

Termination rates at European level

July 2017

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1. Executive Summary

This document is an updated version of the benchmark of fixed and mobile Termination Rates (TRs) across Europe prepared by the BEREC Benchmarking Expert Working Group in cooperation with the BEREC Remedies Expert Working Group and the BEREC Office, and aims to offer a picture of the regulated rates for fixed and mobile interconnection services in Europe. Fixed and mobile termination services in Europe are subject to price regulation.

The European Commission Recommendation on relevant product and service markets 2014 identifies:

- wholesale call termination on individual public telephone networks provided at a fixed location as a relevant market susceptible of ex-ante regulation (market 1)
- wholesale voice call termination on individual mobile networks as a relevant market susceptible of ex-ante regulation (market 2).

Because of the structure of these two markets, in general each network operator has an SMP position (i.e. a monopoly) for termination on its own network and therefore its termination rates are regulated.

The present overview of TRs is based upon the results of a request for information sent to all NRAs in July 2017, referring – if not differently indicated – to data as of 1st July 2017. It includes rates from the thirty seven (37) NRAs¹ that provided responses to our request.

As of July 2017, the situation regarding TRs in Europe can briefly be described as follows (see also Figures 1-3):

- The lowest regulated FTR simple average of incumbents at the European level (all 37 countries) stands at 0.3638 cents per minute.
- The lowest FTR simple average of European Union incumbents (only EU member states) stands at 0.2190 cents per minute.
- The MTR simple average (Avg (S)) at the European level (all 37 countries) stands at 1.0565 cents per minute, whereas the weighted average² (Avg (W)) at European level is estimated at 0.9262 cents per minute.
- The MTR simple average at the EU level (only EU member states) stands at 0.8795 cents per minute, whereas the weighted average at EU level is estimated at 0.9079 cents per minute.

¹ 28 EU member states plus 4 EFTA states (Switzerland, Iceland, Norway and Liechtenstein) and 5 candidate states Albania, Montenegro, FYROM, Serbia and Turkey.

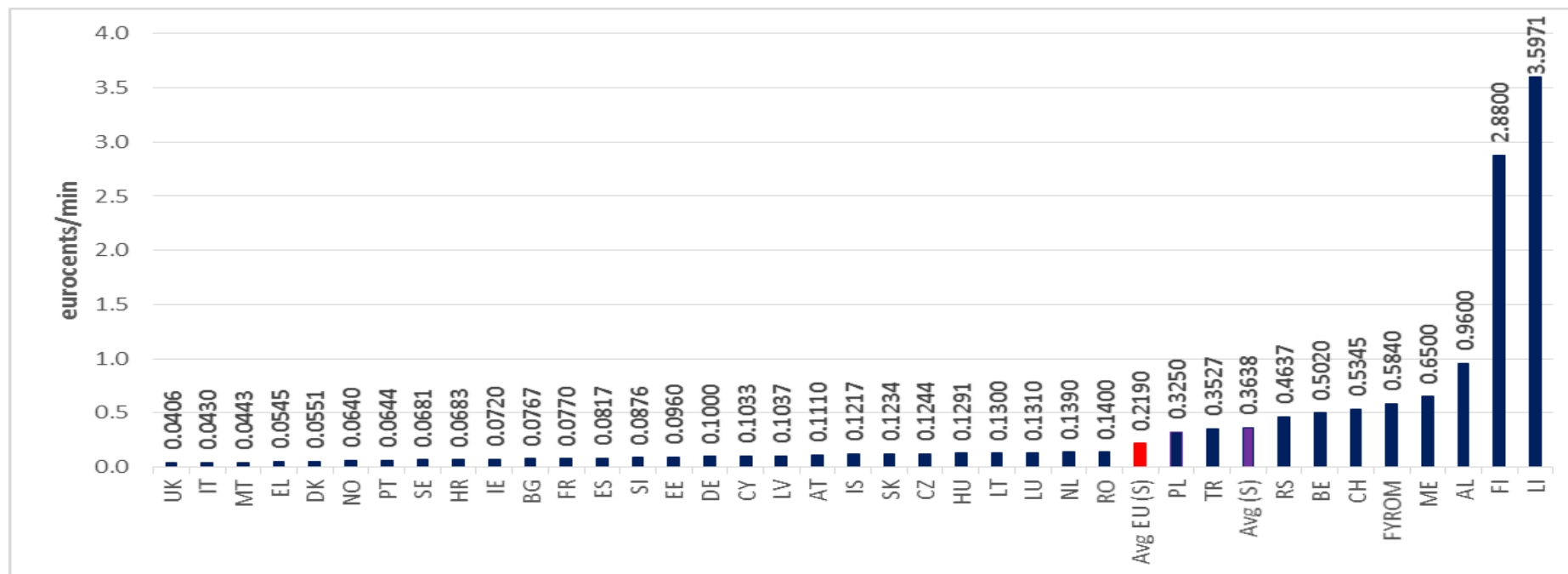
² The weighted averages weight each country's average rate with the share of the country's subscribers (total subscribers per country / total subscribers in all countries).

- The SMS TR simple average at the European level is 2.4057 cents per SMS, whereas the weighted average is reported to be 2.0391 cents per SMS.
- Since not all EU member states report their SMS TR, no averages at the EU level could be calculated.

For non-euro countries, the average exchange rate for the fourth quarter of the year (Q2 2017) was used for the calculation of FTRs, MTRs and SMS TRs. The exchange rates used are reported in [Annex 10](#).

Overview of incumbents' lowest^{3,4,5} regulated fixed termination rates per country – July 2017 (eurocents per minute of service)

Figure 1 FTRs



Source: NRAs, BEREC

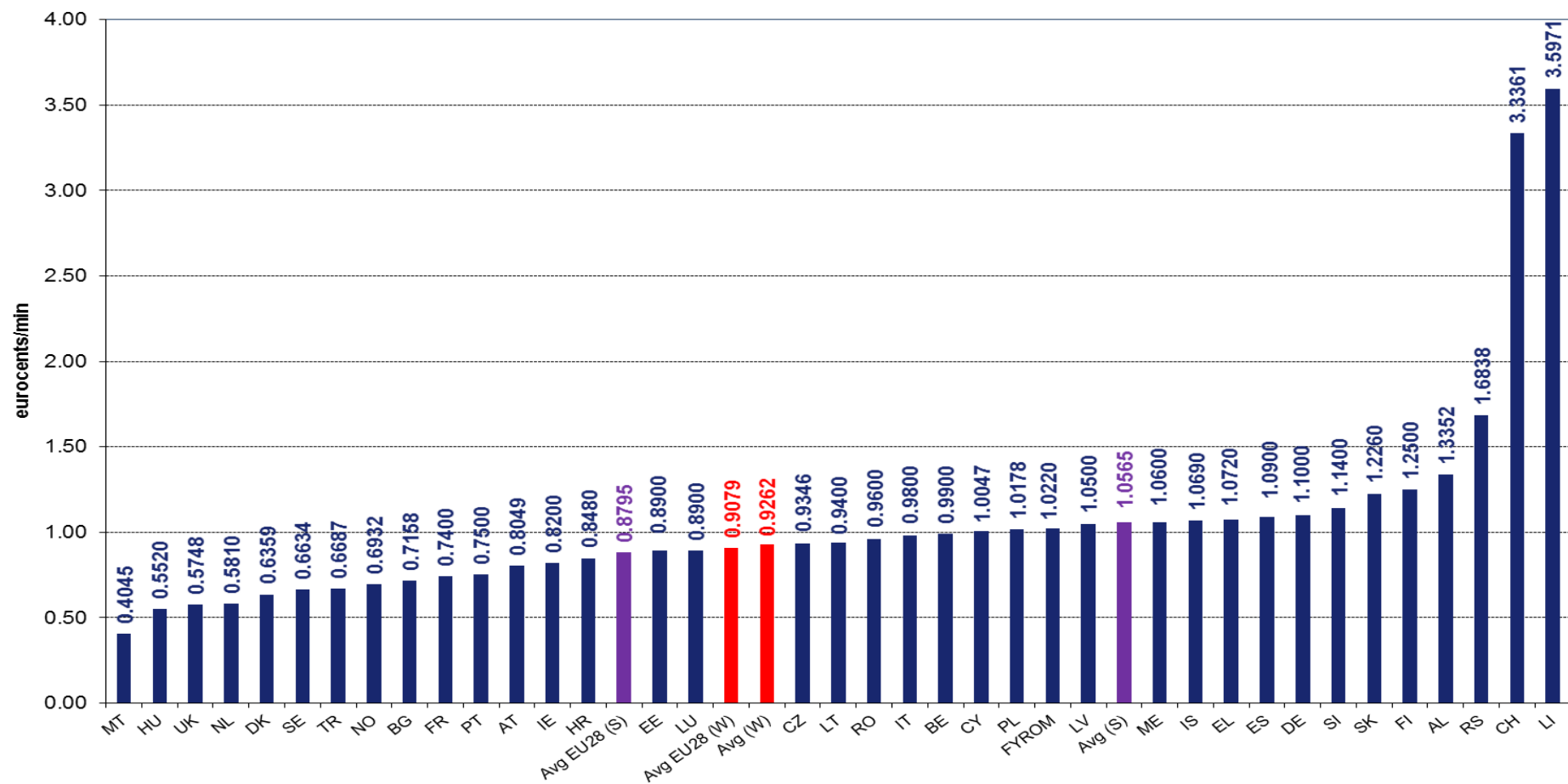
³ The lowest regulated rate of the incumbent. In case the operator uses only one rate, it is considered as a single rate.

⁴ Due to the large number of incumbents present in Finland a weighted average is included for comparison.

⁵ The most recent Belgian FTR is based on the decision of the Supreme Court to set rates on the basis of FDC model.

MTR per country – July 2017 (eurocents per minute of service)

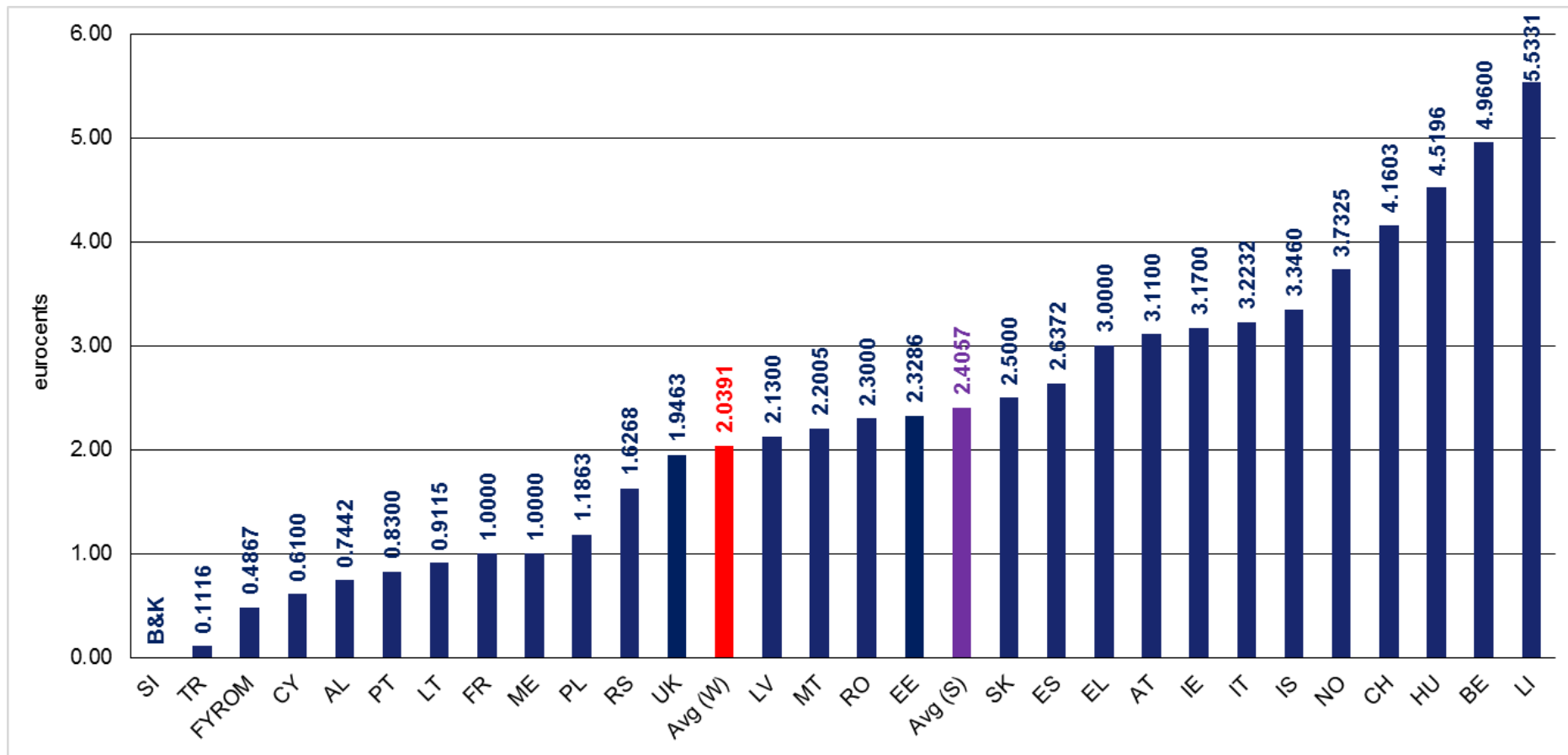
Figure 2 MTRs



Source: NRAs, BEREC

SMS TR per country – July 2017 (eurocents per message)

Figure 3 SMS TRs



Source: NRAs, BEREC

2. Fixed networks – voice interconnection

The regulation of FTRs has been harmonized by the Recommendation of 7.5.2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU (C (2009) 3359 final). However, some differences can be found across the national regulatory regimes:

- 1) In some cases, the termination rate is a two-part tariff, i.e. 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.
- 2) Interconnection services in fixed networks are provided at different levels in the hierarchy of the incumbents' networks, called layers. Even though some peculiarities in specific countries are present, in general three main layers for interconnection are defined: i) layer 1⁶, or local level service provision, ii) layer 2, or regional level service provision (single transit), and iii) layer 3, national level service provision (or double transit). Due to increasing symmetry and decreasing relevance of layers the report features a ranking of the lowest regulated rates as well as a weighted average of peak and off-peak rates in the table of [Annex 1](#).

The "lowest regulated rate" refers to the lowest of the rates of an operator. For operators that have more than one regulated rate, these are ranked in ascending order (first lowest, second lowest, etc.). If there is a single regulated rate, it is considered as "the lowest regulated rate".

2.1. Assumptions made for benchmarking

The following assumptions have been made in order to make tariffs comparable:

- In order to obtain a homogeneous comparison of average prices per minute across operators, a 3-minute average call duration has been assumed, using the standard formula: $(\text{fixed set-up charge} + \text{price per minute} \times 3) / 3$.
- Nominal tariffs are reported only when the NRA has set out the maximum price per minute that operators may charge each other.
- For those countries which have not set a single tariff and which apply distinct rates for the peak/off-peak period, an average price has been calculated taking into account the traffic distribution between peak and off-peak time. When this distribution has not been made available, a 50/50 distribution has been assumed.

2.2. FTR benchmark

In [Annex 1](#) the interconnection prices of operators listed by countries are presented. For each country, the NRA has provided information on the incumbent and some alternative or cable operators offering interconnection services. In the last column, a weighted average of peak/off-peak prices is provided.

⁶ Layer 1 is defined as the closest possible interconnection level to the network termination point.

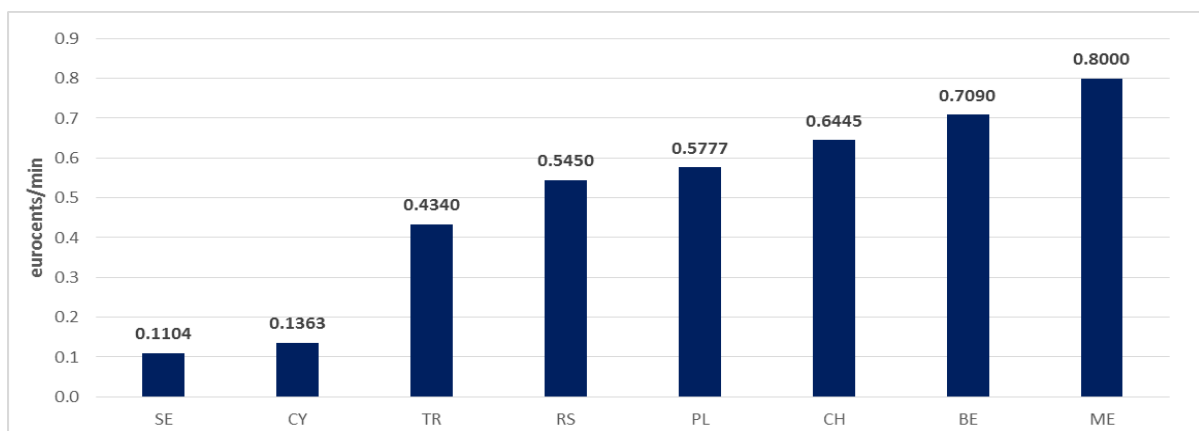
The lowest regulated rate is the rate applied by the operator at the level of interconnection that is closest to the network termination point. The second and third lowest regulated rates apply only to operators that have more than one regulated rate/interconnection layer.

Only five countries out of 37 maintain interconnection services in fixed networks at three different levels in the hierarchy of the incumbents' networks and 3 countries have 2 layers of interconnection.

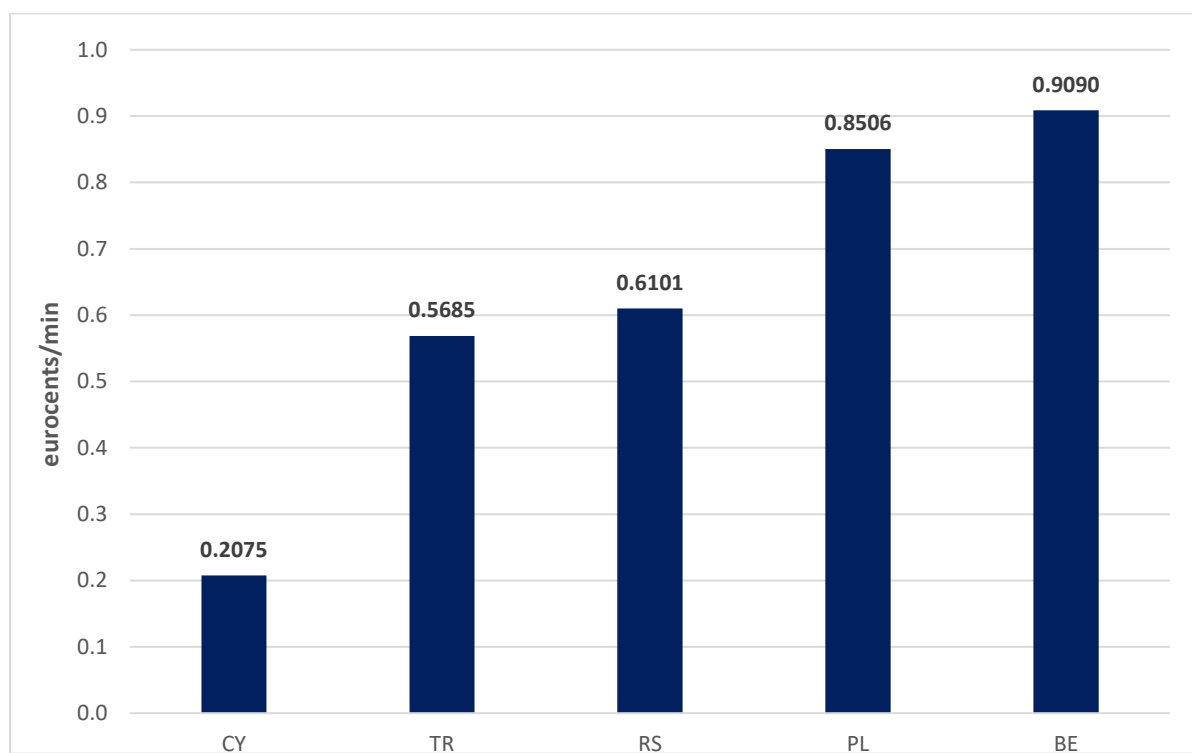
Incumbents' fixed termination rates per lowest regulated rate and country

For more information on the individual lowest rates of respective incumbents, please refer to Figure 1 and respectively [Annex 1](#).

