

Termination rates at the European level

January 2019

13 June 2019

Table of contents

1. Executive Summary	2
2. Fixed networks – voice interconnection	6
2.1. Assumptions made for the benchmarking	6
2.2. FTR benchmark	6
2.3. Short term evolution of fixed incumbents' FTRs (from July 2018 to January 2019).....	9
2.5. FTR regulatory model implemented and symmetry overview	12
2.6. Number of lines and market shares.....	13
3. Mobile networks – voice interconnection	14
3.1. Assumptions made for the benchmarking	14
3.2. Average MTR per country: rates per voice minute (as of January 2019)	15
3.3. Average MTR per operator.....	18
3.4. Average MTR: Time series of simple average and weighted average at European level	19
3.6. Regulatory model implemented and glide paths for MTRs	22
Annex	23
Annex 1 Fixed termination rates as of 1 January 2019	23
Annex 2 FTR regulatory cost accounting model implemented.....	28
Annex 3 FTR symmetry.....	30
Annex 4 Number of active fixed telephony lines and Market shares	32
Annex 5 Average MTR per operator as of 1 January 2019	38
Annex 6 Regulatory model implemented to calculate MTRs.....	43
Annex 7 Abbreviations and Exchange rates	47
Annex 8 Glossary	48

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 Statistics and Indicators Working Group in cooperation with 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 within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC 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 January 2019, referring – if not differently indicated – to data as of 1st January 2019. It includes rates from the thirty seven (37) NRAs¹ that provided responses to our request.

As of January 2019, the situation regarding TRs in Europe can briefly be described as follows (see also Figures 1-2):

- The lowest regulated FTR simple average of incumbents at the European level (all 37 countries Avg (S)) stands at 0,3105 cents per minute.
- The lowest regulated FTR simple average of European Union incumbents (only EU member states Avg EU28(S)) stands at 0,1982 cents per minute.
- The MTR simple average (Avg (S)) at the European level (all 37 countries) stands at 0,8847 cents per minute, whereas the weighted average² (Avg (W)) at European level is estimated at 0,7837 cents per minute.
- The MTR simple average at the EU level (only EU member states) stands at 0,7794 cents per minute, whereas the weighted average at EU level is estimated at 0,7956 cents per minute.

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

For non-Euro countries, the average exchange rate for the last quarter of the year 2018 was used for the calculation of FTRs and MTRs. The exchange rates used are reported in [Annex 7](#).

Overview of incumbents³ lowest regulated fixed termination rates⁴ per country – January 2019 (eurocents per minute of service)

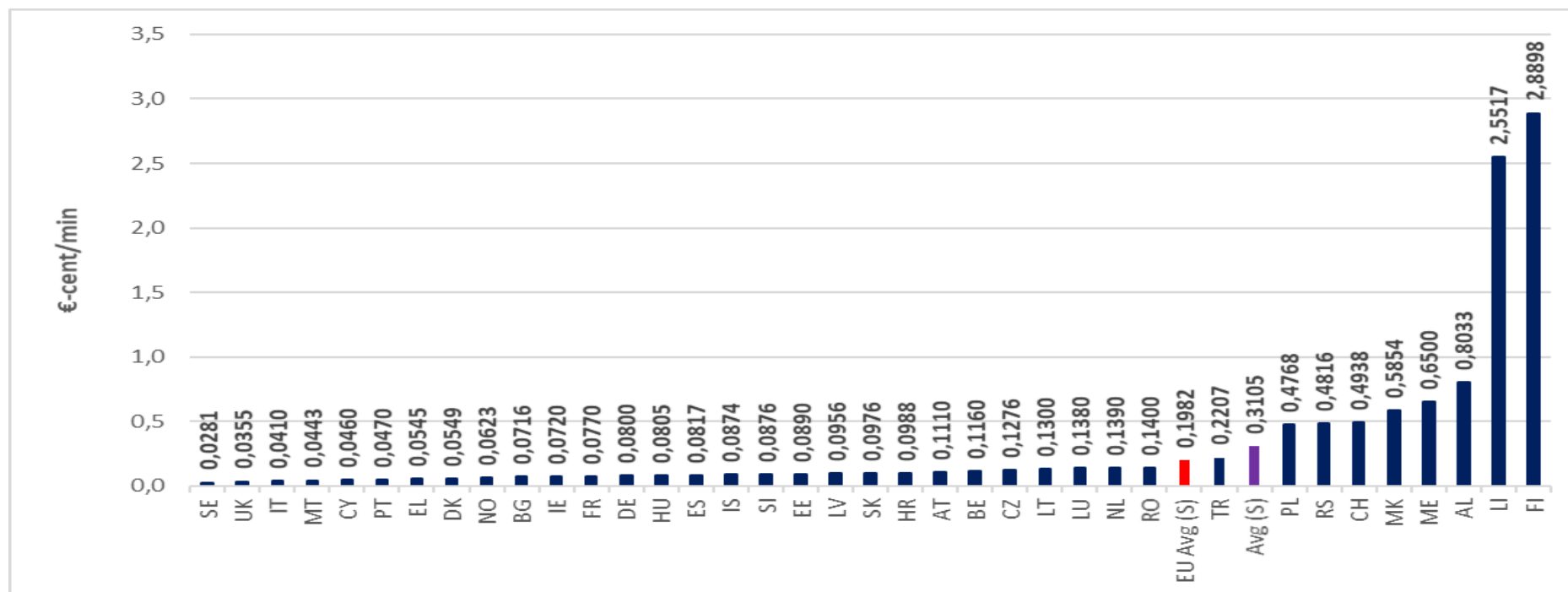


Figure 1 FTRs

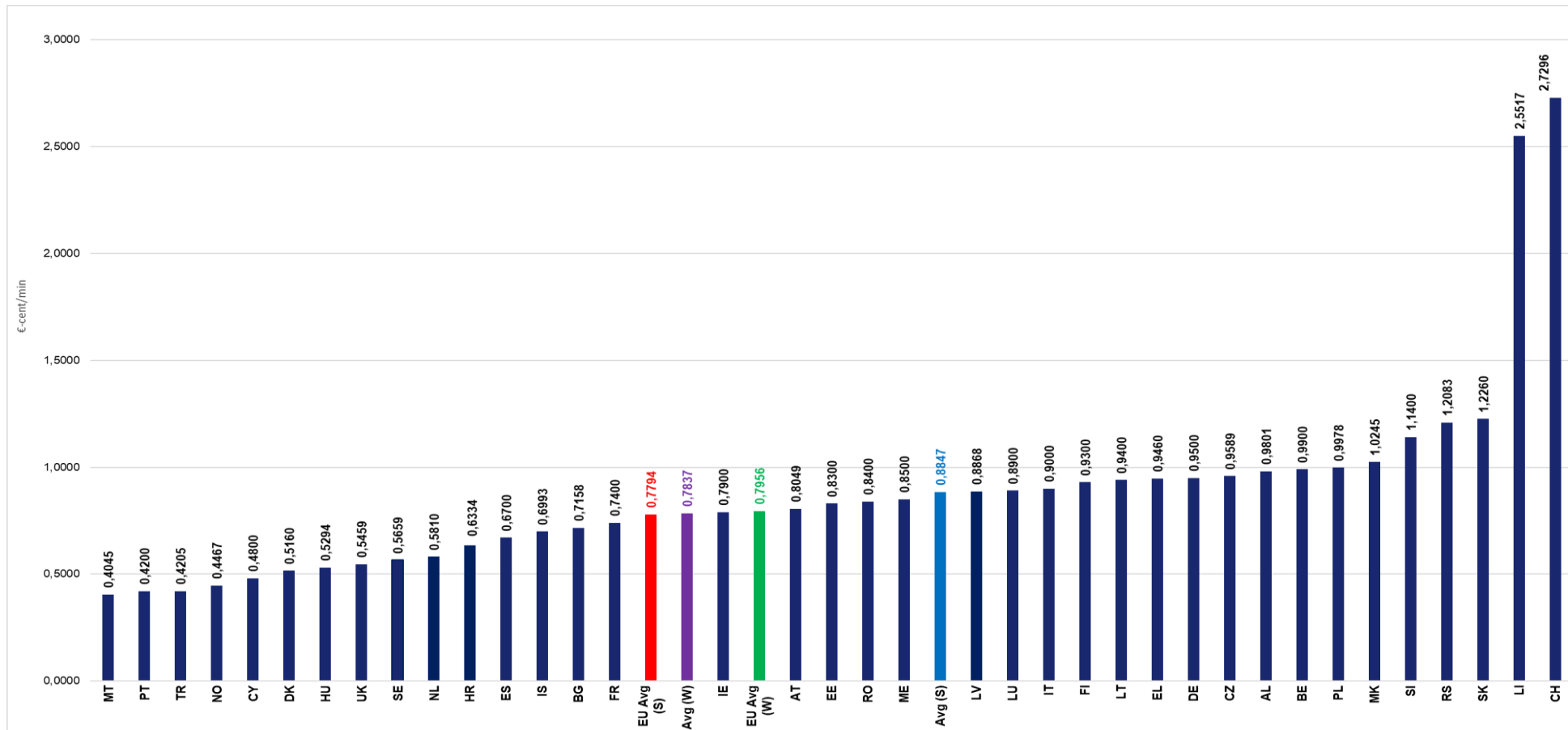
Source: NRAs, BEREC

³ Due to the large number of incumbents present in Finland a weighted average is included for comparison.

⁴ The lowest regulated rate of the incumbent. In case the operator uses only one rate, it is considered as a single rate.

MTR per country – January 2019 (eurocents per minute of service)

Figure 2 MTRs



Source: NRAs, BEREC

2. Fixed networks – voice interconnection

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

- 1) In some cases (BE and CH), 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 1⁵, 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 the 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 (DK, HR and PL), 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

⁵ Layer 1 is defined as the closest possible interconnection level to the network termination point.

operators offering interconnection services. In the last column, a weighted average of peak/off-peak prices is provided.

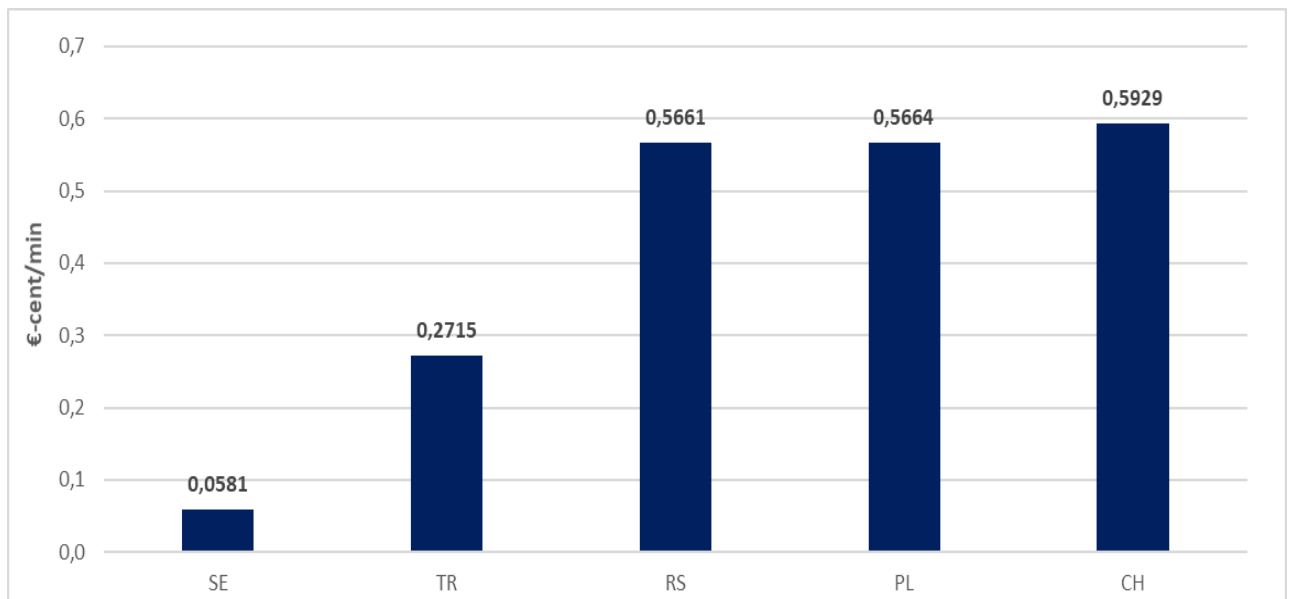
The lowest regulated rate (LRR) is the rate applied by the operator at the level of interconnection that is closest to the network termination point. The second and third lowest regulated rates apply only to operators that have more than one regulated rate/interconnection layer.

