Body of European Regulators
for Electronic Communications

BEREC

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International Roaming
BEREC Benchmark Data Report
October 2017 - March 2018

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1. Structure of the Report

The International Roaming BEREC Benchmark Report on (the "Report") contains five parts and two annexes. Chapter 2 is an introduction to the Body of European Regulators for Electronic Communications (BEREC) Report and describes BEREC's work on roaming based on the Roaming Regulation (EU) No. 531/2012, as amended by Regulation (EU) No. 2120/2015 and by Regulation (EU) No. 2017/920. The third Chapter "**Regulatory evolution**" outlines regulatory measures taken to reduce price levels for roaming services within the EU. The next Chapter "**Main findings"** includes the key findings of this Report. The fifth Chapter "**Charts"** presents the latest available data on the domestic mobile market and international roaming mobile market. "**Annex I: Methodology for the data collection**" provides detailed description of the methodology for the current data collection. "**Annex II: List of respondents**" includes the list of operators that provided data for this Report. The Report is accompanied by a spreadsheet file enabling the user to an easy and open access to the data included in the Report (published together with the Report).

2. Introduction

The Report presents the results of the 21st round of data collection on European international roaming services undertaken by BEREC. The Report covers the period 1 October 2017 – 31 March 2018, i.e. the 4th quarter 2017 and 1st quarter 2018. The Report also includes data from previous rounds of data collection conducted by BEREC and its predecessor, the European Regulators Group (ERG). The earliest data is from the 2nd quarter 2007, when the Roaming Regulation was about to enter into force.

The applicable regulatory framework for this data collection is Roaming Regulation (EU) No. 531/2012, as amended by Regulation (EU) No. 2120/2015[1] and by Regulation (EU) No. 2017/920[2], applied in the European Union (EU)[3], which includes new requirements for the retail and wholesale regulated tariffs for voice, SMS and data roaming.

The assessment of the international roaming market was based on the requirements set out in Article 19 (4) of the Roaming Regulation. In order to assess the competitive developments in the Union-wide roaming markets, BEREC has to regularly collect data from national regulatory authorities on the development of retail and wholesale charges for regulated voice, SMS and data roaming services, including wholesale charges applied for balanced and unbalanced roaming traffic respectively. It shall also collect data on the wholesale roaming agreements not subject to the maximum wholesale roaming charges provided for in Articles 7, 9 or 12 and on the implementation of contractual measures at wholesale level aiming to prevent permanent roaming or anomalous or abusive use of wholesale roaming access for purposes other than the provision of regulated roaming services to roaming providers' customers while the latter are periodically travelling within the Union. On the basis of the collected data, BEREC also has to report regularly on the evolution of pricing and consumption

[1] Regulation (EU) No. 2120/2015, hereinafter 'TSM Regulation', available at: http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32015R2120

[2] Regulation (EU) 2017/920 of the European Parliament and of the Council of 17 May 2017 amending Regulation (EU) No 531/2012 as regards rules for wholesale roaming markets, available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32017R0920.

[3] The amendments are incorporated in the EEA agreement and is therefore applicable in the three EEA/EFTA states Iceland, Liechtenstein and Norway.

patterns in the Member States for both domestic and roaming services and the evolution of actual wholesale roaming rates for unbalanced traffic between roaming providers and on the relationship between retail prices, wholesale charges and wholesale costs for roaming services. BEREC shall assess how closely those elements relate to each other.

BEREC is coordinating this process of data collection by pursuing the following objectives:

- simplifying the process not only for national regulatory authorities (NRAs) as BEREC acts as a central point for the data collection, but also for the European Commission (EC), as the data are received from a single source and a following uniform data processing;
- coordinating the procedures of individual NRAs, as the data collection exercise uses a single and commonly agreed data collection model, and the process is synchronised and based on the same collection periods. BEREC consults the market players and the European Commission before finalising the data collection templates;
- providing, as far as possible, a common response to the different questions posed during the collection process by operators and NRAs, as BEREC serves as the forum where these questions are commonly debated and addressed.

3. Regulatory evolution

ERG initially worked on the long-standing issue of high prices for international roaming services. Following its creation in January 2010, BEREC took over responsibility for this work from ERG.

The 2007 Regulation

In 2005, ERG undertook a study on international roaming that concluded that the EC Regulatory Framework did not provide the necessary tool-kit for NRAs to tackle the problems identified. ERG wrote to the European Commission in December 2005 highlighting its concerns.

