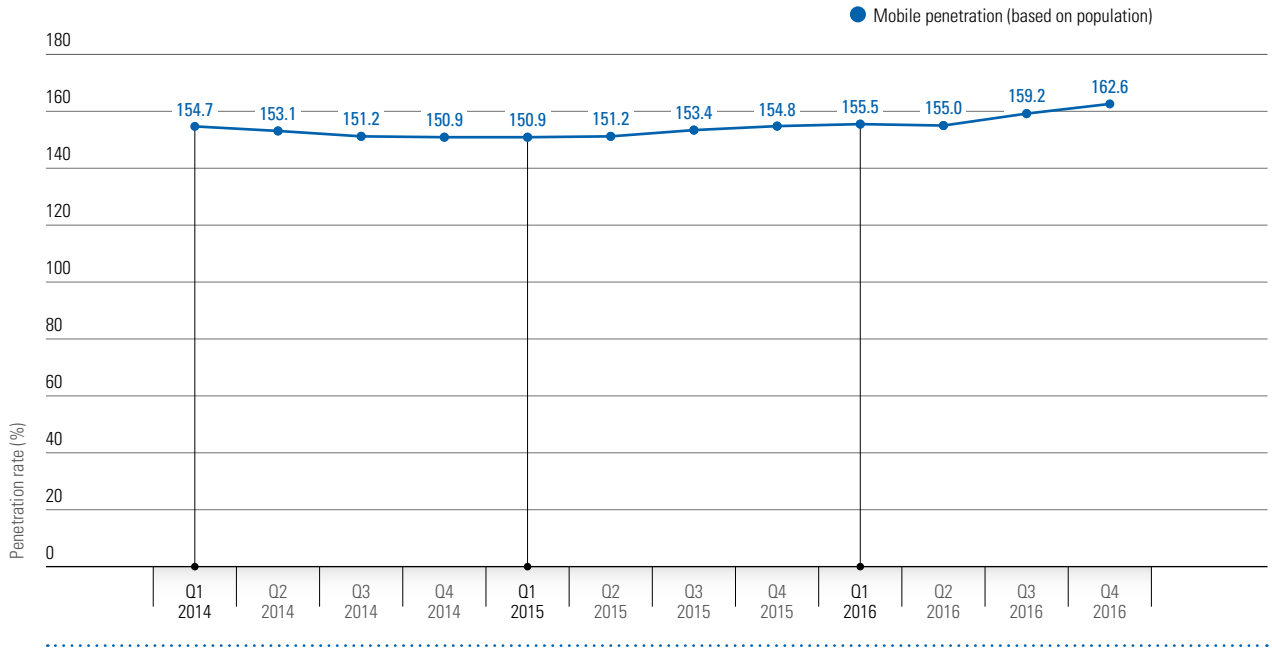


# 1 Mobile communications



# Mobile penetration

## *Further increase in mobile penetration in 2016*



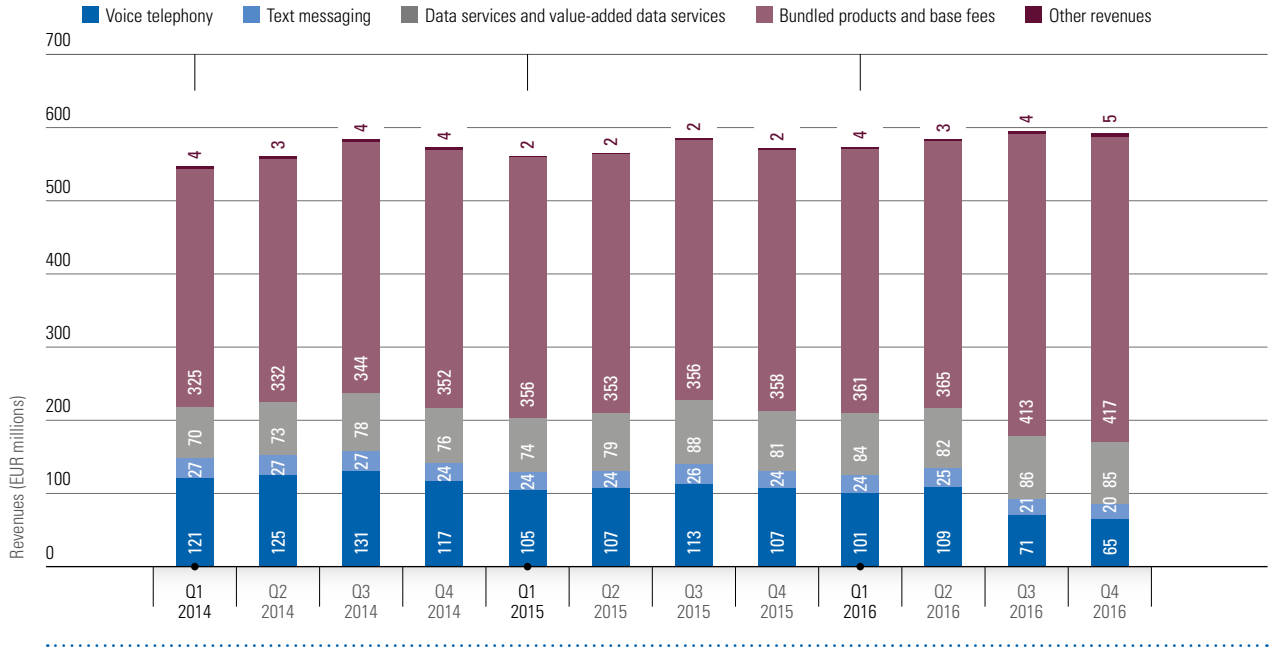

Source for population figure: Statistics Austria

- Altogether, the mobile penetration rate rose in the course of 2016, except for a minimal slump in Q2. At the end of 2015, it was 154.8%, one year later 162.6%. Thus, the number of active SIM cards increased more strongly than the country's population in 2016.

The mobile penetration rate is calculated as the number of activated SIM cards divided by the country's population. This figure therefore represents the (notional) average number of SIM cards owned by every inhabitant. However, it also includes both SIM cards used by businesses and machine-to-machine (M2M) SIM cards.

# Retail revenues from mobile communications

## *Slight year-on-year revenue growth*




- In 2016, the mobile communications retail segment generated revenues of some EUR 2.346 billion. Against the year 2015, this is an increase of 2.7%.
- The major part of the revenues (66.4%) came from bundled products and base fees, amounting to EUR 1.557 billion. Thus, revenues from this category climbed by 9.4% against 2015.
- About EUR 346.0 million were earned from mere voice telephony, 19.8% less than in 2015. Revenues from voice telephony totalled 14.8% of total revenues.
- Data services generated revenues of some EUR 336.8 million (14.4% of total revenues), i.e. revenues from data services increased by 4.6% compared with the previous year.
- Text messages accounted for 3.8% of total revenues (EUR 90.3 million) and other revenues amounted to 0.7% of total revenues (EUR 16.3 million).

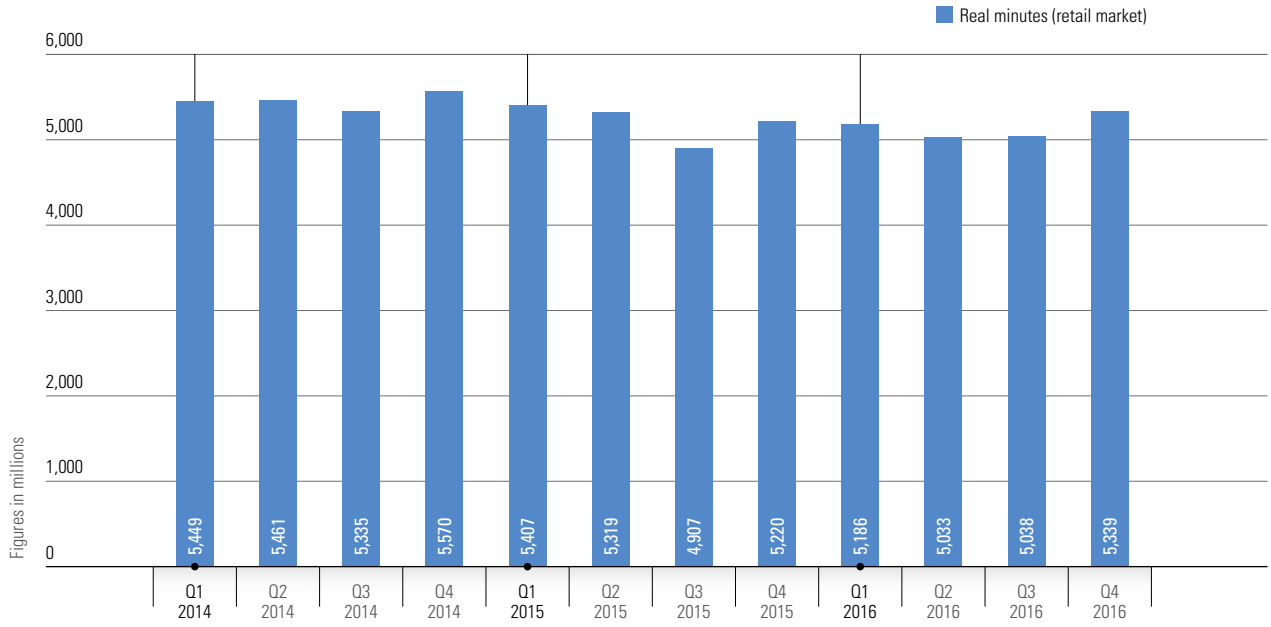
The chart above includes all revenues (base fees, activation charges, service charges, connection charges, etc.) earned from (own) retail customers in Austria, including revenues earned from roaming. In line with the amendment to the KEV, mobile services revenues were classified in 2012 as follows:

- Revenues clearly attributable to mobile voice telephony or value-added voice services;
- Revenues clearly attributable to text messaging and value-added text messaging services;
- Revenues clearly attributable to mobile data and value-added data services (including multimedia messages);
- Bundled products and base fees: revenues not clearly attributable to one of the aforementioned categories;
- Revenues from "bundled products and base fees" accounted for by data services (excluding text messages)*;
- Other revenues, e.g. reminder charges.

*These are not shown separately in the chart; however, their shares are listed in the table at the end of the section.

# Call minutes on the retail market

## *Slight year-on-year decline in number of call minutes*

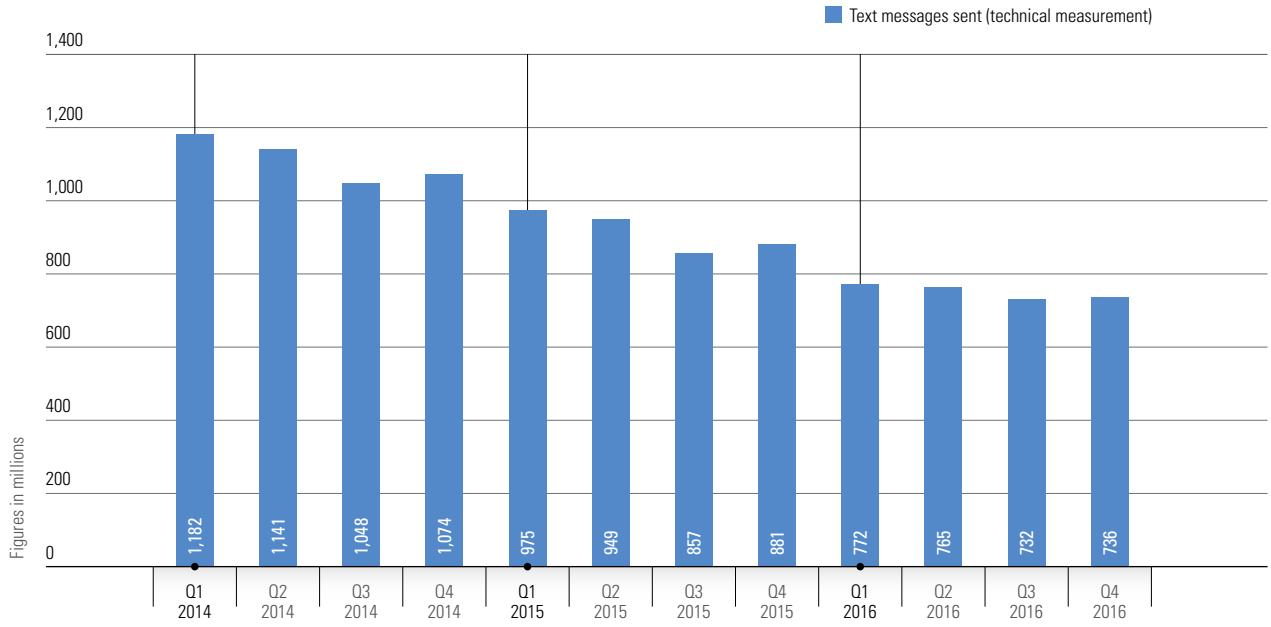



- The number of mobile call minutes rose by 6.0% from Q3 to Q4 2016.
- Altogether however, in 2016, the number of call minutes decreased against the previous year. Mobile call minutes totalled some 20.596 billion, which is a decline of 1.2% against 2015, the general downward trend of recent years continuing.

The chart above shows the actual call minutes (technical measurement, see Glossary) on mobile networks. This includes minutes from voice telephony including value-added voice services, but not non-voice services, video telephony, etc.

# Text messages (SMS)

## *Text messages declining year on year*

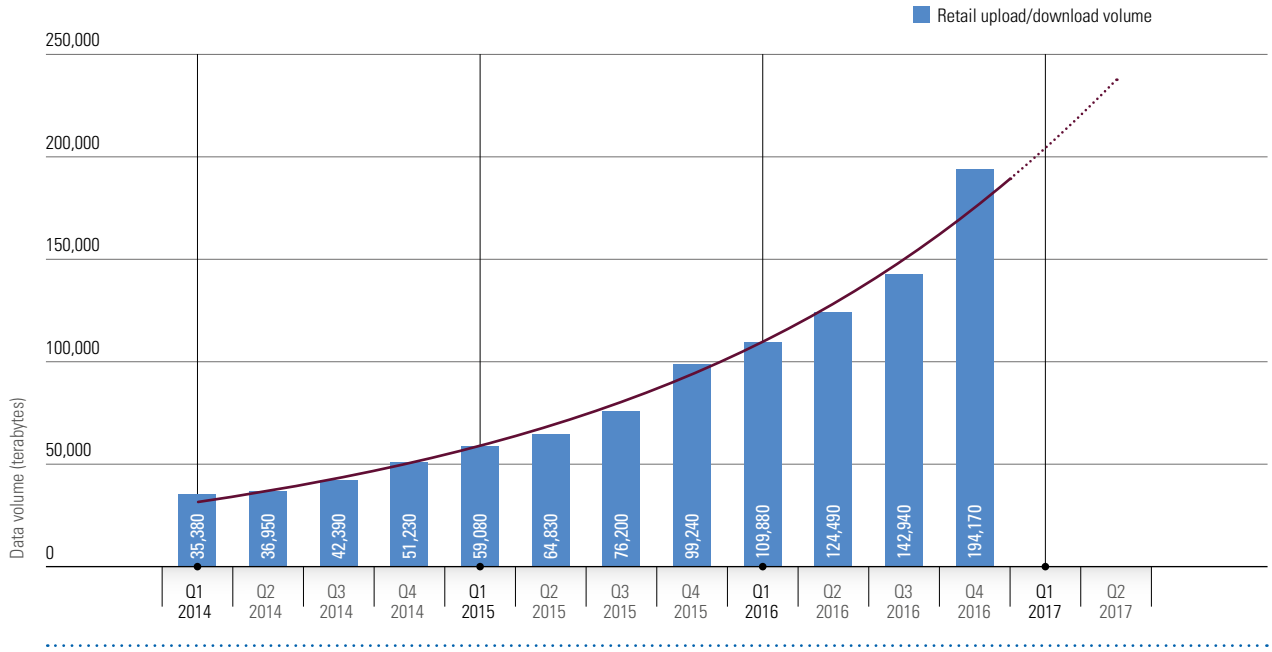



- In Q4 2016, some 736.3 million text messages were sent, which is a slight gain of 0.7% against the previous quarter.
- Year on year, however, fewer text messages were sent than in the year before. In total, about 3.005 billion text messages were recorded, which is a drop of 17.9% compared with 2015. Thus, the downward trend of previous years is seen to continue. This is mainly attributed to widespread use of data-based instant messaging services like WhatsApp or Facebook Messenger.

The chart above shows the number of text messages (technical measurement) sent in the respective quarters. For text messages, similar to call minutes, the term "technical measurement" means that the figure also includes text messages that are not charged individually to the retail customer (e. g. text messages included in the base fee or flat rate). Multimedia messages are not included in these figures.

# Data volume (retail market)

*Data usage in 2016 almost twice as high as in the year before*

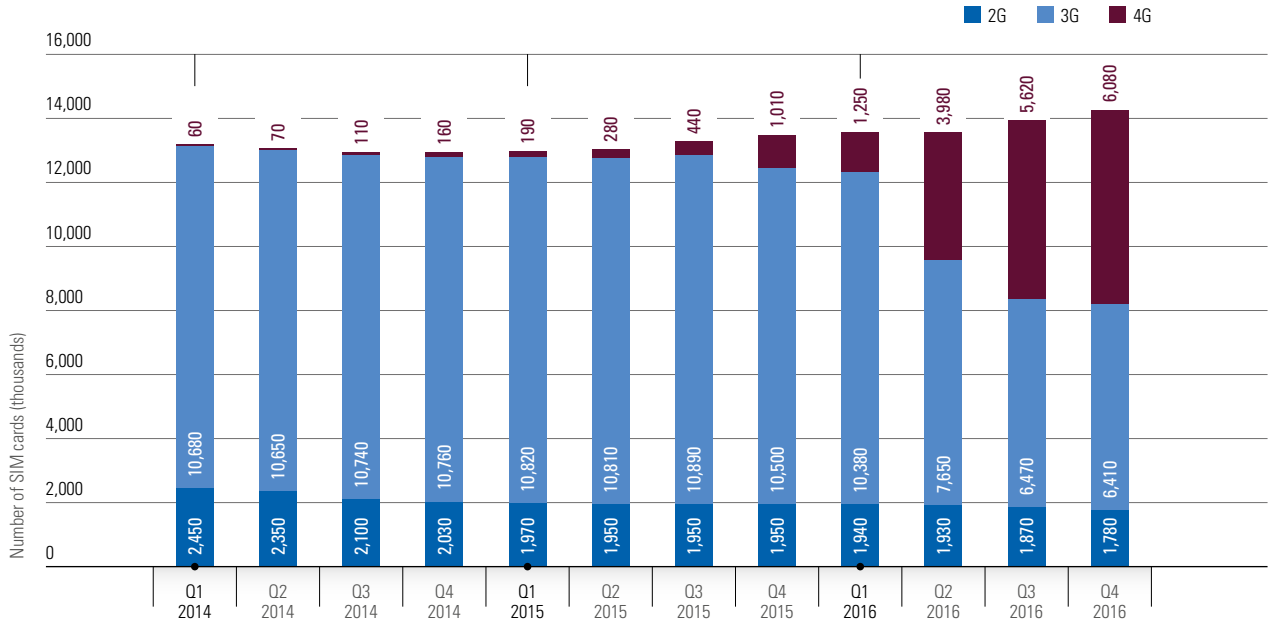



- The data volume used continues to grow unabatedly. In Q4 2016, 194,170 terabytes were used. Thus, data usage increased by 35.8% compared with the previous quarter.
- In 2016, some 571,480 terabytes of data were used in total, which constitutes an increase of 90.9% compared with 2015. Thus, the strong upward trend continued. The data volume used has been rising exponentially in recent years and is expected to increase on this scale also in the future.

The chart above shows the data volume used for uplink and downlink transmissions on the retail mobile communications market in terabytes (1 terabyte = 1,024 gigabytes = 1,048,576 megabytes). These figures do not include text messages or multimedia messages. In addition, a simple exponential trend line illustrates how the data volume would develop if the trend persisted.

# SIM cards in use

## *Number of 3G and 4G cards almost even*




- At the end of 2016, some 14.3 million SIM cards were in use, 5.9% more than in the reference period of 2015.
- In the course of 2016, many operators upgraded previous 3G cards to 4G and many new LTE tariffs were introduced, which is why the number of 4G cards rose substantially. While about 1.0 million 4G cards were in use at the end of 2015, this figure jumped to some 6.1 million at the end of 2016, which corresponds to an increase of 501.2%. At the same time, the number of 3G cards dropped from 10.5 million at the end of 2015 to 6.4 million (down 39.0%) at the end of 2016. 2G cards amounted to about 12.5% (1.8 million) of all SIM cards at the end of 2016, which is a decline in number by 9.1% against 2015.
- About 720,300 SIM cards were explicitly reported as M2M SIM cards at the end of 2016.

The chart above shows the number of SIM cards activated and in use, broken down into 2G (GSM), 3G (UMTS) and 4G (LTE) cards.

The breakdown of SIM cards into prepaid and postpaid customers can be found in the table at the end of the section.

# The average SIM card

## *Data usage on the rise, SMS, minutes and revenues decreasing*

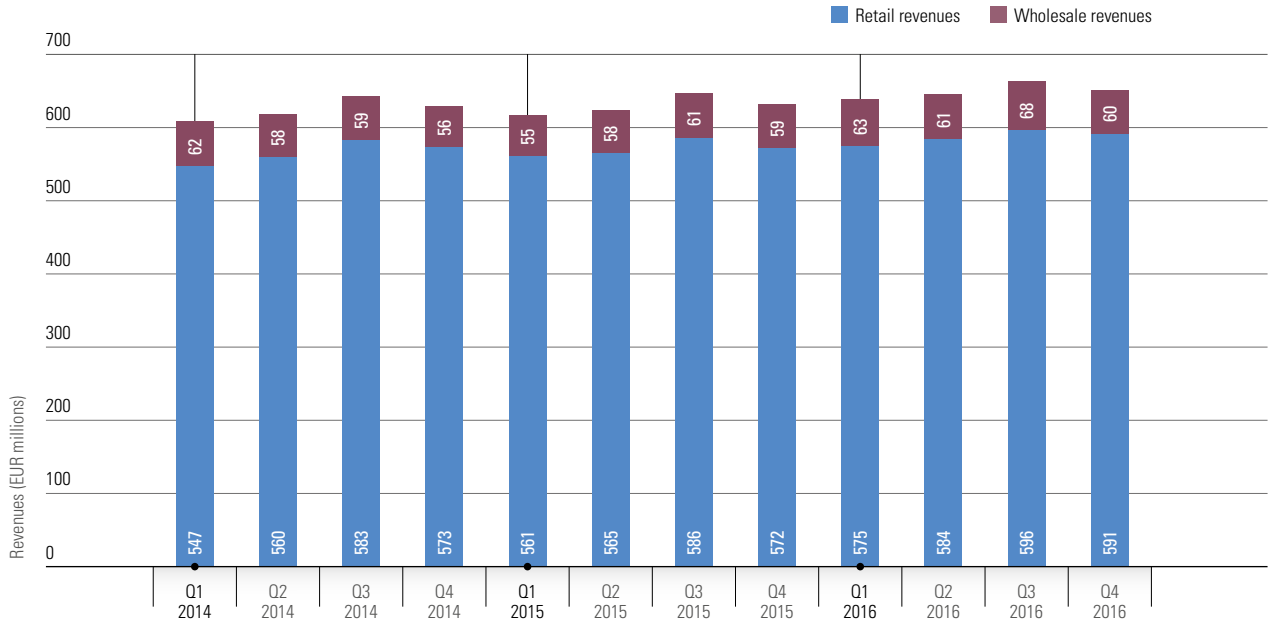

- In Q4 2016, average revenues of EUR 13.8 were generated per SIM card and month. Thus, on average 17.2 text messages were sent, outgoing calls corresponding to 124.8 call minutes were made and 4,758 megabytes of data volume were used.

- These figures reflect the general development of the usage patterns described on the previous pages. Accordingly, compared with Q4 2015, revenues (down 2.3%), the number of text messages sent (down 21.1%) as well as the number of outgoing call minutes (down 3.4%) dropped, while the average data volume used increased by 84.8%.

The charts show the average revenues generated (ARPU – Average Revenue per User), the average number of real minutes and text messages sent as well as the data volume used in megabytes per SIM card in an average month for each quarter. The values are therefore based on one-third of retail customer revenues, real minutes, number of text messages sent and data volumes of a quarter, divided by the total number of activated SIM cards (including mobile broadband cards and M2M SIM cards) at the end of a quarter. The revenues per SIM card depicted shall not be interpreted as prices. Information on the price developments can be found in the mobile communications price index at the end of the section.

# Total mobile communications revenues

## *Slight rise in annual revenues*

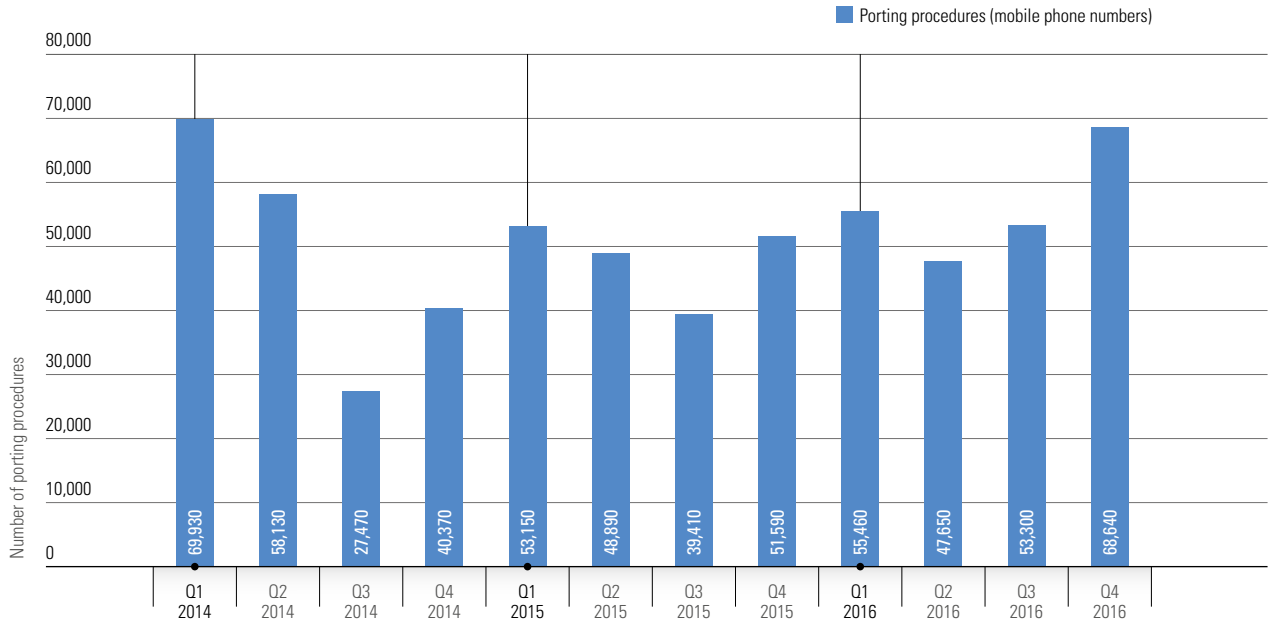



- Total revenues from the retail and wholesale segments of mobile communications amounted to some EUR 2.599 billion in 2016. Thus, compared with 2015, an upswing in revenues of 3.3% was achieved.
- Both retail revenues (up 2.7 to EUR 2.346 billion) and wholesale revenues (up 8.7% to EUR 253.0 million) showed an increase year on year.

The chart above shows the revenues on the retail and wholesale markets. Retail revenues include all revenues (base fees, activation charges, service charges, connection charges, etc.) earned from (own) retail customers in Austria, including revenues earned from roaming. Wholesale revenues are revenues from origination and termination charges, from selling airtime to resellers and revenues from national and international roaming (including MVNO access).

# Porting of mobile telephone numbers

*Number of porting procedures rises substantially towards the end of the year*

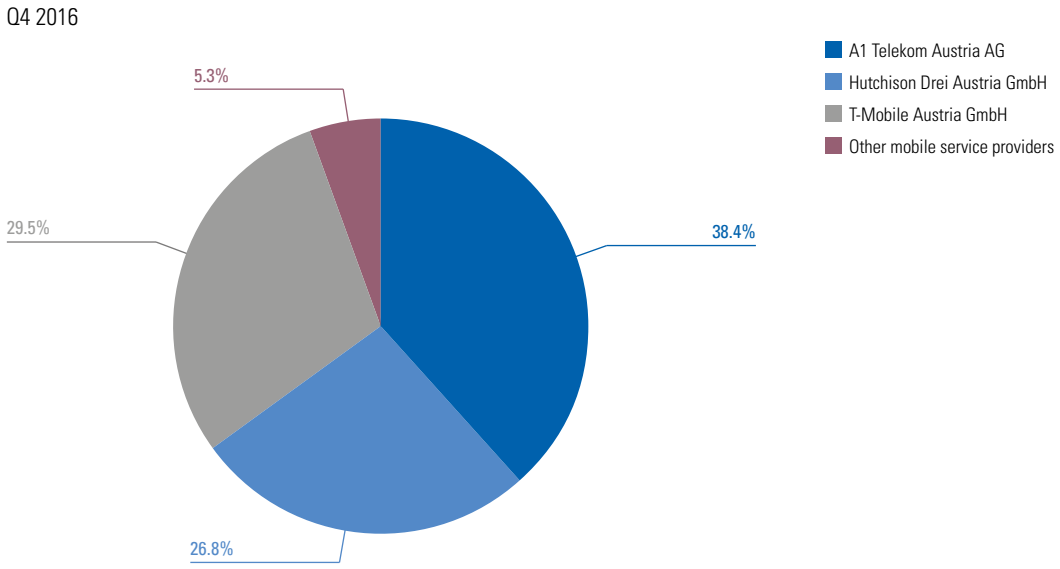



- In Q4 2016, 68,640 mobile phone numbers were ported. Thus, the number of porting procedures was up 28.8% against Q3 2016.

Number porting allows customers to retain their telephone numbers when they switch service providers. The chart above shows the porting procedures/ imports of telephone numbers carried out for an operator in one quarter, i.e. SIM cards in the case of mobile operators and subscriber numbers on the fixed network. Reverse portings (e.g. after cancellation by a subscriber) are not considered as porting procedure. If a subscriber number is ported several times within a quarter ("subsequent porting"), this is counted separately each time.

# Market shares of mobile service providers in Austria

*Alternative mobile service providers achieve a market share above 5%*

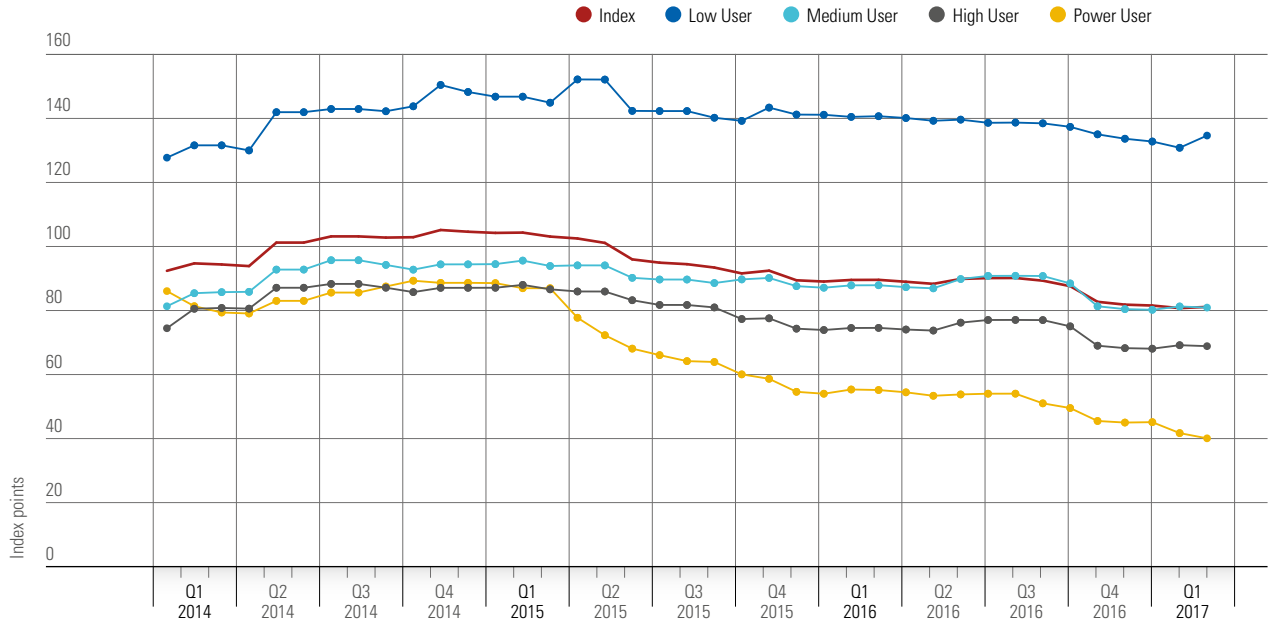



- In Q4 2016, A1 achieved a market share of 38.4% (5.5 million customers), T-Mobile held a market share of 29.5% (4.2 million customers), Hutchison reached a share of 26.8% (3.8 million customers).
- The category of "Other mobile services providers" comprises MVNOs and airtime resellers (see Glossary) that notified RTR of the provision of mobile communications services and hold the corresponding general authorisation. With 746,200 customers, together they had a market share of 5.3% at the end of 2016.

The chart above shows the market shares of mobile operators in Austria based on the number of their subscribers (number of SIM cards used).

# Price index in mobile communications

## *Stable price level in mobile communications in Q1 2017*




- In Q1 2017, the mobile communications price index remained almost unchanged – the overall index dropped by 0.7 percentage point.
- The tariff landscape, however, experienced some changes even though, in total, these had only little effects on the price level. Hutchison, UPC, Bob, Spusu and eety, for example, introduced new tariffs in Q1 2017. A1 lowered the prices for some postpaid tariffs but increased the SIM flat fee. In addition, many providers changed the amount of data volume included in their tariffs, extending it for many tariffs.
- In terms of method, the following adjustments were made in Q1 2017: First, like every year, in January 2017, usage of the four user types was adjusted but as the index was linked accordingly, this usage adjustment does not have an impact on the calculated price level (see Glossary).
- Second, from Q1 2017 onwards, the tariffs of Media Markt Mobil, Saturn Mobil, Krone mobile, Kurier mobil, LIWEST and Rapid Mobil were taken into account in the mobile communications price index. As the prices per brand calculated in the mobile communications price index are weighted with the respective brand's market share, however, the tariffs of the mobile operators without infrastructure, because of their comparatively low market shares, have less influence on the calculated price development than the tariffs of the mobile network operators A1, T-Mobile and Hutchison.

For the calculation of the average monthly prices the tariff data published monthly by the Austrian Chamber of Labour are used and average prices are derived for four different user types: three of these user types are so-called "smartphone users" who use both voice and text messaging services as well as data services. The fourth user type (the "low user") exclusively uses voice and text messaging services. Up to five of the cheapest tariffs per brand are used (see Glossary). The calculation started in January 2011, the chart shows the development over the past three years.

In contrast to the other charts in the RTR Telekom Monitor, this chart does not show the price development on a quarterly but on a monthly basis. As data up to March 2017 are already available, they are also included in the chart.