Five of the responding countries out of 37 maintain interconnection services in fixed networks at only two different levels in the hierarchy of the incumbents' networks and other three countries have three layers of interconnection.

Incumbents' fixed termination rates per lowest regulated rate and country

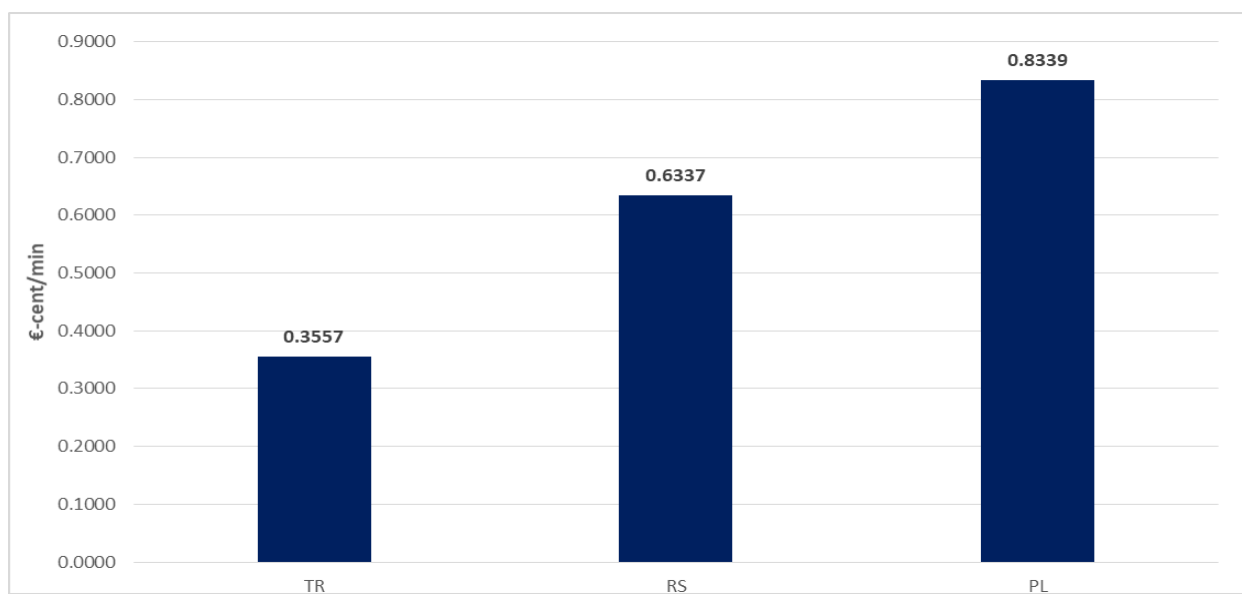
For more information on the individual lowest rates of respective incumbents, please refer to Figure 1 and respectively [Annex 1](#).

Figure 3 Incumbents' second lowest regulated fixed termination rate per country (eurocents per minute)



Source: NRAs, BEREC

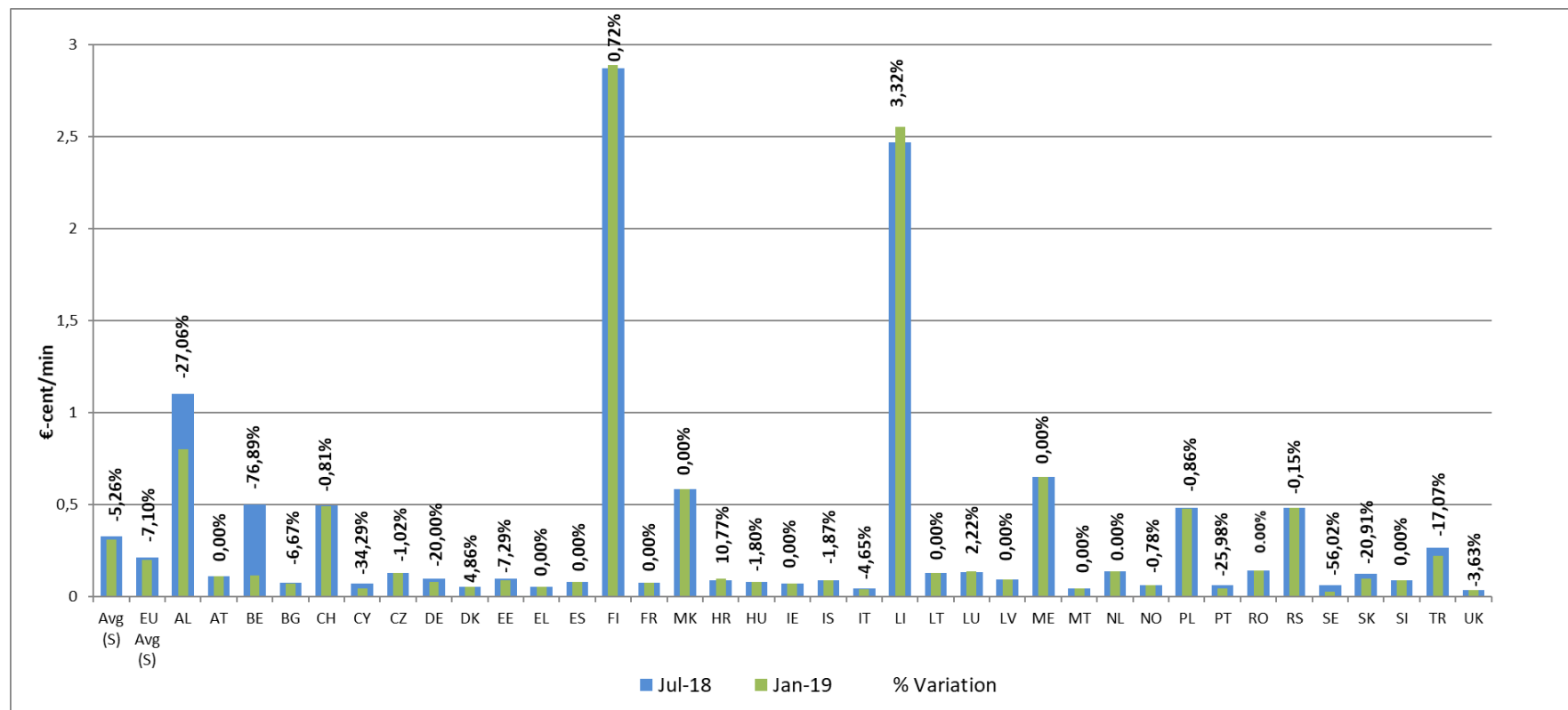
Figure 4 Incumbents' third lowest regulated fixed termination rate per country (eurocents per minute)



Source: NRAs, BEREC

2.3. Short term evolution of fixed incumbents' FTRs (from July 2018 to January 2019)

Figure 5 Incumbents' lowest regulated rate per country⁶⁷ (eurocents/min)



Source: NRAs, BEREC

⁶ 'Due to the large number of incumbents present in Finland a weighted average of all operators have been used for both periods. The variation shown in the graph is due to the change in numbers of lines, since the actual rates have remained unchanged.

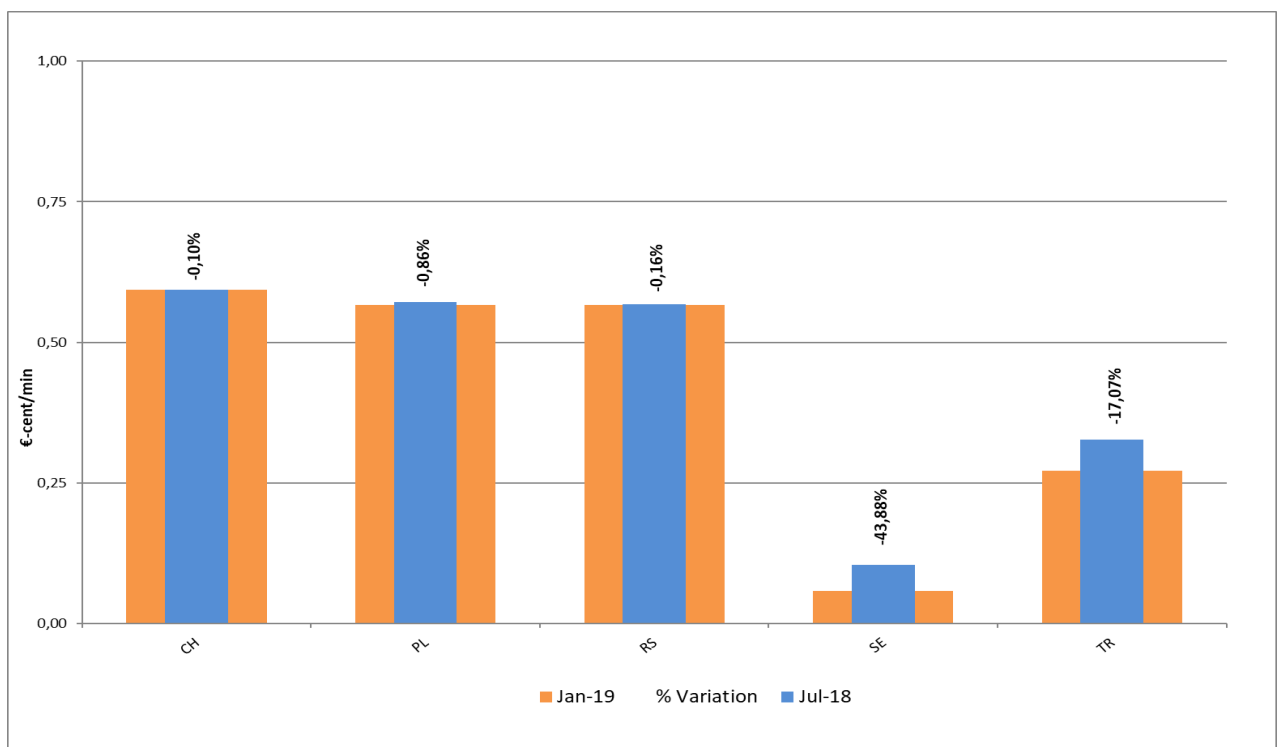
⁷ Calculation for Iceland is based on data from 1 January 2018 and 2019.

The above chart shows the variation in percentage of the lowest regulated fixed termination rate of incumbents between July 2018 and January 2019. For easier comparison, rates are stated in eurocents.

LRR Changes in FTRs in non-euro countries:

Albania, Bulgaria, Croatia, Denmark, Iceland, Sweden, Switzerland and the UK reported changes in their FTRs in their national currencies. The rates decreased in Albania (by 22,48%), Bulgaria (by 6,67%), Switzerland (by 3,99%), Sweden (by 56,06%) and the UK (by 2,48%). Denmark reported an increase of 5,13% in January 2019 compared to July 2018 as well as a rise of 11,06% has been notified by Croatia. Iceland's LRR in national currency has increased by 9,09% between January 2018 and 2019.