After significant debate, the first Regulation on international roaming services was published on 29 June 2007. The primary provisions capped wholesale and retail charges for voice calls under Eurotariff and set a number of transparency provisions to help to ensure that consumers were well informed. The provisions of the Regulation entered into force at different times, with retail and transparency provisions taking full effect by the end of September 2007 and wholesale provisions calculated annually from the end of August 2007[4].

The 2009 amended Regulation

On 22 April 2009, the European Parliament (EP) adopted Regulation (EC) No. 544/2009 at first reading, with a view to amending Regulation (EC) No. 717/2007. Subsequently, on 8 June 2009, the Council of EU Telecoms Ministers formally adopted the new EU roaming rules

[4] In Norway and Iceland the 2007 Regulation was in force from the end of 2007 to the 2nd quarter 2010.

approved by the European Parliament. The definitive text of Regulation (EC) No. 544/2009 was published in the Official Journal of the European Union on 29 June 2009[5,6].

In particular, the Regulation introduced the following measures related to price control, applicable from 1 July 2009 to 30 June 2012:

- an extension of wholesale and retail price regulation for voice services, with yearly decreases in the levels of the caps;
- price regulation of SMS roaming services at both the wholesale and retail level;
- price regulation of data roaming services at the wholesale level.

And from July 2010 to June 2012:

- retail transparency measures to protect consumers from “bill shock” when data roaming.

The 2012 Regulation

On 30 May 2012 the Council of the European Union approved the International Roaming Regulation III[7], which entered into force on 1 July 2012[8].

The Regulation introduced the following measures, applicable from 1 July 2012:

- an extension of wholesale and retail price regulation for voice and SMS with yearly decreases in the levels of the caps until 30 June 2014 with those caps to remain in force until 30 June 2022 for wholesale services, and until 30 June 2017 for the Eurotariffs, subject to a further review by 30 June 2016;
- an extension of wholesale price regulation for data with yearly decreases in the levels of the caps until 30 June 2014 with those caps to remain in force until 30 June 2022;
- price regulation of data roaming services at the retail level with a yearly decrease in the level of the cap until 30 June 2014 with the cap to remain in force until 30 June 2017, being subject to a further review by 30 June 2016;
- the obligation for mobile network operators (MNOs) to meet all reasonable requests for wholesale roaming access, which comprises direct wholesale roaming access and wholesale roaming resale access under the rules set out in the Roaming Regulation. The Regulation also included provisions on the separate sale of roaming services which entered into force on 1 July 2014.
- safeguard mechanisms were extended. The Regulation requires providers to make available to their customers one or more maximum financial or volume limits on data

[5] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:167:0012:0023:EN:PDF
[6] From the 3rd quarter 2009 to the 1st quarter 2010, Regulation 544/2009 applied in the EU while the first Roaming Regulation (EC) No. 717/2007 remained in force in Norway, Iceland and Liechtenstein, with slightly higher voice caps, no SMS caps and no wholesale data cap.
[7] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:172:0010:0035:EN:PDF
[8] With regard to the EEA EFTA countries, it must be noted that the Roaming Regulation applies in these countries as from 7 December (Norway and Liechtenstein) and 21 December (Iceland) 2012.

roaming use during an agreed specified period, subject to the customer's consent to continue ("cut-off mechanism").The safeguard mechanisms also apply to data roaming services used by roaming customers travelling outside the EU except when the visited network operator in the visited country outside the EU does not allow the roaming provider to monitor its customer usage on a real-time basis. The cut-off limit should in principle be made available for all tariffs by default. However, when a customer opts for an offer without a cut-off limit, customers are given the right to be provided with a cut-off limit within one working day at their demand.

The 2012 Regulation as amended by Regulation (EU) No. 2120/2015

On 3 April 2014, the European Parliament took up the position, within the framework of the procedure for the adoption of a Regulation for a European Single Market for Electronic Communications (TSM Regulation), to abolish retail roaming surcharges in order to allow customers to "Roam Like at Home" (RLAH) with a fair use limit.