## Retail revenues from mobile communications (page 9)

| | EUR | Voice telephony | Text messaging | Data services and value-added data services | Bundled products and base fees | Share of data services in bundled products | Other revenues |
|---|---|---|---|---|---|---|---|
| **2014** | Q1 | 120,631,990 | 26,777,090 | 70,131,480 | 325,475,670 | 16.2% | 3,520,680 |
| | Q2 | 124,999,050 | 26,625,960 | 72,544,340 | 332,298,020 | 16.2% | 3,494,430 |
| | Q3 | 130,688,350 | 26,727,090 | 78,453,030 | 343,834,580 | 16.2% | 3,557,350 |
| | Q4 | 116,716,640 | 24,346,790 | 75,917,690 | 351,999,690 | 15.9% | 4,303,150 |
| **2015** | Q1 | 104,690,740 | 23,686,570 | 74,416,240 | 355,881,760 | 24.7% | 2,118,420 |
| | Q2 | 107,235,980 | 24,140,880 | 78,908,480 | 353,092,870 | 24.5% | 2,080,240 |
| | Q3 | 113,186,230 | 26,074,580 | 87,742,710 | 356,376,090 | 24.7% | 2,256,920 |
| | Q4 | 106,537,540 | 24,195,300 | 80,907,520 | 357,883,530 | 25.6% | 2,132,310 |
| **2016** | Q1 | 101,068,020 | 24,350,800 | 84,142,680 | 360,946,810 | 25.5% | 4,305,770 |
| | Q2 | 109,069,050 | 25,124,830 | 81,810,590 | 365,068,050 | 24.4% | 2,998,780 |
| | Q3 | 71,206,320 | 21,035,560 | 85,508,600 | 413,451,210 | 29.4% | 4,498,970 |
| | Q4 | 64,698,250 | 19,744,590 | 85,310,410 | 417,084,130 | 29.8% | 4,511,750 |

## Call minutes on the retail market (page 10)

| | | Real minutes |
|---|---|---|
| **2014** | Q1 | 5,448,927,110 |
| | Q2 | 5,461,038,010 |
| | Q3 | 5,335,100,380 |
| | Q4 | 5,569,638,360 |
| **2015** | Q1 | 5,407,174,220 |
| | Q2 | 5,318,743,560 |
| | Q3 | 4,907,266,740 |
| | Q4 | 5,219,612,720 |
| **2016** | Q1 | 5,186,160,870 |
| | Q2 | 5,033,123,720 |
| | Q3 | 5,038,083,780 |
| | Q4 | 5,338,820,600 |

## Text messages (page 11)

| | | Text messages sent (technical measurement) |
|---|---|---|
| **2014** | Q1 | 1,182,412,900 |
| | Q2 | 1,141,435,250 |
| | Q3 | 1,047,778,890 |
| | Q4 | 1,073,631,360 |
| **2015** | Q1 | 974,741,650 |
| | Q2 | 949,268,080 |
| | Q3 | 857,063,820 |
| | Q4 | 881,028,120 |
| **2016** | Q1 | 771,994,730 |
| | Q2 | 765,122,450 |
| | Q3 | 731,573,530 |
| | Q4 | 736,332,090 |

## Data volume retail market (page 12)

| | | Retail upload/download volume (megabytes) |
|---|---|---|
| **2014** | Q1 | 37,097,553,920 |
| | Q2 | 38,746,695,680 |
| | Q3 | 44,448,829,440 |
| | Q4 | 53,717,923,840 |
| **2015** | Q1 | 61,949,788,160 |
| | Q2 | 67,976,837,120 |
| | Q3 | 79,906,375,680 |
| | Q4 | 104,059,719,680 |
| **2016** | Q1 | 115,213,209,600 |
| | Q2 | 130,535,526,400 |
| | Q3 | 149,880,688,640 |
| | Q4 | 203,606,384,640 |

## SIM cards in use (page 13)

| | Number of SIM cards | 2G | 3G | 4G | thereof M2M SIM cards |
|---|---|---|---|---|---|
| **2014** | Q1 | 2,447,320 | 10,680,630 | 58,290 | 139,390 |
| | Q2 | 2,354,060 | 10,648,920 | 70,130 | 142,560 |
| | Q3 | 2,099,580 | 10,743,490 | 108,690 | 145,990 |
| | Q4 | 2,033,290 | 10,757,350 | 161,970 | 149,470 |
| **2015** | Q1 | 1,969,370 | 10,818,050 | 190,020 | 153,080 |
| | Q2 | 1,953,260 | 10,806,400 | 275,590 | 154,490 |
| | Q3 | 1,947,260 | 10,891,530 | 438,870 | 155,150 |
| | Q4 | 1,954,290 | 10,504,620 | 1,011,720 | 156,580 |
| **2016** | Q1 | 1,938,690 | 10,379,100 | 1,250,420 | 154,910 |
| | Q2 | 1,925,000 | 7,650,280 | 3,975,890 | 167,560 |
| | Q3 | 1,865,250 | 6,470,290 | 5,618,540 | 475,630 |
| | Q4 | 1,776,220 | 6,405,400 | 6,082,160 | 720,320 |

## Prepaid vs. postpaid SIM cards

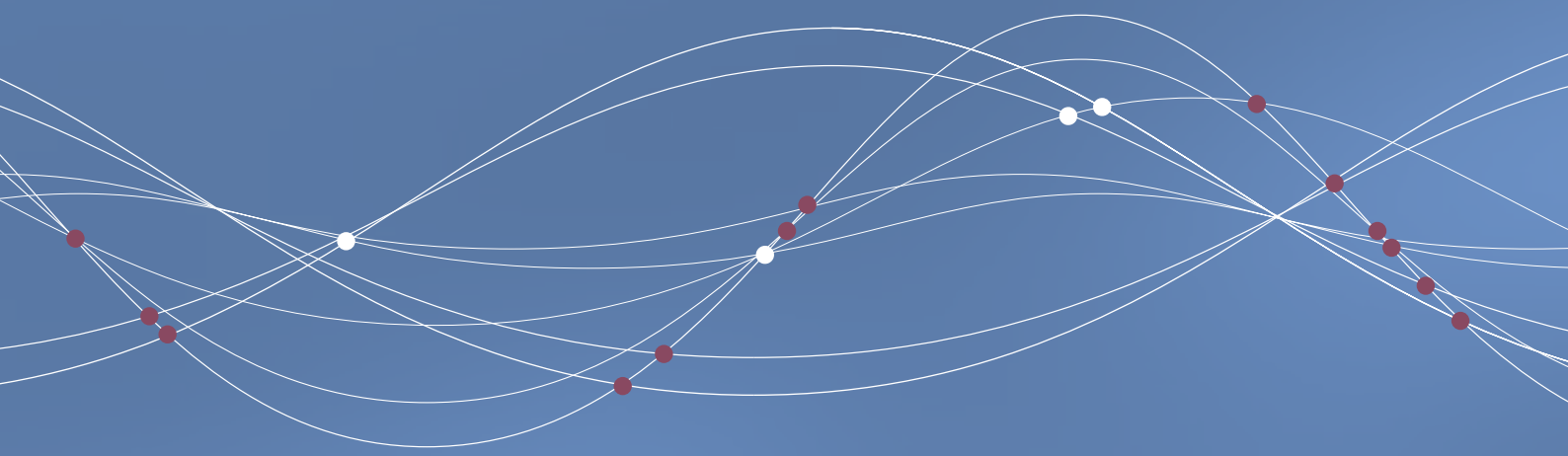
| | Number of SIM cards | Postpaid | Prepaid |
|---|---|---|---|
| **2014** | Q1 | 9,199,180 | 3,987,060 |
| | Q2 | 9,124,880 | 3,948,230 |
| | Q3 | 9,070,280 | 3,881,480 |
| | Q4 | 9,066,370 | 3,886,240 |
| **2015** | Q1 | 8,947,740 | 4,029,700 |
| | Q2 | 8,903,980 | 4,131,260 |
| | Q3 | 8,892,970 | 4,384,690 |
| | Q4 | 8,956,320 | 4,514,300 |
| **2016** | Q1 | 8,993,380 | 4,574,840 |
| | Q2 | 8,989,200 | 4,561,960 |
| | Q3 | 8,933,520 | 5,020,570 |
| | Q4 | 9,071,760 | 5,192,020 |

## Total mobile communications revenues (page 15)

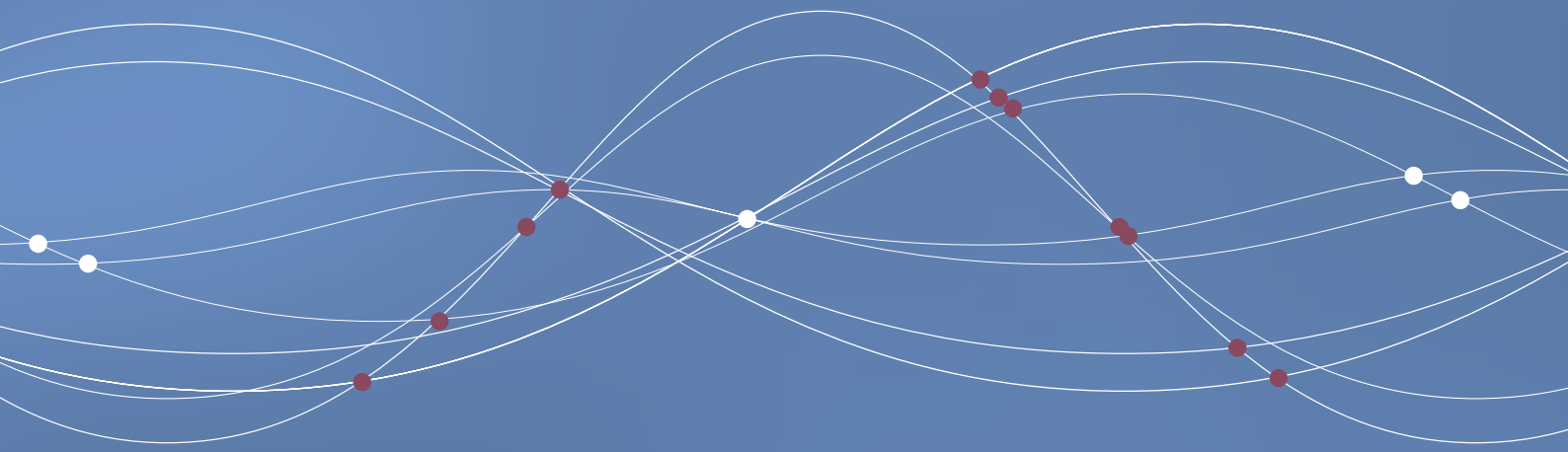
| | EUR | Retail revenues | Wholesale revenues | Total |
|---|---|---|---|---|
| **2014** | Q1 | 546,536,910 | 61,886,600 | 608,423,510 |
| | Q2 | 559,961,800 | 57,524,000 | 617,485,800 |
| | Q3 | 583,260,400 | 58,512,900 | 641,773,300 |
| | Q4 | 573,283,960 | 56,456,900 | 629,740,860 |
| **2015** | Q1 | 560,793,730 | 54,809,900 | 615,603,630 |
| | Q2 | 565,458,450 | 58,293,300 | 623,751,750 |
| | Q3 | 585,636,530 | 61,063,200 | 646,699,730 |
| | Q4 | 571,656,200 | 58,580,900 | 630,237,100 |
| **2016** | Q1 | 574,814,080 | 63,073,300 | 637,887,380 |
| | Q2 | 584,071,300 | 61,257,900 | 645,329,200 |
| | Q3 | 595,700,660 | 68,238,300 | 663,938,960 |
| | Q4 | 591,349,130 | 60,383,600 | 651,732,730 |

## Porting of mobile telephone numbers (page 16)

| | | Number of porting procedures / mobile phone numbers |
|---|---|---|
| **2014** | Q1 | 69,930 |
| | Q2 | 58,130 |
| | Q3 | 27,470 |
| | Q4 | 40,370 |
| **2015** | Q1 | 53,150 |
| | Q2 | 48,890 |
| | Q3 | 39,410 |
| | Q4 | 51,590 |
| **2016** | Q1 | 55,460 |
| | Q2 | 47,650 |
| | Q3 | 53,300 |
| | Q4 | 68,640 |

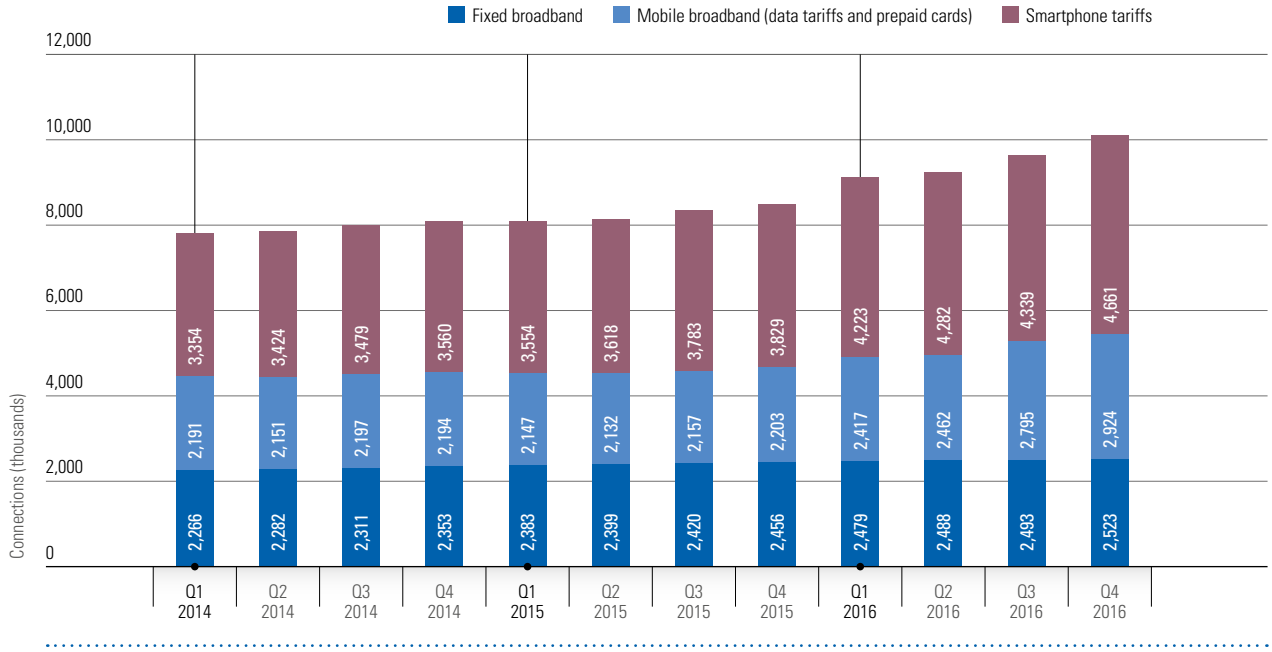


# 2 Broadband



# Fixed and mobile broadband connections

*Significant growth in data and prepaid tariffs as well as in smartphone tariffs*

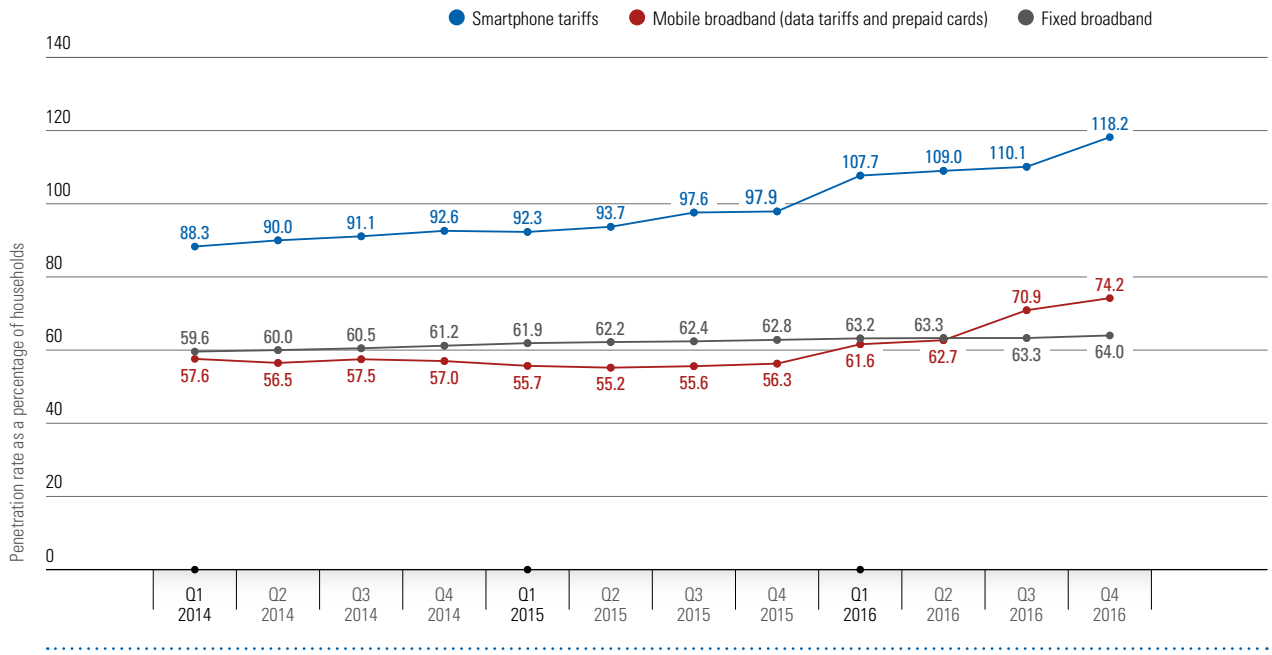



- For the first time, the 10 million mark for broadband connections was topped in Austria. At the end of 2016, 10.1 million broadband connections were recorded, 19.1% more than at the end of 2015.
- In the reference period, fixed broadband connections grew by 2.8% to 2.5 million, data and prepaid tariffs by 32.7% to 2.9 million and smartphone tariffs by 21.7% to 4.7 million connections.
- At the end of 2016, smartphone tariffs accounted for about 46.1% of all broadband connections, 28.9% were attributable to data and prepaid tariffs and the remaining 25.0% to fixed broadband connections.

The chart above shows the total number of fixed and mobile broadband connections. With mobile broadband, mobile data tariffs and smartphone tariffs are distinguished. For the definitions of fixed broadband connections as well as mobile data tariffs and smartphone tariffs see Glossary.

# Broadband penetration

## *Significant growth rates for smartphone tariffs and mobile broadband*



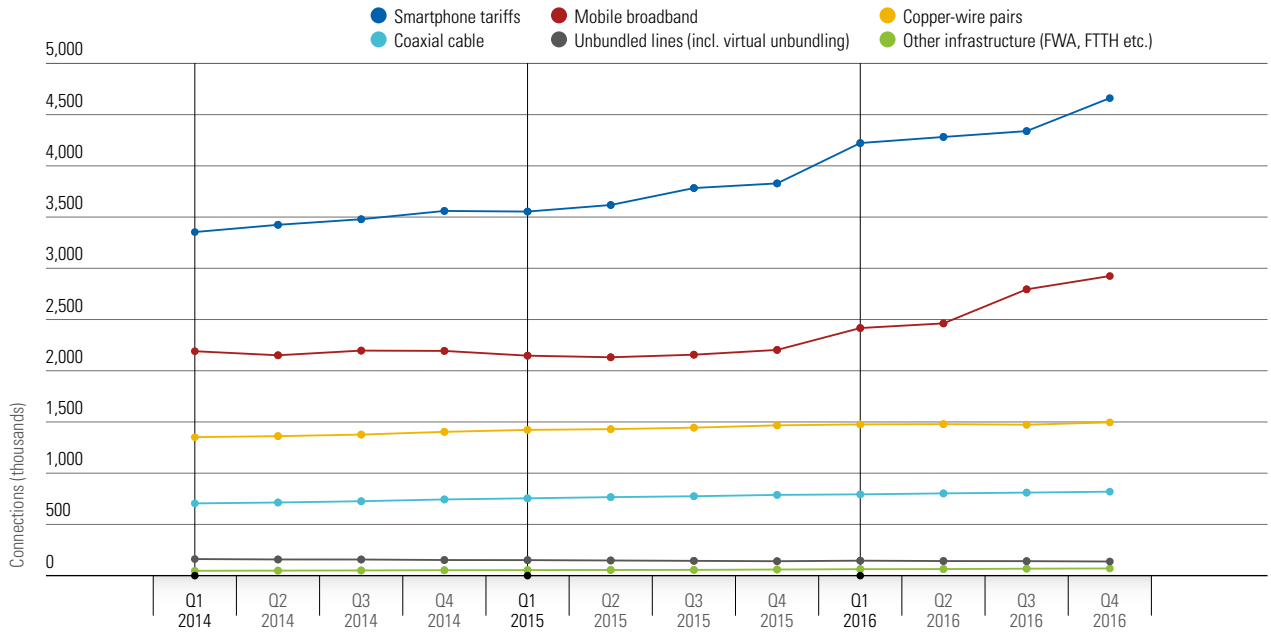

Source for number of households: Statistics Austria

- Smartphone penetration in Austrian households is increasing further. While there were still more households than smartphone tariffs at the end of 2015, this trend reversed from the beginning of 2016 onwards. Meanwhile, statistically speaking, every household uses more than one smartphone tariff (penetration rate of 118.2% in Q4 2016).
- Mobile broadband penetration also rose substantially within one year. While it was still at 56.3% at the end of Q4 2015, it grew to 74.2% in Q4 2016.
- In contrast, little change was seen for fixed broadband penetration in Austrian households. Here, the rate was 64.0% in Q4 2016 (compared with 62.8% at the end of 2015).

Broadband penetration refers to the ratio of fixed and mobile broadband connections to the total number of households in Austria. Calculation of the penetration rate also includes broadband connections used in businesses.

# Retail broadband connections by type of infrastructure

## *Mobile broadband outruns fixed broadband*

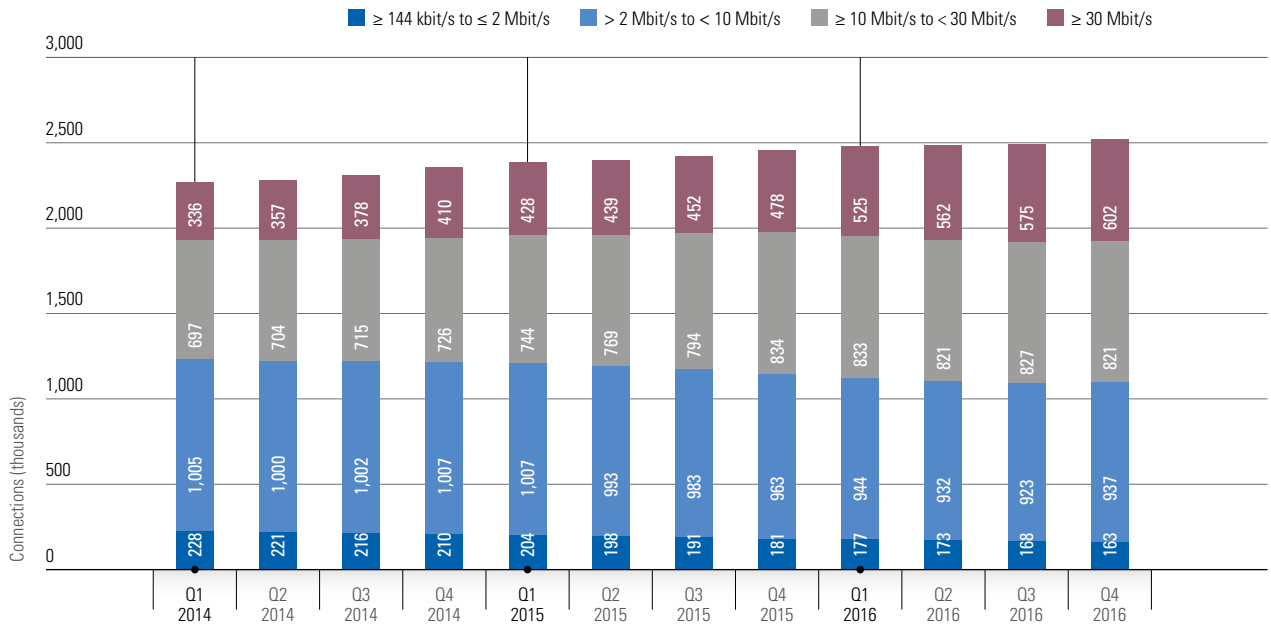



- Within one year, smartphone tariffs went up by 21.7% (to 4.7 million connections), mobile broadband connections grew by 32.7% (to 2.9 million connections).
- Fixed broadband connections developed far less dramatically. Between the end of 2015 and the end of 2016, copper-wire pairs rose by 2.0% (to 1.5 million connections), unbundled lines dropped by 7.2% to 124,600. In contrast, connections implemented by means of virtual unbundling more than doubled, climbing by 103.1% to 13,200 connections.
- Cable broadband connections saw growth of 4.0% to 819,500 at the end of 2016 against the end of 2015.
- Substantial gains were recorded by FWA connections (up 72.9% to 28,700), FTTH connections amounted to some 40,900 connections (up 1.5%) at the end of 2016. Other broadband connections that are not attributable to one of the afore-mentioned technologies (e.g. SAT) are increasingly losing significance, amounting to only about 500 connections (down 82.1%) at the end of 2016.

The chart above shows the total number of fixed and mobile broadband connections in Austria by infrastructure used. For the infrastructure of fixed broadband connections see Glossary. The data underlying this chart and the number of connections realised by means of virtual unbundling are contained in the table at the end of the section.

# Retail broadband connections by bandwidth category – fixed network

## *High bandwidths are rising sharply*

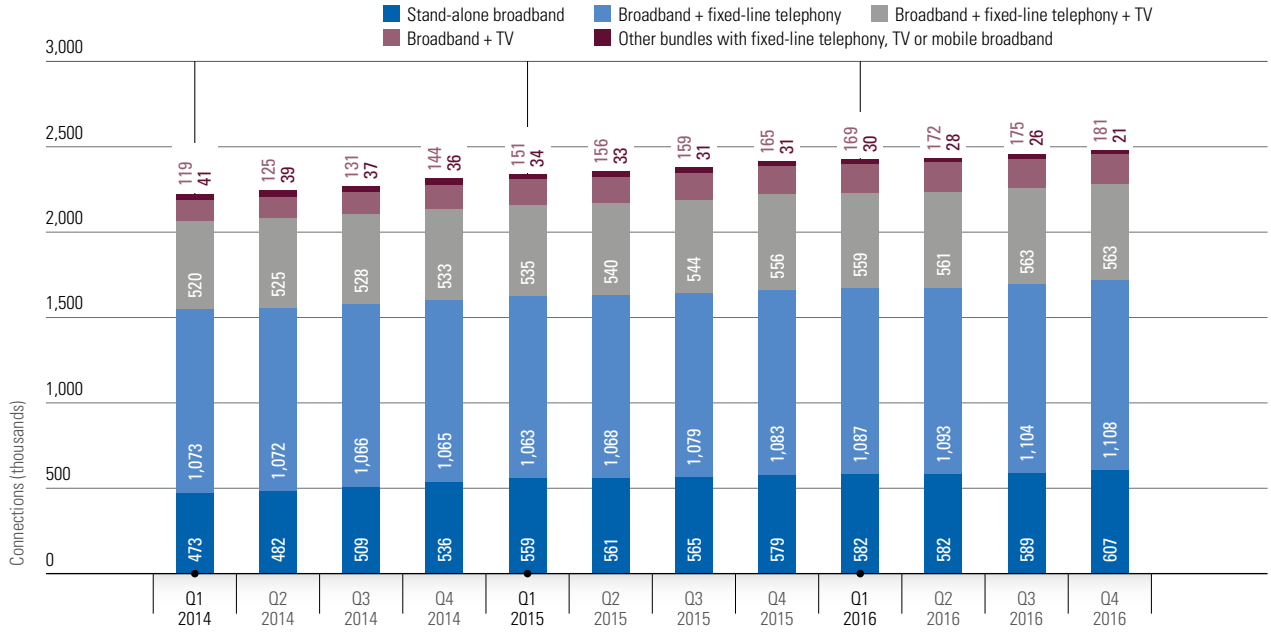



- The majority of fixed broadband connections (37.1%) have bandwidths from 2 Mbit/s to 10 Mbit/s. At the end of 2016, they totalled 937.000 connections, which is 2.7% less than at the end of 2015. Below a bandwidth of 2 Mbit/s the decline was in fact 9.8% (163,000 connections).
- There is a trend towards higher bandwidths; however, from 2015 to 2016, fixed broadband connections with bandwidths of 10 to 30 Mbit/s retreated (by 1.6% to 821,000 connections).
- In contrast, broadband connections with bandwidths above 30 Mbit/s reported significant gains. About 602,300 connections in Q4 2016 constitute a solid increase of 26.1% against Q4 2015. Thus, connections in this bandwidth category meanwhile account for nearly one quarter (23.9% in Q4 2016) of all fixed broadband connections in Austria.
- In total, the number of all fixed broadband connections, regardless of the bandwidth, rose by 2.8% to 2.5 million compared with Q4 2015.

The chart above shows the total number of fixed broadband connections in Austria, broken down by bandwidth categories. Because of the small number of cases, categories with low bandwidths (≥ 144 kbit/s to < 2 Mbit/s and = 2 Mbit/s) and categories with high bandwidths (30 Mbit/s to < 100 Mbit/s and ≥ 100 Mbit/s) were combined. The categories in between (> 2 Mbit/s to < 10 Mbit/s and 10 Mbit/s to < 30 Mbit/s) are unchanged. All categories are shown separately in the table at the end of the section.

# Retail broadband connections by bundle category – fixed network

*Steady upward trend for almost all broadband bundled products*

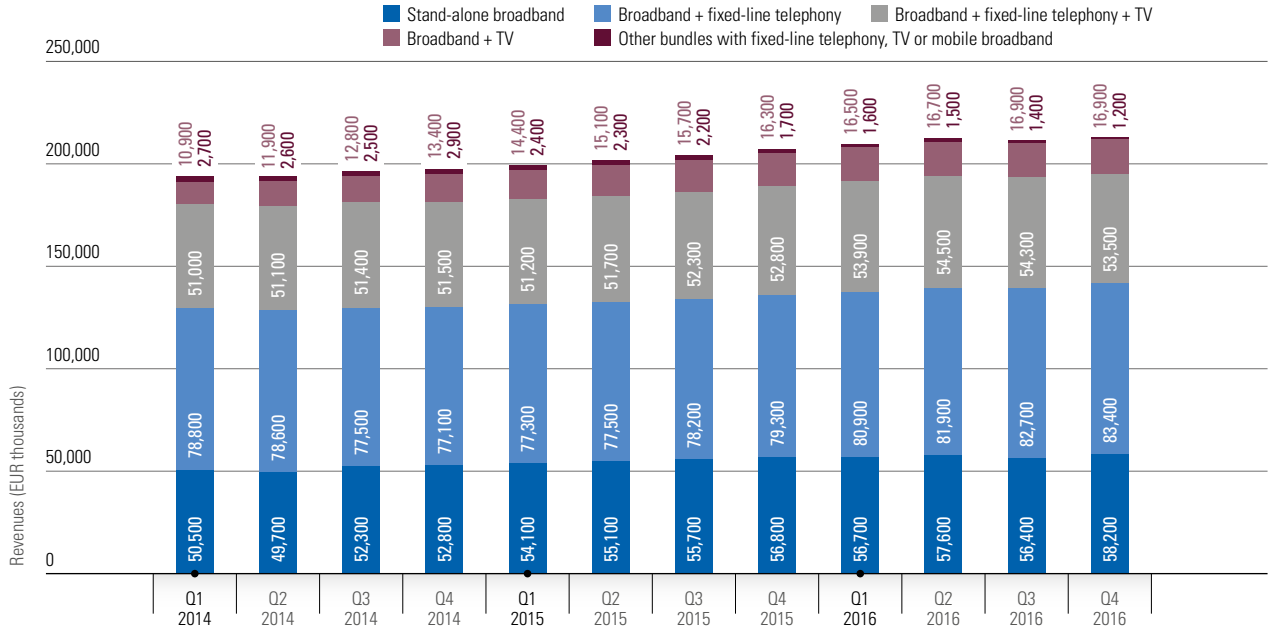



- The number of stand-alone broadband connections went up by 4.8% to 606,600 in the course of the year and accounted for about 24.5% of all possible broadband combinations at the end of 2016.
- At the end of 2016, 44.7% of products bundled with broadband were attributable to the combination of broadband and fixed-line telephony. Thus, this combination amounted to some 1.1 million connections in Austria, which is an increase of 2.3% against the end of 2015.
- The typical bundle combining broadband, fixed-line telephony and TV came to 563,000 connections (up 1.2%). Broadband and TV without fixed-line telephony rose by 10.0% to 181,200 connections, thus reaching a share of 7.3%.
- Other products bundled with broadband accounted for only 0.8% at the end of 2016 and increasingly lost significance (down 32.0% to 21,000 connections).

The chart shows the number of broadband products sold to retail customers, using own infrastructure or an unbundled line but not using additionally purchased infrastructure. Broadband products may be sold without any other product (stand-alone) or can be a combination of broadband with one or more other products (bundled product), for example, broadband and fixed network and/or TV.

# Revenues from retail broadband connections – fixed network

## *More connections – more revenues*

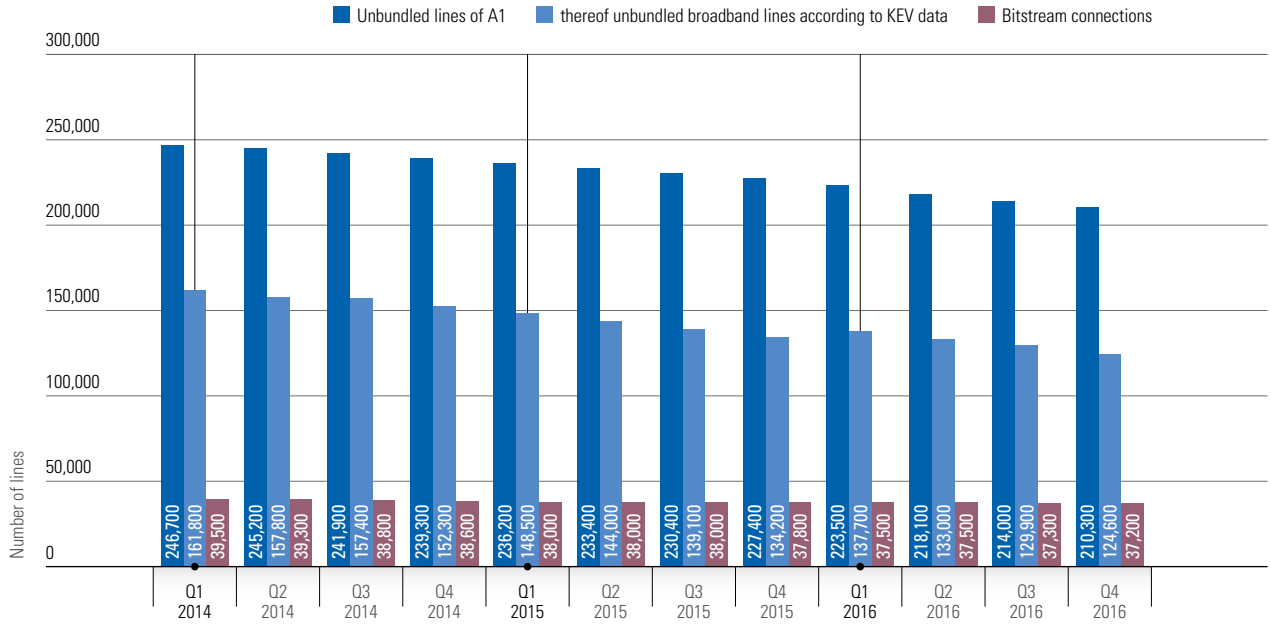



- In 2016, bundled products generated revenues of some EUR 846.6 million, which is an increase of 4.2% compared with the previous year.
- The product combining broadband and fixed-line telephony generated the highest revenues in 2016, contributing EUR 328.8 million to total revenues (up 5.3%). EUR 228.8 million were generated by stand-alone broadband (up 3.2%), EUR 216.3 million were earned by the combination of broadband, fixed-line telephony and TV (up 4.0%).
- Revenues from the bundle combination of broadband and TV grew by 8.8% (about EUR 67.0 million).

The chart shows the revenues from broadband connections sold to retail customers using own infrastructure or an unbundled line. This includes broadband stand-alone products and bundled products where broadband is offered in combination with another product (voice telephony and/or TV and/or other products).

# Wholesale broadband products of A1 Telekom Austria AG

## *Decline in wholesale products of A1*

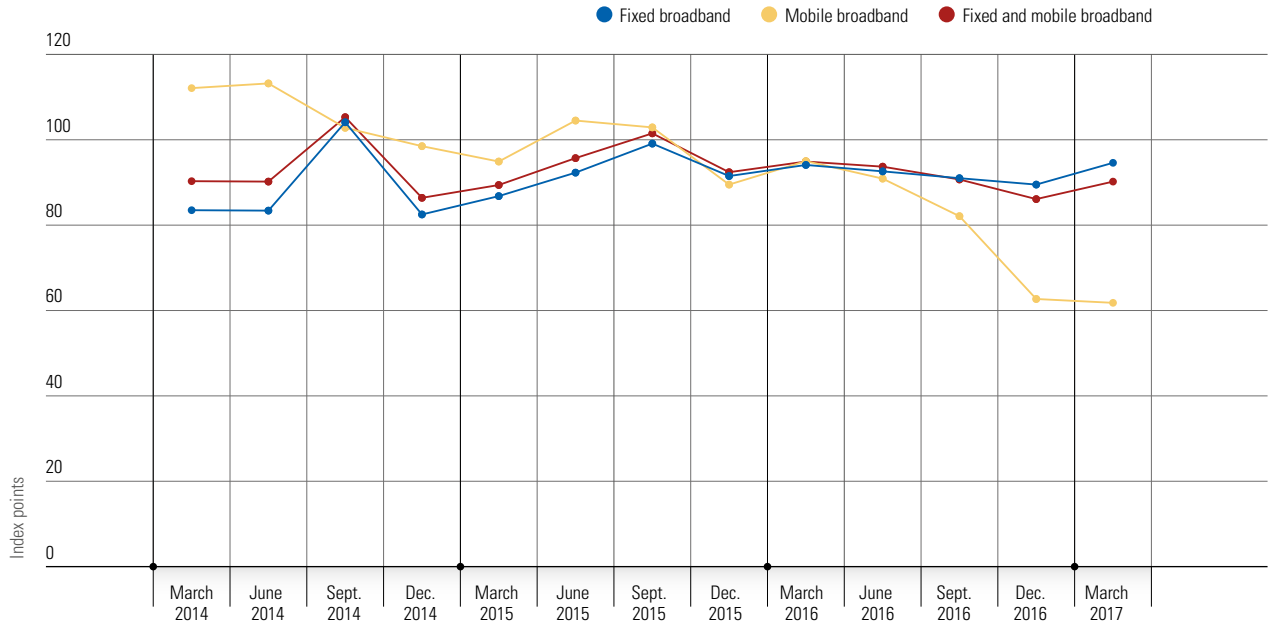



- Unbundled lines in the network of A1 (not only broadband connections) reported last numbered 210,300, which is down 7.5% against the end of 2015.
- Unbundled broadband lines of these amounted to 124,600 connections (down 7.2% compared with the end of 2015).
- Bitstream connections offered by A1 on the wholesale market constituted some 37,200 lines at the end of 2016. Compared with the end of the previous year, this is a drop of 1.6%.

The chart above shows all unbundled lines in the network of A1 Telekom Austria AG and the unbundled broadband lines thereof that are used by the operators according to the KEV sample. This means that all lines unbundled by A1 (supply-side) are depicted in comparison to the broadband lines unbundled by the other operators (demand-side) according to the KEV. The difference between the two bars relates to those unbundled lines that are exclusively used for voice or for leased lines and are therefore not attributable to broadband. In addition, all bitstream connections offered by A1 on the wholesale market are shown.

# Price index for broadband (hedonic)

## *Overall index rises from December until March*




- The index for mobile and fixed-line broadband rose in Q1 2017 compared with the previous quarter, the hedonic price index climbed from 86.1 to 90.2 index points.
- In the fixed-network sector, the index increased mainly due to A1 raising its fees, which was not fully compensated by concurrent bandwidth increases.
- In contrast, in the case of mobile broadband, the index declined further due to special offers of A1.