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

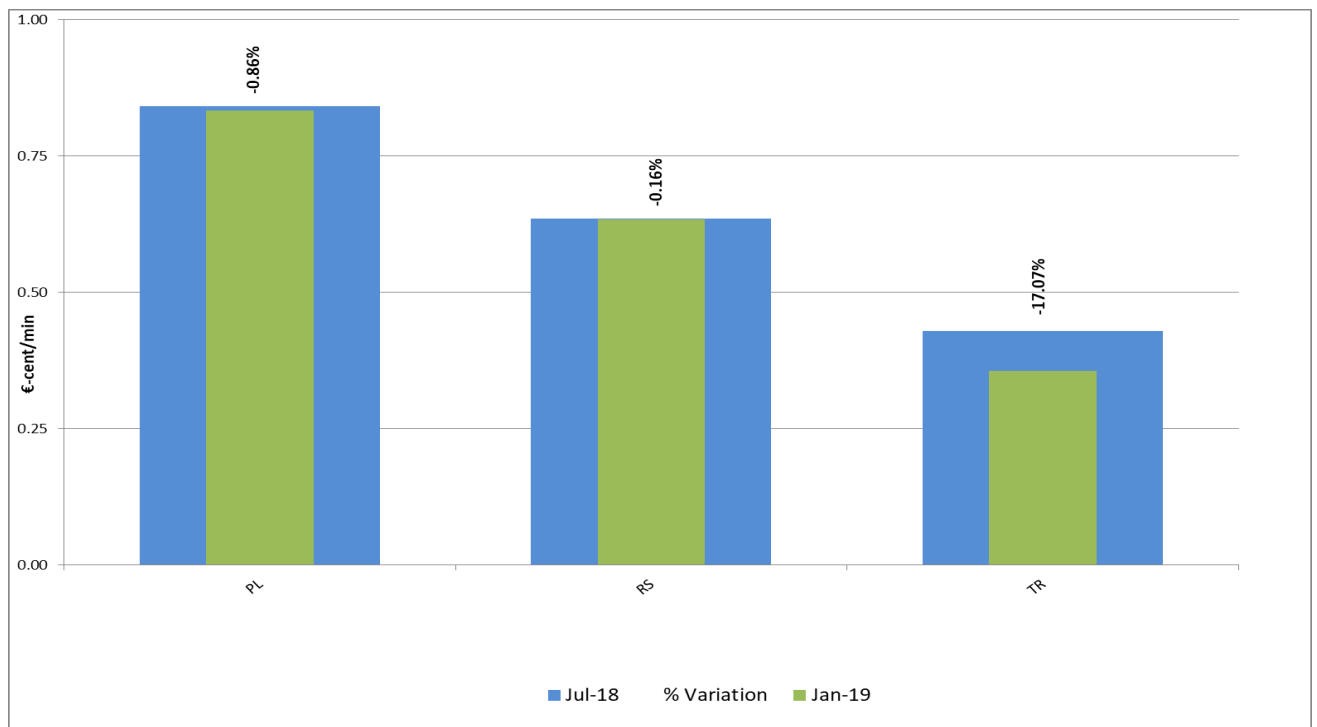


Source: NRAs, BEREC

2nd LRR Changes in FTRs in non-euro countries:

There have been no changes in the 2nd LRR of the FTRs reported by those countries where national currency is not euro except for Switzerland and Sweden. The 2nd LRR Swiss rate decreased by 3,31% and by 43,93% in Sweden between July 2018 and January 2019.

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



Source: NRAs, BEREC

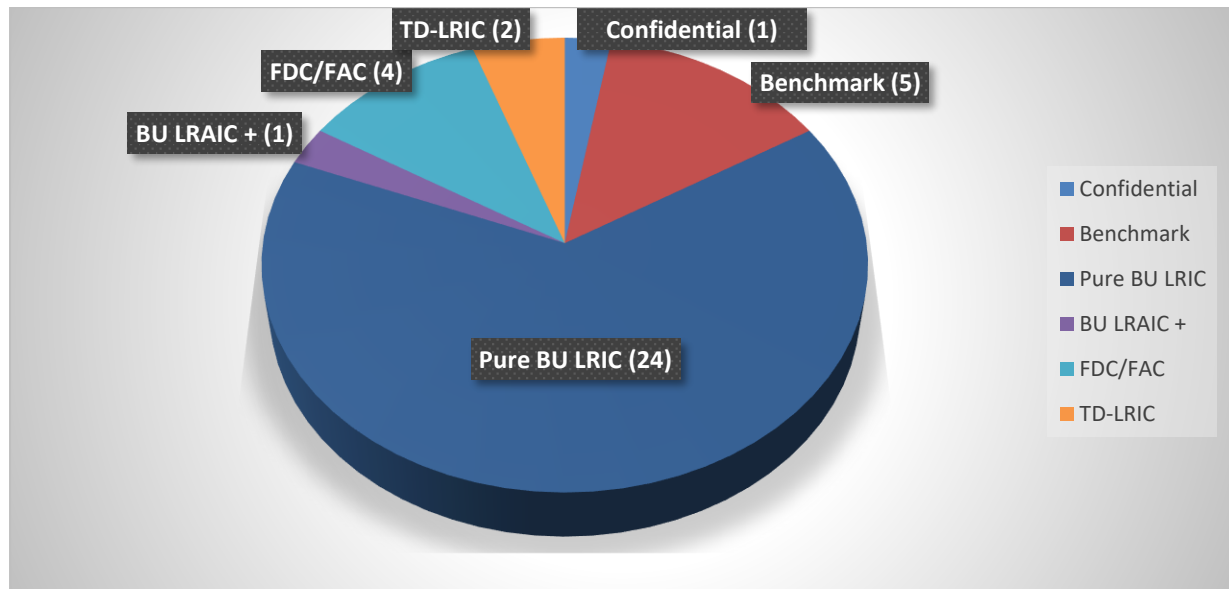
3rd LRR Changes in FTRs in non-euro countries:

There have been no changes in the 3rd LRR of the FTRs reported by those countries where national currency is not euro.

2.5. FTR regulatory model implemented and symmetry overview

24 NRAs use Pure BU LRIC models to set FTRs, 5 NRAs use Benchmarking approaches and FDC/FAC is used by 4 NRAs. In addition to this, 2 NRAs use TD-LRIC and 1 NRA uses BU LRAIC+ model. 1 NRA reported their cost model as confidential.

Figure 8 Cost accounting models for FTR used by NRAs



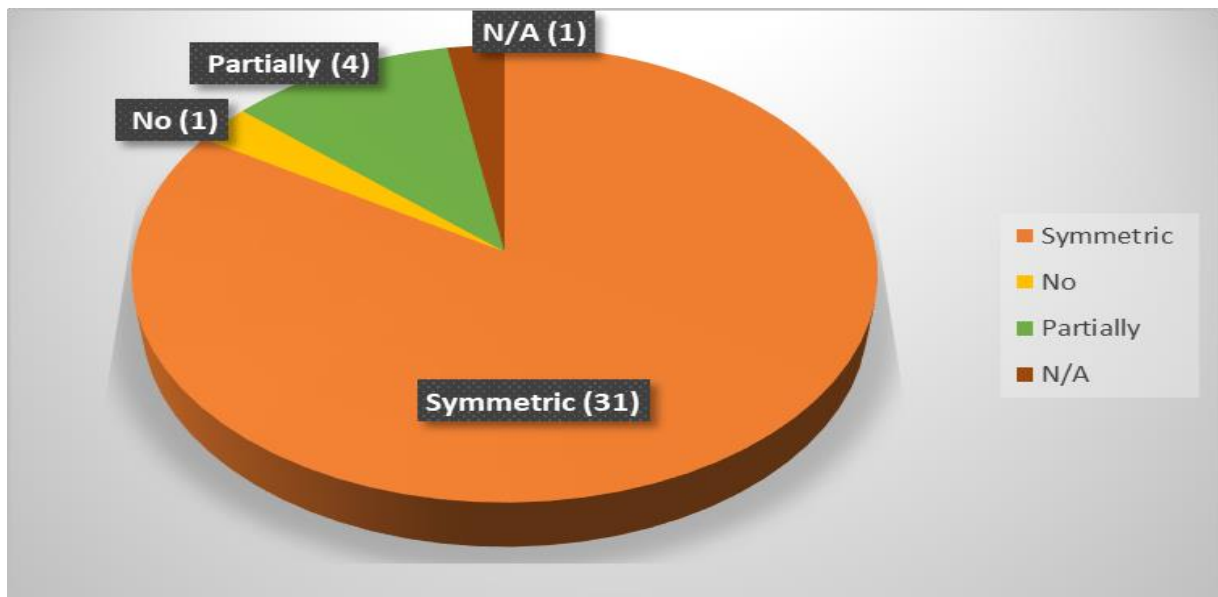
Source: NRAs, BEREC

For more information consult [Annex 2](#).

According to the Commission Recommendation of 7 May 2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU (2009/396/EC), 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 24 NRAs using Pure BU LRIC models. Moreover, 5 NRAs use benchmarking, while 4 of these NRAs base their calculations on Pure BU LRIC.

Furthermore, in most of the respondent countries (31), FTRs are symmetric across all operators. 4 NRAs reported partial symmetry while rates are not symmetric in only 1 of the reporting countries. In one of the cases, there is only one operator in the country, therefore, symmetry is not applicable.

Figure 9 FTRs Symmetry



Source: NRAs, BEREC

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

2.6. Number of lines and market shares

In [Annex 4](#) 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 January 2019 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 MTRs⁸.

The present overview of MTRs is based upon the results of a request for information sent to all NRAs in January 2019. 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 comparable⁹:

- 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.¹⁰

Regarding the short-term MTR evolution (from July 2018 to January 2019), 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);

⁸ See [Annex 6](#)

⁹ Generally speaking, these assumptions may create margins of error in the present comparison, making it difficult to draw valid conclusions for policy purposes.