Figure 4 Incumbents' second lowest regulated fixed termination rate per country



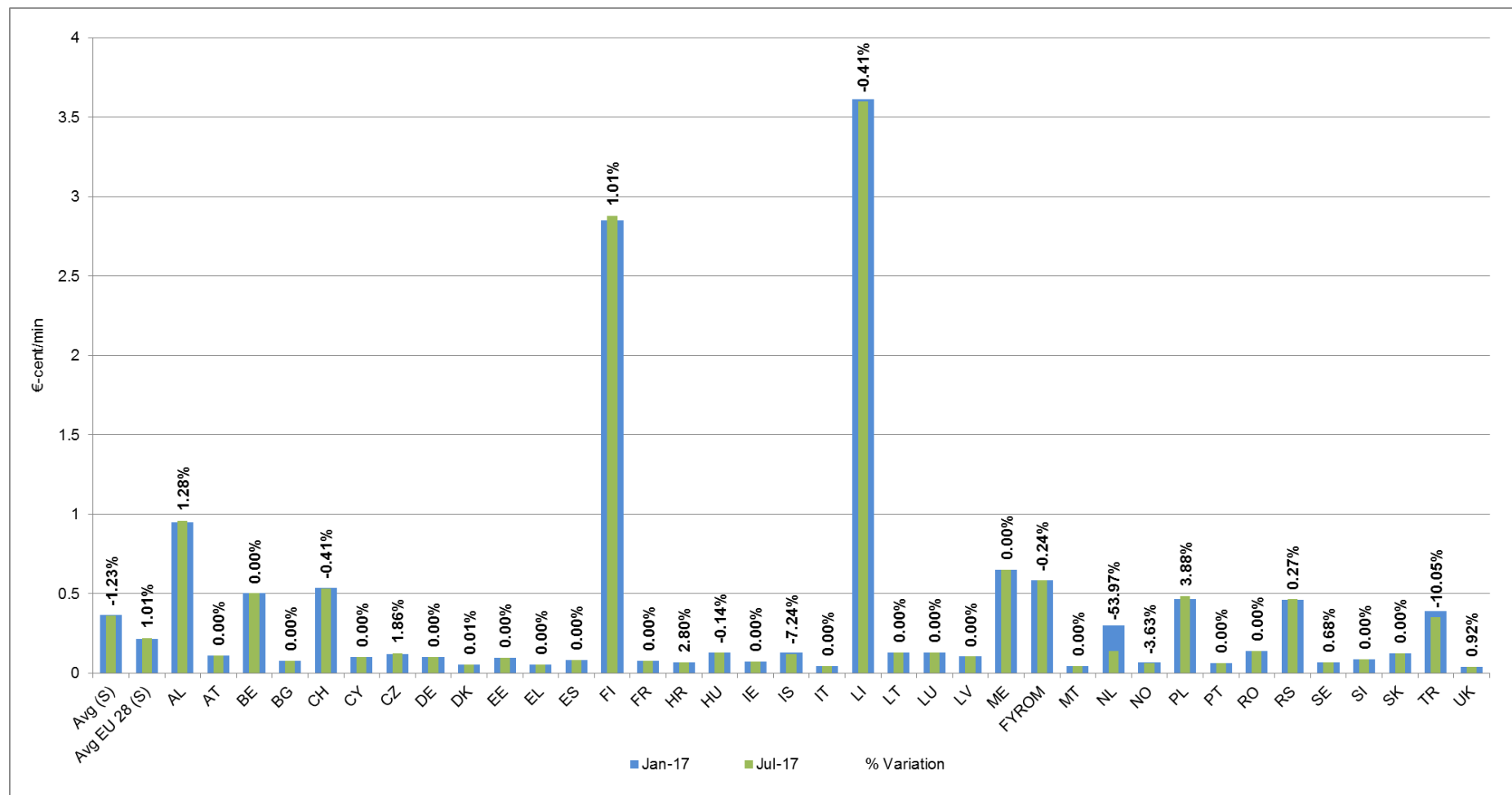
Source: NRAs, BEREC

Figure 5 Incumbents' third lowest regulated fixed termination rate per country

Source: NRAs, BEREC

2.3. Short term evolution of fixed incumbents' FTRs (from January 2017 to July 2017)

Figure 6 Incumbents' lowest regulated rate per country (eurocents/min)

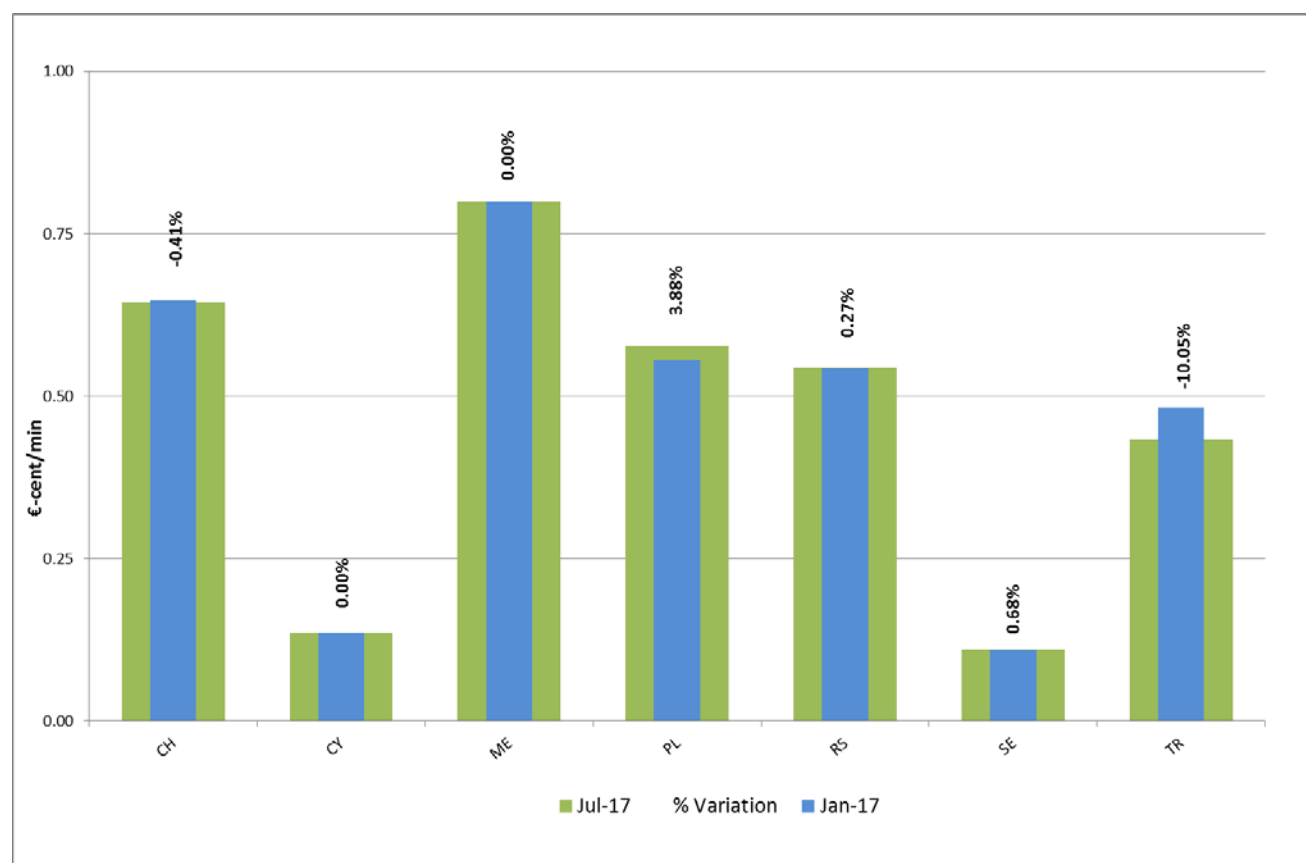


Source: NRAs, BEREC

The above chart shows the variation in percentage of the lowest regulated fixed termination rate of incumbents between January 2017 and July 2017. For easier comparison, rates are stated in cents.^{7 8}

Croatia and Iceland reported changes in their FTRs in their national currencies. The rate in Iceland decreased by 12.50%, as opposed to Croatia, where the rate increased by 1.53%. There were no changes reported in the FTRs in the rest of the non-euro countries in Figure 6.

Figure 7 Incumbents' second lowest regulated rate per country (eurocents/min)

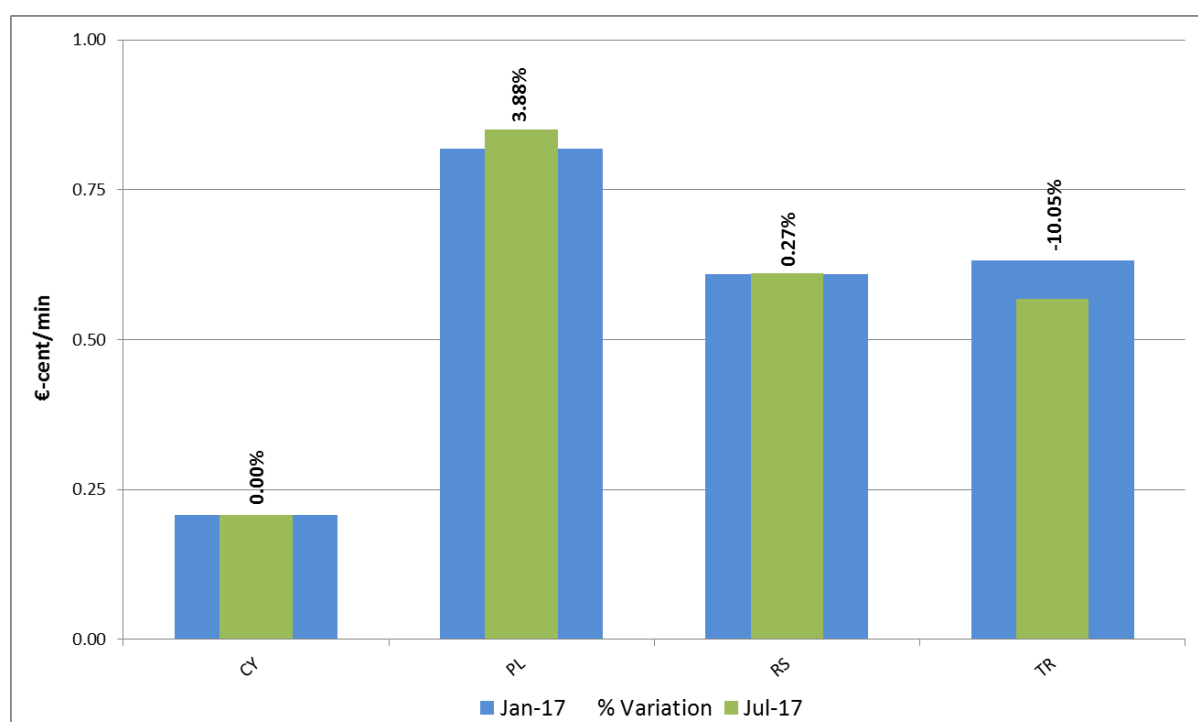


Source: NRAs, BEREC

There were no changes reported by any of the countries in the FTRs in national currency.

⁷ BE: The variation of BE reported as of July 2017 is calculated based on the rate of 0.502 cents for January 2017. The rate was set retroactively based on the Belgian Market Court's decision to use an FDC model for setting FTRs.

⁸ DE: The variation of DE reported as of July 2017 is calculated based on the rate of 0.1 cent for January 2017. The rate was set retroactively based on BNetZA's decision to use a benchmarking approach to set FTRs.

Figure 8 Incumbents' third lowest regulated rate per country (eurocents/min)

Source: NRAs, BEREC

There were no changes reported by any of the countries in the FTRs in national currency.

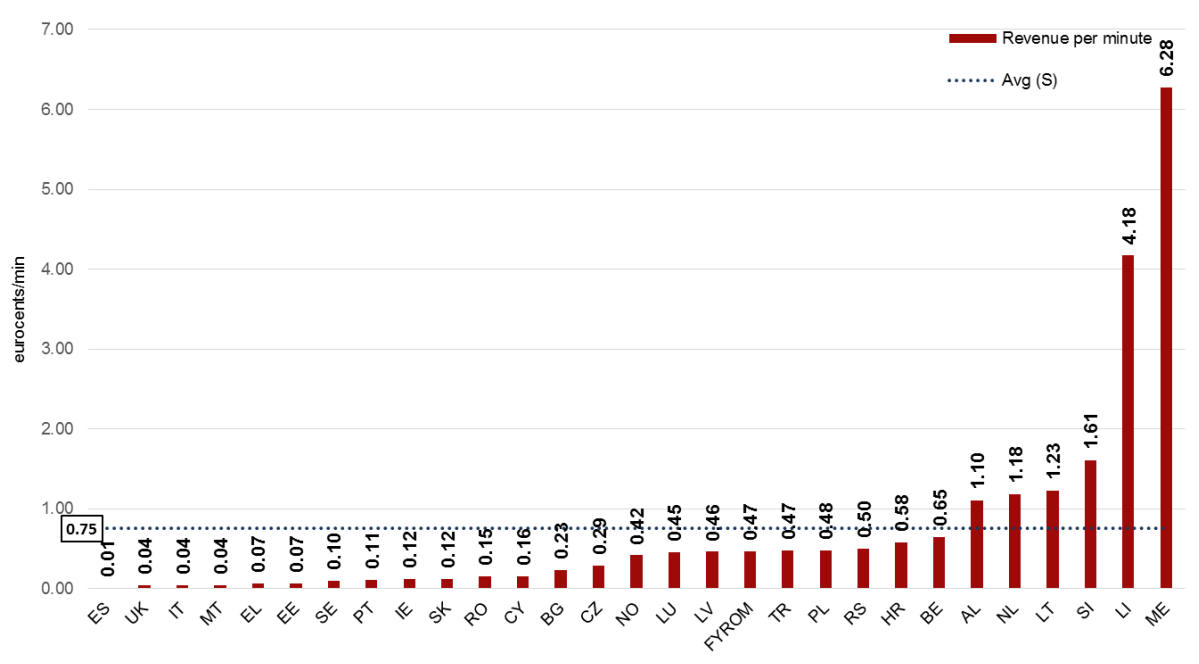
2.4. Average fixed termination revenue per country

Figure 9 illustrates the average revenue per minute from interconnection services across all Layers and for all operators is reported, together with the simple average (horizontal line). The data refer to the entire year of 2016, unless otherwise stated in the notes of Annex 2. Note that the average revenues per minute provided are aggregated for each country to: 1) the different existing layers of interconnection, 2) the different operators (i.e.: incumbents and the rest), and 3) the different prices deriving from the peak /off-peak differentiation in a number of countries.

The comparison across countries of this average revenue has limitations, since each country may have a different distribution in usage across the different layers of interconnection and in the distribution between peak and off-peak traffic.

For more details please consult [Annex 2](#).

Figure 9 Average revenue per minute for all operators

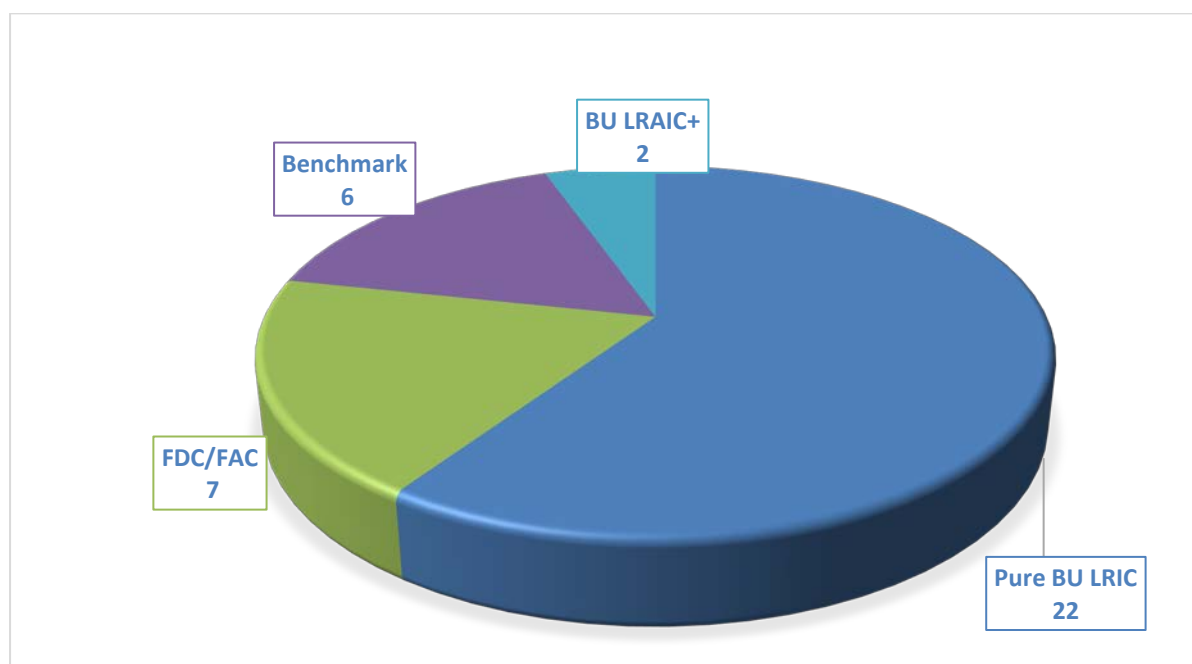


Source: NRAs, BEREC

2.5. FTR regulatory model implemented and symmetry overview

22 NRAs use Pure BULRIC models to set FTRs. The second most common model is FDC/FAC, used by 7 NRAs. 6 NRAs use Benchmarking approaches and BU LRAIC+ is used by 2 NRAs.