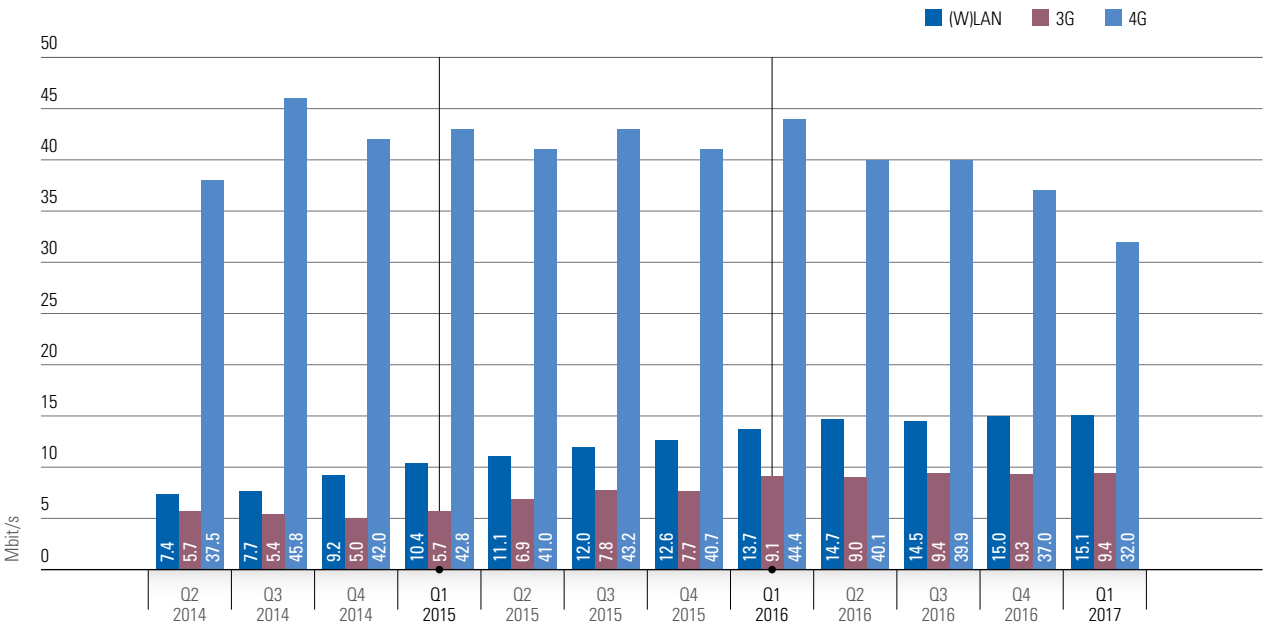
The broadband index is a hedonic price index for fixed and mobile broadband products. Hedonic means that both price changes and changes in the product characteristics (in particular download rate and download volume) are taken into account. For this purpose, a regression of prices on product characteristics and on time variables is performed.

For the calculation, tariffs and product characteristics of the broadband products of the major suppliers (currently A1, UPC, Tele2, LIWEST, Salzburg AG, Kabelplus, Russmedia IT, T-Mobile, Hutchison, HoT) are collected quarterly. All tariffs available to new customers at the respective time are collected. Both mere stand-alone broadband products and products bundled with fixed-line telephony or TV are captured. In the case of mobile broadband, prepaid tariffs are not included. In addition to monthly charges, also one-off charges and annual charges as well as special offers are taken into account. The most expensive 10% of tariffs (currently tariffs exceeding EUR 65) are not included in the calculation, as they can be assumed to be in low demand by customers. The remaining tariffs are weighted in proportion to the operators' market shares in the respective quarter. In the calculation all tariffs of an operator are given the same weights in a quarter. The reference basis is 2010.

As data up to March 2017 are already available, they are also included in the chart.

# RTR-NetTest: Median of download speed per technology

*More measurements in the LTE network, median of download speed is lower*




Source: RTR-NetTest

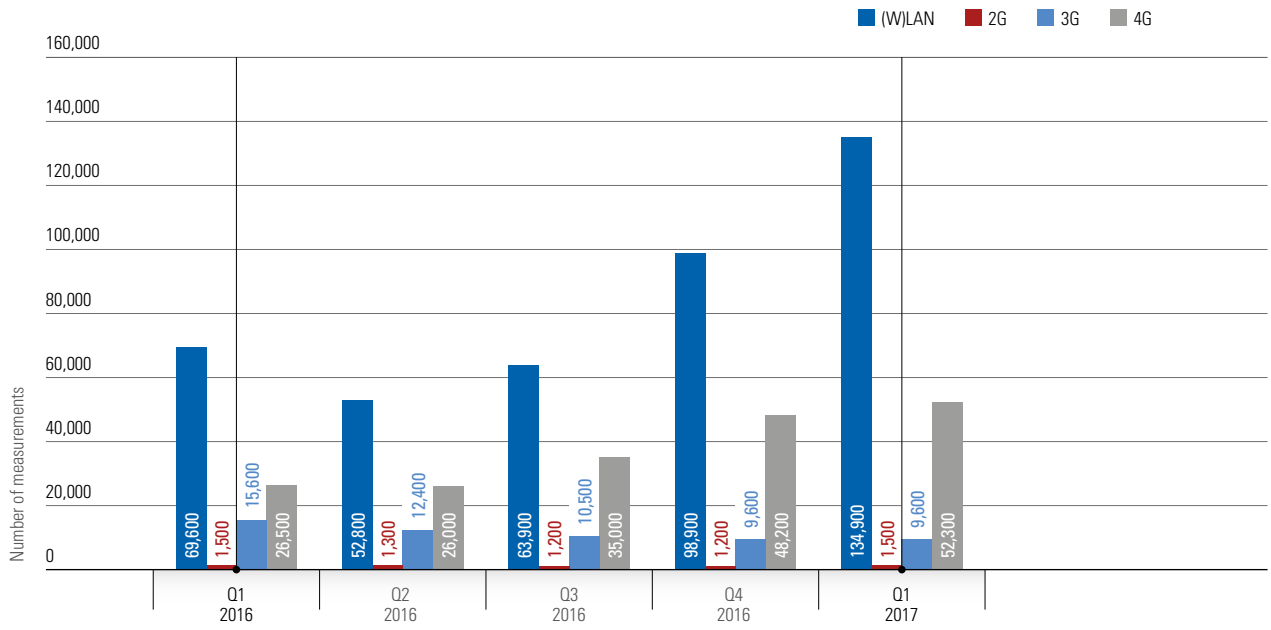
- The median of download speed for LTE fell at the beginning of 2017 (from 37 to 32 Mbit/s), thus following the trend of declining download speeds seen to emerge in the 4G network in 2016.
- The median for the 3G network rose slightly from 9.3 to 9.4 Mbit/s, that for LAN and WLAN connections from 15.0 to 15.1 Mbit/s.

The RTR-NetTest allows users to test the speed and quality of their Internet connection reliably and independently of their provider. In addition, it is possible to compare the measurement results with the average values of other users. The speed of an Internet connection is expressed in megabits per second (Mbit/s) and thus indicates the data volume transmitted in one second. Among other things, the speed depends on the technology used. 2G (GPRS, EDGE), 3G (UMTS, HSPA), 4G (LTE) as well as connections using different technologies that are set up via LAN or WLAN are distinguished. The chart shows the median per technology and quarter, i.e. the observed value that lies exactly in middle of all these values. Due to the low data rates the medians of 2G data connections are not shown in the chart.

The data underlying this chart can be found in the table at the end of the section.

# RTR-NetTest: Number of measurements per technology

## *Number of measurements per quarter increasing*




Source: RTR-NetTest

- The number of recorded measurements again increased. With 157,900 measurements at the end of 2016, this figure rose to 198,300 measurements in Q1 2017, which is a gain of 25.6%.
- The most significant increase was seen for LANs and WLANs (up 36.4% to 134,900).
- Measurements in the LTE network climbed from 48,200 to 52,300 (up 8.5%).
- 3G measurements remained unchanged. With 1,500 measurements, 2G measurements played only a minor role.

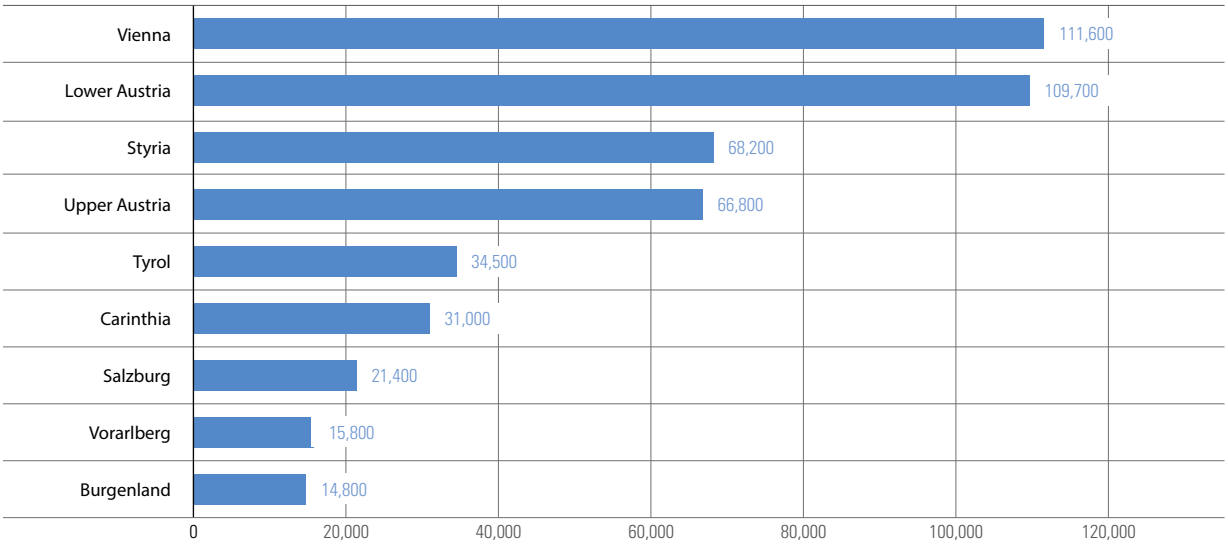
Using the RTR-NetTest users can perform measurements under real conditions and compare their test results with those of other users.

At the beginning of 2016, there was a change regarding the measurements performed within the framework of the RTR-NetTest. Accordingly, repeated measurements carried out by the same user at the same location within a short time span are no longer included in the statistics. Therefore, the statistics from Q1 2016 onwards show fewer measurements compared with previous periods, which is why comparison would have no informative value.

The data underlying this chart can be found in the table at the end of the section.

# RTR-NetTest: Number of measurements per Austrian province in 2016

*Clear regional differences in number of measurements*




Source: RTR-NetTest

- In 2016, the majority of measurements were carried out in Vienna (111,600), followed by Lower Austria (109,700), Styria (68,200) and Upper Austria (66,800). Thus, about three quarters (75.2%) of all measurements using the RTR-NetTest were performed in these Austrian provinces.
- With regard to the number of measurements, the remaining Austrian provinces are running far behind.

In measurements using the RTR-NetTest the location of the measurement can be determined. For the above evaluations only measurements with a location accuracy of < 2 km are used. Accordingly, for each province the number of measurements performed can be determined. The chart shows the sum of all measurements performed in each province in 2016.

## Fixed and mobile broadband connections (page 24)

| Number of connections | | Fixed broadband | Mobile broadband (data tariffs and prepaid cards) | Smartphone tariffs |
|---|---|---|---|---|
| 2014 | Q1 | 2,265,700 | 2,190,500 | 3,353,800 |
| | Q2 | 2,282,000 | 2,151,000 | 3,424,400 |
| | Q3 | 2,311,200 | 2,196,600 | 3,478,700 |
| | Q4 | 2,352,600 | 2,193,500 | 3,559,800 |
| 2015 | Q1 | 2,382,700 | 2,147,100 | 3,553,700 |
| | Q2 | 2,399,100 | 2,131,500 | 3,617,800 |
| | Q3 | 2,419,700 | 2,156,500 | 3,783,200 |
| | Q4 | 2,455,500 | 2,203,200 | 3,828,600 |
| 2016 | Q1 | 2,478,600 | 2,416,800 | 4,222,600 |
| | Q2 | 2,487,600 | 2,462,100 | 4,281,900 |
| | Q3 | 2,492,800 | 2,794,500 | 4,339,100 |
| | Q4 | 2,523,200 | 2,924,400 | 4,661,000 |

## Retail fixed broadband connections by type of infrastructure (page 26)

| Number of fixed broadband connections | | Copper-wire pairs | Unbundled lines | Coaxial cable | FWA (fixed wireless access) | FTTH (fibre to the home) | Virtual unbundling | Others |
|---|---|---|---|---|---|---|---|---|
| 2014 | Q1 | 1,351,600 | 161,800 | 705,000 | 16,100 | 27,5003,700 | | |
| | Q2 | 1,361,500 | 157,800 | 713,800 | 16,300 | 29,1003,500 | | |
| | Q3 | 1,376,800 | 157,400 | 726,300 | 16,400 | 30,9003,400 | | |
| | Q4 | 1,403,600 | 152,300 | 743,800 | 16,500 | 33,1003,300 | | |
| 2015 | Q1 | 1,422,600 | 148,500 | 754,800 | 16,200 | 34,500 | 2,900 | 3,200 |
| | Q2 | 1,429,800 | 144,000 | 766,100 | 16,300 | 35,900 | 3,900 | 3,100 |
| | Q3 | 1,444,400 | 139,100 | 774,900 | 16,600 | 36,600 | 5,100 | 3,000 |
| | Q4 | 1,467,000 | 134,200 | 788,100 | 16,600 | 40,300 | 6,500 | 2,800 |
| 2016 | Q1 | 1,476,200 | 137,700 | 793,500 | 29,100 | 32,600 | 8,200 | 1,300 |
| | Q2 | 1,478,500 | 133,000 | 802,800 | 29,100 | 33,700 | 9,400 | 1,100 |
| | Q3 | 1,473,200 | 129,900 | 810,400 | 28,900 | 38,000 | 11,400 | 1,000 |
| | Q4 | 1,495,800 | 124,600 | 819,500 | 28,700 | 40,900 | 13,200 | 500 |

## Retail mobile broadband connections by customer type (page 26)

| Number of mobile broadband connections | | Residential customers | | Business customers | |
|---|---|---|---|---|---|
| | | Mobile broadband | Smartphone tariffs | Mobile broadband | Smartphone tariffs |
| 2014 | Q1 | 1,878,200 | 2,988,400 | 312,300 | 365,400 |
| | Q2 | 1,820,900 | 3,007,200 | 330,100 | 417,200 |
| | Q3 | 1,859,500 | 3,046,000 | 337,100 | 432,700 |
| | Q4 | 1,857,700 | 3,113,800 | 335,800 | 446,000 |
| 2015 | Q1 | 1,812,200 | 3,098,900 | 334,900 | 454,800 |
| | Q2 | 1,799,600 | 3,137,400 | 331,900 | 480,400 |
| | Q3 | 1,818,600 | 3,303,900 | 337,900 | 479,300 |
| | Q4 | 1,810,100 | 3,346,200 | 393,100 | 482,400 |
| 2016 | Q1 | 1,996,500 | 3,645,200 | 420,300 | 577,400 |
| | Q2 | 2,035,200 | 3,699,400 | 426,900 | 582,500 |
| | Q3 | 1,966,300 | 3,545,400 | 828,200 | 793,700 |
| | Q4 | 2,023,600 | 3,837,500 | 900,800 | 823,500 |

## Retail fixed broadband connections by type of infrastructure – retail customers

| Number of fixed broadband connections | | Copper-wire pairs | Unbundled lines | Coaxial cable | FWA (fixed wireless access) | FTTH (fibre to the home) | Virtual unbundling | Others |
|---|---|---|---|---|---|---|---|---|
| 2014 | Q1 | 1,200,600 | 120,100 | 691,200 | 14,300 | 22,900 | 0 | 2,400 |
| | Q2 | 1,210,100 | 116,800 | 699,500 | 14,400 | 24,500 | 0 | 2,200 |
| | Q3 | 1,225,900 | 113,900 | 711,400 | 14,600 | 26,500 | 0 | 2,100 |
| | Q4 | 1,253,600 | 111,200 | 726,100 | 14,600 | 28,600 | 0 | 2,000 |
| 2015 | Q1 | 1,273,200 | 109,500 | 735,900 | 14,300 | 29,600 | 2,900 | 1,900 |
| | Q2 | 1,280,300 | 106,000 | 746,400 | 14,400 | 30,700 | 3,900 | 1,800 |
| | Q3 | 1,294,100 | 102,000 | 754,500 | 14,700 | 31,500 | 5,100 | 1,600 |
| | Q4 | 1,315,700 | 97,500 | 767,000 | 14,700 | 34,800 | 6,500 | 1,500 |
| 2016 | Q1 | 1,324,400 | 98,800 | 774,000 | 24,000 | 27,500 | 8,200 | 1,100 |
| | Q2 | 1,326,800 | 94,900 | 782,400 | 24,000 | 28,500 | 9,400 | 800 |
| | Q3 | 1,322,900 | 92,500 | 789,300 | 23,800 | 31,700 | 11,400 | 700 |
| | Q4 | 1,346,200 | 87,800 | 797,500 | 23,600 | 34,400 | 13,200 | 300 |

## Retail broadband connections by type of infrastructure – business customers

| Number of fixed broadband connections | | Copper-wire pairs | Unbundled lines | Coaxial cable | FWA (fixed wireless access) | FTTH (fibre to the home) | Virtual unbundling | Others |
|---|---|---|---|---|---|---|---|---|
| 2014 | Q1 | 151,000 | 41,700 | 13,800 | 1,800 | 4,600 | 0 | 1,300 |
| | Q2 | 151,400 | 41,000 | 14,300 | 1,900 | 4,600 | 0 | 1,300 |
| | Q3 | 150,900 | 43,500 | 14,900 | 1,800 | 4,400 | 0 | 1,300 |
| | Q4 | 150,000 | 41,100 | 17,700 | 1,900 | 4,500 | 0 | 1,300 |
| 2015 | Q1 | 149,400 | 39,000 | 18,900 | 1,900 | 4,900 | 0 | 1,300 |
| | Q2 | 149,500 | 38,000 | 19,700 | 1,900 | 5,200 | 0 | 1,300 |
| | Q3 | 150,300 | 37,100 | 20,400 | 1,900 | 5,100 | 0 | 1,400 |
| | Q4 | 151,300 | 36,700 | 21,100 | 1,900 | 5,500 | 0 | 1,300 |
| 2016 | Q1 | 151,800 | 38,900 | 19,500 | 5,100 | 5,100 | 0 | 200 |
| | Q2 | 151,700 | 38,100 | 20,400 | 5,100 | 5,200 | 0 | 300 |
| | Q3 | 150,300 | 37,400 | 21,100 | 5,100 | 6,300 | 0 | 300 |
| | Q4 | 149,600 | 36,800 | 22,000 | 5,100 | 6,500 | 0 | 200 |

## Retail broadband connections by bandwidth category – fixed network (page 27)

| Number of connections | | ≥ 144 kbit/s to < 2 Mbit/s | = 2 Mbit/s | > 2 Mibt/s to < 10 Mbit/s | ≥ 10 Mbit/s to < 30 Mbit/s | ≥ 30 Mbit/s to < 100 Mbit/s | ≥ 100 Mbit/s |
|---|---|---|---|---|---|---|---|
| 2014 | Q1 | 13,000 | 215,200 | 1,004,700 | 697,100 | 294,700 | 41,200 |
| | Q2 | 11,900 | 209,300 | 1,000,400 | 703,700 | 315,900 | 40,800 |
| | Q3 | 11,300 | 205,100 | 1,001,800 | 714,900 | 334,900 | 43,200 |
| | Q4 | 10,500 | 199,500 | 1,006,600 | 725,700 | 339,800 | 70,600 |
| 2015 | Q1 | 9,600 | 194,500 | 1,006,500 | 743,900 | 354,200 | 74,100 |
| | Q2 | 8,900 | 189,000 | 993,200 | 769,400 | 363,400 | 75,100 |
| | Q3 | 8,300 | 182,800 | 982,800 | 793,700 | 374,900 | 77,300 |
| | Q4 | 6,800 | 173,900 | 962,800 | 834,300 | 394,100 | 83,600 |
| 2016 | Q1 | 5,900 | 171,000 | 944,000 | 833,200 | 434,700 | 89,900 |
| | Q2 | 5,400 | 167,800 | 932,000 | 821,000 | 466,300 | 95,200 |
| | Q3 | 5,000 | 163,100 | 922,700 | 826,900 | 475,900 | 99,400 |
| | Q4 | 4,300 | 158,700 | 937,000 | 821,000 | 495,300 | 107,000 |

## Number of retail broadband connections by bundle category – fixed network (page 28)

| | Number of connections | Stand-alone broadband | Broadband + fixed-line telephony | Broadband + fixed-line telephony + TV | Broadband + TV | Other bundles with fixed-line telephony, TV or mobile broadband |
|---|---|---|---|---|---|---|
| **2014** | Q1 | 472,800 | 1,073,300 | 520,400 | 118,800 | 40,900 |
| | Q2 | 482,100 | 1,072,100 | 524,800 | 125,200 | 38,800 |
| | Q3 | 508,800 | 1,066,100 | 528,100 | 131,000 | 37,200 |
| | Q4 | 536,400 | 1,064,900 | 532,500 | 143,600 | 35,500 |
| **2015** | Q1 | 559,000 | 1,063,200 | 534,700 | 151,000 | 33,800 |
| | Q2 | 561,000 | 1,067,500 | 539,600 | 156,100 | 32,500 |
| | Q3 | 565,000 | 1,078,500 | 543,800 | 159,400 | 31,400 |
| | Q4 | 578,600 | 1,082,900 | 556,400 | 164,800 | 30,900 |
| **2016** | Q1 | 582,400 | 1,087,300 | 558,500 | 168,700 | 29,600 |
| | Q2 | 581,500 | 1,092,500 | 561,200 | 171,800 | 28,100 |
| | Q3 | 588,800 | 1,103,900 | 562,600 | 175,100 | 26,200 |
| | Q4 | 606,600 | 1,108,100 | 563,000 | 181,200 | 21,000 |

## Revenues from retail broadband connections – fixed network (page 29)

| | EUR | Stand-alone broadband | Broadband + fixed-line telephony | Broadband + fixed-line telephony + TV | Broadband + TV | Other bundles with fixed-line telephony, TV or mobile broadband |
|---|---|---|---|---|---|---|
| **2014** | Q1 | 50,524,700 | 78,807,700 | 50,971,200 | 10,936,400 | 2,737,300 |
| | Q2 | 49,690,500 | 78,567,300 | 51,121,500 | 11,879,800 | 2,604,700 |
| | Q3 | 52,267,200 | 77,526,800 | 51,446,100 | 12,764,200 | 2,503,200 |
| | Q4 | 52,834,900 | 77,146,500 | 51,545,000 | 13,369,900 | 2,854,100 |
| **2015** | Q1 | 54,060,400 | 77,289,700 | 51,169,700 | 14,395,700 | 2,382,000 |
| | Q2 | 55,087,200 | 77,503,200 | 51,671,000 | 15,144,700 | 2,290,400 |
| | Q3 | 55,717,900 | 78,219,900 | 52,338,000 | 15,673,900 | 2,209,800 |
| | Q4 | 56,844,500 | 79,294,600 | 52,822,200 | 16,310,400 | 1,739,500 |
| **2016** | Q1 | 56,746,400 | 80,853,800 | 53,930,500 | 16,478,900 | 1,613,800 |
| | Q2 | 57,559,800 | 81,879,100 | 54,471,400 | 16,730,500 | 1,489,700 |
| | Q3 | 56,369,300 | 82,653,500 | 54,333,500 | 16,886,400 | 1,407,100 |
| | Q4 | 58,170,600 | 83,401,000 | 53,524,400 | 16,866,400 | 1,197,500 |

## Number of wholesale broadband connections

| | Number of connections | Copper-wire pairs | Unbundled lines | Coaxial cable | FWA (fixed wireless access) | FTTH (fibre to the home) | Others (satellite etc.) | Mobile broadband |
|---|---|---|---|---|---|---|---|---|
| **2014** | Q1 | 39,490 | 6,470 | 10,500 | 1,000 | 6,250 | 1,550 | 78,370 |
| | Q2 | 39,300 | 6,380 | 10,410 | 1,020 | 6,210 | 1,560 | 79,230 |
| | Q3 | 38,860 | 7,020 | 10,780 | 1,020 | 6,180 | 1,560 | 79,630 |
| | Q4 | 38,650 | 6,890 | 11,030 | 1,050 | 6,100 | 1,560 | 79,220 |
| **2015** | Q1 | 37,990 | 6,750 | 11,280 | 1,050 | 5,930 | 1,570 | 21,670 |
| | Q2 | 38,000 | 6,640 | 11,870 | 1,050 | 5,820 | 1,610 | 21,740 |
| | Q3 | 38,000 | 6,480 | 12,120 | 1,050 | 4,530 | 1,610 | 65,270 |
| | Q4 | 37,800 | 6,240 | 12,530 | 1,070 | 5,480 | 1,600 | 66,670 |
| **2016** | Q1 | 37,540 | 9,890 | 15,470 | 290 | 4,030 | 120 | 64,600 |
| | Q2 | 37,470 | 9,780 | 15,630 | 280 | 3,960 | 130 | 64,390 |
| | Q3 | 37,300 | 9,680 | 15,820 | 290 | 3,900 | 130 | 669,590 |
| | Q4 | 37,200 | 9,640 | 15,970 | 290 | 3,870 | 150 | 707,180 |

## Number of wholesale broadband connections – Bitstream

| Number of connections | | Copper-wire pairs | Unbundled lines | Coaxial cable | FWA (fixed wireless access) | FTTH (fibre to the home) |
|---|---|---|---|---|---|---|
| **2014** | Q1 | 39,460 | 3,100 | 9,080 | 980 | 6,240 |
| | Q2 | 39,270 | 2,990 | 9,160 | 1,000 | 6,200 |
| | Q3 | 38,830 | 2,880 | 9,260 | 1,000 | 6,170 |
| | Q4 | 38,620 | 2,860 | 9,420 | 1,020 | 6,080 |
| **2015** | Q1 | 37,960 | 2,760 | 9,640 | 1,030 | 5,920 |
| | Q2 | 37,970 | 2,680 | 11,870 | 1,030 | 5,800 |
| | Q3 | 37,970 | 2,600 | 12,120 | 1,030 | 4,520 |
| | Q4 | 37,770 | 2,470 | 12,530 | 1,050 | 5,460 |
| **2016** | Q1 | 37,540 | 3,840 | 13,820 | 260 | 4,000 |
| | Q2 | 37,470 | 3,800 | 13,980 | 250 | 3,940 |
| | Q3 | 37,300 | 3,760 | 14,160 | 250 | 3,870 |
| | Q4 | 37,200 | 3,740 | 14,320 | 260 | 3,850 |

## Number of wholesale broadband connections – Resale

| Number of connections | | Copper-wire pairs | Unbundled lines | Coaxial cable | FWA (fixed wireless access) | FTTH (fibre to the home) |
|---|---|---|---|---|---|---|
| **2014** | Q1 | 30 | 3,370 | 1,420 | 20 | 10 |
| | Q2 | 30 | 3,390 | 1,250 | 20 | 10 |
| | Q3 | 30 | 4,130 | 1,520 | 20 | 10 |
| | Q4 | 30 | 4,040 | 1,610 | 20 | 10 |
| **2015** | Q1 | 30 | 3,990 | 1,640 | 20 | 10 |
| | Q2 | 30 | 3,960 | 0 | 20 | 10 |
| | Q3 | 30 | 3,890 | 0 | 20 | 20 |
| | Q4 | 30 | 3,770 | 0 | 20 | 20 |
| **2016** | Q1 | 0 | 6,050 | 1,650 | 30 | 30 |
| | Q2 | 0 | 5,990 | 1,650 | 30 | 30 |
| | Q3 | 0 | 5,920 | 1,650 | 30 | 30 |
| | Q4 | 0 | 5,900 | 1,650 | 30 | 30 |

## Revenues from wholesale broadband connections

| EUR | | Bitstream | Resale |
|---|---|---|---|
| **2014** | Q1 | 2,568,700 | 1,030,100 |
| | Q2 | 2,542,500 | 995,500 |
| | Q3 | 2,543,200 | 1,021,700 |
| | Q4 | 2,544,100 | 1,062,000 |
| **2015** | Q1 | 2,548,200 | 1,064,900 |
| | Q2 | 2,637,700 | 1,176,500 |
| | Q3 | 2,613,000 | 1,053,900 |
| | Q4 | 2,669,600 | 898,300 |
| **2016** | Q1 | 2,778,600 | 988,400 |
| | Q2 | 2,804,200 | 985,700 |
| | Q3 | 2,796,600 | 4,169,300 |
| | Q4 | 2,781,000 | 4,185,200 |

## Number of retail fixed broadband connections by customer type

| | Number of connections | Residential customers | Business customers | Total |
|---|---|---|---|---|
| **2014** | Q1 | 2,032,500 | 193,800 | 2,226,300 |
| | Q2 | 2,050,900 | 192,100 | 2,243,000 |
| | Q3 | 2,076,800 | 194,400 | 2,271,200 |
| | Q4 | 2,118,500 | 194,500 | 2,313,000 |
| **2015** | Q1 | 2,147,800 | 193,900 | 2,341,700 |
| | Q2 | 2,163,200 | 193,500 | 2,356,700 |
| | Q3 | 2,184,700 | 193,400 | 2,378,100 |
| | Q4 | 2,218,800 | 194,800 | 2,413,600 |
| **2016** | Q1 | 2,228,800 | 197,700 | 2,426,500 |
| | Q2 | 2,238,000 | 197,200 | 2,435,200 |
| | Q3 | 2,260,500 | 196,100 | 2,456,600 |
| | Q4 | 2,284,500 | 195,400 | 2,479,900 |

## Revenues from retail fixed broadband connections by customer type

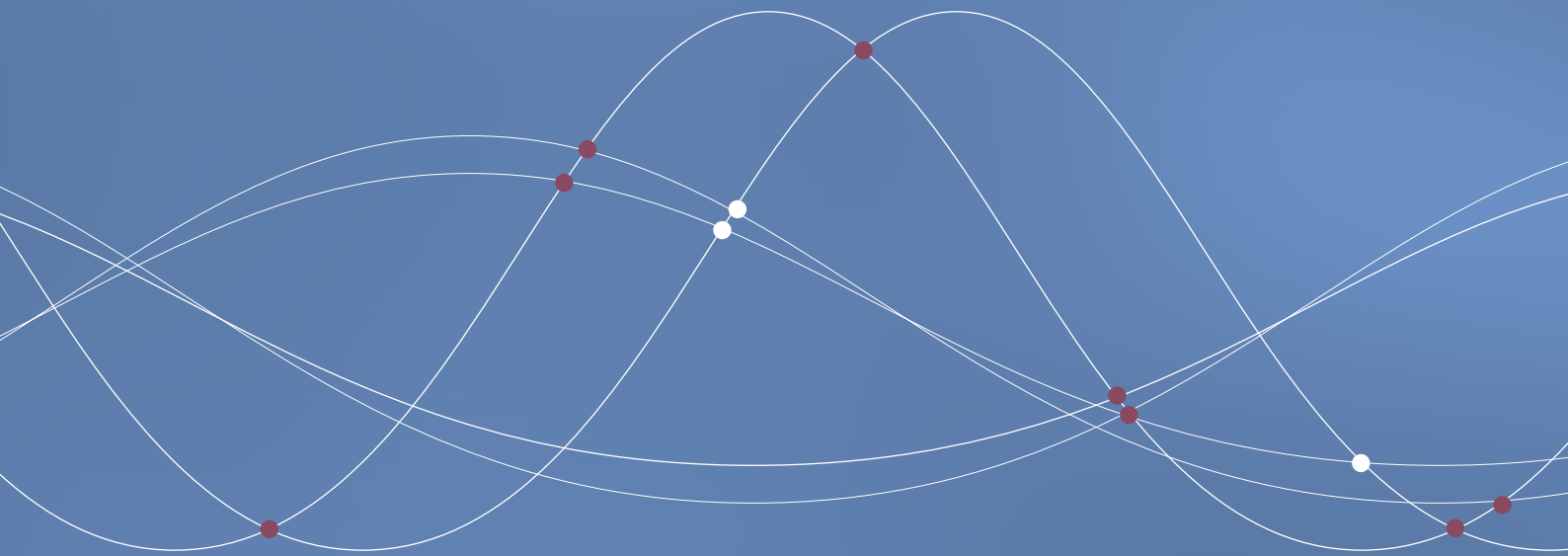
| | EUR | Residential customers | Business customers | Total |
|---|---|---|---|---|
| **2014** | Q1 | 158,946,900 | 37,256,800 | 196,203,700 |
| | Q2 | 158,971,300 | 37,135,600 | 196,106,900 |
| | Q3 | 160,969,100 | 37,809,700 | 198,778,800 |
| | Q4 | 162,121,500 | 37,941,900 | 200,063,400 |
| **2015** | Q1 | 163,721,100 | 37,918,000 | 201,639,100 |
| | Q2 | 165,853,000 | 38,200,200 | 204,053,200 |
| | Q3 | 167,932,000 | 38,605,800 | 206,537,800 |
| | Q4 | 169,618,900 | 39,805,900 | 209,424,800 |
| **2016** | Q1 | 172,025,800 | 40,024,200 | 212,050,000 |
| | Q2 | 174,038,400 | 40,527,300 | 214,565,700 |
| | Q3 | 173,775,600 | 40,330,900 | 214,106,500 |
| | Q4 | 174,178,600 | 41,461,100 | 215,639,700 |

## RTR-NetTest: Median of download speed per technology (page 32)

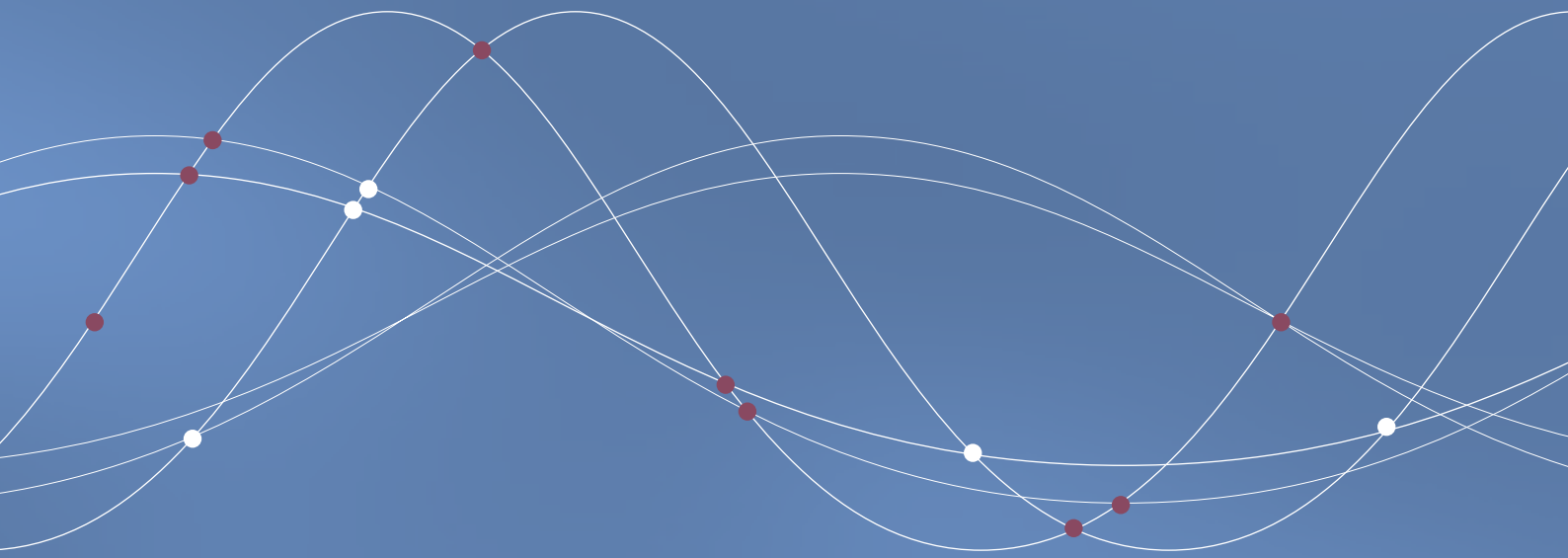
| | Mbit/s | (W)LAN | 3G | 4G |
|---|---|---|---|---|
| **2014** | Q2 | 7.40 | 5.70 | 37.50 |
| | Q3 | 7.70 | 5.40 | 45.80 |
| | Q4 | 9.20 | 5.00 | 42.00 |
| **2015** | Q1 | 10.40 | 5.70 | 42.80 |
| | Q2 | 11.10 | 6.90 | 41.00 |
| | Q3 | 12.00 | 7.80 | 43.20 |
| | Q4 | 12.60 | 7.70 | 40.70 |
| **2016** | Q1 | 13.70 | 9.10 | 44.40 |
| | Q2 | 14.70 | 9.00 | 40.10 |
| | Q3 | 14.50 | 9.40 | 39.90 |
| | Q4 | 15.00 | 9.30 | 37.00 |
| **2017** | Q1 | 15.10 | 9.40 | 32.00 |

## RTR-NetTest: Number of measurements per technology (page 33)

| Number of measurements | | (W)LAN | 2G | 3G | 4G |
|---|---|---|---|---|---|
| **2016** | Q1 | 69,600 | 1,500 | 15,600 | 26,500 |
| | Q2 | 52,800 | 1,300 | 12,400 | 26,000 |
| | Q3 | 63,900 | 1,200 | 10,500 | 35,000 |
| | Q4 | 98,900 | 1,200 | 9,600 | 48,200 |
| **2017** | Q1 | 134,900 | 1,500 | 9,600 | 52,300 |

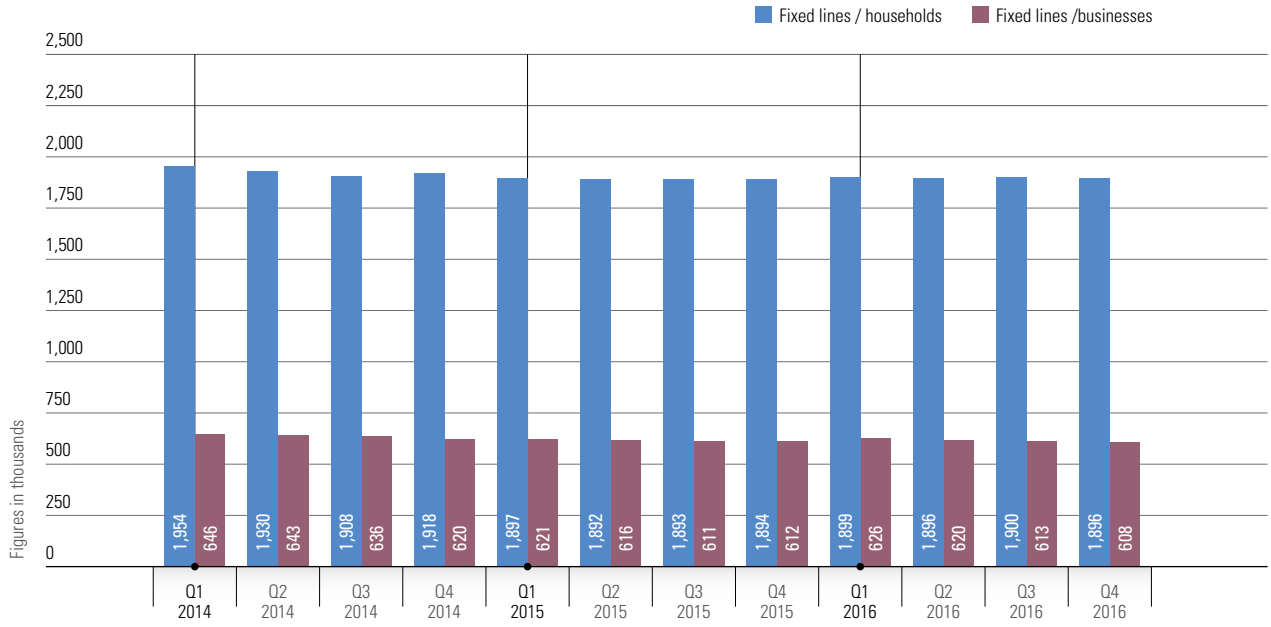


# 3 Fixed network



# Fixed lines

## *Hardly any changes against 2015*

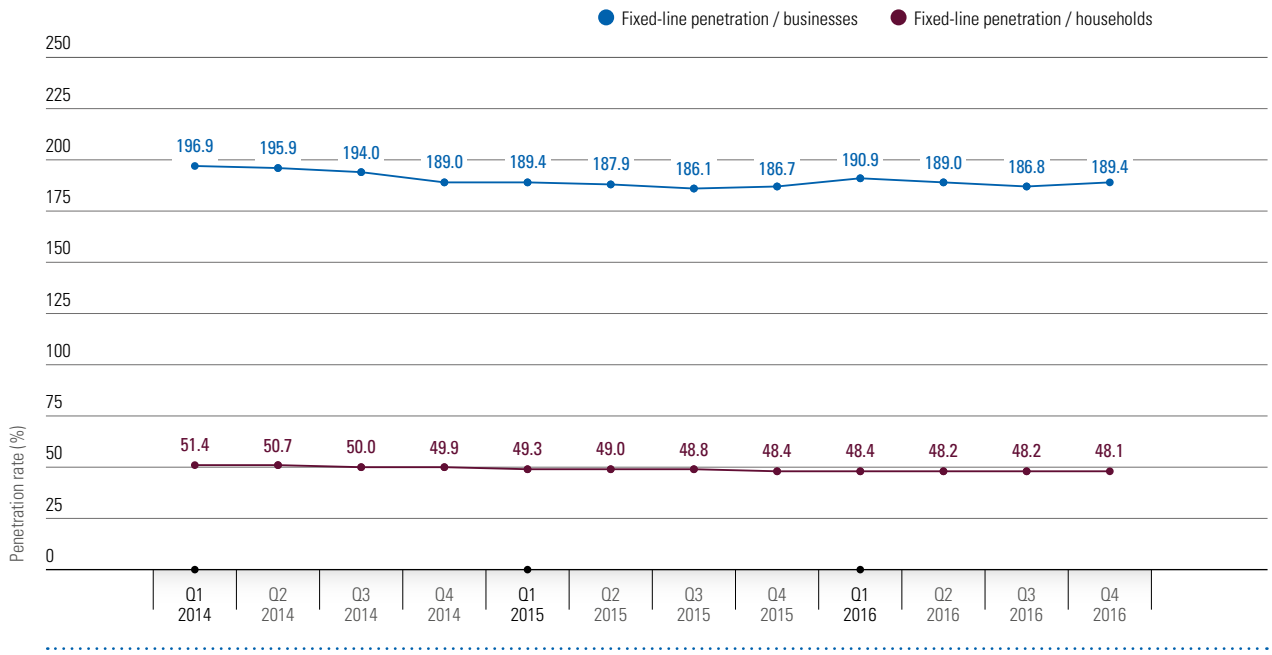



- At the end of 2016, there were 2.5 million fixed lines in Austria, 0.1% less than at the end of 2015. This suggests that fixed lines show constant development.
- Connections in households, at 1,895,500, went up by 0.1% against the end of 2015, business connections dropped by 0.7% (to 608,200).