¹⁰ 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 countries¹¹;
- 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 January 2019)

Table 1

Country	Average MT per country (eurocents/min)
AL	0,9801
AT	0,8049
BE	0,9900
BG	0,7158
CH	2,7296
CY	0,4800
CZ	0,9589
DE	0,9500
DK	0,5160
EE	0,8300
EL	0,9460
ES	0,6700
FI	0,9300
FR	0,7400
HR	0,6334
HU	0,5294
IE	0,7900
IS	0,6993
IT	0,9000
LI	2,5517
LT	0,9400
LU	0,8900
LV	0,8868
ME	0,8500
MK	1,0245
MT	0,4045
NL	0,5810
NO	0,4467
PL	0,9978
PT	0,4200
RO	0,8400
RS	1,2083
SE	0,5659

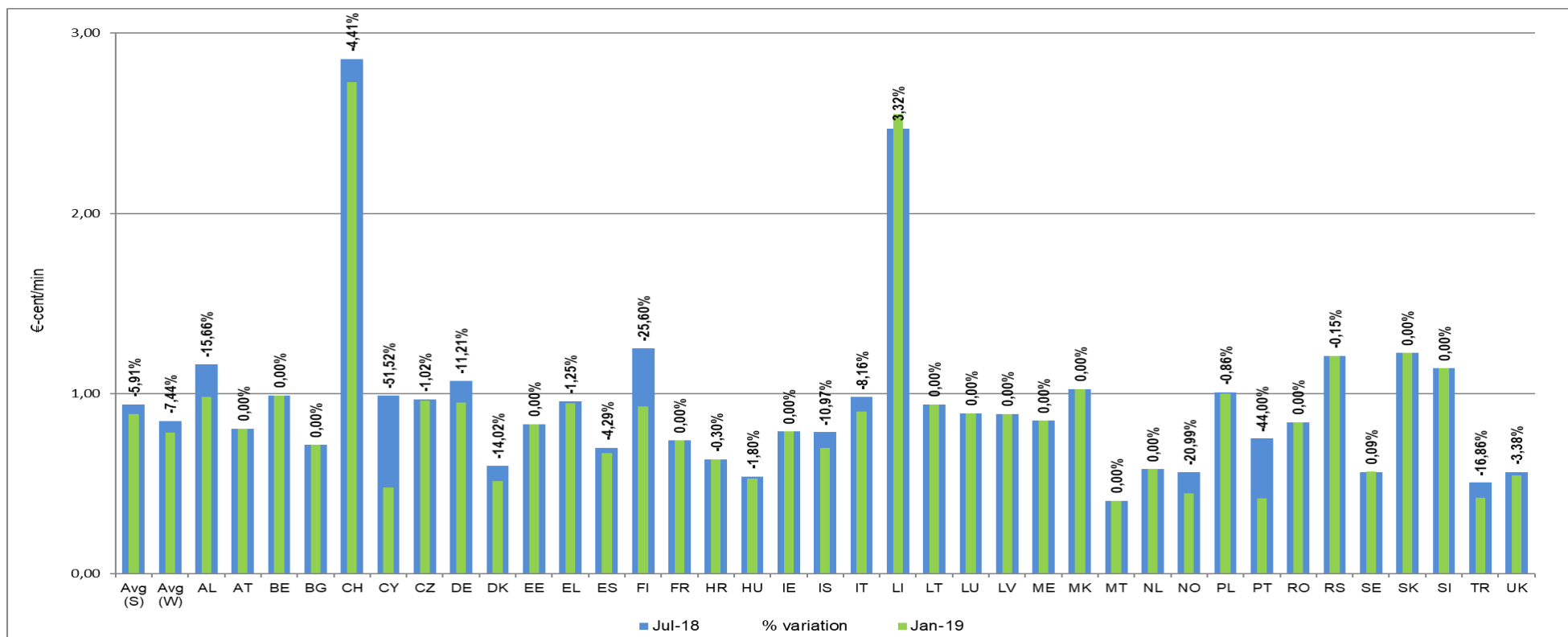
¹¹ This only affects short-term MTR evolution (figure 12) because the percentage of tariff variation in each country (figure 13) has been calculated by comparing rates expressed in terms of the national currency.

SI	1,1400
SK	1,2260
TR	0,4205
UK	0,5459
Avg (S)	0,8847
Avg (W)	0,7837
EU Avg (S)	0,7794
EU Avg (W)	0,7956

Figures 10 and 11 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 July 2018 to January 2019)

Figure 10 Variation in eurocents and %¹²

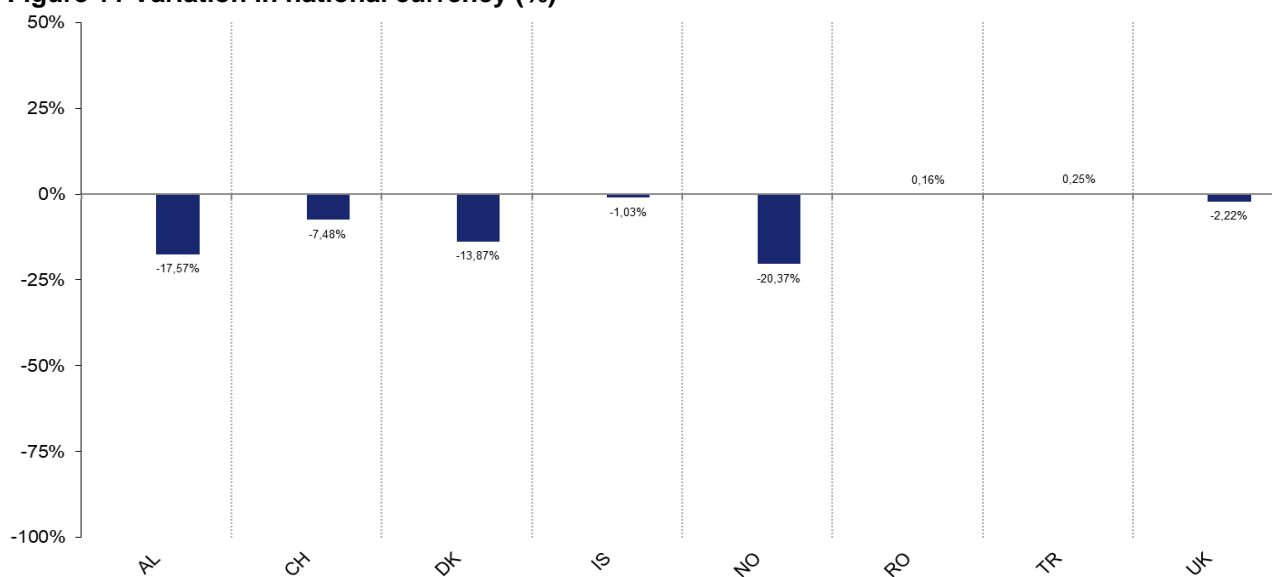


Source: NRAs, BEREC

¹² Calculation for Iceland is based on data from 1 January 2018 and 2019.

Variation of average MTRs in national currency other than euro per country (from July 2018 to January 2019)

Figure 11 Variation in national currency (%)^{13,14}



Source: NRAs, BEREC

Most countries did not experience a real short term variation of MTRs and therefore are not shown in figure 11.

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.

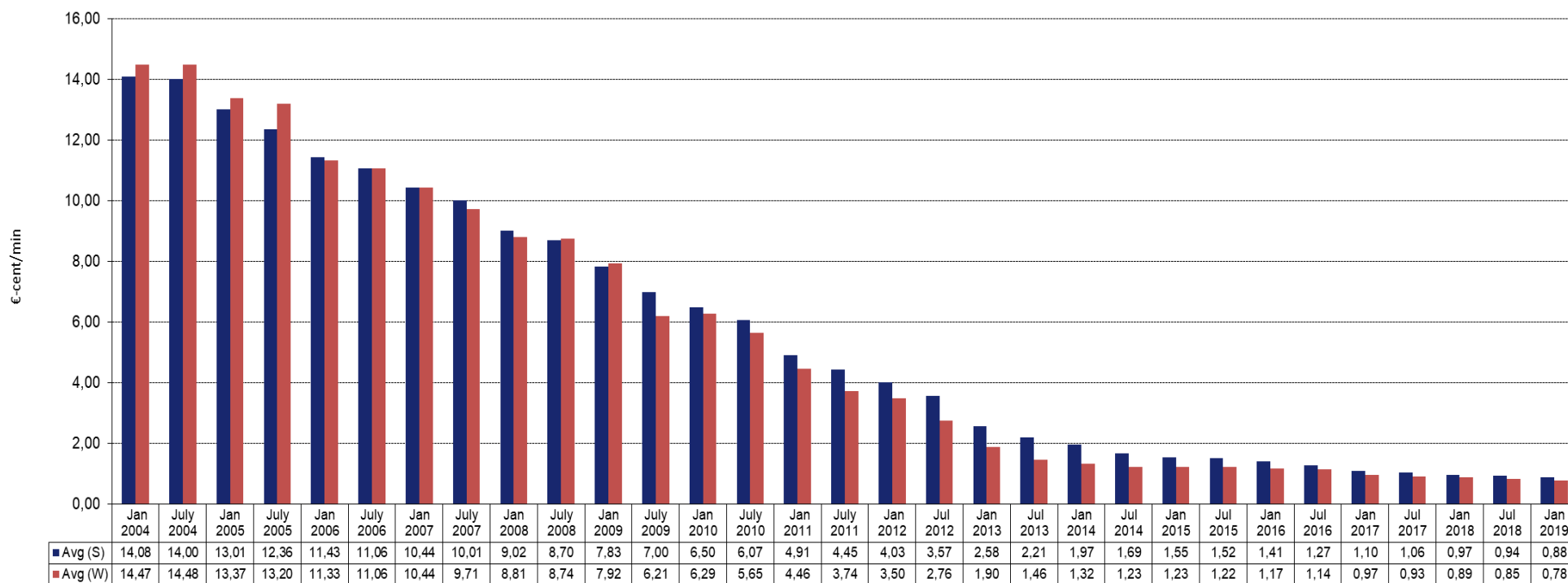
For further details see [Annex 5](#).

¹³ In Romania MTRs are regulated in euro instead of the national currency. Therefore, the increase of 0,16% represents the currency exchange rate fluctuation.

¹⁴ Calculation for Iceland is based on data from 1 January 2018 and 2019.

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

Figure 12 Evolution of simple and weighted averages



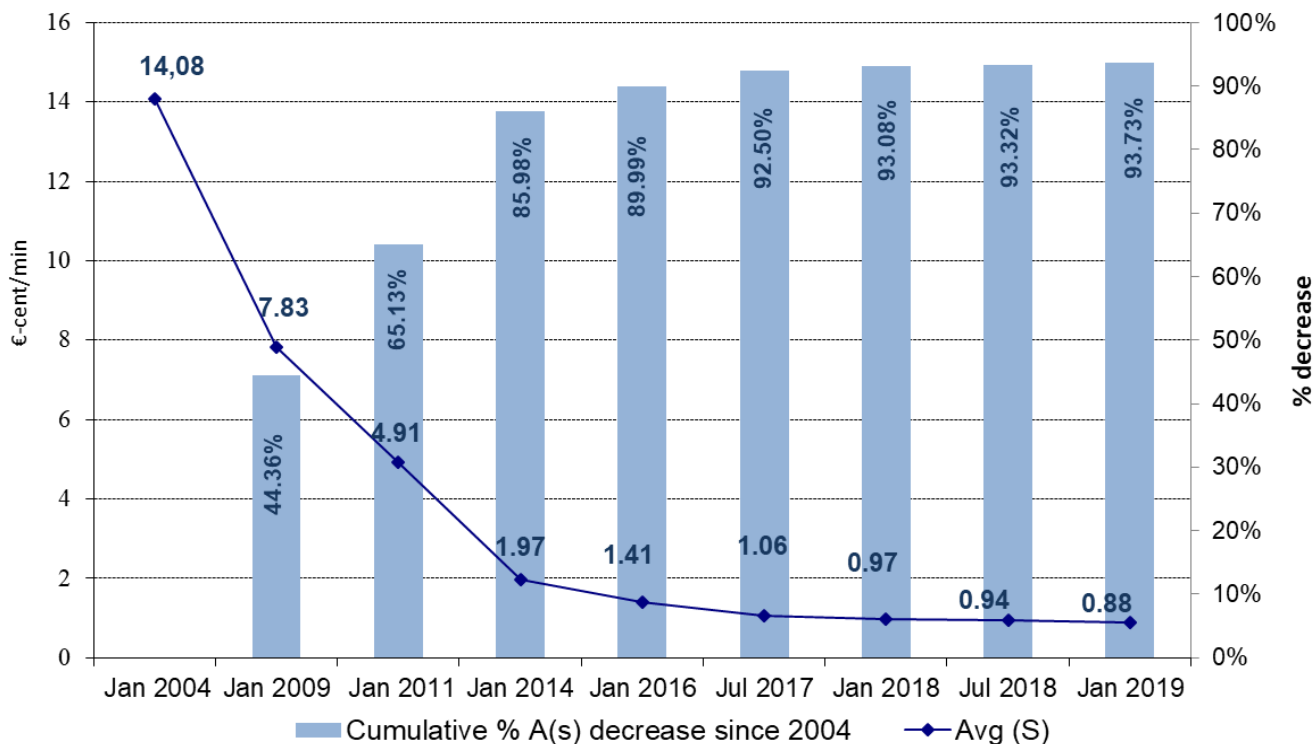
Source: NRAs, BEREC

Note to figure 12: 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 13 and 14 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 93% since January 2004, from 14,08 cents to 0,88 cents in January 2019.

