

BEREC Annual Reports for 2018

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Foreword by the BEREC Chair 2018

Undoubtedly, 2018 was a very important year for Europe's electronic communications sector. On the one hand, this was reflected in an ambitious BEREC work programme, which resulted in an even more harmonised market, as well as more stakeholder engagement and more consumer empowerment. In addition, we began the work on facilitating the fast and consistent deployment of 5G in Europe. On the other hand, there was – not reflected in the work program - the European Electronic Communications Code.

BEREC contributed its expertise to the European Electronic Communications Code

Harmonisation in Europe allows consumers and operators to benefit from an effective and competitive internal telecoms market. Therefore, in the first half of 2018, we contributed our expertise to the negotiations on the new European Electronic Communications Code (EECC); our strength lies in our ability to give independent and unbiased advice.

BEREC guidelines will be important in turning the EECC's provisions into useful tools. We will be engaging with the industry as we develop them, and we hope to answer as many questions as possible to provide certainty and predictability. I am absolutely confident that the implementation and application of the new rules will be consistent across Europe, as in the case of the Open Internet Regulation.

BEREC is prepared for its future tasks

In parallel, we also provided input regarding the new BEREC Regulation, which entered into force in December 2018. The two-tier structure has been retained, and we will remain close to the markets. However, BEREC continues to further develop its mode of operation. In 2018, we kicked off a process of reflecting on our working methods. As a first step, BEREC approved a new expert working group structure in order to better meet our challenges ahead. We will also continue to optimise transparency and enhance stakeholder engagement.

Stakeholder engagement inside and outside Europe

Engaging with stakeholders is important for BEREC, both inside and outside the EU. Consequently, we opened our doors to discussions with more regulators overseas. We signed a memorandum of understanding with both the Telecom Regulatory Authority of India (TRAI) and the Canadian Radio-television and Telecommunications Commission (CRTC) to learn from each other and improve the way we regulate. In addition, we started to contribute to the approximation of the six Western Balkan economies. BEREC is supporting the region in implementing European rules and has already contributed to its regional roaming agreement.

All-time record: 11 public consultations

I am proud to say that we completed all the deliverables set out in the Work Programme 2018. With 11 in total, we had a record number of consultations in 2018 and introduced two-stage public

consultations where possible. We have also paved the way for our Open Data Platform and adapted our policy on access to documents.

In the future, BEREC will maintain its important role in further improving the consistent application of regulatory rules, enhancing its working methods and engaging cooperatively and effectively with stakeholders.

This important role is possible only because of the ambitious work of experts from national regulatory authorities across Europe and thanks to the stakeholders who accept our invitation to open dialogue.

Thank you!

Johannes Gungl

BEREC Chair 2018

PART A: Annual Report on developments in the electronic communications sector in 2018, under Article 3.1(n) of Regulation (EC) No 1211/2009 of the European Parliament and of the Council of 25 November 2009 establishing the Body of European Regulators for Electronic Communications (BEREC) and the Office

Executive summary

This report by the Body of European Regulators for Electronic Communications (BEREC) presents the major trends in the electronic communications sector, addressing both market dynamics and the development of EU public policies and regulatory practices. Although the report is mainly based on the key findings of the BEREC expert working groups in 2018, it also aims to adopt a forward-looking approach.

Europe continues to see innovation in all areas of electronic communications and has witnessed relevant developments in the industry.

5G has been playing a key role in the electronic communications sector in 2018. Thus, BEREC decided to improve its understanding of 5G in terms of the key technologies and services that may emerge and the obstacles and enablers for success covering the 2018-2022 period by commissioning a study on this subject.

Figures suggest that revenues in the fixed communications sector either remained constant or increased between the end of 2015 and the end of 2017. Based on the overall harmonised index of consumer prices (HICP) the most notable reductions in communication prices for consumers were experienced in Poland (-6.2%), Italy (-6.1%) and Cyprus (-5.3%). In contrast, notable increases in communications prices for consumers were experienced in Greece (+5.5%), the UK (+2.8%), and Slovenia (+2.2%).

Overall, according to the Eurostat data, communications prices for the EU-28 between January 2018 and December 2018 decreased by 1.5%, while the overall HICP actually increased by 2.3% during the same period.

The mobile sector went through a period of intense Mergers and Acquisitions (M&A) activity in 2010-2015, as a result of which many of the M&As in 2017-2018 were cleared by the relevant competition authorities, although some of them were subject to specific commitments designed to ensure that effective competition would not be significantly reduced as a result of the concentration.

Total next generation access (NGA) coverage in the EU increased significantly between 2013 and 2017 from 67% of households to 80%. This increase mainly came from growth in very high

bit rate digital subscriber line (VDSL) and FTTP coverage, while cable (DOCSIS 3.0) coverage was fairly constant during this period. Looking at mobile networks, LTE was rolled out from about 60% coverage to almost 98% during this period.

Over the past six years, mobile broadband penetration has shown an increasing trend at EU level. It rose notably over the past year, it has risen from 89.9% (in July 2017) to 96% (in July 2018).

Coverage in rural areas has been challenging, as network deployments (especially fixed ones) in these areas are more costly and less demanded. However, LTE services reached 89.9% of EU rural households in 2017. Moreover, a large increase is expected in terms of the European demand of mobile data by 2021. According to estimates, European internet traffic should reach 12% by 2021.

The bundling of electronic communications services is pervasive in Europe. An important difference regarding bundle types relies on the relevance of packages combining mobile and fixed services, a relatively new phenomenon that has developed mainly in the countries where bundling is most common. Bundling is used by operators to cater for several, or even all, communication needs of consumers and to commercialise value added services, such as premium TV content. Its effect on electronic communication markets has remained specific to national circumstances.

Wholesale interconnection rates for mobile telephony services in Europe fell markedly between July 2004 and July 2018: the simple average, Avg (S), fell from 14.00 to 0.94 cents per minute, while the weighted average, Avg (W), fell from 14.48 to 0.85 cents per minute.

The average mobile termination rate (MTR) Avg (S) at the EU level (EU Member States only) stands at 0.83 cents per minute, whereas Avg (W) at EU level is estimated at 0.85 cents per minute.

The simple average of the lowest regulated fixed termination rate (FTR) of incumbents at European level (all 37 countries) stood at 0.33 cents per minute. The simple average of the lowest FTR of European Union incumbents (EU-28) stood at 0.21 cents per minute.

In general, off-net wholesale short message service (SMS) services have not been subject to price regulation in most of the EU-28 (i.e. in most of the cases, they remain freely set by commercial agreements among operators).

The 2018 overall picture with regard to the cost accounting methodologies has been relatively stable in comparison to 2017, with just a small number of changes by NRAs having taken place. There are clear preferences for price control methods (cost orientation alone or in combination with price caps, but the overall picture is more differentiated), cost base (current cost accounting) and allocation methodologies (mainly long-run incremental costs (LR(A)IC), with fully distributed costs (FDC) preferred only for a few products). The degree of consistency of application of methodologies continues to be high and accommodates the use of elements or parameters that reflect national circumstances.

During 2017, the co-legislators made significant progress in the analysis of the Commission's legislative proposals, and in 2018 — after nine trilogues — a political agreement was reached between the legislators. The final texts of the EECC Directive and the BEREC Regulation were published in the Official Journal on 17 December 2018.

Since 15 June 2017 and thanks to Regulation (EU) 2015/2120, roaming charges in the EU and the EEA have been history. Consumers in the EU can now use their mobile phones within the EU as at home, without any additional surcharge ('Roam Like at Home'). Only in exceptional cases may an operator levy a surcharge for roaming in the EU. At the wholesale level, the voice, SMS and data roaming charges set between operators have fallen significantly below the regulated average caps.

At the wholesale level, the EEA average price for voice services was 2.32 cents in Q4 2017 and 2.06 cents in Q1 2018. The average EEA SMS price decreased to 0.53 cents in Q4 2017 and subsequently to 0.38 cents in Q1 2018. The EEA average price for wholesale data services fell to 0.40 cents per MB in Q4 2017 and 0.27 cents per MB in Q1 2018.

1. Introduction

The electronic communications sector is vital for boosting productivity and bringing growth back to the EU. Completing the creation of a single market in electronic communications is a crucial part of the EU's overriding objective of stimulating economic recovery in Europe. The Body of European Regulators for Electronic Communications (BEREC) is committed to the objectives of Article 8 of the Framework Directive, and recognises its central role in ensuring regulatory consistency across Europe. Therefore, BEREC closely monitors and reports on developments in the electronic communications sector and publishes its annual report on sector developments under Article 3.1(n) of Regulation (EC) No 1211/2009 of the European Parliament and of the Council of 25 November 2009 establishing the Body of European Regulators for Electronic Communications (BEREC) and the Office.

The following analysis looks at the developments in the sector in 2018, paying particular attention to market and regulatory trends, openness of the internet and framework review challenges, as well as international roaming, termination rates and regulatory accounting.

This report presents BEREC's view, which is based on its members' own expertise and knowledge, and, at the same time, describes BEREC's own contribution to the development of the sector. The analysis includes qualitative reasoning, based on information from BEREC expert working group (EWG) activity, and quantitative data, based on periodic BEREC data collection exercises and other public documents.

2. 5G study

In 2017, the BEREC Office commissioned DotEcon Ltd (DotEcon) and Axon Partners Group Consulting SL (Axon) to conduct, for BEREC, a study on the implications of 5G deployment on future business models. In 2018, the study was finished and published on the BEREC website.

This study aimed to help BEREC improve its understanding of 5G in terms of the key technologies and services that may emerge and the obstacles and enablers for success, with a focus on the

near future, specifically the period 2018-2022. In particular, the following high-level areas were addressed:

- the role of 5G, trends in demand and the benefits that 5G could deliver to consumers and businesses alongside other technologies;
- a short introduction to the main technological features and concepts of 5G and how these will change the telecommunications service offerings;
- development of telecommunications and adjacent markets in the advent of the impending 5G introduction;
- potential implications of 5G deployment on business models and value chains;
- the influence of requirements of key applications on the technological development of 5G;
- a time perspective of 5G development and an introduction assessing the major influencing factors.

The content of this study does not reflect the official opinion of BEREC. Responsibility for the information and views expressed therein lies entirely with the authors.

3. Market trends

3.1 Economic context

In previous years, BEREC has presented an overall value for the electronic communications sector in Europe, based on revenue statistics collected by the European Commission for its Digital Agenda Scoreboard¹.

Given that the most recently available revenue data on the European Commission's digital indicators website is from 2015 (which was presented in BEREC's 2017 annual report), the source has not been used in this year's annual report. The data presented is based on data collected by Analysys Mason², the telecoms consultant and research service provider, using its DataHub portal.

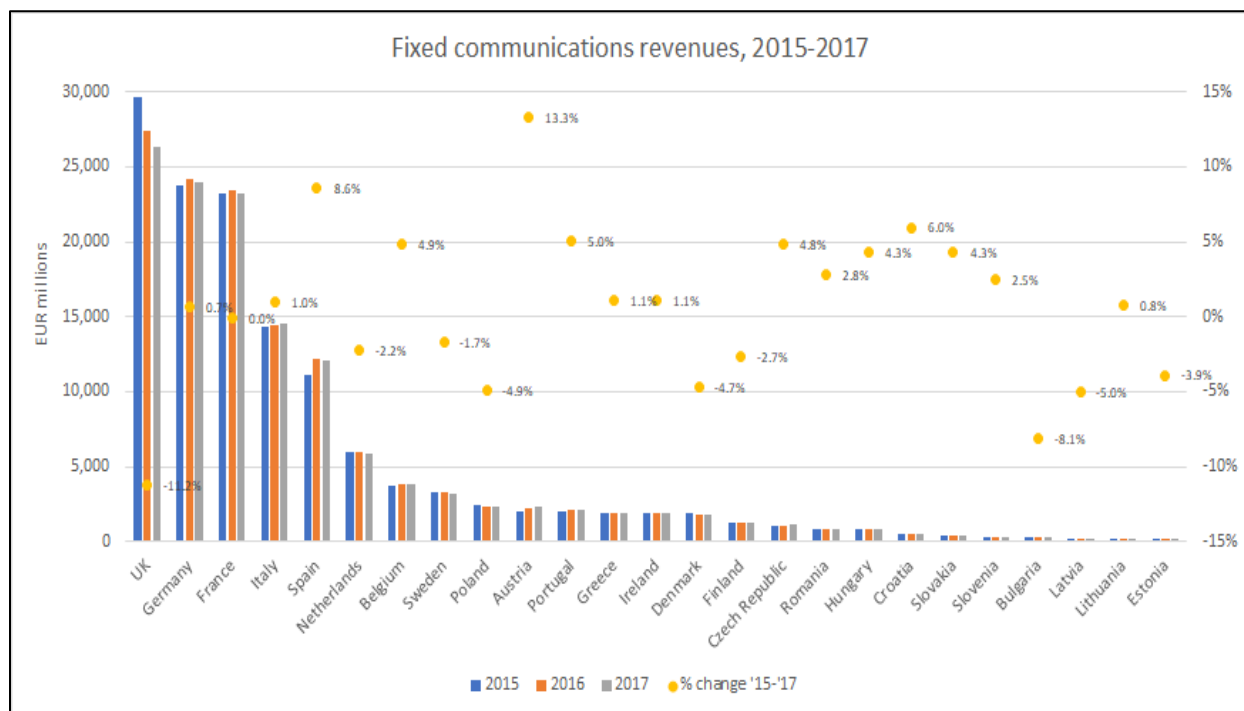
Based on this data, Figures 1 and 2 below present a comparison of fixed and mobile revenues, respectively, between 2015 and 2017 for 25 European countries based on the Analysys Mason data. The data presented in BEREC's 2017 annual report highlighted that the overall value of the electronic communications sector in Europe remained flat in the 12 months leading up to December 2015. As a different source of data has been used in this year's annual report, it would

¹ <https://ec.europa.eu/digital-single-market/graph-european-society-indicators>

² <http://www.analysysmason.com/>

be inappropriate to attempt to compare the data previously presented. Therefore, the analysis presented below should stand alone.

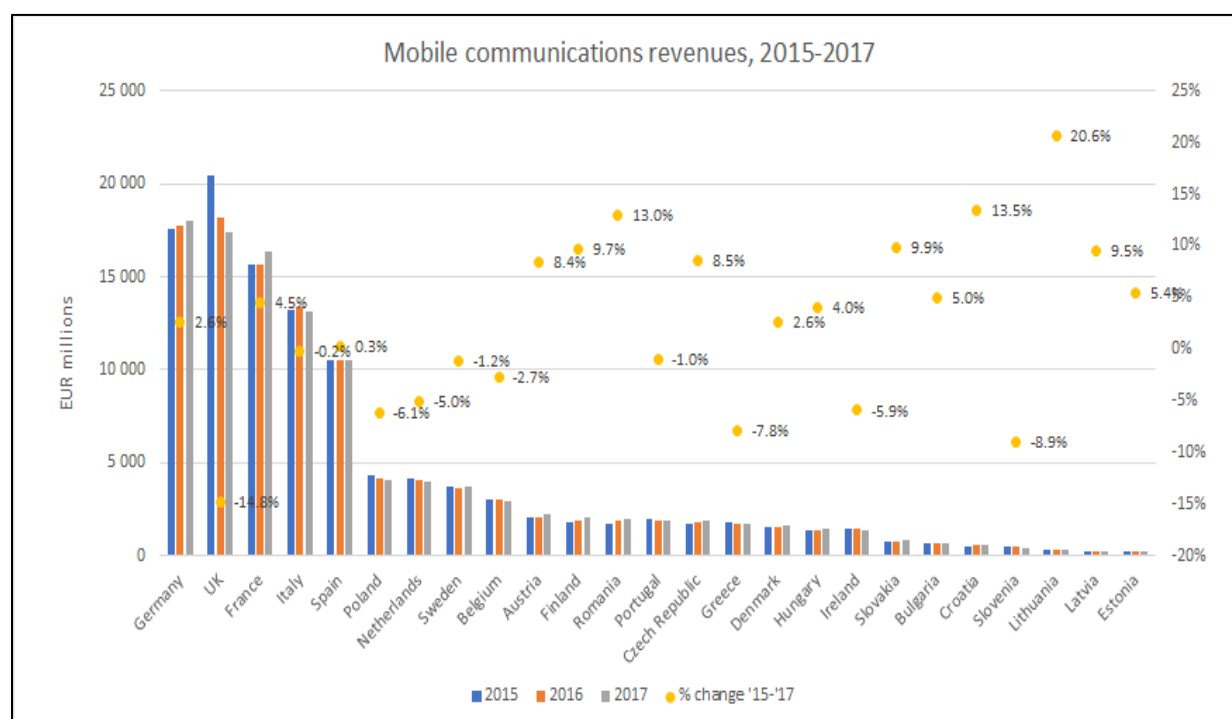
Figure 1: Fixed telecom sector revenues, 2015-2017, and percentage change, 2015-2017



Source: Analysys Mason

Figure 1 shows that revenues in the fixed communications sector either remained constant or increased between the end of 2015 and the end of 2017 in 16 of the 25 EU countries analysed. According to the Analysys Mason data, fixed revenues in Austria, Croatia, Portugal and Spain grew by over 5% during this period (Czechia grew by 4.8%), while fixed revenues in the UK, Bulgaria and Latvia fell by more than 5% during the same period (Poland fell by 4.9%). Overall, across the 25 EU countries presented, fixed revenues fell by 1.3% during the analysed period.

Figure 2: Mobile telecom sector revenues, 2015-2017, and percentage change, 2015-2017



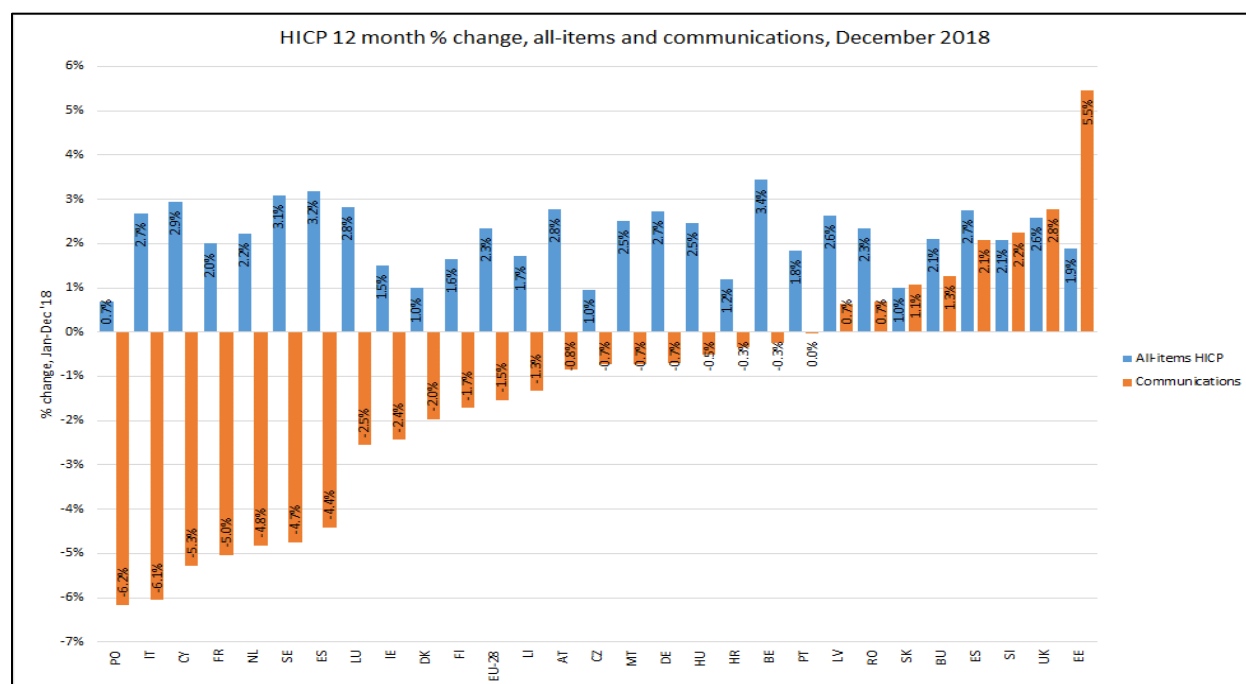
Source: Analysys Mason

Figure 2 illustrates that revenues in the mobile communications sector either remained constant or grew between the end of 2015 and the end of 2017 in 15 of the 25 EU countries analysed. According to the Analysys Mason data, mobile revenues in Lithuania, Romania and Croatia grew by over 13% during this period (Czechia only 8.5%), while mobile revenues in the UK, Slovenia and Greece fell by more than 7% during the same period. Overall, across the 25 EU countries presented, mobile revenues fell by 1.5 % during the analysed period.

Figure 3 illustrates the change in the overall harmonised index of consumer prices (HICP) and the communications sub-component between January 2018 and December 2018. The most notable reductions in communication prices for consumers were experienced in Poland (-6.2%), Italy (-6.1%), Cyprus (-5.3%), France (-5.0%) and the Netherlands (-4.8%). In contrast, notable increases in communications prices for consumers were experienced in Greece (+5.5%), the UK (+2.8%), Slovenia (+2.2%), Spain (+2.1%) and Bulgaria (+1.3%).

Overall, according to the Eurostat data, communications prices for the EU-28 between January 2018 and December 2018 decreased by 1.5%, while the overall HICP actually increased by 2.3% during the same period.

Figure 3: EU-28 percentage change (January-December 2018) in the HICP and the communications sub-component



Sources: Eurostat and Office for National Statistics

While the revenue and inflation data tell a story of ‘winners and losers’ in terms of the overall national perspective and how consumers in different Member States are affected by price fluctuations, the market performance of European telecommunications operators is evidenced rather clearly in Figure 4. The figure compares the 2018 performance of the telecommunications sector (STOXX Europe 600 Telecommunications Index) with the performance of the overall STOXX Europe 600 Index. While the telecoms index (blue line) outperformed the overall index (orange line) for much of the year, both indices fell by more than 13% by the end of the year.

Figure 4: Performance (January-December 2018) of STOXX Europe 600 Telecommunications Index and STOXX Europe 600 Index



Source: <https://www.stoxx.com/index-details?symbol=SXKP>

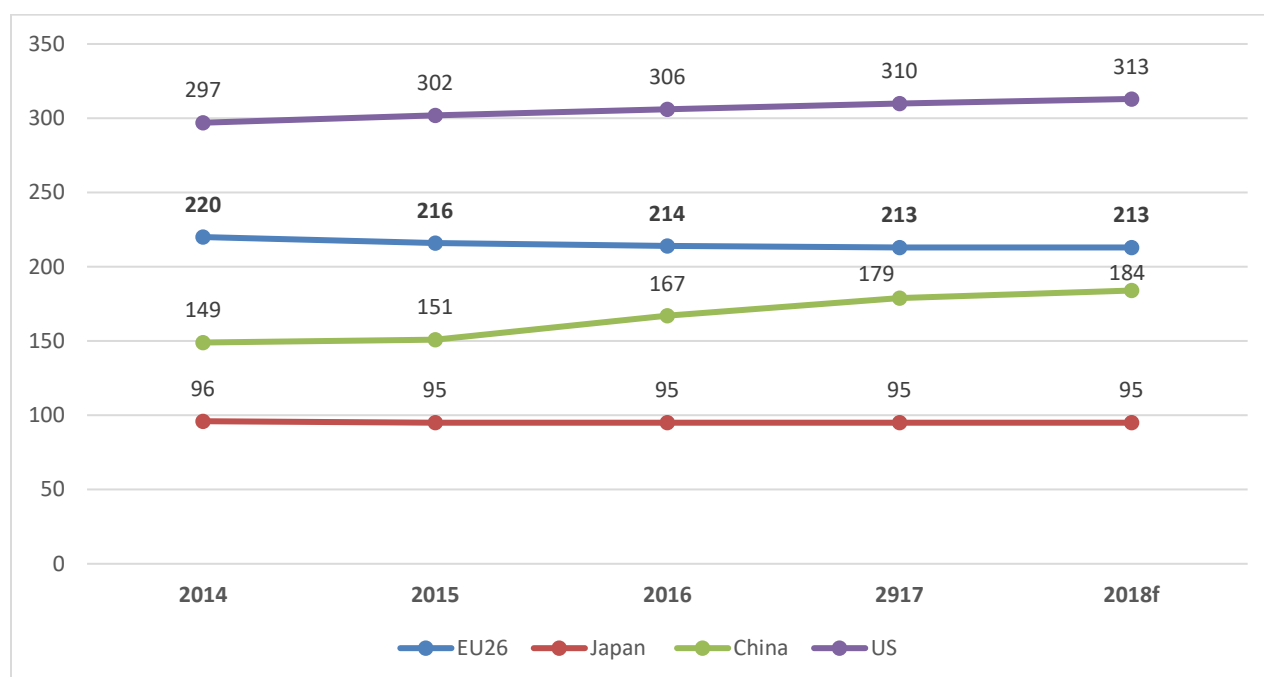
3.2 Market overview

According to the Digital Economy and Society Index (DESI) 2018³, total telecom services revenues have slightly declined (by 3.1 %) in Europe since 2014. Revenues went slightly down from 220 billion euros in 2014 to EUR 213 billion in 2017 in Europe. In the same period, US operators' revenues slightly increased from EUR 297 billion to EUR 310 billion in 2017 (+5%).

Chinese operators increased their revenues by 23.3 %, from EUR 149 billion in 2014 to EUR 179 billion in 2017 while Japanese operators' revenues have stabilized by 95 billion euros.

³ <https://ec.europa.eu/digital-single-market/en/desi>.

Figure 5: Total telecom services revenues per region (2014-2018f*), billion euros



Source: European Commission, DESI 2018

*2018: forecast

Note: this analysis is based on detailed figures from 26 Member States, which covered about 98% of the total EU market (total telecom carrier services).