The chart above shows the total number of fixed telephone lines in households and businesses, regardless of the infrastructure on which those lines are based (e.g. copper-wire pairs, coaxial cable or optical fibre).

# Fixed-line penetration

## *Barely any changes over time*



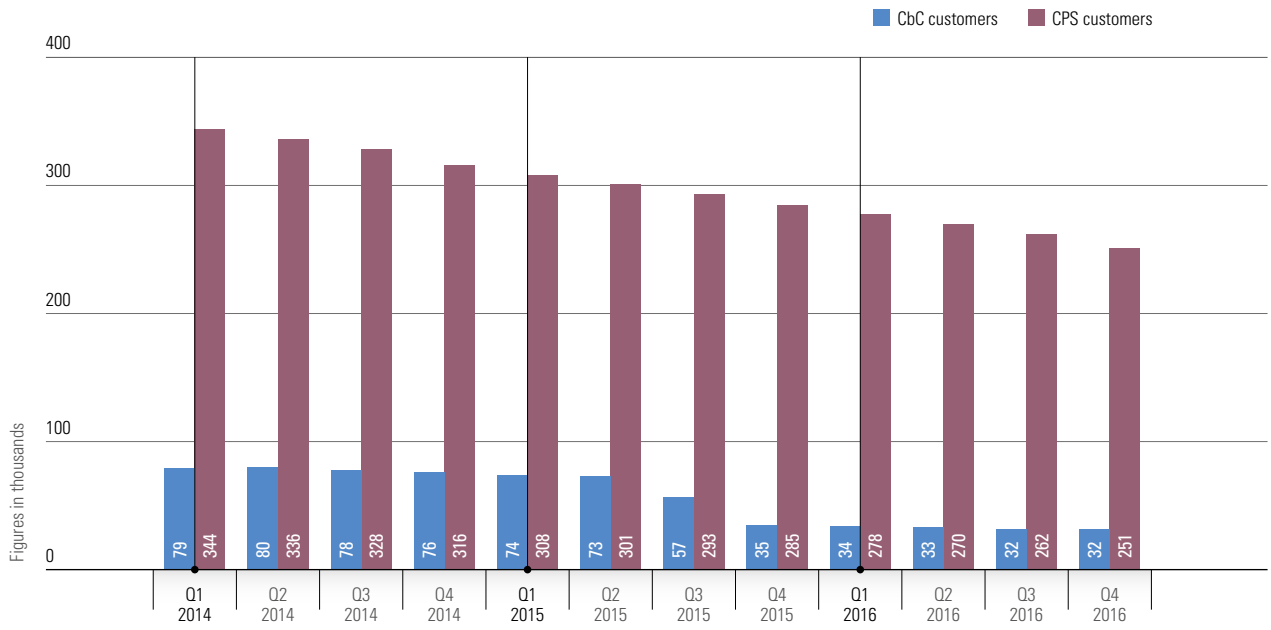

Source for number of households and businesses: Statistics Austria

- The penetration rates of connections in households and businesses are not subject to major changes either. At the end of 2016, the penetration rate for businesses was 189.4%, for households 48.1%.
- Against the end of 2015, the penetration rate for businesses climbed by 2.7 percentage points, that for households fell by 0.3 percentage point.

The chart shows fixed-line penetration rates among households and businesses. The higher penetration rate for businesses is due to the – in most cases – greater number of fixed lines per business and is therefore not strictly comparable with that of households.

# Carrier pre-selection and call-by-call usage

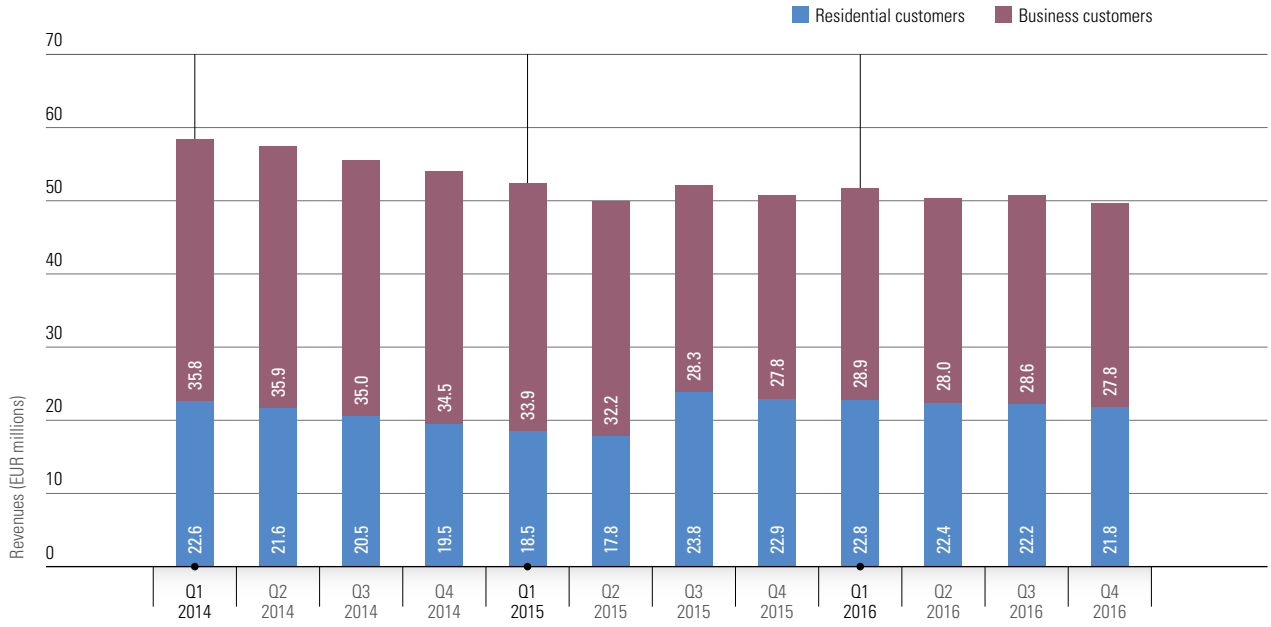
## *Continuing decline of CPS and CbC*




- CPS and CbC lines continue to lose importance over time.
- At the end of 2016, there were some 250,700 CPS lines in Austria (12.1% less than at the end of 2015). CbC lines show a similar pattern: 31,800 lines constitute a decline of 9.9% against the end of 2015.
- The chart shows the number of customers with lines on which carrier pre-selection (CPS) is used and the number of call-by-call (CbC) customers who used call-by-call at least once in each quarter (see Glossary).

# Retail revenues from access services

## *Access services are declining slightly*




- In 2016, some EUR 202.4 million were generated from access services, i.e. base fees and setup charges, which is a drop of 1.4% against 2015.
- At the residential customer level, annual revenues picked up by 7.5% to EUR 89.1 million. However, this is basically due to the fact that until mid-2015 one operator's revenues from residential customers had been booked as revenues from business customers, which was corrected only then. Therefore, in 2015, revenues from residential customers were underrepresented.
- For the same reason, revenues from business customers declined by 7.4% (to EUR 113.3 million) in the course of the year.

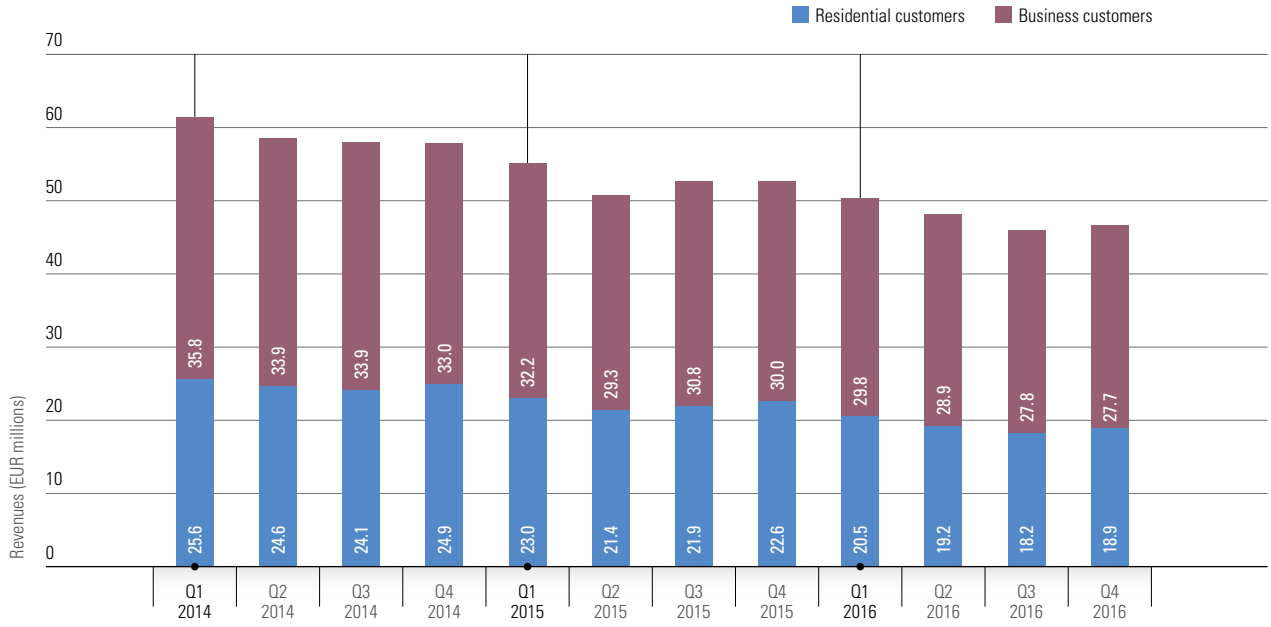
Retail revenues from access services include base fees and setup charges.

Base fees refer to revenues that are earned periodically and do not depend on the actual use of the subscriber line. They also include revenues from monthly flat rates (e.g. packages which include a certain number of minutes), but such rates do not play a significant role in fixed-network services. Not included are so-called "optional tariffs" and "flat-rate tariffs" as well as revenues from products bundled with broadband.

Setup charges include revenues generated from the setup, transfer and termination of fixed telephone lines.

# Retail revenues from carrier services

## *Trend of declining revenues from carrier services continues in 2016*



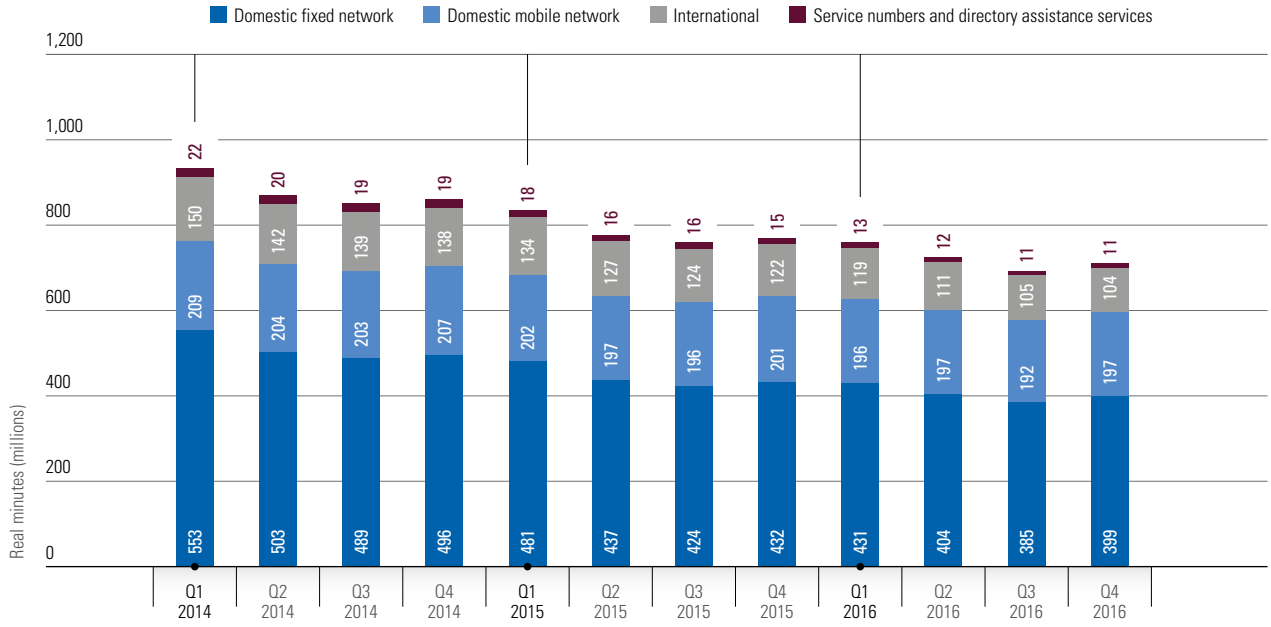

- Revenues from carrier services continue to decline: EUR 190.8 million were generated in 2016, which is 9.6% less than in 2015. Not even the usual revenue increase in the residential customer segment in Q4 (up 4.1%) was able to change this.
- For residential customers, revenues from carrier services dropped by 13.7% (to EUR 76.7 million) from 2015 to 2016; at 6.6% (to EUR 114.2 million) the decline was somewhat more moderate for business customers.

Retail revenues from carrier services depend on the number of call minutes used, i.e. the more telephone calls a fixed subscriber makes, the higher their bill normally is.

The revenues shown above include the retail fees charged by operators for calls to the domestic fixed network, domestic mobile networks, international destinations and service numbers. Revenues from fixed monthly flat rates (e.g. packages including a certain number of minutes) are not included in the figures above.

# Call minutes on the retail market

## *Significantly fewer call minutes than in 2015*

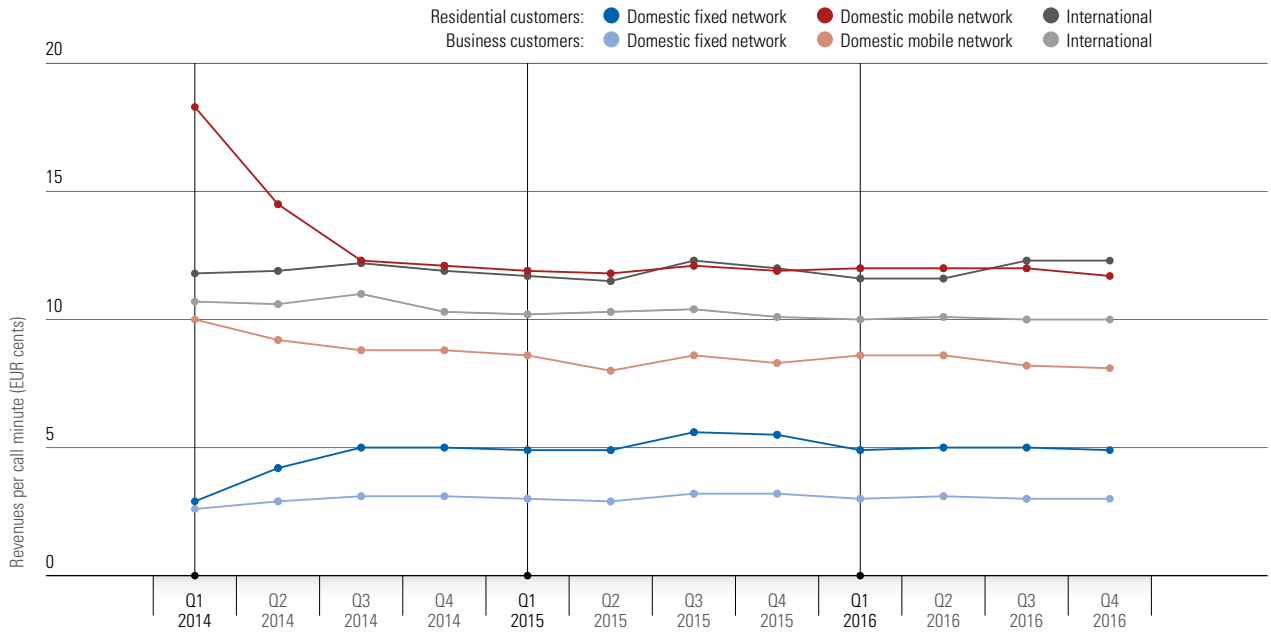



- The ongoing decline in revenues from carrier services was caused by the decrease in call minutes in the fixed network. In 2016, call minutes totalled 2.885 billion, which is 8.2% less than in 2015.
- Most minutes (1.618 billion) were accounted for by calls to the domestic fixed network. Here, the decrease against 2015 was about 8.8%.
- Calls to the domestic mobile network amounted to 781.5 million minutes, the decline, at 1.9%, being less dramatic compared with 2015.
- Calls to international networks amounted to 438.9 million minutes (down 13.5% against 2015), calls to service numbers totalled 46.5 million minutes, which means a drop of 28.3%.

The chart above shows the number of real minutes (see Glossary) in the fixed network, broken down by destination.

# Revenues per call minute

## *Stable development of revenues per call minute*

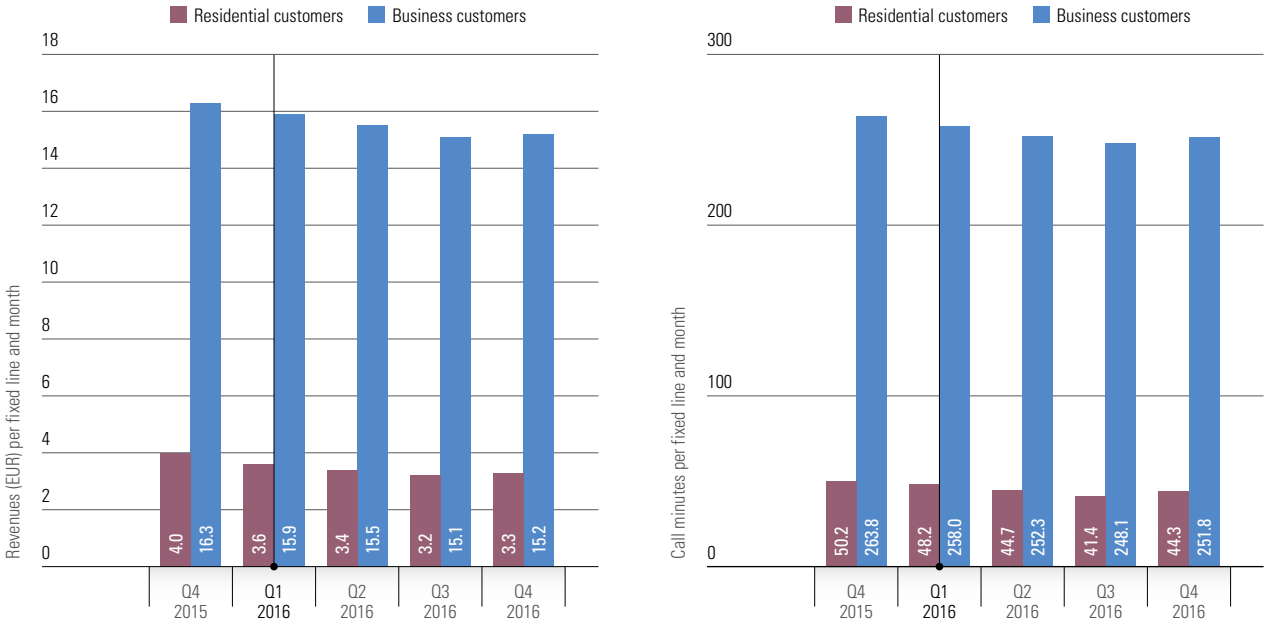



- In Q4 2016, revenues per call minute for calls to the domestic network amounted to 4.9 euro cents (down 10.9% against Q4 2015) in the residential customer segment and 3.0 euro cents in the business customer segment (down 6.3%).
- Calls to the domestic mobile network generated 11.7 euro cents per call minute in the private customer segment (down 1.7%) and 8.1 euro cents for business customers (down 2.4%).
- Revenues per call minute from the fixed network to international networks amounted to 12.3 euro cents for private customers (up 2.5%); the business customers' contribution to revenues was 10.0 euro cents per minute (down 1.0%).
- In the private customer segment calls to service numbers generated revenues per minute of 9.0 euro cents (up 9.8%), for business customers this figure was 37.9 euro cents (up 17.3%).

The chart above shows the revenues per call minute for telephone calls from the fixed network to various destinations, broken down into residential and business customer segments. Revenue per call minute is calculated from retail revenues from carrier services to individual destinations (see table at the end of the section), divided by the number of real minutes (chart "Call minutes on the retail market"). The data underlying this chart can be found in the table at the end of the section. For the sake of clarity, the revenue figure for call minutes to service numbers is not included in the chart.

# The average fixed line

## *Fixed line ARPU declining year on year*

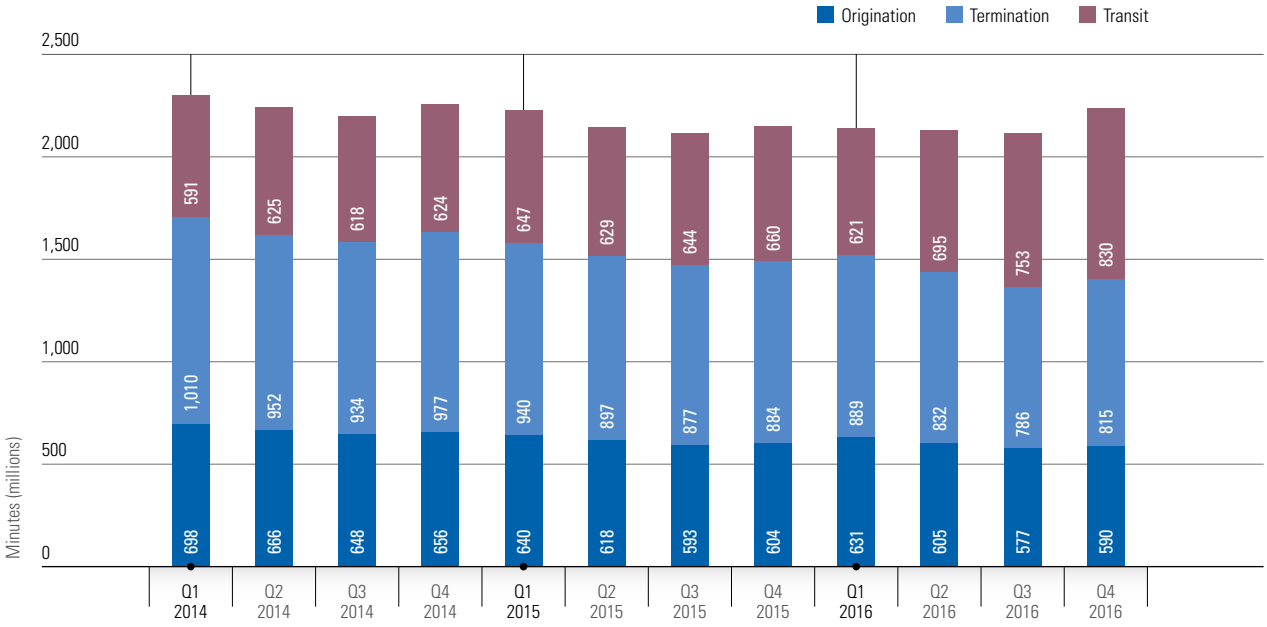



- At the end of 2016, private customers made calls amounting to about 44.3 minutes per month (down 11.8% against the end of 2015), generating monthly revenues of EUR 3.30 (down 17.5%).
- Calls made by business customers amounted on average to 251.8 minutes per month (down 4.5%) and thus yielded average monthly revenues of EUR 15.20 (down 6.7%).

The chart shows the average number of active call minutes (real minutes) on the fixed network per customer in the business and residential segments per month in the respective quarter as well as the average revenues from carrier services generated per month in the quarter. The monthly values are calculated from a third of revenues from carrier service charges and a third of the call minutes, divided in each case by the total number of fixed-network lines in the respective quarter. Revenues from access services are not depicted in the chart as they are no longer exactly attributable to fixed-line voice telephony (products bundled with broadband) following the KEV amendment.

# Wholesale market in minutes

## *Increase in transit minutes year on year*

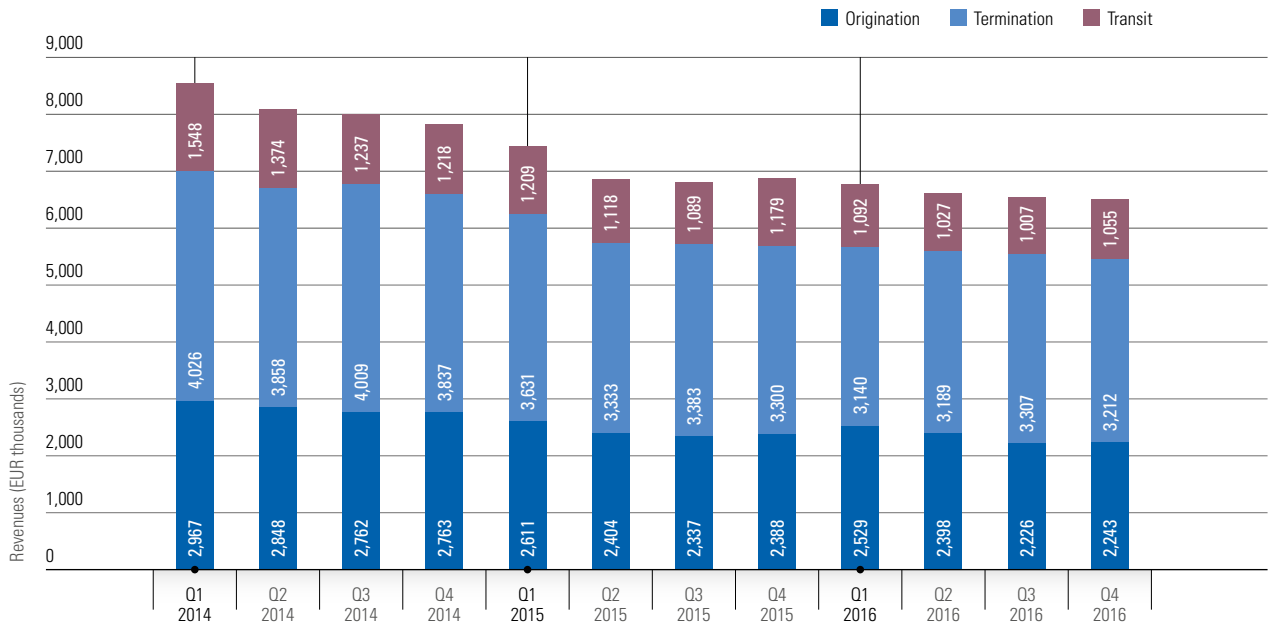



- In 2016, minutes at the wholesale level totalled some 8.624 billion, remaining at much the same level as in 2015 (down 0.1%).
- Origination minutes amounted to 2.403 billion (down 2.1% against 2015). Termination minutes came to 3.321 billion (down 7.7%) and transit minutes increased by 12.4% to 2.899 billion compared with 2015.

Wholesale services in the field of fixed-network voice telephony include three sub-services: origination, termination and transit services (see Glossary). In the chart wholesale minutes are shown.

# Wholesale revenues

## *Downward trend for wholesale revenues*

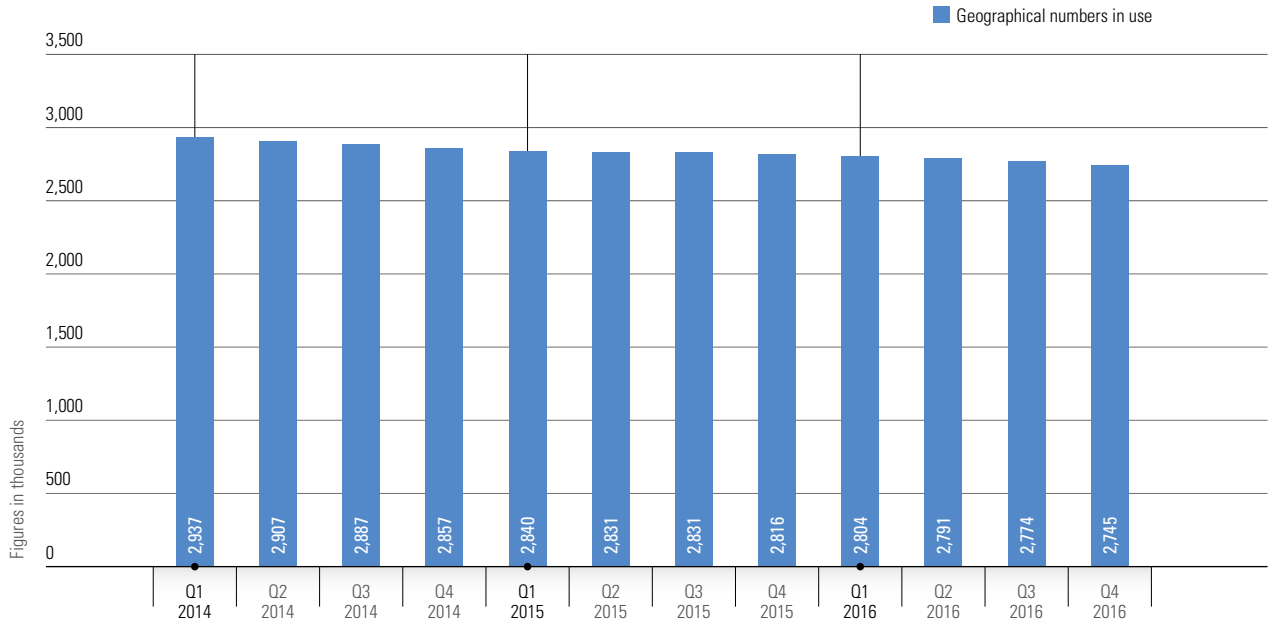



- In the course of 2016, at EUR 26.4 million, wholesale revenues were down by about 5.6% against 2015.
- Origination revenues declined by 3.5% to just below EUR 9.4 million, termination revenues dropped by 5.9% to EUR 12.8 million.
- Transit revenues generated EUR 4.2 million (down 9.0%) in 2016.

In line with wholesale minutes, wholesale revenues are shown for origination, termination and transit services.

# Geographical numbers in use

## *Geographical numbers in use are falling slowly but steadily*



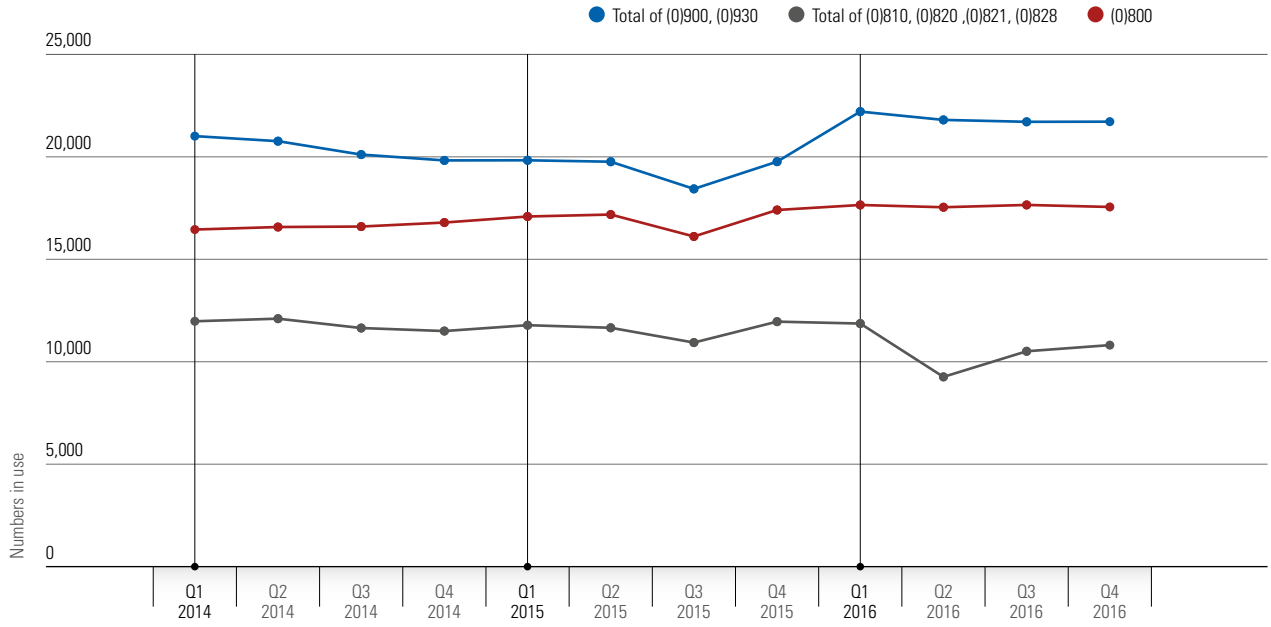

- The amount of geographical numbers in use continues to fall slowly but steadily over time. At the end of 2016, some 2.7 million geographical numbers were recorded, which is down by 2.5% against the end of 2015.

Geographical numbers are domestic telephone numbers prefixed by a local area code (e.g. 01 for Vienna).

As more than one number may be assigned to a single line, the number of geographical numbers is not identical to the number of fixed subscriber lines.

# Service numbers in use

## *More (0)900 and (0)930 premium rate numbers year on year*




- The amount of (0)900 and (0)930 premium rate numbers increased year on year (basis Q4 2015) by 9.9% to 21,717.
- (0)800 numbers posted a slight increase, namely by 0.9% to 17,554.
- In total, the amount of numbers from the (0)810, (0)820, (0)821 and (0)828 ranges dropped by 9.6% to 10,811. The decline in Q2 2016 can be explained by the fact that one operator, who had been using a relatively large proportion of numbers from the stated ranges according to the transmitted notifications of use, discontinued service.