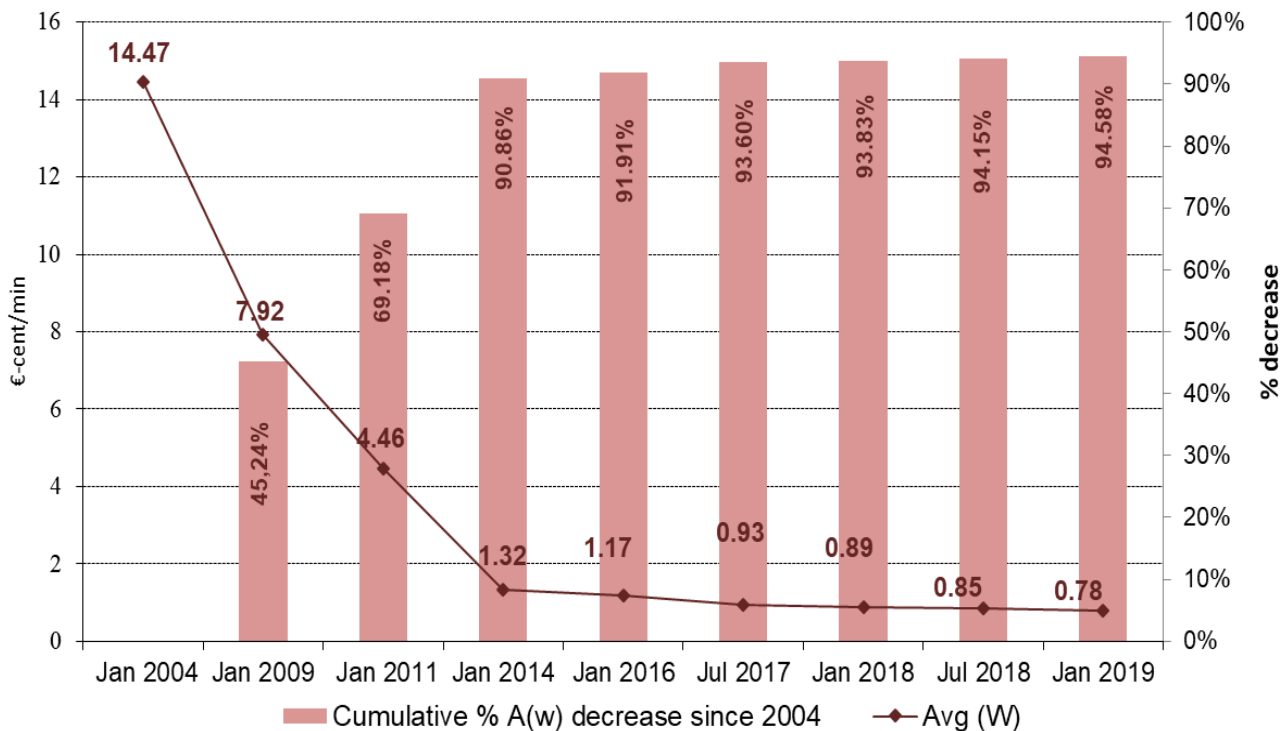
Figure 13 European MTRs simple average and cumulative decline



Source: NRAs, BEREC

Figure 14 European MTRs weighted average and cumulative decline

The weighted average of European MTRs has declined even more, from 14,47 cents to 0,78 in the same period from January 2004.

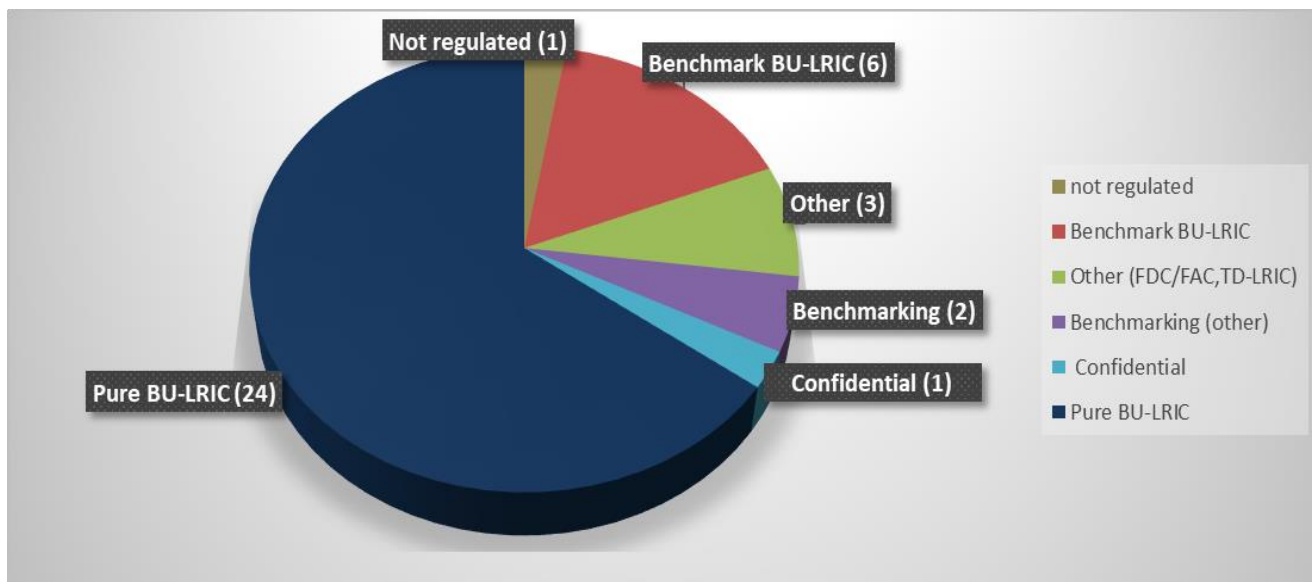


Source: NRAs, BEREC

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. In one country (Switzerland) MTRs are not regulated and one NRA reported their model to be confidential.

Figure 15 Cost accounting models used by NRAs



Source: NRAs, BEREC

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

Annex

Annex 1 Fixed termination rates as of 1 January 2019

Table 2¹⁵

Country	Operator	Lowest Regulated Rate	WA in cents
AL	Albtelecom	Single-rate	0.8033
	Abcom	Single-rate	0.8033
	Albanian Satellite Communications	Single-rate	0.8033
	Rest of operators	Single-rate	0.8033
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	Single-rate	0,1160
	Rest of operators	Single-rate	0,1160
BG	Bulgarian Telecommunication Company (BTC)	Single-rate	0.0716
	A1 Bulgaria	Single-rate	0,0716
	Telenor Bulgaria	Single-rate	0,0716
CH	Swisscom	LRR	0,4938
	Swisscom	2nd LRR	0,5929
CY	Cyta	Single-rate	0,0460
	Primetel	Single-rate	0,0460
	Cablenet	Single-rate	0,0460
	MTN	Single-rate	0,0460
CZ	Česká telekomunikační infrastruktura a.s.	Single-rate	0,1276
	UPC Česká republika, s.r.o.	Single-rate	0,1276
	Vodafone Czech Republic a.s.	Single-rate	0,1276
	T-Mobile Czech Republic a.s.	Single-rate	0,1276
	IPEX a.s.	Single-rate	0,1276
	České Radiokomunikace a.s.	Single-rate	0,1276
DE	Telekom Deutschland GmbH	Single-rate	0,0800
DK	TDC	Single-rate	0,0549
	Telia	Single-rate	0,0549
	Telenor	Single-rate	0,0549
EE	Telia Eesti AS	Single-rate	0,0890
	STV	Single-rate	0,0890
	Elisa	Single-rate	0,0890

¹⁵ For a Decimal separator in the tables is used **comma** to separate whole numbers from decimals and a **point** is used to indicate thousands in whole numbers. More information: <http://publications.europa.eu/code/en/en-360500.htm>

Country	Operator	Lowest Regulated Rate	WA in cents
EL	OTE	Single-rate	0,0545
	FORTHNET	Single-rate	0,0545
	VODAFONE	Single-rate	0,0545
	WIND	Single-rate	0,0545
ES	Telefónica de España	Single-rate	0,0817
	Vodafone - Ono	Single-rate	0,0817
	Orange	Single-rate	0,0817
	Grupo MASMOVIL	Single-rate	0,0817
	Euskaltel	Single-rate	0,0817
	Rest of operators	Single-rate	0,0817
FI	DNA Oyj	Single-rate	2,8000
	Elisa Oyj	Single-rate	2,8000
	TeliaSonera Finland Oyj	Single-rate	2,8000
	Rest of operators	Single-rate	3,2000
	Weighted average of all operators	Average	2,8898
FR	All operators	Single-rate	0,0770
HR	HT	Single-rate	0,0988
	OPTIMA	Single-rate	0,1016
	A1	Single-rate	0,1007
HU	Magyar Telekom	Single-rate	0,0805
	Digi	Single-rate	0,0805
	UPC	Single-rate	0,0805
	Rest of operators	Single-rate	0,0805
IE	Eir	Single-rate	0,0720
	Virgin Media	Single-rate	0,0720
IS	Siminn	Single-rate	0,0874
	Vodafone	Single-rate	0,0874
IT	Telecom Italia	Single-rate	0,0410
	Vodafone	Single-rate	0,0410
	Wind Tre	Single-rate	0,0410
	Fastweb	Single-rate	0,0410
	Linkem	Single-rate	0,0410
	Tiscali	Single-rate	0,0410
	Rest of operators	Single-rate	0,0410
LT	Telia Lietuva, AB	Single-rate	0,1300
	UAB „CSC Telecom“	Single-rate	0,1300
	AB Lietuvos gelezinkeliai	Single-rate	0,1300
LI	Telecom Liechtenstein AG	Single-rate	2,5517
LU	EPT	Single-rate	0,1380
LV	Lattecom	Single-rate	0,0956
	Telefons	Single-rate	0,0956
	CSC Telecom	Single-rate	0,0956
	D-COM	Single-rate	0,0956
	Rest of operators	Single-rate	0,0956
ME	Crnogorski Telekom	Single-rate	0,6500
	Mtel	Single-rate	0,6500

Country	Operator	Lowest Regulated Rate	WA in cents
	Telenor	Single-rate	0,6500
	Telemach	Single-rate	0,6500
MK	Makedonski Telekom	Single-rate	0,5854
	One.VIP	Single-rate	0,5854
	Robi	Single-rate	0,5854
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
	Vanilla Telecoms Ltd	Single-rate	0,0443
NL	KPN	Single-rate	0,1390
	Ziggo	Single-rate	0,1390
	T-Mobile/Tele2	Single-rate	0,1390
NO	Telenor	Single-rate	0,0623
	NexGenTel	Single-rate	0,0623
	Get	Single-rate	0,0623
	Telia	Single-rate	0,0623
	Rest of operators	Single-rate	0,0623
PL	Orange Polska S.A.	LRR	0,4768
	Orange Polska S.A.	2nd LRR	0,5664
	Orange Polska S.A.	3rd LRR	0,8339
	Netia	Single-rate	0,4768
	Multimedia Polska S.A.	Single-rate	0,4768
	Multimedia Polska Poludnie S.A.	Single-rate	0,5059
PT	MEO	Single-rate	0,0470
	NOS Group	Single-rate	0,0470
	Vodafone	Single-rate	0,0470
	Apax Group	Single-rate	0,0470
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	0,4816
	Telekom Srbija	2nd LRR	0,5661
	Telekom Srbija	3rd LRR	0,6337
	Orion telekom	Single-rate	0,5239
	Telenor	Single-rate	0,5239
	Serbia Broadband	Single-rate	0,5239
SE	Telia Company AB	LRR	0,0281
	Telia Company AB	2nd LRR	0,0581
	Rest of operators	LRR	0,0281
	Rest of operators	2nd LRR	0,0581
SI	Telekom Slovenije	Single-rate	0,0876
	Telemach	Single-rate	0,0876
	T-2	Single-rate	0,0876
	A1 Slovenija	Single-rate	0,0876

Country	Operator	Lowest Regulated Rate	WA in cents
SK	Slovak Telekom a.s.	Single-rate	0,0976
	Orange Slovensko a.s.	Single-rate	0,0976
	UPC Broadband Slovakia s.r.o.	Single-rate	0,0976
	SWAN, a.s.	Single-rate	0,0976
TR	Türk Telekom	LRR	0,2207
	Türk Telekom	2nd LRR	0,2715
	Türk Telekom	3rd LRR	0,3557
	TTNet	Single-rate	0,5081
	Türksat	Single-rate	0,5081
	Superonline	Single-rate	0,5081
	Rest of operators	Single-rate	0,5081
UK	BT	Single-rate	0,0355
	TalkTalk	Single-rate	0,0355
	Sky	Single-rate	0,0355
	Virgin Media	Single-rate	0,0355
	Vodafone	Single-rate	0,0355

Notes to table 2:

Incumbents are indicated first in the table.