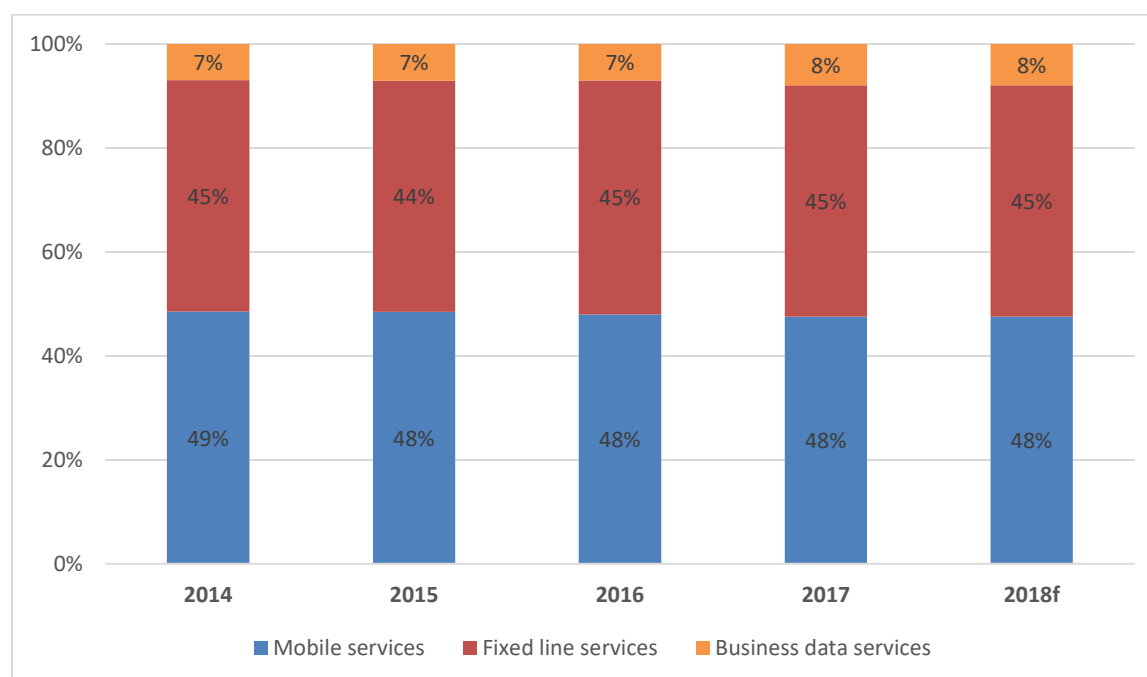
The analysis of telecommunications revenues by segment shows a decline in fixed and mobile voice services revenues. According to the European IT Observatory (EITO), fixed voice service revenues have fallen by 11.6% since 2014, compared to 20.4% for mobile services over the same period (2014 – 2017). Mobile and fixed voice revenues have decreased by 16% since 2014 and together, represented 44% of total telecom revenues in 2017, compared with 51% in 2014.

Mobile data services represented 27% of total revenues in 2017, up from 24% in 2014. The growth in mobile data services could not, however, compensate for the major decline in voice services and overall revenues fall by 3%.

An increase in mobile data and internet services was not enough to offset the major decline in voice services.

Although they have decreased, revenues from mobile services still have the greatest weight among telecom services, representing 48% of total revenues in 2017.

Figure 6: Telecom services revenues by segment in Europe (2014-2018f), % of total



Source: European Commission, DESI 2018; 2017 - 2018 EITO in collaboration with IDC

*2018f: forecast

Note: The analysis is based on detailed figures from 26 Member States, which covered about 98% of the total EU market (total telecom carrier services).

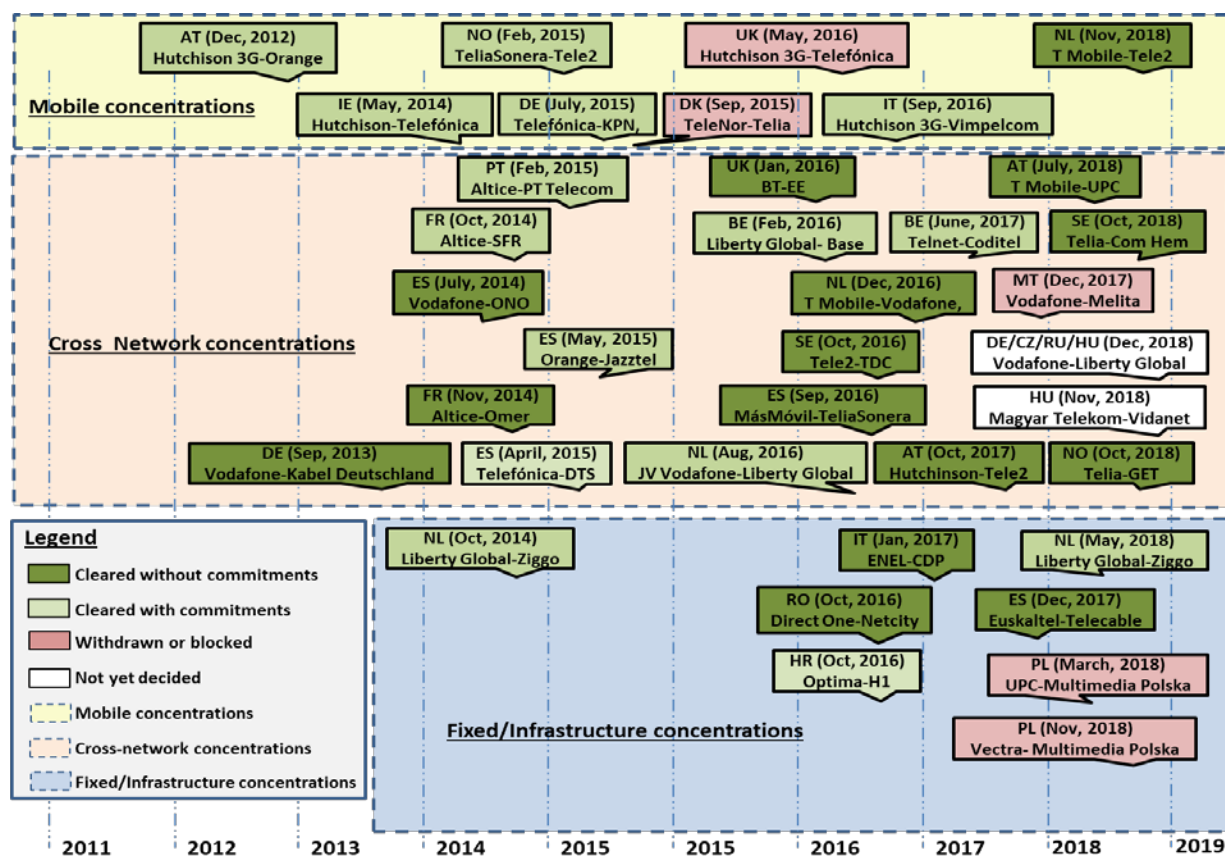
3.3 Mergers and acquisitions

Consolidation through M&As continued in the European electronic communications services (ECS) markets in 2018. This consolidation process involved both mergers in the same markets (either fixed or mobile) and fixed/mobile mergers. The latter are motivated by competition in a convergent scenario where telecommunications operators provide bundled and integrated services over their own fixed and mobile infrastructures.

In most cases, the mergers have been national in scope, implying that a majority of concentration operations aimed to strengthen firms' market position in a European national market, rather than to extend its footprint to cover additional countries. However, the European markets have also witnessed some of these broader operations, which are not shown in Figure 7, such as the acquisition of Telenor's Central and Eastern European assets by PPF Group or the acquisition of the Irish fixed telecoms incumbent Eircom by Toohil, controlled by Xavier Niel, owner of the French operator, Iliad.

Depending on the transnational scope of the parties involved in these mergers, some of them were analysed by national competition authorities (this was the case for Malta, Belgium and Norway) and some by the European Commission (as was the case for the Netherlands, for example).

Figure 7: Mergers and acquisitions in Europe 2012-2018



Source: BEREC

Figure 7 shows that many of the M&As in 2017-2018 were cleared by the relevant competition authorities, although some of them were subject to specific commitments designed to ensure that effective competition would not be significantly reduced as a result of the concentration.

The mobile sector went through a period of intense M&A activity in 2010-2015. The parties involved in some of these mergers were mobile network operators (MNOs) retailing similar mobile services within the same country; whereas in other cases, mobile virtual network operators (MVNOs) merged or were acquired by MNOs (not shown in Figure 7). The most interesting M&As are those in which two MNOs merge. As shown in Figure 7, four of the transactions involving MNOs were cleared in the EU between 2012 and 2016, one was withdrawn in 2015 (Denmark) and another was blocked in 2016 (United Kingdom). No mergers among MNOs took place or were notified in 2017, and the acquisition of Tele2 by T-Mobile in the Netherlands was cleared in November 2018. Most of these transactions resulted in the number of operators falling from four

to three (specifically, the M&As in Austria in 2013, Ireland in 2014, Germany in 2015 and the Netherlands in 2018). The M&As notified in Denmark that were later withdrawn and the M&A in the United Kingdom that was ultimately blocked were also mergers that reduced the number of MNOs in the market from four to three.

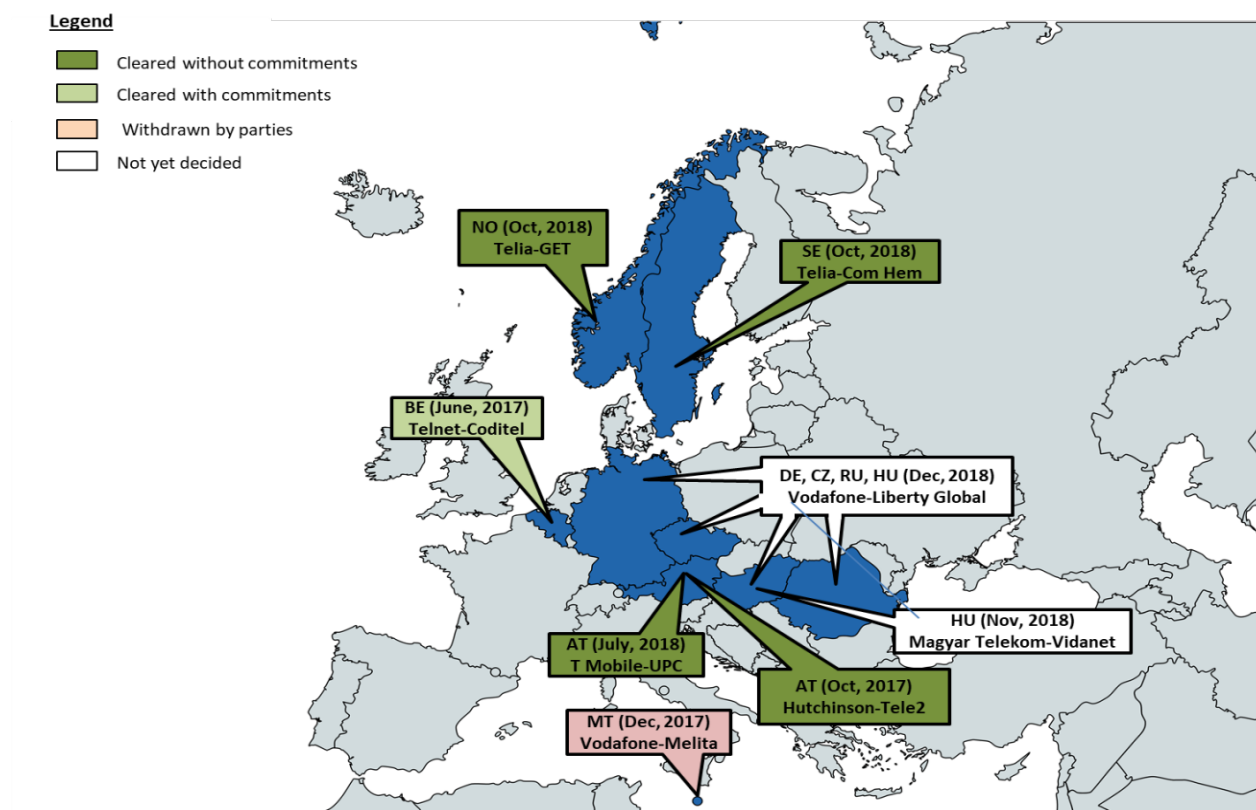
The European Commission has cleared most of the M&As, conditional on commitments proposed by the merging parties. These commitments, which were initially related to opening the merged network to MVNOs, have evolved to include measures to facilitate the potential entry of a new player to replace the fourth operator.

In fact, the acquisition of Wind (formerly owned by Vimpelcom) by Hutchinson in 2016 was cleared conditional on the divestiture of spectrum, sharing or selling base stations and coming to a national roaming agreement with Iliad. These commitments enabled Iliad to become the new fourth operator in Italy, maintaining a four-player market structure in this country. Conversely, the M&As that were not cleared (Hutchinson 3G-Telefónica in the United Kingdom and TeleNor-Telia in Denmark) failed to fulfil this requirement on enabling a new entry.

The exception to this pattern is the approval in November 2018 of the acquisition of Tele2 by T-Mobile, which the European Commission cleared without any commitment, contrary to the other four-to-three MNOs concentrations. The European Commission based its decision on several aspects, including the limited mobile market share for the merged entity, the uncertainties of Tele2 as an important competitive force and the different strategies and incentives of the other relevant operators, which do not increase the likelihood of coordinated behaviour.

Cross-network concentrations can be classified into two categories: (1) mobile operators that have acquired fixed operators (e.g. Hutchinson's 2017 acquisition of the Tele2 branch in Austria or T-Mobile's 2018 acquisition of UPC Austria); (2) integrated or fixed operators acquiring other integrated operators (like the acquisition of Coditel by Telenet in Belgium).

Figure 8: Cross-network consolidation throughout Europe (2017-2018)



Source: BEREC

In the past, cross-network M&As were in general cleared and many of them done so without commitments. However, the outcome for the main cross-network concentrations in 2018 varies.

In this regard, some M&As were cleared without commitments, such as the acquisitions of UPC by T-Mobile in Austria, GET by Telia in Norway and Com Hem by Telia in Sweden. However, the acquisition of Melita (both the second fixed operator and the third mobile operator in Malta) by Vodafone Malta (the country's first mobile operator), notified in May 2017, was finally withdrawn by the parties. This transaction raised serious concerns with the national competition authority (NCA) regarding the horizontal effects of the transaction in the mobile-only market (a reduction from three MNOs to two MNOs) and the potential for coordinated and foreclosure effects in the mobile-only and multi-play markets, potentially leading to duopolistic issues.

There were two other cross-networks M&As notified in 2018 that are currently being reviewed: Vodafone's proposed acquisition of Liberty Global's operations in Germany, Czechia, Hungary and Romania and the acquisition of the Vidanet network in several cities by Magyar Telekom in Hungary. The acquisition of Liberty Global assets by Vodafone has led to an in-depth phase II merger control investigation by the European Commission, due to potential competition concerns in Germany (two major cable networks with overlapping activities in a number of service markets) and in Czechia (conglomerate effects, due to the merged entity's ability to offer multiple play products).

Regarding fixed concentrations, some relevant operations took place in 2018, such as the acquisition of Ziggo by Liberty Global in the Netherlands (cleared by the European Commission with commitments to ensure competition from over-the-top services and other stakeholders), and the acquisition in Spain of Telecable by Euskaltel (cleared without commitments by the NCA). In both cases, cable operators are extending their footprint at a national level, acquiring non-overlapping networks.

In Poland, both UPC Polska (owned by Liberty Global) and Vectra notified their intentions to acquire Multimedia Polska in 2018; however, in both cases, the intended acquisitions were withdrawn by the parties after the NCA raised concerns on the potential restriction of competition.

3.4 Broadband and next-generation networks

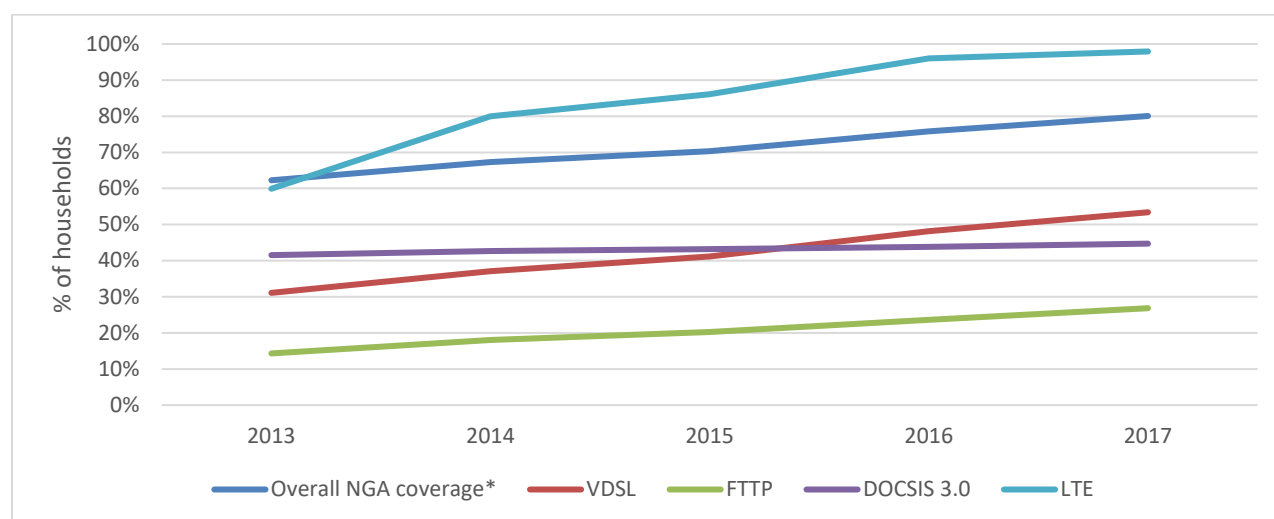
In 2018, BEREC did not specifically analyse the developments of broadband and next generation networks in Europe (although there were several publications related to this topic⁴). A more comprehensive look at next-generation access (NGA) and fibre rollout was carried out in 2016 in the BEREC report *Challenges and drivers of NGA rollout and infrastructure competition* (BoR (16) 171)⁵. This section will update some of the figures included in that report and discuss developments since then. Our main data source is the study *Broadband coverage in Europe 2017*⁶ and its predecessors, commissioned by the European Commission.

⁴ For example, the *BEREC Report on access to physical infrastructure in market analysis* (https://berec.europa.eu/eng/document_register/subject_matter/berec/public_consultations/8323-draft-berec-report-on-access-to-physical-infrastructure-in-the-context-of-market-analysis) and the *BEREC Report on pricing for access to infrastructure and civil works* (https://berec.europa.eu/eng/document_register/subject_matter/berec/public_consultations/8243-draft-berec-report-on-pricing-for-access-to-infrastructure-and-civil-works-according-to-the-bcrd).

⁵ See https://berec.europa.eu/eng/document_register/subject_matter/berec/reports/6488-berec-report-challenges-and-drivers-of-nga-rollout-and-infrastructure-competition.

⁶ See <https://ec.europa.eu/digital-single-market/en/news/study-broadband-coverage-europe-2017>.

Figure 9: Development of LTE and NGA coverage in the EU by technology 2013-2017



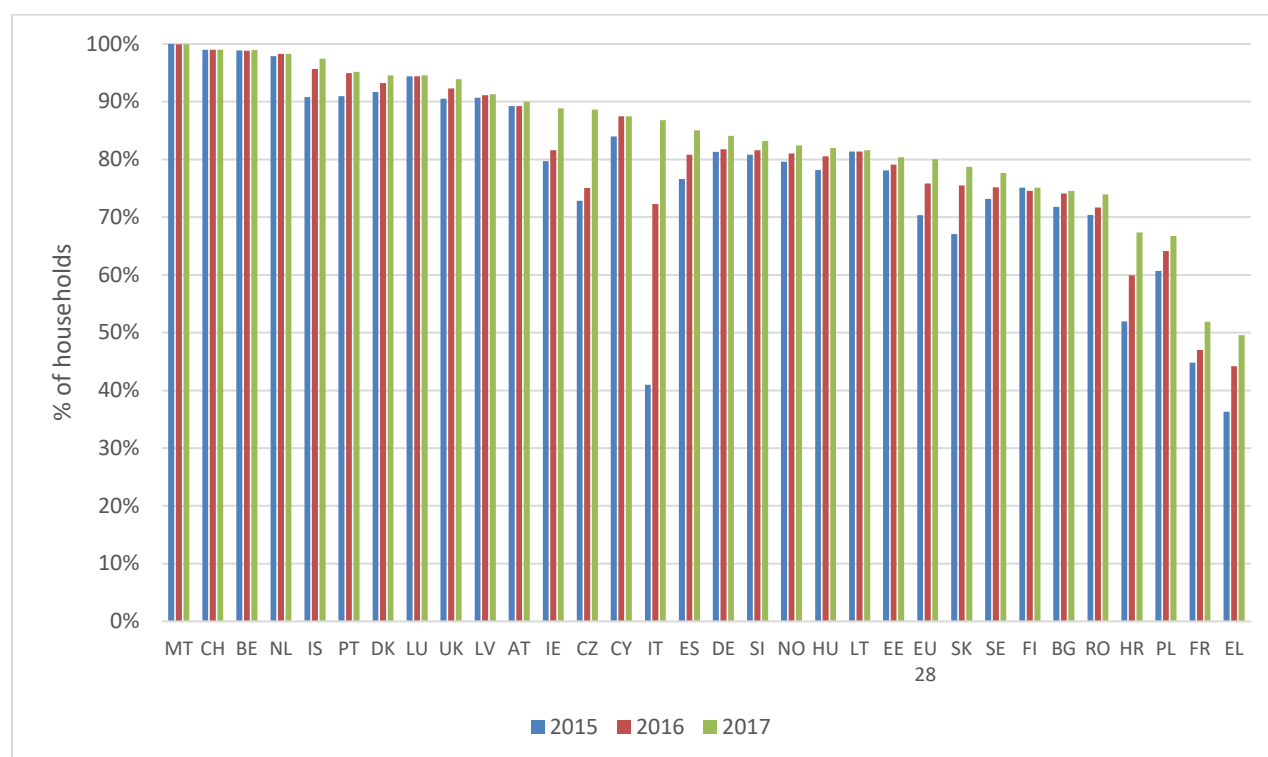
* NGA coverage includes VDSL (very-high-bit-rate digital subscriber line), FTTP (fibre-to-the-premises) and DOCSIS 3.0.

Source: EU Study on Broadband Coverage in Europe 2017⁷

Figure 9 shows that total NGA coverage in the EU increased significantly between 2013 and 2017 from 67% of households to 80%. This increase mainly came from growth in VDSL and FTTP coverage, while cable (DOCSIS 3.0) coverage was fairly constant during this period. Looking at mobile networks, long-term evolution (LTE) was rolled out from about 60% coverage to almost 98% during this period. From 2015 to 2017 alone, NGA coverage increased from 70% to 80%, with VDSL coverage climbing from 41% to 53% and FTTP coverage from 20% to 27%.

⁷ <https://ec.europa.eu/digital-single-market/en/news/study-broadband-coverage-europe-2017>

Figure 10: Development of NGA coverage by country 2015-2017

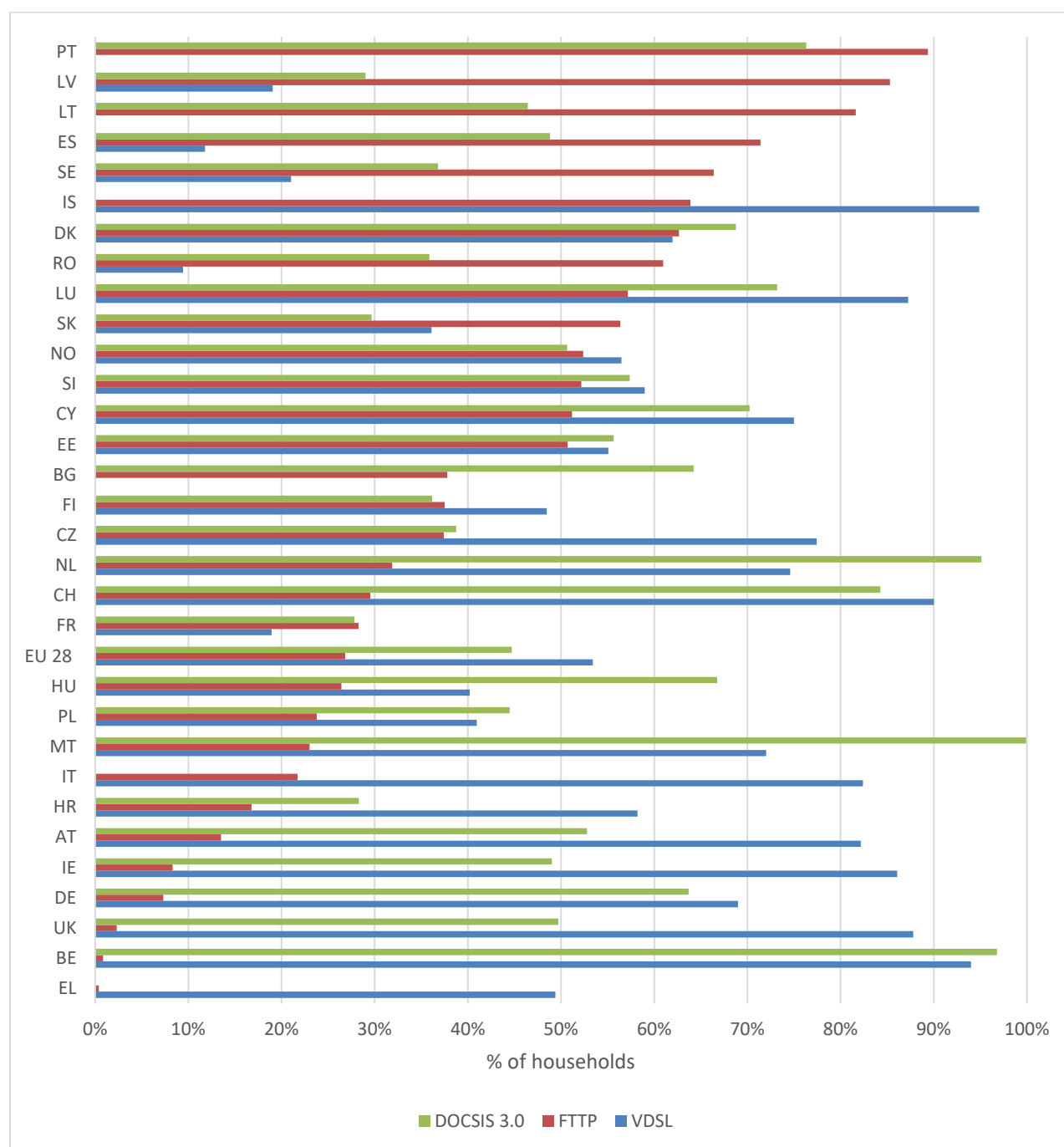


Source: <https://ec.europa.eu/digital-single-market/en/news/study-broadband-coverage-europe-2017>

With regard to country level data, *Figure 10* shows that there were particularly large increases in NGA coverage in Italy (46% points), Czechia (16% points), Croatia (15% points), Greece (13% points) and Slovakia (12% points) between 2015 and 2017. These increases can be attributed mainly (but not only) to a growth in VDSL coverage. Regarding FTTP coverage, the strongest increases can be observed in Czechia (20% points), Spain (19% points) and Poland (15% points), followed by Portugal (14% points) and France (13% points).