Regulation (EU) No. 2015/2120[9], adopted by the European Parliament on 27 October 2015 and published in the Official Journal of 26 November 2015, includes amendments to Roaming Regulation No. 531/2012[10], the main one being the principle of Roam Like At Home, i.e. requiring roaming providers not to levy any surcharge in addition to the domestic retail price on roaming customers as of 15 June 2017 (RLAH tariffs). However, there are several cases (e.g. when a Fair Use Policy (FUP) under the conditions of the Roaming Regulation is breached or a data volume limit is exceeded) where the roaming provider is allowed to apply surcharges. Moreover, according to Article 6c Roaming Regulation, in specific and exceptional circumstances, with a view to ensuring the sustainability of its domestic charging model, a roaming provider may apply for authorisation to apply a surcharge. The Roaming Regulation lays down detailed rules on the methodology for assessing the sustainability of the abolition of retail roaming surcharges and on the application to be submitted by a roaming provider for the purposes of that assessment. For more information on surcharges in excess of or non-compliance with the FUP and derogation mechanism please see BEREC Guidelines on Regulation (EU) No 531/2012, as amended by Regulation (EU) 2015/2120 and Commission Implementing Regulation (EU) 2016/2286 (Retail Roaming Guidelines)[11]. Furthermore, similar to the provisions set out in the third Roaming Regulation, roaming providers can also offer alternative roaming tariffs as an alternative to RLAH and customers may deliberately choose those alternative tariffs.

It should also be mentioned that the Roaming Regulation also established a transitional period, from the 30th April 2016 to 14th June 2017, where operators could apply a surcharge in addition to the domestic price for the provision of retail roaming regulated services.

The amendments to the Roaming Regulation resulted in an update of the BEREC Benchmark Report and the current Report includes indicators on volumes and revenues for RLAH, RLAH+ (non-compliance with/exceeding the FUP), RLAH+ (derogation) and alternative tariffs offered by operators. BEREC would like to note that some indicators presented in the following figures and its evolution must be carefully evaluated as before the implementation of the Regulation

[9] Available at: http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32015R2120
[10] Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32012R0531
[11] Available at: BEREC Guidelines on Regulation (EU) No 531/2012, as amended by Regulation (EU) 2015/2120 and Commission Implementing Regulation (EU) 2016/2286 (Retail Roaming Guidelines)

(EU) No. 2120/2015, it was possible to clearly separate domestic revenues from intra-EEA roaming revenues, since the latter had a separate charging mechanism. However, with the implementation of RLAH, roaming is charged at domestic prices, except for alternative tariffs, and they are included therefore under domestic revenues. Only intra-EEA roaming revenues related to the application of surcharges and revenues from alternative tariffs are now reported under roaming revenues (see more details in Annex I).

The 2012 Regulation as amended by Regulation (EU) No. 2017/920

Regulation (EU) No. 2017/920[12] adopted by the European Parliament on 17 May 2017 and published in the Official Journal of 9 June 2017, includes amendments to Roaming Regulation No. 531/2012[13] the main one regarding new wholesale prices for voice, SMS and data services that entered into force on 15 June 2017. Also, its amendments included new provisions for wholesale agreements to prevent permanent roaming and the requirement to collect data about the evolution of actual wholesale roaming rates for unbalanced traffic between providers of roaming services, and on the relationship between retail prices, wholesale charges and wholesale costs for roaming services.

The amendments to the Roaming Regulation resulted in an update of the BEREC Benchmark Report, and the current Report includes the lowest charged as proxy wholesale costs for roaming services and those new clauses to prevent permanent roaming introduced in the roaming wholesale agreements.

4. Main findings

Over 152 providers of international roaming services provided information for this Report. This number includes virtually all of the mobile network operators in the EEA countries and Switzerland, as well as a significant number of mobile virtual network operators (MVNOs) that provide EEA roaming services. BEREC estimates that this report covers around 95 % of mobile customers in the EEA.

Retail domestic prices (ARRPU) for mobile services

BEREC has analysed the retail domestic prices and found that it is hard to disaggregate the different mobile communications services since they are often provided as part of a bundle of several services, including intra-EEA roaming communications and, in several cases, also non-mobile services. Operators are finding it difficult to organize their revenue data by individual service categories (ISCs), such as fixed telephony, mobile telephony, fixed broadband, intra-EEA roaming communications and others and no common methodology is defined for this purpose. Bundles challenge this practice, as ISCs require allocating bundle revenues to their components. Therefore, BEREC examined the alternative of presenting data on the evolution of the ARRPU. However, in the context of the BoR (16) 33 BEREC Report on the wholesale roaming market it was emphasized that the ARRPU depends on many different parameters (volumes, handset subsidies, sensitivity to the number of active SIM cards, etc.). In general, the ARRPU is quite a weak index for comparing domestic price levels. In spite of the limitations and lack of common methodology mentioned above, BEREC has calculated the ARRPU, the results of it should, however, be interpreted with caution. For this calculation

[12] Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32017R0920
[13] Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32012R0531

BEREC used the data relative to mobile domestic services submitted by operators[14]. The domestic monthly ARRPU for Q1 2018 varies considerably between the countries, ranging from 3.74 Euros per month to 29.23 Euros per month, with a weighted EEA average of 9.29 Euros (Figure 1). Disproportion between individual ARRPUs could be caused by different methodologies used by operators to allocate the revenues relative to different domestic mobile services. With regard to Q4 2017, the ARRPU in Q1 2018 remains overall stable.