The chart above shows the number of service numbers in use in the following ranges:

- (0)800 range: toll-free services
- (0)810 range: max. EUR 0.10 per minute or text message
- (0)820 range: max. EUR 0.20 per minute or text message
- (0)821 range: max. EUR 0.20 per call or text message
- (0)828 range: text messages only; standard charges apply
- (0)900 range: max. EUR 3.64 per minute or max. EUR 10.- per text message
- (0)930 range: max. EUR 3.64 per minute or max. EUR 10.- per text message (erotic hotlines)

## Fixed lines (page 44)

| Number of fixed lines | | Households | Businesses |
|---|---|---|---|
| 2014 | Q1 | 1,954,000 | 645,800 |
| | Q2 | 1,929,500 | 642,500 |
| | Q3 | 1,907,700 | 636,300 |
| | Q4 | 1,918,200 | 620,000 |
| 2015 | Q1 | 1,897,400 | 621,100 |
| | Q2 | 1,891,900 | 616,300 |
| | Q3 | 1,892,800 | 610,500 |
| | Q4 | 1,893,600 | 612,300 |
| 2016 | Q1 | 1,898,600 | 626,000 |
| | Q2 | 1,895,600 | 619,800 |
| | Q3 | 1,900,300 | 612,600 |
| | Q4 | 1,895,500 | 608,200 |

## Fixed-line penetration (page 45)

| Fixed-line penetration in % | | Households | Businesses |
|---|---|---|---|
| 2014 | Q1 | 51.40% | 196.90% |
| | Q2 | 50.70% | 195.90% |
| | Q3 | 50.00% | 194.00% |
| | Q4 | 49.90% | 189.00% |
| 2015 | Q1 | 49.30% | 189.40% |
| | Q2 | 49.00% | 187.90% |
| | Q3 | 48.80% | 186.10% |
| | Q4 | 48.40% | 186.70% |
| 2016 | Q1 | 48.40% | 190.90% |
| | Q2 | 48.20% | 189.00% |
| | Q3 | 48.20% | 186.80% |
| | Q4 | 48.10% | 189.40% |

## Development of fixed lines

| Number of lines | | POTS | ISDN | Multi-ISDN | VoB | Wireless |
|---|---|---|---|---|---|---|
| 2014 | Q1 | 2,288,300 | 291,800 | 19,600 | 612,700 | 29,500 |
| | Q2 | 2,262,200 | 288,800 | 20,900 | 628,900 | 30,300 |
| | Q3 | 2,236,800 | 285,600 | 21,600 | 638,900 | 30,400 |
| | Q4 | 2,241,200 | 274,400 | 22,600 | 645,000 | 30,700 |
| 2015 | Q1 | 2,224,500 | 270,600 | 23,400 | 647,600 | 30,700 |
| | Q2 | 2,214,900 | 269,000 | 24,400 | 653,300 | 30,900 |
| | Q3 | 2,212,400 | 263,500 | 27,400 | 660,800 | 30,900 |
| | Q4 | 2,216,700 | 260,100 | 29,100 | 673,300 | 31,200 |
| 2016 | Q1 | 2,225,100 | 271,600 | 27,800 | 694,100 | 15,800 |
| | Q2 | 2,219,100 | 267,400 | 28,900 | 702,500 | 3,400 |
| | Q3 | 2,222,100 | 263,900 | 27,000 | 727,100 | 100 |
| | Q4 | 2,215,800 | 260,200 | 27,700 | 752,300 | 100 |

## Carrier pre-selection and call-by-call usage (page 46)

| Number of customers | | CbC | CPS |
|---|---|---|---|
| **2014** | Q1 | 78,600 | 344,200 |
| | Q2 | 80,000 | 335,700 |
| | Q3 | 78,100 | 327,700 |
| | Q4 | 76,400 | 316,100 |
| **2015** | Q1 | 74,000 | 308,000 |
| | Q2 | 73,300 | 300,900 |
| | Q3 | 57,400 | 292,700 |
| | Q4 | 35,300 | 285,200 |
| **2016** | Q1 | 33,500 | 277,500 |
| | Q2 | 32,900 | 270,000 |
| | Q3 | 32,300 | 261,900 |
| | Q4 | 31,800 | 250,700 |

## Retails revenues from access services (page 47)

| | EUR | Residential customers | Business customers |
|---|---|---|---|
| **2014** | Q1 | 22,572,600 | 35,849,700 |
| | Q2 | 21,575,600 | 35,937,000 |
| | Q3 | 20,512,200 | 35,023,400 |
| | Q4 | 19,533,100 | 34,461,400 |
| **2015** | Q1 | 18,453,200 | 33,946,000 |
| | Q2 | 17,754,800 | 32,240,000 |
| | Q3 | 23,754,200 | 28,336,100 |
| | Q4 | 22,947,500 | 27,784,600 |
| **2016** | Q1 | 22,773,800 | 28,919,600 |
| | Q2 | 22,362,200 | 27,980,700 |
| | Q3 | 22,166,200 | 28,602,000 |
| | Q4 | 21,814,800 | 27,787,200 |

## Retail revenues from carrier services (page 48)

| | EUR | Residential customers | Business customers |
|---|---|---|---|
| **2014** | Q1 | 25,623,700 | 35,803,300 |
| | Q2 | 24,644,700 | 33,911,400 |
| | Q3 | 24,068,300 | 33,865,300 |
| | Q4 | 24,878,600 | 33,012,400 |
| **2015** | Q1 | 22,974,000 | 32,181,200 |
| | Q2 | 21,377,800 | 29,300,300 |
| | Q3 | 21,903,700 | 30,801,100 |
| | Q4 | 22,586,700 | 29,989,300 |
| **2016** | Q1 | 20,455,900 | 29,771,600 |
| | Q2 | 19,156,300 | 28,860,200 |
| | Q3 | 18,150,200 | 27,784,900 |
| | Q4 | 18,893,500 | 27,737,900 |

## Retail revenues from carrier services 2

| | EUR | Domestic fixed network | Domestic mobile network | International | Service numbers and directory assistance services |
|---|---|---|---|---|---|
| **2014** | Q1 | 14,925,600 | 25,784,400 | 16,763,100 | 3,953,900 |
| | Q2 | 17,287,400 | 21,785,000 | 15,917,100 | 3,566,600 |
| | Q3 | 18,713,200 | 19,784,900 | 15,880,400 | 3,555,100 |
| | Q4 | 19,089,600 | 20,112,600 | 15,167,100 | 3,521,700 |
| **2015** | Q1 | 18,121,400 | 19,212,600 | 14,530,900 | 3,290,300 |
| | Q2 | 16,050,600 | 17,760,400 | 13,757,000 | 3,110,200 |
| | Q3 | 17,444,200 | 18,631,700 | 13,736,400 | 2,892,400 |
| | Q4 | 17,645,300 | 18,632,300 | 13,232,500 | 3,065,900 |
| **2016** | Q1 | 16,342,500 | 18,742,500 | 12,593,500 | 2,549,000 |
| | Q2 | 15,363,300 | 18,606,700 | 11,852,700 | 2,193,700 |
| | Q3 | 14,435,800 | 17,666,400 | 11,339,000 | 2,493,900 |
| | Q4 | 14,923,900 | 17,823,200 | 11,286,400 | 2,598,100 |

## Call minutes on the retail market (page 49)

| | Minutes | Domestic fixed network | Domestic mobile network | International | Service numbers and directory assistance services |
|---|---|---|---|---|---|
| **2014** | Q1 | 553,321,000 | 209,059,000 | 150,413,000 | 21,800,000 |
| | Q2 | 503,026,000 | 204,270,000 | 142,479,000 | 19,822,000 |
| | Q3 | 489,067,000 | 203,102,000 | 138,685,000 | 19,389,000 |
| | Q4 | 496,474,000 | 207,307,000 | 138,285,000 | 18,847,000 |
| **2015** | Q1 | 480,876,000 | 202,419,000 | 134,444,000 | 17,525,000 |
| | Q2 | 437,122,000 | 197,064,000 | 127,338,000 | 16,219,000 |
| | Q3 | 423,613,000 | 196,167,000 | 123,942,000 | 15,727,000 |
| | Q4 | 432,277,000 | 200,775,000 | 121,612,000 | 15,292,000 |
| **2016** | Q1 | 431,251,000 | 196,352,000 | 118,667,000 | 12,610,000 |
| | Q2 | 403,643,000 | 196,696,000 | 110,965,000 | 11,851,000 |
| | Q3 | 384,764,000 | 191,567,000 | 104,801,000 | 10,999,000 |
| | Q4 | 398,722,000 | 196,899,000 | 104,452,000 | 11,003,000 |

## Revenues per call minute (page 50)

| | EUR cents | Domestic fixed network / residential customers | Domestic mobile network / residential customers | International / residential customers | Domestic fixed network / business customers | Domestic mobile network / business customers | International / business customers |
|---|---|---|---|---|---|---|---|
| **2014** | Q1 | 2.90 | 18.30 | 11.80 | 2.60 | 10.00 | 10.70 |
| | Q2 | 4.20 | 14.50 | 11.90 | 2.90 | 9.20 | 10.60 |
| | Q3 | 5.00 | 12.30 | 12.20 | 3.10 | 8.80 | 11.00 |
| | Q4 | 5.00 | 12.10 | 11.90 | 3.10 | 8.80 | 10.30 |
| **2015** | Q1 | 4.90 | 11.90 | 11.70 | 3.00 | 8.60 | 10.20 |
| | Q2 | 4.90 | 11.80 | 11.50 | 2.90 | 8.00 | 10.30 |
| | Q3 | 5.60 | 12.10 | 12.30 | 3.20 | 8.60 | 10.40 |
| | Q4 | 5.50 | 11.90 | 12.00 | 3.20 | 8.30 | 10.10 |
| **2016** | Q1 | 4.90 | 12.00 | 11.60 | 3.00 | 8.60 | 10.00 |
| | Q2 | 5.00 | 12.00 | 11.60 | 3.10 | 8.60 | 10.10 |
| | Q3 | 5.00 | 12.00 | 12.30 | 3.00 | 8.20 | 10.00 |
| | Q4 | 4.90 | 11.70 | 12.30 | 3.00 | 8.10 | 10.00 |

## Wholesale market in minutes (page 52)

| | Minutes | Origination | Termination | Transit |
|---|---|---|---|---|
| **2014** | Q1 | 697,907,500 | 1,009,864,900 | 590,609,500 |
| | Q2 | 666,073,700 | 952,006,900 | 625,252,700 |
| | Q3 | 647,579,300 | 933,714,100 | 618,289,900 |
| | Q4 | 656,254,400 | 976,529,200 | 624,081,700 |
| **2015** | Q1 | 640,330,500 | 939,535,600 | 647,467,800 |
| | Q2 | 618,165,500 | 896,752,900 | 628,577,100 |
| | Q3 | 592,976,100 | 876,556,600 | 644,334,100 |
| | Q4 | 603,928,700 | 883,696,700 | 659,559,500 |
| **2016** | Q1 | 631,096,500 | 888,579,800 | 620,841,800 |
| | Q2 | 604,717,000 | 831,934,200 | 695,077,800 |
| | Q3 | 577,337,200 | 785,935,200 | 753,409,000 |
| | Q4 | 590,069,300 | 814,922,900 | 830,143,300 |

## Wholesale revenues (page 53)

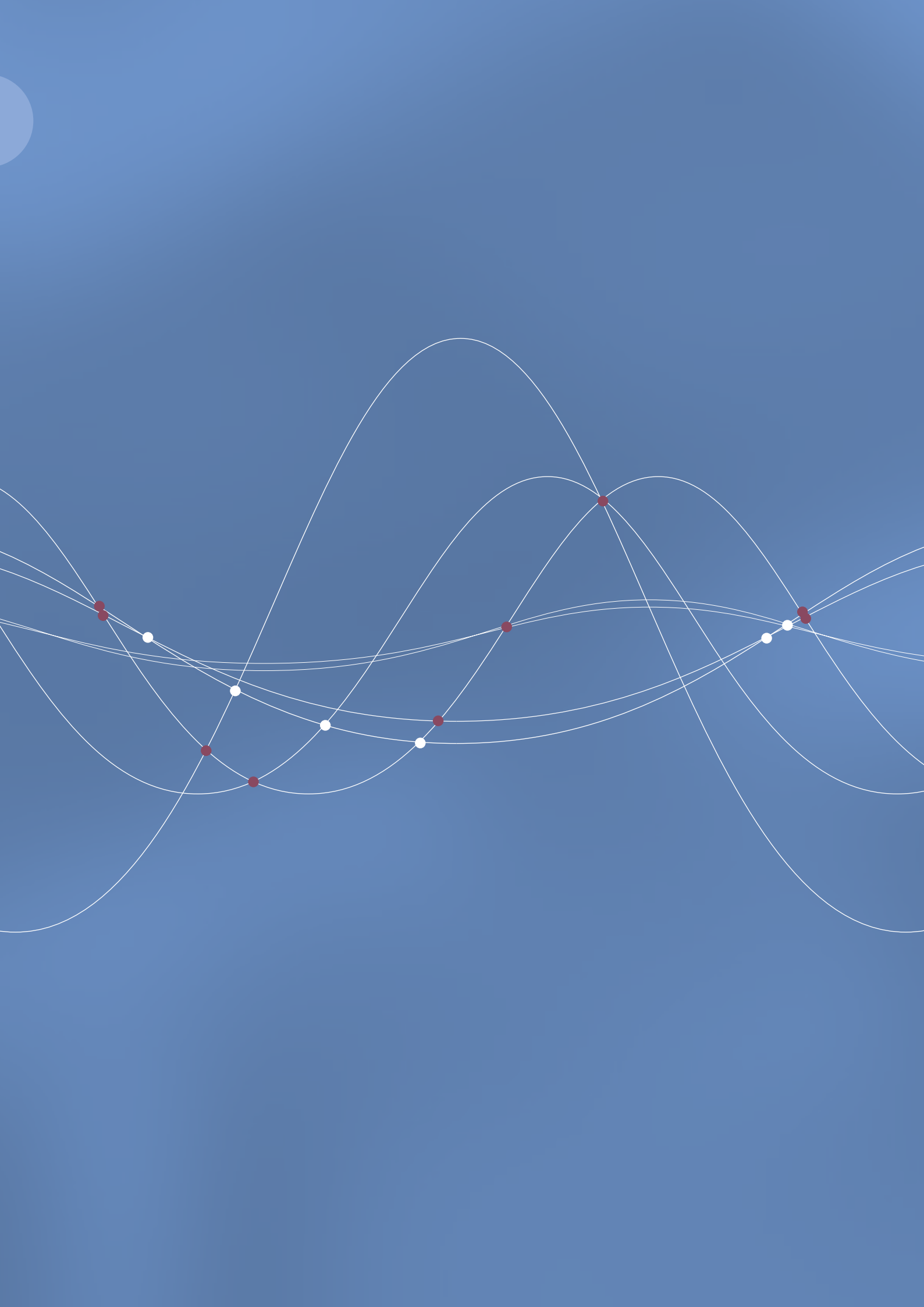
| | EUR | Origination | Termination | Transit |
|---|---|---|---|---|
| **2014** | Q1 | 2,967,300 | 4,025,900 | 1,548,000 |
| | Q2 | 2,847,700 | 3,857,800 | 1,374,400 |
| | Q3 | 2,761,500 | 4,008,600 | 1,236,600 |
| | Q4 | 2,762,900 | 3,837,300 | 1,217,700 |
| **2015** | Q1 | 2,610,900 | 3,630,500 | 1,208,800 |
| | Q2 | 2,404,300 | 3,332,500 | 1,117,500 |
| | Q3 | 2,337,000 | 3,383,100 | 1,089,100 |
| | Q4 | 2,387,500 | 3,299,900 | 1,179,100 |
| **2016** | Q1 | 2,529,300 | 3,139,900 | 1,091,700 |
| | Q2 | 2,397,800 | 3,188,700 | 1,026,800 |
| | Q3 | 2,226,000 | 3,306,600 | 1,006,700 |
| | Q4 | 2,242,600 | 3,212,200 | 1,054,900 |

## Geographical numbers in use and fixed-line porting (page 54)

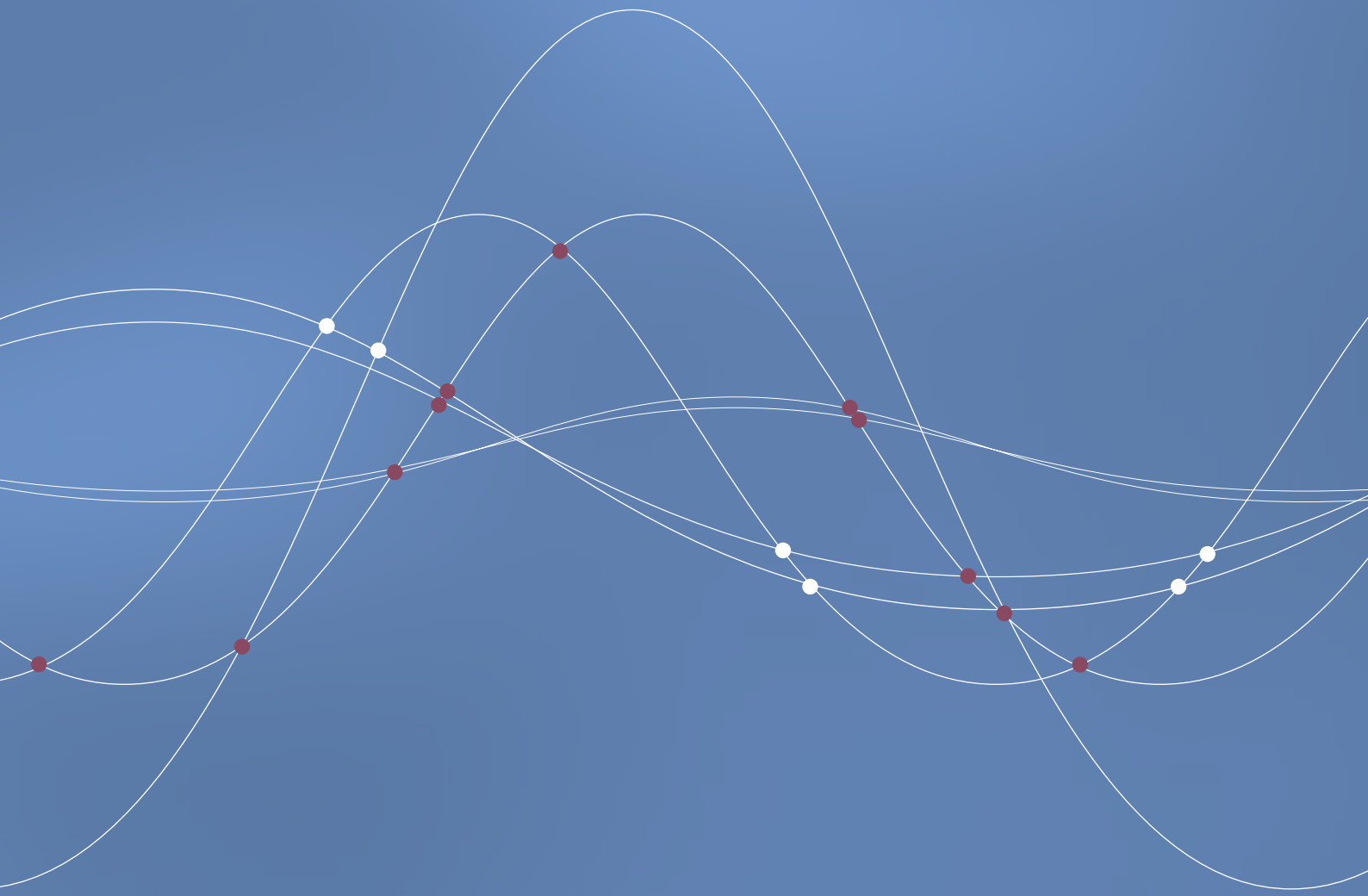
| | Number of telephone numbers | Geographical numbers in use | Geographical numbers ported | Service numbers ported |
|---|---|---|---|---|
| **2014** | Q1 | 2,936,986 | 307,383 | 12,058 |
| | Q2 | 2,907,113 | 308,597 | 11,933 |
| | Q3 | 2,887,446 | 311,403 | 13,240 |
| | Q4 | 2,857,400 | 310,853 | 13,080 |
| **2015** | Q1 | 2,839,775 | 311,003 | 13,446 |
| | Q2 | 2,830,545 | 310,215 | 13,463 |
| | Q3 | 2,830,825 | 309,391 | 13,340 |
| | Q4 | 2,815,607 | 301,393 | 13,340 |
| **2016** | Q1 | 2,804,325 | 301,121 | 13,192 |
| | Q2 | 2,790,785 | 300,382 | 13,032 |
| | Q3 | 2,773,564 | 295,123 | 12,891 |
| | Q4 | 2,745,236 | 292,967 | 12,552 |

## Service numbers in use (page 55)

| Number of service numbers | | (0)720 | (0)780 | (0)800 | (0)810, (0)820, (0)821, (0)828 | (0)900, (0)930 |
|---|---|---|---|---|---|---|
| **2014** | Q1 | 42,342 | 549 | 16,452 | 11,975 | 21,012 |
| | Q2 | 43,255 | 549 | 16,575 | 12,102 | 20,765 |
| | Q3 | 46,107 | 545 | 16,598 | 11,645 | 20,111 |
| | Q4 | 46,450 | 542 | 16,794 | 11,498 | 19,826 |
| **2015** | Q1 | 43,958 | 536 | 17,088 | 11,784 | 19,832 |
| | Q2 | 48,280 | 536 | 17,184 | 11,657 | 19,762 |
| | Q3 | 46,954 | 536 | 16,114 | 10,936 | 18,436 |
| | Q4 | 47,840 | 531 | 17,406 | 11,957 | 19,765 |
| **2016** | Q1 | 53,684 | 529 | 17,651 | 11,864 | 22,208 |
| | Q2 | 54,463 | 528 | 17,540 | 9,261 | 21,803 |
| | Q3 | 54,734 | 527 | 17,653 | 10,511 | 21,710 |
| | Q4 | 53,925 | 203 | 17,554 | 10,811 | 21,717 |

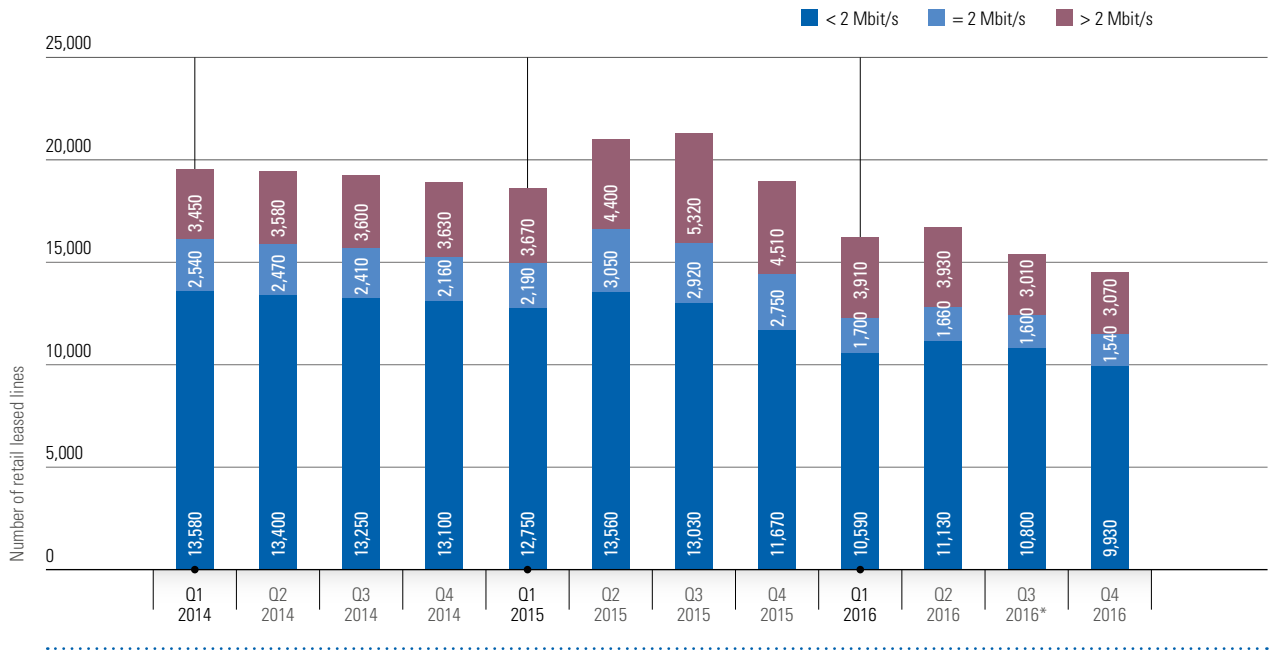


# 4 Leased lines



# Number of retail leased lines in Austria

## *Drop in all bandwidth categories*



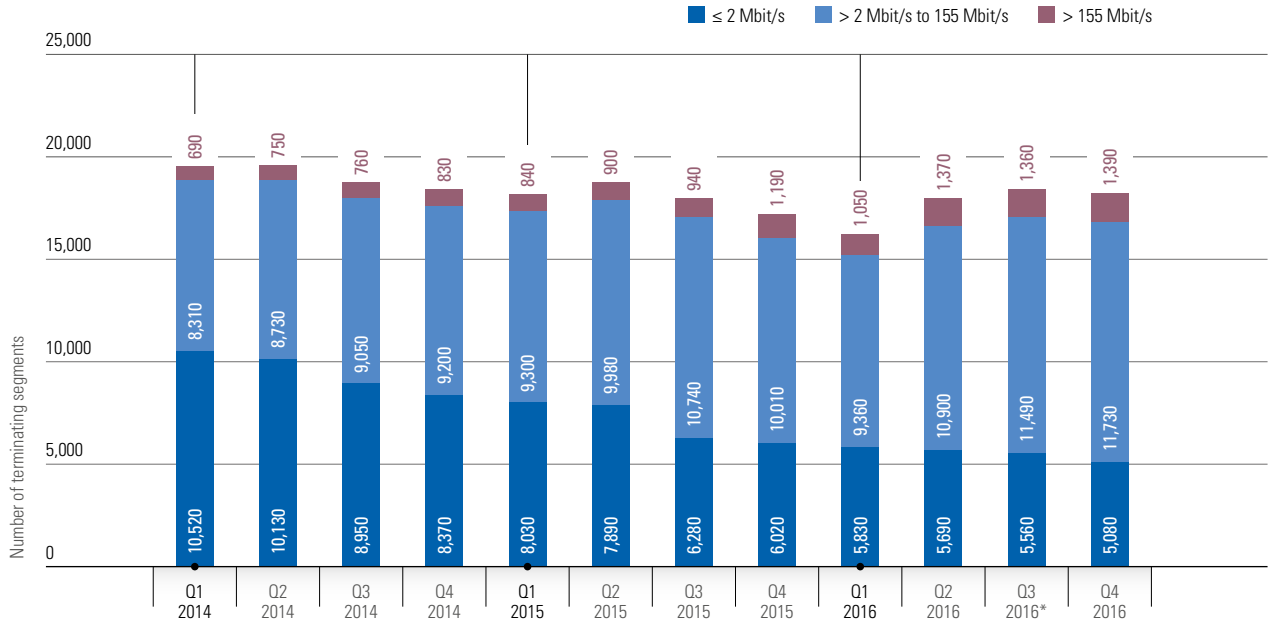

- The number of retail leased lines has shown a general downward trend over time, with exceptions in 2015. These were caused by the fact that one operator also recorded all backup lines from the beginning of Q2 2015 onwards.
- At the end of 2016, leased lines totalled 14,540, which is a decline of 23.2% against the previous year, when 18,930 leased lines were recorded.
- Not only did the total number of leased lines decrease, also the number of leased lines in the individual bandwidth categories went down year on year. The number of leased lines with bandwidths of < 2 Mbit/s fell by 14.9%, that of the = 2 Mbit/s category by 44.0% and the category of > 2 Mbit/s posted a drop of 31.9%.

The chart above shows the number of retail leased lines (see Glossary), broken down into data rates of < 2 Mbit/s, = 2 Mbit/s and > 2 Mbit/s. A differentiation between the > 2 Mbit/s to 155 Mbit/s and > 155 Mbit/s categories as well as corresponding revenues can be found in the tables at the end of the section.

*Due to post-hoc data corrections, the values presented here differ by more than 5% from those provided in the previous issue of the RTR Telekom Monitor.

# Number of national terminating segments (at the wholesale level)

*Year-on-year increase, mainly in higher bandwidth categories*




- The number of terminating segments of leased lines and Ethernet services rose by 5.7% throughout 2016. Terminating segments of leased lines plummeted (down 25.9%), while those of Ethernet services jumped by 40.2%.
- Looking at the individual bandwidth categories year on year, the ≤ 2 Mbit/s category shows a decline of 15.6%, while the number of terminating segments in the > 2 Mbit/s to 155 Mbit/s categories increased by 17.2% and that in the > 155 Mbit/s category grew by 16.8%.

The chart above shows the number of terminating segments of leased lines and Ethernet services on the wholesale market, broken down into data rates of ≤ 2 Mbit/s, > 2 Mbit/s to 155 Mbit/s and > 155 Mbit/s. A breakdown into data rates of < 2 Mbit/s and = 2 Mbit/s as well as > 155 Mbit/s to 1 Gbit/s and > 1 Gbit/s, broken down into terminating segments of leased lines and Ethernet services, as well as corresponding revenues can be also found in the tables at the end of the section.

*Due to post-hoc data corrections, the values presented here differ by more than 5% from those provided in the previous issue of the RTR Telekom Monitor.

## Number of retail leased lines in Austria (page 64)

| Number of lines | | < 2 Mbit/s | = 2 Mbit/s | > 2 Mbit/s to 155 Mbit/s | > 155 Mbit/s |
|---|---|---|---|---|---|
| **2014** | Q1 | 13,580 | 2,540 | 3,200 | 250 |
| | Q2 | 13,400 | 2,470 | 3,290 | 290 |
| | Q3 | 13,250 | 2,410 | 3,300 | 300 |
| | Q4 | 13,100 | 2,160 | 3,310 | 320 |
| **2015** | Q1 | 12,750 | 2,190 | 3,360 | 310 |
| | Q2 | 13,560 | 3,050 | 4,070 | 330 |
| | Q3 | 13,030 | 2,920 | 4,990 | 330 |
| | Q4 | 11,670 | 2,750 | 3,920 | 590 |
| **2016** | Q1 | 10,590 | 1,700 | 3,320 | 590 |
| | Q2 | 11,130 | 1,660 | 3,410 | 520 |
| | Q3 | 10,800 | 1,600 | 2,580 | 430 |
| | Q4 | 9,930 | 1,540 | 2,620 | 450 |

## Revenues from retail leased lines in Austria

| | EUR | < 2 Mbit/s | = 2 Mbit/s | > 2 Mbit/s to 155 Mbit/s | > 155 Mbit/s |
|---|---|---|---|---|---|
| **2014** | Q1 | 1,899,100 | 3,483,400 | 5,456,500 | 608,500 |
| | Q2 | 1,874,500 | 3,392,700 | 5,536,800 | 716,600 |
| | Q3 | 1,800,200 | 3,332,700 | 5,571,100 | 783,100 |
| | Q4 | 1,837,300 | 2,987,900 | 5,650,800 | 786,100 |
| **2015** | Q1 | 1,572,300 | 3,156,900 | 5,836,800 | 823,100 |
| | Q2 | 1,629,800 | 3,175,000 | 5,892,900 | 756,400 |
| | Q3 | 1,662,700 | 3,051,900 | 5,875,300 | 719,500 |
| | Q4 | 1,661,000 | 3,003,600 | 5,218,200 | 1,632,100 |
| **2016** | Q1 | 1,549,700 | 2,752,500 | 4,522,200 | 1,264,500 |
| | Q2 | 1,557,900 | 2,695,800 | 4,645,800 | 1,336,000 |
| | Q3 | 1,512,100 | 2,689,300 | 4,155,300 | 1,310,100 |
| | Q4 | 1,477,900 | 2,649,800 | 4,348,300 | 1,371,700 |

## Number of terminating segments of leased lines in Austria (page 65)

| Number of terminating segments | | < 2 Mbit/s | = 2 Mbit/s | > 2 Mbit/s to 155 Mbit/s | > 155 Mbit/s to 1 Gbit/s | > 1 Gbit/s |
|---|---|---|---|---|---|---|
| **2014** | Q1 | 320 | 8,860 | 3,170 | 290 | 11 |
| | Q2 | 360 | 8,400 | 3,260 | 330 | 10 |
| | Q3 | 340 | 7,420 | 3,280 | 320 | 14 |
| | Q4 | 330 | 6,910 | 3,240 | 340 | 11 |
| **2015** | Q1 | 330 | 6,600 | 3,240 | 340 | 11 |
| | Q2 | 320 | 6,460 | 3,770 | 350 | 11 |
| | Q3 | 300 | 4,920 | 4,380 | 320 | 8 |
| | Q4 | 310 | 4,660 | 3,490 | 470 | 64 |
| **2016** | Q1 | 280 | 4,460 | 2,530 | 290 | 30 |
| | Q2 | 220 | 4,160 | 1,800 | 200 | 30 |
| | Q3 | 170 | 4,130 | 2,520 | 270 | 40 |
| | Q4 | 170 | 3,670 | 2,490 | 290 | 40 |

## Number of terminating segments of Ethernet services in Austria (page 65)

| | Number of terminating segments | < 2 Mbit/s | = 2 Mbit/s | > 2 Mbit/s to 155 Mbit/s | > 155 Mbit/s to 1 Gbit/s | > 1 Gbit/s |
|---|---|---|---|---|---|---|
| **2014** | Q1 | 14 | 1,330 | 5,140 | 380 | 12 |
| | Q2 | 7 | 1,360 | 5,470 | 380 | 25 |
| | Q3 | 12 | 1,180 | 5,770 | 400 | 27 |
| | Q4 | 14 | 1,120 | 5,960 | 450 | 30 |
| **2015** | Q1 | 14 | 1,090 | 6,060 | 460 | 30 |
| | Q2 | 12 | 1,100 | 6,210 | 500 | 36 |
| | Q3 | 12 | 1,050 | 6,360 | 560 | 47 |
| | Q4 | 9 | 1,040 | 6,520 | 610 | 54 |
| **2016** | Q1 | 69 | 1,020 | 6,830 | 690 | 40 |
| | Q2 | 90 | 1,220 | 9,100 | 1,080 | 60 |
| | Q3 | 80 | 1,180 | 8,970 | 950 | 100 |
| | Q4 | 90 | 1,150 | 9,240 | 1,010 | 50 |

## Wholesale revenues from leased lines and Ethernet services

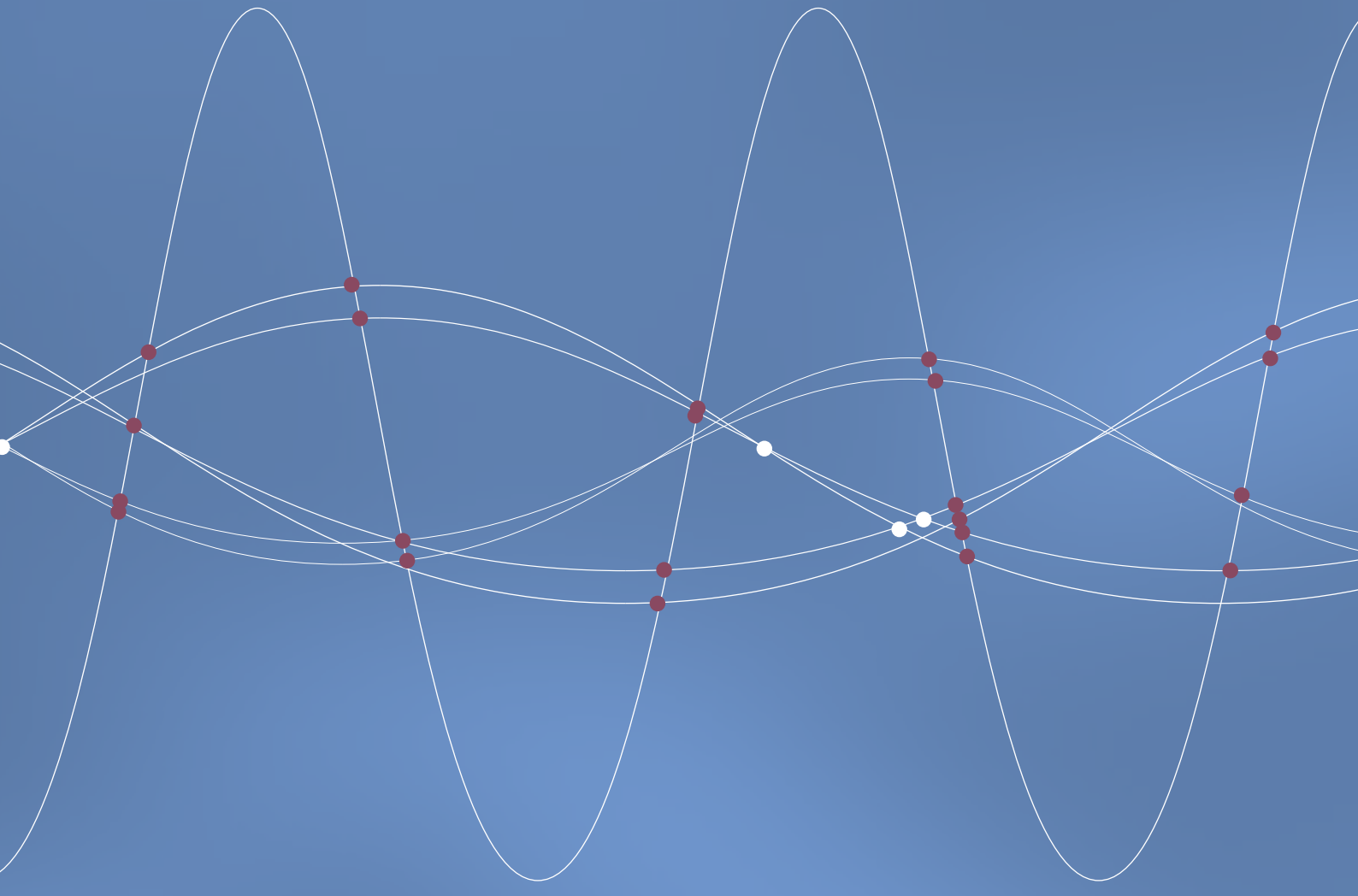
| | EUR | Terminating segments / leased lines | Terminating segments / Ethernet services | Trunk segments / leased lines | Trunk segments / Ethernet services |
|---|---|---|---|---|---|
| **2014** | Q1 | 14,069,100 | 9,528,500 | 1,374,500 | 1,054,800 |
| | Q2 | 13,840,600 | 10,453,300 | 1,291,000 | 866,300 |
| | Q3 | 12,888,400 | 10,677,700 | 1,290,700 | 903,300 |
| | Q4 | 11,413,200 | 11,121,000 | 1,295,800 | 931,500 |
| **2015** | Q1 | 12,002,700 | 11,424,400 | 1,301,400 | 964,300 |
| | Q2 | 12,267,600 | 11,757,200 | 1,431,900 | 980,400 |
| | Q3 | 11,887,800 | 12,128,500 | 1,552,600 | 937,300 |
| | Q4 | 10,528,500 | 12,281,500 | 1,611,700 | 917,800 |
| **2016** | Q1 | 8,105,200 | 13,556,300 | 1,287,300 | 1,017,100 |
| | Q2 | 7,338,400 | 15,104,800 | 1,275,500 | 1,122,000 |
| | Q3 | 7,681,900 | 13,326,300 | 1,266,100 | 1,033,900 |
| | Q4 | 7,296,800 | 19,599,100 | 1,197,900 | 1,109,500 |