Figure 10 Cost accounting models used by NRAs



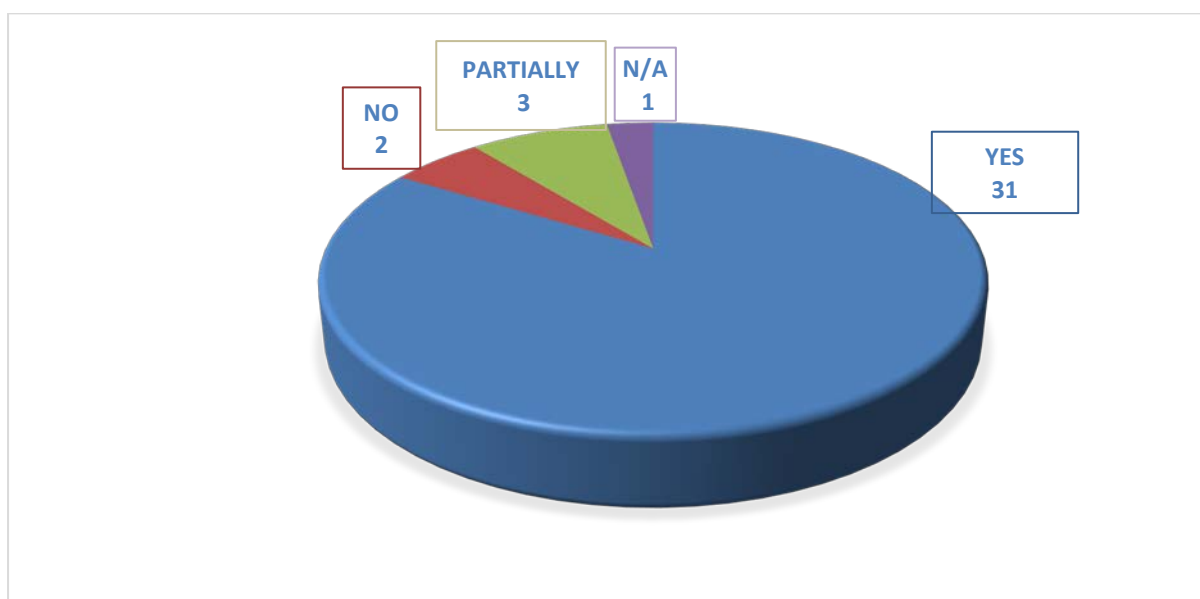
Source: NRAs, BEREC

For more information consult [Annex 3](#).

According to the European Commission Recommendation of 7.5.2009 on the Regulatory Treatment of Fixed and Mobile Rates in the EU Member States, NRAs should set termination rates based on the costs incurred by an efficient operator. This implies that they would also be symmetric. The above figure shows compliance with the Recommendation in the case of 22 NRAs using Pure BU LRIC models. 6 NRAs are using Benchmarking while 5 of these NRAs are using Benchmarking based on Pure BU LRIC.

Furthermore, in most of the respondent countries (31), FTRs are symmetric across all operators. 3 NRAs reported partial symmetry while rates are not symmetric in only 2 of the reporting countries. In one of the cases, there is only one operator in the country, therefore, symmetry is not applicable.

Figure 11 FTRs Symmetry



Source: NRAs, BEREC

For more information, consult [Annex 4](#).

2.6. Number of lines and market shares

In [Annex 5](#) the number of active fixed telephony lines in the retail market is provided for each operator included in the report. For a number of countries this information is confidential.

3. Mobile networks – voice interconnection

This section presents the benchmark of mobile termination rates (MTR) with data as of 1 July 2017 and its recent evolution. The purpose of this comparison is to provide an indication of the level of MTRs across the NRAs, their variations and the cost models adopted for setting MTRs. Moreover, this benchmarking exercise includes a section devoted to the future evolution of MTRs⁹.

The present overview of MTRs is based upon the results of a request for information sent to all NRAs in July 2017. It includes data from thirty-seven (37) NRAs that provided responses.

3.1. Assumptions made for the benchmarking

For the present benchmarking exercise, the following assumptions have been made in order to make tariffs comparable¹⁰:

- Operators with a market share below 1.5% have been excluded from the national MTR average calculation.
- Only nominal tariffs are represented in the report, defining them as “the price (in cents/minute) set out by the regulator that represents the maximum price per minute which operators may charge each other (without any adjustment for purchasing power parity or real effects – inflation).”
- Average MTRs per country have been obtained by weighting the MTR of each operator by its market share, measured in terms of subscribers. Four general averages have been calculated: a simple average and a weighted average, each at the European level (including all 37 countries reporting data) and at EU level (including only the 28 EU member states). The weighted averages weight each country’s average rate with the share of the country’s subscribers (total subscribers per country / total subscribers in all countries).
- Regarding the number of subscribers, it must be considered that different estimation methods are used among European countries (especially in the case of pre-paid consumers. Mobile subscribers (active SIM cards) means both 2G, 3G and 4G subscribers of a Mobile Network Operator or Mobile Virtual Network Operators. An active subscriber of mobile telephony means a subscriber of post-paid mobile telephony who has a valid contract, or a pre-paid subscriber who has made or received a call, sent an SMS or MMS or used data services at least once in the last 3 months. M2M, M2P and data-only SIMs cards should be excluded.¹¹

Regarding the short-term MTR evolution (from January 2017 to July 2017), some variation may be a consequence of any of the following reasons:

- i. Modifications in the tariff structure (for instance, disappearance of the set-up charge or initial period);

⁹ See [Annex 8 – Table 8](#)

¹⁰ Generally speaking, these assumptions may create margins of error in the present comparison, making it difficult to draw valid conclusions for policy purposes.

¹¹ Please note that due to a specification of the definition of mobile subscribers the number of total subscribers in some countries changed significantly compared to the previous reports.

- ii. Currency exchange rate variations in non-Euro countries¹²;
- iii. Changes in operators' market shares (e.g. due to a change in methodology in the calculation of subscriber rates) may have an effect on the average MTR for an individual country;
- iv. Inclusion of new operators that were not present in the previous benchmarks.

3.2. Average MTR per country: rates per voice minute (as of July 2017)

Table 1 - Average MTR per country

| Country | Average MT per country |
|---------|------------------------|
| AL | 1.3352 |
| AT | 0.8049 |
| BE | 0.9900 |
| BG | 0.7158 |
| CH | 3.3361 |
| CY | 1.0047 |
| CZ | 0.9346 |
| DE | 1.1000 |
| DK | 0.6359 |
| EE | 0.8900 |
| EL | 1.0720 |
| ES | 1.0900 |
| FI | 1.2500 |
| FR | 0.7400 |
| HR | 0.8480 |
| HU | 0.5520 |
| IE | 0.8200 |
| IS | 1.0690 |
| IT | 0.9800 |
| LI | 3.5971 |
| LT | 0.9400 |
| LU | 0.8900 |
| LV | 1.0500 |
| ME | 1.0600 |
| FYROM | 1.0220 |
| MT | 0.4045 |
| NL | 0.5810 |
| NO | 0.6932 |
| PL | 1.0178 |
| PT | 0.7500 |
| RO | 0.9600 |
| RS | 1.6838 |
| SE | 0.6634 |
| SI | 1.1400 |

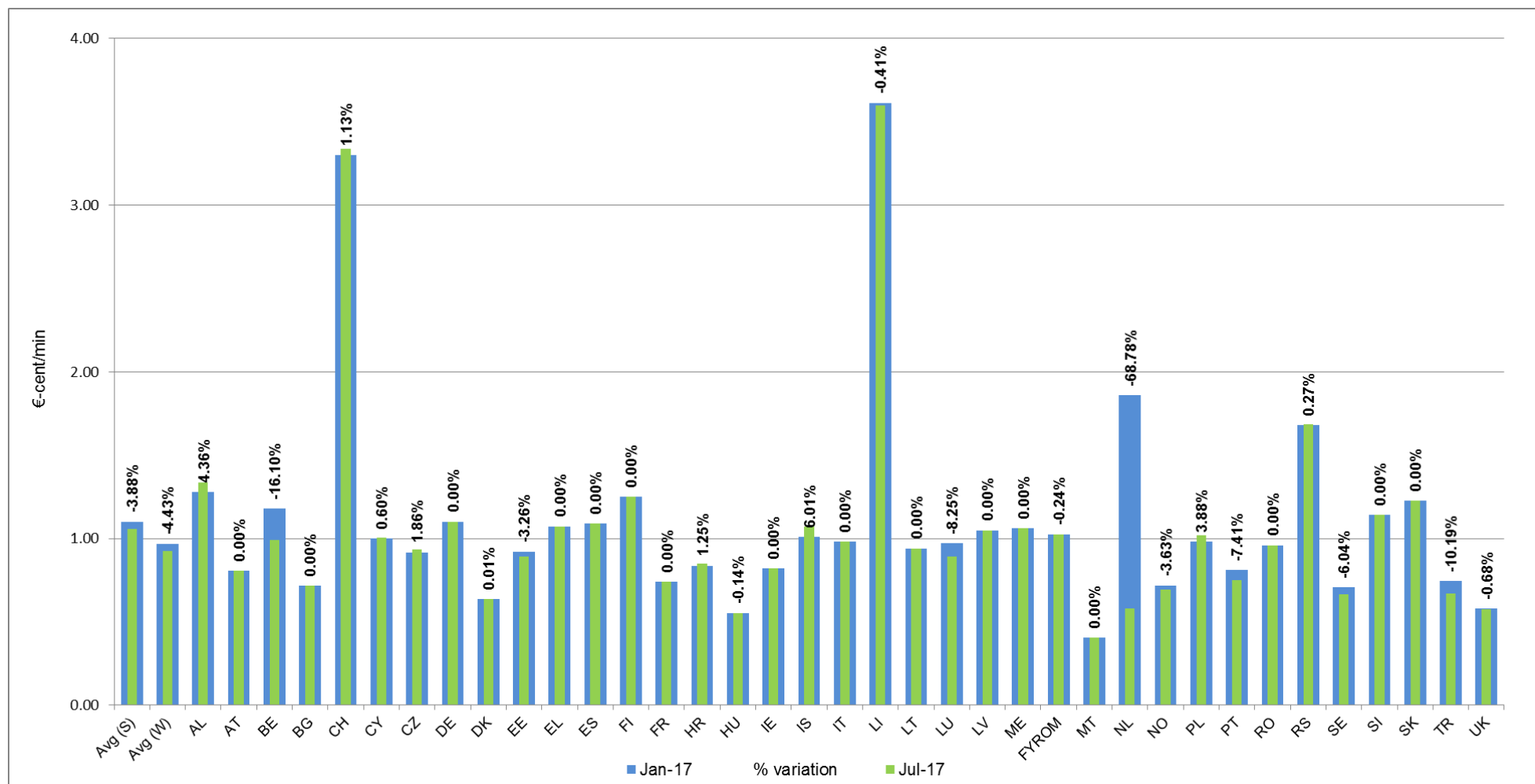
¹² This only affects short-term MTR evolution (figure 12) because the percentage of tariff variation in each country (figure 13) has been calculated by comparing rates expressed in terms of the national currency.

| | |
|--------------|--------|
| SK | 1.2260 |
| TR | 0.6687 |
| UK | 0.5748 |
| Avg (S) | 1.0565 |
| Avg (W) | 0.9262 |
| Avg EU28 (S) | 0.8795 |
| Avg EU28 (W) | 0.9079 |

Figures 12 and 13 show the short term variations of MTRs in Euro and in national currency. These two figures illustrate the effect of the exchange rate on the short term evolution.

Variation of MTRs per country (from January 2017 to July 2017)

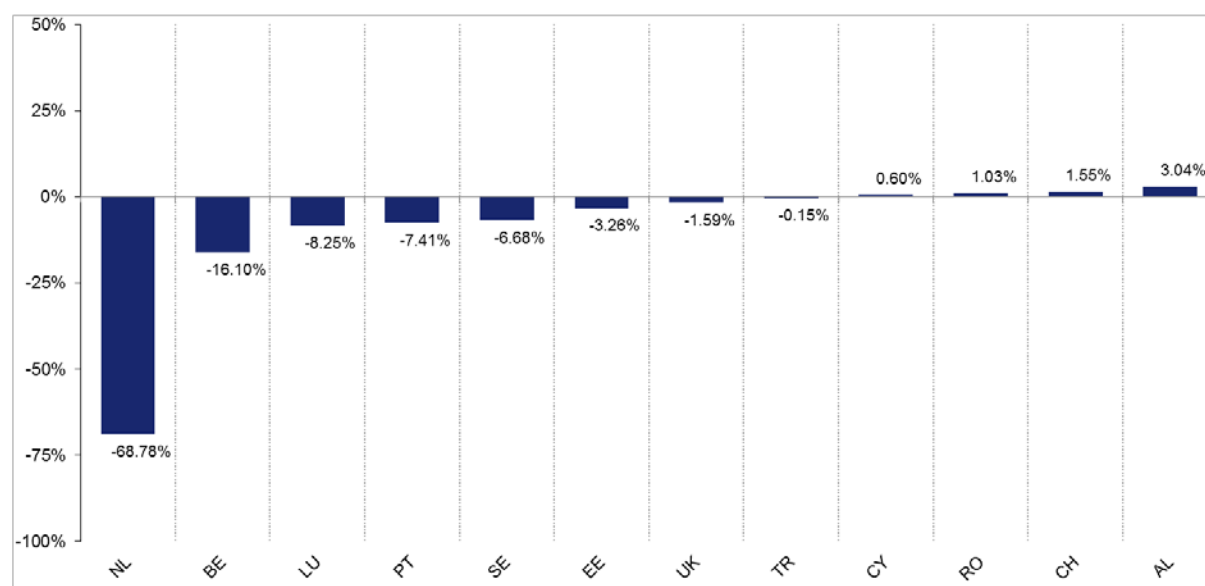
Figure 12 Variation in eurocents and %



Source: NRAs, BEREC

Variation of average MTRs in national currency per country (from January 2017 to July 2017)

Figure 13 Variation in national currency (%)



Source: NRAs, BEREC

Most countries did not experience a real short term variation of MTRs and therefore are not shown in figure 13. The Netherlands experienced a significant decrease, while Belgium, Luxembourg, and Portugal all showed decreases of more than 5%. The slight increases in Albania, Switzerland and Cyprus are a result of changes of the markets shares of the different operators. In Romania, the regulated tariff is expressed in cents and had no variation during the period. Therefore, the increase is a result of changes in the exchange rate.

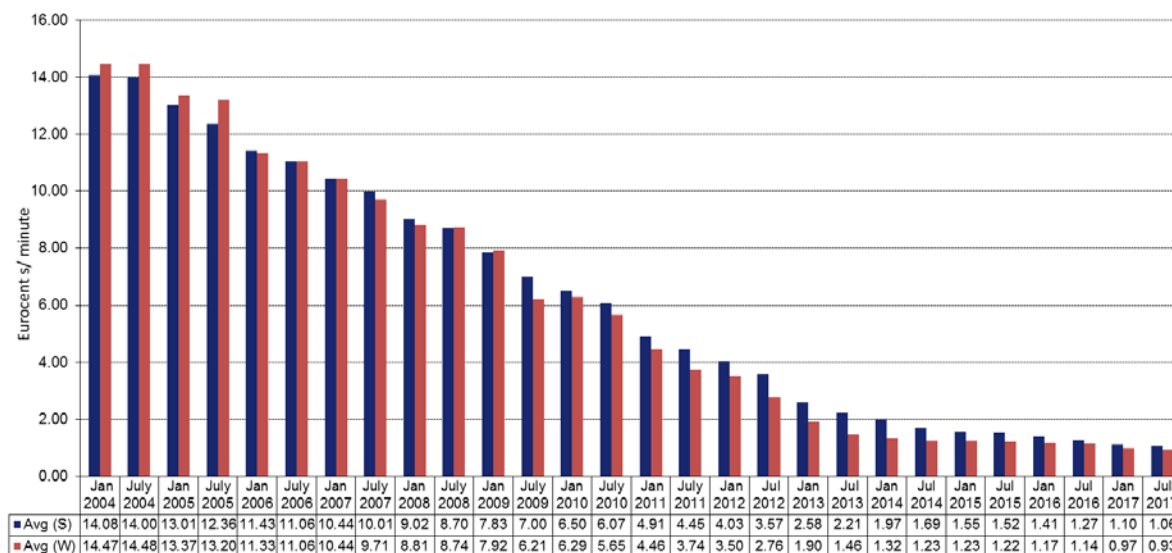
3.3. Average MTR per operator

There are a number of countries where information regarding number of subscribers and/or market share has been declared as confidential data and for this reason this report does not publish this data. Nevertheless, market shares have been taken into account for the average MTR calculations.

For further details see [Annex 6](#).

3.4. Average MTR: Time series of simple average and weighted average at European level

Figure 14 Evolution of simple and weighted averages



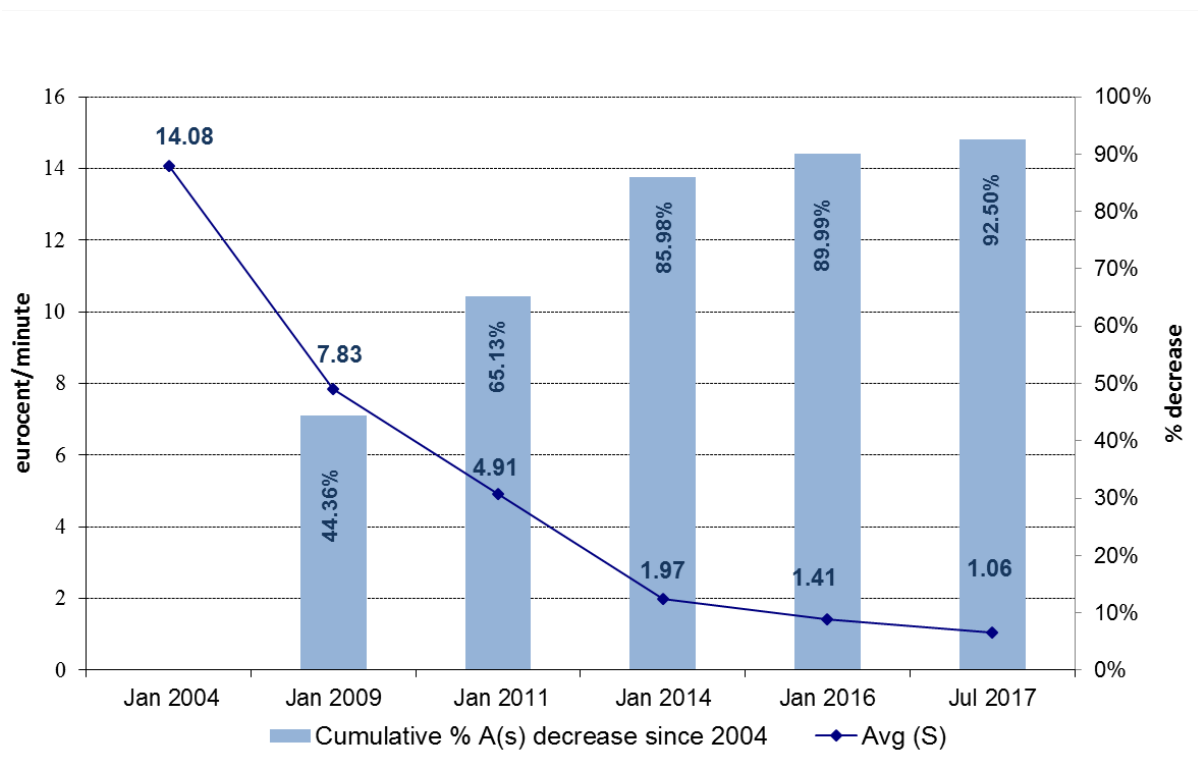
Source: NRAs, BEREC

Note to figure 14: Averages are based on nominal rates per minute of service. The number of countries and operators considered has increased over the years, thus affecting the average slightly. Moreover, the Weighted Average does not take into account countries not providing the total number of subscribers and those that could have changed over the years. Considering these caveats, the graph shows the general trend.