Coverage with different technologies still varies widely within the EU. *Figure 11* shows that the coverage of each of the three main NGA technologies, VDSL, FTTP and DOCSIS 3.0, varies between 0% and 90-100% across the countries listed. With regard to FTTP coverage, Portugal was the leading country in 2017, followed by Latvia, Lithuania, Spain and Sweden.

Figure 11: NGA coverage by technology and country 2017



Source: <https://ec.europa.eu/digital-single-market/en/news/study-broadband-coverage-europe-2017>

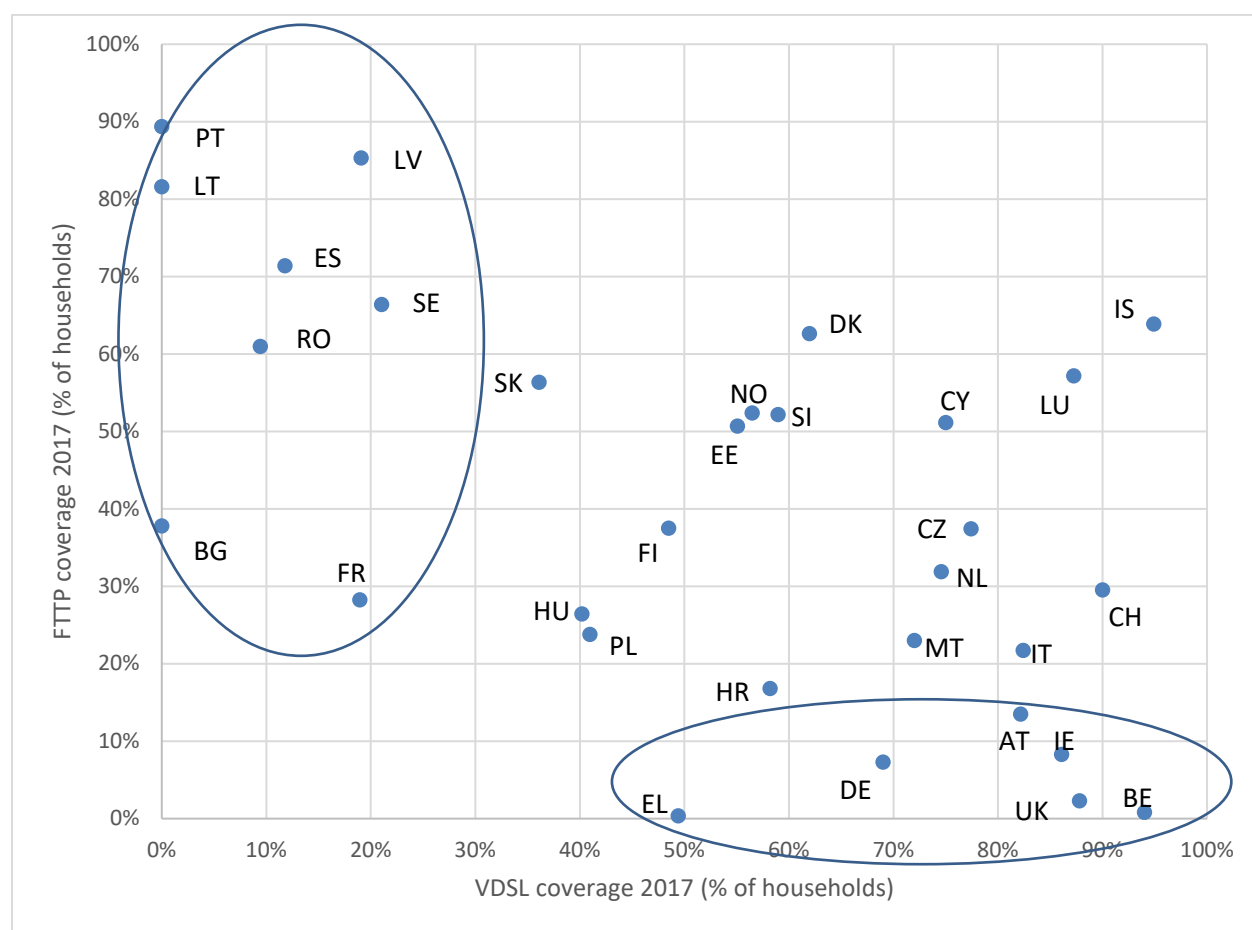
Regarding the relationship between FTTP coverage and VDSL coverage, Figure 11 shows that there are still countries with a clear focus on either FTTP or VDSL. As already discussed in the 2016 report *Challenges and drivers of NGA rollout and infrastructure competition* (BoR (16) 171), FTTP dominates where either a widespread duct network of the incumbent is available (such as

in France, Lithuania, Portugal and Spain) or the copper network is historically less developed (e.g. in Bulgaria and Romania) ⁸.

On the other hand, the incumbent is pursuing a VDSL strategy, mainly in countries where no ducts are available (which leads to high costs of FTTP rollout) and the copper network is well suited for the rollout of fibre-to-the-cabinet. Examples of such countries are Austria, Belgium, Germany, Greece, Ireland and the United Kingdom. This may also lead to differences in regulatory approaches, with a focus on duct regulation in the first group and a focus on virtual products (virtual unbundled local access (VULA)) in the second group.

Finally, compared with 2016, there are more countries with both significant FTTP and VDSL coverage.

Figure 12: FTTP versus VDSL coverage 2017



Source: Fig. 8 BoR (16) 171 updated using <https://ec.europa.eu/digital-single-market/en/news/study-broadband-coverage-europe-2017>

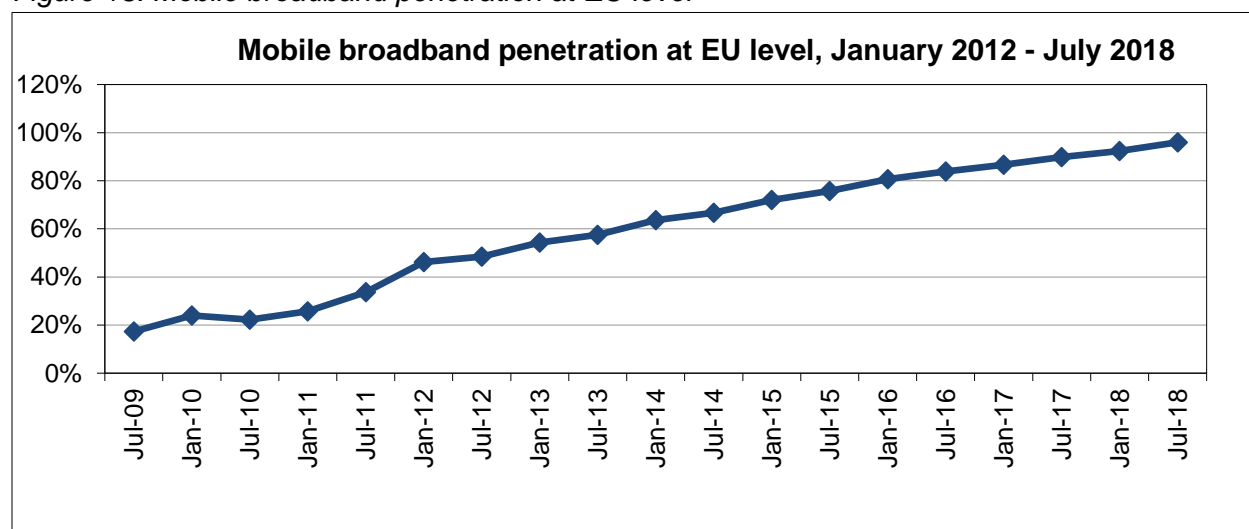
⁸ An exception here is Sweden, where the high FTTP coverage is mainly driven by demand-side factors.

3.5 Mobile broadband

Mobile broadband penetration

Over the past six years, mobile broadband penetration has shown an increasing trend at EU level. It rose notably from 89.9% in July 2017 to 96% in July 2018.

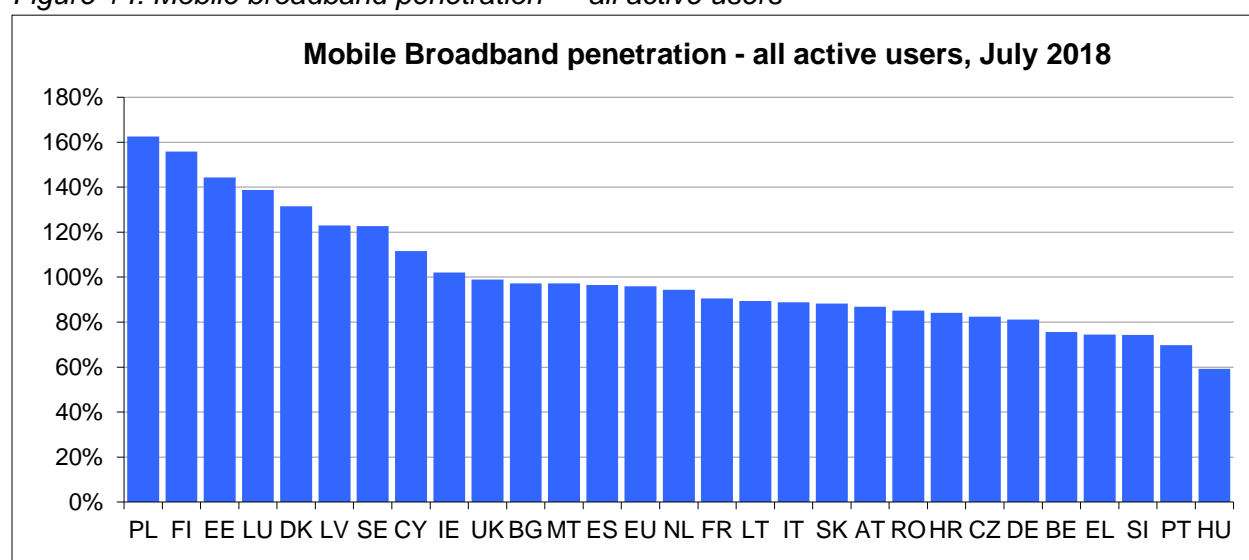
Figure 13: Mobile broadband penetration at EU level



Source: European Commission

In July 2018, mobile broadband penetration, measured in terms of all active users, showed the highest rates in Poland (163%), Finland (156%), Estonia (144%) and Luxembourg (139%).

Figure 14: Mobile broadband penetration — all active users



Source: European Commission

Mobile broadband coverage

According to the latest European Commission study examining mobile network coverage, by the end of June 2017, high speed packet access (HSPA) remained relatively unchanged and continued to provide near universal availability (97.9%) at the EU level. Moreover, LTE coverage increased by 1.9 percentage points by mid - 2017, reaching, for the first time, the same level as HSPA. Given the continued deployment of LTE networks in many Member States, LTE is expected to overtake HSPA coverage in the EU in the following year.

Coverage in rural areas has been challenging, as network deployments (especially fixed ones) in these areas are more costly and less in demand. However, LTE services reached 89.9% of EU rural households in 2017, thanks to the mobile technologies providing the opportunity to improve broadband coverage in regions where fixed network deployment is more challenging or not feasible.

LTE download speed

According to the 2018 DESI, which tracks the progress of EU Member States in digital competitiveness, the average 4G (LTE) download speed in Europe ranges from 20 Mbps to 42 Mbps. The Netherlands, Hungary, Bulgaria and Denmark are among the top countries in Europe and worldwide.

Similarly, the Netherlands is among the world leaders in average LTE download speed at 42.1 Mbps, followed by Norway and South Korea at 41.2 Mbps and 40.4 Mbps, respectively. The EU-26⁹ had an average download speed of 26.3 Mbps in 2018. This was faster than the average speed in Japan (25.4 Mbps), Brazil (19.7 Mbps), the United States (16.3 Mbps) and Russia (15.8 Mbps).

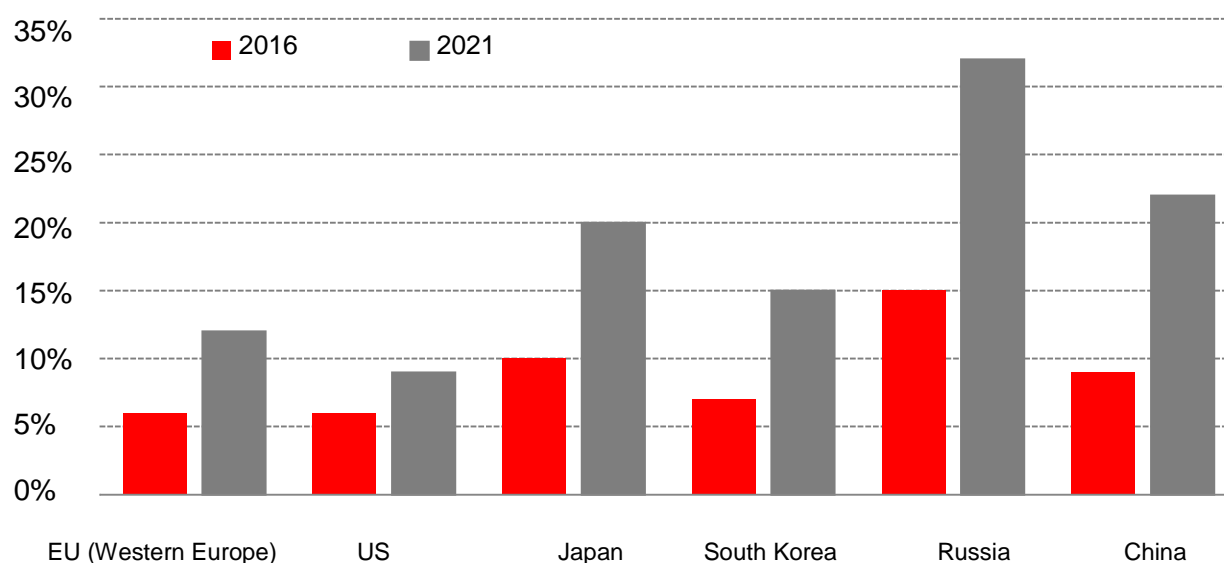
Mobile data traffic in general

Overall, the DESI reports internet traffic per capita in Western Europe (Belgium, Denmark, France, Germany, Iceland, Ireland, Italy, Norway, Spain, Sweden, the Netherlands and the United Kingdom) as being below the figures for the United States and South Korea. Mobile data traffic still represents only a small part of total IP traffic.

However, Cisco forecasts a large increase in the European demand of mobile data by 2021. According to their estimates, European internet traffic should reach 12% by 2021. Nevertheless, the share of mobile traffic is forecasted to be significantly higher in Russia (32%), China (22%) and Japan (20%). Whereas, the United States is estimated to have only 9% of its internet traffic on mobile networks.

⁹ Data for Malta and Cyprus are not available.

Figure 15: Percentage of mobile data share of total internet traffic, 2016-2021

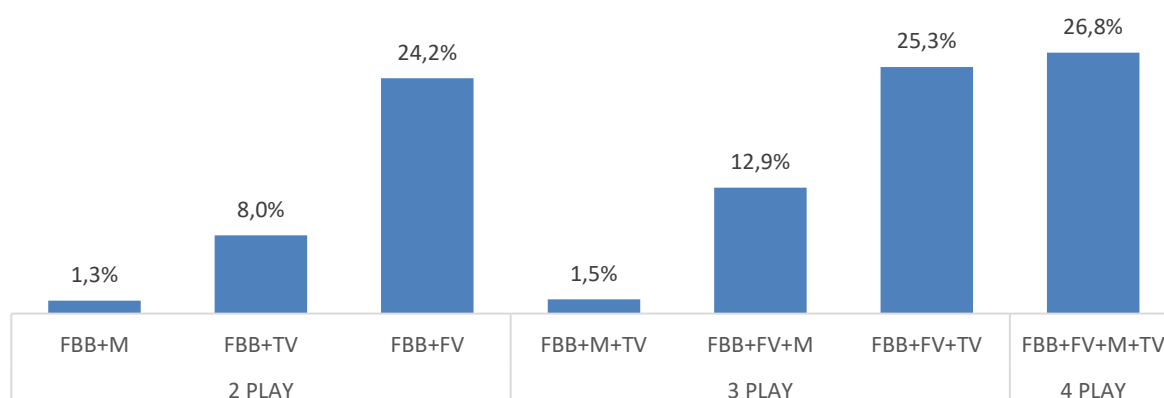


Source: Cisco, VNI Forecast Highlights

3.6 Bundles

The bundling of electronic communications services is pervasive in Europe. According to the latest Special Eurobarometer, 6 out of 10 European households in 2017 subscribed to a package combining at least two electronic communications services, with fixed internet access being the most commonly bundled (in 42% of households). Along these lines, and based on data from 21 European countries, BEREC's 2018 report *European benchmark of the pricing of bundles — methodology guidelines* concluded that 83% of fixed broadband lines were sold bundled: three out of every four with a fixed voice service and 7 out of every 20 with mobile services. The same document illustrated that almost 30% of bundles, including fixed broadband, were 4-play offers, while one quarter comprised bundles of the three fixed services.

Figure 16: Percentage of bundles over total bundles with fixed broadband in Europe (2017)



Source: BEREC, European benchmark of the pricing of bundles — methodology guidelines

However, there is substantial variation between European countries with respect to the prevalence of bundling and the kinds of bundles sold. Countries such as Finland, Bulgaria, Denmark, Slovenia and Sweden have less bundling and contrast with France, Spain and Portugal, where bundling is a very important market feature. An important difference regarding bundle types relies on the relevance of packages combining mobile and fixed services, a relatively new phenomenon that has developed mainly in the countries where bundling is most common.

Bundling is used by operators to cater for several, or even all, communication needs of consumers and to commercialise value added services, such as premium TV content. Its effects on electronic communication markets are specific to national circumstances and have been widely commented upon. During 2017, BEREC studied this phenomenon in relation to the difficulties end users may experience in switching providers to provide guidelines that address bundles of fixed and mobile services in the European Commission methodologies to benchmark European broadband prices.

3.7 Termination rates

Termination rates at European level

BEREC constantly monitors domestic¹⁰ termination rates (TRs) in Europe and provides an overview report twice a year on fixed termination rates (FTRs) and mobile termination rates (MTRs).

Following interventions by national regulatory authorities (NRAs) in the two relevant markets, namely Market 1, 'Wholesale call termination on individual public telephone networks provided at a fixed location', and Market 2, 'Wholesale voice call termination on individual mobile networks', and the application of the Commission Recommendation on TRs (Recommendation 009/396/EC), the wholesale rates both for mobile and fixed interconnection have fallen significantly and continue to decrease.

In most EU countries, short message services (SMS) are not subject to a wholesale termination price regulation. Nevertheless, a substantial decrease in SMS termination rates has been observed in EU markets over the years.

Mobile termination rates

MTRs have been regulated based on cost-oriented pricing in all countries of the EU-28 since the beginning of the decade. Most NRAs have implemented the Commission Recommendation on TRs (Commission Recommendation of 7 May 2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU (2009/396/EC)), which established pure long-run incremental

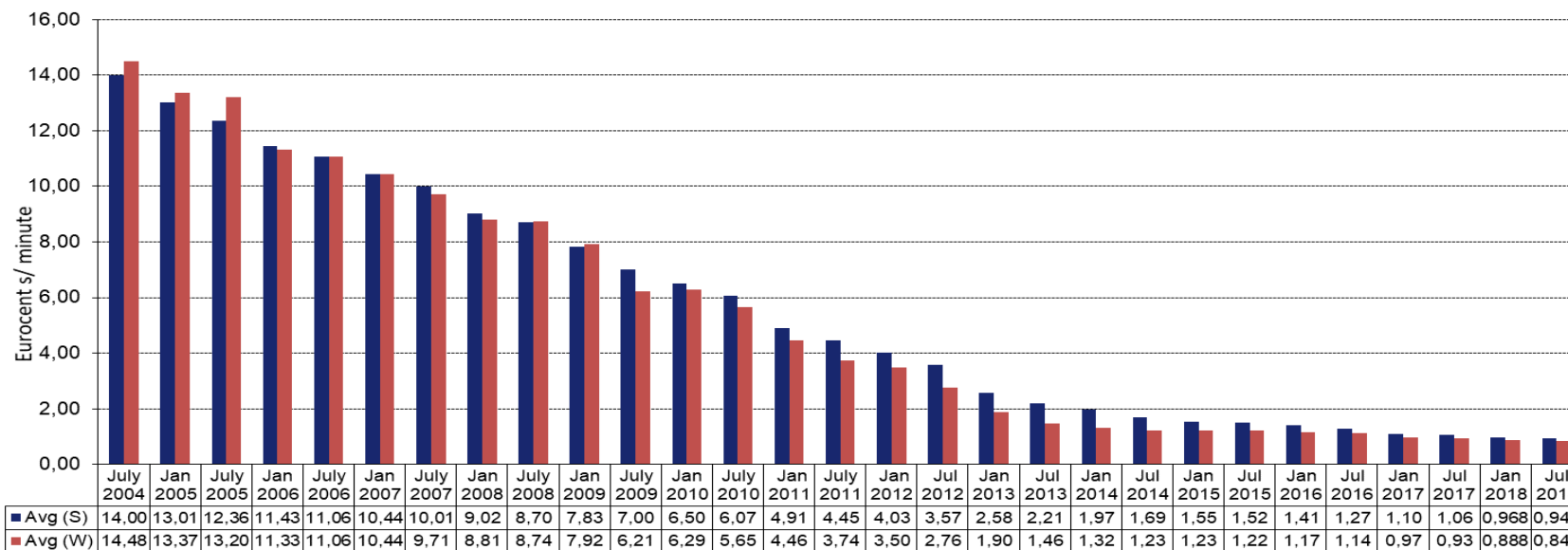
¹⁰ Referring to calls originating and terminating in the same EU country.

costs (LRIC) as the cost standard to be applied to the interconnection service for voice calls on mobile networks at the wholesale level.

As shown in Figure 17, wholesale interconnection rates for mobile telephony services in Europe fell markedly between July 2004 and July 2018: the simple average, Avg (S), fell from 14.00 to 0.94 cents per minute, while the weighted average, Avg (W), fell from 14.48 to 0.85 cents per minute¹¹.

¹¹ In the BEREC periodic MTRs benchmark reports, both a simple average and a weighted average are reported. The latter is calculated by weighting each country's average according to the proportion of the country's subscribers to all subscribers.

Figure 17: Average MTR: time series of simple average and weighted average at European level

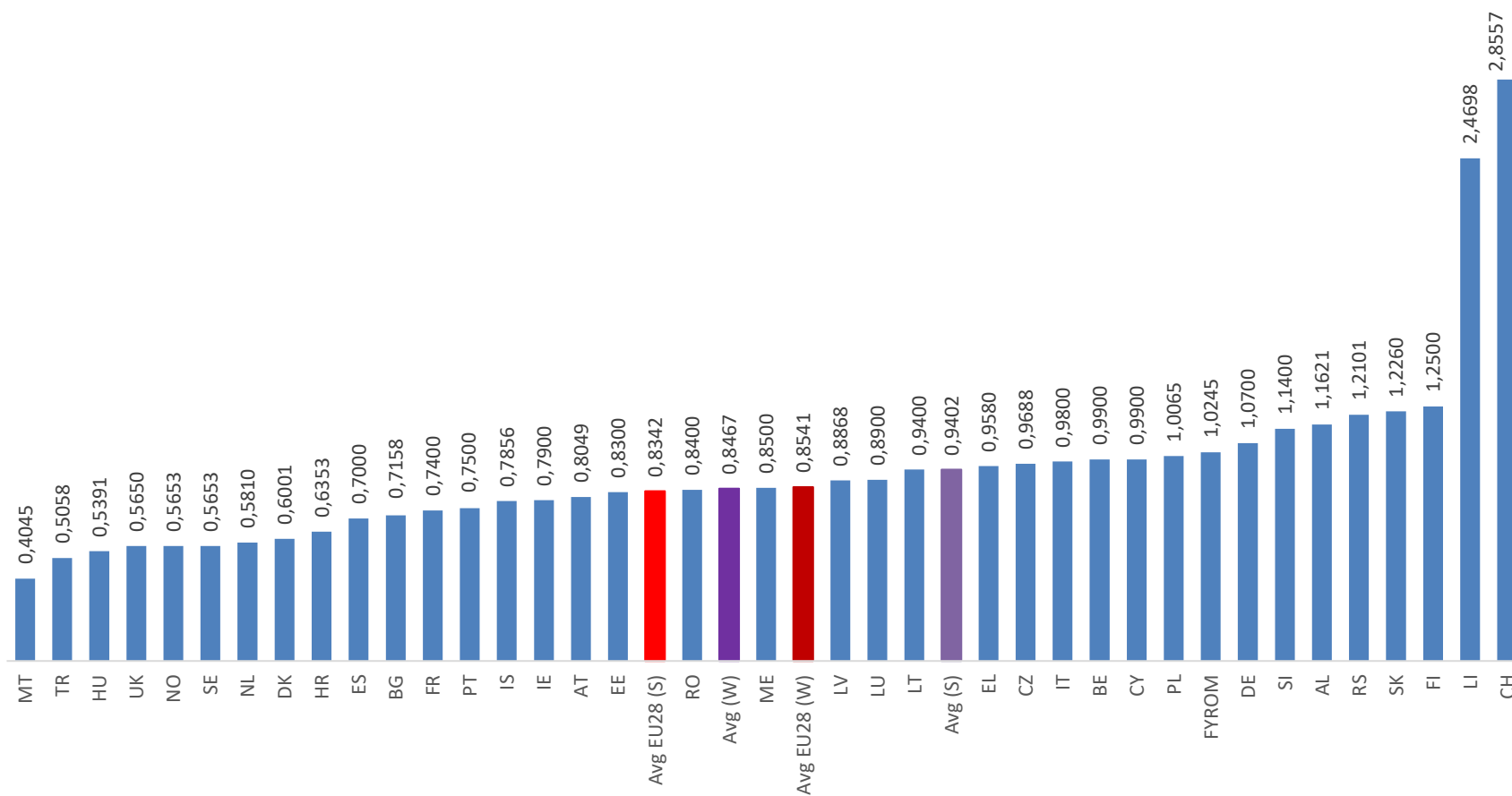


Source: BEREC, Termination rates at European level July 2018

The average MTR Avg (S) at the EU level (EU Member States only) stands at 0.83 cents per minute, whereas Avg (W) at EU level is estimated at 0.85 cents per minute. For July 2018, individual Member States' and observers' average rates¹², together with European and EU simple and weighted averages, are shown in Figure 18.