## Number of 64 kbit/s equivalents of terminating segments of leased lines

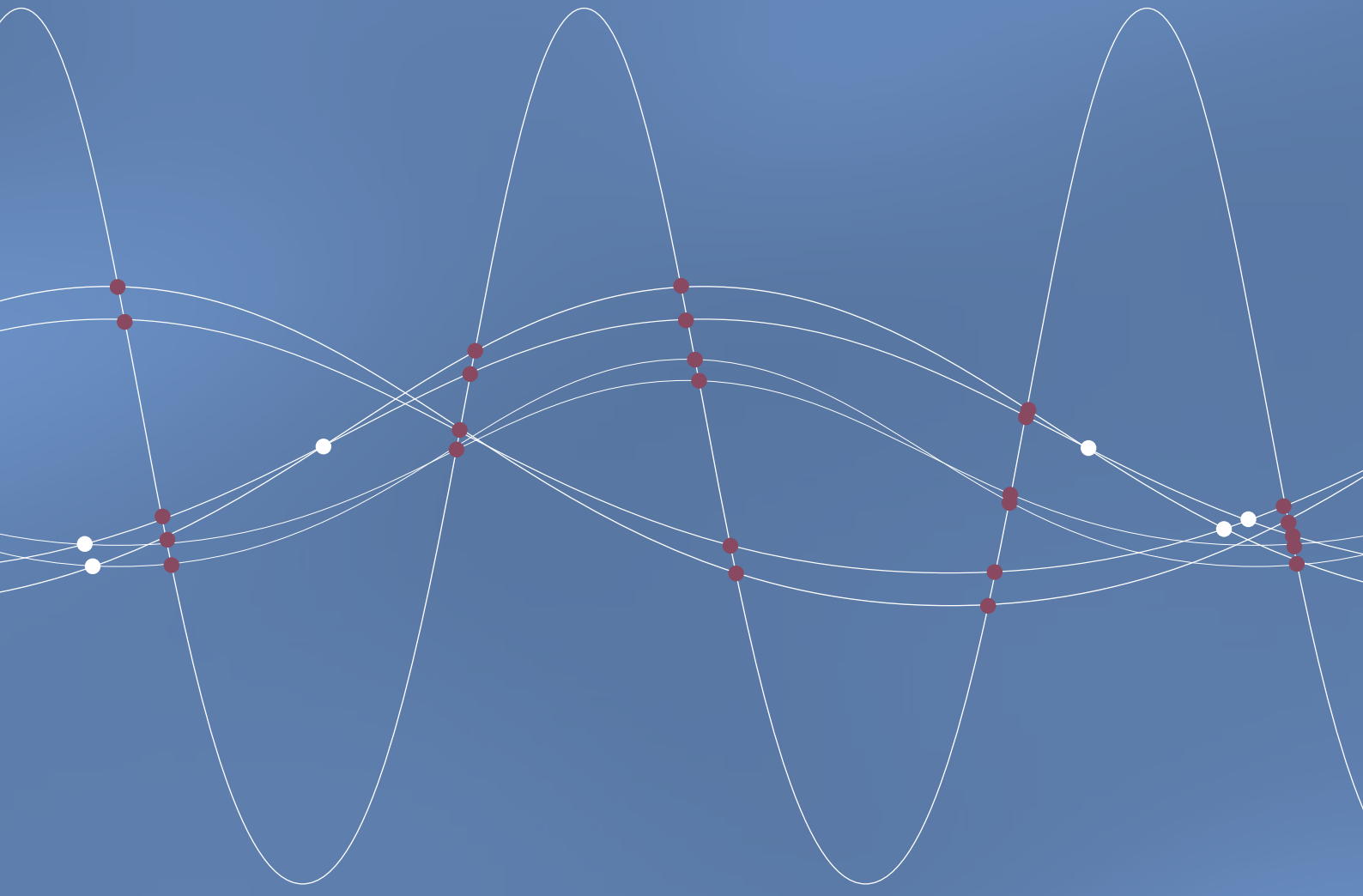
| | Number of 64 kbit/s equivalents | < 2 Mbit/s | = 2 Mbit/s | > 2 Mbit/s to 155 Mbit/s | > 155 Mbit/s to 1 Gbit/s | > 1 Gbit/s |
|---|---|---|---|---|---|---|
| **2014** | Q1 | 3,600 | 282,600 | 1,814,000 | 2,456,200 | 1,360,300 |
| | Q2 | 4,700 | 264,800 | 1,753,900 | 2,744,800 | 1,204,700 |
| | Q3 | 4,600 | 233,700 | 1,782,700 | 2,626,300 | 1,941,800 |
| | Q4 | 4,500 | 220,000 | 1,798,600 | 3,119,400 | 1,461,800 |
| **2015** | Q1 | 4,200 | 210,800 | 1,796,500 | 2,707,900 | 1,604,400 |
| | Q2 | 4,200 | 205,700 | 3,971,700 | 2,854,900 | 1,721,700 |
| | Q3 | 4,000 | 156,000 | 3,840,400 | 2,639,700 | 1,408,700 |
| | Q4 | 5,000 | 149,200 | 1,788,400 | 3,271,700 | 11,570,200 |
| **2016** | Q1 | 4,200 | 142,000 | 1,337,700 | 2,549,900 | 2,988,300 |
| | Q2 | 2,900 | 131,300 | 955,700 | 1,289,900 | 3,179,600 |
| | Q3 | 1,600 | 130,100 | 1,207,100 | 1,628,600 | 3,411,800 |
| | Q4 | 1,600 | 117,200 | 1,202,100 | 1,734,000 | 4,263,000 |

## Number of 64 kbit/s equivalents of terminating segments of Ethernet services

| | Number of 64 kbit/s equivalents | < 2 Mbit/s | = 2 Mbit/s | > 2 Mbit/s to 155 Mbit/s | > 155 Mbit/s to 1 Gbit/s | > 1 Gbit/s |
|---|---|---|---|---|---|---|
| **2014** | Q1 | 200 | 41,400 | 2,690,500 | 3,157,100 | 486,800 |
| | Q2 | 100 | 42,300 | 2,787,700 | 3,226,900 | 930,800 |
| | Q3 | 200 | 37,200 | 2,840,900 | 3,267,100 | 942,900 |
| | Q4 | 200 | 35,500 | 2,939,400 | 3,435,600 | 962,700 |
| **2015** | Q1 | 200 | 34,800 | 3,083,600 | 3,705,900 | 960,800 |
| | Q2 | 200 | 34,800 | 3,122,500 | 4,061,400 | 1,136,600 |
| | Q3 | 200 | 32,400 | 3,201,000 | 4,753,800 | 1,556,700 |
| | Q4 | 100 | 32,100 | 3,294,800 | 5,349,400 | 1,984,700 |
| **2016** | Q1 | 1,000 | 31,600 | 3,201,800 | 5,585,700 | 1,479,500 |
| | Q2 | 1,200 | 38,100 | 4,333,400 | 7,742,700 | 2,418,500 |
| | Q3 | 1,200 | 36,800 | 4,835,500 | 8,378,500 | 2,545,200 |
| | Q4 | 1,400 | 36,000 | 4,974,100 | 7,718,400 | 1,675,300 |

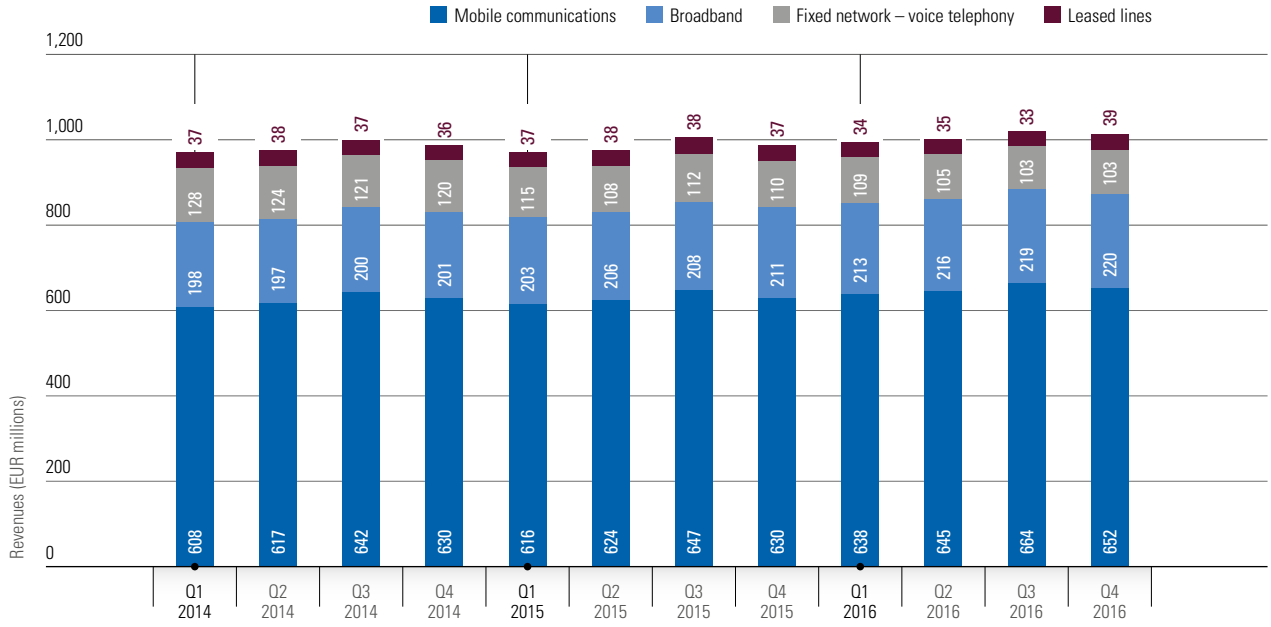


# 5 Comparisons across sectors



# Revenues from mobile, broadband, fixed and leased line services

## *Revenue growth compared with 2015*




- In 2016, the telecom sector generated EUR 4.028 billion, which is 2.3% more than in the previous year.
- The largest share of telecom revenues is accounted for by mobile services with just below EUR 2.599 billion. Against the year 2015, this is an increase of 3.3%.
- Revenues from broadband services amounted to EUR 868.1 million, up 5.0% compared with 2015.
- Revenues from fixed-line services dropped by 5.6% to EUR 419.6 million year on year.
- Leased line revenues totalled EUR 141.2 million, declining by 5.7% compared with 2015.

The chart includes revenues from the following categories:

**Mobile communications:** Retail revenues from periodic base fees, activation charges, connection charges and data services, remuneration pursuant to the Telecommunications Fee Subsidies Act, wholesale revenues from termination, origination, international roaming, national roaming, sale of airtime to resellers (see Glossary);

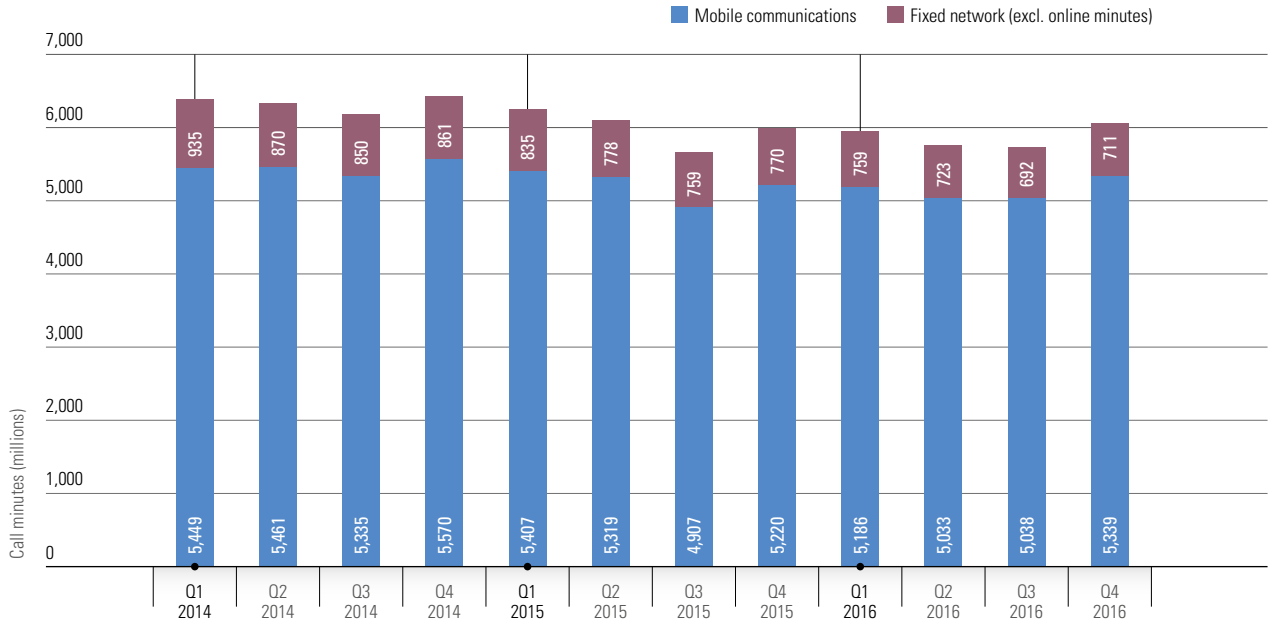
**Broadband (fixed network):** Retail revenues (including revenues from products bundled with broadband) and wholesale revenues from setup charges, ongoing charges and volume-based charges;

**Fixed network** (voice telephony): Retail revenues from residential and business customers (except for bundles with broadband) as well as public pay phones (phone booths), wholesale revenues, revenues from additional services, other fees and remuneration pursuant to the Telecommunications Fee Subsidies Act;

**Leased lines:** Retail revenues from periodic base fees and setup charges for domestic retail leased lines, wholesale revenues from terminating segments and trunk segments (see Glossary).

# Real minutes in fixed and mobile networks

## *Fewer call minutes year on year*

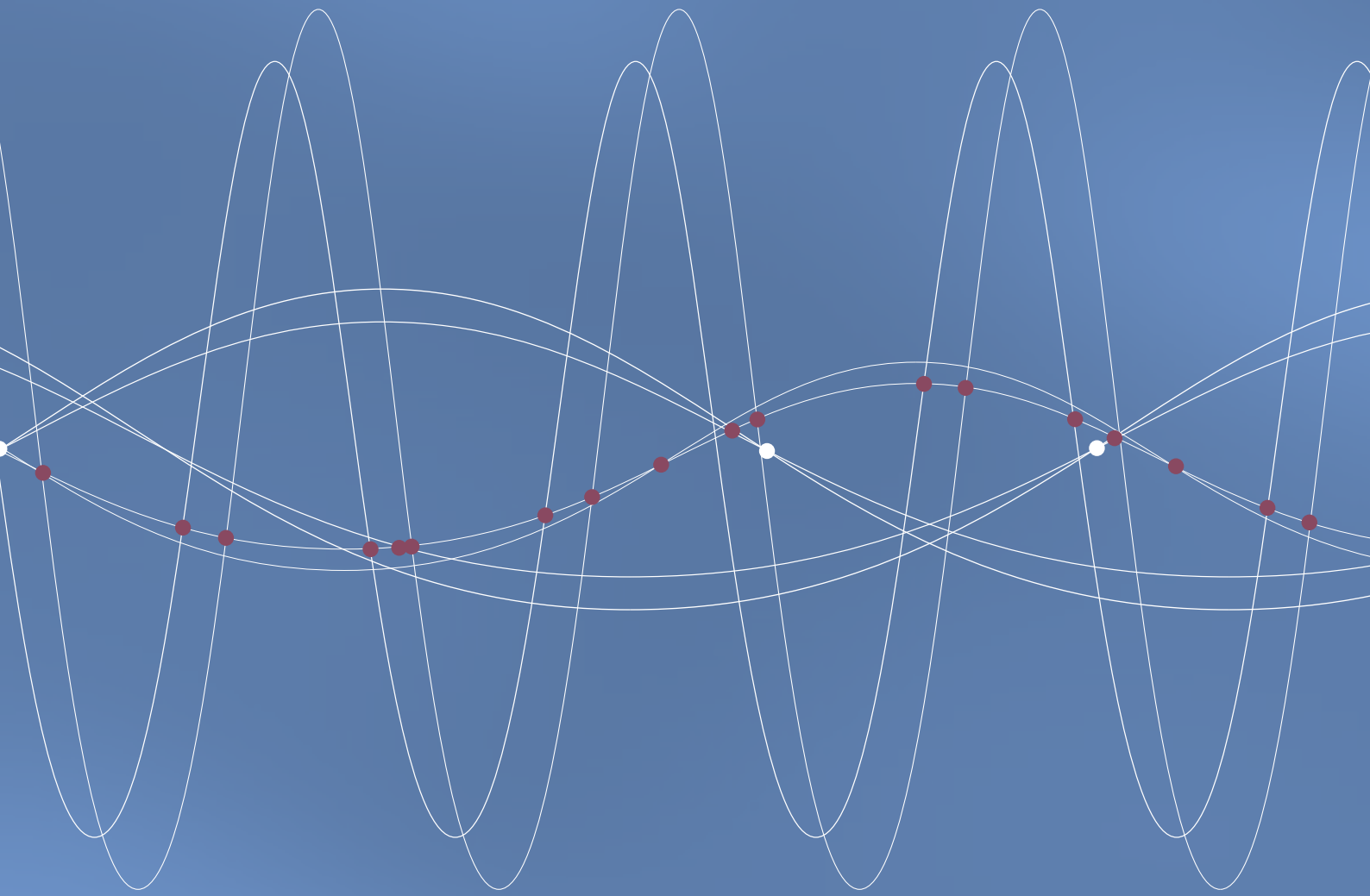



- In 2016, call minutes in the mobile and fixed networks totalled some 23.481 billion minutes, which is a decline of 2.1% compared with 2015.
- With 20.596 billion minutes, the mobile network contributed the lion's share, even though the number of minutes retreated by 1.2% against 2015.
- Minutes from the fixed network amounted to 2.885 billion in 2016, which is 8.2% less than in the reference period.

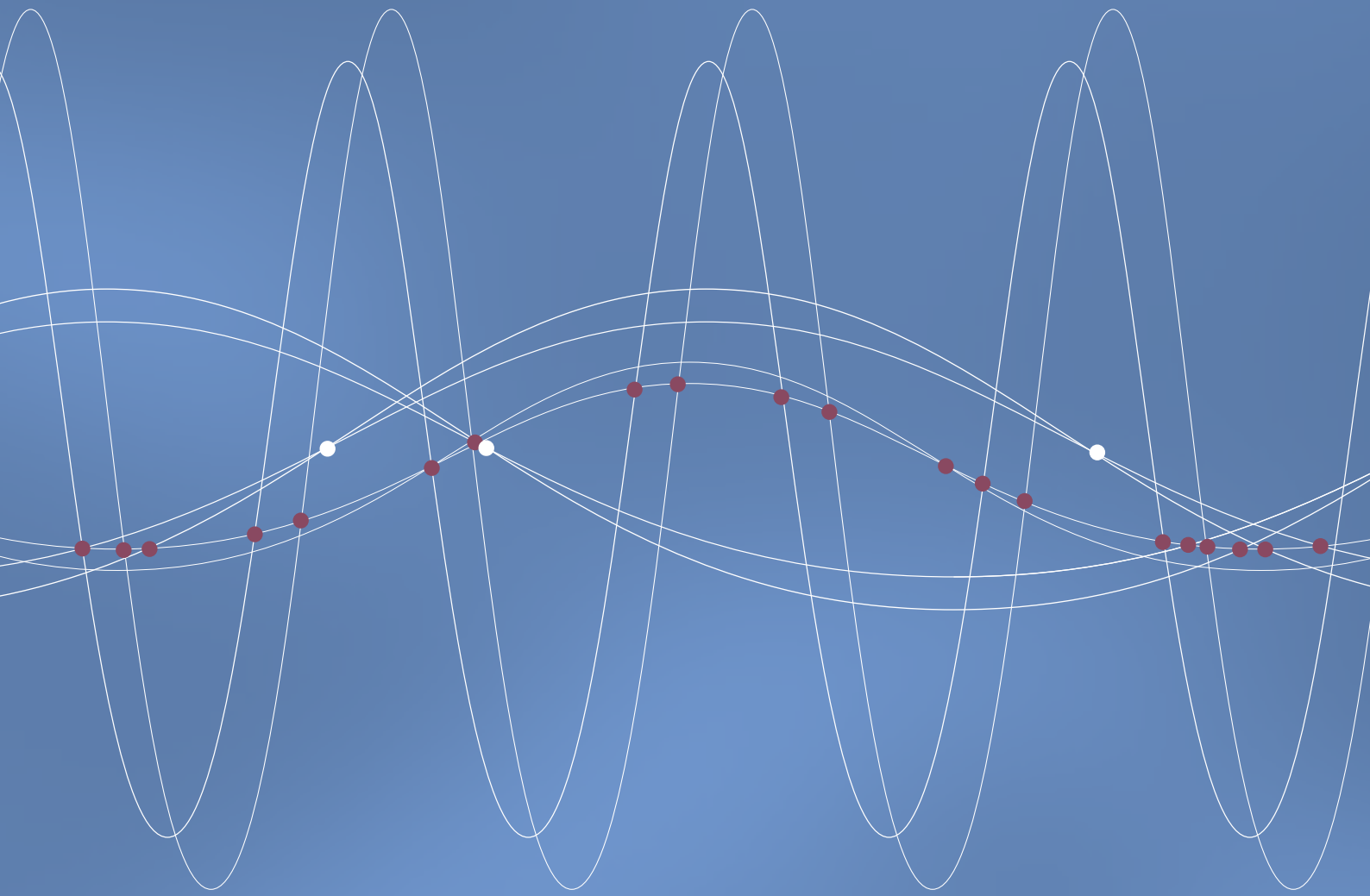
The chart above shows the number of real minutes (in million) in the following segments:

**Mobile communications:** Call minutes to the domestic fixed network, domestic mobile networks, international numbers, service numbers and directory assistance services;

**Fixed network:** Call minutes to the domestic fixed network, domestic mobile networks, international numbers, service numbers and directory assistance services.

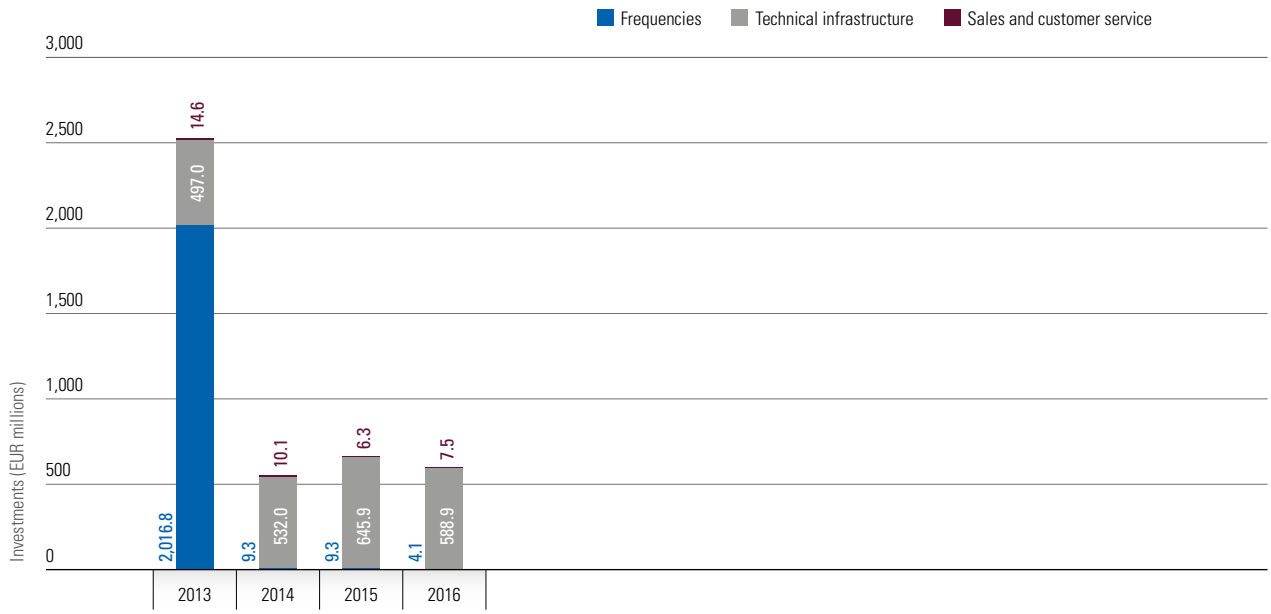


# 6 Business indicators



# Investments

## *Lower investment activity than in 2015*




- In 2016, total investments in the telecommunications sector amounted to some EUR 600.5 million. This figure is down by 9.2% against 2015.
- Investments in the telecommunications sector mainly go into technical infrastructure, i.e. into network expansion. In 2016, investments came to some EUR 588.9 million, which is 8.8% less than in 2015.
- In 2016, investments in frequencies slumped by 55.9% to EUR 4.1 million. In 2018, the frequencies in the 3.4 GHz to 3.8 GHz bands are to be auctioned.
- Investments in sales and customer service were intensified: EUR 7.5 million mean an increase of 19.0%.
- The 2-billion investment of the mobile operators in 2013 was generated by the frequency auction for the 800/900/1800 MHz frequencies and is now used for the rollout of ultra-fast broadband in Austria.

The chart above shows the development of investments in frequencies, technical infrastructure as well as sales and customer service on an annual basis. In this context, it is important to note that the values reported here are partly based on estimates and extrapolations from individual quarters for entire years. As a result, the exact figure for total investments cannot be calculated reliably.

The investment volumes shown above only include those investments made directly by telecommunications enterprises. They do not include investments by upstream or downstream industry sectors.

# Employees in the telecommunications sector

## *Fewer leased employees and freelancers than in 2015*

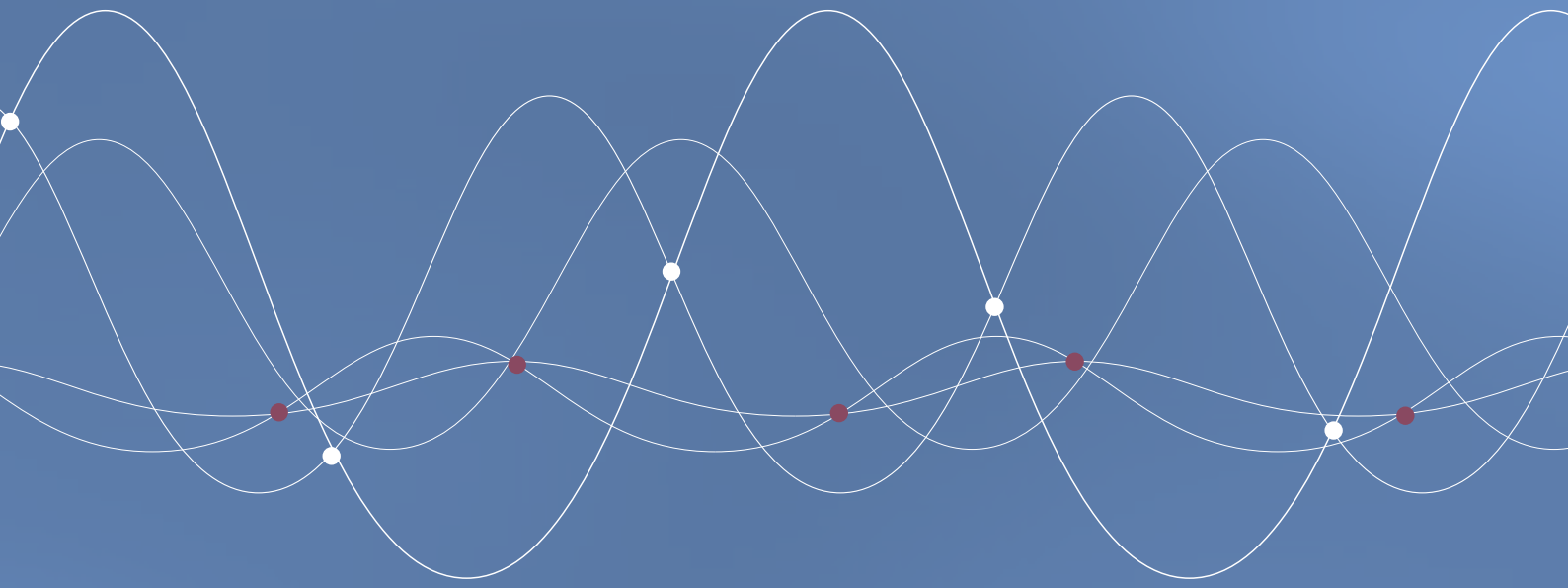

- At the end of 2016, 13,760 persons were employed in the telecom sector, which roughly corresponds to the figure of the previous year.
- 12,500 persons were employed directly in telecommunications companies; this figure is down by 0.5% against the end of 2015.
- Leased employees and freelancers dropped by 7.4% to 1,260 persons.

The chart above shows the number of employees in the telecommunications sector, broken down into employees directly employed by telecommunications enterprises, leased employees and freelancers, and expressed in terms of full-time equivalents.

When interpreting these figures, please note that they only include staff employed in the telecom sector. The figures do not include employees in supplier industries, external call-centre employees or outsourced positions.

## Investments (page (76))

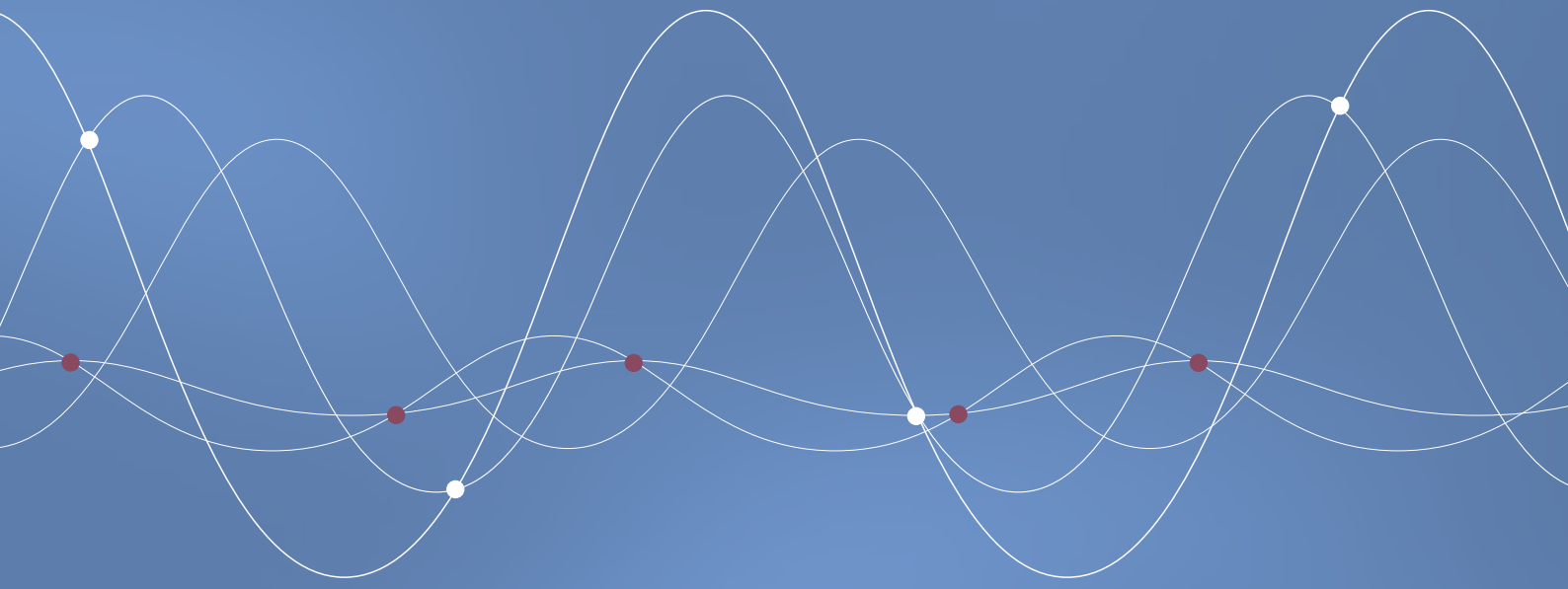
| EUR | Frequencies | Technical infrastructure | Sales and customer service | Total |
|---|---|---|---|---|
| **2013** | 2,016,800,000 | 497,000,000 | 14,600,000 | 2,528,400,000 |
| **2014** | 9,300,000 | 532,000,000 | 10,100,000 | 551,400,000 |
| **2015** | 9,300,000 | 645,900,000 | 6,300,000 | 661,500,000 |
| **2016** | 4,100,000 | 588,900,000 | 7,500,000 | 600,500,000 |



# 7 International comparisons

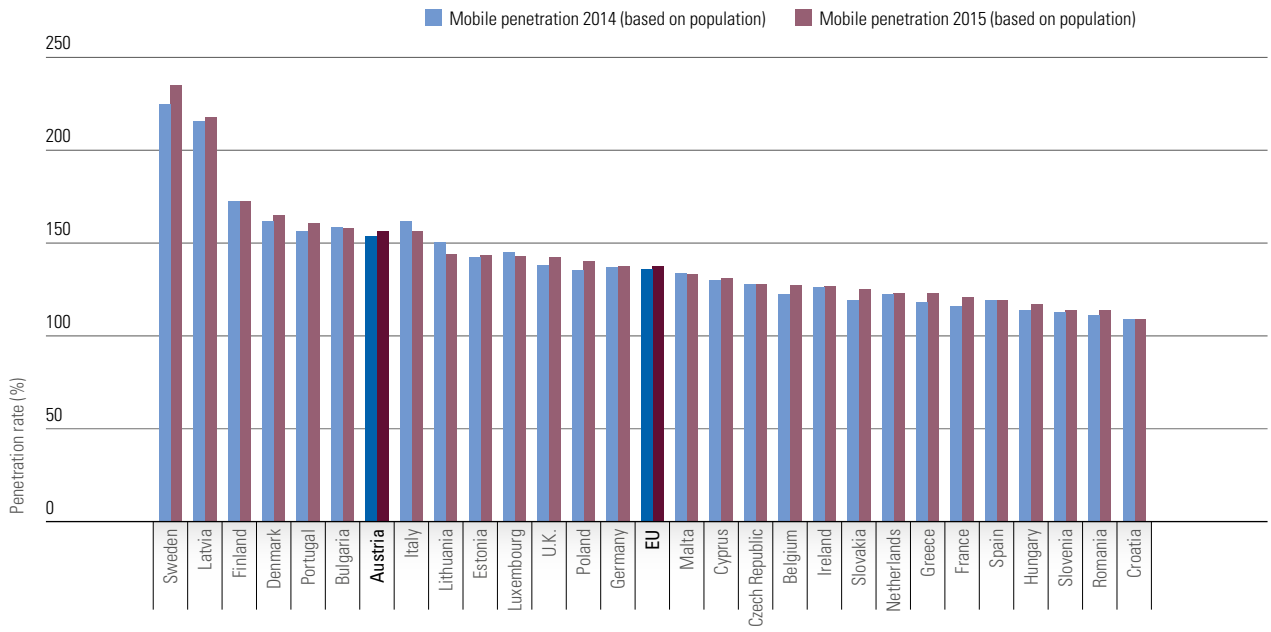
This section contains several comparisons of European mobile and broadband services data. The statistics given here are an extended and more in-depth analysis of the data on the Austrian market discussed in Sections 1-6. The data are taken mainly from the Digital Agenda Scoreboard of the European Commission. It contains a series of indicators charting the progress made in achieving the goals of the Digital Agenda of the European Commission.

All other graphics in this section show the latest available figures. Regularly updated data and the option to create interactive charts can be found on the website of the Digital Agenda (http://ec.europa.eu/digital-agenda/en/scoreboard).