Roam Like At Home (RLAH) traffic

BEREC data show clear evidence of seasonal movements. The data roaming traffic compared to Q3 2017 decreased by 26.69 % in Q4 2017 and by 16.63 % in Q1 2018 (Figure 73). The same applies for roaming calls made, they decreased by around 17 % in Q4 2017 and Q1 2018 with respect to Q3 2017 (Figure 32). In order to deal with the impact of seasonality, BEREC compared data with the same quarter of the previous year. Compared with the same quarter a year ago (Q1 2017), data traffic increased by 397.59 % and the traffic for calls made by 97.86 %. Traffic for calls received grew by 56.30 % in Q1 2018, compared with Q1 2017 (Figure 40). The traffic for SMS services increased by 33.82 % in Q1 2018, compared with Q1 2017 (Figure 56). Although international roaming services demonstrate high seasonal variations, the results clearly show that the 2017 update of the Roaming Regulation has significantly contributed to stimulate the demand for roaming services and the development of the international roaming market.

EEA roaming consumption patterns

The introduction of RLAH services, coupled with the growing demand for data services, has changed the international roaming market. A relevant point could be made that the RLAH services enabled a substantial increase in international roaming traffic. The minutes generated under RLAH tariffs account for the majority of the voice traffic. 89.20 % of minutes of calls made and 86.94 % of minutes of calls received were generated by subscribers of RLAH tariffs (Figure 26 and Figure 34). For text messages sent while roaming within EEA countries RLAH tariffs accounted for 93.12 % of the total volume in Q1 2018 (Figure 50). In Q1 2018 around 89.82 % of data traffic was based on the RLAH data tariff while roaming (Figure 67).

Increased volumes can be exemplified in the relationship between Q1 2017 and Q1 2018. The average EEA roaming subscriber spent 18.54 minutes per month in calls made in Q1 2018 in comparison to 10.90 minutes in Q1 2017 (Figure 29). The number of received call minutes abroad amounted to 15.79 minutes per EEA average roaming subscriber per month in Q1 2018, whereas this was around 11.75 minutes in Q1 2017 (Figure 37). Data roaming consumption ranged from 129.8 to 718.6 MB per roaming subscriber monthly in Q1 2018 in comparison to the range from 15.9 to 314.7 MB in Q1 2017 (Figure 69).

Rest of the World (RoW) roaming retail prices

With regard to 'Rest of World' retail voice roaming calls (Figure 74 and Figure 75), the EEA average RoW tariff for calls made was 74.47 Euro cents in Q4 2017 and 69.59 Euro cents in Q1 2018. The EEA average prices for calls received are given in Figure 76 and Figure 77.

[14] The monthly ARRPU was calculated per country by dividing retail revenues (i.e. total revenues related to mobile voice, SMS and data traffic. Any other type of revenue, such as those originating from mobile devices, subscription fees to services etc. are not included) in the respective quarters with the total number of domestic and roaming subscribers per country within the same period and dividing it by 3.

Receiving calls when roaming outside the EEA area cost 39.00 Euro cents in Q4 2017 and 37.03 Euro cents in Q1 2018. At the same time, data from the operators reveals that the average price for data consumption outside EEA (Figure 80 and Figure 81) cost 11.44 Euro cents per MB in Q4 2017 and 9.26 Euro cents per MB in Q1 2018.

Wholesale roaming rates

At the wholesale level, the voice, SMS and data roaming charges set between operators have declined significantly below the regulated average caps.