Figures 15 and 16 show the cumulative declines of the simple and the weighted average of European MTRs since 2004.

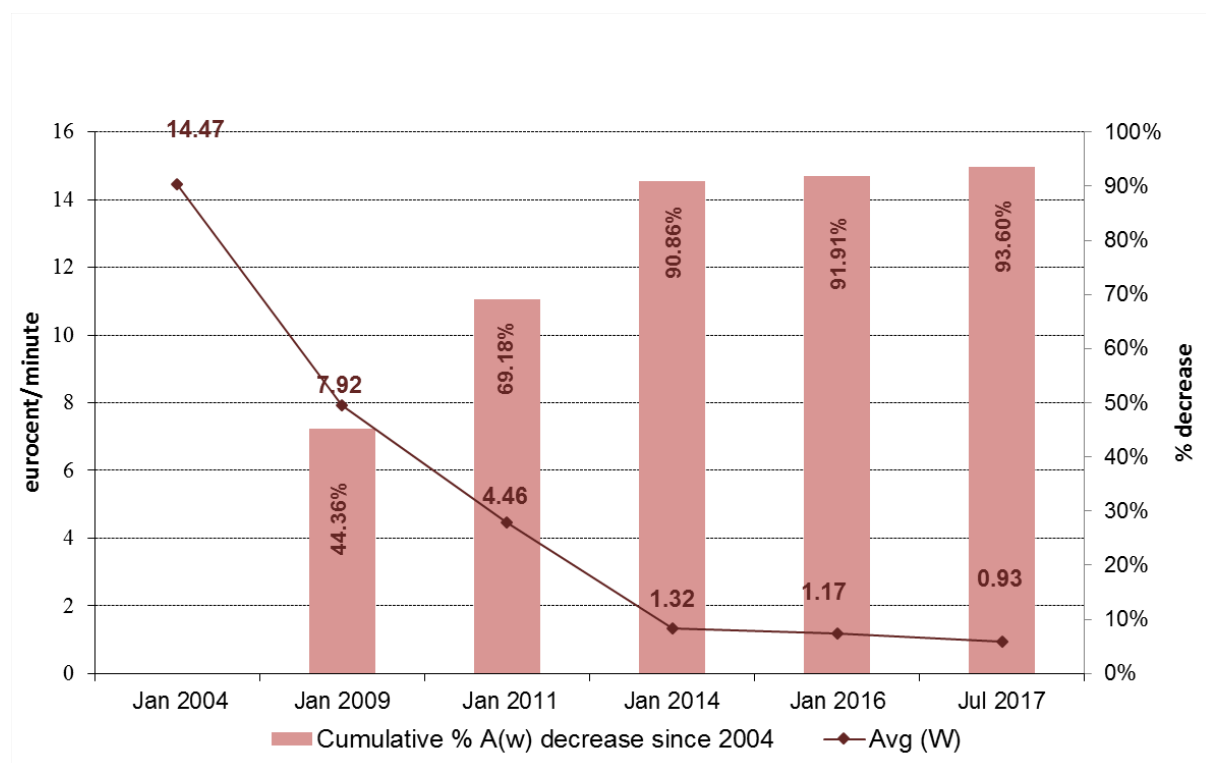
Considering the number of countries and operators included over the years, the simple average MTRs dropped by more than 92% since January 2004, from 14.08 cents to 1.06 cents in July 2017. When weighted, the average of European MTRs has declined even more, from 14.47 cents to 0.93 in the same period.

Figure 15 European MTRs simple average cumulative decline



Source: NRAs, BEREC

Figure 16 European MTRs weighted average cumulative decline



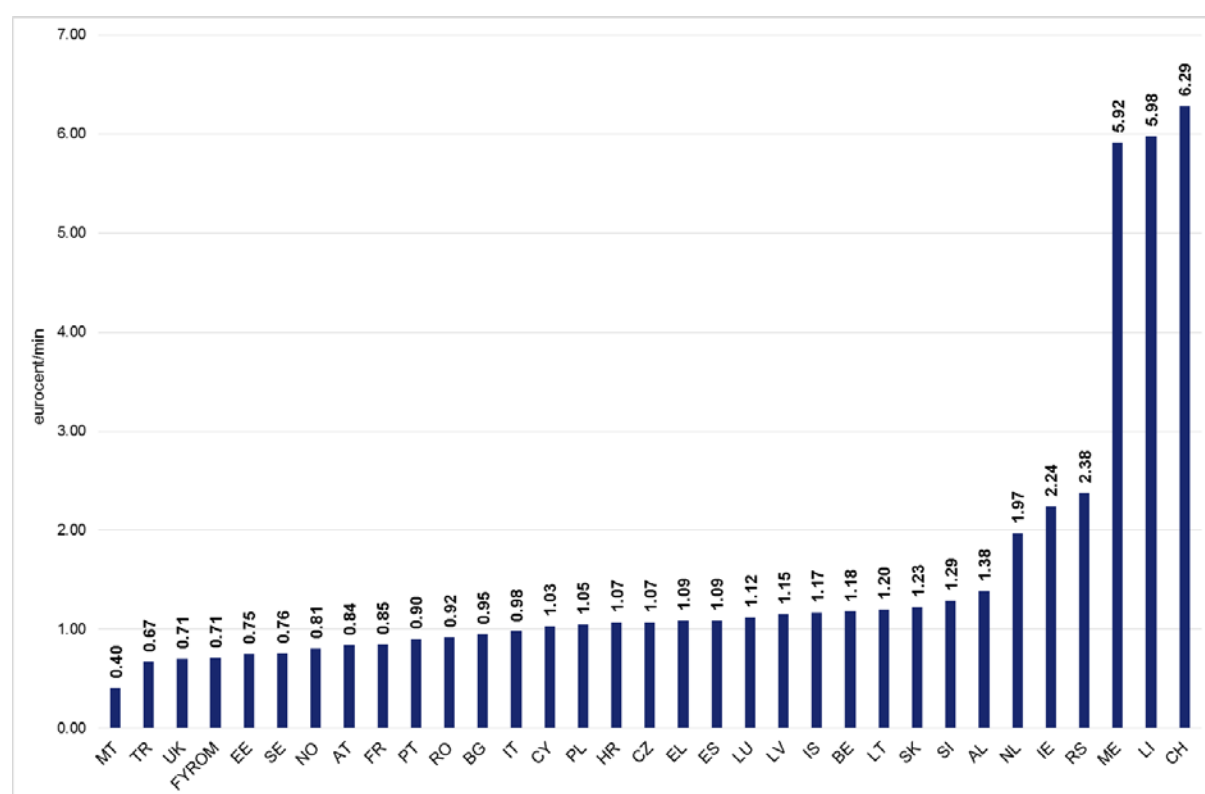
Source: NRAs, BEREC

3.5. Average mobile termination revenue per minute per country

The average wholesale termination revenue per minute is obtained as a ratio of total revenues from termination of voice services divided by the total number of minutes of termination provided by the operators. The data refer to the entire year of 2016, unless otherwise stated in the notes.

Some countries do not collect information about termination revenues or treat this data as confidential. Those countries are not included in the figure.

Figure 17 Average wholesale termination revenues per country (euro cent/min)

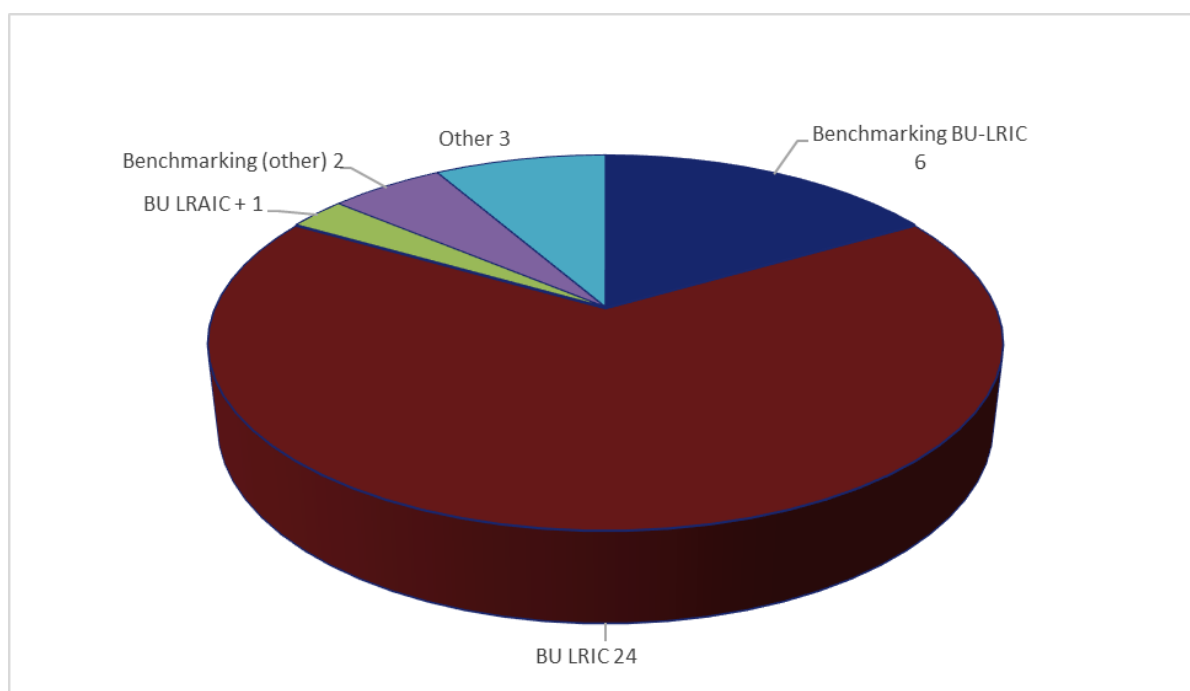


Source: NRAs, BEREC

For notes to figure 17, see [Annex 7](#).

3.6. Regulatory model implemented and glide paths for MTRs

In the majority of countries BU LRIC models are used to calculate the MTRs. However, a significant number of NRAs base their price decision on benchmarking. There is only one NRA left using a BU LRAIC+ model, the Turkish NRA. In one country (Switzerland) MTRs are not regulated.

Figure 18 Cost accounting models used by NRAs

Source: NRAs, BEREC

For further details, see [Annex 8](#).

4. Mobile networks - SMS interconnection

The short message service (SMS) offered by operators is used every day by millions of people all over the world. This service is not regulated in most EU countries, but the evolution of wholesale SMS termination rates is monitored in most cases by NRAs.

The present SMS benchmark report bases its results on the data provided by NRAs as of July 2017. Thirty-seven (37) countries provided data, but some NRAs – following national law provisions – asked to treat the SMS Termination Rates as confidential information.

The benchmark aims at keeping track of the main trends in wholesale SMS TRs in Europe. The scope of the report is limited to describe termination prices at national level (no international SMS TR are therefore considered¹³).

4.1. Assumptions made for benchmarking

The SMS TRs collected in this report reflect wholesale rates applied among domestic operators for an off-net SMS exchange, excluding VAT. They may diverge from the “average revenue from an SMS at wholesale level”.

In this report, individual, i.e. operator specific, SMS TRs are presented, as well as averages calculated for each country as a whole. In some countries, SMS wholesale rates are considered to be confidential information.

The following characteristics of SMS TRs make the collection and comparison of data more straightforward (as compared to the exercise of benchmarking the FTRs and the MTRs):

- No countries differentiate between peak time, off-peak time and weekend hours.
- The price for SMS termination is related to each delivered domestic off-net SMS; therefore, no assumption is necessary about set-up charges or average call durations. Slovenia is the only country where “Bill & Keep” agreements are in place for traffic between all domestic operators.
- Average SMS TRs per country have been obtained by weighting the average TR of each operator by its market share, measured in terms of subscribers. Two general averages at the European level have been calculated: a simple average and a weighted average. The latter weights each country’s average with the share of the country’s subscribers (total subscribers per country / total European subscribers). In the case of the European weighted average, only the countries that reported TRs and the number of subscribers are taken into account. Since not all countries report complete sets of data, the calculated averages might vary slightly.
- Regarding the number of subscribers, it must be considered that different estimation methods are used among European countries (especially in the case of pre-paid consumers, but also in the case of services considered, some countries are including

¹³ International SMS TRs in most European countries are also based on bilateral negotiations among operators, which generally result in higher levels than the domestic rates that are reflected in this report.

data-only SIM cards and/or M2M SIM cards). In contrast to the calculation of the average MTRs, M2M SIM cards are included for the calculation of average SMS TRs.

On the other hand, and due to the generally unregulated environment existing for SMS TRs in most European countries, there is a high degree of bilateral negotiation among operators. Therefore, some peculiarities in setting SMS TRs could emerge and require additional assumptions (as compared to the exercise of benchmarking the FTRs and the MTRs):

- In some countries, operators have bilateral contract agreements implying different rates depending on the volume of SMS sent across the two networks. These non-linear relationships imply different average rates depending on the volume of SMS exchanged. In this case, the lowest average rate expected (corresponding to the highest volume of SMS) has been considered.
- Additionally, in some countries, operators will negotiate different SMS TRs vis-à-vis each one of the other operators. In this case, if not differently indicated, a TR simple average is considered.

Due to these considerations, for some countries the benchmarking proposed in this exercise may represent – with different levels of accuracy – the average SMS TR effectively charged for an off-net SMS.

For non-Euro countries, the exchange rates reported in the [Annex 10](#) are used.

For more information, consult [Annex 9](#): SMS TR per operator.

4.2. Average SMS TR per country and per message (as of July 2017)

Table 2 - Average SMS TR per country

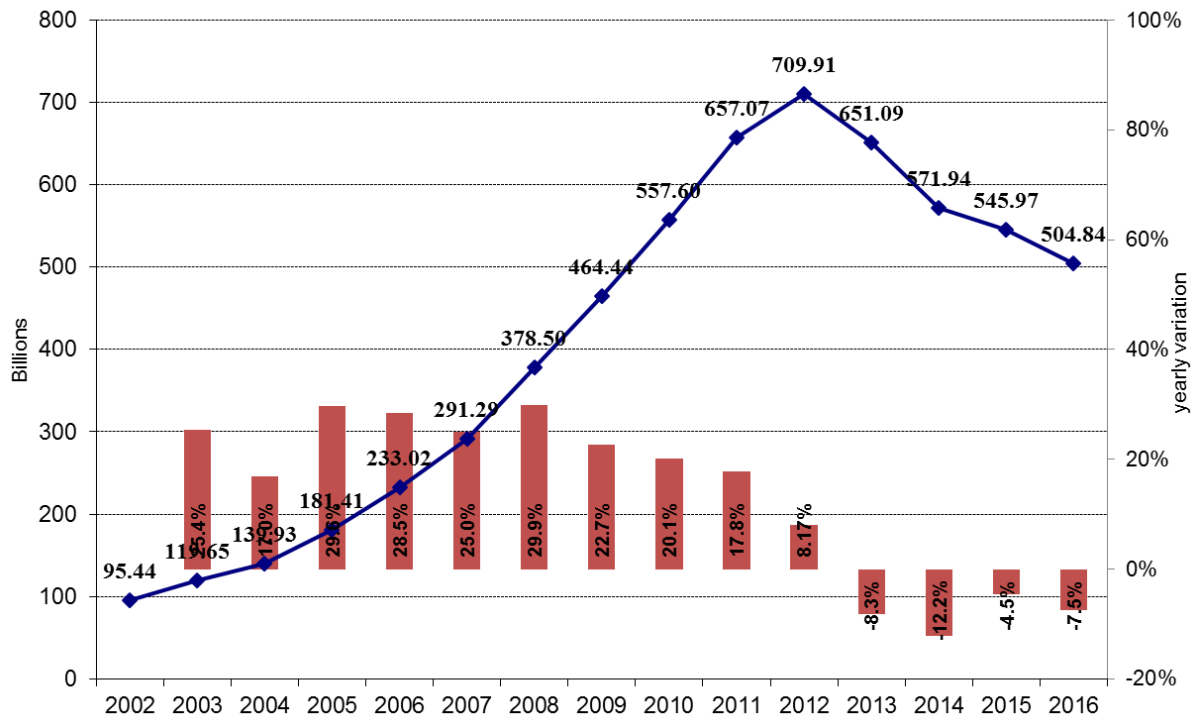
| Country | Average SMS TR per country (eurocents) |
|---------|--|
| AL | 0.7442 |
| AT | 3.1100 |
| BE | 4.9600 |
| BG | Confidential |
| CH | 4.1603 |
| CY | 0.6100 |
| CZ | Confidential |
| DE | N/A |
| DK | N/A |
| EE | 2.3286 |
| EL | 3.0000 |
| ES | 2.6372 |
| FI | N/A |
| FR | 1.0000 |
| HR | N/A |
| HU | 4.5196 |
| IE | 3.1700 |

| | |
|-------------|--------|
| IS | 3.3460 |
| IT | 3.2232 |
| LI | 5.5331 |
| LT | 0.9115 |
| LU | N/A |
| LV | 2.1300 |
| ME | 1.0000 |
| FYROM | 0.4867 |
| MT | 2.2005 |
| NL | N/A |
| NO | 3.7325 |
| PL | 1.1863 |
| PT | 0.8300 |
| RO | 2.3000 |
| RS | 1.6268 |
| SE | N/A |
| SI | B&K |
| SK | 2.5000 |
| TR | 0.1116 |
| UK | 1.9463 |
| Average (S) | 2.4057 |
| Average (W) | 2.0391 |

4.3. Volumes of SMS sent (2016)

Figure 19 is based on the time series of the countries from which information was available from 2002 to 2016. These countries are: Austria, Belgium, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Lithuania, Malta, Norway, Poland, Portugal, Romania, Slovak Republic, Spain, Sweden, Switzerland and UK.