# Mobile penetration rate 2014 to 2015

## *Small increase in Austria from 2014 to 2015*




Source: Digital Agenda Scoreboard

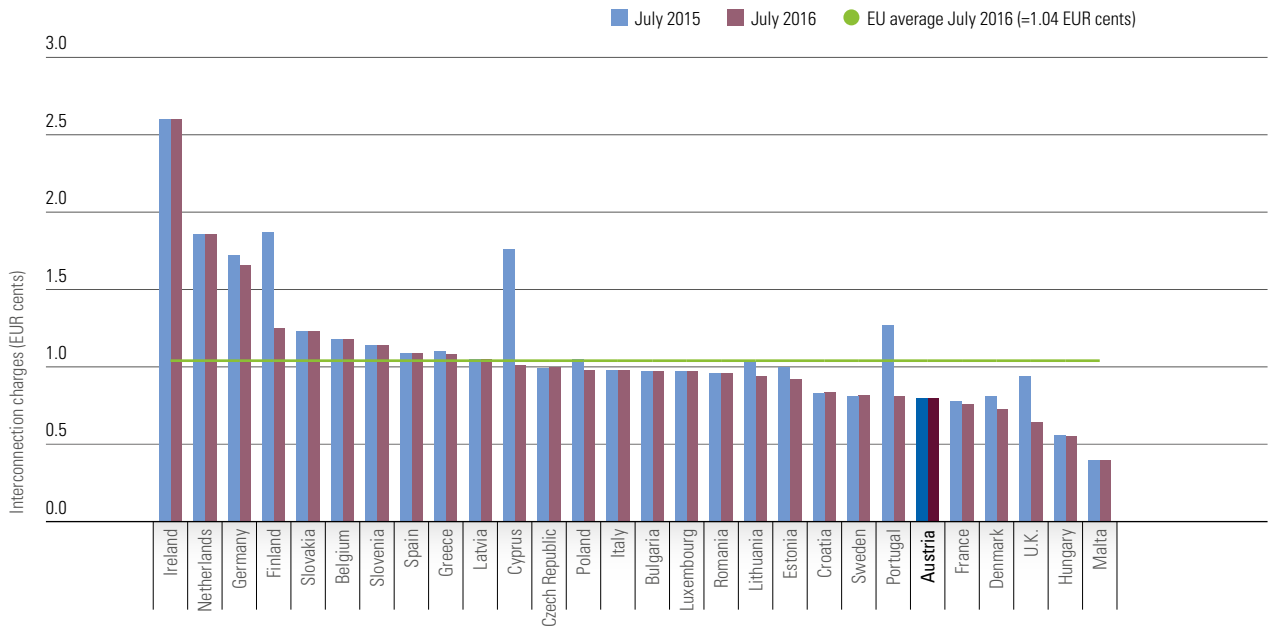
- The mobile penetration rate in Austria increased slightly from 153.5% in 2014 to 156.6% in 2015. With close to 20 percentage points above the EU average of 2015, which was at 137.7%, Austria improved by one spot to 7th place by international comparison.
- Compared with 2014, the unweighted EU average rose by 2 percentage points to 137.7% in 2015.
- With a penetration rate of 235.0%, Sweden replaced Latvia (217.6%) as leading nation. However, Sweden revised its annual figures for 2014 upwards. Finland, with 172.8%, reached the third place. At the bottom of the ranking were Slovenia (114.0%), Romania (113.7%) and, in last place, Croatia with a penetration rate of 109.0%.

The chart above provides an international comparison of mobile penetration rates (as of 2014 and 2015). The respective penetration rate is based on the number of SIM cards per 100 inhabitants.

The data underlying this chart can be found at the end of the section.

# Interconnection charges for termination in mobile networks

## *Austria has low termination rates by EU comparison*




Source: BEREC – Termination rates at European level July 2016

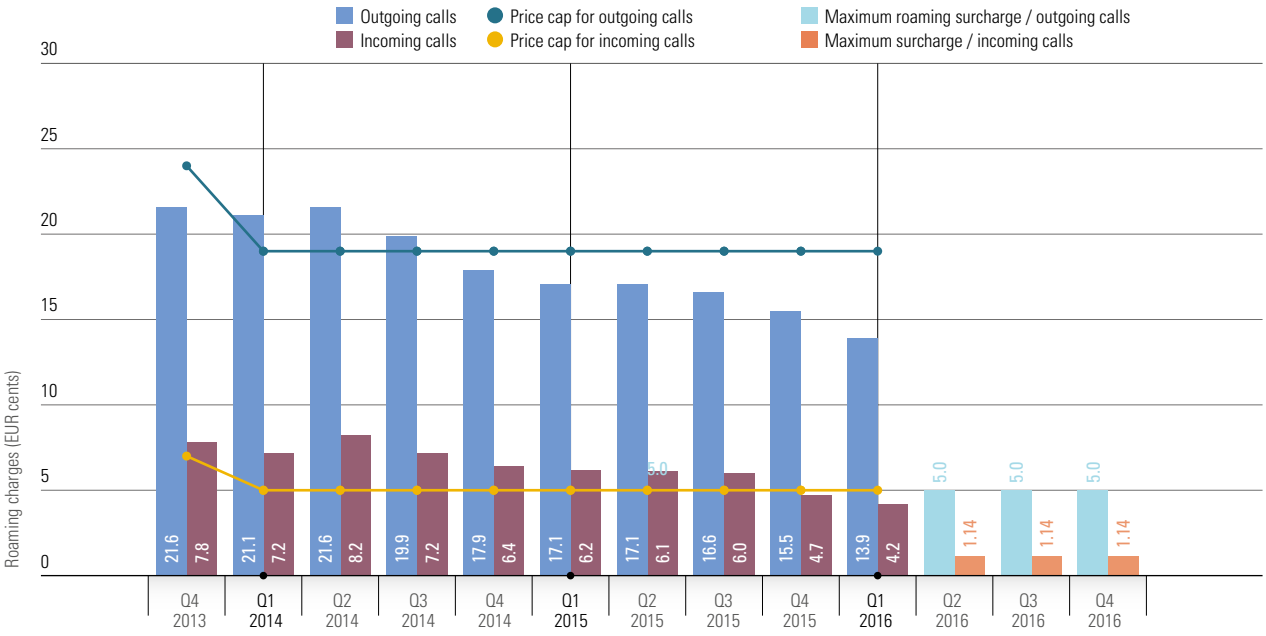
- Compared with 2015, Austria lost two places (to the United Kingdom and Denmark), ranking 6th in 2016. Nevertheless, with termination rates unchanged against 2015, at 0.80 euro cents Austria is still among the countries with the lowest termination rates and lies far below the EU average.
- From 2014 to 2016, the EU average was dropping steadily from 1.36 euro cents to 1.13 euro cents and is now at 1.04 euro cents.
- Malta (0.40 euro cents), Hungary (0.55 euro cents) and the United Kingdom (0.64 euro cents) led the ranking of lowest termination rates in the EU in 2016.
- In Finland, Cyprus, Portugal and the United Kingdom, termination rates were reduced significantly between July 2015 and July 2016.
- Even though Germany lowered its termination rates from 1.72 to 1.66 euro cents, it is still the third expensive country in terms of termination rates. Higher termination rates are found only in Ireland, at 2.60 euro cents, and in the Netherlands, at 1.86 euro cents.

The chart above provides an international comparison of mobile termination charges. Telecommunications service providers charge each other (at the wholesale level) for termination services, that is, the routing of incoming calls to their mobile networks.

The data underlying this chart can be found at the end of the section.

# Average retail roaming charges for calls within the EU/EEA

## *Transitional regime from Q2 2016 onwards*



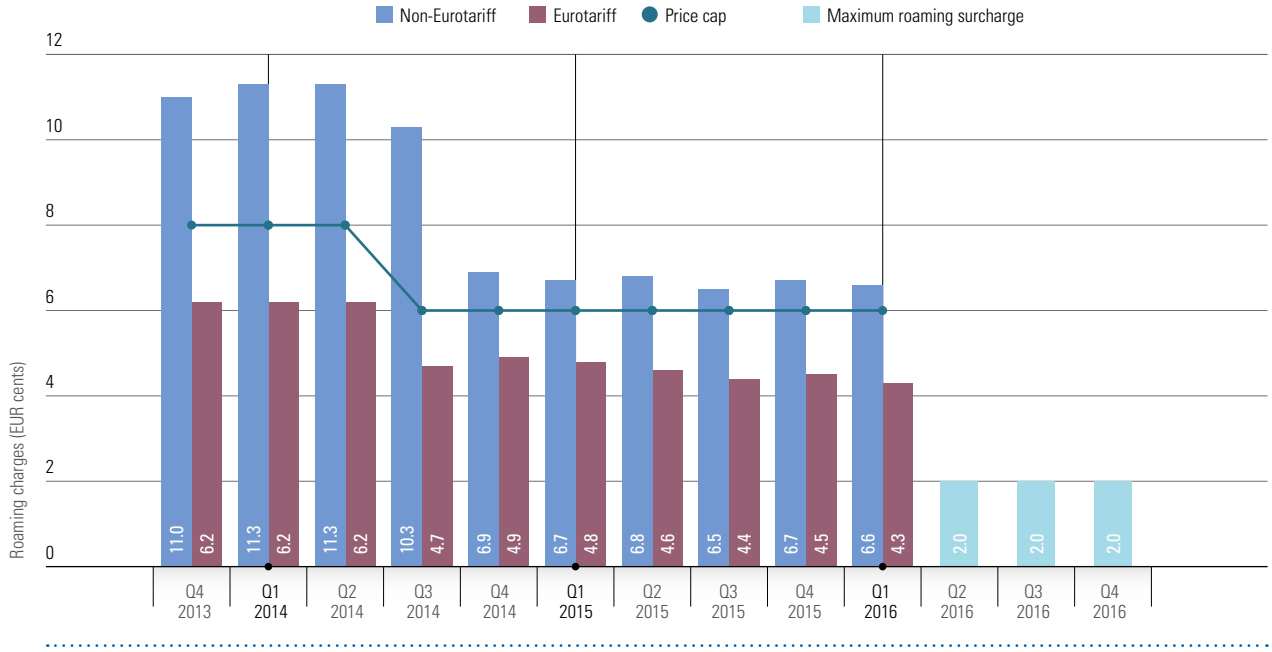

Source: RTR, BEREC International Roaming Benchmark Data Reports

- The downward trend of roaming charges continued also in Q1 2016. Before the transitional regime took effect on 30 April 2016, average retail roaming prices for both calls received and calls made within the EEA had dropped to 4.2 euro cents (for incoming calls) and to 13.9 euro cents (for outgoing calls).

The chart above shows the average retail roaming rates (excluding VAT) charged to Austrian subscribers for outgoing and incoming calls while roaming within the EU/EEA and the price caps prescribed by the Roaming Regulation until the end of Q1 2016. Since 30 April 2016 a transitional regime has been in force, which constitutes the first step towards ultimate abolition of roaming charges within the EU. Within this transitional period, which is effective until 14 June 2017, providers may levy a roaming surcharge in addition to the domestic retail price but may not exceed certain maximum charge levels. In addition to the domestic price for voice minutes, only a surcharge corresponding to the wholesale price cap (5 euro cents per outgoing minute exclusive of VAT, 1.14 euro cents per incoming minute exclusive of VAT) will be charged. No distinction is made anymore between domestic prices and roaming prices; therefore, these figures can no longer be shown from Q2 2016 onwards.

# Average retail SMS roaming charges within the EU/EEA

## *Constant charges before the transitional regime took effect*



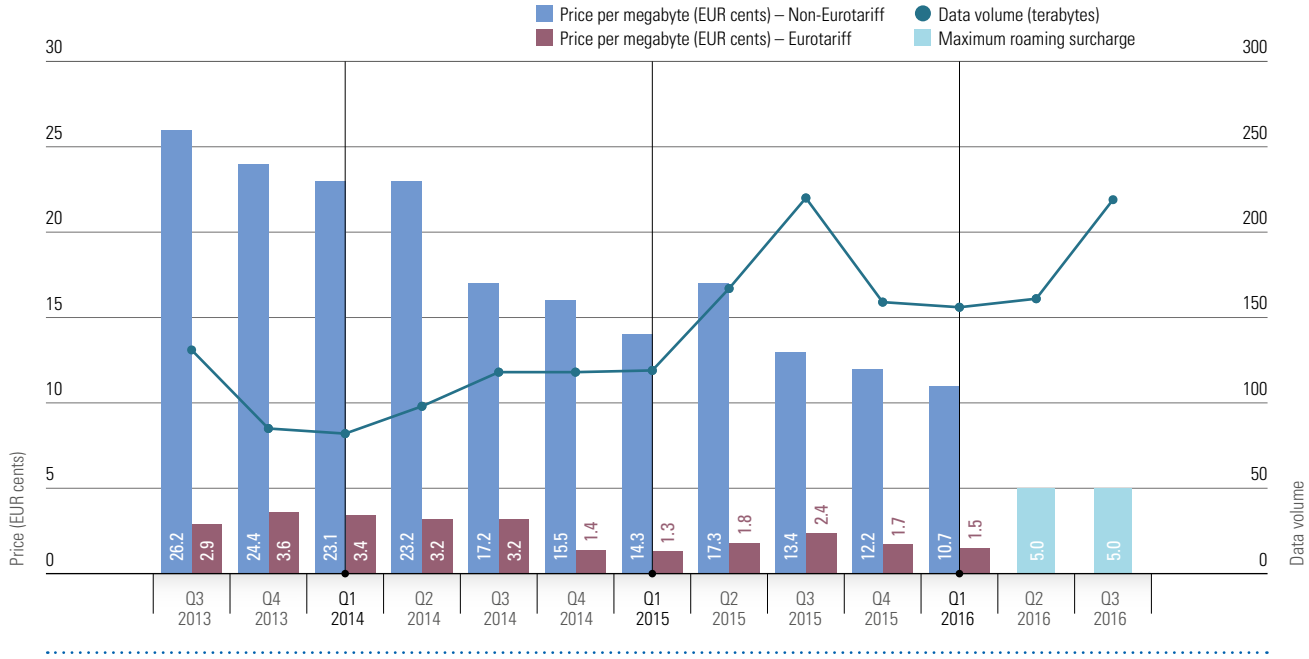

Source: RTR, BEREC International Roaming Benchmark Data Reports

- In Q1 2016, hardly any change was seen against the previous quarters; before the transitional regime took effect, the charges for text messages had remained relatively constant.

For roaming text messages the same is true as for roaming minutes. Accordingly, providers may levy a roaming surcharge in addition to the domestic retail price but may not exceed certain maximum charge levels. In addition to the domestic price for a text message, only a surcharge corresponding to the wholesale price cap (2 euro cents per text message exclusive of VAT) will be charged. No distinction is made anymore between domestic and roaming prices; therefore, these figures can no longer be shown from Q2 2016 onwards.

# Average retail data roaming charges within the EU/EEA (per megabyte)

## *Again vigorous rise in data roaming usage*



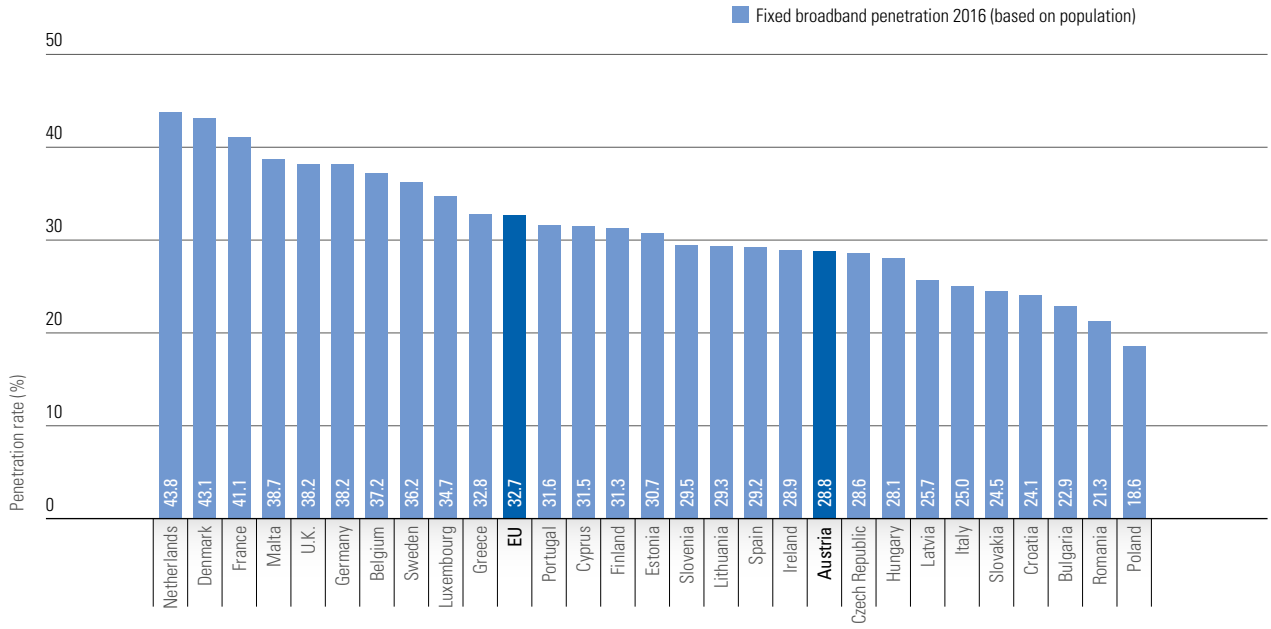

Source: RTR

- As in Q1 2015, average retail roaming charges per megabyte were again seen to contract both for the Eurotariff as well as outside the Eurotariff in Q1 2016.
- Data usage increased significantly after the transitional regime had become effective.

Since 30 April 2016, a transitional regime directed towards ultimate abolishment of roaming charges within the EU has been in force also for data roaming, in line with that for voice minutes and text messages. Here, too, providers may levy a roaming surcharge in addition to the domestic retail price but may not exceed certain maximum charge levels. In addition to the domestic price per megabyte, only a surcharge corresponding to the wholesale price cap (5 euro cents per megabyte exclusive of VAT) will be charged. Here, too, no distinction is made anymore between domestic and roaming prices; therefore, these figures can no longer be shown from Q2 2016 onwards.

# Fixed broadband penetration

*No major changes against the previous year*



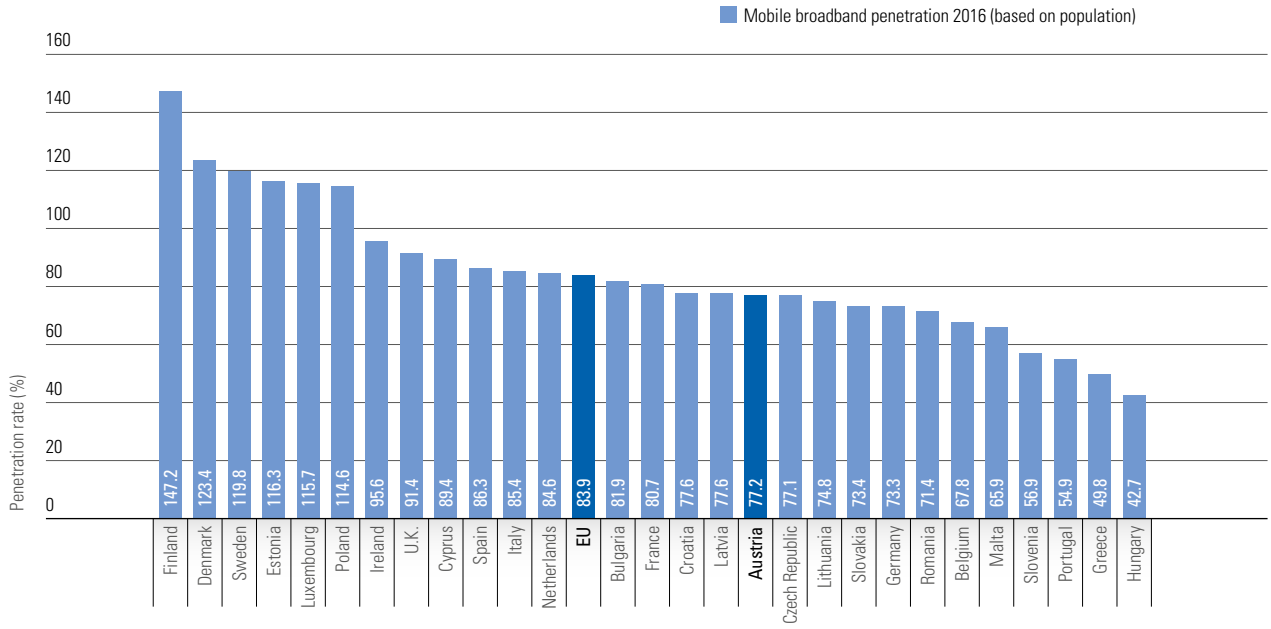

Source: Digital Agenda Scoreboard

- Compared with 2015, fixed broadband penetration in Austria (relative to the country's population) remained almost constant (increase of 0.8 percentage point) to 28.8%. Against 2015, the EU average rose slightly from 31.6% to 32.7%.
- The highest density of fixed broadband connections was reported for the following three countries: Netherlands (43.8%), Denmark (43.1%) and France (41.1%).
- At the bottom of the ranking were Poland (18.6%), Romania (21.3%) and Bulgaria (22.9%).

The chart above provides an international comparison of broadband penetration rates based on fixed infrastructure such as DSL, cable broadband, unbundled line (see Glossary), wireless, etc. (as of June 2016). The penetration rate is calculated from the number of broadband connections per 100 inhabitants. Mobile broadband connections are not included in these figures.

# Mobile broadband penetration

*Despite improvement similar ranking as in the previous year*



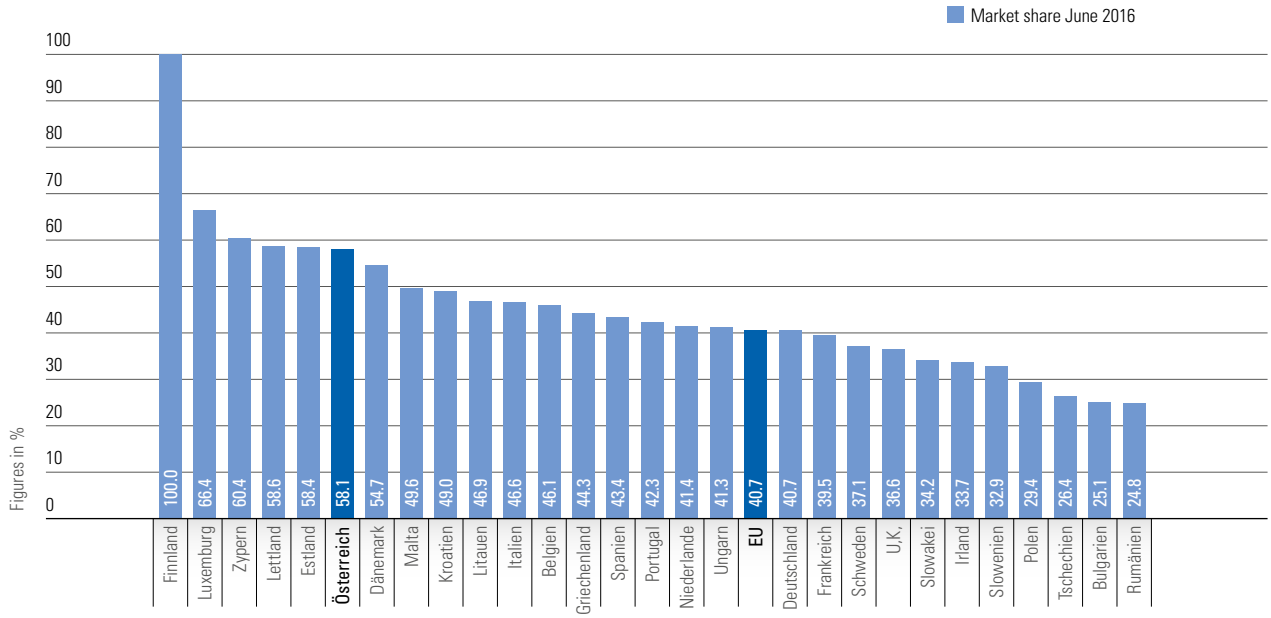

Source: Digital Agenda Scoreboard

- Although Austria increased its mobile penetration rate by 10 percentage points compared with the previous year, at 77.2%, it nevertheless remained in the middle range among the countries compared, below the EU average of 83.9%
- As in 2015, the first three places were occupied by Finland (147.2%), Denmark (123.4%) and Sweden (119.8%), the latter two switching places compared with 2015.
- In 2016, again Hungary was the country with the lowest mobile broadband penetration (42.7%). Greece performed only slightly better (49.8%) and Portugal (54.9%) was in the third last position.

The chart provides an international comparison of mobile broadband penetration rates (as of June 2016). The penetration rate is calculated from the number of mobile broadband connections (active broadband SIM cards) per 100 inhabitants. Broadband connections on fixed infrastructure (such as DSL, cable broadband, etc.) are not included in these figures.

# Incumbent operator's share of broadband market

## *Austrian incumbent continues to hold a market share of 58%*




Source: Digital Agenda Scoreboard

- International comparison of the market shares of the respective incumbents did not show any major changes. With a market share of 58.1%, A1 is in 6th place.
- Incumbent operators reached the highest market shares, with penetration rates beyond 60%, in Finland (100%), Luxemburg (66.4%) and Cyprus (60.4%).
- The lowest market shares were reported for the incumbents in Romania (24.8%), Bulgaria (25.1%) and Czech Republic (26.4%).

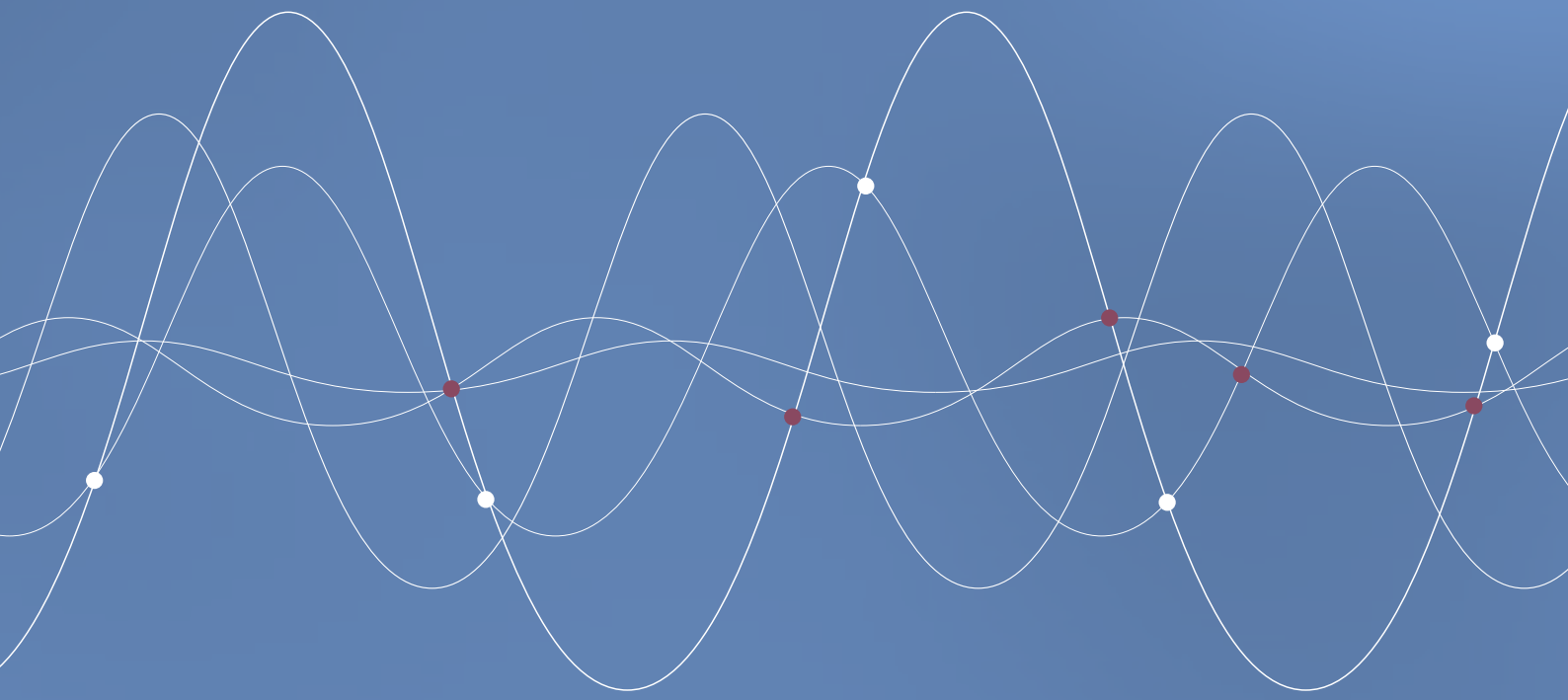
The chart above shows the market shares of the retail broadband market held by national incumbent operators (former monopoly operators) (as of June 2016). It only includes broadband connections based on fixed infrastructure (e.g. DSL, cable broadband, etc.). Mobile broadband connections are not included in these figures.

## Mobile penetration rate 2014 to 2015 (page 82)

| | Penetration rate 2014 | Penetration rate 2015 |
|---|---|---|
| Sweden | 224.7% | 235.0% |
| Latvia | 215.5% | 217.6% |
| Finland | 172.6% | 172.8% |
| Denmark | 162.1% | 165.1% |
| Portugal | 156.7% | 160.6% |
| Bulgaria | 158.6% | 157.8% |
| Austria | 153.5% | 156.6% |
| Italy | 161.6% | 156.2% |
| Lithuania | 150.6% | 143.9% |
| Estonia | 142.6% | 143.5% |
| Luxembourg | 145.1% | 143.2% |
| United Kingdom | 138.2% | 142.7% |
| Poland | 135.4% | 140.3% |
| Germany | 137.0% | 137.7% |
| European Union | 135.8% | 137.7% |
| Malta | 133.7% | 133.4% |
| Cyprus | 130.2% | 131.4% |
| Czech Republic | 128.1% | 127.9% |
| Belgium | 122.7% | 127.3% |
| Ireland | 126.1% | 126.7% |
| Slovakia | 119.4% | 125.1% |
| Netherlands | 122.5% | 123.3% |
| Greece | 118.4% | 122.8% |
| France | 116.1% | 120.9% |
| Spain | 119.2% | 119.1% |
| Hungary | 114.0% | 116.9% |
| Slovenia | 112.8% | 114.0% |
| Romania | 111.3% | 113.7% |
| Croatia | 109.3% | 109.0% |

## Interconnection charges for termination in mobile networks (page 83)

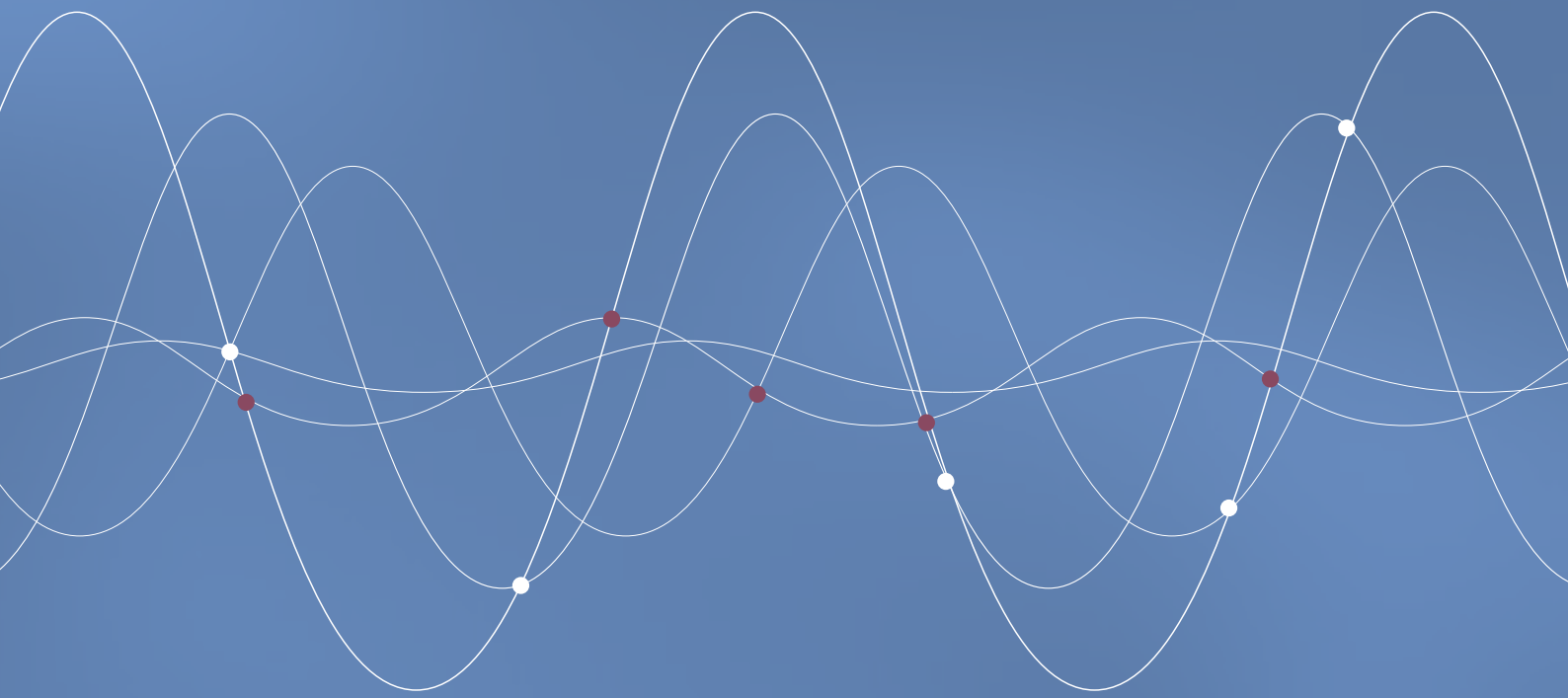
| EUR cents | July 2015 | July 2016 |
|---|---|---|
| Ireland | 2.60 | 2.60 |
| Netherlands | 1.86 | 1.86 |
| Germany | 1.72 | 1.66 |
| Finland | 1.87 | 1.25 |
| Slovakia | 1.23 | 1.23 |
| Belgium | 1.18 | 1.18 |
| Slovenia | 1.14 | 1.14 |
| Spain | 1.09 | 1.09 |
| Greece | 1.10 | 1.08 |
| Latvia | 1.05 | 1.05 |
| Cyprus | 1.76 | 1.01 |
| Czech Republic | 0.99 | 1.00 |
| Poland | 1.05 | 0.98 |
| Italy | 0.98 | 0.98 |
| Bulgaria | 0.97 | 0.97 |
| Luxembourg | 0.97 | 0.97 |
| Romania | 0.96 | 0.96 |
| Lithuania | 1.04 | 0.94 |
| Estonia | 1.00 | 0.92 |
| Croatia | 0.83 | 0.84 |
| Sweden | 0.81 | 0.82 |
| Portugal | 1.27 | 0.81 |
| Austria | 0.80 | 0.80 |
| France | 0.78 | 0.76 |
| Denmark | 0.81 | 0.73 |
| United Kingdom | 0.94 | 0.64 |
| Hungary | 0.56 | 0.55 |
| Malta | 0.40 | 0.40 |



# 8 Technology indicators

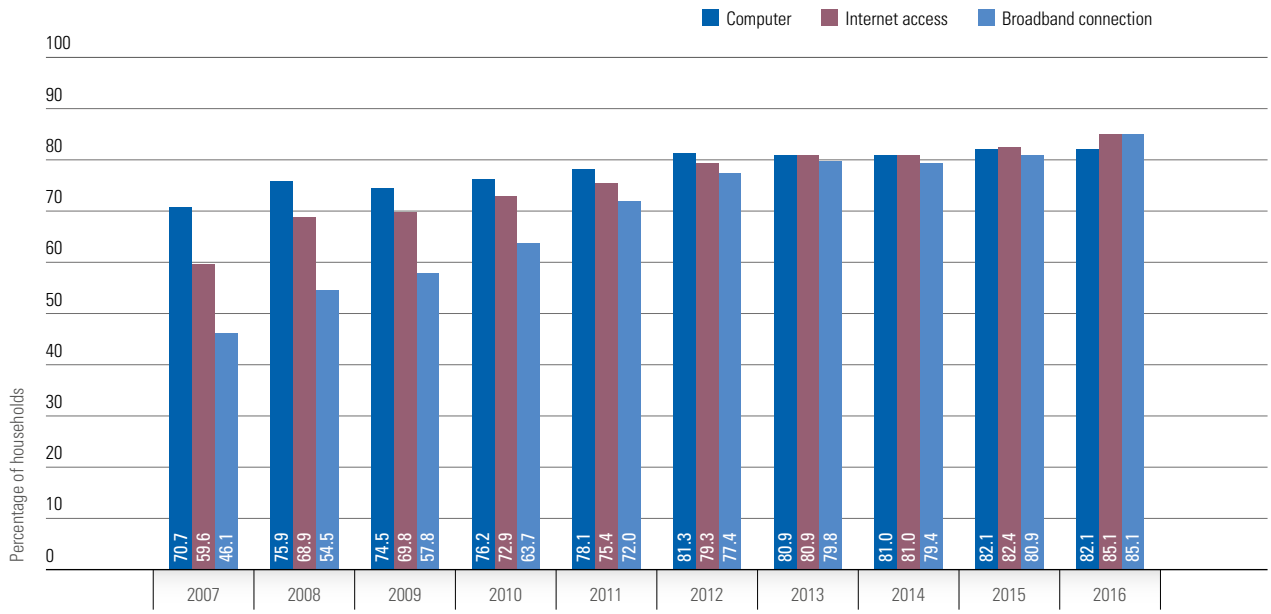
Information and communications systems are the pillars of the knowledge society and form the basis for the interaction of industry, politics and society. Technologies driving and underpinning information and communications are therefore increasingly important. Coupled with this is the need to quantify the developmental levels of societies with respect to the use of information and communications technologies (ICT). The intention is to make comparisons between countries, chart developments over time and create the basis for economic and political decision-makers. One method of responding to all these requirements is to map the relevant technology and communications parameters in the form of indices.

There are various technology indices used internationally with differing methodological approaches and emphasis. This section will discuss the main indices and Austria's performance by international standards.