¹² Average MTR per country is obtained by weighting the average MTR of each operator by its market share, measured in terms of subscribers.

Figure 18: MTR by country, July 2018 (eurocents per minute of service)



Source: BEREC, Termination rates at European level July 2018

Fixed termination rates

Since the beginning of the liberalisation period, when incumbent operators served all the end-users of fixed network services, the termination service has been regulated not only in relation to price but also in relation to service characteristics and quality parameters. The regulation of voice termination in fixed networks has resulted in a clear overall decline in FTRs over the past decade, although this is of a smaller magnitude than the decline in MTRs.

However, in the past year, a significant reduction in this regulated price has taken place in the EU-28 countries, thanks to the increasing implementation of the Commission Recommendation on TRs.

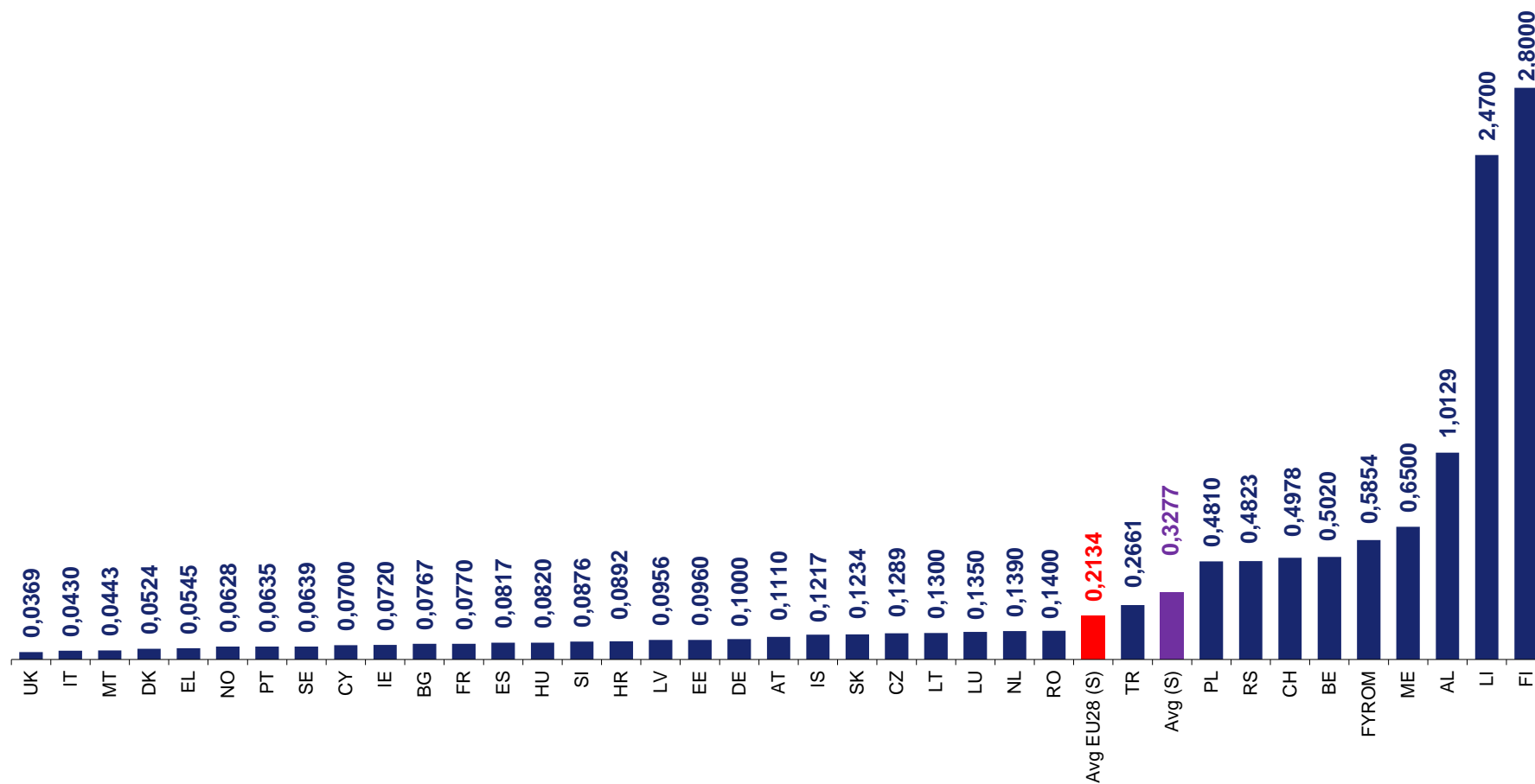
Although the regulation of FTRs had been harmonised by the Recommendation of 7 May 2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU (Recommendation 2009/396/EC), some differences can be found across the national regulatory regimes:

In some cases, the TR is a two-part tariff, that is, composed of a variable part (to be paid for each minute of a call) plus a set-up or fixed part (to be paid for each call). In other cases, termination prices consist only of the variable part.

An overview of incumbents' lowest regulated fixed termination rates per country is provided in Figure 19. Data refer to 1 July 2018 and include simple averages at European level as well the simple average of EU-28 incumbents. The simple average of the lowest regulated¹³ FTR of incumbents at European level (all 37 countries) stood at 0.33 cents per minute. The simple average of the lowest FTR of EU incumbents (EU-28) stood at 0.21 cents per minute.

¹³ Interconnection services in fixed networks are provided at different levels in the hierarchy of the incumbents' networks, called layers. Although some peculiarities in specific countries are present, in general three main layers for interconnection are defined: layer 1, or local level service provision (layer 1 is defined as the closest possible interconnection level to the network termination point); layer 2, or regional level service provision (single transit); and layer 3, national level service provision (or double transit). As a result of increasing symmetry and the decreasing relevance of the layers, the TR report features a ranking of the lowest regulated rates as well as a weighted average of peak and off-peak rates.

Figure 19: Overview of incumbents' lowest regulated fixed termination rates per country, July 2018 (eurocents per minute of service)



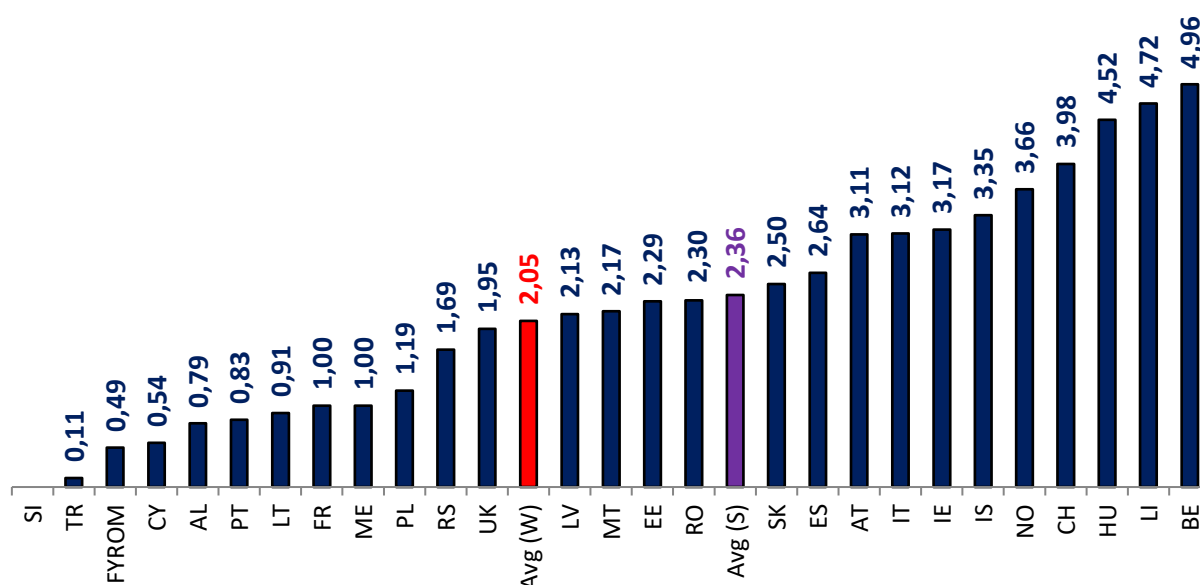
Source: BEREC, Termination rates at European level July 2018

Short message service termination rates

A traditionally important service in terms of revenues generated is the messaging (SMS/MMS) service. Just like voice calls, each SMS that originates from one network and is sent to an end user on another network will need an interconnection, and thus a termination service. In general, off-net wholesale SMS services have not been subject to price regulation in most of the EU-28 (i.e. they have been freely set by commercial agreements among operators).

Individual Member States' average rates, together with simple and weighted averages, as of 1 July 2018 are shown in Figure 20.

Figure 20: SMS TRs by country, July 2018 (eurocents per message)



Source: BEREC, Termination rates at European level July 2018

3.8 Regulatory accounting

The overall picture with regard to the cost accounting methodologies (Chapter 3) is relatively stable in comparison with 2017, with just a small number of changes by NRAs having taken place. There are clear preferences for price control methods (cost orientation alone or in combination with price caps, but the overall picture is more differentiated), cost base (current cost accounting) and allocation methodologies (mainly long-run (average) incremental costs (LR(A)IC), with fully distributed costs (FDC) preferred only for a few products). The degree of consistency of application of methodologies continues to be high and accommodates the use of elements or parameters that reflect national circumstances.

The 2018 regulatory accounting report in practice provides an analysis that focuses more on single products (increasing the scope of monitoring). The 2018 report collects information on 19 main products (13 in 2015).

Cost orientation remains the most commonly used price control method and it is applied mainly to legacy products, while the retail minus category, rarely chosen, refers mainly to wholesale line rental and, to some extent, VULA products.

The economic replicability test price control methodology, in line with the Commission Recommendation 2013/466/EU, is still not widely used for NGA products.

The most frequently used cost allocation approach is LRIC/LRAIC, for almost all products/markets. LRIC is the preferred approach specifically in termination markets. In the access market (Market 3a), there is a preference for LRIC/LRAIC. In general, when LRAIC/LRIC is chosen as the main category, the most common approach is bottom-up. FDC is the preferred approach for duct access, products in Market 4 and wholesale line rental. Both methods are used in Market 3b for legacy products.

The Accounting Separation obligation has been widely removed in a quite mature and stable environment, such as local loop unbundling in Market 3a (only 17 NRAs apply this remedy, versus 32 in 2017). A particular case is represented by termination markets, where NRAs that have determined prices through pure bottom-up LRIC models have, in some cases, removed the Accounting Separation obligation.

With reference to the asset base used a top down/accounting approach is still more frequently used for Markets 3b and 4 than a bottom-up model.

In termination markets, in line with the Commission Recommendation 2009/396/EC, a bottom-up approach is more frequently used, irrespective of the kind of price control in use.

The analysis of the structural data (Chapter 4 of this report) confirms that countries start from very different points in terms of population, topography, market situation, etc. These factors influence the regulatory strategy of NRAs for the wholesale access markets.

Regarding the weighted average cost of capital (WACC), the in-depth survey and the update provided in this report (Chapter 5) show that all NRAs use the capital-asset pricing model (CAP-M)¹⁴ and hence similar parameters for determining the WACC. However, the value of these parameters naturally differs, reflecting different national financial market conditions and economic circumstances (e.g. inflation rates, tax rates), the timing of market reviews and the sources of evidence used. This kind of evidence reflects and supports the arguments in the opinion given to the Commission's WACC consultation (BoR (18) 167). A specific focus on fixed and mobile markets shows that there is no significant difference in the methodology used to estimate the WACC.

Overall, the 2018 data confirm a consistent approach to regulatory accounting methods. This indicates that NRAs are providing a predictable regulatory environment in their countries. The convergence of regulatory accounting methods is more pronounced for the termination markets, whereas we see a more differentiated picture for the wholesale access markets reflecting the different national market situations and structural factors influencing the regulatory strategy.

For the first time, this report also provides information about the regulatory and competitive framework in each Member State, such as the presence of a geographical regulation, the equivalence model applied, the application of the retail margin squeeze test, the vectoring

¹⁴ BoR (13) 110.

regulation, the cable regulation and the issue of wholesale only operators. Outcomes of the survey are just reported in a descriptive form.

4. Regulatory framework

The regulatory developments in the electronic communications sector should be considered in the context of the economic trends outlined above. At the end of 2016, the European Commission had already embarked on a project to update the relevant pieces of EU legislation to adjust them to newly emerged market dynamics and participants, as well as to the policy objectives set in response.

The Commission's legislative proposals, referred to as the 'connectivity package' and released in September 2016¹⁵, aim to take stock of new players active in the markets and to further foster investment in ultra-broadband infrastructure by introducing, under certain circumstances, a more favourable regulatory treatment for brand-new, highly innovative network elements.

During 2017, the co-legislators made significant progress in the analysis of the Commission's legislative proposals, and in 2018 — after nine trilogues — a political agreement was reached between the legislators. The European Parliament's plenary vote took place on 14 November 2018, while the Council approved the final text on 4 December 2018. The final texts of the EECC Directive¹⁶ and the BEREC Regulation¹⁷ were published in the Official Journal on 17 December 2018.

BEREC provided professional support to the European Parliament Committee on Industry, Research and Energy as well as the Council Working Party, which invited the BEREC Chair to hold a presentation and exchange views with representatives of the Member States.

Stemming from the EECC and the new BEREC Regulation, the Regulatory Framework Expert Working Group started to work particularly on the following work items:

- updating of the Rules of Procedure;
- numbering related issues;
- guidelines on the general authorisation notifications and the establishment of a database.

5. Openness of the internet

One of BEREC's strategic goals in 2018 has been to foster a consistent approach to the net neutrality principles and thus safeguard an open internet throughout Europe. In this respect, BEREC has continued to act as a forum that supports NRAs in applying the Net Neutrality Regulation in a consistent way throughout Europe. Furthermore, BEREC has continued its work that looks into how net neutrality is affected by changes in markets and new technologies

¹⁵The package includes a directive setting out the European Electronic Communications Code, a regulation establishing BEREC, a regulation on the promotion of internet connectivity in local communities, a communication entitled 'Connectivity for a competitive Digital Single Market — Towards a European gigabit society' and a communication setting out an action plan for 5G.

¹⁶ Directive (EU) 2018/1972.

¹⁷ Regulation (EU) 2018/1971.

and that encourages NRAs to share their experiences on the practical implementation of the Net Neutrality Regulation and the BEREC guidelines.

Strengthening and ensuring an open internet throughout Europe

In 2018, BEREC published its second *Report on the implementation of Regulation (EU) 2015/2120 and BEREC Net Neutrality Guidelines*. This report found that NRAs had actively implemented the regulation. It is evident that, during the second year of the application of the regulation, the adoption of monitoring methods had increased when compared with the first year. Moreover, quite a few NRAs had dealt with zero-rating cases, and a handful of formal decisions were reached.

The report also outlined that half of the NRAs had already set national specifications in relation to the different types of speed-related information required under Article 4 of the regulation — maximum, normally available and minimum speed. Even though the Regulation has been in place for more than two years, internet service providers in almost half of the countries had not yet included speed information in their contracts. A great majority of the NRAs monitor end-user complaints about the performance of the internet access service. Two thirds of the NRAs (19 out of 29) offer an internet access service quality monitoring mechanism to consumers.

Overall, BEREC concludes that the regulation has been implemented by NRAs with adequate coherence. BEREC will continue to follow this path in 2019. In addition, NRAs coordinated and exchanged information on ongoing cases and will continue to do so in 2019.

The Commission is conducting an evaluation of Regulation (EU) 2015/2120 and will publish a report by 30 April 2019. Given this, in late 2018, BEREC provided the Commission with an opinion for the evaluation of the application of the regulation and the BEREC Net Neutrality Guidelines.

For the purpose of this opinion, BEREC ran a public consultation between 14 March 2018 and 25 April 2018. From the stakeholders' inputs, BEREC observed that some of them (for example internet service providers) wanted the BEREC Net Neutrality Guidelines to be less stringent, while others (for example consumer organisations) argued that the guidelines should be more stringent. It is clear that both the regulation and the guidelines could be considered to strike a balance between the views of many stakeholders.

Nevertheless, BEREC concluded that the guidelines could, after their application in the first two years, be clarified in certain instances. This will be done in 2019, with the regular involvement of stakeholders through a written consultation on a draft version of updated guidelines.

This ambitious work on safeguarding net neutrality has been strengthened through BEREC's relations with regulators in non-EU countries. Consequently, 2018 was marked by the signature of a memorandum of understanding between BEREC and the Telecom Regulatory Authority of India (TRAI), with an emphasis on net neutrality. Furthermore, exchanges between experts from BEREC and a Korean delegation took place on this subject in 2018.

The cooperation between BEREC and the networks of regulators from Central and South America (Regulatel) will continue in 2019 with a joint meeting in April, to facilitate an exchange

of views on expert level on net neutrality developments after the regulation's entry into force and the effect of devices on the open use of the internet.

Development of a net neutrality measurement tool for the benefit of NRAs and end-users

In 2018, BEREC ran a procurement process for a net neutrality measurement tool. Since the end of 2018, the project has been ongoing and BEREC has continued to provide for the follow-up and supervision of the development of the net neutrality measurement tool, performed by the awarded contractor. Moreover, BEREC will prepare for the roll-out of the tool among the NRAs that choose to deploy the tool, either as a supplement to an existing national tool or as their main national tool. The development of the tool is scheduled to take one year, with a view to have it completed by the end of 2019, and will be followed by a three-year maintenance phase. The development phase consists of five milestones, as specified in the tender specification, and the BEREC Office and an advisory committee (comprising NRA experts) will oversee the user acceptance tests and sign off on the accepted deliverables. BEREC will engage in multi-NRA coordination of the tool when it is rolled out on a larger scale, after the finalisation of the development at the end of 2019.

6. International roaming developments

Since 15 June 2017, roaming charges in the EU and the EEA have been history. With the entry into force of the Roaming Regulation (Regulation (EU) 2015/2120, published in the Official Journal of 26 November 2015, and including amendments to Regulation (EU) No 531/2012), consumers in the EU can now use their mobile phones within the EU as at home, without any additional surcharge ('Roam Like at Home' — RLAH). Only in exceptional cases may the operator levy a surcharge for roaming in the EU.

To assess the competitive developments and the impact of RLAH in the EU-wide roaming markets, BEREC has to regularly collect data from NRAs on the development of retail and wholesale charges for regulated voice, SMS and data roaming services, including wholesale charges applied for balanced and unbalanced roaming traffic. BEREC must also collect data on wholesale roaming agreements that are not subject to the maximum wholesale roaming charges and on the implementation of contractual measures at wholesale level that aim to prevent permanent roaming or anomalous or abusive usage of wholesale roaming access for purposes other than roaming.

On the basis of the collected data, BEREC has to report regularly on the evolution of pricing and consumption patterns in the Member States for both domestic and roaming services, the evolution of actual wholesale roaming rates for unbalanced traffic between roaming providers and the relationship between retail prices, wholesale charges and wholesale costs for roaming services. BEREC has to assess how closely these elements relate to each other.

The following paragraphs provide the results of these exercises and show the developments on volumes and revenues for both the retail and wholesale markets.

The introduction of RLAH services, coupled with the growing demand for data services, has changed the international roaming market. A relevant point is that the RLAH services enabled

a substantial increase in international roaming traffic. The minutes generated under RLAH tariffs account for the majority of voice traffic. In total, 89.20% of minutes of calls made and 86.94% of minutes of calls received in Q1 2018 were generated by subscribers of RLAH tariffs. For text messages sent while roaming within EEA countries, RLAH tariffs accounted for 93.12% of the total volume in Q1 2018. Around 89.82% of data traffic in Q1 2018 was based on the RLAH data tariff while roaming.

BEREC data also show clear evidence of seasonal movements. Compared with Q3 2017, the data roaming traffic decreased by 26.69% in Q4 2017 and by 16.63% in Q1 2018. The same applies to roaming calls made, which, compared with Q3 2017, decreased by around 17% in Q4 2017 and Q1 2018. To deal with the impact of seasonality, BEREC compared its data with data from the same quarter in the previous year.

Increased volumes can be seen in the relationship between Q1 2017 and Q1 2018. The average European Economic Area (EEA) roaming subscriber spent 18.54 minutes per month on calls made in Q1 2018, in comparison with 10.90 minutes in Q1 2017. The number of received call minutes abroad amounted to 15.79 minutes per EEA average roaming subscriber per month in Q1 2018, whereas this was around 11.75 minutes in Q1 2017. Data roaming consumption ranged from 129.8 MB to 718.6 MB per roaming subscriber monthly in Q1 2018 in comparison with a range from 15.9 MB to 314.7 MB in Q1 2017.

In comparison with the same quarter (Q1) in the previous year, data traffic in 2018 increased by 397.59% and the traffic for calls made increased by 97.86%. Traffic for calls received grew by 56.30% in Q1 2018, compared with Q1 2017. The traffic for SMS services increased by 33.82% in Q1 2018, compared with Q1 2017. Although international roaming services demonstrate high seasonal variations, the results clearly show that the 2017 update to the Roaming Regulation has significantly contributed to stimulating demand for roaming services and to the development of the international roaming market.

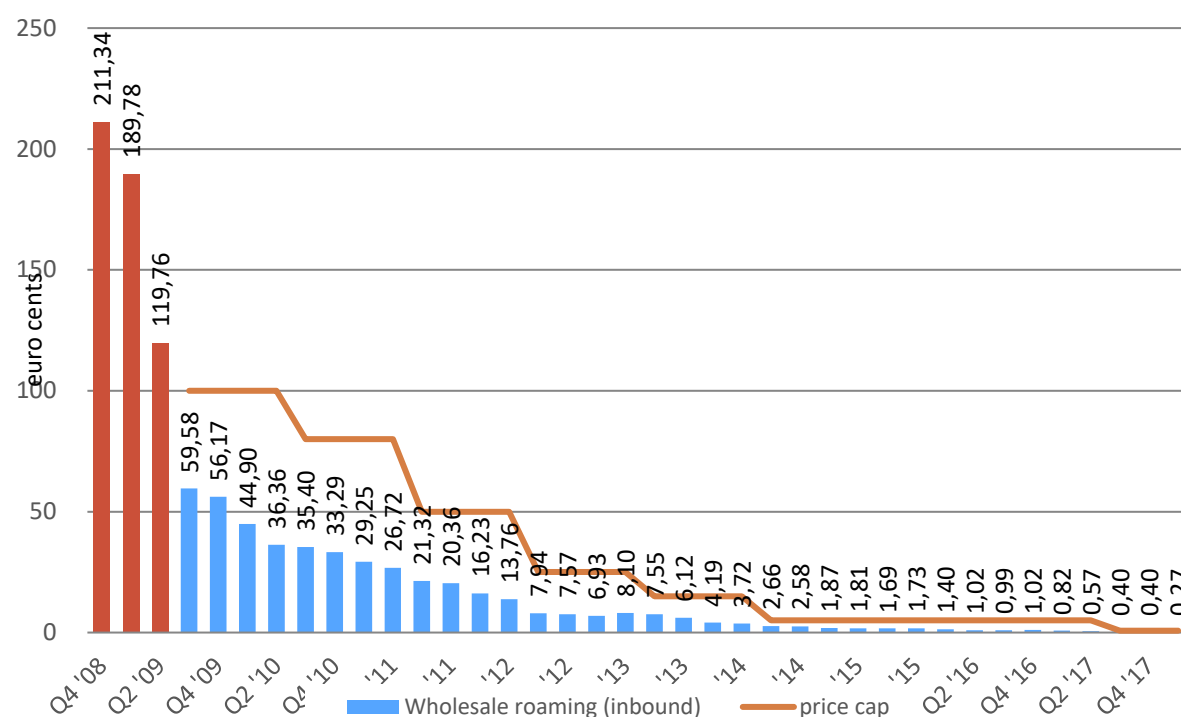
BEREC analysed domestic retail prices and found that it is hard to disaggregate the different mobile communications services, since they are often provided as part of a bundle of several services, including intra-EEA roaming communications and, in several cases, non-mobile services as well. Operators are finding it difficult to organise their revenue data by individual service categories, such as fixed telephony, mobile telephony, fixed broadband and intra-EEA roaming communications, and no common methodology has been defined for this purpose. Bundles challenge this practice, as individual service categories require bundle revenues to be allocated to their components. Given this, BEREC examined the alternative of presenting data on the evolution of the average retail revenue per user (ARRPU). Further conclusions on the price levels of mobile communications services can be made only by a thorough review of retail prices. In spite of the limitations and lack of a common methodology, as mentioned above, BEREC has calculated the ARRPU; however, the results should be interpreted with caution. For this calculation, BEREC used data relating to domestic mobile services submitted by operators. The domestic monthly ARRPU for Q1 2018 varies considerably between countries, ranging from EUR 3.74 per month to EUR 29.23 per month, with a weighted EEA average of EUR 9.29. Disproportion between individual ARRPU could be caused by the different methodologies used by operators to allocate the revenues relative to different domestic mobile services. With regard to Q4 2017, the ARRPU in Q1 2018 remains stable overall.