AL: Market analysis and SMP decisions for fixed call termination for the incumbent and 67 other fixed network operators on 1.10.2018 imposed the regulation of FTRs through benchmarking methodology and a glide path (1.12.2018 AKEP's decision): symmetrical FTRs starting from 1.01.2016 and only one single layer FTR to be applied from the incumbent and the other FNOs; the FTR (one single rate) to be applied from 01/01/2018 was calculated by AKEP as the simple average of FTRs in BEREC countries with one layer interconnection as of 01/07/2017.

BE: The second lowest regulated rate is identical to the 1st LRR in Belgium.

BG: CRC Decision 550 from 20 October 2016 approved cost-oriented fixed terminating rates based on Pure Bu-LRIC model as follows:

from 01.11.2016 - 0,0015 BGN/minute

from 01.01.2017 - 0,0015 BGN/minute

from 01.01.2018 - 0,0015 BGN/minute

from 01.01.2019 - 0,0014 BGN/minute

from 01.01.2020 - 0,0014 BGN/minute.

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.

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

DE: No glide path regulation. FTR are valid from 01.01.2019 until 31.12.2020.

IE: ComReg Decision D12/12 set fixed termination rates at layer one (ie eircom's primary). ComReg Decision D12/12 imposed symmetrical blended rate of 0,085 cents 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 made. ComReg conducted a market review consultation commencing Q4 2017 and pricing consultation commencing Q1 2018. Decision notices are expected later in 2019. In Ireland transit markets are not regulated. FTRs only apply at Level 1. Eircom and Virgin Media account for the largest percentage of FTRs as they have most of the infrastructure. Eircom also provides call termination services for other operators. The other operators who have SMP in fixed call termination are BT Communications Ireland Ltd., Colt Telecom Ireland Ltd., Magnet Networks Ltd., Smart Telecom (Digiweb) and Verizon Ireland Ltd.. These operators also charge 0.072 euro cent per minute for call termination. There are other small operators who provide call termination and who are not regulated as regards call termination. Those operators can, and some do, charge more than 0.072 cent per minute.

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

Annex 2 FTR regulatory cost accounting model implemented

Table 3

Country	COST ACCOUNTING MODEL
AL	Benchmark (Other)
AT	Pure BU LRIC
BE	Pure BU LRIC
BG	Pure BU LRIC
CH	BU LRAIC +
CY	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/FAC
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
MT	Pure BU LRIC
MK	TD 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	Confidential
UK	Pure BU LRIC

Notes to table 3:

CH: Source of the Swisscom-Tariffs: :

https://www.swisscom.ch/dam/swisscom/de/ws/documents/D_IC-Dokumente/de_handbuch-preiseicv1-19.pdf, p.11 and https://www.swisscom.ch/dam/swisscom/de/ws/documents/D_IC-Dokumente/voip-ic/de_voip_ic_handbuch-preise2-3.pdf, p. 7.

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

EL: A Pure BU LRIC model applies since 28.5.2014 as a result of EETT's decision 714/09/10-4-2014 (Official Gazette 1049/28-04-2014). EETT is planning to conduct a new market analysis during 2019.

LI: 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 2018, based on TD-FDC and Benchmarking. (EFTA Surveillance Authority Recommendation of 13.04.2011 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 Peak/Off-peak".

LU: Règlement 16/209/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. Other SMP operators apply symmetrical FTR.

SE: A new Pure BU LRIC model was adopted by PTS in September 2018; prices applicable from 01.10.2018.

SK: Ru has not used any glide path.

UK: Rates have been set on a BU LRIC basis since 01.01.2014.

Annex 3 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 4

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 2018. 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	
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 18.12.2013.
EE	Yes	
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 PoI, then a transit for terminating at the other PoIs should be paid. For IP interconnection the number of PoI 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 PoI for FTR. It is subject to commercial negotiation, as it was in the past.
FI	Partially	The biggest operators (DNA, Elisa and Telia) have the same FTRs (2,8 cents), smaller operators have a little bit higher FTRs (3,2 cents).
FR	Yes	
HR	Yes	Symmetry applies to all fixed network operators as of 01.01.2013.
HU	Yes	
IE	Yes	Those fixed operators who are not designated by a market review decision as having SMP in call termination are not regulated on the fixed termination rates that they charge. Those operators for the most part charge more than the blended rate of 0,072 cent per minute . Hence their rates are not symmetrical with operators who charge the maximum regulated FTR.
IS	Yes	
IT	Yes	

Country	Symmetry	Comments
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, etc.
LU	Partially	A maximal price cap is defined by the regulation, but operators may implement the solution in their own way.
LV	Yes	
ME	Yes	
MK	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	
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.
RO	Yes	Symmetric FTRs.
RS	Partially	Operators have different topology and different number of the levels of interconnection. Telekom Serbia has three levels of interconnection. Other operators have one level of interconnection.
SE	Yes	
SI	Yes	Based on national coverage of layer.
SK	Yes	The FTR is non-discriminatory for all operators without any exception.
TR	No	
UK	Yes	

Annex 4 Number of active fixed telephony lines and Market shares**Table 5**

Country	Operator	Number of lines	Total number of lines	Market share
AL	Albtelecom	177.129	247.428	71,59%
	Abcom	11.637		4,70%
	Albanian Satellite Communications	40.377		16,32%
	Rest of operators	18.285		7,39%
AT	A1 Telekom Austria	1.898.721	3.155.898	60,16%
	Operator 2	531.958		16,86%
	Operator 3	409.128		12,96%
	Operator 4	63.558		2,01%
	Operator 5	58.100		1,84%
	Operator 6	31.646		1,00%
	Rest of operators	162.787		5,16%
BE	Proximus	2.239.446	4.105.557	54,55%
	Rest of operators	1.866.111		45,45%
BG	Bulgarian Telecommunication Company	Confidential	1.199.643	Confidential
	A1 Bulgaria	Confidential		Confidential
	Telenor Bulgaria	Confidential		Confidential
	Rest of operators	70.666		5,89%
CH	Swisscom	N/A	N/A	N/A
CY	Cyta	211.582	309.385	68,39%
	Primetel	45.798		14,80%
	Cablenet	23.230		7,51%
	MTN	28.775		9,30%
CZ	Česká telekomunikační infrastruktura a.s.	Confidential	Confidential	38,55%
	UPC Česká republika, s.r.o.	Confidential		11,21%
	Vodafone Czech Republic a.s.	Confidential		8,71%
	T-Mobile Czech Republic a.s.	Confidential		7,42%
	IPEX a.s.	Confidential		3,96%
	České Radiokomunikace a.s.	Confidential		2,30%
	Rest of operators	Confidential		27,86%

Country	Operator	Number of lines	Total number of lines	Market share
DE	Telekom Deutschland GmbH	18.740.000	38.820.000	48,27%
	Rest of operators	20.080.000		51,73%
DK	TDC	410.848	550.659	74.61%
	Telia	76.162		13.83%
	Telenor	42.970		7.80%
	Rest of operators	20.679		3,76%
EE	Telia Eesti AS	285.997	309.410	92.43%
	STV	11.352		3.67%
	Elisa	12.061		3.90%
EL	OTE	2.653.558	4.766.850	55,67%
	FORTHNET	Confidential		Confidential
	VODAFONE	Confidential		Confidential
	WIND	Confidential		Confidential
ES	Telefónica de España	8.832.056	19.37.836	45.58%
	Vodafone - ONO	4.541.063		23.43%
	Orange	4.055.740		20.93%
	Grupo MASMOVIL	91.,096		4.70%
	Euskaltel	782.661		4.04%
	Rest of operators	256.220		1.32%
FI	DNA Oyj	Confidential	352.000	Confidential
	Elisa Oyj	Confidential		Confidential
	Telia Finland Oyj	Confidential		Confidential
	Rest of operators	Confidential		Confidential
FR		N/A	N/A	N/A
HR	HT	Confidential	1.360.525	Confidential
	OPTIMA	Confidential		Confidential
	A1	Confidential		Confidential
	Rest of operators	Confidential		Confidential
HU	Magyar Telekom	1.500.351	3.080.000	48.71%
	DIGI	702.329		22.80%
	UPC	626.009		20.32%
	Rest of operators	251.311		8,16%
IE	Eir	570.882	1.446.253	39.47%
	Virgin Media	352.347		24.36%
	Vodafone	197.349		13.65%
	Sky	193.815		13.40%

Country	Operator	Number of lines	Total number of lines	Market share
	Rest of operators	131.860		9,12%
IS	Siminn	80.073	128.056	62.53%
	Vodafone	47.983		37.47%
IT	Telecom Italia	10.451.479	20.396.603	51.24%
	Vodafone	2.773.109		13.60%
	Wind Tre	2.683.469		13.16%
	Fastweb	2.596.348		12.73%
	Linkem	563.274		2.76%
	Tiscali Italia	441.557		2.16%
	Rest of operators	887.368		4.35%
LI	Telecom Liechtenstein AG	22.729	22.729	100,00%
LT	Telia Lietuva, AB	351.249	400.589	87.68%
	UAB „CSC Telecom“	10.335		2.58%
	AB Lietuvos gelezinkeliai	4.222		1.05%
	Rest of operators	34.783		8,68%
LU	Post Telecom	187.700	272.600	68,86%
	Rest of operators	84.900		31,14%
LV	Latt telecom	Confidential	251.177	Confidential
	Latvijas Mobilais Telefons	Confidential		Confidential
	CSC TELECOM	12.200		4,86%
	D-COM	11.110		4,42%
	Rest of operators	52.954		21,08%
ME	Crnogorski Telekom	113.670	172.880	65,75%
	Mtel	44.962		26,01%
	Telenor	1.785		1,03%
	Telemach	12.463		7,21%
MK	Makedonski Telekom	210.333	375.441	56,02%
	One.VIP	126.387		33,66%
	Robi	23.805		6,34%
	Rest of operators	14.916		3,97%
MT	Go plc	161.038	281.158	57,28%
	Melita plc	96.981		34,49%
	Vodafone Malta Ltd	18.315		6,51%
	Ozone	654		0,23%
	Vanilla Telecoms Ltd	4.170		1,48%
NL	KPN	3.316.318	6.502.584	51,00%