Figure 19 Volumes of SMS sent



Source: NRAs, BEREC

Annex

Annex 1 Fixed termination rates as of 1 January 2017

Table 3

| Country | Operator | Lowest Regulated Rate | WA in eurocents |
|---------|---|-----------------------|-----------------|
| AL | Albtelecom | Single-rate | 0.9600 |
| | Abcom | Single-rate | 0.9600 |
| | Albanian Satellite Communications | Single-rate | 0.9600 |
| | Rest of operators | Single-rate | 0.9600 |
| AT | A1 Telekom Austria | Single-rate | 0.1110 |
| | Operator 2 | Single-rate | 0.1110 |
| | Operator 3 | Single-rate | 0.1110 |
| | Operator 4 | Single-rate | 0.1110 |
| | Operator 5 | Single-rate | 0.1110 |
| | Operator 6 | Single-rate | 0.1110 |
| | Rest of operators | Single-rate | 0.1110 |
| BE | Proximus | LRR | 0.5020 |
| | Proximus | 2 nd LRR | 0.7090 |
| | Proximus | 3 rd LRR | 0.9090 |
| | Rest of operators | LRR | 0.7090 |
| | Rest of operators | 2 nd LRR | 0.9090 |
| BG | Bulgarian Telecommunication Company | Single-rate | 0.0767 |
| | Telenor Bulgaria | Single-rate | 0.0767 |
| | Mobiltel | Single-rate | 0.0767 |
| CH | Swisscom | LRR | 0.5345 |
| | Swisscom | 2 nd LRR | 0.6445 |
| CY | Cyta | LRR | 0.1033 |
| | Cyta | 2 nd LRR | 0.1363 |
| | Cyta | 3 rd LRR | 0.2075 |
| | Primetel | LRR | 0.1033 |
| | Primetel | 2 nd LRR | 0.1363 |
| | Primetel | 3 rd LRR | 0.2075 |
| | Cablenet | LRR | 0.1363 |
| | Cablenet | 2 nd LRR | 0.2075 |
| | MTN | LRR | 0.1363 |
| CZ | Česká telekomunikační infrastruktura a.s. | Single-rate | 0.1244 |
| | UPC Česká republika, s.r.o. | Single-rate | 0.1244 |
| | Vodafone Czech Republic a.s. | Single-rate | 0.1244 |
| | T-Mobile Czech Republic a.s. | Single-rate | 0.1244 |
| | IPEX a.s. | Single-rate | 0.1244 |
| | České Radiokomunikace a.s. | Single-rate | 0.1244 |

| | | | |
|-----------|--|-------------|---------------|
| | Rest of operators | Single-rate | 0.1244 |
| DE | Telekom Deutschland GmbH | Single-rate | 0.1000 |
| DK | TDC | Single-rate | 0.0551 |
| | Telia | Single-rate | 0.0551 |
| | DLG Tele | Single-rate | 0.0551 |
| | Telenor | Single-rate | 0.0551 |
| | Rest of operators | Single-rate | 0.0551 |
| EE | Telia Eesti AS | Single-rate | 0.0960 |
| | STV | Single-rate | 0.0970 |
| | Starman | Single-rate | 0.0970 |
| | Elisa | Single-rate | 0.0970 |
| EL | OTE | Single-rate | 0.0545 |
| | FORTHNET | Single-rate | 0.0545 |
| | VODAFONE | Single-rate | 0.0545 |
| | WIND | Single-rate | 0.0545 |
| | Rest of operators | Single-rate | 0.0545 |
| ES | Telefónica de España | Single-rate | 0.0817 |
| | Vodafone - Ono | Single-rate | 0.0817 |
| | Orange | Single-rate | 0.0817 |
| | Rest of operators | Single-rate | 0.0817 |
| FI | DNA Oyj | Single-rate | 2.8000 |
| | Elisa Oyj | Single-rate | 2.8000 |
| | Telia Finland Oyj | Single-rate | 2.8000 |
| | Rest of operators (weighted average) | Average | 2.9970 |
| | Weighted average of all operators (weighted average) | Average | 2.8800 |
| FR | All operators | Single-rate | 0.0770 |
| HR | HT | Single-rate | 0.0683 |
| | OPTIMA | Single-rate | 0.0700 |
| | VIPnet | Single-rate | 0.0683 |
| | H1 | Single-rate | 0.0740 |
| HU | Magyar Telekom | Single-rate | 0.1291 |
| | Invitel | Single-rate | 0.1291 |
| | UPC | Single-rate | 0.1291 |
| | Rest of operators | Single-rate | 0.1291 |
| IE | Eir | Single-rate | 0.0720 |
| | Virgin Media | Single-rate | 0.0720 |
| | Vodafone | Single-rate | 0.0720 |
| | Sky | Single-rate | 0.0720 |
| | Rest of operators | Single-rate | 0.0720 |
| IS | Siminn | Single-rate | 0.1217 |
| | Vodafone | Single-rate | 0.1217 |
| IT | Telecom Italia S.p.A. | Single-rate | 0.0430 |
| | WindTre S.p.A. | Single-rate | 0.0430 |
| | Fastweb S.p.A. | Single-rate | 0.0430 |

| | | | |
|-------|--|-------------|---------------|
| | Vodafone Italia S.p.A. | Single-rate | 0.0430 |
| | Rest of operators | Single-rate | 0.0430 |
| LT | TEO LT, AB | Single-rate | 0.1300 |
| | CSC Telecom | Single-rate | 0.1300 |
| | AB Lietuvos gelezinkeliai | Single-rate | 0.1300 |
| | Rest of operators | Single-rate | 0.1310 |
| LI | Telecom Liechtenstein AG | Single-rate | 3.5971 |
| LU | EPT | Single-rate | 0.1310 |
| | Rest of operators | Single-rate | 0.1310 |
| LV | Latt telecom | Single-rate | 0.1037 |
| | Latvijas Mobilais Telefons | Single-rate | 0.1037 |
| | Baltcom | Single-rate | 0.1037 |
| | Telecom Baltija | Single-rate | 0.1037 |
| | Rest of operators | Single-rate | 0.1037 |
| ME | Crnogorski Telekom | LRR | 0.6500 |
| | Crnogorski Telekom | 2nd LRR | 0.8000 |
| | Mtel | Single-rate | 0.9400 |
| | Telenor | Single-rate | 0.9400 |
| | Telemach | Single-rate | 0.9400 |
| FYROM | Makedonski Telekom | Single-rate | 0.5840 |
| | VIP operator | Single-rate | 0.5840 |
| | Robi | Single-rate | 0.5840 |
| MT | Go plc | Single-rate | 0.0443 |
| | Melita plc | Single-rate | 0.0443 |
| | Vodafone Malta Ltd | Single-rate | 0.0443 |
| | Ozone | Single-rate | 0.0443 |
| | Solutions and Infrastructure Ltd (SIS) | Single-rate | 0.0443 |
| | Vanilla Telecoms Ltd | Single-rate | 0.0443 |
| NL | KPN | Single-rate | 0.139 |
| | Ziggo | Single-rate | 0.139 |
| | Rest of operators | Single-rate | 0.139 |
| NO | Telenor | Single-rate | 0.0640 |
| | NexGenTel | Single-rate | 0.0640 |
| | Get | Single-rate | 0.0640 |
| | Phonero | Single-rate | 0.0640 |
| | Phonect | Single-rate | 0.0640 |
| | Rest of operators | Single-rate | 0.0640 |
| PL | Orange Polska S.A. | LRR | 0.4686 |
| | Orange Polska S.A. | 2nd LRR | 0.5777 |
| | Orange Polska S.A. | 3rd LRR | 0.8506 |
| | Netia | Single-rate | 0.6477 |
| | Multimedia Polska S.A. | Single-rate | 0.6477 |
| | Multimedia Polska Poludnie S.A. | Single-rate | 0.6477 |
| PT | MEO | Single-rate | 0.0644 |

| | | | |
|----|-------------------------------|---------------------|---------------|
| | NOS Group | Single-rate | 0.0644 |
| | Vodafone | Single-rate | 0.0644 |
| | Apax Group | Single-rate | 0.0644 |
| | Rest of operators | Single-rate | 0.0644 |
| RO | Telekom RC S.A. | Single-rate | 0.1400 |
| | S.C. RCS&RDS S.A. | Single-rate | 0.1400 |
| | S.C. UPC Romania S.R.L. | Single-rate | 0.1400 |
| | S.C. VODAFONE ROMANIA S.A. | Single-rate | 0.1400 |
| RS | Telekom Srbija | LRR | 0.4637 |
| | Telekom Srbija | 2nd LRR | 0.5450 |
| | Telekom Srbija | 3rd LRR | 0.6101 |
| | Orion telekom | Single-rate | 0.5043 |
| | Telenor | Single-rate | 0.5043 |
| | Serbia Broadband | Single-rate | 0.5043 |
| | Rest of operators | Single-rate | 0.5043 |
| SE | TeliaSonera AB | LRR | 0.0681 |
| | TeliaSonera AB | 2 nd LRR | 0.1104 |
| SI | Telekom Slovenije | Single-rate | 0.0876 |
| | Telemach | Single-rate | 0.0876 |
| | T-2 | Single-rate | 0.0876 |
| | A1 Slovenija | Single-rate | 0.0876 |
| | Rest of operators | Single-rate | 0.0876 |
| SK | Slovak Telekom a.s. | Single-rate | 0.1234 |
| | Orange Slovensko a.s. | Single-rate | 0.1234 |
| | UPC BROADBAND SLOVAKIA s.r.o. | Single-rate | 0.1234 |
| | SWAN, a.s. | Single-rate | 0.1234 |
| TR | Türk Telekom | LRR | 0.3527 |
| | Türk Telekom | 2 nd LRR | 0.4340 |
| | Türk Telekom | 3 rd LRR | 0.5685 |
| | TTNet | Single-rate | 0.8121 |
| | Superonline | Single-rate | 0.8121 |
| | Turknet | Single-rate | 0.8121 |
| | Rest of operators | Single-rate | 0.8121 |
| UK | BT | Single-rate | 0.0406 |
| | TalkTalk | Single-rate | 0.0406 |
| | Sky | Single-rate | 0.0406 |
| | Virgin Media | Single-rate | 0.0406 |
| | Others | Single-rate | 0.0406 |

Notes to table 3:

Incumbents are indicated first in the table.

AL: Starting from 01.01.2016 only one interconnection level is applied for termination of calls on all fixed network operators. There is no differentiation between Peak/Off -Peak FTRs.

BG: The incumbent's core network is conditionally divided into two logical hierarchy levels: one level with regional coverage (including regional and local layer - the local layer is no longer applied) and one level with national coverage. The segmentation of the network is based on geographical codes served by the media gateways in the network. The applied fixed terminating rate is cost-oriented based on Pure Bu-LRIC model: BGN/min 0.0015 and there is no differentiation between peak/off-peak or hierarchy levels. In the first half of 2017 Blizoo Media and Broadband merged with Mobiltel.

CH: The prices indicated are taken from the Swisscom price manual for TDM-Interconnection. For IP-Interconnection the same prices as the ones for regional TDM-interconnection (LRR) apply. Furthermore, there exists a "clause of reciprocity", meaning that the tariffs of other operators have to be same as the ones of Swisscom. Source of the Swisscom-Tariffs:

https://www.swisscom.ch/dam/swisscom/de/ws/documents/D_IC-Dokumente/de_handbuch-preiseicv1-17.pdf, p.11 and https://www.swisscom.ch/dam/swisscom/de/ws/documents/D_IC-Dokumente/voip-ic/de_voip_ic_handbuch-preise2-1.pdf, p. 7.

CY: No peak and off-peak separation of rates.

HR: In Croatia, HT has only one interconnection level (regional), however, this doesn't mean that some operators can't be interconnected on national level but this will be subject to commercial agreements between operators.

IE: Operators can choose between a set per call and charge per minute rate and a charge per minute rate. Please note that ComReg Decision D12/12 set fixed termination rates at layer one (i.e. eircom's primary). ComReg Decision D12/12 imposed symmetrical blended rate of 0.085 cent per minute for all SMP fixed operators from 01.07.2014. This blended FTR was reduced to 0.072 cents per minute from 01.07.2015. Please refer to Annex1 in ComReg Decision D12/12 at

<http://www.comreg.ie/fileupload/publications/ComReg12125.pdf>

FTRs will remain at the above rate until after a Market Analysis and corresponding Pricing Decision have been completed. ComReg is planning consultations in Q3/4 2017 with Decision Notices in 2018. In Ireland transit markets are not regulated. FTRs only apply at Level 1.

LU: In Luxembourg, there is no layer distinction for regulation purposes.

LV: FTR for incoming calls from countries outside the EEA isn't regulated.

PT: Following ANACOM's Decision on 21.12.2016, there's only a single rate for the FTR (for both local and single transit levels), and it was set at the level of 0.0644 cents per minute starting on 04.01. 2017.

TK: In Turkey, there is no differentiation in fixed termination rates such as peak and off-peak.

UK: Ofcom is currently in between national consultation and final statement to set a new charge control. BT is not currently subject to a charge control but has made voluntary commitments to maintain the cap set by the previous charge control. This was an average price cap for the year that had to be no more than GBP/min 0.035. BT is free to set prices within this cap. BT has set different rates for day, evening and weekend traffic. The off-peak rate corresponds to the evening rate. Its weekend rate is GBP/min 0.016. As stated above, all other CPs must set rates that are fair and reasonable rates, which are presumed to be symmetric to BT.

Annex 2 Average fixed termination revenue per country

Notes to figure 9

AT: Not available.

BE: Termination of geographical numbers.

BG: In 2016 the cost-oriented fixed termination rates based on Pure Bu-LRIC models were in force as follows:

Until 31.10.2016 - BGN/min 0.005 (Decision 134 from 14.02.2013);

From 01.11.2016 to 31.12.2016 - BGN/min 0.0015 (Decision 550 from 20.10.2016).

CH: This data has not been collected.

DE: Revenues are not regulated in Germany and are therefore not available.

DK: Not available.

FI: Data not available (not collected on detailed level).

HU: Not available.

IT: Total minutes and revenues used to calculate average revenues are estimates.

LU: Revenues are total revenues (no IX layers apply) and they include revenues from traffic from abroad (international traffic). These revenues may include non-termination related revenues like revenues from the transport of calls.

ME: Data for National FTR are for calls originated from national (fixed and mobile) operators and from abroad. FTR for calls that are originated from abroad are not regulated and different from FTR for calls that originated from national operators. Crnogorski Telekom FTRs changed from 25.12.2016.

NO: The FTR was NOK 0.026 until 01.04.2016. From 1 April the FTR was NOK 0.006.

When calculating the average FTR based on revenue and minutes NKOM calculated a higher TR. One of the reasons why the result is above the regulated TR is that FTR revenue and FTR minutes also includes traffic terminated in non-geographical numbers. Price cap regulation is only imposed on geographical numbers.

PT: Estimated values.

Local FTR included both local level (0.1026 cents) and single-rate (0.1114 cents) traffic.

RS: Data provided are for 2016 and includes only national fixed-to-fixed and mobile-to-fixed calls. Revenue and traffic do not include self-supply and do not include calls when both the fixed and the mobile network are owned and run by the same operator.

SI: National FTR revenues and minutes also include traffic terminated in fixed network on premium numbers, numbers for tele voting, mass calling and short dialling numbers.

SK: The FTR value didn't change during the reported period.

TR: Total FTR revenue is available on aggregate. Data for total FTR minutes exclude traffic from international origin that is terminated at Turk Telekom's network since it is available on aggregate.

Annex 3 FTR regulatory model implemented

Table 4

| Country | COST MODEL | ACCOUNTING |
|---------|--------------------------|------------|
| AL | Benchmark (Other) | |
| AT | Pure BU LRIC | |
| BE | FDC/FAC | |
| BG | Pure BU LRIC | |
| CH | BU LRAIC+ | |
| CY | Benchmark (Pure BU LRIC) | |
| CZ | Pure BU LRIC | |
| DE | Benchmark (Pure BU LRIC) | |
| DK | Pure BU LRIC | |
| EE | Benchmark (Pure BU LRIC) | |
| EL | Pure BU LRIC | |
| ES | Pure BU LRIC | |
| FI | FDC | |
| FR | Pure BU LRIC | |
| HR | Pure BU LRIC | |
| HU | Pure BU LRIC | |
| IE | Pure BU LRIC | |
| IS | Benchmark (Pure BU LRIC) | |
| IT | Pure BU LRIC | |
| LI | FDC/FAC | |
| LT | Pure BU LRIC | |
| LU | Pure BU LRIC | |
| LV | Benchmark (Pure BU LRIC) | |
| ME | TD LRIC | |
| FYROM | TD LRIC | |
| MT | Pure BU LRIC | |
| NL | Pure BU LRIC | |
| NO | Pure BU LRIC | |
| PL | TD-FDC /FAC | |
| PT | Pure BU LRIC | |
| RO | Pure BU LRIC | |
| RS | TD-FAC-CCA | |
| SE | Pure BU LRIC | |
| SI | Pure BU LRIC | |
| SK | Pure BU LRIC | |
| TR | BU LRAIC+ | |
| UK | Pure BU LRIC | |

Notes to table 4:

BG: With Decision 550 from 20.10.2016 CRC approved cost-oriented fixed terminating rates based on Pure Bu-LRIC model as follows:

from 01.11.2016 - BGN/min 0.0015

from 01.01.2017 - BGN/min 0.0015

from 01.01.2018 - BGN/min 0.0015

from 01.01.2019 - BGN/min 0.0014

from 01.01.2020 - BGN/min 0.0014

CY: By the end year all termination rates will be regulated on a Pure BU LRIC. The relevant decisions are expected to be issued in the Q4 2017.

CZ: Calculation of FTR is based on pure BU-LRIC model. For purposes of FTR regulation CTU has determined one level of FTR without differentiation between peak and off-peak time or POI. Data regarding number of lines are as of 31.12.2016, data for the first half of 2017 are not yet available.

DE: The calculation of rates is based on a pure LRIC cost model, adjusted by benchmarking with other European countries that use pure LRIC.

ES: From 01.11.2015 onwards, new regulation for FTR is applied. There is no differentiation between peak- off peak, there is symmetry in tariffs and only local level is regulated.

FI: Rest of operators (market share 18.8 %) standardized FTR pricing during 01.01.2017-01.07.2017 and have now equal pricing (EUR 0.032). Weighted average of all operators was EUR 0.0288.

IS: The country is a single interconnection area with one pricing structure and SINGLE TRANSIT. Cost model is Benchmark - Target rate in glide path based on historical cost reached 04.12.2012.

LI: benchmarking as efficiency check for TD-FDC calculated FTR.FTR regulation is not finalized.

Current FTR cap was decided in 2007. Market analysis and remedies M3 decided in 2010. New FTR decision expected in 2017, based on TD-FDC and Benchmarking. (EFTA Surveillance Authority Recommendation of 13 April 2011 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EFTA States).

LT: Rates of termination on alternative fixed networks should not be higher than rates applied by Telia Lietuva, AB at particular network level. No differentiation between Peak/Off-peak.

LU: Règlement16/209/ILR du 28 novembre 2016 portant sur la fixation des plafonds tarifaires pour les prestations de la terminaison d'appel sur divers réseaux téléphoniques publics individuels en position déterminée (Marché 1/2014)

ME: Current FTR are regulated according to the TD LRIC costing methodology. Incumbent operator Crnogorski Telekom had developed TD LRIC cost model, and NRA approved results every year.