The applicable price caps and the related EEA average prices during the data collection period were:

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

Wholesale roaming rates for outgoing calls

At the wholesale level (Figure 18 and Figure 19), the EEA average price was 2.32 Euro cents in Q4 2017 and 2.06 Euro cents in Q1 2018 compared to a cap of 3.2 Euro cents. A constant reduction in the average EEA wholesale prices for intra-EEA roaming voice calls (Figure 20) is observed. BEREC also assessed the prices for balanced and unbalanced traffic (Figure 16 and Figure 17). The EEA average wholesale price for balanced traffic was 2.41 Euro cents during Q4 2017 and 2.23 Euro cents during Q1 2018. Meanwhile, the EEA average payments for unbalanced traffic were at 2.19 Euro cents during Q4 2017 and 1.84 Euro cents during Q1 2018.

Wholesale roaming rates for SMS

At the wholesale level, a reduction in the average EEA SMS price (Figure 43 and Figure 44) to 0.53 Euro cents in Q4 2017 and 0.38 Euro cents in Q1 2018 is observed compared to a cap of 1 Euro cents respectively. The average price for balanced traffic was 0.59 Euro cents in Q4 2017 and 0.41 Euro cents in Q1 2018. Over the same time, the average price for unbalanced traffic was 0.48 Euro cents in Q4 2017 and 0.34 Euro cents in Q1 2018 (Figure 41 and Figure 42).

Wholesale roaming rates for data

At the wholesale level, the data cap applying in the EEA is 0.77 Euro cents per MB in Q4 2017 and 0.6 Euro cents per MB in Q1 2018. The EEA average price for wholesale data services (Figure 59 and Figure 60) fell to 0.40 Euro cents per MB in Q4 2017 and 0.27 Euro cents per MB in Q1 2018, compared to € 1.02 Euro cents and 0.82 Euro cents in Q4 2016 and Q1 2017,

[15] Conversion of gigabytes to megabytes was done in line with Recital 17 of Regulation (EU) 2017/920 of the European Parliament and of the Council of 17 May 2017 amending Regulation (EU) No 531/2012, which results in 1 gigabyte being equal to 1000 megabytes.

respectively. In the context of the wholesale inbound roaming prices, the EEA average price for balanced traffic was 0.42 Euro cents per MB in Q4 2017 and 0.28 Euro cents per MB in Q1 2018, whereas the EEA average price for unbalanced traffic was 0.36 Euro cents per MB in Q4 2017 and 0.26 Euro cents per MB in Q1 2018 (Figure 57 and Figure 58).

Wholesale roaming agreements (Article 3)

In the case of wholesale agreements based on Article 3 of the Roaming Regulation, only some operators submitted these data. BEREC's International Roaming Compliance Report[16] showed that operators negotiated roaming services at the wholesale level individually and that the provision of such services was based on commercial agreements. Some light MVNOs as well as resellers stated that these services continued to be provided on the basis of the existing contracts with national host MNOs and their wholesale prices stay close to CAP prices of the Roaming Regulation (Figure 83, Figure 84 and Figure 85).

How wholesale costs and prices relate to each other

In the table below BEREC presents the cost estimates for wholesale roaming services in each of the 29 countries (28 Member States (MS) and Norway) considered in TERA Consultants cost model.

Wholesale roaming services cost estimates in each of the 29 countries considered in the TERA Consultants' cost model for 2017[17]