At the wholesale level, the voice, SMS and data roaming charges set between operators have fallen significantly below the regulated average caps. The applicable price caps and the related EEA average prices during the data collection period were:

Service at wholesale level (no VAT)	Q4 2017		Q1 2018	
	Price Cap	EEA Average	Price Cap	EEA Average
Wholesale voice (€/minute)	3.2	2.32	3.2	2.06
Wholesale SMS (€/SMS)	1	0.53	1	0.38
Wholesale data (€/MB ¹⁵)	0.77	0.40	0.6	0.27

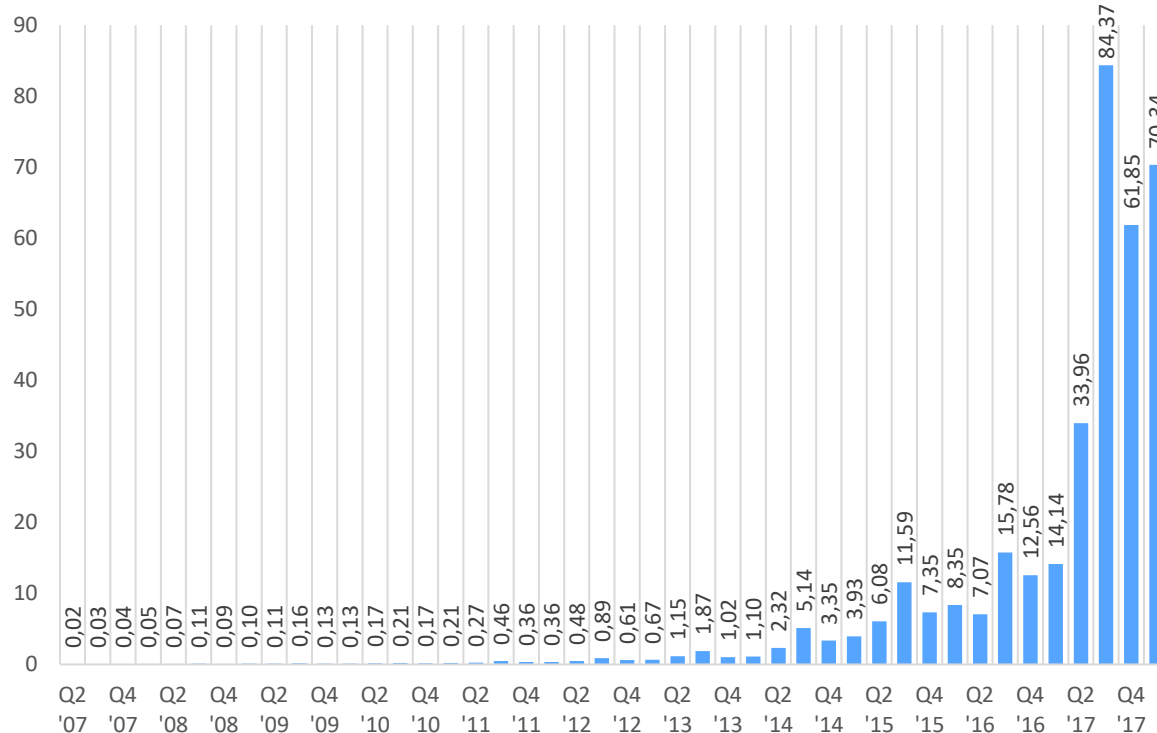
For data services in particular, there has been a significant decrease in the EEA average wholesale price per MB and a significant increase in the retail traffic (see Figures 22 and 23).

Figure 22: EEA average wholesale data price per MB, Q4 2008-Q1 2018



Source: BEREC, International roaming BEREC benchmark data report October 2017-March 2018

Figure 23: EEA retail data traffic, Q2 2007-Q1 2018 (millions of GB)



Source: BEREC, *International roaming BEREC benchmark data report October 2017-March 2018*

In addition, according to the data collected, BEREC found that the ARPU of MNOs was higher than MVNOs, and roaming consumption was lower for MVNOs' subscribers than MNOs subscribers. Furthermore, in Q1 2018, 4% of MNOs' subscribers had 'domestic only' tariffs, while 23% of MVNOs' subscribers had this kind of tariff but without roaming enabled.

Finally, BEREC published its roaming benchmark report this year, along with a spreadsheet containing the data in a form that is easily accessible to and manageable for the public.

Conclusion

2018 was another busy year for BEREC, which, under an ambitious work programme, focusing on the review of the European regulatory framework for electronic communications, as well as open internet and 5G deployment in Europe, approved several important pieces of work in response to market developments.

As mentioned in the foreword, BEREC actively contributed to the negotiations for the new European Electronic Communications Code and continued to engage with its stakeholders, taking into account their views during the public consultations organised throughout 2018.

Facilitating a fast and consistent deployment of 5G in Europe and safeguarding an open internet in Europe were among the top priorities for BEREC in 2018. As already reflected in BEREC's strategy for 2018-2020, 5G deployment in Europe has been defined as another top priority, taking into account the latest market developments. BEREC has completed a contract for the delivery of a study on the implications of 5G deployment on future business models, with special focus on key technologies and services that may emerge, in the years up to 2022.

BEREC supported the consistent implementation of the Open Internet Regulation and also decided to develop a measurement tool to measure the quality of fixed or mobile internet access services and detect potential illegal traffic management practices.

In addition to these, BEREC addressed various other topics, including data economy, Internet of Things, infrastructure sharing, the review of the Significant Market Power Guidelines, the implementation of the new BEREC Regulation, and provided input to the Commission's consultation on the WACC Guidance.

Another important topic was the Commission's Strategy for the Western Balkans (WB6) (COM(2018)65). Two high-level meetings were held between BEREC and the WB6 in 2018. Both agreed to cooperate more closely in the fields of roaming, termination rates and capacity building and decided to monitor the cooperation on heads level twice a year.

To harmonise regulatory approaches across the EU and safeguard the application of new rules, BEREC will continue to seek the valuable contributions of its stakeholders and foster cooperation with other competent authorities in the forthcoming years. As has been the practice in the past, BEREC will continue to seek the opportunity to contribute its insights and expertise to the development of the Single Market in the future.

PART B: Annual Report on BEREC activities in 2018, under Article 5.5 of Regulation (EC) No 1211/2009 establishing the Body of European Regulators for Electronic Communications (BEREC) and the Office

1. Introduction

In this report, the activities of the Body of European Regulators for Electronic Communications (BEREC) in 2018 are presented in accordance with Article 5.5 of Regulation (EC) No 1211/2009 establishing the Body of European Regulators for Electronic Communications (BEREC) and the Office.

The report focuses on the priorities and work streams that were laid out in the *BEREC work programme 2018* and updated throughout the year. One of the top priorities of 2018 was 5G. Even though the next-generation mobile networks are not likely to be operational until 2020, BEREC nevertheless wanted to proactively prepare itself for the upcoming challenges, to support the consistent deployment of 5G across the Member States. Therefore, BEREC adopted a common position on infrastructure sharing and a report on spectrum auctions and coverage obligations. Another top priority was harmonisation that allows consumers and operators to benefit from an effective and competitive telecoms sector. To this end, BEREC contributed its expertise to the negotiations for the new European Electronic Communications Code (EECC). Stakeholder engagement also remained a top priority. In 2018, 11 public consultations were held, and engagement with national regulatory authorities (NRAs) overseas was strengthened: memorandums of understanding (MoUs) with both the Telecom Regulatory Authority of India (TRAI) and the Canadian Radio-television and Telecommunications Commission (CRTC) were signed to learn from each other and improve the way regulation is implemented. Furthermore, BEREC started to cooperate with the WB6.

This report also covers the work carried out by the expert working groups (EWGs) and ad hoc teams. Each section contains a description of the work undertaken in 2018 and a list of all the documents that were produced by each work stream. Article 7/7a cases are presented in a similar manner.

1.1. BEREC the next decade

In summer 2018, a political agreement on the new EECC and the new BEREC Regulation, which did not foresee big changes to the institutional setting, was reached. Yet, during the summer, BEREC started to think about its 'work of operation'. The outcome of this thinking was a workshop on BEREC the next decade, which was held at the plenary meeting in Portorož, Slovenia. The workshop was organised to collect ideas on a variety of topics, such as the organisation of meetings, the BEREC Work Programme, the EWG structure and BEREC's success, perception and transparency.

One result from the Portorož workshop revealed that, in light of the new BEREC Regulation, in which BEREC needs to adopt an outline of the work programme for the coming year at the end of January, the BEREC Work Programme should progressively become a multiannual work programme in the coming years. This is important because the implementation of the new EECC will be carried out over a two-year period. Moreover, it is crucial to have a multiannual work programme to focus on long-term projects. Another important conclusion of the workshop was to amend the EWG structure. After a thorough assessment of the work BEREC might have to carry out in the years to come, the Board of Regulators (BoR) decided to renew the EWG structure in the following way:

Figure 1: New BEREC Expert Working Group structure



Source: BEREC

It decided to establish a new group that will be devoted to identifying forward-looking regulatory issues and medium- to long-term projects. This group will also be responsible for drafting the medium-term strategy and will contribute to the drafting process of the BEREC Work Programme.

The BoR also decided to slightly change three groups because of future workload. The Regulatory Accounting EWG was integrated into the Remedies Group, and the Mobile and Roaming EWG was split into two groups.

Finally, the BoR renamed some of the groups. Their new names should better reflect the topics for which they are responsible.

2. Work Programme 2018

2.1. Responding to connectivity challenges and new conditions for access to high capacity networks

2.1.1. Access to physical infrastructure in the context of market analysis

Physical infrastructure represents a significant proportion of the investment in next generation access (NGA) networks. Measures aimed at facilitating greater use of existing physical infrastructure can reduce the civil engineering works required to deploy new networks and significantly lower costs.

NRAs have to date imposed access to physical infrastructure through existing wholesale markets (largely Market 3a), either as an ancillary remedy or by including physical infrastructure in the relevant market and imposing respective remedies. As evidenced by the responses to a BEREC questionnaire designed for this report, the majority of NRAs believe that the existing list of relevant markets is currently sufficient to impose access to physical infrastructure where needed.

However, some NRAs have identified both current and prospective analytical and practical issues with this approach, which may become more prominent in years to come, particularly because of technological changes, increased infrastructure-based competition, development of offers of access to physical infrastructure from alternative operators or competition concerns that are wider than the ones currently identified by NRAs under the market review process. A market centred on access to physical infrastructure may offer a potential path to resolving these issues, depending on national circumstances.

A public consultation was organised on this report. The consultation report and the final version of the report will be published in mid-2019.

Document:

BoR (18) 228 - Public Consultation BEREC Report on Access to physical infrastructure in the context of market analyses

2.1.2. Pricing for access to infrastructure and civil works

The Broadband Cost Reduction Directive (BCRD) aims to facilitate and incentivise the roll-out of high-speed electronic communications networks by promoting the joint use of existing physical infrastructure and enabling a more efficient deployment of new physical infrastructure so that such networks can be rolled out at a lower cost. The BCRD in particular contains rules on access to existing physical infrastructure (Article 3), coordination of civil works (Article 5) and access to in-building physical infrastructure (Article 9). In case the involved parties are not able to reach an agreement or access is refused, either party is entitled to refer the issue to the competent national dispute settlement body. Since determining pricing terms is one of

the more complex issues addressed by the BCRD, it has been studied in more detail (see also BoR (17) 245 - Implementation of the Broadband Cost Reduction Directive Section 3.1.3).

The focus of this BEREC report is on pricing with regard to access to existing physical infrastructure (Article 3), as it is the most relevant Article for most Member States. Topics dealt with in the report are access to existing physical infrastructure (Article 3), including the relevance and effect of different (occasionally, already existing) access regimes on BCRD pricing, pricing methodologies according to the BCRD regime and pricing decisions; coordination of civil works (Article 5) and in-building physical infrastructure (Article 9).

The aim of the report is to foster knowledge transfer between NRAs. The analysis is descriptive and does not aim to be normative or recommend best practice. It is based on replies to a questionnaire from NRAs of 24 Member States in which the relevant regulations regarding access to existing physical infrastructure and civil works have been transposed and are in place.

The report was approved for public consultation by the BoR at Plenary 3/2018. The public consultation ran from 10 October 2018 to 7 November 2018. The final report and consultation report will be published after plenary 1/2019.

Document :

BoR (18) 163 - BEREC report on pricing for access to infrastructure and civil works according to the BCRD

2.1.3. Geographical market definition

The BEREC common position on geographical aspects of market analysis (definition and remedies) was published in June 2014. After its publication, many of the NRAs applied this common position in the context of geographical segmentation of market definition and of remedies, and, in October 2014, the European Commission published a new recommendation on relevant markets. This report aims to provide an overview of the experiences in NRAs of applying geographical segmentation of both markets and remedies.

The main reasons for the growing relevance of geographical analysis observed in markets 3a, 3b and 4 relate to the NGA roll-out by both alternative and incumbent operators and the take-up of regulated access services. As these developments continue, geographical analysis is likely to gain further importance in the future, particularly in markets 3a and 4, where the number of cases is still low compared with Market 3b. BEREC considers that a harmonised approach to this increasingly relevant issue is important to ensure consistency across EU Member States.

NRAs have ended up with a range of outcomes, in terms of differentiating markets and remedies geographically, reflecting differences in national conditions. Neither the European Commission nor the national courts have challenged geographical market analyses (although not all cases challenged by national courts were closed by the time the present report was written). This suggests that the current regime allows sufficient scope for NRAs to exercise their judgement when reflecting local conditions.

Given these results, and since no major issues with the BEREC common position on geographical aspects of market analysis were raised in the replies to the questionnaire, BEREC currently does not see a need to revise the common position.

2.1.4. Benchmarking on technical and economic replicability assessment in the context of symmetric access

The report *Technical and economic replicability assessment in the context of symmetric access* examined NRA experiences of assessing technical or economic replicability when considering the imposition of symmetric access obligations. It builds on the work undertaken in 2017 that examined the rationale for and scope of symmetric access obligations. This follow-on report examines NRA experiences of assessing technical or economic replicability when considering the imposition of symmetric access obligations in situations in which operators lack access to viable alternatives to non-replicable assets, as required by Article 12(3) of the Framework Directive and Article 61(3) of the EECF. The report makes clear that these powers are not the only means by which NRAs can impose symmetric obligations and there is overlap with, for example, the BCRD.

The first part of the report examines the link between market structure and the application of symmetrical regulation. It shows that countries that have imposed symmetric access obligations have reasonable/significant coverage by both significant market power (SMP) operators and non-SMP operators, whereas there is no particular market structure associated with countries that have not imposed symmetric obligations. However, the analysis does not draw any conclusions regarding causal relationships between market structure and the use of, or effects of, symmetrical regulation.

The second part of the report examines the scope and type of symmetric access obligations in the countries that have imposed the latter and the type and range of regulatory powers that have been used by the NRAs to impose symmetrical regulation.

Where symmetrical regulation has been imposed, it was for reasons of in-building wiring and local access obligations, and, in a majority of instances, it was also imposed on the backhaul segment. In terms of the type of symmetrical regulation imposed, seven out of nine NRAs have imposed it on civil infrastructure, and, in five NRAs, symmetrical regulation was applied to dark fibre (although usually in very specific settings). There were no instances of active remedies imposed through symmetric access obligations. There was no clear correlation either between the type of symmetric access obligation imposed (access to civil infrastructure, dark fibre or active remedies) and the scope of these obligations regarding the part of the network they apply to (e.g. in-building wiring or local access network).

The report found that a structured assessment of economic and technical replicability was undertaken on only three occasions. This limited use of a structured assessment stems from not only the growing use of the BCRD, but also the use of alternative regulatory and legislative tools to impose symmetrical regulation, such as planning rules that provide access to buildings and national legislation to facilitate infrastructure deployment. The technical assessment focused on constraints in accessing in-building wiring and ducts, whereas the economic assessment focused on the supply side and demand parameters that determine the commercial viability of deploying alternative infrastructure.

Document :

BoR (18) 214 - Technical and economic replicability assessment in the context of symmetric access

2.1.5. Layer 2 wholesale access products excluding Ethernet-based leased lines on Market 4

In June 2018, BEREC published the report Layer 2 wholesale access products excluding Ethernet-based leased lines on Market 4 in response to the use, in recent years, of a Layer 2 wholesale access product (L2 WAP) on the wholesale high-quality access market (Market 4), which is not an Ethernet-based leased line, in several countries.

BEREC had already analysed L2 WAPs imposed as a remedy on the wholesale local access market (Market 3a) and on the wholesale central access market (Market 3b) and had published a report on common characteristics of L2 WAPs (BoR (15) 133) and a common position on L2 WAPs (BoR (16) 162).

The new report analyses L2 WAPs imposed on Market 4 with a focus on advanced bitstream products (not including Ethernet-based leased lines). To gain deeper insight into these products and contribute to consistent regulation of access products, as well as to foster knowledge transfer between NRAs, the objectives of the report are (1) to provide an overview of L2 WAPs currently in place in Market 4 based on experiences of NRAs; (2) to analyse the reasons why such products have been imposed on Market 4; (3) to analyse the extent to which L2 WAPs in different countries have common characteristics and identify them; and (4) to analyse the main differences between L2 WAPs imposed on Market 4 and L2 WAPs imposed on markets 3a and 3b. The analysis is descriptive and does not aim to be normative or to recommend best practices.

Six countries imposed an L2 WAP on Market 4. The main motivation was to enable alternative network operators (ANOs) to offer high-quality retail communication services to businesses and/or replicate such services of the SMP operator. Compared with (Ethernet) leased lines, an L2 WAP has the advantage of being less costly, and it still has a sufficiently high-quality level to be used for high-end business services.

The imposition of an L2 WAP on Market 4 indicates that traditional remedies, like leased lines with traditional interfaces or even Ethernet-based leased lines (and other remedies on markets 3a and 3b), have not been sufficient to address the competition problems identified during the course of the Market 4 analysis. It also shows that, in some cases, it was considered more appropriate to impose an L2 WAP on Market 4 than on Market 3a or 3b for example. This would usually be the case if the L2 WAP is a substitute for other Market 4 products (mainly leased lines). In four of the countries mentioned above, this is actually the case. In the other two countries, the L2 WAP is also analysed together with Market 4 products, since both are 'high-quality access' wholesale products and the competitive conditions are considered to be sufficiently homogenous.

Common characteristics of the L2 WAPs on Market 4 in the countries analysed were identified for the following topics: 1) technology, 2) availability, 3) bandwidth, 4) quality of service (QoS), 5) service level agreement (SLA), 6) service level guarantee, 7) redundancy, 8) customer premises equipment (CPE)/modem, 9) traffic prioritisation, 10) customer identification, and 11) security.

The common characteristics of the L2 WAPs on Market 4 identified differ from the common characteristics of the L2 WAPs on Markets 3a and 3b, analysed by BEREC in 2015 (BoR (15) 133), as follows: The L2 WAPs on Markets 3a and 3b do have common characteristics 1), 2) and 8) (partly), and 9) to 11), but they do not have 3) and 4) in common, which are rather similar to Ethernet-based leased lines (characteristics 5) to 7) are specific to leased lines and therefore were not considered in BoR (15) 133).

Document :

BoR (18) 120 — Layer 2 Wholesale Access products excluding Ethernet-based Leased Lines on Market 4

2.2 Monitoring potential bottlenecks in the distribution of digital services

2.2.1 Data economy

The role of data becomes increasingly relevant in most sectors of the economy. The telecommunications sector is no exception, especially given its growing interactions with other sectors, which are at the core of data. Taking this into account, BEREC considers that it is important to study the impact of the data economy on the electronic communications sector, which is under its regulatory scope, and consider the role that NRAs could play in the context of the data economy.

With this aim, BEREC has carried out some preparatory meetings with academics and stakeholders, including a workshop in June 2018, in which NRAs' heads and various relevant stakeholders took part. BEREC also prepared a call for input in the fourth quarter of 2018, with the aim of getting insights from all types of stakeholders on issues that are to be taken into account by NRAs in the context of the data economy and ideas on where the experience of NRAs can be used, in collaboration with other regulatory bodies, to encourage the development of the data economy.

Following on from this, BEREC will prepare a report to be published in mid-2019.

Document:

BoR (18) 168 - BEREC public consultation on the data economy

2.2.2 Location of the network termination point

BEREC's 2018 Work Programme includes within strategic priority 2, 'monitoring potential bottlenecks in the distribution of digital services', the subject of the location of the network

termination point (NTP) (III.2.2). Defining the location of the NTP is the responsibility of the NRA and it has an impact on whether a piece of equipment is part of the public network or part of the telecommunications terminal equipment.

BEREC's report *Location of the network termination point* aims to foster the knowledge transfer between NRAs and gain deeper insight into the legal provisions of NRAs (and other national authorities as well) in the EU on the location of the (fixed and mobile) NTP with the following objectives: (1) to give an overview of the definition of the NTP location in the EU; (2) to analyse the legal provisions of NRAs or other national authorities that define the NTP location in general (i.e. for all NTPs); and (3) to examine L2/L3 WAPs imposed by NRAs with regard to characteristics that may have an impact on the NTP location. The analysis is descriptive and does not aim to be normative or recommend best practices.

The overview of the definition of the NTP location in the EU shows that national authorities either defined or plan to define the location of the fixed NTP in general (i.e. for all fixed NTPs) in five EU countries and the location of the mobile NTP in general (i.e. for all mobile NTPs) in three EU countries. The NRA does have this legal power in 13 other countries but has not used it so far.

The NRA has the legal power to decide in individual disputes between end-users and network operators or service providers on the fixed and mobile NTP location in 15 EU countries. In all 15 countries, there has been no need to resolve any such dispute with a decision so far.

The report analyses the legal provisions of the national authorities in the five countries that either defined or plan to define the NTP location in general focusing on: Authority and legal instrument, main reasons for the definition of the NTP location, definition of the fixed NTP location, definition of the mobile NTP location, and CPE/modem end-users.

The findings of the examination of L2 WAPs and L3 WAPs imposed by NRAs in 14 countries with regard to characteristics that may have an impact on the NTP location are as follows:

- L2 WAPs and L3 WAPs allow ANOs to use their own CPE including modem in nearly all cases on copper-based access lines and in about half of the cases on fibre-based access lines, which enable ANOs to provide retail services with an NTP at point A (or B or C).
- When ANOs are allowed to use their own CPE including modem, they are then allowed to use any CPE (including modem) that fulfils the requirements of the SMP operator in about two thirds (copper-based access) or half (fibre-based access) of these cases, and, in the other cases, they are allowed to use CPEs that are on a white list.

Overall, there was only a need to define the NTP location in some countries. In the case of the fixed NTP, it seems this was driven mainly, on the one hand, by end-users who demanded to be able to use their own CPE (including modem) and, on the other hand, by the need in one country to define the demarcation line between public network infrastructure and the private in-building network infrastructure. In most cases, the national authority laid down that the fixed NTP is at point A and that end-users are allowed to use all CPEs (including modem) that fulfil the characteristics of the NTP (no restriction to a white list or certification).

This report also constitutes a comprehensive basis for the guidelines on the topic 'location of the NTP' that BEREC has to adopt under the new EECC.

Document :

BoR (18) 159 — Location of the Network Termination Point

2.2.3 IoT indicators

In recent years, BEREC has considered the implications of the Internet of Things (IoT). In 2016, BEREC published a report on enabling the Internet of Things. In 2017, BEREC held IoT-related workshops to discuss the regulatory implications and solutions required to ‘ensure a large-scale and sustainable IoT roll-out, in order to deliver significant benefits to citizens and consumers across different industries’. In December 2018, BEREC launched a public consultation on IoT indicators. The public consultation (which closed on 23 January 2019) focused specifically on:

- general issues regarding the collection of statistical information on the IoT, including a BEREC definition of the IoT;
- BEREC’s IoT universe, discussing the applications and network technologies that BEREC and NRAs should consider with respect to monitoring the IoT;
- the effect of the IoT on NRA spectrum policies and scarce resources, covering the extent to which NRAs should monitor and BEREC should benchmark IoT developments and the effects of such developments on spectrum and numbering requirements;
- the importance of IoT indicators for BEREC, focusing on what NRAs currently collect and the potential future approach of BEREC in this area.

The final report and the response to the public consultation will be adopted, and subsequently published, at the 38th BEREC plenary meeting in Budapest in March 2019.

Document :

BoR (18) 230 — BEREC Public Consultation on Internet of Things Indicators

2.2.4 Content and devices

The general purpose of the report “*on the impact of premium content on ECS markets and the effect of devices on the open use of the Internet*” was to provide a snapshot of how the electronic communications sector is influenced by other sectors, in particular by content and devices, and some thoughts on the potential implications of this influence.

The report demonstrated that, in most countries, bundling is used by electronic communications services (ECS) providers to commercialise premium content, and this trend appears to be on the rise globally. A mixed picture emerges regarding the impact of these practices on competition dynamics in ECS markets, with both negative and positive effects. Whether the bundling of premium content with ECS affects competition in the ECS market may depend on the ability of all stakeholders to compete effectively with the bundled offers of large ECS providers.

The second issue analysed in this report was whether devices challenge the general objective of an open internet in terms of how end-users can use internet services practically on their devices. Devices and their embedded operating systems provide the interface for consumers to use the internet. Given this, the choice of internet content and applications that are actually available to consumers may differ depending on the device they use. BEREC is of the opinion that the monitoring of device markets and software platforms (operating system and

application stores) by regulatory authorities (i.e. competition authorities or sector-specific agencies) might be useful in verifying that internet use remains open.