PT: The latest fixed termination market analysis was approved in December 2016 together with a pure BU LRIC costing model developed for ANACOM in accordance with the Commission Recommendation on Termination rates. The new maximum value for fixed termination rate (FTR) is in place since 04.01. 2017. It was set based on a pure BU LRIC cost model, and dropped from 0.1114 to 0.0644 cents per minute, on the basis of per-second billing, for the local and single transit interconnection levels.

SK: Ru has not set any glide path.

UK: BT is not currently subject to a charge control but has made voluntary commitments to maintain the cap set by the previous charge control, which took effect on 01.10.2015. This

was an average price cap for the year that had to be no more than GBP/min 0.035. BT is free to set prices within this cap. Rates have been set on a BU LRIC basis since 01.01.2014.

Annex 4 FTR symmetry

The following table emphasises the level of **symmetry** among the operators when interconnection in fixed networks is offered. The information below is directly reported by each NRA explaining its particular situation.

Table 5

| Country | Symmetry | Comments |
|---------|----------|--|
| AL | Yes | FTRs are symmetrical for all FNOs since 01.01.2016 as decided in market analysis and SMP decisions on October 2015. The same FTR applies to all FNOs regardless of network topology and levels of interconnection. |
| AT | Yes | Full symmetry. |
| BE | Yes | |
| BG | Yes | |
| CH | Yes | Symmetry is ensured on the basis of geographical coverage from a certain point of interconnection (e.g. regional termination is priced the same both ways regardless of actual network hierarchy). Symmetry is evaluated on the basis of the average FTR (i.e. pricing flexibility is left for operators). |
| CY | Yes | Yes, from 01.01.2016 the same regulated terminations rates apply for all providers. |
| CZ | Yes | |
| DE | Yes | Tariffs are symmetrical because of contractual agreements between incumbent Telekom Deutschland and alternative fixed network operators to charge reciprocal tariffs. |
| DK | Yes | Same FTR apply to all price regulated operators, cf. market decisions as of 02.06.2017. |
| EE | Yes | Same FTR applies for nine operators with SMP. |
| EL | Yes | |
| ES | Yes | The FTR is symmetrical for all the operators and established in market analysis. As the FTR is based on an efficient NGN-based operator, there is not anymore the concept of level of interconnection, as there was in the past, because the architecture of NGN operators is not hierarchical. However, it was decided in the market analysis that, just for the case of termination in incumbent network, the interconnected operator should be connected at 21 Points of Interconnection, if TDM based interconnection is used. If the operator connects to less than these 21 Pol, then a transit for terminating at the other Pol should be paid. For IP interconnection the number of Pol for termination in incumbent operator is still pending of decision. For the termination in alternative operators, there is no remedy concerning the minimum number of Pol for FTR. It is subject to commercial negotiation, as it was in the past. |
| FI | Yes | In Finland there are no price caps on FTRs. FTRs are symmetrical among fixed operators. |
| FR | Yes | |
| HR | Yes | Symmetry in fixed network is prescribed for all operators as of the 01.01. 2013. |
| HU | Yes | |

| | | |
|-------|-----------|--|
| IE | Yes | Please note that ComReg Decision D12/12 set fixed termination rates at layer one (i.e. eircom's primary). http://www.comreg.ie/fileupload/publications/ComReg12125.pdf |
| IS | Yes | |
| IT | Yes | |
| LI | N/A | There is only one FNO in Liechtenstein: Telecom Liechtenstein AG. Fixed net interconnection partners of Telecom Liechtenstein are regulated by other NRAs and are not obliged to apply Liechtenstein's FTR regulation. |
| LT | Yes | FTRs of all fixed operators having SMP, are symmetrical, i.e. FTRs are the same despite number of customers, difference in network topologies, level of interconnection, and so on. |
| LU | Partially | A maximal price cap is defined by the regulation, but operators may implement the solution in their own way. |
| LV | Yes | |
| ME | No | |
| FYROM | Yes | |
| MT | Yes | Due to national characteristics interconnection is at layer 1. The FTR charge applicable to all those operators having an SMP in the wholesale fixed termination market is on a symmetrical basis. |
| NL | Yes | Same FTR rate for all operators. |
| NO | Yes | |
| PL | Partially | |
| PT | Yes | Prices applied by operators with SMP in the wholesale markets for call termination on the public telephone network at a fixed location must be symmetrical, and following ANACOM's Decision on December 21, 2016 they were set at the level of 0.0644 cents per minute starting on 04.01.2017. All SMP operators apply a 'per second' billing system that does not include any setup fee. |
| RO | Yes | Symmetric FTRs irrespective of interconnection level. |
| RS | Partially | Operators have different topology and different number of the levels of interconnection. Telekom Srbija have 3 levels of interconnection. Other operators have 1 level of interconnection. |
| SE | Yes | |
| SI | Yes | It's based on national coverage of layer. |
| SK | Yes | The FTR is non-discriminatory for all operators without any exception. |
| TR | No | |
| UK | Yes | Termination is regulated only at point of interconnection closest to the called customer. At this point, BT has rates set via a charge control. All other CPs rates are required to be set on fair and reasonable terms, and it is presumed that this means rates should be symmetric with the charge controlled rates unless the CP can demonstrate why a higher rate is necessary and in the interests of consumers. Rates for regional and national level interconnection are not regulated. To date, no CP has demonstrated to Ofcom that higher rates are necessary for them. |

Annex 5 Number of active fixed telephony lines and Market shares

Table 6

| Country | Operator | Number of lines | Total number of lines | Market share |
|---------|---|-----------------|-----------------------|--------------|
| AL | Albtelecom | 175,005 | 245,736 | 71.22% |
| | Abcom | 14,355 | | 5.84% |
| | Albanian Satellite Communications | 39,994 | | 16.28% |
| | Rest of operators | 16,382 | | 6.67% |
| AT | A1 Telekom Austria | 2,256,682 | 3,614,191 | 62.44% |
| | Operator 2 | 535,108 | | 14.81% |
| | Operator 3 | 208,947 | | 5.78% |
| | Operator 4 | 198,307 | | 5.49% |
| | Operator 5 | 57,203 | | 1.58% |
| | Operator 6 | 53,722 | | 1.49% |
| | Rest of operators | 304,222 | | 8.42% |
| BE | Proximus | 2,440,482 | 4,371,055 | 55.83% |
| | Rest of operators | 1,930,573 | | 44.17% |
| BG | Bulgarian Telecommunication Company (incumbent) | Confidential | 1,445,831 | Confidential |
| | Mobiltel | Confidential | | Confidential |
| | Telenor Bulgaria | Confidential | | Confidential |
| | Rest of operators | 57,040 | | 3.95% |
| CH | Swisscom | N/A | N/A | N/A |
| CY | Cyta | 238,612 | 318,477 | 74.92% |
| | Primetel | 41,426 | | 13.01% |
| | Cablenet | 24,201 | | 7.60% |
| | MTN | 14,238 | | 4.47% |
| CZ | Česká telekomunikační infrastruktura a.s. | Confidential | Confidential | 42.31% |
| | Vodafone Czech Republic a.s. | Confidential | | 8.55% |
| | UPC Česká republika, s.r.o. | Confidential | | 8.54% |
| | T-Mobile Czech Republic a.s. | Confidential | | 7.56% |
| | IPEX a.s. | Confidential | | 3.43% |
| | České Radiokomunikace a.s. | Confidential | | 2.80% |
| | Rest of operators | Confidential | | 26.82% |
| DE | Telekom Deutschland GmbH | 19,780,000 | 37,040,000 | 53.40% |
| | Rest of operators | 17,260,000 | | 46.60% |
| DK | TDC | 516,408 | 687,965 | 75.06% |
| | Telia | 50,455 | | 7.33% |

| | | | | |
|----|----------------------|--------------|------------|--------------|
| | Telenor | 53,560 | | 7.79% |
| | DLG Tele | 44,079 | | 6.41% |
| | Rest of operators | 23,463 | | 3.41% |
| EE | Telia Eesti AS | 298,687 | 352,866 | 84.65% |
| | STV | 12,557 | | 3.56% |
| | Starman | 28,682 | | 8.13% |
| | Elisa | 12,940 | | 3.67% |
| EL | OTE | 2,667,310 | 4,750,488 | 56.15% |
| | FORTHNET | Confidential | | Confidential |
| | VODAFONE | Confidential | | Confidential |
| | WIND | Confidential | | Confidential |
| ES | Telefónica de España | 9,368,438 | 19,149,876 | 48.92% |
| | Vodafone - ONO | 4,630,144 | | 24.18% |
| | Orange | 4,062,516 | | 21.21% |
| | Rest of operators | 1,088,778 | | 5.69% |
| FI | DNA Oyj | 64,000 | 457,000 | 14.00% |
| | Elisa Oyj | 206,000 | | 45.08% |
| | Telia Finland Oyj | 101,000 | | 22.10% |
| | Rest of operators | 86,000 | | 18.82% |
| FR | | N/A | N/A | N/A |
| HR | HT | Confidential | 1,383,748 | Confidential |
| | OPTIMA | Confidential | | Confidential |
| | VIPnet | Confidential | | Confidential |
| | H1 | Confidential | | Confidential |
| | Rest of operators | Confidential | | Confidential |
| HU | Magyar Telekom | 1,617,688 | 3,124,000 | 51.78% |
| | Invitel | 382,469 | | 12.24% |
| | UPC | 564,666 | | 18.08% |
| | Rest of operators | 559,177 | | 17.90% |
| IE | Eir | 588,789 | 1,475,661 | 39.90% |
| | Virgin Media | 352,683 | | 23.90% |
| | Vodafone | 225,776 | | 15.30% |
| | Sky | 165,274 | | 11.20% |
| | Rest of operators | 143,139 | | 9.70% |
| IS | Siminn | 83,053 | 120,781 | 68.76% |
| | Vodafone | 37,728 | | 31.24% |
| IT | Telecom Italia | 11,285,398 | 20,267,173 | 55.68% |
| | WindTre | 2,658,364 | | 13.12% |

| | | | | |
|--------------|---------------------------|--------------|--------------|--------------|
| | Fastweb | 2,415,735 | | 11.92% |
| | Vodafone | 2,319,003 | | 11.44% |
| | Rest of operators | 1,588,673 | | 7.84% |
| LI | Telecom Liechtenstein AG | 25,582 | 25,582 | 100.00% |
| LT | Telia Lietuva, AB | Confidential | Confidential | 90.13% |
| | UAB „CSC Telecom“ | Confidential | | 2.02% |
| | AB Lietuvos gelezinkeliai | Confidential | | 1.13% |
| | Rest of operators | Confidential | | 6.71% |
| LU | EPF | 203,000 | 276,400 | 73.44% |
| | Rest of operators | 73,400 | | 26.56% |
| LV | | N/A | N/A | N/A |
| ME | Crnogorski Telekom | 144,115 | 162,664 | 88.60% |
| | Mtel | 14,337 | | 8.81% |
| | Telenor | 1,396 | | 0.86% |
| | Telemach | 2,816 | | 1.73% |
| FYROM | Makedonski Telekom | 213,938 | 362,077 | 59.09% |
| | one.VIP | 105,911 | | 29.25% |
| | Robi | 25,546 | | 7.06% |
| | Rest of operators | 16,682 | | 4.61% |
| MT | Go plc | 164,688 | 253,755 | 64.90% |
| | Melita plc | 81,381 | | 32.07% |
| | Vodafone Malta Ltd | 4,724 | | 1.86% |
| | Ozone | 862 | | 0.34% |
| | Vanilla Telecoms Ltd | 2,100 | | 0.83% |
| NL | KPN | 3,448,000 | 6,771,000 | 50.92% |
| | VODAFONEZIGGO | 2,559,000 | | 37.79% |
| | Rest of operators | 764,000 | | 11.28% |
| NO | Telenor | 507,069 | 806,776 | 62.85% |
| | NextGenTel | 63,478 | | 7.87% |
| | Get | 52,048 | | 6.45% |
| | Phonero | 39,221 | | 4.86% |
| | Phonect | 33,335 | | 4.13% |
| | Rest of operators | 111,625 | | 13.84% |
| PL | Orange Polska S.A | Confidential | 5,605,442 | Confidential |
| | Netia S.A. | Confidential | | Confidential |
| | Multimedia Polska S.A. | Confidential | | Confidential |
| | Rest of operators | Confidential | | Confidential |
| PT | MEO (incumbent) | Confidential | 4,788,552 | 45.3% |

| | | | | |
|----|----------------------------------|--------------|--------------|--------------|
| | NOS Group | Confidential | | 35.4% |
| | Vodafone | Confidential | | 15.2% |
| | Apax Group | Confidential | | 3.7% |
| | Rest of operators | Confidential | | 0.4% |
| RO | Telekom RC S.A. | Confidential | 4,009,080 | Confidential |
| | S.C. RCS&RDS S.A. | Confidential | | Confidential |
| | S.C. UPC Romania S.R.L. | Confidential | | Confidential |
| | S.C. VODAFONE ROMANIA S.A. | Confidential | | Confidential |
| | Rest of operators | Confidential | | Confidential |
| RS | Telekom Srbija | N/A | 2,684,419 | 89.50% |
| | Serbia Broadband | N/A | | 8.6% |
| | Rest of operators | N/A | | 1.9% |
| SE | TeliaSonera AB | 1,746,800 | 3,104,000 | 56.28% |
| | Com Hem AB | 281,600 | | 9.07% |
| | Tele2 Sverige AB | 179,200 | | 5.77% |
| | Telenor Sverige AB | 201,200 | | 6.48% |
| | Telavox AB | 135,000 | | 4.35% |
| | Rest of operators | 560,200 | | 18.05% |
| SI | Telekom Slovenije | Confidential | Confidential | 54.44% |
| | Telemach | Confidential | | 16.62% |
| | T-2 | Confidential | | 13.51% |
| | A1 Slovenija | Confidential | | 8.60% |
| | Rest of operators | Confidential | | 6.84% |
| SK | Slovak Telekom, a. s. | Confidential | 852,268 | Confidential |
| | Orange Slovensko, a. s. | Confidential | | Confidential |
| | UPC Broadband Slovakia, s. r. o. | Confidential | | Confidential |
| | SWAN, a. s. | Confidential | | Confidential |
| | Rest of operators | Confidential | | Confidential |
| TR | Türk Telekom | 7,981,461 | 11,077,559 | 72.05% |
| | TTNet | 1,725,810 | | 15.58% |
| | Superonline | 398,302 | | 3.60% |
| | Turknet | 195,283 | | 1.76% |
| | Rest of operators | 776,703 | | 7.01% |
| UK | BT | Confidential | Confidential | Confidential |
| | TalkTalk | Confidential | | Confidential |
| | Sky | Confidential | | Confidential |
| | Virgin Media | Confidential | | Confidential |
| | Rest of operators | Confidential | | Confidential |

Notes to table 6

AL: Number of fixed lines as of 01.07.2017.

AT: Number of lines as of end Q1 2017.

BE: Number of lines as of 01.01.2017.

BG: Number of lines (network termination points) as of 01.07.2017. Data per operator is considered confidential.

CY: Number of lines as at 31.12.2016.

CZ: The total number of lines as of 31.12.2016 is available as the latest information.

DE: Number of lines refer to 2016 figures. Source: BNetzA Annual Report 2016.

DK: Number of lines refer to 2016.

EL: Data refer to the number of lines (not to the number of end users connected) as of 31.12.2016; the wholesale line rental lines are included in the incumbent's (OTE) lines.

FI: Market shares as of 31.12.2016.

IE: Number of lines and market share data is as of 01.01.2017 as data as of 01.07.2017 is not yet available.

IS: Number of lines refer to end of 2016.

LT: Data as of Q2 2017.

LU: The number of lines is considering the number of network termination points.

ME: Data for number of lines are from 30.06.2017.

MT: Data reflects the position as at Q1 2017. Data includes the number of channels.

NO: Number of lines are provided as of 01.01.2017. The total number of lines according to 01.07.2017 will not be available before Q3 2017.

PT: Please note that information regarding the number of lines by operator is confidential.

RO: The number of lines per operator is confidential. Data as of 01.07.2017 is provisional.

RS: Number of lines are as of 31.12.2016. Number of lines are collected by using ITU indicator i112 Fixed-telephone subscriptions which refers to the sum of active number of analogue fixed-telephone line, voice-over-IP (VoIP) subscriptions, fixed wireless local loop (WLL) subscriptions, ISDN voice-channel equivalents and fixed public payphones. Information on individual's number of lines by operator is confidential.

SI: Absolute number of lines per operator is confidential. Absolute number of all lines is confidential if published together with market shares of operators. As all operator's systems are not adopted to reporting the data at such detailed level, all lines in case of VoIP are not taken into account.

SK: Operators have requested the number of lines to be treated as confidential information.

TR: In Turkey, there is no differentiation in fixed termination rates such as peak and off-peak. The number of lines specified above table for alternative network operators includes the number of wholesale line rental and VoIP subscribers. Number of Lines can be given as total number of lines including layer 1, layer 2 and layer 3 termination points.