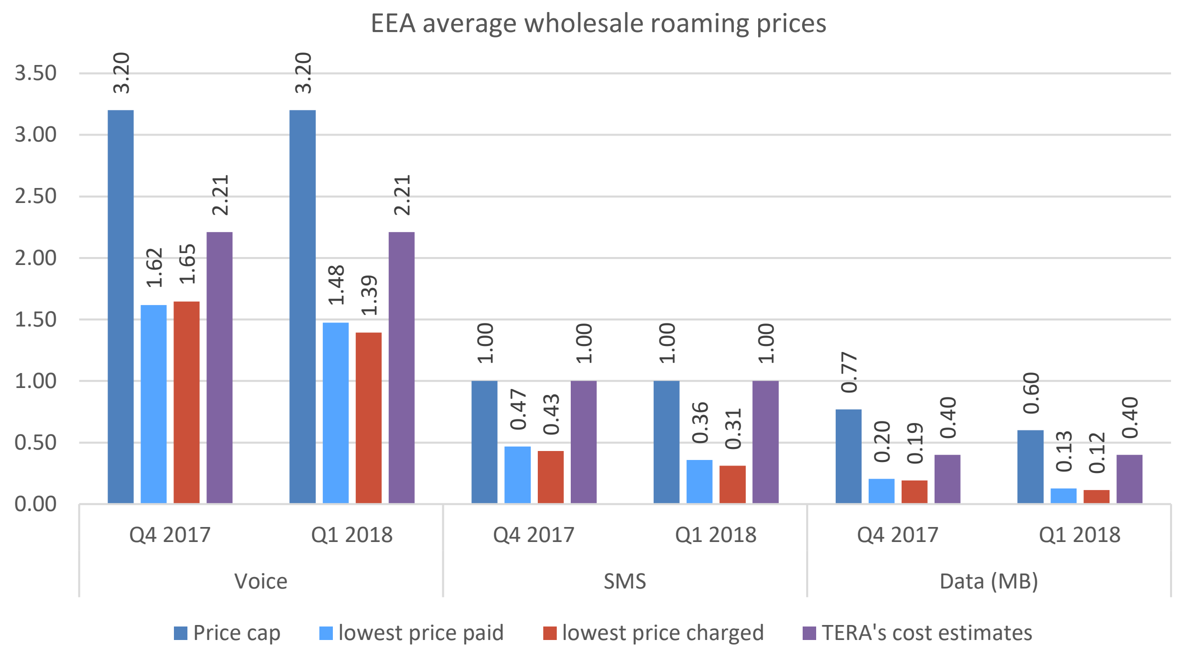
	Voice (€c/min)	SMS (€c/SMS)	Data (€c/MB)
AT	2.6	1.00	0.3
BE	1.85	1.00	0.41
BG	2.74	1.00	0.53
CY	1.63	1.00	0.35
CZ	1.86	1.00	0.42
DE	1.7	1.00	0.31
DK	1.86	1.00	0.29
EE	1.82	1.00	0.34
EL	1.94	1.00	0.35
ES	2.81	1.00	0.41
FI	1.65	1.00	0.28
FR	2.79	1.00	0.39
HR	2.31	1.00	0.36
HU	2.39	1.00	0.39

[16] BEREC International Roaming Compliance Report (Regulation (EU) No 531/512 of the European Parliament and of the Council of 13 June 2012 on roaming), the link: http://berec.europa.eu/eng/document_register/subject_matter/berec/reports/1482-berec-international-roaming-compliance-report-regulation-eu-no-531512-of-the-european-parliament-and-of-the-council-of-13-june-2012-on-roaming

[17] These cost estimates include: 1) the total wholesale roaming costs in MS estimated by TERA (including network costs, roaming-specific costs and the impact of seasonality on roaming costs); 2) an allocation for the termination rate that the visited network operator needs to pay the terminating network operator for terminating a call on its network and 3) an allocation for the transit costs that the visited network operator needs to pay for routing a call to the terminating network operator or to send data traffic back to the home network.
Available at: https://ec.europa.eu/transparency/regdoc/rep/10102/2016/EN/SWD-2016-202-F1-EN-MAIN-PART-1.PDF

IE	1.24	1.00	0.31
IT	1.75	1.00	0.31
LT	1.62	1.00	0.43
LU	2.63	1.00	0.44
LV	2.81	1.00	0.52
MT	4.2	1.00	0.67
NL	2.57	1.00	0.37
PL	1.72	1.00	0.32
PT	1.78	1.00	0.36
RO	1.79	1.00	0.59
SE	3.22	1.00	0.29
SI	2.52	1.00	0.57
SK	1.63	1.00	0.55
UK	2.65	1.00	0.36
NO	1.96	1.00	0.38
Average[18]	**2.21**	**1.00**	**0.40**

BEREC compared the lowest wholesale prices for the unbalanced traffic in Q4 2017 and Q1 2018 against TERA's estimated costs for 2017.[19]



The evidence from the estimates of the lowest wholesale roaming rates paid/charged for the unbalanced traffic shows that the TERA Consultants' cost estimates for 2017 are for SMS and

[18] Values are calculated as a simple average
[19] Prices are calculated from the lowest unbalanced rates submitted by the operators and expressed as simple average

data much higher than the lowest EEA average wholesale roaming rates paid/charged for SMS and data services in Q4 2017 and Q1 2018[20].

MNOs and MVNOs

For both quarters (Q4'17 and Q1'18), the ARRPU of MNOs is higher than MVNOs (Figure 90 and Figure 91).

Roaming consumption is lower for MVNOs' subscribers than MNOs' ones (Figure 105 to Figure 115). While MNOs has 4 % of subscribers with "domestic only" tariffs, MVNOs reach 23 % of its subscribers with this kind of tariffs without roaming enable in Q1 2018 (Figure 101 to Figure 104).