This draft report was subject to a public consultation between 11 October and 8 November 2017, and the final report was approved in early 2018.

Document :

BoR (18) 35 - BEREC report on the impact of premium content on ECS markets and the effect of devices on the open use of the Internet

2.3 Enabling 5G and promoting innovation in network technologies

2.2.1. Report on practices on spectrum authorisation, award procedures and coverage obligations with a view to considering their suitability to 5G

As 5G technologies are being developed, European countries are considering granting, amending or renewing frequency licences that could accommodate these technologies. It is also possible that 5G might be deployed using unlicensed spectrum.

The design of the selection procedures for spectrum licences and the conditions attached to these licences may have consequences on the structure of national mobile markets (by either enhancing competition or limiting it).

The Radio Spectrum Policy Group (RSPG) has already produced report RSPG16-004 on efficient awards and efficient use of spectrum. The report provides a comprehensive analysis of different types of awards and discusses the trends and best practices as well as how to address them in view of the objectives set and the market context. However, this report was concluded at the beginning of 2016 and is based on information gathered in 2015.

To pave the way for 5G, BEREC's report provides NRAs with an updated compilation of practices with regard to the market-shaping aspects of spectrum licence granting, amendment or renewal in the following bands harmonised for ECS by the European Conference of Postal and Telecommunications Administrations and the EU: 700 MHz, 800 MHz, 900 MHz, 1500 MHz, 1800 MHz, 2100 MHz, 2300 MHz, 2600 MHz frequency division duplex (FDD), 2600 MHz time division duplex (TDD) and 3400-3800 MHz.

The report offers an overview of current practices with regard to frequency award designs and their market shaping aspects and information on existing coverage obligations in general and for challenging areas.

The report is based on analyses of both past spectrum awards and spectrum awards that are currently being designed for ECS bands.

The report slightly identifies future spectrum authorisation and award mechanisms and coverage obligations for 5G.

Document :

BoR (18) 235 - BEREC report on practices on spectrum authorisation, award procedures and coverage obligations with a view to considering their suitability to 5G

2.2.2. Draft common position on mobile infrastructure sharing

In June 2018, BEREC adopted a report on infrastructure sharing, which depicts different regulatory and legal frameworks applicable in European countries, the existing sharing arrangements, the benefits and challenges related to such arrangements and possible evolutions with regard to 5G.

Based on this report, BEREC produced a draft common position that describes criteria that NRAs can take into account in their assessment of mobile infrastructure sharing agreements, when they have the competency to do so. It is intended to provide NRAs, stakeholders and interested parties with information relating to the treatment of such agreements in Europe.

On 8 December 2018, BEREC submitted the draft common position on mobile infrastructure sharing for public consultation.

In 2019, BEREC will finalise the common position on mobile infrastructure sharing.

Documents :

BoR (18) 236 - BEREC Common Position on Mobile Infrastructure Sharing

BoR (18) 116 - BEREC Report on infrastructure sharing

2.2.3. Common position on information to consumers on mobile coverage

In fulfilling their duties, NRAs and competent authorities monitor mobile coverage of licensed spectrum in bands identified for International Mobile Telecommunications. Each NRA uses different means to provide information on national mobile coverage, which may constitute an obstacle to a consistent approach in presenting mobile coverage for both public policy and consumer information. In the latter case, there is a greater emphasis on accessibility of mobile coverage information by different means (e.g. a map, apps, etc.). There are benefits to achieving a common understanding of how mobile coverage can be defined and measured for information purposes.

In 2017, BEREC conducted a public consultation on a preliminary report on a common position on monitoring mobile coverage. This report aimed to facilitate a common understanding through better defining key concepts, baselines and accessibility of information, and to foster a consistent approach on how mobile coverage information is made available and understandable to NRAs and the public throughout Europe.

Taking into account comments received from the public consultation, BEREC continued its initial work and established the following four common positions with the aim of achieving a common understanding of how to provide information to consumers on mobile coverage and how it can be defined, measured and reported:

CP1 — technical specifications for providing relevant and comparable information on mobile coverage to European consumers;

CP2 — the use of signal predictions for mobile coverage estimation;

CP3 — ensuring the accuracy of coverage information provided to the public;

CP4 — availability and presentation of mobile coverage information.

Document :

BoR (18) 237 — Common Position on information to consumers on mobile coverage

2.4 Fostering a consistent approach of the net neutrality principles

2.4.1 Development of a net neutrality measurement tool

In 2018, the implementation of the BEREC net neutrality measurement tool was initiated by the BEREC Office. The Net Neutrality EWG supported the BEREC Office during the execution of a public tender procedure. In the second half of 2018, the selected contractor initiated its work, which has been closely followed by BEREC.

2.4.2 Implementation of the Net Neutrality Regulation

In October 2018, BEREC published its annual *Report on the implementation of Regulation (EU) 2015/2120 and BEREC Net Neutrality Guidelines*. This report provides an overview of the activities of NRAs during the course of their implementation of the net neutrality provisions of Regulation (EU) 2015/2120 (the Open Internet Regulation) and associated BEREC Net Neutrality Guidelines. This report reflects the second year of the application of the regulation, covering the period 1 May 2017-30 April 2018. BEREC has gathered information from 29 NRAs through an internal questionnaire. NRAs also published national reports on the second year of application of the regulation. Descriptions of publicly known net neutrality cases or investigations have been added to this information. These cases arose during the 12-month reporting period. However, this report does not constitute an exhaustive description of the current actions in the field of net neutrality.

In addition to drafting the report, NRAs exchanged experiences and discussed national questions and cases related to the Open Internet Regulation.

This work on safeguarding net neutrality has been strengthened through BEREC's relationship with regulators in non-EU countries. 2018 was a year used to continue the development of bilateral relations with TRAI, India's regulator, with an emphasis on net neutrality. Exchanges

between experts from BEREC and TRAI on this subject took place in 2018, and the adoption of an association agreement between the two institutions took place in June 2018.

Document :

BoR (18) 170 - Report on the implementation of Regulation (EU) 2015/2120 and BEREC Net Neutrality Guidelines

2.4.3 Net neutrality — input to an evaluation

In December 2018, BEREC published the *BEREC opinion for the evaluation of the application of Regulation (EU) 2015/2120 and the BEREC Net Neutrality Guidelines*, based on NRAs' experiences and a public consultation that was held from 14 March 2018 to 25 April 2018. This opinion provides input to the European Commission's 2019 evaluation of the regulation.

In the opinion, BEREC concluded that the application of both the Open Internet Regulation and the BEREC Net Neutrality Guidelines is working well. It is clear that both the regulation and the guidelines could be considered to strike a balance between the views of many stakeholders. From their inputs, BEREC observed that some stakeholders (for example internet service providers) wanted the BEREC Net Neutrality Guidelines to be less stringent, while others (for example consumer organisations) argued that the guidelines should be more stringent.

In the opinion, BEREC also took a specific interest in addressing emerging 5G technologies. According to BEREC's current understanding and analysis, the regulation seems to leave considerable room for the implementation of 5G technologies, such as network slicing, 5QI and mobile edge computing. To date, BEREC is not aware of any specific example provided by stakeholders of a situation in which the implementation of 5G technology would be impeded by the regulation.

Nevertheless, BEREC concludes that the guidelines could, after their application in the first two years, be clarified in certain instances. This will be done in 2019, with the regular involvement of stakeholders through a written consultation on a draft version of updated guidelines. The opinion focuses on the major points eligible for clarification; it does not contain a comprehensive list of subjects on which the guidelines could be clarified.

Documents :

BoR (18) 244 - BEREC Opinion for the evaluation of the application of Regulation (EU) 2015/2120 and the BEREC Net Neutrality Guidelines

BoR (18) 245 - BEREC Report on the outcome of the consultation on the evaluation of the application of Regulation (EU) 2015/2120 and the BEREC Net Neutrality Guidelines

2.5 Exploring new ways to boost consumer empowerment

2.5.1 Termination of contracts and switching providers

The draft *BEREC report on terminating contracts and switching provider* builds on previous BEREC work in this area, namely the *BEREC report on best practices to facilitate consumer switching* (BoR (10) 34 Rev1), published in 2010.

The ability and willingness of consumers to terminate a contract or switch between service providers is, in respect of ECS, a key facilitator of consumer choice and effective competition in a competitive telecommunications environment. Effective competition, which is a consequence of assuring switching or terminating contracts, enables consumers to take full advantage of alternative offers, thus delivering increased choice, lower prices to consumers, appropriate quality and innovation. BEREC considers that all consumers should have the right to choose their service provider at any time with regard for their contractual circumstances.

Barriers to switching (such as switching costs) are present in many retail markets, and financial barriers or penalties for leaving contracts early may discourage consumers from switching providers to obtain a better contract. Less explicit barriers, such as uncertainty about the relative merits of different contracts or the inconvenience associated with changing provider, may also decrease switching activity.

Understanding these barriers to consumer switching in ECS markets can aid NRAs and Member States¹⁸ in their aims to protect consumers and, at the same time, facilitate a competitive environment.

The draft report collates information on the approaches to switching across different communications services. It discusses the processes used in Member States and the applicable rules¹⁹ in each Member State to ensure that there are robust safeguards and adequate protection for consumers against any failures or drawbacks within the switching process.

The information compiled for the report was provided by 30 NRAs in response to a questionnaire issued by BEREC.

The draft report was published for public consultation in December 2018, and the final report will be adopted in March 2019, having carefully considered the submissions received from stakeholders in response to the public consultation.

¹⁸ 'Member States' is the generic term used throughout the report to refer to all countries whose NRAs responded to the BEREC questionnaire, regardless of the NRA's status with respect to BEREC (e.g. member or observer) or the country's status with respect to the EU (e.g. Member State, accession state or member of the EEA/EFTA).

¹⁹ For the purposes of this report, the term 'rules' is interpreted broadly and is considered to include any practice, decision or legal requirement that is in place in Member States.

Document :

BoR (18) 229 - BEREC Report on Terminating Contracts and Switching Provider

2.5.2 NRAs' practices on equivalence for access and choice for disabled end-users

Under the current legislative framework for electronic communications, Member States play an important role in the promotion of equivalent access and choice for end-users with disabilities. In the context of the *BEREC Report on NRAs' practices for ensuring equivalence of access and choice for disabled end-users*, 'equivalence' means that equivalent access to and choice of ECS should be available to end-users with disabilities. However, this may be accomplished by implementing specific solutions for end-users with disabilities that are not necessarily available to other end-users.

The aim of the report is primarily to collate information from NRAs for the purposes of compiling an inventory of measures and initiatives that NRAs might consider when evaluating any action to be pursued relating to the provision of services for disabled end-users, under the terms of relevant legislative provisions. These legislative provisions are set out in Section 3 of the report and extend to Articles 6, 7, 21(3)(f) and 23(a) of the Universal Services Directive²⁰, as amended, and the Roaming Regulation²¹.

The report follows on from a previous BEREC report²² and is structured around a questionnaire that BEREC circulated to NRAs to gain an insight into how the issues of access and choice for disabled end-users are currently addressed across Member States.

The responses to the questionnaire showed that NRAs have adopted a range of approaches to implement and monitor the relevant provisions.

The report concludes that NRAs actively engage with representatives from the disabled community and, having regard for national circumstances, adopt different approaches to ensure equivalent access to and choice of ECS. Given this, the report will serve as a tool to assist and inform NRAs as they evaluate the adoption of policies to ensure equivalent access and choice for disabled end-users.

²⁰ Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009 amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services.

²¹ Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union, as amended by Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 and by Regulation (EU) 2017/920 of the European Parliament and of the Council of 17 May 2017.

²² BoR (15) 201, *Update of the report on equivalent access and choice for disabled end-users*.

Document :

BoR (18) 30 - BEREC Report on NRAs' practices for ensuring equivalence of access and choice for disabled end-users

2.5.3 Contractual simplification

Contracts between providers of ECS and their end-users are becoming increasingly complex. End-user contracts can take different forms (e.g. they can be provided electronically or as a hard copy; they can be concluded in the provider's shop or from a distance) and may therefore include different amounts and categories of information. To allow consumers to make informed and correct decisions when acquiring, terminating and switching ECS (or ECS bundled with equipment/devices), it is important that such contracts provide clear and relevant information in a simplified, easily understandable manner.

BEREC produced a report on contractual simplification, which collated information on practices and initiatives in Member States²³ to prescribe key information elements (i.e. important contract terms) for contracts between consumers and providers of publicly available ECS, which are intended to help the consumer to better understand the terms of their contract. BEREC issued a comprehensive questionnaire to NRAs, which sought information on any measures or initiatives that had been taken in their Member State to prescribe the way in which key information elements should be presented so that consumers of ECS could better understand their contracts. The responses received to the questionnaire form the basis of the report. The report also includes details of NRAs' formal enforcement action in respect of unclear or missing contract information and NRAs' opinions on the most important information elements (and sub-elements) that should be included in a contract summary, regardless of any measures or initiatives that the NRA may have taken.

The report is divided into two main sections:

- Section 2, which describes actual measures and initiatives that have already been taken in Member States to better clarify consumer contracts;
- Section 3, which presents the NRAs' assessments of the key information elements that they consider should be included in a contract summary.

The draft report was published for public consultation before it was finalised, allowing stakeholders to make comments and observations on its content. In addition, BEREC sought stakeholders' responses to specific questions on how a contract summary should be drafted.

A report on the public consultation, summarising stakeholders' responses to the questions above and BEREC's appraisal of those responses, is included in a separate document accompanying the report. While none of the submissions received warranted an amendment to the initial draft report, stakeholders did provide some constructive and insightful comments. Along with this report, BEREC will take relevant stakeholders' submissions into consideration

²³ 'Member States' is the generic term used throughout the report to refer to all countries whose NRAs responded to the BEREC questionnaire, regardless of the NRA's status with respect to BEREC (e.g. member or observer) or the country's status with respect to the EU (e.g. Member State, accession state or member of the EEA/EFTA).

when it is asked to provide input to the Commission's Implementing Act specifying a contract summary template in 2019, as provided for in Article 102(3) of the EEC.

Document :

BoR (18) 172 - BEREC Report on contractual simplification

2.5.4 European benchmark of the pricing of the bundles — methodology guidelines

In October 2018, BEREC published the report *European Benchmark of the pricing of bundles — methodology guidelines*. In this document, BEREC, in cooperation with the European Commission, provides guidelines for updating the existing European Commission methodologies for the comparison of fixed and mobile broadband prices.

The existing Commission methodologies date from the beginning of 2015. However, European markets have evolved substantially since then: according to the European Digital Scoreboard, data mobile broadband is now widely used by end-users (in 2017, 90.2% of individuals used the service) and the take-up of fast and ultra-fast fixed broadband has doubled and trebled since 2015, reaching penetration rates of 33.5% and 15.4% in 2017. In addition, some operators are commercialising convergent offerings, which include fixed services (fixed broadband, fixed voice and TV) and mobile services (mobile broadband, voice and short message services (SMS)). The data collected by BEREC reveals that, in 2017, 34.9% of the fixed broadband lines in 21 European countries were bundled with mobile services. In some countries, these convergent bundles had the most competitive prices.

For all of this, BEREC has reviewed the current European Commission methodologies to compare broadband prices so that they better reflect the current situation and the diversity of European markets. As in the current European Commission Broadband Internet Access Cost studies, the guidelines propose a 'basket approach' to comparing electronic communication offers. The new household approach considers baskets that reflect the different household demands. A set of 17 representative households plus stand-alone broadband service categories with different usage patterns were identified: low, medium, high and very high. Some of the representative households combine the consumption of fixed and mobile services. This will enable the incorporation of convergent bundles and stand-alone prices in the comparison, and thus facilitate a more accurate and complete comparison of offers, since mobile and fixed broadband services are bundled in some countries and not in others.

The document also proposes changes to other aspects of the current methodology. With regard to the standard contract duration, the discount rate to be applied to non-recurring charges and the exclusion of selective discounts for mobile, BEREC considers that this methodology based on household consumption should accurately reflect the prices of ECS across the EU.

Document :

BoR (18) 171 - European Benchmark of the pricing of bundles - methodology guidelines

3.9 BEREC obligatory work and engagement with stakeholders

2.6.1 International roaming BEREC benchmark data report

According to Article 19 of the 2012 Roaming Regulation, BEREC must regularly monitor the retail and wholesale roaming prices for voice, SMS and data services, as well as the volume and revenues generated by mobile operators across Member States. Moreover, because of the amendments to Article 19, BEREC must report regularly on the development of pricing and consumption patterns in Member States for both domestic and roaming services and on the development of actual wholesale roaming rates for unbalanced traffic between roaming providers.

These benchmark data reports are widely acknowledged by the relevant stakeholders and are used by the Commission to review the effectiveness of the Roaming Regulation. BEREC published the 20th benchmark report in June 2018 and the 21st benchmark report in October 2018.

Documents :

BoR (18) 31 - International Roaming BEREC Benchmark Data Report April-September 2017
BoR (18) 160 - International Roaming BEREC Benchmark Data Report October 2017-March 2018

2.6.2 Transparency and comparability of roaming tariffs

Pursuant to Article 19 of the 2012 Roaming Regulation, BEREC is responsible for regularly monitoring the transparency and comparability of roaming tariffs and must present the findings in an annual report. The objective of the report is to monitor and increase consumer awareness of the variety of roaming tariffs and to increase transparent market conditions and the ability of customers to make well-informed decisions. The report addresses key questions on whether information on price and tariff conditions are made available in a clear and convenient way and whether consumers are able to compare those tariffs. Operators and regulators were asked several questions relating to these two key issues in August 2018. BEREC published its fifth BEREC report on the transparency and comparability of tariffs in December 2018.

The report covers the results of the questionnaire regarding the implementation of 'Roam Like at Home' (RLAH) with a fair-use policy and sustainability applications, in line with the amendments to the Telecoms Single Market Regulation. In the questionnaire for NRAs, BEREC focused on information about complaints on transparency issues that NRAs received between July 2017 and July 2018. BEREC included specific questions about those complaints that were received after 15 June 2017 related to the application of RLAH and associated fair-use policies. The questionnaire for operators focused on seeking information about the tariff structures offered, including default regulated tariffs in accordance with Article 6a (RLAH), RLAH+²⁴, alternative roaming tariffs in accordance with Article 6e(3) and those tariffs in which

²⁴ Since 15 June 2017 (the implementation date of RLAH), RLAH+ has referred to either those operators who have the authorisation to apply a surcharge in accordance with the sustainability mechanisms or those users who have exceeded the roaming allowance or have not complied with the fair use policies.

roaming has not been offered since RLAH entered into force. Moreover, BEREC has collected information about the fair-use policies implemented by roaming providers and the information given to customers on the use of the tariffs and their fair-use policies. The report shows that during the first year of RLAH, 17 NRAs received applications for sustainability surcharges, with a total amount of 57 applications. Of these applications, 46 were granted and 11 were refused.

Document :

BoR (18) 220 – BEREC Report on Transparency and Comparability of International Roaming Tariffs

2.6.3 Input on the European Commission Implementing Act on weighted average maximum mobile termination rates

According to Article 6e(2) of the 2012 Roaming Regulation, the Commission must review the Implementing Acts annually, after having consulted with BEREC, setting out the weighted average of the maximum mobile termination rates (MTRs). BEREC provided input to the Commission on the weighted average of the maximum MTRs on 9 October 2018.

Document :

BoR (18) 180 - BEREC input to the Commission Implementing Act on weighted average MTRs

2.6.4 Termination rates at European level

Following the work started by the European Regulators Group, BEREC has been collecting and publicly reporting information on MTRs. Data collection on fixed termination rates (FTRs) and SMS termination rates started in 2011. The termination rate benchmarking exercises have been developed in close cooperation with the Communications Committee (COCOM), and from 2013 the Commission has made use of the BEREC termination rate data in its annual publications on the telecommunications industry in Europe (Digital Agenda Scoreboard). The purpose of this comparison is to provide an indication of the level of FTRs, MTRs and SMS termination rates in the countries represented within BEREC as well as their variations and the cost model adopted for the definition of termination rates.

In 2018, BEREC twice collected termination rate data from its members and observers to monitor the changes in termination rates and to collect information on the regulatory mechanisms used in determining them.

BEREC published two termination rate benchmark reports in 2018. The report on FTRs and MTRs in the EU (from 1 January 2018) was approved at the 35th plenary meeting, and the report on termination rates at European level (from 1 July 2018) was approved at the 37th plenary meeting.

Documents

BoR (18) 103 — Termination rates at European level January 2018

BoR (18) 218 — Termination rates at European level July 2018

2.6.5 Regulatory accounting

The BEREC Report Regulatory Accounting in Practice 2018 summarises the findings of a detailed survey of regulatory accounting systems across Europe. Information has been gathered from NRAs. It includes the state of play in terms of remedies of market regulation and focuses on price control and its definition in practice. The report also covers (1) elements relating to structural parameters in each country, (2) weighted average cost of capital (WACC) methodologies applied by NRAs and (3) WACC values currently in force.

The document offers an up-to-date report on the regulatory accounting frameworks implemented by NRAs and an assessment of the level of consistency achieved. Where possible, trends and comparisons with data collected in previous years are illustrated.

The report focuses on the analysis of services in key wholesale markets: wholesale local access (Market 3a), wholesale central access (Market 3b) and wholesale high quality access (Market 4). Moreover, the cost base and allocation methodologies used for fixed (Market 1) and mobile (Market 2) termination markets are also reported.

Furthermore, as in the 2017 report, additional structural data (e.g. population, market and competitive structure, infrastructure) have been collected from NRAs to illustrate factors influencing NRAs' regulatory strategy. Not surprisingly, differences in the market/competitive situations and infrastructure in place can be observed among the responding countries; this reflects the different external and technical requirements that NRAs need to take into account.

The report also looks at the annualisation methodologies provided by the respondent NRAs. As in the 2017 report, accounting information for specific products in Market 3a, such as copper access (including local loop unbundling (LLU), shared access, subloop unbundling), fibre access (LLU, virtual unbundled local access), dark fibre access and duct access have been further analysed.

The report includes an updated section on the implementation of the TR Recommendation 2009/396/EC of 7 May 2009.

An evaluation of the implementation of the Recommendation 2013/466/EU on consistent non-discrimination obligations and costing methodologies is also presented (paragraph 3.6).

The report delivers an extended survey on WACC parameters, focusing on Market 3a and, for the first year, on the mobile market as well. The WACC chapter summarises the main methodologies currently used by NRAs and sets out the reasons behind the estimation of single parameters needed to evaluate the cost of capital under the Capital Asset Pricing Model (CAPM).

Document :

BoR (18) 215 - BEREC Report Regulatory Accounting in Practice 2018

2.6.6 Article 7 Phase II cases

The procedures defined in Article 7/7a of the amended Framework Directive constitute one of the principal innovative features of the 2009 package. Since its first full year of operation, 2011, BEREC has continued to respond successfully and efficiently to Article 7/7a Phase II cases.

In 2018, the handling of Article 7/7a Phase II procedures remained an important part of BEREC's work. During 2018, the European Commission opened only three Article 7/7a Phase II cases, compared with eight cases in 2017. One case was a combined Art 7/7a case, which required two opinions. BEREC responded in a timely manner to all three cases that required expert opinions in 2018.