Country	Operator	Number of lines	Total number of lines	Market share
	Vodafone/Ziggo	2.490.490		38,30%
	T-Mobile/Tele2	370.647		5,70%
NO	Telenor	387.979	620.955	62,48%
	NextGenTel	41.768		6,73%
	Get	42.749		6,88%
	Telia	32.249		5,19%
	Rest of operators	116.210		18,71%
PL	Orange Polska S.A	Confidential	4.743.059	Confidential
	Netia S.A.	Confidential		Confidential
	Multimedia Polska S.A.	Confidential		Confidential
	Multimedia Polska Poludnie S.A.	Confidential		Confidential
	Rest of operators	Confidential		Confidential
PT	MEO (incumbent)	Confidential	5.073.527	45,46%
	NOS Group	Confidential		34,12%
	Vodafone	Confidential		16,36%
	Apax Group	Confidential		3,54%
	Rest of operators	Confidential		0,51%
RO	Telekom RC S.A.	Confidential	3.639.063	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	Confidential	2.526.649	Confidential
	Serbia Broadband	Confidential		Confidential
	Rest of operators	Confidential		Confidential
SE	Telia Company AB	1.504.804	2.392.386	62,90%
	Com Hem AB	286.316		11,97%
	Tele2 Sverige AB	10.058		0,42%
	Telenor Sverige AB	141.358		5,91%
	Telavox AB	90.837		3,80%
	Rest of operators	359.013		15,01%
SI	Telekom Slovenije	Confidential	Confidential	53,07%
	Telemach	Confidential		18,65%
	T-2	Confidential		14,83%
	A1 Slovenija	Confidential		8,37%

Country	Operator	Number of lines	Total number of lines	Market share
	Rest of operators	Confidential		5,07%
SK	Slovak Telekom, a. s.	Confidential	803.705	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	6.338.640	11.633.461	54,49%
	TTNet	3.564.692		30,64%
	Türksat	427.517		3,67%
	Superonline	284.882		2,45%
	Rest of operators	1.017.730		8,75%
UK	BT	Confidential	26.997.826	Confidential
	TalkTalk	Confidential		Confidential
	Sky	Confidential		Confidential
	Virgin Media	Confidential		Confidential
	Vodafone	Confidential		Confidential

Notes to table 5:

AT: Number of lines as of end Q3 2018.

BG: Data on number of lines (network termination points) as of 31.12.2018 per operator is confidential.

CY: Number of lines as of 31.12.2018.

DE: Number of lines are estimate for year-end 2018.

EE: Number of lines as of 01.10.2018.

EL: The number of lines data refer to the number of active telephone access lines as of 30.06.2018. The wholesale line rental lines are included in the incumbent's (OTE) lines.

FI: Number of lines as of 01.07.2018.

HR: Data refers to Q3 2018.

LT: Subscribers as of Q3 2018.

LU: Data as of 30.06.2018.

MT: Data as of Q3 2018.

NO: Number of lines as of 30.06.2018.

RS: Number of lines as of 31.12.2018. Number of lines are collected by using ITU indicator i112 Fixed-telephone subscriptions which refers to the sum of of active number of analogue fixed-telephone line, voice-over-IP (VoIP) subscriptions, fixed wireless local loop (WLL) subscriptions, ISDN voice-channel equivavelnts and fixed public payphones. Number of fixed telephone subscriptions over FWA networks

and number of fixed subscriptions over mobile networks (CLL technology) are also included. Information on individual number of lines per operator is confidential.

SE: Data as of 30.06.2018.

SI: As all operators' systems are not adopted to reporting the data at such detailed level, all lines in case of VoIP are not taken into account.

TR: 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 5 Average MTR per operator as of 1 January 2019

Table 6

Country	Operator (B)	Average effective prices (eurocents)	Mobile Subscribers	Total mobile subscribers ¹⁶	Real Mkt Shares
AL	Telekom Albania	0,9801	1.004.323	2.714.878	36,99%
	Vodafone Albania	0,9801	1.279.480		47,13%
	Albtelecom	0,9801	431.075		15,88%
AT	A1Telekom Austria	0,8049	Confidential	10.812.575	Confidential
	T-Mobile Austria	0,8049	Confidential		Confidential
	Hutchison Drei Austria	0,8049	Confidential		Confidential
BE	Proximus	0,9900	4.706.746	11.724.816	40,14%
	Orange	0,9900	2.997.278		25,56%
	Telenet	0,9900	3.347.354		28,55%
	Full MVNO's (Lycamobile, Vectone, Medialaan)	0,9900	673.438		5,74%
BG	A1 Bulgaria	0,7158	Confidential	Confidential	39,39%
	Telenor Bulgaria	0,7158	Confidential		32,89%
	BTC	0,7158	Confidential		27,71%
CH	Swisscom	2,4637	5.000.000	8.798.646	56,83%
	Sunrise	3,0796	2.034.000		23,12%
	Salt	3,0796	1.764.646		20,06%
CY	CYTA	0,4800	607.425	1.148.053	52,91%
	MTN	0,4800	408.674		35,60%
	PRIMETEL	0,4800	118.955		10,36%
	CABLENET	0,4800	12.999		1,13%
CZ	T-Mobile Czech Republic a.s.	0,9589	Confidential	Confidential	37,89%
	O2 Czech Republic a.s.	0,9589	Confidential		28,40%
	Vodafone Czech Republic a.s.	0,9589	Confidential		26,08%
	Nordic Telecom s.r.o.	0,9589	Confidential		0,12%
DE	Telekom Deutschland GmbH	0,9500	N/A	107.500.000	N/A
	Vodafone GmbH	0,9500			
	Telefónica Germany GmbH & Co. OHG	0,9500			
DK	TDC	0,5160	2.854.515	7.108.023	40,16%
	Telenor	0,5160	1.515.998		21,33%
	Telia	0,5160	1.079.499		15,19%
	3 (Hi3G)	0,5160	1.005.737		14,15%
EE	Telia Eesti AS	0,8300	669.891	1.584.422	42,28%
	Tele2 Eesti AS	0,8300	385.940		24,36%
	Elisa Eesti AS	0,8300	528.591		33,36%
EL	Cosmote	0,9460	Confidential	12.151.095	Confidential
	Vodafone	0,9460	Confidential		Confidential
	WIND	0,9460	Confidential		Confidential

¹⁶ 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.**"

Country	Operator (B)	Average effective prices (eurocents)	Mobile Subscribers	Total mobile subscribers ¹⁶	Real Mkt Shares
	CYTA Hellas	0,9460	Confidential		Confidential
ES	TME	0,6700	16.030.497	53.998.797	29,69%
	Orange	0,6700	13.944.173		25,82%
	Vodafone	0,6700	12.716.067		23,55%
	Masmovil	0,6700	5.992.931		11,10%
FI	DNA Oyj	0,9300	Confidential	7.286.000	Confidential
	Elisa Oyj	0,9300	Confidential		Confidential
	Telia Finland Oyj	0,9300	Confidential		Confidential
	Ålcom	0,9300	Confidential		Confidential
FR	Orange	0,7400	N/A	73.452.000	N/A
	SFR	0,7400			
	Bouygues Telecom	0,7400			
	Free Mobile	0,7400			
	MVNOs	0,7400			
MK	Makedonski Telekom	1,0245	1.002.272	2.050.793	48,87%
	one.VIP	1,0245	1.003.153		48,92%
	Lycamobile	1,0245	45.368		2,21%
HR	HT	0,6334	2.090.482	4.546.527	45,98%
	A1	0,6334	1.582.977		34,82%
	Tele2	0,6334	873.068		19,20%
HU	Magyar Telekom	0,5294	Confidential	10.041.939	Confidential
	Telenor	0,5294	Confidential		Confidential
	Vodafone	0,5294	Confidential		Confidential
	UPC	0,5294	Confidential		Confidential
	Netfone	0,5294	Confidential		Confidential
	Tarr	0,5294	Confidential		Confidential
IE	Vodafone	0,7900	1.794.276	4.786.813	37,48%
	Three Ireland Group	0,7900	1.602.505		33,48%
	Eircom Group Mobile	0,7900	985.525		20,59%
	Tesco Mobile	0,7900	404.507		8,45%
IS	Siminn	0,6993	138.241	422.992	32,68%
	Vodafone	0,6993	128.011		30,26%
	Nova	0,6993	147.248		34,81%
	Hringdu	0,6993	9.492		2,24%
IT	Telecom Italia	0,9000	23.297.358	83.342.486	27,95%
	Vodafone	0,9000	21.648.000		25,97%
	WindTre	0,9000	27.669.337		33,20%
	Iliad Italia S.p.A.	0,9000	2.230.000		2,68%
	PosteMobile	0,9000	4.011.857		4,81%
LI	Telecom Liechtenstein AG	2,5517	Confidential	Confidential	Confidential
	Swisscom (Schweiz) AG	2,5517	Confidential		Confidential
	Salt (Liechtenstein) AG	2,5517	Confidential		Confidential
LT	Tele2	0,9400	1.917.482	4.589.676	41,78%
	Telia Lietuva, AB	0,9400	1.123.383		24,48%
	Bite Lietuva	0,9400	1.392.068		30,3%
LU	Post Télécom	0,8900	Confidential	Confidential	47,22%
	Tango	0,8900	Confidential		33,27%

Country	Operator (B)	Average effective prices (eurocents)	Mobile Subscribers	Total mobile subscribers ¹⁶	Real Mkt Shares
	Orange	0,8900	Confidential		14,15%
LV	Bite Latvija	0,8868	470.337	2.081.740	22,59%
	Latvijas Mobilais Telefons	0,8868	Confidential		Confidential
	Tele2	0,8868	871.005		41,84%
	Zetcom	0,8868	168.338		8,09%
ME	Telenor	0,8500	394.374	1.134.412	34,76%
	Crnogorski Telekom	0,8500	369.400		32,56%
	Mtel	0,8500	370.638		32,67
MT	Go plc	0,4045	222.232	621.744	35,74%
	Melita plc	0,4045	126.749		20,39%
	Vodafone	0,4045	263.757		42,42%
	Redtouch fone	0,4045	8.830		1,42%
NL	KPN	0,5810	Confidential	Confidential	41,05%
	T-Mobile/ Tele2	0,5810	Confidential		30,33%
	Vodafone Ziggo	0,5810	Confidential		28,62%
NO	Telenor	0,4467	2.804.820	5.709.401	49,13%
	Telia	0,4467	2.132.126		37,34%
	ICE	0,4467	422.251		7,40%
	Com4	0,4467	0		0,00%
		0,0000	0		0,00%
PL	Orange Polska S.A.	0,9978	Confidential	50.458.196	Confidential
	Polkomtel sp. z o.o.	0,9978	Confidential		Confidential
	P4 sp. z o.o.	0,9978	Confidential		Confidential
	T-Mobile Polska S.A.	0,9978	Confidential		Confidential
PT	MEO	0,4200	Confidential	11.859.873	Confidential
	NOS	0,4200	Confidential		Confidential
	Vodafone	0,4200	Confidential		Confidential
RO	VODAFONE ROMANIA S.A.	0,8400	Confidential	22.575.153	Confidential
	ORANGE ROMANIA S.A.	0,8400	Confidential		Confidential
	TELEKOM RMC S.A.	0,8400	Confidential		Confidential
	RCS & RDS S.A.	0,8400	Confidential		Confidential
	LycaMobile	0,8400	Confidential		Confidential
RS	Telekom Srbija - MTS	1,2083	Confidential	8.431.367	45,03%
	Telenor	1,2083	Confidential		31,62%
	Vip mobile	1,2083	Confidential		23,17%
SE	Telia Company	0,5659	4.615.816.	12.476.537	37,00%
	Tele2	0,5659	3.687.379		29,55%
	Telenor	0,5659	2.204.341		17,67%
	Hi3G	0,5659	1.523.516		12,21%
	Lycamobile	0,5659	167.400		1,34%
	Telavox AB	0,5659	62.863		0,50%
SI	Telekom Slovenije	1,1400	Confidential	Confidential	43,10%
	A1 Slovenija	1,1400	Confidential		30,11%
	Telemach	1,1400	Confidential		21,34%
	T-2	1,1400	Confidential		5,45%
SK	Orange Slovensko, a s.	1,2260	Confidential	6.216.746	Confidential
	Slovak Telekom, a. s.	1,2260	Confidential		Confidential

Country	Operator (B)	Average effective prices (eurocents)	Mobile Subscribers	Total mobile subscribers ¹⁶	Real Mkt Shares
	O2 Slovakia, s. r. o.	1,2260	Confidential		Confidential
	Swan Mobile, a. s.	1,2260	Confidential		Confidential
TR	Turkcell	0,3969	31.742.904	75.134.272	42,25%
	Vodafone	0,4096	23.163.987		30,83%
	Avea	0,4700	20.227.383		26,92%
UK	EE	0,5459	Confidential	78.924.326	Confidential
	Telefonica	0,5459	Confidential		Confidential
	Vodafone	0,5459	Confidential		Confidential
	H3G	0,5459	Confidential		Confidential

Notes to table:

AT: individual operator subscriber data are confidential. No MVNO exceeded a market share of 1,5%; subscriber data as of 1.10.2018.