# Computers, Internet access and broadband in households

## *Internet access increasingly without computer*



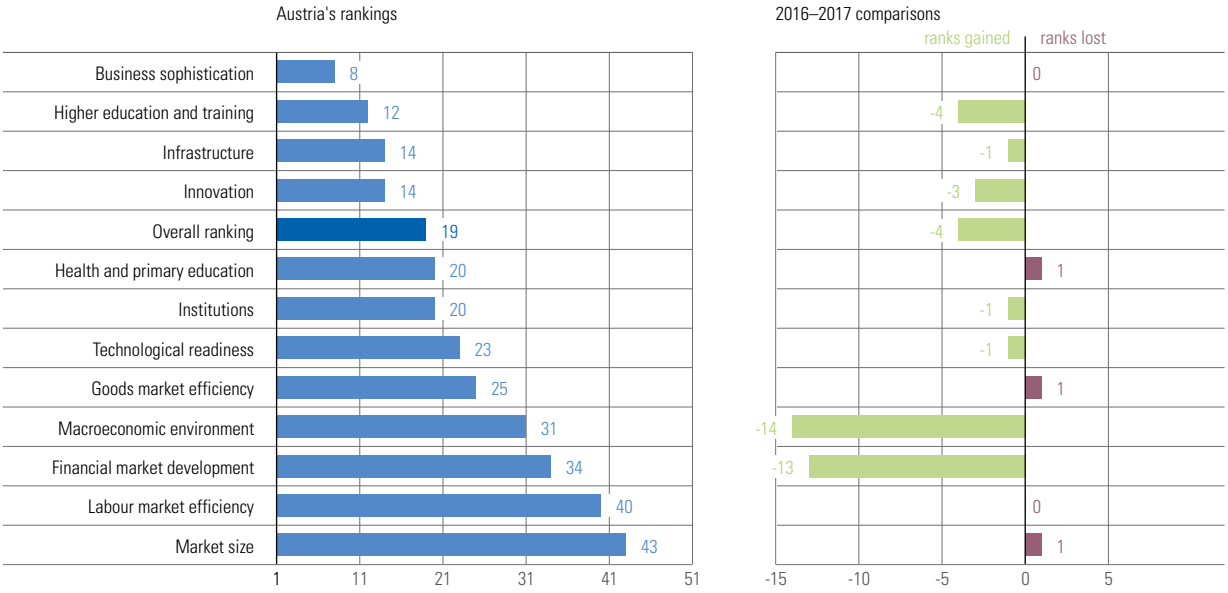

Source: Statistics Austria

This chart shows the percentages of Austrian households with computers, Internet access and (fixed or mobile) broadband connection over the years.

- Up to 2013, statistical data on the use of computers in households, Internet access and broadband connections still showed substantial differences and growth rates; since then a certain saturation level has apparently been reached. In 2016, as in 2015, 82.1% of Austrian households had a computer. 85.1% used the Internet via broadband Internet connections.
- The apparent contradiction that there were fewer computers than Internet connections can be explained by the increasing distribution of smartphones and tablets with mobile broadband connections.
- About 15% of households have neither fixed nor mobile Internet connections.

# Global Competitiveness Index

## *Austria improves considerably by international comparison*




Source: World Economic Forum, Global Competitiveness Report 2016-2017

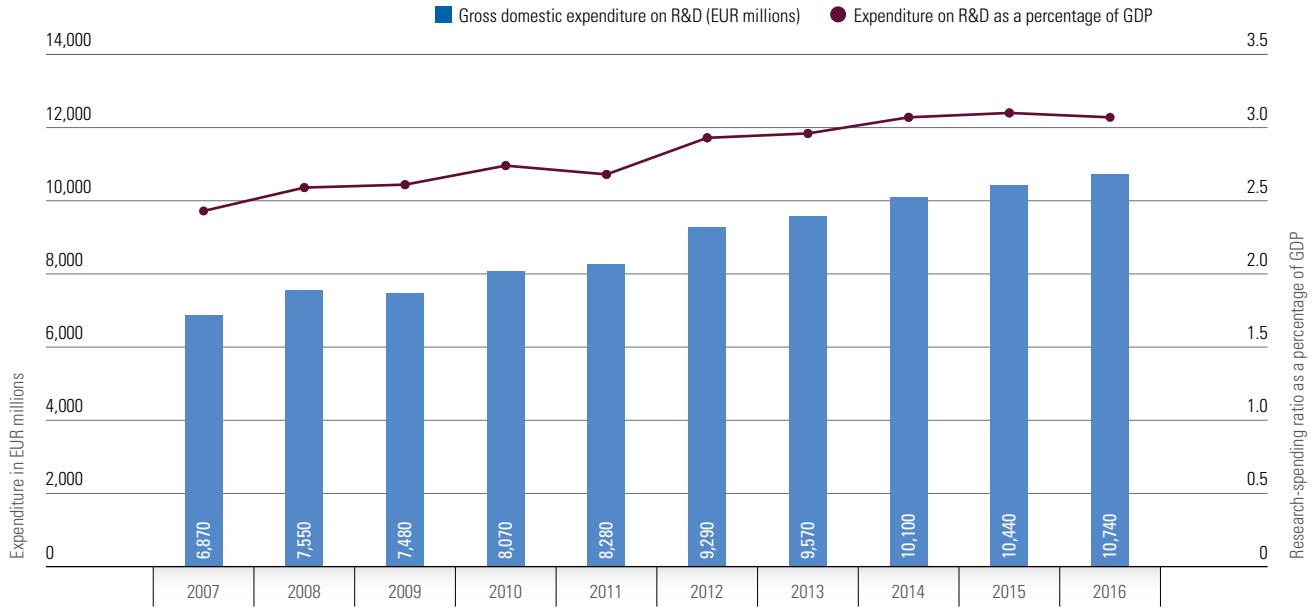
- Following the setbacks in the ranking in the previous two years, Austria improved by four places to rank 19 in the current competitiveness ranking of the World Economic Forum, thus closing up with its historical best positions.
- Austria improved in nearly all categories, especially in the typical economic parameters "Macroeconomic environment" (up 14 places to currently rank 31) and "Financial market development" (up 13 places, currently rank 34).
- Moreover, there were improvements by several ranks in the following parameters: "Higher education and training" (up four ranks to currently 12th position) and „Innovation" (up three places, currently rank 14).
- In three categories Austria lost one place against the previous year ("Market size", "Goods market efficiency" and "Health and primary education"). As in 2016, "Business sophistication" retained its 8th position.
- The ranking is headed by Switzerland, followed by Singapore and the United States. Germany is in 5th place.

The World Economic Forum defines competitiveness as the set of institutions, policies and production factors that determine the level of productivity of a country. The level of productivity, in turn, sets the level of prosperity that can be earned by an economy. In other words, the greater a country's competitiveness, the more likely it is that it can produce high incomes. Productivity is by definition an input-output ratio, i.e. it is a measure of the best possible output that can be achieved with the existing production factors.

The twelve parameters are measured either by questioning or by observation. The index also takes into account a country's level of development. Accordingly, it distinguishes between factor-driven, efficiency-driven and innovation-driven economies. Developing countries are among the factor-driven economies, while western industrial nations represent innovation-driven economies.

# Gross domestic expenditure on R&D in absolute terms and as a proportion of GDP

*Research-spending ratio consistently above 3% for the first time*



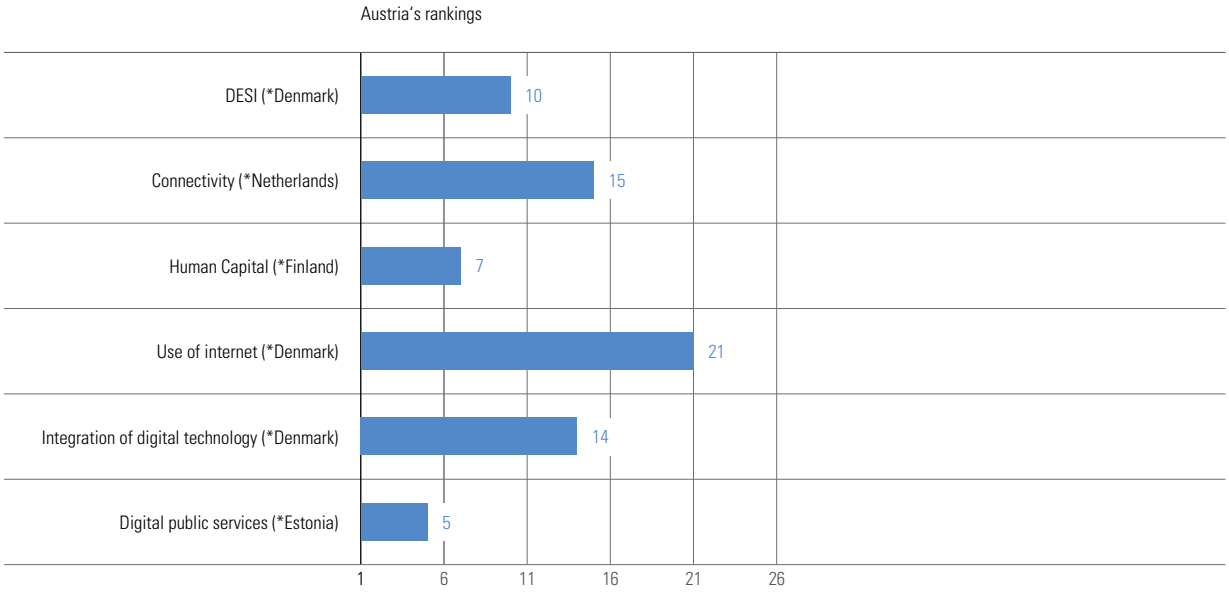

Source: Statistics Austria

- In 2016, the research-spending ratio, at 3.07% of GDP, dropped slightly against the previous year. Nevertheless, the research-spending ratio was above 3% of GDP for the third year in a row.
- Absolute expenditure on research and development increased by 2.9% to EUR 10.740 billion.

The annual overall estimate of gross domestic expenditure on research and development (R&D) is derived from the detailed structural data of Statistics Austria obtained from primary-data surveys on R&D and the research-related analyses and evaluations of the budgets of the federal and provincial governments of Austria, also conducted annually. Gross domestic expenditure on R&D, expressed as a percentage of gross domestic product, constitutes the research-spending ratio.

# Digital Economy and Society Index (1)

## *Austria ranks 10th in the EU*



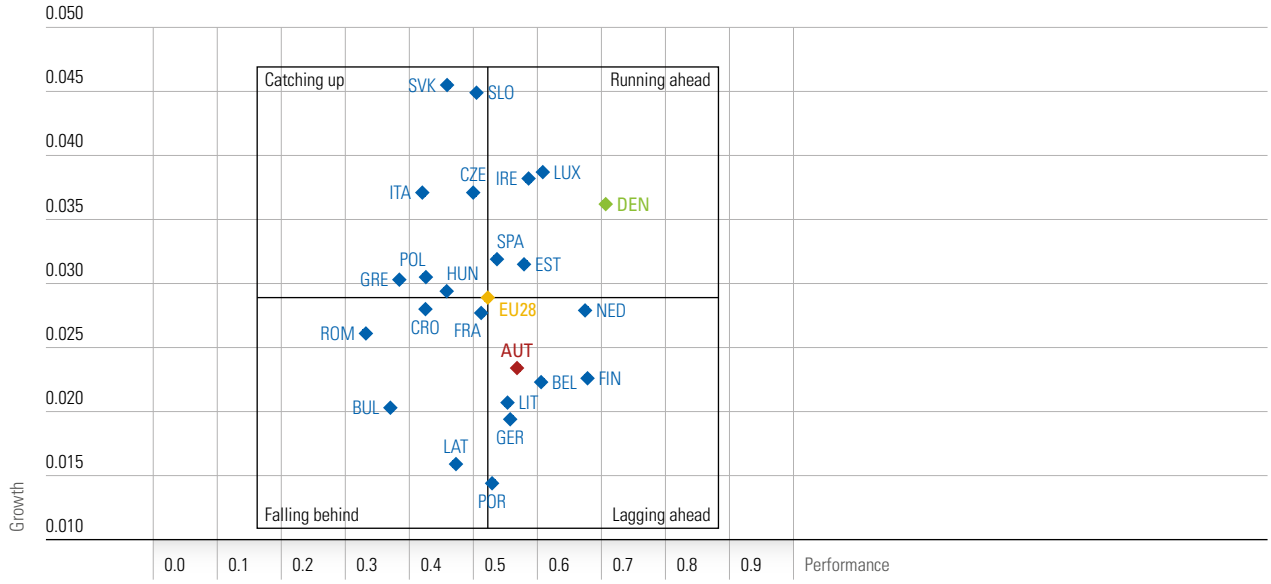

Source: http://digital-agenda-data.eu/charts/

- In the current DESI ranking Austria is in 10th place. In "Digital public services" (5th place) and "Human capital" (7th place) Austria scored particularly well. Improvement is needed for the "Use of Internet" dimension (21st place). In "Integration of digital technology" Austria ranks 14, losing four places compared with the previous year.
- The ranking is headed by Denmark, followed by Finland and Sweden.

The index for digital economy and society (Digital Economy and Society Index – DESI) is compiled annually by the EU Commission. Different technology parameters are used to compare the 28 EU Member States. In the course of the evaluation by the European Commission, Member States were surveyed according to performance indicators in 5 main groups and 33 subgroups that altogether showed the degree of their digitisation. The chart shows the rankings of Austria in the DESI and in its five main groups. The countries in brackets (with the asterisk) denote the leader in the respective main group.

# Digital Economy and Society Index (2)

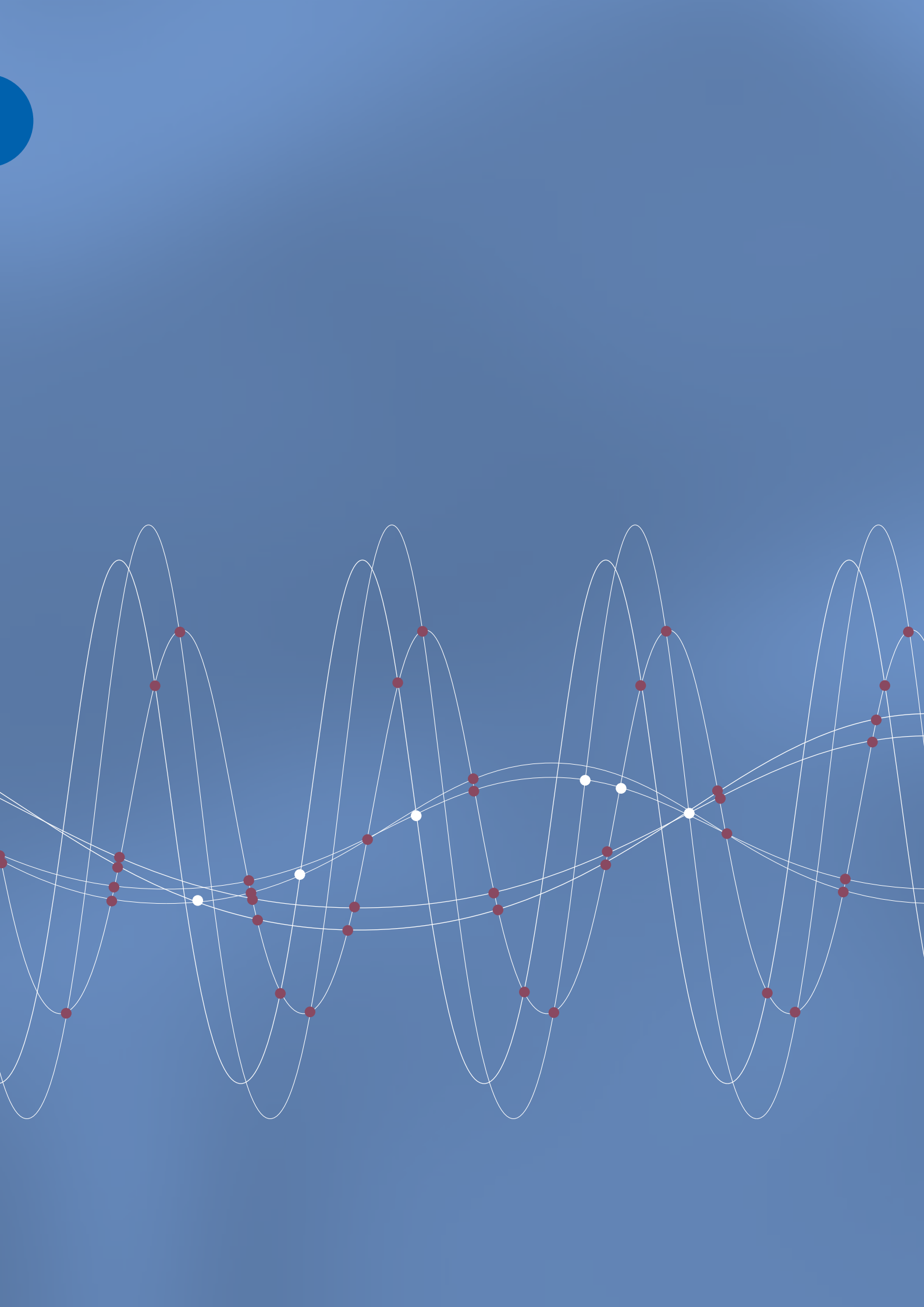
## *Austria among the "Lagging ahead nations" in the EU*



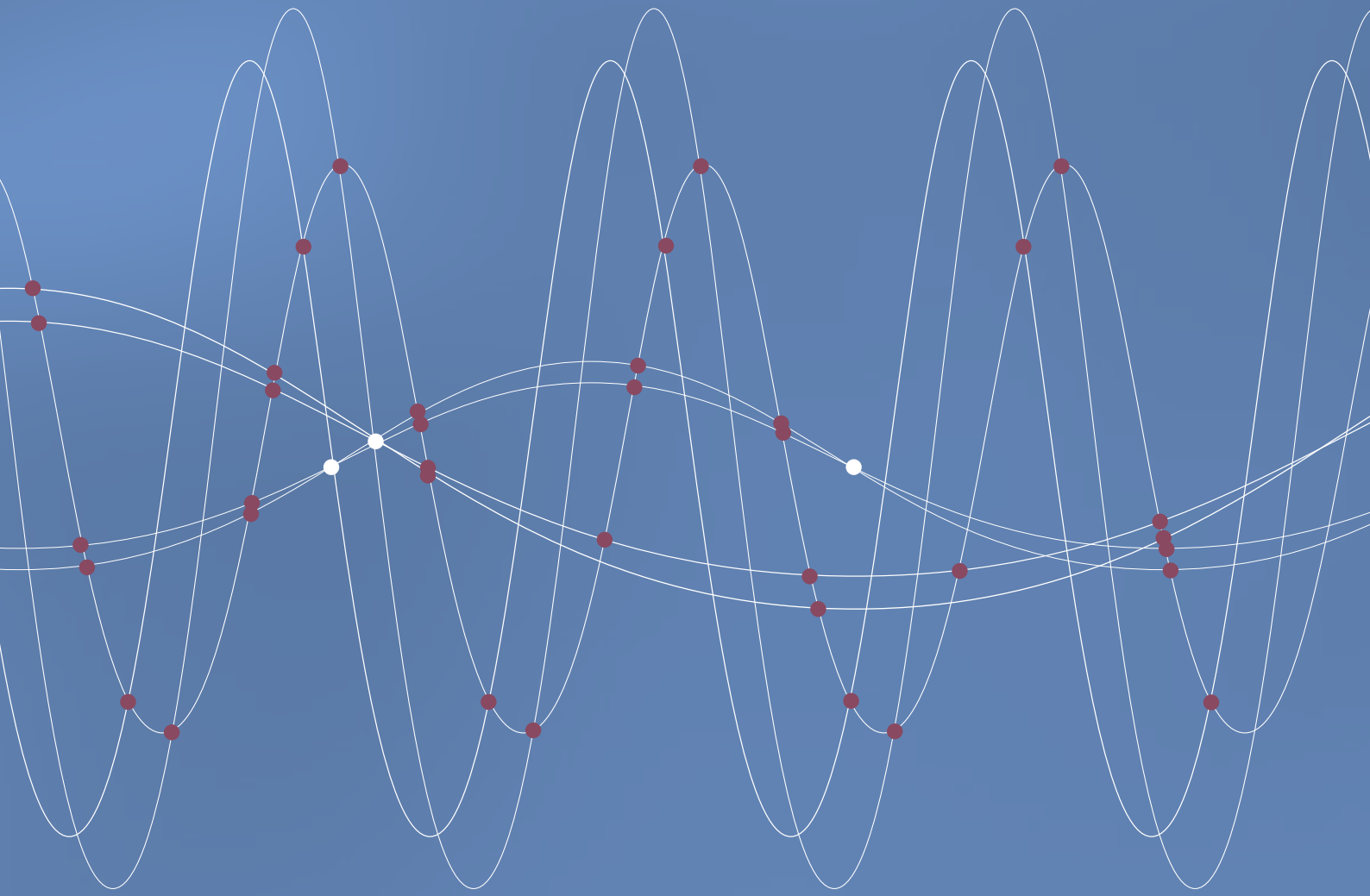

Source: http://digital-agenda-data.eu/charts/; RTR calculations

In line with their performance in the DESI and their development from 2016 to 2017 the 28 EU countries can be grouped in four quadrants. For this purpose the absolute values for "Performance" according to the DESI are entered on the x-axis and the absolute changes between 2016 and 2017 on the y-axis ("Growth"). The origin constitutes the EU average of all 28 Member States ("EU28").

- "Running ahead countries" are those that are above the EU average and developed faster han the EU average. Among others, the number one, Denmark, as well as Luxemburg, Estonia and Spain fall into this quadrant.
- Even though "Lagging ahead countries" score above average, they develop more slowly than the EU average. This suggests that a certain ICT maturity has already been achieved in these countries. In addition to top ICT nations such as Finland, Germany and the Netherlands, Austria is also found in this category.
- "Catching up countries" are still below the EU average but are catching up fast. Among them are, for example, Italy, Czech Republic, Greece and Poland.
- "Falling behind countries" constitute the fourth and last quadrant and designate all those countries that are lagging behind the EU average in terms of ICT performance and development. For example, Croatia, Bulgaria and Romania fall into this category.



# 9 Explanatory comments and glossary



# Explanatory comments on the survey

The RTR Telekom Monitor is published quarterly and examines the developments on the Austrian telecommunications markets.

The rationale for the data survey on which the RTR Telekom Monitor is based is the Communications Survey Ordinance (KEV), Federal Law Gazette II No. 365/2004, which came into force on 1 October 2004 and was amended in 2012 and 2013. RTR is obliged by this Ordinance to carry out statistical surveys of communications markets on a quarterly basis, compile the statistics and publish them.

In order to reduce the burden on the individual operators, RTR specified the sample in line with Art. 4 Par. 1 KEV in such a way that in each segment (mobile communications, broadband, fixed network and leased lines) a market share of at least 90% of the total market is covered. From this sample, RTR extrapolates the data for the total market. The data for the total market are available to RTR from the last full survey in the course of the market analysis procedure. For this edition of the RTR Telekom Monitor the extrapolation was adjusted by using the data of the full survey carried out in 2015, which is why leaps may occur in the charts.

The charts and tables in the RTR Telekom Monitor contain for the most part rounded values. Due to occasional post-hoc data corrections, the values in the charts and tables presented here may differ slightly from the information provided in earlier issues of the RTR Telekom Monitor. Where major deviations (> 5%) arise in individual data values, a comment to this effect is provided for the figure in question. Retail revenues referred to are always net revenues.

# Glossary

## Airtime (mobile communications)

Airtime refers to a service that mobile network operators provide for domestic resellers. A reseller (airtime reseller) is a communications service provider that offers public mobile services to retail customers but does not provide those services using its own network. This includes all mobile service providers, such as resellers or (enhanced) service providers, that do not operate their own communications network – neither a radio network nor a core network – in providing mobile communications services.

## Bitstream and resale

Bitstream and resale are wholesale products at different levels of the value chain, on the basis of which Internet connections can be provided to the end user. Bitstream access is provided at predefined (regional or national) handover points, the wholesale customer providing Internet connectivity. By comparison, in the case of resale, Internet connectivity is provided by the wholesale supplier, the wholesale customer acting merely as reseller.

## Broadband

Broadband Internet access or broadband Internet connections are Internet connections (technology neutral) with a download speed of > 144 kbit/s. The Internet connection can also be offered as part of a bundle with other services. The connection can be made in the following ways:

- using own infrastructure (copper-wire pairs in the A1 Telekom Austria AG network),
- on an unbundled line (see unbundling),
- as virtual unbundling (see virtual unbundling),
- via coaxial cable (cable modem),
- as fixed wireless access, e.g. WLAN, WiFi, WLL ("fixed" access, not via hotspots),
- or on other infrastructure. This includes e.g. power line carrier broadband (PWL) and broadband access via satellite (SAT).

## Carrier Pre-Selection and Call-by-Call

Carrier pre-selection (CPS) refers to a pre-set carrier network code (10xx) that routes all of a subscriber's traffic (except for calls to value-added services and public service numbers) via the pre-selected carrier network.

In contrast, call-by-call carrier selection (CbC) makes it possible to route individual telephone calls via a service provider other than the network that provides the subscriber line. In this case, the subscriber is required to enter the carrier network code (10xx) before each call.

## Ethernet services

Ethernet services with guaranteed bandwidth are lines that provide guaranteed bandwidth between two network termination points, excluding leased lines with Ethernet user interfaces at the user's end (because, for example, on-demand switching functionality is provided).

## Fixed wholesale market for voice telephony

The fixed wholesale market includes three sub-services: origination, termination and transit services.

Origination refers to calls that originate from a fixed-network termination point in a carrier's own network. Termination refers to the routing of calls to a fixed-network termination point in a carrier's own network. Transit refers to calls between two networks or between two interconnectable exchanges in a network. These services can be provided internally (i.e. as self-provided services, e.g. in an intra-network call) or externally between network operators (e.g. origination to services and carrier network operators or termination from an external network). Origination, termination and transit services are not charged to the customer directly but are settled between network operators (at the wholesale level). The RTR Telekom Monitor reports both revenues and corresponding origination, termination and transit minutes.

## International roaming

In connection with mobile communications, the term "roaming" refers to the use of a mobile telephone outside the coverage area of one's own network operator (the home network), in which case the mobile phone uses the service of another network (the host network). In international roaming, the home and host networks are located in different countries and their coverage areas generally do not overlap.

## Leased lines

Leased lines provide symmetrical transmission capacity with a guaranteed bandwidth between two points without switching functions. Leased lines may also be referred to as "dedicated lines" or "point-to-point connections". A distinction is made between retail and wholesale leased lines.

Retail leased lines refer to leased lines which are not provided for operators or providers of communications networks or services (i.e. companies having a general authorisation) but for companies outside the telecommunications sector (e.g. banks, insurance companies, retail stores, etc.).

Wholesale leased lines are leased lines provided for other operators or providers of communications networks or services. A distinction is made between trunk segments and terminating segments (see trunk segments and terminating segments).

Where leased lines are concerned, it must be borne in mind that there are often time lags in leased lines markets between revenues and demand, frequently resulting in strong fluctuations between months and, indeed, quarters, caused by the billing of project business, billbacks and credits.

## Mobile broadband

Mobile broadband comprises pure data tariffs, data products not based on a fixed monthly charge and smartphone tariffs.

Up to Q4 2015, pure data tariffs (no voice services or text messaging) were restricted to tariffs that included at least 250 megabytes in the monthly charges. This restriction was abolished as from Q1 2016.

Products not based on a fixed monthly charge (e.g. prepaid data products or data/voice products) are products that are used by customers to access the Internet at least once each quarter. Smartphone tariffs are all contracts for voice and text messaging services that are used by customers to access the Internet at least once each quarter. Up to Q4 2015, the tariffs were additionally restricted to those that included at least 250 megabytes in the monthly charges. This restriction was abolished as from Q1 2016.

## Mobile Virtual Network Operator (MVNO)

Mobile Virtual Network Operators (MVNOs) are communications network operators that do not have their own radio communications networks (or the corresponding frequency usage rights) but operate essential network elements in the core network (Home Location Register "HLR", Mobile Switching Centre "MSC", etc.), possess corresponding addressing elements (e.g. Mobile Network Code) and administer SIM cards themselves. Thus, MVNOs are active as providers on the retail and wholesale markets. As they do not have their own radio communications networks, they have to rely on corresponding wholesale services of mobile network operators. Examples of MVNOs are Mass Response (Spusu) and UPC (UPC mobile).

## Number porting

Number porting allows customers to retain their telephone numbers when they switch service providers. The RTR Telekom Monitor only includes the porting procedures/imports of telephone numbers carried out for an operator in one quarter, i.e. SIM cards in the case of mobile operators and subscriber numbers on the fixed network. Reverse portings (e.g. after cancellation by a subscriber) are not considered porting procedures. If the number of a subscriber is ported several times within a quarter (subsequent porting), this is counted separately each time.

## Price index in mobile communications

For the calculation of the monthly prices for different user types RTR uses the tariff data published by the Austrian Chamber of Labour on a monthly basis. Only new tariffs available in the respective month are considered because this allows immediate detection of changes in tariffs (price increases and reductions).

The details about minutes, text messages and data services used monthly by the respective user types and about handset subsidies per tariff are supplied by the mobile operators; with regard to information not provided, RTR makes every effort to estimate such information on the basis of available data. Average prices per month are calculated for four different user types. The medium user, high user and power user types also use data services; therefore, for these user types only so-called smartphone tariffs (with included data volume) are applied. The fourth user type, the so-called low user, exclusively relies on voice and text messaging services.

The user types were classified as follows: For each service (voice, text messaging, data) users were ranked according to the frequency of use and divided into four groups of equal size (quartiles). One quartile each represents one user type and the median of the respective quartile is used for the underlying number of used minutes, text messages and megabytes. The user type data are fed into the tariff data by means of the following procedure: The usage values of the previous year are used for the respective tariffs of the current year (e.g. usage in 2012 for calculation of the prices per tariff for 2013). It is determined which new tariffs available are the cheapest ones for the respective user type per brand. Apart from the monthly base fees and the included minutes, text messages and data volume, the following tariff components are reflected in the calculation: activation charge, SIM/service flat fee, minimum revenue, where appropriate, as well as the price per minute, text message and megabyte beyond the included quantities and the handset subsidies (written off over 24 months).

An average price from the respective up to five most inexpensive tariffs per brand is calculated. The following brands are reflected: A1, T-Mobile, Drei, tele.ring, Yesss!, Bob, Ge.org, Red Bull Mobile, S-Budget, since Q1 2015 HoT, UPC, since Q2 2015 also VOLmobil, Wowww! and Spusu. Since Q3 2015 also tariffs of the Allianz SIM brand of ATK Telekom and Service GmbH have been reflected and since Q4 2015 also eety und Yoopi. From Q1 2017 onwards, also tariffs of Media Markt Mobil, Saturn Mobil, Krone mobile, Kurier mobil, LIWEST and Rapid Mobile are taken into account in the mobile communications price index. Subsequently, the price per brand is weighted with the brand's market share.

The calculated price index is a linked index, where usage is adjusted regularly, in this case annually, similarly to the Consumer Price Index.

Average usage of the four user types used for the calculation is shown in the following table:

| | User type | | | |
|---|---|---|---|---|
| Minutes | Power | High | Medium | Low |
| **2010** | 550 | 240 | 120 | 20 |
| **2011** | 530 | 250 | 120 | 20 |
| **2012** | 510 | 240 | 100 | 20 |
| **2013** | 500 | 230 | 110 | 20 |
| **2014** | 471 | 208 | 93 | 19 |
| **2015** | 469 | 210 | 94 | 21 |
| **2016** | 450 | 198 | 91 | 23 |
| Text messages | | | | |
| **2010** | 229 | 33 | 5 | 1 |
| **2011** | 243 | 42 | 7 | 1 |
| **2012** | 260 | 46 | 7 | 1 |
| **2013** | 168 | 42 | 9 | 1 |
| **2014** | 104 | 28 | 6 | 1 |
| **2015** | 90 | 23 | 6 | 1 |
| **2016** | 66 | 17 | 5 | 1 |
| Data in megabytes | | | | |
| **2010** | 136 | 9 | 2 | 0 |
| **2011** | 417 | 36 | 3 | 0 |
| **2012** | 932 | 134 | 2 | 0 |
| **2013** | 1483 | 345 | 21 | 0 |
| **2014** | 2093 | 632 | 60 | 0 |
| **2015** | 2382 | 816 | 171 | 0 |
| **2016** | 3440 | 1240 | 381 | 0 |

## Residential customers – business customers

"Business customers" are all legal persons and corporations under public or private law, partnerships, registered companies and partnerships under the Civil Code [eingetragene Erwerbsgesellschaften, Gesellschaften bürgerlichen Rechts], as well as natural and legal persons who are entrepreneurs within the meaning of Art. 1 of the Austrian Consumer Protection Act, Federal Law Gazette 140/1979 as amended (including start-up activities within the meaning of Art. 1 Par. 3 leg. cit). In this context, business shall mean any organisation that is intended to be permanent for the purposes of independent commercial activity, even though it may be a non-profit enterprise.

"Residential customers" are all customers not captured by the above definition.

For the distinction between residential customers and business customers all relevant information available shall be used.

## Technical measurement (real minutes)

Real minutes refer to the actual duration of calls made by customers. In contrast, billed call minutes indicate the number of minutes actually charged to those customers. The main factors accounting for the difference between these two figures are the number of free minutes included in the base fee, which carry considerably more weight in mobile networks than in the fixed network, and the billing increment.

## Trunk segments and terminating segments (leased lines and Ethernet services)

At the wholesale level a distinction is made between trunk segments and terminating segments. Trunk segments refer to leased lines or Ethernet services that normally do not extend to the user's network termination point and link interconnection points in the 28 Austrian towns and cities where A1 Telekom Austria AG has set up network interconnection points to other telecommunications operators. In contrast, terminating segments refer to leased lines or Ethernet services at the wholesale level, which are not to be classified as trunk segments.

## Unbundling

In telecommunications, unbundling refers to the separate provision of specific services which were previously available only in conjunction with other services. For example, the unbundling of sub- scriber lines from fixed-network access offered by the incumbent operator gives alternative service providers direct access to the customer without requiring the latter to install the "last mile" them- selves, as they can lease the (naked) subscriber line from the incumbent at a regulated price. Unbundled network elements are made available if the regulatory authority has identified in a market analysis procedure that one company has significant market power and has imposed on it the obligation of granting access to its telecommunications network and unbundled elements thereof.

## Virtual unbundling

According to an official TKK decision, A1 Telekom Austria AG is obliged to offer virtual unbundling in areas where it expands the fibre optic cable network (Next Generation Access - NGA). Virtual unbundling is a wholesale service that enables alternative providers (as in the case of physical unbundling) to offer their own (broadband) products to end users.

## Voice over Broadband (VoB)

VoB are voice telephony services based on a broadband connection (stand-alone or bundled). VoB does not include Voice over Internet, where services are provided on the basis of the (public) Internet, but the Internet connection is provided by an independent third party (e.g. Skype).

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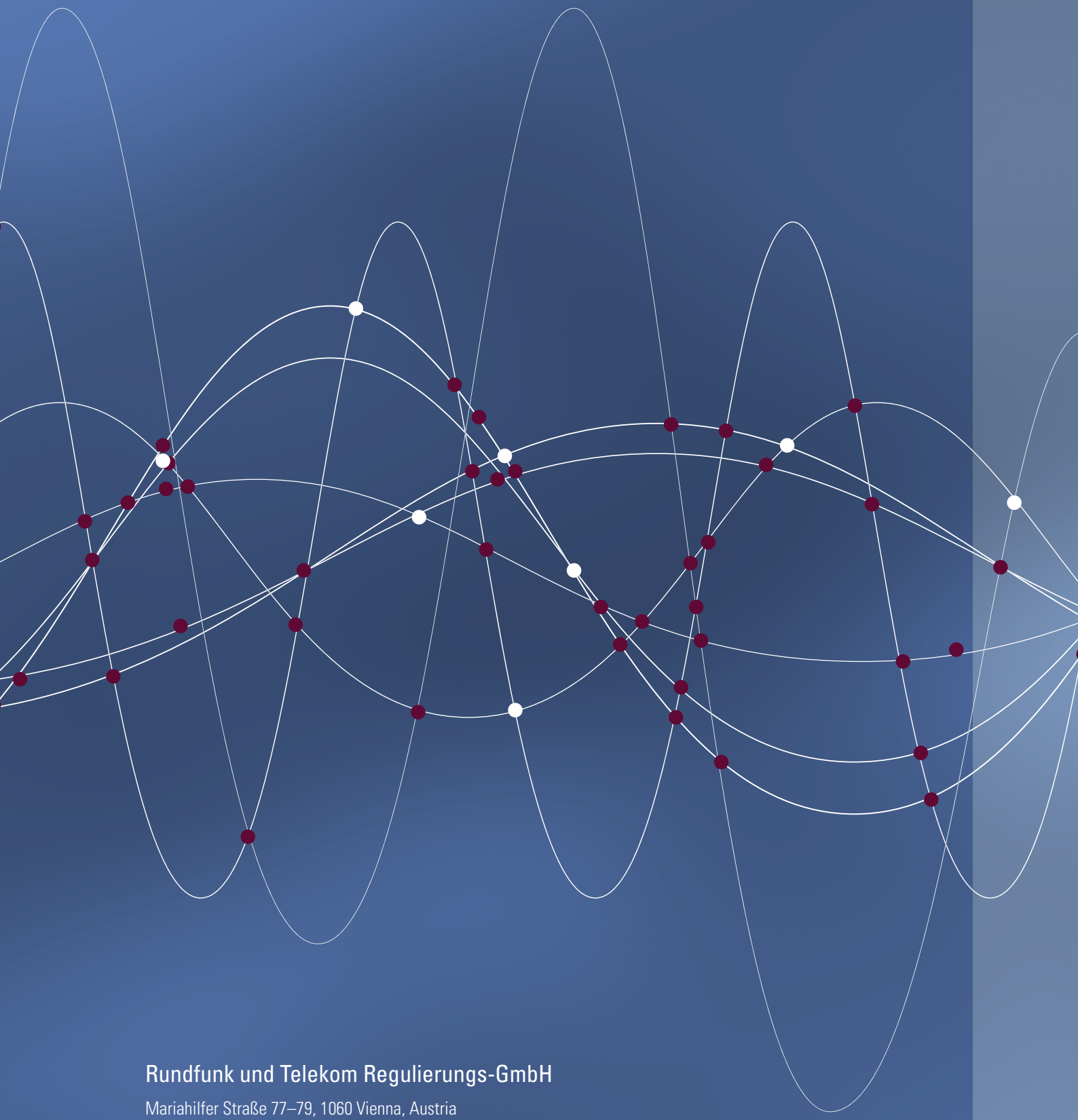

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