All the cases are outlined in the table below:

A. Case SI/2018/2050 — Slovenia

Market	Market for wholesale high-quality access provided at a fixed location (Market 4) in Slovenia
Description	<p>Phase II was opened under Article 7a on 9 February 2018.</p> <p>The BEREC opinion was adopted on 23 March 2018 and published on 26 March 2018.</p> <p>BEREC considered that the Commission's serious doubts were justified.</p> <p>BEREC was of the opinion that:</p> <ul style="list-style-type: none"> • the use of a size premium in WACC calculations was not commonly applied by NRAs in the EU; • the inclusion of a size premium in WACC calculations has not been sufficiently justified by AKOS; • AKOS, while it has explained how it reached the value of the size premium of 3.67%, has not explained why this value is appropriate for use in calculating the WACC of the Slovenian-regulated company.
Outcome	The European Commission issued a Recommendation on 8 June 2018 that AKOS should amend or withdraw the price control and cost accounting remedy to bring its WACC calculations in line with the policy objectives set out in the Framework Directive, and therefore comply with the Access Directive.
Document	BoR (18) 55 — <i>BEREC opinion on Phase II investigation pursuant to Article 7a of Directive 2002/21/EC as amended by Directive 2009/140/EC: Case SI/2018/2050 — Market for wholesale high-quality access provided at a fixed location (Market 4) in Slovenia.</i>

B. Case SK/2018/2051 — Slovakia

Markets	Market for wholesale voice call termination on individual public telephone networks provided at a fixed location (Market 1) in Slovakia
Description	<p>Phase II was opened under Article 7a on 20 February 2018.</p> <p>The BEREC opinion was adopted on 4 April and published on 6 April 2018.</p> <p>BEREC considered that the Commission's serious doubts were justified.</p> <p>BEREC was of the opinion that the use of a size premium was not commonly applied by NRAs in the EU when estimating the cost of equity</p>

	using the CAPM. Furthermore, the inclusion of a size premium has not been sufficiently justified by the Slovak NRA, RÚ. It was BEREC's view that the absence of serious doubts on previous notifications did not justify the inclusion of a size premium in the current notification. Finally, even if the use of a size premium had been justified (and BEREC is of the opinion that it has not been justified), the actual value of the size premium was not sufficiently justified by RÚ.
Outcome	The European Commission issued a Recommendation on 19 June 2018 that RÚ should amend or withdraw the remedies relating to price caps for fixed call termination services in Slovakia to bring its WACC calculations in line with the policy objectives set out in the Framework Directive, and therefore comply with the Access Directive.
Document	BoR (18) 67 — <i>BEREC opinion on Phase II investigation pursuant to Article 7a of Directive 2002/21/EC as amended by Directive 2009/140/EC: Case SK/2018/2051 — Market for wholesale voice call termination on individual public telephone networks provided at a fixed location (Market 1) in Slovakia</i>

C. Case HU/2018/2107 — Hungary

Markets	Wholesale high-quality access provided at a fixed location (Market 4) in Hungary
Description	<p>Phase II was opened under Article 7 and 7a on 7 September 2018.</p> <p>The BEREC opinion under Article 7 was adopted on 15 October 2018 and published on 17 October 2018.</p> <p>The BEREC opinion under Article 7a was adopted and published on 25 October 2018.</p> <p>Article 7: BEREC was of the opinion that the Commission's serious doubts were not justified with regard to the alleged insufficient explanation of the changes in the market. BEREC also concluded that, given the market definition, the Commission's doubts were not justified regarding market shares on specific segments of the market and alleged diminished advantages from legacy networks. In addition, the pricing behaviour did not justify the serious doubts of the Commission regarding the SMP assessment.</p> <p>BEREC agreed with the Commission that the services provided by Hungarian companies, NISZ and MVM, to public institutions and the electricity transmission market, although governed by a separate legal requirement, should be included in the assessment of the market, as they are capable of constraining Magyar Telekom's behaviour. BEREC felt that the regulatory body, NMHH, should have assessed the extent to which the infrastructure used by NISZ and MVM could be used to provide leased line services to other customers and should have considered these networks in terms of their size/coverage/extent to assess MT's dominance.</p>

	<p>However, BEREC also feels that such an analysis would not have a significant effect on the SMP assessment.</p> <p>Article 7a: BEREC considers that the Commission's serious doubts on the obligations were partly justified. Although the Commission's doubts regarding the under-recovery of costs of passive infrastructure seemed to be based on a misunderstanding, the Commission's doubts regarding the non-recovery of common costs were justified. BEREC advises NMHH to clarify in its final decision what was meant by direct costs, to avoid further misunderstanding.</p> <p>On the WACC size premium, NMHH stated that its methodology was consistent with the WACC study that was ordered by the Commission (the Brattle study), but BEREC had agreed with the Commission's serious doubts on three previous cases of this type during the previous year. BEREC agreed with the Commission that such a mark-up was neither in compliance with the Framework Directive nor commonly applied by NRAs and that a country risk premium (that includes issues such as the size of companies) would be a more consistent approach.</p>
Outcome	<p>Article 7: the European Commission lifted its reservations on 16 November 2018.</p> <p>Article 7a: The European Commission withdrew its serious doubts regarding the recovery of MT's joint and common costs on 13 December 2018.</p> <p>The European Commission issued a recommendation on 16 December 2018 that NMHH should amend or withdraw the decision relating to price regulation of MT's leased lines in Hungary to bring its WACC calculations in line with the policy objectives set out in the Framework Directive, and therefore comply with the Access Directive.</p>
Documents	<p>BoR (18) 199 — <i>BEREC opinion on Phase II investigation pursuant to Article 7 of Directive 2002/21/EC as amended by Directive 2009/140/EC: Case HU/2018/2107 — Wholesale high quality access provided at a fixed location (Market 4) in Hungary</i></p> <p>BoR (18) 205 — <i>BEREC opinion on Phase II investigation pursuant to Article 7a of Directive 2002/21/EC as amended by Directive 2009/140/EC: Case HU/2018/2107 — Wholesale high quality access provided at a fixed location (Market 4) in Hungary</i></p>

2.6.7 Input to the consultation on WACC

The European Commission opened a targeted consultation on guidance on the cost of capital for EU electronic communications regulators on 11 July 2018. The consultation ran until 3 October 2018. The BEREC response consists of two parts: a position paper responding to the background document and a response to the online questionnaire.

The main elements of the draft BEREC response, which follows the structure of the background document, are:

- an introduction characterising the status as non-binding guidance;
- regulatory principles, with which BEREC agrees;
- WACC formula (no comments, except that the Commission does not address the taxation);
- Chapter 4 dealing with the estimation of the different parameters (risk-free rate, equity risk premium, beta, gearing parameters, cost of debt, inflation);
- Chapter 5 looking at the distinction between electronic communications services (i.e. the disaggregation of the WACC for different services);
- Chapter 6 dealing with the transition period.

BEREC agrees with the four regulatory principles (predictability, transparency, consistency, efficiency) and thinks that a principle-based framework is sufficient to further harmonise the WACC calculations of the NRAs. However, it considers it unnecessary to go deeper into the estimation of the single parameters, as NRAs need some flexibility to take into account the national situation and the regulatory strategy.

BEREC also considers that the annual benchmarking exercise contributes to a convergence of NRAs' methodologies. Based on the 2018 data, BEREC also sees further convergence happening in practice.

The answers to the Commission's online questionnaire are based on the position paper and follow the general structure described above. The BEREC response was adopted at the 36th plenary meeting and submitted on 8 October 2018 to the Commission.

Documents :

BoR (18) 167 and 167b - BEREC Position Paper Input to the Commission's WACC consultation 2018

2.6.8 Opinion on the draft SMP guidelines

BEREC has participated in the review process of the Commission Guidelines on market analysis and the assessment of the SMP guidelines, initiated by the European Commission with a public consultation in March 2017. BEREC provided its feedback on the draft updated SMP guidelines published in 2018.

Regarding the content of the draft SMP guidelines themselves, BEREC was generally satisfied with the document. Notably, the changes made with respect to the assessment of joint dominance were a positive development. However, BEREC was of the view that some elements in the draft SMP guidelines should be further improved:

- The SSNIP test should mainly serve as a conceptual framework when no empirical evidence is available.
- The indirect constraints that over-the-top services exert on the wholesale markets are to be analysed only when relevant.

- On inter-platform competition, BEREC considers it necessary for the draft SMP guidelines to explicitly state that the potential entry of new players should be assessed and not taken for granted.
- Regarding 'chain of substitution' in the context of shrinking markets, market definition should be primarily driven by economic evidence and not by regulatory objectives.
- On single SMP, BEREC does not see the justification for the deletion of the 25% and 40% thresholds for market shares.
- Regarding the sustainability of the coordination mechanism under joint dominance, BEREC considers that the European Commission has an excessively symmetric view on the deterrent mechanism.
- Finally, BEREC reiterated its view that NRAs still do not have adequate means to tackle tight oligopolies, namely situations where an oligopoly leads to a non-competitive equilibrium without any tacit collusion on either market level, ultimately to the detriment of retail customers.

Document :

BoR (18) 50 - BEREC Opinion on Draft SMP Guidelines

3 Organisational issues

3.1 Organisational issues

The BoR appoints its Chair and Vice-Chairs from among its members. Pursuant to Article 4(4) of the BEREC Regulation, the term of office of the Chair and Vice-Chairs is 1 year. In compliance with Article 2(1) of the Rules of Procedure of the BoR, before serving his/her term as Chair for 1 year, the Chair must first serve as a Vice-Chair for 1 year. To ensure the continuity of BEREC's work, the Chair must also serve as a Vice-Chair for the year following his/her term as Chair.

In addition to the support provided to the Chair by the two Vice-Chairs (the outgoing and incoming Chairs), the BoR may decide to elect other members as additional Vice-Chairs for 1 year.

In accordance with the Rules of Procedure, during its final ordinary plenary meeting for 2017, the BoR decided to elect two additional Vice-Chairs for 2018. Following the elections, the BoR was led by the following Chair and Vice-Chairs in 2018:

BEREC Chair for 2018:

- Johannes Gungl, Managing Director of RTR (Austria), elected Chair for 2018 at the 29th BoR plenary meetings (8-9 December 2016, Berlin)

BEREC Vice-Chairs for 2018:

- Jeremy Godfrey, Commissioner of ComReg (Ireland), elected Chair for 2019 at the 33rd BoR plenary meetings (7-8 December 2017, Copenhagen)
- Sébastien Soriano, President of ARCEP (France), elected Chair for 2017 at the 25th BoR plenary meetings (10-11 December 2015, London)
- George Michaelides, Commissioner of the Cypriot Office of Electronic Communications and Postal Regulation — OCECPR (Cyprus)
- Dan Sjöblom, Director General of the Swedish Post and Tele-com Authority — PTS (Sweden)

3.2 BEREC working structure

Expert working groups

Following the successful reform of the structure of BEREC EWGs in 2014 and the subsequent appointment of EWG Co-Chairs, the streamlined structure proved to be effective, as it helped BEREC to work faster while still maintaining a very high level of quality.

As laid out in the internal arrangements, new EWG Co-Chairs were appointed in late 2017 based on a comparative evaluation of the candidates using specific criteria.

The organisational structure used to support BEREC's work in 2018 is presented in Annex 11.

BEREC main meetings

The BoR held four ordinary plenary meetings in 2018. Each of these was preceded 3 weeks beforehand by a meeting of the BEREC Contact Network (the intermediate structure of representatives of members and observers) to prepare the plenary.

Annex 12 lists the members and observers of the BoR and Annexes 5 and 6 list the BEREC BoR and Contact Network meetings that took place in 2018.

4 Representation and cooperation

4.1 Events, speeches and presentations

Since its creation, BEREC has been committed to developing close contacts with stakeholders and interested parties, as well as the EU institutions, EU bodies and groups such as the EU Agency for Network and Information Security (ENISA) and the RSPG. This dialogue with stakeholders and the EU institutions has been particularly important this year with the adoption of the new EECC. In 2018, BEREC was also committed to further strengthening its relationship with stakeholders and citizens by developing early public consultations and using new tools (DISCUTO) to facilitate contributions to its consultations.

As a result, the BEREC Chair, Vice-Chairs and other representatives, such as the EWG Chairs, represented BEREC at a wide range of events in 2018. The speeches and presentations given focused on a wide range of topics, from BEREC's ongoing work on the

review of the EECC to openness of the internet issues and more prospective topics on its future development.

Annex 8 lists the events attended by the BEREC Chair, Vice-Chairs and other representatives.

4.2 Workshops

In 2018, BEREC organised three workshops that preceded the BoR plenary meetings. Prior the ordinary plenary meetings, on 7 March 2018, there was an internal BEREC/ENISA workshop 'Exploring the cybersecurity landscape of 5G and IoT' organised. In this workshop, the BEREC study about 5G (*Study on implications of 5G deployment on future business models*, BoR (18) 23) was presented by the consultants. Preceding the 35th plenary meeting, BEREC organised a workshop on data economy. The event brought together experts and stakeholders to discuss issues relating to the challenges and regulatory implications of the data economy. On 3 October 2018, preceding the 36th plenary meeting, BEREC held a workshop on BEREC over the next decade.

Annex 7 lists the BEREC workshops conducted in 2018.

4.3 BEREC Stakeholder Forum

For the sixth time, BEREC held its annual Stakeholder Forum in Brussels on 17 October 2018. Almost 240 participants attended to participate in the three sessions the event offered. They focused on the draft BEREC Work Programme 2019, BEREC's effectiveness and stakeholder engagement and efficient investment in European telecoms. BEREC Chair 2018, Johannes Gungl (RTR), opened the Forum, highlighting the importance of the event and the opportunity it provides for valuable stakeholder input.

The incoming BEREC Chair 2019, Jeremy Godfrey (ComReg), set out the draft BEREC Work Programme 2019. This was prepared with significant regard to the new EECC and BEREC's strategic priorities, as defined in its Strategy 2018-2020.

Philippe Defraigne (Cullen International) then moderated a discussion on the content of the draft BEREC Work Programme 2019. Audience interaction included real-time voting (using the Mentimeter tool). This interaction covered potential metrics to measure BEREC's success over the next 3-4 years and the identification of those stakeholders that could have the greatest impact on achieving a vision for Europe as a leader in the global digital economy.

A panel session followed on BEREC's effectiveness and stakeholder engagement. The panellists were Professor David Coen (University College London), Kevin Martin (Facebook), Ursula Pachi (the European Consumer Organisation, BEUC) and Daniel Pataki (Global System Mobile Association, GSMA). The panellists discussed criteria that BEREC's stakeholders use to assess whether it has been successful and ideas about how BEREC can optimise its stakeholder engagement. In summary, they explored some theoretical and practical examples of communications in networked agencies.

The second panel session focused on efficient investment in the European telecoms sector, specifically exploring the interplay between efficient investment, promotion of competition and consumer benefits. Tony Shortall (Telage) moderated the discussion, which opened with a

scene-setting presentation by Professor Emanuele Tarantino (University of Mannheim). The panellists were Dr Jonathan Dann (Royal Bank of Canada), Frank Sixt (Hutchison Whampoa), Dr Martin Wrulich (McKinsey & Company) and Gabrielle Gauthey (Caisse des Dépôts). Panellists discussed the opening presentation and remarked on practical examples of what attracts an investor to telecoms rather than to other regulated/unregulated markets. In addition, the panel tried to determine what considerations a transnational company takes when investing between markets and sectors in different geographical regions and how European telecoms investment opportunities rank in a global setting.

The event concluded with a keynote speech by Director General Roberto Viola (DG Connect, European Commission). He set out the need for Europe to maintain levels of certainty and predictability so that investors can continue to unlock value in the European telecommunications ecosystem. BEREC's role in achieving the goal of regulatory predictability was a key issue that was mentioned.

In conclusion, according to Roberto Viola, the Stakeholder Forum is a valuable platform for engaging stakeholders. The work of BEREC's constituent NRAs helps to improve connectivity in Europe with numerous awards of spectrum suitable for 5G completed and other very high capacity networks rolled out to date.

4.4 International co-operation

2018 has been an intensive year for BEREC when it comes to international cooperation activities. Not only did it maintain existing close relationships with regional regulator groups, but it also developed new joint activities with other regulators across the world.

BEREC international mission to Canada

Each year, BEREC organises a visit to non-EU member countries to gain insights into their local electronic communications markets and digital ecosystem. The BEREC delegation meets representatives of the NRAs and the relevant ministries, as well as incumbent operators, new entrants and other stakeholders in the industry. In 2017, BEREC visited India.

In April 2018, the BEREC delegation, composed of the BEREC Chair and Vice-chairs of 2018, travelled to Canada to meet institutional and industrial stakeholders, as Canada is one of the leading countries benefiting from a strong framework that protects net neutrality and which is also very active in preparing the roll-out of 5G in the years to come. In particular, the delegation carried out discussions with the Canadian NRA (CRTC), the ministry responsible for spectrum issues (ISED), operators and organisations in the digital environment, covering various topics from 5G to net neutrality and how to incentivise investment and broadband deployment. It was also an occasion for the BEREC Chair and Vice-Chairs to engage in discussions with its Canadian counterpart, CRTC, and build a relationship for further cooperation. Finally, the study trip gave the BEREC delegation the opportunity to discover the Canadian tech scene in more depth, with visits organised to innovation centres in Toronto and Montreal.

On their way back to Europe, the delegation made a stop in Washington D.C., United States, to visit the latter's NRA (FCC), the Federal Trade Commission, the National Telecommunications and Information Administration and other stakeholders, such as Access

Now. The objective was to discuss the latest issues on spectrum and 5G and exchange on the latest net neutrality discussions in the US.

Following this visit, in October 2018, BEREC signed an MoU with the CRTC aimed at providing a framework and highlighting the areas of mutual interests for a long-standing cooperation, such as net neutrality and 5G. BEREC also renewed its MoU with the FCC, which was originally signed in 2014.

Annex 9 lists the publicly available documents approved by the BoR in 2018.

BEREC international cooperation activities in 2018: open internet in the spotlight

To continue the work engaged in 2017, BEREC and the Indian NRA (TRAI) have further developed their collaborative work in 2018. This was marked by the adoption of an MoU in June 2018, highlighting topics of common interests and demonstrating the willingness to develop a long-standing relationship between the two institutions. It showed that net neutrality is one of the main topics on which the two institutions are willing to exchange experiences and knowledge and develop a common understanding. This resulted in the adoption of a 'Joint statement for an open internet', exposing BEREC's and TRAI's common understanding of the building blocks of net neutrality rules and the core aspects of the regulators' mission in preserving these rules in June 2018. Following these fruitful exchanges, the BEREC Chair travelled to India in October 2018 to participate as an honoured guest at the Indian Mobile Congress.

BEREC and the network of Latin-American regulators (Regulatel) also closely worked together in 2018, within the framework of the MoU renewed in 2017. In particular, they organised joint working group meetings as well as a joint summit in November 2018. This summit was centred on the new regulatory challenges faced by regulators in a fast-changing digital environment. The summit was concluded by the signature of a joint BEREC-Regulatel Summit declaration, highlighting the common interests of both networks to discuss and tackle issues related to connectivity, the openness of the internet and further engagement with stakeholders. In particular, the benefits of sharing best practices on net neutrality enforcement and new regulatory tools and the use of data to adapt the regulation to new trends affecting the digital environment were highlighted in the declaration.

Close collaboration continued with other networks of regulators that have established working relationships with BEREC. BEREC was represented at the network of Mediterranean regulators (EMERG) plenary meeting in March 2018, to agree on the renewal of the BEREC-EMERG MoU signed in 2014. The two institutions will organise, within the framework of this MoU, a joint workshop on 5G issues in January 2019. BEREC also took part in the network of non-EU Eastern European regulators (EaPeReg) plenary meeting and workshop on infrastructure mapping, organised in April 2018.

Western Balkan Strategy

Commissioner Gabriel contacted BEREC in March 2018 to ask BEREC for cooperation regarding the Commission's Strategy for the Western Balkans (WB6) (COM(2018)65). The strategy included a Digital Agenda that should include a roadmap covering a variety of topics.

To support the European Commission's strategy, BEREC held an initial high-level meeting on 13 June 2018, prior to the BEREC plenary meeting. During this meeting, BEREC and the WB6 agreed on closer cooperation regarding roaming, termination rates and capacity building. They also decided to monitor the cooperation at heads level twice a year.

To monitor the progress made in the second half of the year, a second high-level meeting was organised on 5 December 2018, prior to the last BEREC plenary meeting of the year. The WB6 agreed to a common data collection on international roaming to monitor market developments. In addition, BEREC agreed to organise a workshop with WB6 NRAs and the European Commission to exchange views on mobile termination rates regulation. BEREC also offered support in terms of capacity building to the WB6 NRAs.

4.5 Engagement with the EU institutions

BEREC demonstrated its commitment to working in close cooperation with the EU institutions in 2018. The BEREC Chair, Vice-Chairs, BEREC Office representatives and the co-chairs from the Regulatory Framework EWG met with representatives of the European Commission, the European Parliament and the Council on several occasions to discuss the ongoing review of the regulatory framework for electronic communications and the review of the BEREC Regulation, in particular during the first half of 2018.

The BEREC Chair also confirmed BEREC's commitment to maintaining an excellent working relationship with the European Commission and, before each plenary meeting, organised a videoconference with the Director General of DG Connect, Roberto Viola. Furthermore, as in previous years, BEREC provided regular input to the European Commission on termination rates and roaming.

The incoming BEREC Chair also took part in a European Parliament Industry, Research and Energy (ITRE) Committee hearing about the development of roaming in the EU in November 2018. The BEREC Chair and Vice-chairs also met with the Council's presidency and attended a Council Working Group meeting to discuss EECC-related matters in March 2018.

A list of the meetings that took place with the EU institutions and other EU bodies is available in Annex 1.

Annex 1 Meetings with the EU institutions and other EU bodies

A. Meetings with the European Commission

Dates/place	Event
28 March 2018, Brussels, Belgium	Meeting between the BEREC Chair and Commissioner
28 March 2018, Brussels, Belgium	Meeting between the BEREC Chair and the Director General of DG Connect
23 May 2018, Brussels, Belgium	Meeting between the BEREC Chair and the Director of DG Connect
10 October 2018, Brussels, Belgium	Meeting between the BEREC Chair and BEREC Vice-Chair (ComReg) and the Director General of DG Connect
17 October 2018, Brussels, Belgium	Meeting between the BEREC Miniboard and representatives of the European Commission

B. Meetings with the European Parliament

Dates/place	Event
15 March 2018, Brussels, Belgium	Meeting between the BEREC Chair and the Permanent Representative of Bulgaria to the European Union

Dates/place	Event
27 March 2018, Brussels, Belgium	Meeting between the BEREC Chair and the Permanent Representative of Bulgaria to the European Union and Council Working Group representatives
8 May 2018, Brussels, Belgium	Meeting between the BEREC Chair and the MEP (ECR) representative
20 June 2018, Brussels, Belgium	Meeting between the BEREC Chair and MEP (EPP)
22 November 2018, Brussels, Belgium	Participation of a BEREC Vice-Chair (ComReg) in the public hearing of the European Parliament ITRE Committee

C. Meetings with the Council of the EU

Dates/place	Event
27 March 2018, Brussels, Belgium	Meeting between the BEREC Chair and Council WG representatives

D. Meetings and workshops with other EU bodies

Dates/place	Event
31 October 2018, Brussels, Belgium	Meeting between the BEREC Chair and the European Data Protection Board

Annex 2 Public debriefings and BEREC engagement with stakeholders

Dates/place	Event
31 January 2018, Brussels, Belgium	Meeting between the BEREC Chair and ECTA members
14 March 2018, Brussels, Belgium	Public debriefing on the outcomes of the 34th BEREC plenary meetings
14 March 2018, Brussels, Belgium	Meeting between the BEREC Chair and MVNO representatives
28 March 2018, Brussels, Belgium	Meeting between the BEREC Chair and BEUC and VEON representatives
6 April 2018, Vienna, Austria	Meeting between the BEREC Chair and Telefonica representatives
8 May 2018, Brussels, Belgium	Meeting between the BEREC Chair and BEUC representatives
29 May 2018, Bonn, Germany	Meeting between the BEREC Chair and Deutsche Telekom representatives
8 June 2018, Vienna, Austria	Meeting between the BEREC Chair and Facebook representatives
8 June 2018, Vienna, Austria	Meeting between the BEREC Chair and Vodafone representatives

Dates/place	Event
12 June 2018, Vienna, Austria	Meeting between the BEREC Chair and Huawei representatives
19 June 2018, Brussels, Belgium	Meeting between the BEREC Chair and ESOA representatives
20 June 2018, Brussels, Belgium	Meeting between the BEREC Chair and FTTH-Council representatives
20 June 2018, Brussels, Belgium	Public debriefing on the outcomes of the 35th BEREC plenary meetings
16 July 2018, Rome, Italy	Meeting between the BEREC Chair and FTTH/Open Fibre representatives
19 July 2018, Riga, Latvia	Meeting between the BEREC Chair, a BEREC Vice-Chair and Administrative Manager of the BEREC Office with Ministry of Foreign Affairs of Latvia and Ministry of Transport of Latvia
10 October 2018, Brussels, Belgium	Public debriefing on the outcomes of the 36th BEREC plenary meetings
17 October 2018, Brussels, Belgium	6th BEREC Stakeholder Forum meeting
17 October 2018, Brussels, Belgium	Meeting between the BEREC Chair and Vice-Chair (ComReg) with representatives of the Latvian Ministry for Transport and Telecommunication

Dates/place	Event
17 October 2018, Brussels, Belgium	Meeting between the BEREC Chair and RSPG representatives
12 December 2018, Brussels, Belgium	Public debriefing on the outcomes of the 37th BEREC plenary meetings
14 December 2018, Brussels, Belgium	Meeting between the BEREC Chair and ITU representative

Annex 3 International events

Dates/place	Event
9-13 April 2018, Canada and Washington D.C., United States	BEREC Chair and Vice-Chairs' study trip to Canada and Washington D.C., United States
17-18 April 2018, Baku, Republic of Azerbaijan	Participation of the BEREC representative in the 4th EaPeReg Roaming Expert Working Group (REWG)
3-5 July 2018, Budapest, Hungary	Participation of the BEREC representative in the ITU organised Regional Seminar for Europe and CIS on '5G implementation in Europe and CIS: strategies and policies enabling new growth opportunities'
9-12 July 2018, Geneva, Switzerland	Participation of the BEREC Chair in the Global Symposium for Regulators
8-11 October 2018, Cartagena, Columbia	Participation of the BEREC representatives in the BEREC-Regulatel EWG meeting
25-27 October 2018, New Delhi, India	Participation of the BEREC Chair in the India Mobile Congress
19- 20 November 2018, Lima, Peru	Participation of a BEREC Vice-Chair (Arcep) in the BEREC-Regulatel- Summit

Dates/place	Event
10 December 2018, Addis Ababa, Ethiopia	Participation of the BEREC Chair representative in the PRIDA 1st global steering committee meeting

Annex 4 Meetings between the BEREC Chair, Vice-Chairs and expert working group (EWG) Chairs

Dates/place	Event
18-19 January 2018, Vienna, Austria	Meeting between the BEREC Chair and Vice-Chairs
22-23 January 2018, Brussels, Belgium	Meeting between EWG Co-Chairs
14 February 2018, videoconference	Meeting between the BEREC Chair and Vice-Chairs
30 May 2018, videoconference	Meeting between the BEREC Chair and Vice-Chairs
11 July 2018, videoconference	Meeting between the BEREC Chair and Vice-Chairs
19-20 July 2018, Riga, Latvia	Meeting between the EWG Co-Chairs
20-21 September 2018, Lagenlois, Austria	Meeting between the BEREC Chair and Vice-Chairs
26 November 2018, video conference	Meeting between the BEREC Chair and Vice-Chairs

Annex 5 Plenary meetings of the Board of Regulators (BoR)

Dates/place	Event	Agenda	Conclusions
7-9 March 2018, Bratislava, Slovak Republic	34th BEREC BoR plenary meeting	BoR (18) 21	BoR (18) 70
13-15 June 2018, Gdansk-Sopot, Poland	35th BEREC BoR plenary meeting	BoR (18) 102	BoR (18) 138
3-5 October 2018, Portorož, Slovenia	36th BEREC BoR plenary meeting	BoR (18) 158	BoR (18) 204
6-7 December 2018, Prague, Czechia	37th BEREC BoR plenary meeting	BoR (18) 212	BoR (18) 266

Annex 6 Meetings of the Contact Network (CN) established prior to the Board of Regulators (BoR)