Annex 6 Average MTR per operator as of 1 July 2017

Table 7

| Country | Operator | Average effective prices (eurocents) | Subscribers | Country total subscribers | Market Share % |
|------------------|-----------------------------------|--------------------------------------|--------------|---------------------------|----------------|
| AL | Telekom Albania | 1.1014 | 1,037,347 | 3,350,196 | 30.96% |
| | Vodafone Albania | 1.1014 | 1,649,919 | | 49.25% |
| | Albtelecom | 1.1014 | 454,089 | | 13.55% |
| | Plus Communication | 4.8521 | 208,841 | | 6.23% |
| AT | A1Telekom Austria | 0.8049 | 4,933,991 | 12,035,016 | 41.00% |
| | T-Mobile Austria | 0.8049 | 3,127,037 | | 25.98% |
| | Hutchison Drei Austria | 0.8049 | 3,111,292 | | 25.85% |
| BE | Proximus (incl light MVNO) | 0.9900 | Confidential | 11,907,401 | Confidential |
| | Orange Belgium (incl light MVNO) | 0.9900 | Confidential | | Confidential |
| | Telenet Group (incl light MVNO) | 0.9900 | Confidential | | Confidential |
| BG | Mobitel | 0.7158 | Confidential | 8,734,082 | Confidential |
| | Telenor Bulgaria | 0.7158 | Confidential | | Confidential |
| | BTC | 0.7158 | Confidential | | Confidential |
| CH | Swisscom | 2.8593 | 5,380,000 | 9,452,123 | 56.92% |
| | Sunrise | 3.9661 | 2,338,014 | | 24.74% |
| | Salt | 3.9661 | 1,734,109 | | 18.35% |
| CY | MTN | 0.9900 | 416,025 | 1,173,429 | 35.45% |
| | Primetel | 1.1880 | 86,314 | | 7.36% |
| | Cyta | 0.9900 | 657,894 | | 56.07% |
| CZ | T-Mobile Czech Republic a.s. | 0.9346 | Confidential | Confidential | 37.76% |
| | O2 Czech Republic a.s. | 0.9346 | Confidential | | 29.73% |
| | Vodafone Czech Republic a.s. | 0.9346 | Confidential | | 24.68% |
| DE ¹⁴ | Telekom Deutschland | 1.1000 | 42,011,000 | 124,705,000 | N/A |
| | Vodafone | 1.1000 | 45,200,000 | | N/A |
| | Telefónica Germany GmbH & Co. OHG | 1.1000 | 45,194,000 | | N/A |
| DK | TDC | 0.6359 | 2,727,372 | 6,985,035 | 39.05% |
| | Telenor | 0.6359 | 1,642,473 | | 23.51% |
| | Telia | 0.6359 | 1,212,776 | | 17.36% |
| | 3 (Hi3G) | 0.6359 | 887,611 | | 12.71% |
| EE | Telia Eesti AS | 0.8900 | 763,857 | 1,886,896 | 40.48% |
| | Elisa Eesti AS | 0.8900 | 625,821 | | 33.17% |
| | Tele2 Eesti AS | 0.8900 | 497,218 | | 26.35% |
| EL | Cosmote | 1.0720 | Confidential | 12,538,927 | Confidential |
| | Vodafone | 1.0720 | Confidential | | Confidential |

¹⁴ M2M SIM cards are included in the individual subscriber numbers, but not the total subscriber number. Therefore, markets shares cannot be shown.

| | | | | | |
|----|----------------------------|---------------|--------------|------------|---------------------|
| | Wind | 1.0720 | Confidential | | Confidential |
| ES | TME | 1.0900 | 15,313,229 | 51,521,507 | 29.72% |
| | Vodafone | 1.0900 | 14,121,777 | | 27.41% |
| | Orange | 1.0900 | 13,146,629 | | 25.52% |
| | Masmovil | 1.0900 | 4,249,574 | | 8.25% |
| FI | DNA | 1.2500 | Confidential | 7,367,000 | Confidential |
| | Elisa | 1.2500 | Confidential | | Confidential |
| | Telia Finland Oyj | 1.2500 | Confidential | | Confidential |
| FR | Orange | 0.7400 | N/A | 70,940,000 | N/A |
| | SFR | 0.7400 | N/A | | N/A |
| | Bouygues Telecom | 0.7400 | N/A | | N/A |
| | Free Mobile | 0.7400 | N/A | | N/A |
| HR | HT | 0.8480 | Confidential | 4,358,323 | Confidential |
| | VIPnet | 0.8480 | Confidential | | Confidential |
| | Tele2 | 0.8480 | Confidential | | Confidential |
| HU | T-Mobile | 0.5528 | Confidential | 11,783,806 | Confidential |
| | Telenor | 0.5528 | Confidential | | Confidential |
| | Vodafone | 0.5528 | Confidential | | Confidential |
| IE | Vodafone | 0.8200 | 1,801,987 | 4,896,704 | 36.80% |
| | Three Ireland Group | 0.8200 | 1,591,429 | | 32.50% |
| | eircom Group mobile | 0.8200 | 994,031 | | 20.30% |
| | Tescomobile | 0.8200 | 357,459 | | 7.30% |
| IS | Siminn | 1.0690 | 130,734 | 400,503 | 32.64% |
| | Vodafone | 1.0690 | 111,743 | | 27.90% |
| | Nova | 1.0690 | 139,947 | | 34.94% |
| | 365/Tal | 1.0690 | 14,472 | | 3.61% |
| IT | WindTre | 0.9800 | 30,863,000 | 84,830,255 | 36.38% |
| | Telecom Italia | 0.9800 | 23,915,080 | | 28.19% |
| | Vodafone | 0.9800 | 22,958,652 | | 27.06% |
| | PosteMobile | 0.9800 | 3,666,806 | | 4.32% |
| LI | Salt (Liechtenstein) AG | Confidential | Confidential | 11,737 | Confidential |
| | Swisscom (Schweiz) AG | Confidential | Confidential | | Confidential |
| | Telecom Liechtenstein AG | Confidential | Confidential | | Confidential |
| LT | Tele2 | 0.9400 | 1,806,457 | 4,217,131 | 42.84% |
| | Telia Lietuva, AB | 0.9400 | 1,268,117 | | 30.07% |
| | Bite Lietuva | 0.9400 | 1,057,758 | | 25.08% |
| LU | Post Télécom | 0.8900 | Confidential | 763,600 | Confidential |
| | Tango | 0.8900 | Confidential | | Confidential |
| | Orange | 0.8900 | Confidential | | Confidential |
| LV | Bite Latvija | 1.0500 | 497,396 | 2,474,151 | 20.10% |
| | Latvijas Mobilais Telefons | 1.0500 | 802,680 | | 32.44% |
| | Tele2 | 1.0500 | 915,693 | | 37.01% |
| | Zetcom | 1.0500 | 175,029 | | 7.07% |
| ME | Telenor | 1.0600 | 366,063 | 1,010,107 | 36.24% |
| | Crnogorski Telekom | 1.0600 | 338,655 | | 33.53% |

| | | | | | |
|-------|------------------------|--------|--------------|--------------|--------------|
| | Mtel | 1.0600 | 305,389 | | 30.23% |
| FYROM | Makedonski Telekom | 1.0220 | 988,187 | 2,024,404 | 48.81% |
| | one.VIP | 1.0220 | 1,004,606 | | 49.62% |
| | Lycamobile | 1.0220 | 31,611 | | 1.56% |
| MT | Go plc | 0.4045 | 202,289 | 549,093 | 36.84% |
| | Melita plc | 0.4045 | 97,090 | | 17.68% |
| | Vodafone | 0.4045 | 240,283 | | 43.76% |
| | Redtouch fone | 0.4045 | 9,420 | | 1.72% |
| NL | KPN | 0.5810 | 6,673,000 | 20,890,217 | 31.94% |
| | VodafoneZiggo | 0.5810 | 4,515,000 | | 21.61% |
| | T-Mobile | 0.5810 | 3,609,000 | | 17.28% |
| | Tele2 | 0.5810 | 1,044,000 | | 5.00% |
| NO | Telenor | 0.6932 | 2,885,913 | 5,729,569 | 50.37% |
| | Telia | 0.6932 | 2,031,272 | | 35.45% |
| | ICE | 0.6932 | 233,731 | | 4.08% |
| | Phonero | 0.6932 | 217,928 | | 3.80% |
| | Lyca | 0.6932 | 108,000 | | 1.88% |
| PL | Orange Polska S.A. | 1.0178 | Confidential | 53,001,776 | Confidential |
| | Polkomtel sp. z o.o. | 1.0178 | Confidential | | Confidential |
| | P4 sp. z o.o. | 1.0178 | Confidential | | Confidential |
| | T-Mobile Polska S.A. | 1.0178 | Confidential | | Confidential |
| PT | MEO | 0.7500 | Confidential | 11,630,812 | Confidential |
| | VODAFONE | 0.7500 | Confidential | | Confidential |
| | NOS | 0.7500 | Confidential | | Confidential |
| RO | Vodafone Romania S.A. | 0.9600 | Confidential | 22,234,035 | Confidential |
| | Orange Romania S.A. | 0.9600 | Confidential | | Confidential |
| | TELEKOM RMC S.A. | 0.9600 | Confidential | | Confidential |
| | RCS & RDS S.A. | 0.9600 | Confidential | | Confidential |
| RS | Telekom Srbija - MTS | 1.6838 | Confidential | 9,094,447 | 46.80% |
| | Telenor | 1.6838 | Confidential | | 31.20% |
| | Vip mobile | 1.6838 | Confidential | | 22.00% |
| SE | Telia Company | 0.6634 | 4,699,200 | 12,543,000 | 37.46% |
| | Tele2 | 0.6634 | 3,709,400 | | 29.57% |
| | Telenor | 0.6634 | 2,122,400 | | 16.92% |
| | Hi3G | 0.6634 | 1,392,200 | | 11.10% |
| SI | Telekom Slovenije | 1.1400 | Confidential | Confidential | 47.86% |
| | A1 Slovenija | 1.1400 | Confidential | | 29.60% |
| | Telemach | 1.1400 | Confidential | | 18.11% |
| | T-2 | 1.1400 | Confidential | | 4.43% |
| SK | Orange Slovensko, a.s. | 1.2260 | Confidential | 6,192,892 | Confidential |
| | Slovak Telekom, a.s. | 1.2260 | Confidential | | Confidential |
| | O2 Slovakia, s.r.o. | 1.2260 | Confidential | | Confidential |
| | Swan Mobile a.s. | 1.2260 | Confidential | | Confidential |
| TR | Turkcell | 0.6344 | 32,208,257 | 71,941,193 | 44.77% |
| | Vodafone | 0.6547 | 22,570,652 | | 31.37% |
| | Avea | 0.7512 | 17,162,284 | | 23.86% |
| UK | EE | 0.5748 | Confidential | 65,447,525 | Confidential |
| | Telefonica | 0.5748 | Confidential | | Confidential |

| | | | | | |
|--|----------|--------|--------------|--|--------------|
| | Vodafone | 0.5748 | Confidential | | Confidential |
| | H3G | 0.5748 | Confidential | | Confidential |

Notes to Table 7

AT: Subscriber numbers as of 31.03.2017.

None of the MVNOs has a market share of 1.5% or higher.

BE: Subscriber number reflects situation at 1st of January 2017 as the BIPT only collects data once a year.

CH: Subscriber base as of 30.06.2017. In Switzerland, the decrease in mobile subscribers is also due to a restatement of mobile subscribers by at least one operator.

CY: M2M SIM Cards are included in the number of subscribers.

To Primetel a glide path was imposed which states that for 2017 the regulated MTR should be 20% above the symmetric rate imposed on other operators (20% above 0.0099). After 2017, symmetry is imposed on Primetel as well.

CZ: Regulated MTR is defined as a single price per minute.

The total number of SIM cards as of 31st December 2016 is available as the latest information.

DE: Current MTR are valid from 01.12.2016 until 30.11.2017.

The number of subscribers are as of 2nd quarter of 2017.

The number of subscribers per operator include 7.7 million M2M SIM cards. "Total subscribers" excludes M2M, M2P and data-only SIM cards.

DK, EL, FI, ME, PL, RS: The number of subscribers as of 31.12.2016.

FR: Number of subscribers as of 01.07.2017.

FYROM: Subscribers as of 31.03.2017.

HU: The number of subscribers is from 2016.

IE: Subscribers as of 31.03.2017.

Some operators, Virgin Mobile and ID Mobile, are not currently subject to MTR regulation.

A market share figure for Lycamobile is not available from the quarterly key data report published by ComReg. Lycamobile however is subject to MTR regulation.

HR, MT: Subscribers as of Q1 2017.

LT: Subscribers as of Q2 2017

LU: Data as of 31.12.2016.

Règlement ILR/T17/4 du 9 juin 2017 portant fixation du plafond tarifaire pour les prestations de la terminaison d'appel vocal sur les réseaux mobiles individuels (Marché 7/2007) , Price cap based on Pure-LRIC.

NO: Number of subscribers are provided per 01.01.2017.

The total number of subscribers per 1 July 2017 will be available in Q4 2017.

PT: The number of subscribers considers users that have effectively used the service in the last 30 days.

RO: Data as of 01.07.2017 is provisional.

Annex 7 Average mobile termination revenue per minute per country

Notes to figure 17

BG: Revenues from traffic originated from national fixed networks and terminated in mobile networks during 2016. Excluded are fixed-to-mobile calls when both the fixed and the mobile network are owned and run by the same operator.

Traffic originated in national fixed networks and terminated in mobiles networks during 2016. Excluded are fixed-to-mobile calls when both the fixed and the mobile network are owned and run by the same operator.

In 2016 the cost-oriented mobile termination rates based on Pure Bu-LRIC models are into force as follows:

Until 30.11.2016 - BGN/min 0.019 (Decision 135 from 14 February 2013);

From 01.12.2016 to 31.12.2016 – BGN/min 0.014 (Decision 585 from 24 November 2016).

CH: The data refers to the whole year 2016.

HU: Revenue and MTR minutes data are not available for 2016.

IT: Estimated data

LU: Revenues are total revenues (no differentiation of IX layers apply) and they include revenues from traffic from abroad (international traffic). These revenues may include non-termination related revenues like revenues from the transport of calls.

LV: MTR for incoming calls from countries outside the EEA are not regulated.

ME: Data are for calls originated from national operators (fixed and mobile) and from abroad. MTR for calls that are originated from abroad are not regulated, and different from MTR for call that are originated from national operators.

FYROM: Mobile to mobile and fixed to mobile revenue included. For fixed to mobile calls only the value is MKD 11,394,314

Mobile to mobile and fixed to mobile calls included. For fixed to mobile calls only, the value is: 13.991.672 min.

PT: Total MTR minutes also includes international traffic terminated in mobile operators of which traffic originated outside EEA is not subject to price control obligation. This is the reason that justifies average revenues per minute higher than the maximum regulated value for EEA traffic.

RS: Data provided are for the whole 2016 and includes only national fixed-to-mobile calls. Revenue and traffic do not include fixed-to-mobile calls when both the fixed and the mobile network are owned and run by the same operator.

SI: Including international termination. Self-supply is not included.

MTR revenues and minutes include traffic terminated on premium numbers, numbers for tele voting, mass calling, and short dialing numbers.

Annex 8 Regulatory model implemented to calculate MTRs

Table 8

| Jul-17 | COST ACCOUNTING MODEL | | | | | | | |
|--------|-----------------------|---------------|---|---|---|---|---|---|
| | Model | Rate status | When a tariff adopted by a final decision and meeting the standards of the TR Recommendation has been or will be firstly applied? | Period 1 - From 01/07/2017 until 31/12/2017 | Period 2 - From 01/01/2018 until 30/06/2018 | Period 3 - From 01/07/2018 until 31/12/2018 | Period 4 - From 01/01/2019 until 30/06/2019 | Period 5 - From 01/07/2019 until 31/12/2019 |
| AL | Benchmark BU-LRIC | adopted | 01.12.14 | 1.1014 | | | | |
| AT | Pure BU-LRIC | adopted | | 0.8049 | 0.8049 | 0.8049 | | |
| BE | Pure BU-LRIC | adopted | 01.01.13 | 0.9900 | 0.9900 | 0.9900 | 0.9900 | 0.9900 |
| BG | Pure BU-LRIC | adopted | 01.12.16 | 0.7158 | 0.7158 | 0.7158 | 0.7158 | 0.7158 |
| CH | | not regulated | | | | | | |
| CY | Benchmark BU-LRIC | adopted | | 0.9900 | 0.9900 | | | |
| CZ | Pure BU-LRIC | adopted | 01.07.13 | 0.9346 | | | | |
| DE | Pure BU-LRIC | notified | 01.12.16 | 1.1000 | 1.1000 | 1.0700 | 1.0700 | 0.9500 |
| DK | Pure BU-LRIC | adopted | 01.01.13 | 0.6359 | | | | |
| EE | Benchmark BU-LRIC | adopted | 26.05.16 | 0.8900 | 0.8900 | | | |
| EL | Pure BU-LRIC | adopted | 01.01.13 | 0.9820 | 0.9580 | 0.9580 | 0.9460 | 0.9460 |
| ES | Pure BU-LRIC | adopted | 05.10.12 | 1.0900 | 1.0900 | 1.0900 | 1.0900 | 1.0900 |
| FI | other (FDC/FAC) | adopted | 01.12.15 | 1.2500 | 1.2500 | 1.2500 | | |
| FR | Pure BU-LRIC | adopted | 01.01.13 | 0.7400 | | | | |
| HR | Pure BU-LRIC | adopted | | 0.6326 | | | | |
| HU | Pure BU-LRIC | adopted | 01.04.15 | 0.5520 | 0.5520 | | | |
| IE | Pure BU-LRIC | adopted | 01.09.16 | 0.8200 | 0.7900 | 0.7900 | | |
| IS | Benchmark BU-LRIC | notified | | 1.0690 | | | | |

| | | | | | | | | |
|--------------|-------------------|---------|----------|---------|---------|---------|---------|---------|
| IT | Pure BU-LRIC | adopted | 01.07.13 | 0.9800 | | | | |
| LI | Benchmarking | adopted | | 3.5971 | | | | |
| LT | Benchmark BU-LRIC | adopted | 01.04.16 | 0.9400 | | | | |
| LU | Pure BU-LRIC | adopted | 09.06.17 | 0.8900 | 0.8900 | 0.8900 | 0.8900 | 0.8900 |
| LV | Benchmark BU-LRIC | adopted | 01.07.14 | 1.0500 | 0.8868 | 0.8868 | 0.8868 | 0.8868 |
| ME | TD LRIC | adopted | | 1.0600 | | | | |
| FYROM | TD LRIC | | | 1.0220 | | | | |
| MT | Pure BU-LRIC | adopted | 01.04.14 | 0.4045 | 0.4045 | | | |
| NL | Pure BU-LRIC | adopted | 12.07.17 | 0.5810 | 0.5810 | 0.5810 | 0.5810 | 0.5810 |
| NO | Pure BU-LRIC | adopted | 01.07.15 | 0.6932 | 0.6932 | | | |
| PL | Pure BU-LRIC | adopted | 01.07.13 | 1.0178 | 1.0178 | 1.0178 | 1.0178 | 1.0178 |
| PT | Pure BU-LRIC | adopted | 31.12.12 | 0.7500 | | | | |
| RO | Pure BU-LRIC | adopted | 01.04.14 | 0.9600 | | | | |
| RS | Benchmarking | | | 1.6838 | | | | |
| SE | Pure BU-LRIC | adopted | 01.07.13 | 0.6634 | 0.6634 | 0.6026 | 0.6026 | 0.6026 |
| SI | Pure BU-LRIC | adopted | 01.09.14 | 1.1400 | 1.1400 | 1.1400 | 1.1400 | 1.1400 |
| SK | Pure BU-LRIC | adopted | 01.08.13 | 1.2260 | | | | |
| TR | BU LRAIC+ | | | | | | | |
| UK | Pure BU-LRIC | adopted | 01.04.13 | 0.57483 | 0.57483 | 0.54348 | 0.54348 | 0.50283 |

Notes to Table 8

AL: The reported MTRs for Telekom Albania, Vodafone Albania and Albtelecom have been applied since 1.12.2014. The rate was calculated by AKEP using benchmarking methodology in 2014: the simple average of MTRs in BEREC countries that had applied pure BULRIC cost model until end year 2013. AKEP's decisions regarding the MTR of Plus Communication applicable from 01.04.2015 onward (glide path to reach the MTR of the other 3 MNOs i.e. symmetrical rates, by 1.04.2016) are under several court proceedings and at different stages of court appeals. The reported MTR for Plus Communication applicable from 01.01.2017 is based on the clarification issued by the Administrative Court on 18.01.2017 regarding its decision on 31.10.2016, which revoked AKEP decision to set the MTR of Plus Communication symmetrical to the MTR of the other 3 MNOs starting from 1.04.2016. These decisions of the Administrative Court are currently under appeal to the Administrative Court of Appeal.

A new market analysis for mobile call termination is currently under public consultation.

BG: With Decision 585 from 24 November 2016 CRC approved cost-oriented mobile termination rates based on Pure Bu-LRIC model as follows:

from 01/12/2016 - BGN/min 0.014

from 01/01/2017 - BGN/min 0.014

from 01/01/2018 - BGN/min 0.014

from 01/01/2019 - BGN/min 0.014

from 01/01/2020 - BGN/min 0.014

No MTRs peak/off-peak differentiation

CH: MTRs are not regulated in 2017.