BE: Subscribers and number of M2M sim cards as of 01.10.2018. Data-only sim cards are included as these data are not part of the October survey but only of the annual survey.

BG: Data as of 31.12.2018. M2M, M2P and data-only SIMs cards are excluded. Individual data on number of subscribers/M2M SIM Cards by operators is confidential.

CH: Subscriber base as of 31.12.2018.

CZ: Regulated MTR is defined as a single price per minute. SIM cards filled in column "rest of operators" are MVNOs (Service Providers) with no MTR regulation - however, termination is carried out by their MNOs for regulated rates. The total number of SIM cards as of 30.06.2018 is available as the latest information.

DE: Current MTR are valid until 30.11.2019. The total number of active subscribers corresponding to the definition in this report is not available by individual operator. Data are estimates for year-end 2018.

DK: Total Subscribers is derived as of H1 2018. Mundio Mobile (Vectone) used to be regulated but they have ceased operations in Denmark as of June 2018. Mundio is therefore left out of this data-collection.

EL: As far as the subscriptions are concerned, please note that data refers to 30.09.2018 .

FI: Subscriber figures per 1.7.2018.

Subscriber figures depict the number of subscriptions not SIM cards. Subscription figures include all subscriptions other than data-only subscriptions. SIM card volumes are very close to the subscription number in Finland. Traficom does not collect detailed information of SIM cards (e.g. data-only SIM cards) and therefore the figure would not have reflected the asked figures. Number of M2M SIM cards is collected and is reported in the figures.

IE: Virgin Mobile is not currently subject to MTR regulation.

IS: Vodafone bought MVNO 365/Tal end of 2017, MTR is set by benchmark against BU-LRIC for one year at a time. Subscriber data from mid 2018.

IT: Data refer to 3Q 2018.

LT: Data as of Q3 2018.

LU: data as of 30.06.2018. 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.

ME: No data for M2M SIM cards.

MT: Data reflects Q3 2018.

NO: Number of subscribers are provided per 30 .06.2018. The total number of subscribers per 01.01.2019 will be available in Q2 2019.

PL: Subscriber base as of 31.12.2017.

PT: The number of subscribers is according to the definition and it only considers users that have efectively used the service in the last 30 days.

RO: Number of M2M SIM cards exclusively used for M2M is not available.

RS: Number of subscribers as of 31.12.2018. These numbers are collected by using ITU indicator i271 which excludes data cards, USB modems and M2M. It includes the number of postpaid subscriptions, and the number of active prepaid accounts (i.e. that have been used during the last three months). M2M are collected by using ITU indicator i271m2m with the following definiton - M2M mobile-network subscriptions refers to the number of mobile-cellular machine-to-machine subscriptions that are assigned for use in machines and devices (cars, smart meters, consumer electronics) for the exchange of data between networked devices, and are not part of a consumer subscription. For instance, SIM-cards in personal navigation devices, smart meters, trains and automobiles should be included. Mobile dongles and tablet subscriptions should be excluded.)

SE: Subscriber numbers and market shares are as of 30.06.2018.

Annex 6 Regulatory model implemented to calculate MTRs

Table 7

Jan 19	COST ACCOUNTING MODEL			Period 1 - From 01/01/2019 until 30/06/2019	Period 2 - From 01/07/2019 until 31/12/2019	Period 3 - From 01/01/2020 until 30/06/2020	Period 4 - From 01/07/2020 until 31/12/2020	Period 5 - From 01/01/2021 until 30/06/2021
	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?					
AL	Benchmark BU-LRIC	adopted	01.12.2018	0,980	0,980	0,892		
AT	Pure BU-LRIC	adopted		0,805	0,805			
BE	Pure BU-LRIC	adopted	1.1.2013	0,990	0,990	0,990	0,990	
BG	Pure BU-LRIC	adopted	1.12.2016	0,716	0,716	0,716		
CH		not regulated						
CY	Pure BU-LRIC	adopted		0,0048	0,0048			
CZ	Pure BU-LRIC	adopted	1.7.2013	0,95886				
DE	Pure BU-LRIC	adopted	1.12.2017	0,9500	0,9500			
DK	Pure BU-LRIC	adopted		0,516	0,516			
EE	Benchmark BU-LRIC	adopted	26.5.2016	0,830				
EL	Pure BU-LRIC	adopted	1.1.2013	0,9460	0,9460	0,9460	0,9460	0,9460
ES	Pure BU-LRIC	adopted	5.10.2012	0,6700	0,6700	0,6400	0,6400	0,6400
FI	Other (FDC/FAC)	adopted		0,930	0,930	0,890	0,890	0,820
FR	Pure BU-LRIC	adopted	1.1.2013	0,740				
MK	TD - LRIC	adopted		0,010				
HR	Pure BU-LRIC	adopted		0,633				

HU	Pure BU-LRIC	adopted	1.4.2015	0,529				
IE	Pure BU-LRIC	adopted	1.9.2016	0,790				
IS	Benchmark BU-LRIC	notified		0,699				
IT	Pure BU-LRIC	adopted	1.7.2013 (1.1.2018 for Iliad)	0,900	0,900	0,760	0,760	0,670
LI	Benchmarking (other)	adopted	2,552					
LT	Benchmark BU-LRIC	adopted	1.4.2016	0,940				
LU	Pure BU-LRIC	adopted		0,890	0,890			
LV	Benchmark BU-LRIC	adopted	26.4.2017	0,8868	0,8868	0,8868	0,8868	
ME	TD - LRIC	adopted		0,850				
MT	Pure BU-LRIC	adopted		0,405				
NL	Pure BU-LRIC	adopted						
NO	Pure BU-LRIC	adopted	1.7.2015	0,447	0,447	0,332	0,332	0,332
PL	Pure BU-LRIC	adopted	1.7.2013	0,998	0,998	0,998	0,998	0,998
PT	Pure BU-LRIC	adopted	31.12.2012	0,420	See comment below	See comment below	See comment below	
RO	Benchmark BU-LRIC	adopted	1.4.2014	0,840				
RS	Benchmarking (other)			1,208				
SE	Pure BU-LRIC	adopted	1.7.2013	0,566	TBD	TBD	TBD	
SI	Pure BU-LRIC	adopted	1.10.2014	1,140				
SK	Pure BU-LRIC	adopted	1.8.2013	1,226				
TR	Confidential							
UK	Pure BU-LRIC	adopted		0,546	0,540	0,536	0,531	

Notes to Table 7 :

AL: For MTR calculations Benchmarking is used based on BU-LRIC models of BEREC countries. The above MTR (0,98 cent/122 Qindarka) applies from 1 December 2018 and the new rate (0,892 cent/111 Qindarka) will be applied from 1.12. 2019.

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 - 0.014 BGN/minute

from 01/01/2017 - 0.014 BGN/minute

from 01/01/2018 - 0.014 BGN/minute

from 01/01/2019 - 0.014 BGN/minute

from 01/01/2020 - 0.014 BGN/minute

No MTRs peak/off-peak differentiation.

CH: MTRs are not regulated in 2019.

CY: For the year 2020 OCECPR will run the BU-MODEL with the latest data and will set the new rate accordingly.

DE: Deviating from the specified regulation periods, MTR are valid from 01.01.2019 until 30.11.2019: 0,95 Eurocent/Minute.

DK: The DBA issues MTR ultimo any year for the entire following year. Hence, the MTR after 2019 is undecided. Furthermore, due to the subscription data is derived as of ultimo H1 2018.

EL: The rates included in the table above derived from the model that EETT has developed during 2012. Following EC's comment on the 2017 EETT's notification of Market 2, EETT will update as soon as possible the 2012 pure LRIC bottom-up model and will adapt the MTRs accordingly.

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.

HU: Glide path is not applied. The above mentioned MTR would still be valid until next decision.

IE: A market share figure for Lycamobile is not available from the quarterly key data report published by ComReg. Lyca however is subject to MTR regulation. Virgin Mobile is currently not subject to MTR regulation. Termination rates for the periods from 1.1.2019 are currently under consultation. It is expected that a decision will be issued this year.

IS: benchmarked yearly in sep/oct for the following year.

IT: Poste Mobile and Iliad Italia entered in the market later than Telecom Italia, Vodafone Italia and Wind Tre. This is the reason why they have been subject to price control regulation (with price defined through a pure Bu-LRIC model) later than the other operators.

LU: subscriber at 30.06.2018.

LV: SPRK doesn't use 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.

MT: Data reflects Q3 2018.

PT: On 21.06.2018, ANACOM approved a new decision establishing the new MTR also in accordance with the EC Recommendation on Termination rates - BU-LRIC. According to this decision, in 01.07.2019 and in 01.07.2020 the MTRs will be updated on the basis of existing and foreseen inflation data.

RO: MTR 0.84eurocents/min, starting 01.05.2018, based on benchmark of MTRs applied by member states that developed pure LRIC models.

RS: Price of 1,43 RSD is effective from 01.01.2018, until new RATEL`'s definition. MTR is based on the termination rates applied in countries in our region and represent national MTR which is subject of regulation.

SI: MTR will change with new decision in year 2019.

SK: RU does not apply any glide path. RU is in process of preparing a new price 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 glidepath, in general MTRs are revised when it is needed.

UK: Future rates are in nominal terms assuming 2% inflation per year. Source: <https://www.ofcom.org.uk/about-ofcom/latest/media/analysts/regulated-prices>. Period 5 cannot be estimated as this falls outside of Ofcom's charge control period.

Annex 7 Abbreviations and Exchange rates

Table 8 – 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
MK	The Republic of North 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 9 – Exchange Rates¹⁷

COUNTRY	1 EURO
AL	124.48
BG	1.96
CH	1,14
CZ	25,86
DK	7,46
HR	7,42
HU	323
IS	137,28
LI	1,14
MK	61,49
NO	9,63
PL	4,30
RO	4,66
RS	118,35
SE	10,32
TR	6,30
UK	0,89

¹⁷ ECB website, <https://sdw.ecb.europa.eu/browse.do?node=9691296>

Bank of Albania website https://www.bankofalbania.org/Tregjet/Kursi_zyrtar_i_kembimit

National Bank of the Republic of North Macedonia website http://www.nbrm.mk/kursna_lista-en.nspX

National Bank of Serbia website https://www.nbs.rs/export/sites/default/internet/english/scripts/kl_srednji.html

Annex 8 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