Dates/place	Event	Agenda	Conclusions
7-8 February 2018, Bonn, Germany	1st BEREC CN meeting in 2018	BEREC CN (18) 01	BEREC CN (18) 27
24-25 May 2018, Riga, Latvia	2nd BEREC CN meeting in 2018	BEREC CN (18) 29	BEREC CN (18) 56
13-14 September 2018, Dublin, Ireland	3rd BEREC CN meeting in 2018	BEREC CN (18) 57	BEREC CN (18) 88
15-16 November 2018, Luxembourg	4th BEREC CN meeting in 2018	BEREC CN (18) 89	BEREC CN (18) 133

Annex 7 Internal BEREC workshops

Dates/place	Event
7 March 2018, Bratislava, Slovak Republic	BEREC joint ENISA internal workshop on 5G and Internet of Things
13 June 2018 Gdansk-Sopot, Poland	BEREC internal workshop on data economy
3 October 2018, Portorož, Slovenia	BEREC internal workshop on BEREC over the next decade — the way forward

Annex 8 Events attended by the BEREC Chair and/or Vice-Chairs on behalf of BEREC

Dates/place	Event
19 January 2018, Brussels, Belgium	Participation of the BEREC Chair representative in the 12th Seminar for National Judges
31 January 2018, Brussels, Belgium	Keynote speech by the BEREC Chair in the ETNO-MLex Regulatory Summit 2018
12 February 2018, Brussels, Belgium	Participation of the BEREC Chair in the panel discussion at the 5G conference
24-28 February 2018, Barcelona, Spain	Participation of the BEREC Chair in the panel discussion at the BEREC-GSMA Roundtable at the GSMA World Mobile Congress
28 March 2018, Brussels, Belgium	Participation of the BEREC Chair in the CERRE executive seminar
19 April 2018, Skopje, Former Yugoslav Republic of Macedonia	Participation of the BEREC Chair in the Western Balkan Digital Summit
23 May 2018, Brussels, Belgium	Participation of the BEREC Chair in the panel discussion organised by the Greens/European Free Alliance

Dates/place	Event
3-4 July 2018, Brussels, Belgium	Participation of a BEREC-Vice Chair (ComReg) in the EU-LAC Summit
27 August 2018, Salzburg, Austria	Participation of the BEREC Chair in 19th Salzburger Telekom Forum
15 October 2018, Brussels, Belgium	Participation of the BEREC Chair and BEREC Vice-Chair (ComReg) in the FT-ETNO Conference
24 October 2018, Madrid, Spain	Participation of the BEREC Vice-Chair (ComReg) in the IESE II Conference on Competition and Regulation in the Telecommunications Market
24 October 2018, Athens, Greece	Participation of BEREC representatives (EETT) in the ITU Forum 'Towards 5G Enabled Gigabit Society'
25-27 October 2018, New Delhi, India	Participation of the BEREC Chair in the India Mobile Congress
25-26 October 2018, Barcelona, Spain	Participation of a BEREC Vice-Chair (ComReg) in the World 5G Congress
21 November 2018, Bucharest, Romania	Participation of the BEREC Chair in the ANACOM's conference on 5G

Dates/place	Event
27 November 2018, Brussels, Belgium	Participation of the BEREC Chair in the ECTA Regulatory Conference 2018
29 November 2018, Berlin, Germany	Participation of the BEREC Chair at the BREKO Jahrestagung
10 December 2018, Budapest, Hungary	Participation of the BEREC Chair at the RSPG Stakeholder Meeting
12 December 2018, Brussels, Belgium	Speech by the BEREC Chair at the BITS seminar on 'Wholesale only'

Annex 9 Publicly available documents approved by the Board of Regulators (BoR) in 2018

A. BEREC opinions

Document number	Description	Date
BoR (18) 50	BEREC opinion on draft SMP guidelines	16 March 2018
BoR (18) 55	BEREC opinion on Phase II investigation Case SI/2018/2050	23 March 2018
BoR (18) 67	BEREC opinion on Phase II investigation Case SK/2018/2051	4 April 2018
BoR (18) 98	BEREC opinion on BNetzA request on providing wholesale roaming access	1 June 2018
BoR (18) 144	BEREC opinion on Implementing Regulation (EU) 2016/2286	31 July 2018
BoR (18) 167	BEREC position paper — Input to the Commission's WACC consultation 2018	4 October 2018
BoR (18) 199	BEREC opinion on Phase II investigation (Article 7) Case HU/2018/2107	15 October 2018
BoR (18) 205	BEREC opinion on Phase II investigation (Article 7a) Case HU/2018/2107	25 October 2018
BoR (18) 244	BEREC opinion for the evaluation of the application of Regulation (EU) 2015/2120 and the BEREC Net Neutrality Guidelines	6 December 2018

B. BEREC reports

Document number	Description	Date
BoR (18) 23	Study on implications of 5G deployment on future business models	8 March 2018
BoR (18) 24	Assessment of the need to review the BEREC common positions on Markets 3a, 3b and 4	8 March 2018
BoR (18) 30	Report on NRAs' practices for ensuring equivalence of access and choice for disabled end-users	8 March 2018
BoR (18) 31	International roaming BEREC benchmark data report April 2017-September 2017	8 March 2018
BoR (18) 34	BEREC report on the outcome of the public consultation on the impact of premium content on ECS markets and the effect of devices on the open use of the internet	8 March 2018
BoR (18) 35	BEREC report on the impact of premium content on ECS markets and the effect of devices on the open use of the internet	8 March 2018
BoR (18) 41	BEREC preliminary analysis of intra-EU calls	26 February 2018
BoR (18) 75	BEREC supplementary analysis of intra-EU calls	20 April 2018
BoR (18) 103	Termination rates at European level January 2018	14 June 2018
BoR (18) 106	BEREC report on the outcome of the public consultation on the draft preliminary report in view of a common position monitoring mobile coverage	14 June 2018

Document number	Description	Date
BoR (18) 116	BEREC report on infrastructure sharing	14 June 2018
BoR (18) 119	BEREC report on post-merger market developments — price effects of mobile mergers in Austria, Ireland and Germany	15 June 2018
BoR (18) 120	Layer 2 wholesale access products excluding Ethernet-based leased lines on Market 4	15 June 2018
BoR (18) 159	Location of the network termination point	4 October 2018
BoR (18) 160	International roaming BEREC benchmark data report October 2017-March 2018	4 October 2018
BoR (18) 161	BEREC report on open data policy	4 October 2018
BoR (18) 162	Report on BEREC international mission to Canada	4 October 2018
BoR (18) 170	Report on the implementation of Regulation (EU) 2015/2120 and BEREC Net Neutrality Guidelines	4 October 2018
BoR (18) 213	BEREC report on the application of the common position on geographical aspects of market analysis	6 December 2018
BoR (18) 214	Technical and economic replicability assessment in the context of symmetric access	6 December 2018
BoR (18) 215	BEREC report: regulatory accounting in practice 2018	6 December 2018

Document number	Description	Date
BoR (18) 216	BEREC report on the outcome of the public consultation on the draft BEREC report on contractual simplification	6 December 2018
BoR (18) 217	BEREC report on contractual simplification	6 December 2018
BoR (18) 218	Termination rates at European level July 2018	6 December 2018
BoR (18) 219	BEREC report on the outcome of the consultation on the draft preliminary report in view of a common position on monitoring mobile coverage	6 December 2018
BoR (18) 220	BEREC report on transparency and comparability of international roaming tariffs	6 December 2018
BoR (18) 235	BEREC report on practices on spectrum authorisation, award procedures and coverage obligations with a view to considering their suitability to 5G	6 December 2018
BoR (18) 241	BEREC report on the outcome of the public consultation on the draft Work Programme for 2019	6 December 2018
BoR (18) 245	BEREC report on the outcome of the consultation on the evaluation of the application of Regulation (EU) 2015/2120 and the BEREC Net Neutrality Guidelines	6 December 2018

C. BoR decisions

Document number	Description	Date
BoR/2018/01	Decision of the Board of Regulators on the appointment of the Remedies Expert Working Group Co-Chair	26 January 2018
BoR/2018/02	Decision of the Board of Regulators on confirmatory application for access to Net Neutrality Expert Working Group documents	2 February 2018
BoR/2018/03	Decision of the Board of Regulators on confirmatory application for access to Net Neutrality EWG documents	12 April 2018
BoR/2018/04	Decision of the Board of Regulators on confirmatory application for access to Net Neutrality Expert Working Group documents	19 April 2018
BoR/2018/05	Decision of Board of Regulators on confirmatory application for access to BoR (17) 39	8 June 2018
BoR/2018/06	Decision of the Board of Regulators authorising the BEREC Chair to sign the Memorandum of Understanding between the United States Federal Communications Commission and the Body of European Regulators for Electronic Communications (BEREC)	10 July 2018
BoR/2018/07	Decision of the Board of Regulators on confirmatory application for access to BoR (17) 180 BEREC internal report summarising annual reports by NRAs on the implementation of the net neutrality provisions	13 July 2018
BoR/2018/08	Decision of the Board of Regulators for the procurement of a study on 'The determinants of investment in very high capacity networks — a system dynamics approach'	14 September 2018

Document number	Description	Date
BoR/2018/09	Decision of the Board of Regulators on the BEREC Expert Working Groups	6 December 2018
BoR/2018/10	Decision of Board of Regulators amending BoR decision for the procurement of a study on 'The determinants of investment in very high capacity networks — a system dynamics approach'	6 December 2018

D. Documents approved for public consultation

Document number	Description	Date
BoR (18) 33	Consultation paper on the evaluation of the application of Regulation (EU) 2015/2120 and the BEREC Net Neutrality Guidelines	8 March 2018
BoR (18) 65	Call for inputs to the BEREC Work Programme 2019	26 March 2018
BoR (18) 115	Draft common position on monitoring mobile coverage	15 June 2018
BoR (18) 163	Draft BEREC report on pricing for access to infrastructure and civil works according to the BCRD	4 October 2018
BoR (18) 168	BEREC public consultation on the data economy	4 October 2018
BoR (18) 172	Draft BEREC report on contractual simplification	4 October 2018
BoR (18) 174	Draft BEREC work programme 2019	4 October 2018
BoR (18) 228	Draft BEREC report on access to physical infrastructure in the context of market analysis	6 December 2018
BoR (18) 229	Draft BEREC report on terminating contracts and switching provider	6 December 2018

Document number	Description	Date
BoR (18) 230	Draft BEREC public consultation on Internet of Things indicators	6 December 2018
BoR (18) 236	Draft BEREC common position on mobile infrastructure sharing	6 December 2018

E. Annual work programme and annual reports

Document number	Description	Date
BoR (18) 104	BEREC annual reports 2017	14 June 2018
BoR (18) 240	BEREC work programme 2019	7 December 2018

F. Regulatory best practices

Document number	Description	Date
BoR (18) 171	European benchmark of the pricing of bundles — methodology guidelines	4 October 2018
BoR (18) 237	BEREC common position on information to consumers on mobile coverage	6 December 2018

G. Other documents

Document number	Description	Date
BoR (18) 117	Memorandum of Understanding between Telecom Authority of India (TRAI) and Body of European Regulators for Electronic Communications (BEREC)	14 June 2018
BoR (18) 118	BEREC-TRAI Joint Statement for an Open internet	14 June 2018
BoR (18) 136	Memorandum of Understanding between the United States Federal Communications Commission and the Body of European Regulators for Electronic Communications (BEREC)	19 July 2018
BoR (18) 173	Memorandum of Understanding between BEREC and CRTC	4 October 2018
BoR (18) 252	BEREC-Regulator Summit Declaration	19 – 20 November 2018
BoR (18) 221	6th BEREC Stakeholder Forum — summary of proceedings	6 December 2018

Annex 10 Board of Regulators electronic voting procedures

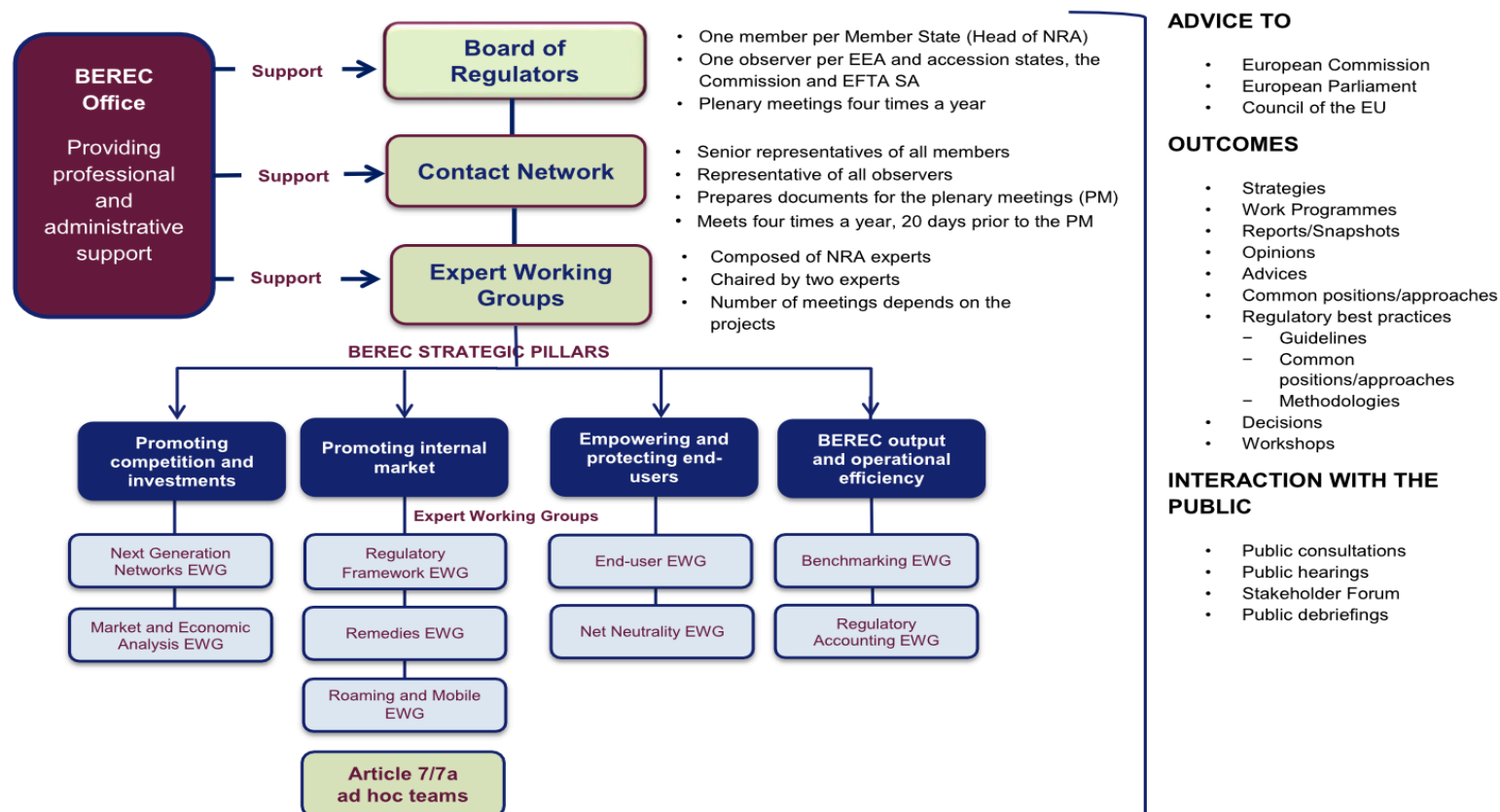
No	Subject	Comments round		Voting round	
		Start/link to documents	End	Start/link to documents	End/link to record
1.	Decision of the Board of Regulators on the appointment of the Remedies Expert Working Group Co-chair	11 January 2018	18 January 2018	19 January 2018	26 January 2018
2.	Decision of the Board of Regulators on confirmatory application for access to Net Neutrality Expert Working Group documents	29 January 2018	31 January 2018	1 February 2018	2 February 2018
3.	BEREC technical analysis of the market for intra-EU calls	19 February 2018	21 February 2018	23 February 2018	26 February 2018
4.	BEREC opinion on draft SMP guidelines	12 March 2018	13 March 2018	15 March 2018	16 March 2018
5.	BEREC opinion on Article 7a Phase II case SI/2018/2050	16 March 2018	20 March 2018	22 March 2018	23 March 2018
6.	Decision of the Board of Regulators on confirmatory application for access to Net Neutrality Expert Working Group documents from 2017 meetings	26 March 2018	3 April 2018	5 April 2018	12 April 2018

No	Subject	Comments round		Voting round	
		Start/link to documents	End	Start/link to documents	End/link to record
7.	BEREC opinion on Article 7a Phase II case SK/2018/2051	26 March 2018	28 March 2018	3 April 2018	4 April 2018
8.	Decision of the Board of Regulators on confirmatory application for access to Net Neutrality Expert Working Group documents from 2016 meetings	13 April 2018	17 April 2018	18 April 2018	19 April 2018
9.	BEREC supplementary analysis of intra-EU calls	16 April 2018	17 April 2018	19 April 2018	20 April 2018
10.	BEREC position on in-flight offer	9 May 2018	16 May 2018	18 May 2018	25 May 2018
11.	BEREC opinion on BNETZA request on providing wholesale roaming access pursuant to Article 3 of the Roaming Regulation	28 May 2018	29 May 2018	30 May 2018	1 June 2018

No	Subject	Comments round		Voting round	
		Start/link to documents	End	Start/link to documents	End/link to record
12.	Decision of the Board of Regulators on confirmatory application for access to documents on symmetric regulation	4 June 2018	5 June 2018	7 June 2018	8 June 2018
13.	Memorandum of Understanding between BEREC and FCC	4 July 2018	5 July 2018	9 July 2018	10 July 2018
14.	Decision of the Board of Regulators on confirmatory application for access to BEREC report summarising annual reports by NRAs on the implementation of the net neutrality provisions	11 July 2018	12 July 2018	12 July 2018	13 July 2018
15.	BEREC opinion on implementing Regulation (EU) 2016/2286	16 July 2018	23 July 2018	24 July 2018	31 July 2018
16.	BoR Decision for the procurement of a study on 'The determinants of investment in very high capacity networks — a system dynamics approach'	28 August 2018	4 September 2018	6 September 2018	13 September 2018

No	Subject	Comments round		Voting round	
		Start/link to documents	End	Start/link to documents	End/link to record
17.	BEREC input on weighted average of maximum mobile termination rates	24 September 2018	1 October 2018	1 October 2018	8 October 2018
18.	BEREC opinion on Article 7 Phase II case HU/2018/2017	8 October 2018	10 October 2018	12 October 2018	15 October 2018
19.	BEREC opinion on Article 7a Phase II case HU/2018/2017	19 October 2018	23 October 2018	24 October 2018	25 October 2018

Annex 11 BEREC and BEREC Office organisational chart



Annex 12

LIST

List of the members and observers of the Board of Regulators established pursuant to Article 4 (1) of Regulation (EC) No 1211/2009 of the European Parliament and of the Council of 25 November 2009 establishing the Body of European Regulators for Electronic Communications (BEREC) and the Office

No	Country (if applicable)	Title	Name(s)	Surname(s)	Name of organisation	Member or observer
1.	Albania	Mr	Ilir	Zela	Electronic and Postal Communications Authority of Albania, AKEP	Observer
2.	Austria	Mr	Johannes	Gungl	Austrian Regulatory Authority for Broadcasting and Telecommunications (RTR-GmbH)	Member
3.	Belgium	Mr	Michel	Van Bellinghen	Institut Belge des Postes et Télécommunications (IBPT / BIPT)	Member
4.	Bulgaria	Mr	Nikola Pavlov	Kolev	Communications Regulation Commission (CRC)	Member
5.	Croatia	Mr	Tonko	Obuljen	Croatian Regulatory Authority for Network Industries (HAKOM)	Member
6.	Cyprus	Mr	George	Michaelides	Office of the Commissioner of Telecommunications and Postal Regulation (OCECPR)	Member
7.	Czechia	Mr	Jaromír	Novák	Czech Telecommunication Office (CTU)	Member
8.	Denmark	Mrs	Katrine	Windning	Danish Business Authority (DBA)	Member
9.	Estonia	Mr	Kaur	Kajak	Estonian Technical Regulatory Authority (ETRA)	Member
10.	Finland	Mrs	Kirsi	Karlamaa	Finnish Communications	Member

No	Country (if applicable)	Title	Name(s)	Surname(s)	Name of organisation	Member or observer
					Regulatory Authority (FICORA)	
11.	Former Yugoslav Republic of Macedonia	Mr	Sasho	Dimitrijoski	Agency for Electronic Communications (AEC)	Observer
12.	France	Mr	Sébastien	Soriano	Autorité de Régulation des Communications électroniques et des Postes (ARCEP)	Member
13.	Germany	Mr	Wilhelm	Eschweiler	Federal Network Agency (BNetzA)	Member
14.	Greece	Mr	Konstantinos	Masselos	Hellenic Telecommunications and Post Commission (EETT)	Member
15.	Hungary	Mrs	Monika	Karas	National Media and Infocommunications Authority (NMHH)	Member
16.	Iceland	Mr	Hrafnkell	Gislason	Post and Telecom Administration (PTA)	Observer
17.	Ireland	Mr	Jeremy	Godfrey	Commission for Communications Regulation (COMREG)	Member
18.	Italy	Mr	Angelo Marcello	Cardani	Autorità per le Garanzie nelle Comunicazioni (AGCOM)	Member
19.	Latvia	Mr	Rolands	Irklis	Public Utilities Commission (SPRK)	Member
20.	Liechtenstein	Mr	Kurt	Buehler	Office for Communications / Amt für Kommunikation (AK)	Observer
21.	Lithuania	Mr	Feliksas	Dobrovolskis	Communications Regulatory Authority (RRT)	Member
22.	Luxembourg	Mr	Luc	Tapella	Institut Luxembourgeois de Régulation (ILR)	Member

No	Country (if applicable)	Title	Name(s)	Surname(s)	Name of organisation	Member or observer
23.	Malta	Mr	Edward	Woods	Malta Communications Authority (MCA)	Member
24.	Montenegro	Mr	Darko	Grgurovic	Montenegro Agency for Electronic Communications and Postal Services (EKIP)	Observer
25.	Norway	Mrs	Elisabeth	Sørbøe Aarsæther	Norwegian Communications Authority Nkom	Observer
26.	Poland	Mr	Marcin	Cichy	Office of Electronic Communications (UKE)	Member
27.	Portugal	Mr	Joao Antonio	Cadete Matos de	Autoridade Nacional de Comunicações (ANACOM)	Member
28.	Romania	Mr	Sorin Mihai	Grindeanu	National Authority for Management and Regulation in Communications (ANCOM)	Member
29.	Serbia	Mr	Vladica	Tintor	Regulatory Agency for Electronic Communications and Postal Services (RATEL)	Observer
30.	Slovak Republic	Mr	Vladimír	Kešjar	Regulatory Authority for Electronic Communications and Postal Services (RÚ)	Member
31.	Slovenia	Mrs	Tanja	Muha	Agency for Communication Networks and Services of the Republic of Slovenia (AKOS)	Member
32.	Spain	Mr	Bernardo	Lorenzo	Comisión Nacional de los Mercados y la Competencia (CNMC)	Member
33.	Sweden	Mr	Dan	Sjoblom	National Post and Telecommunications Agency (PTS)	Member

No	Country (if applicable)	Title	Name(s)	Surname(s)	Name of organisation	Member or observer
34.	Switzerland	Mr	Stephan	Netzle	Federal Communications Commission (COMCOM)	Observer
35.	The Netherlands	Mr	Henk	Don	Authority for Consumers and Markets (ACM)	Member
36.	Turkey	Mr	Ömer Abdullah	Karagözoğlu	Information and Communication Technologies Authority (ICTA)	Observer
37.	United Kingdom	Mrs	Lindsey	Fussell	Office of Communications (OFCOM)	Member
38.		Mr	Roberto	Viola	European Commission	Observer
39.		Mr	Gunnar Thor	Pétursson	European Free Trade Association (EFTA) Surveillance Authority (ESA)	Observer

Riga, 03 October 2018
BEREC Office

List of acronyms

ANO – Alternative Network Operator

ARRPU - Average Retail (mobile) Revenue Per User

BCRD - Broadband Cost Reduction Directive

BEREC - Body of European Regulators for Electronic Communications

BoR – Board of Regulators

CAPM – Capital Asset Pricing Model

CRTC – Canadian Radio-television and Telecommunication Commission

DESI - Digital Economy and Society Index

EaPeReg – Eastern Partnership Electronic Communications Regulators Network

ECS - Electronic Communications Service(s)/Sector

EEA - European Economic Area

EECC - European Electronic Communications Code

EITO – European IT Observatory

EMERG - Euro-Mediterranean Regulators Group

ENISA - European Union Agency for Network and Information Security

EU - European Union

EWG - Expert Working Group

FCC - Federal Communications Commission (United States of America)

FDC - Fully-Distributed Costs

FTR - Fixed Termination Rate

FTTC – Fibre-To-The-Cabinet

FTTH - Fibre-To-The-Home

FTTP – Fibre-To-The-Premises

HICP - Harmonised Index of Consumer Prices

HSPA - high speed packet access

IoT – Internet of Things

ITRE - European Parliamentary Committee on Industry, Research and Energy

LLU - Local Loop Unbundling

LRAIC – Long-Run (Average) Incremental Costs

LRIC – Long-Run Incremental Costs

LTE – Long-Term Evolution

L2 WAP - Layer 2 wholesale access product

M&A – Mergers and Acquisitions

MNO - Mobile Network Operator

MoU – Memorandum of Understanding

MTR - Mobile Termination Rate

MVNO - Mobile Virtual Network Operator

NCA – National Competition Authority

NGA - Next Generation Access

NRA - National Regulatory Authority

NTP – Network Termination Point

REGULATEL - Latin American Forum of Telecommunications Regulators

RLAH - Roam Like At Home

RSPG - Radio Spectrum Policy Group

SMP - Significant Market Power

SMS - Short Message Service

TR - Termination Rate

TRAI - Telecom Regulatory Authority of India

ULL - Unbundled Local Loop

VDSL - Very-High-Bit-Rate Digital Subscriber Line

VULA - Virtual Unbundled Local Access

WACC - Weighted Average Cost of Capital