CY: Please note that the current regulation is based on a benchmark approach. Specifically, the average of the EU member states that have imposed BULRIC results is used. A BULRIC model is currently been finalized. Once the results of the model are finalized, a new market analysis will be initiated.

For Primetel the value for Period 1 is 0.01188 Euro.

CZ: In December 2016 the CTU issued new price decisions which set up MTR in amount of CZK/min 0.248 for all SMPs operators. This price (based on the pure LRIC model) has been effective since the end of 2016 for new agreements and from 1st of March 2017 for current agreements.

DE:

*Deviating from the specified regulation periods, MTR are valid for the following BNetzA regulation periods:

01.12.2016 until 30.11.2017: 1.10 cents/min

01.12.2017 until 30.11.2018: 1.07 cents/min

01.12.2018 until 30.11.2019: 0.95 cents/min

DK: The DBA issues MTR ultimo any year for the entire following year. Hence, the MTR for 2018 is yet underived and will be notified in H2 2017. Therefore, it is stated as unknown in the table after 2017.

EL: The MTR of 0.982 cents/min has been applied since 04.08.2017. During the period 01.07. - 03.08. 2017 a MTR of 1.072 cents/min had been applied.

FI: FICORA issued new decisions concerning significant market power in the mobile voice call termination markets on 10 August 2015. FICORA has, for the first time, set a cost-oriented maximum price for MTRs. The MTR 1.25 came into effect on 1th of December 2015. The cost-oriented maximum price for MTRs has been calculated based on FDC approach. Some of the operators have appealed to Supreme Administrative Court and the process is still going on.

HR: Please note that MRs are regulated only for the calls originated on A numbers belonging to the EU/EEA operators and terminated into the individual fixed networks in Croatia.

IS: Benchmark against BU-LRIC conducted in autumn 2017 for validity in 2018. Notified 1.oct to ESA and ratified 1 November.

LI: Market analysis M7 and MTR decisions are available on: <http://www.llv.li/#/111026/m>

Last step of glide path, effective since 1/1/2013: CHF/min 0.0765 (cap)

Benchmarking method: The weighted average of the termination rates in Switzerland, CHF/min 0.0765 as of 1 January 2011, served as a reference value for setting the termination rates of the Liechtenstein mobile operators in the context of the M7 market analysis.

Effective MTR as of May 1, 2016 is CHF 3.9 cents per minute

LV: Latvian NRA does not apply any glide path.

ME: NRA in Montenegro does not apply any glide path for MTR. Currently SMP operators have applied MTR based on TD LRIC methodology and cost model.

The NRA comments that "Period 1" is from 01/07/2017 until new NRA decision based on results of cost model of SMP operators.

RO: No glide path

RS: Price of RSD 2.07 is effective from 01.01.2017, until new RATEL's decision.

TR: The MTR values effective from the date 01.07.2013 are close to the values calculated in cost model for the mobile operator of highest market share. For the other two mobile operators a constant asymmetric regulation ratio is applied with respect to the operator having highest market share. Moreover, ICTA does not regulate MTRs via glide path; in general, MTRs are revised annually when necessary.

UK: Future rates are dependent on the level of inflation. For the above we have assumed an inflation rate of 2% per annum from 2012/13 to 2017/18. All prices are nominal.

Annex 9 SMS TR per operator as of 1 July 2017

Table 9

| Country | Operator | SMS TR (eurocents) | | Subscribers ¹⁵ | | Market share |
|---------|----------------------------------|--------------------|---------------------|---------------------------|-------------------|---------------------|
| | | per operator | WA per country | per operator | Total per country | |
| AL | Telekom Albania | 0.7442 | 0.7442 | 1,178,547 | 3,513,522 | 32.47% |
| | Vodafone Albania | 0.7442 | | 1,667,797 | | 49.59% |
| | Albtelecom | 0.7442 | | 458,337 | | 12.76% |
| | Plus Communication | 0.7442 | | 208,841 | | 5.18% |
| AT | A1Telekom Austria | N/A | 3.1100 | 4,956,167 | 12,871,397 | 38.51% |
| | T-Mobile Austria | N/A | | 3,892,367 | | 30.24% |
| | Hutchison Drei Austria | N/A | | 3,160,167 | | 24.55% |
| BE | Proximus (incl light MVNO) | 4.9600 | 4.9600 | Confidential | 13,928,438 | Confidential |
| | Orange Belgium (incl light MVNO) | 4.9600 | | Confidential | | Confidential |
| | Telenet Group (incl light MVNO) | 4.9600 | | Confidential | | Confidential |
| BG | Mobiltel | Confidential | Confidential | Confidential | 9,607,464 | Confidential |
| | Telenor Bulgaria | Confidential | | Confidential | | Confidential |
| | BTC | Confidential | | Confidential | | Confidential |
| CH | Swisscom | Confidential | 4.1603 | Confidential | 9,964,275 | Confidential |
| | Sunrise | Confidential | | Confidential | | Confidential |
| | Salt | Confidential | | Confidential | | Confidential |
| CY | MTN | 0.6800 | 0.6100 | 416,025 | 1,173,429 | 35.45% |
| | Primetel | 0.7300 | | 86,314 | | 7.36% |

¹⁵ Including M2M SIM cards for the majority of countries. Numbers of subscribers of IE, LI, ME and RO do not include M2M SIM cards. For IE, ME and RO no M2M SIM card data was provided. For LI an explanation is available in the notes to table 9.

| | | | | | | |
|----|-----------------------------------|--------------|--------------|--------------|--------------|--------------|
| | CYTA | 0.5500 | | 657,894 | | 56.07% |
| CZ | T-Mobile Czech Republic a.s. | Confidential | Confidential | Confidential | Confidential | 38.13% |
| | O2 Czech Republic a.s. | Confidential | | Confidential | | 29.97% |
| | Vodafone Czech Republic a.s. | Confidential | | Confidential | | 24.55% |
| DE | Telekom Deutschland | N/A | N/A | 42,011,000 | 124,705,000 | N/A |
| | Vodafone | N/A | | 45,200,000 | | N/A |
| | Telefónica Germany GmbH & Co. OHG | N/A | | 45,194,000 | | N/A |
| DK | TDC | N/A | N/A | Confidential | Confidential | Confidential |
| | Telenor | N/A | | Confidential | | Confidential |
| | Telia | N/A | | Confidential | | Confidential |
| | 3 (Hi3G) | N/A | | Confidential | | Confidential |
| EE | Telia Eesti AS | 2.6000 | 2.3286 | 975,518 | 2,133,351 | 45.73% |
| | Elisa Eesti AS | 2.1000 | | 631,419 | | 29.60% |
| | Tele2 Eesti AS | 2.1000 | | 526,414 | | 24.68% |
| EL | Cosmote | Confidential | 3.0000 | Confidential | 12,789,695 | Confidential |
| | Vodafone | Confidential | | Confidential | | Confidential |
| | Wind | Confidential | | Confidential | | Confidential |
| ES | Movistar | Confidential | 2.6372 | 17,319,578 | 55,878,587 | 31.00% |
| | Vodafone | Confidential | | 15,413,646 | | 27.58% |
| | Orange | Confidential | | 14,205,491 | | 25.42% |
| | Masmovil | Confidential | | 4,249,574 | | 7.61% |
| FI | DNA | N/A | N/A | Confidential | 8,548,000 | Confidential |
| | Elisa | | | Confidential | | Confidential |
| | Telia Finland Oyj | | | Confidential | | Confidential |
| FR | Orange | 1.0000 | 1.0000 | N/A | 84,624,000 | N/A |
| | SFR | 1.0000 | | N/A | | N/A |
| | Bouygues Telecom | 1.0000 | | N/A | | N/A |
| | Free Mobile | 1.0000 | | N/A | | N/A |
| HR | HT | N/A | N/A | Confidential | | Confidential |

| | | | | | | |
|----|----------------------------|--------------|--------|--------------|--------------|--------------|
| | VIPnet | N/A | | Confidential | 4,487,369 | Confidential |
| | Tele2 | N/A | | Confidential | | Confidential |
| HU | T-Mobile | 4.5196 | 4.5196 | Confidential | Confidential | Confidential |
| | Telenor | 4.5196 | | Confidential | | Confidential |
| | Vodafone | 4.5196 | | Confidential | | Confidential |
| IE | Vodafone | 3.1700 | 3.1700 | 1,801,987 | 4,896,704 | 36.80% |
| | Three Ireland Group | 3.1700 | | 1,591,429 | | 32.50% |
| | eircom Group mobile | 3.1700 | | 994,031 | | 20.30% |
| | Tescomobile | 3.1700 | | 357,459 | | 7.30% |
| IS | Siminn | 3.3460 | 3.3460 | Confidential | 424,495 | Confidential |
| | Vodafone | 3.3460 | | Confidential | | Confidential |
| | Nova | 3.3460 | | Confidential | | Confidential |
| IT | WindTre | Confidential | 3.2232 | 32,027,000 | 97,907,252 | 32.71% |
| | Telecom Italia | Confidential | | 29,416,975 | | 30.05% |
| | Vodafone | Confidential | | 29,298,348 | | 29.92% |
| | PosteMobile | Confidential | | 3,695,300 | | 3.77% |
| LI | Salt (Liechtenstein) AG | Confidential | 5.5331 | Confidential | 11,737 | Confidential |
| | Swisscom (Schweiz) AG | Confidential | | Confidential | | Confidential |
| | Telecom Liechtenstein AG | Confidential | | Confidential | | Confidential |
| LT | Tele2 | 0.7240 | 0.9115 | 1,838,023 | 4,450,361 | 41.30% |
| | Telia Lietuva, AB | 0.7240 | | 1,396,766 | | 31.39% |
| | Bite Lietuva | 1.4480 | | 1,130,773 | | 25.41% |
| LU | Post Télécom | N/A | N/A | Confidential | 853,000 | Confidential |
| | Tango | N/A | | Confidential | | Confidential |
| | Orange | N/A | | Confidential | | Confidential |
| LV | Bite Latvija | 2.1300 | 2.1300 | 509,975 | 2,770,955 | 18.40% |
| | Latvijas Mobilais Telefons | 2.1300 | | 1,079,342 | | 38.95% |
| | Tele2 | 2.1300 | | 923,199 | | 33.32% |
| | Zetcom | 2.1300 | | 175,029 | | 6.32% |
| ME | Telenor | 1.0000 | 1.0000 | 366,063 | | 36.24% |

| | | | | | | |
|-------|-----------------------|--------------|--------|--------------|------------|--------------|
| | Crnogorski Telekom | 1.0000 | | 338,655 | 1,010,107 | 33.53% |
| | Mtel | 1.0000 | | 305,389 | | 30.23% |
| FYROM | Makedonski Telekom | 0.4867 | 0.4867 | 1,090,756 | 2,206,157 | 49.44% |
| | one.VIP | 0.4867 | | 1,083,790 | | 49.13% |
| MT | GoMobile | 2.4300 | 2.2005 | 210,230 | 560,460 | 37.51% |
| | Melita Mobile | 1.7800 | | 97,090 | | 17.32% |
| | Vodafone | 2.1700 | | 243,709 | | 43.48% |
| NL | KPN | N/A | N/A | 9,227,000 | 24,835,272 | 37.15% |
| | VodafoneZiggo | N/A | | 5,813,173 | | 23.41% |
| | T-Mobile | N/A | | 3,698,088 | | 14.89% |
| | Tele2 | N/A | | 1,047,794 | | 4.22% |
| NO | Telenor | 3.7325 | 3.7325 | 3,939,653 | 6,968,082 | 56.54% |
| | Telia | 3.7325 | | 2,076,564 | | 29.80% |
| | Phonero | 3.7325 | | 239,502 | | 3.44% |
| | Lyca | 3.7325 | | 108,000 | | 1.55% |
| PL | Orange Polska S.A. | 1.1863 | 1.1863 | Confidential | 55,460,529 | Confidential |
| | Polkomtel sp. z o.o. | 1.1863 | | Confidential | | Confidential |
| | P4 sp. z o.o. | 1.1863 | | Confidential | | Confidential |
| | T-Mobile Polska S.A. | 1.1863 | | Confidential | | Confidential |
| PT | MEO | Confidential | 0.8300 | Confidential | 12,444,958 | Confidential |
| | VODAFONE | Confidential | | Confidential | | Confidential |
| | NOS | Confidential | | Confidential | | Confidential |
| RO | Vodafone Romania S.A. | Confidential | 2.3000 | Confidential | 22,234,035 | Confidential |
| | Orange Romania S.A. | Confidential | | Confidential | | Confidential |
| | TELEKOM RMC S.A. | Confidential | | Confidential | | Confidential |
| | RCS & RDS S.A. | Confidential | | Confidential | | Confidential |
| RS | Telekom Srbija - MTS | 1.6268 | 1.6268 | Confidential | 9,337,424 | Confidential |
| | Telenor | 1.6268 | | Confidential | | Confidential |
| | VIP mobile | 1.6268 | | Confidential | | Confidential |

| | | | | | | |
|----|------------------------|--------------|-------------|--------------|--------------|--------------|
| SE | Telia Company | N/A | N/A | 5,535,200 | 21,198,000 | 26.11% |
| | Tele2 | N/A | | 3,914,400 | | 18.47% |
| | Telenor | N/A | | 9,157,400 | | 43.20% |
| | Hi3G | N/A | | 1,392,200 | | 6.57% |
| SI | Telekom Slovenije | Bill & Keep | Bill & Keep | Confidential | Confidential | 48.23% |
| | A1 Slovenija | | | Confidential | | 29.77% |
| | Telemach | | | Confidential | | 17.68% |
| | T-2 | | | Confidential | | 4.32% |
| SK | Orange Slovensko, a.s. | 2.5000 | 2.500 | Confidential | 6,808,428 | Confidential |
| | Slovak Telekom, a.s. | 2.5000 | | Confidential | | Confidential |
| | O2 Slovakia, s.r.o. | 2.5000 | | Confidential | | Confidential |
| | Swan Mobile a.s. | 2.5000 | | Confidential | | Confidential |
| TR | Turkcell | 0.1091 | 0.1116 | 33,926,588 | 75,523,389 | 44.92% |
| | Vodafone | 0.1091 | | 23,522,805 | | 31.15% |
| | Avea | 0.1193 | | 18,073,996 | | 23.93% |
| UK | EE | Confidential | 1.9463 | Confidential | 73,028,467 | Confidential |
| | Telefonica | Confidential | | Confidential | | Confidential |
| | Vodafone | Confidential | | Confidential | | Confidential |
| | H3G | Confidential | | Confidential | | Confidential |

Notes to Table 9

For notes concerning subscriber numbers see Notes to Table 7.

AT: Due to lack of data SMS TR is calculated on the basis of average revenue per SMS from the year 2016. Subscriber numbers as of 31.03.2017.

BG: SMS termination is not regulated and it is based on company agreements between operators.

CY: Please note that SMS termination is not regulated and it is based on company agreements between operators.

CZ: All Czech SMP-operators use the same level of SMS call termination rates all the time without any differences between peak time and off peak time.

DE, FI, HR, IS: SMS call termination rates are not regulated.

DK: No regulation for SMS is issued in Denmark anymore. A regulated termination charge was abolished in 2016.

HU: SMS termination rate in national currency has not changed. The HUF / Euro exchange rate has changed only.

IT: TR data is estimated.

LI: Salt (Liechtenstein) AG: "We do not charge MT-SMS and in all AA.19 contract the price is EUR 0.0 therefore we do not have a price list." M2M SIM cards are mostly used by international customers, with nearly any national terminations, i.e. always based on roaming, and not necessarily on SMS-communication. Therefore, M2M SIM cards are excluded in the subscriber number.

LU: No data available as not regulated.

ME: Current SMS termination rates are applied from 01.07.2017. Before that SMS termination rates was 1.5 cents per SMS.

SMS termination rates are valid only for termination of SMS's that originated from national operators.

NL: ACM does not collect data on SMS TR.

SE: We currently do not apply any termination rates for SMS services.

SK: 0 - 100 000 SMS/month = EUR 0.0284;

100 001 - 500 000 SMS/month = EUR 0.0261;

500 001 and more SMS/month = EUR 0.0250.

Termination rates continue to vary with respect to terminated traffic volumes. All operators meet requirement for EUR 0.0250 rate.

SI: SMS termination rates are not regulated. Operators apply "bill and keep" system.

Annex 10 Abbreviations and Exchange rates

Table 10 – Abbreviations

| | |
|--------------|---|
| AL | Albania |
| AT | Austria |
| BE | Belgium |
| BG | Bulgaria |
| CH | Switzerland |
| CY | Cyprus |
| CZ | Czech Republic |
| DK | Denmark |
| DE | Germany |
| EE | Estonia |
| EL | Greece |
| ES | Spain |
| FI | Finland |
| FR | France |
| HR | Croatia |
| HU | Hungary |
| IE | Ireland |
| IS | Iceland |
| IT | Italy |
| LI | Liechtenstein |
| LT | Lithuania |
| LV | Latvia |
| LU | Luxembourg |
| ME | Montenegro |
| FYROM | the former Yugoslav Republic of Macedonia |
| MT | Malta |
| NL | Netherlands |
| NO | Norway |
| PL | Poland |
| PT | Portugal |
| RO | Romania |
| RS | Serbia |
| SE | Sweden |
| SI | Slovenia |
| SK | Slovakia |
| TR | Turkey |
| UK | United Kingdom |

Table 11 – Exchange Rates¹⁶

| COUNTRY | 1 EURO |
|----------------|---------------|
| AL | 134.38 |
| BG | 1.96 |
| CH | 1.08 |
| CZ | 26.54 |
| DK | 7.44 |
| HR | 7.43 |
| HU | 309.76 |
| IS | 115.06 |
| LI | 1.08 |
| FYROM | 61.64 |
| NO | 9.38 |
| PL | 4.21 |
| RO | 4.55 |
| RS | 122.94 |
| SE | 9.69 |
| TR | 3.94 |
| UK | 0.86 |

¹⁶ ECB website (<https://sdw.ecb.europa.eu/browse.do?node=9691296>) except for:

- AL at https://www.bankofalbania.org/web/Exchange_Rates_2014_2.php
- IS at <https://www.cb.is/?Pageld=6909b7bd-5189-45dd-bf5b-c76ea33496ef>
- FYROM at http://www.nbrm.mk/kursna_lista-en.nspX
- RS at http://nbs.rs/export/sites/default/internet/english/scripts/kl_period.html

Annex 11 Glossary

| | |
|---------------|-----------------------------------|
| Avg(S) | Simple average |
| Avg(W) | Weighted average |
| FTR | Fixed Termination Rate |
| MTR | Mobile terminate rate |
| NRA | National Regulatory Authority |
| SMS | Short Message Service |
| TR | Termination Rate |
| TD | Top Down |
| BU | Bottom Up |
| LRIC | Long Run Incremental Cost |
| LRAIC | Long Run Average Incremental Cost |
| FAC | Fully Allocated Cost |
| CCA | Current Cost Accounting |
| FDC | Fully Distributed Cost |