[20] This conclusion can be qualified by comparing the five lowest wholesale roaming prices for unbalanced traffic to the five lowest cost estimates by TERA for 2017 (instead of the average), which are 1.55 Euro cents per minute for voice and 0.3 cent/MB for data. Therefore, the lowest TERA cost estimates for voice for 2017 are slightly below the lowest market prices observed in Q2, Q3 and Q4 2017 (resp. 2.22 Euro cents per minute, 1.99 Euro cents per minute and 1.65 Euro cents per minute), and for data slightly higher than the lowest prices observed from Q3 2017 onwards (resp. 0.34 cent/MB, 0.22 cent/MB and 0.19 cent/MB for Q2, Q3 and Q4 2017).

5. Charts

5.1. Analysis of subscribers and those that use roaming services

5.1.1. Domestic average Retail Mobile Revenue per User (ARRPU)

Figure 1: domestic mobile service: monthly retail revenue per total number of subscribers (ARRPU)

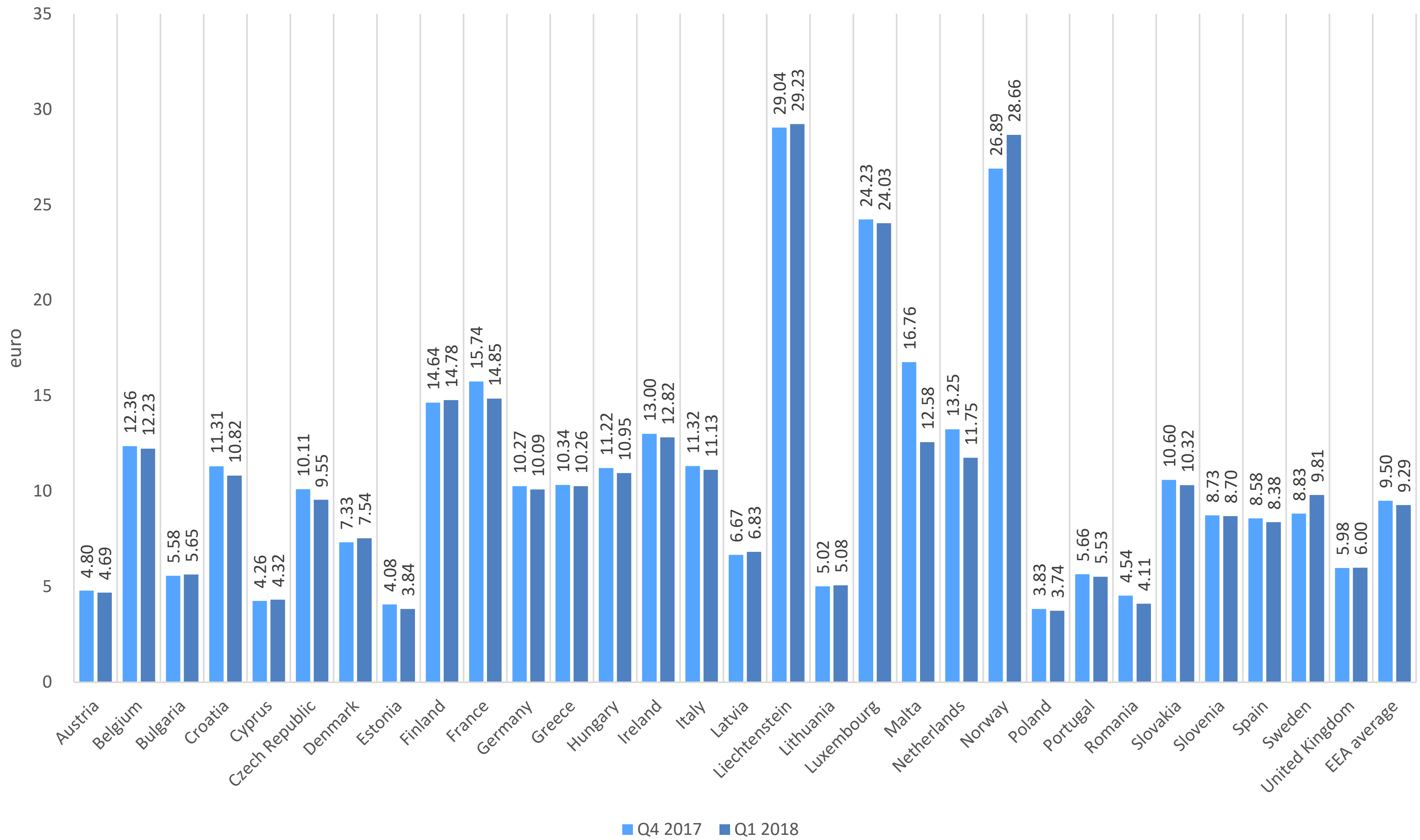
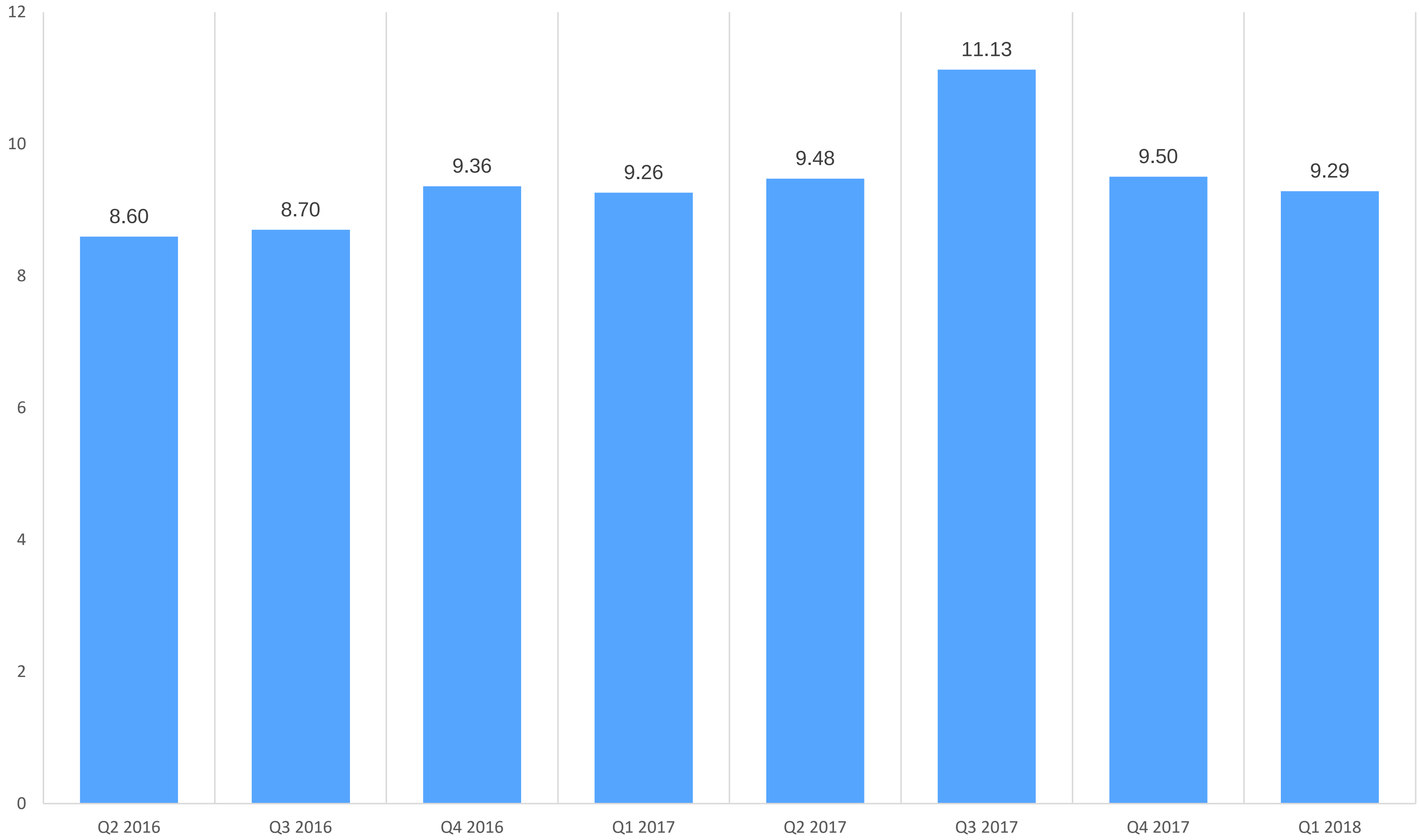


Figure 2: EEA average: domestic mobile service: monthly retail revenue per total number of subscribers (ARRPU)



5.1.2. Consumption patterns for domestic mobile retail services

Figure 3: domestic calls made: average number of minutes per month per total number of subscribers

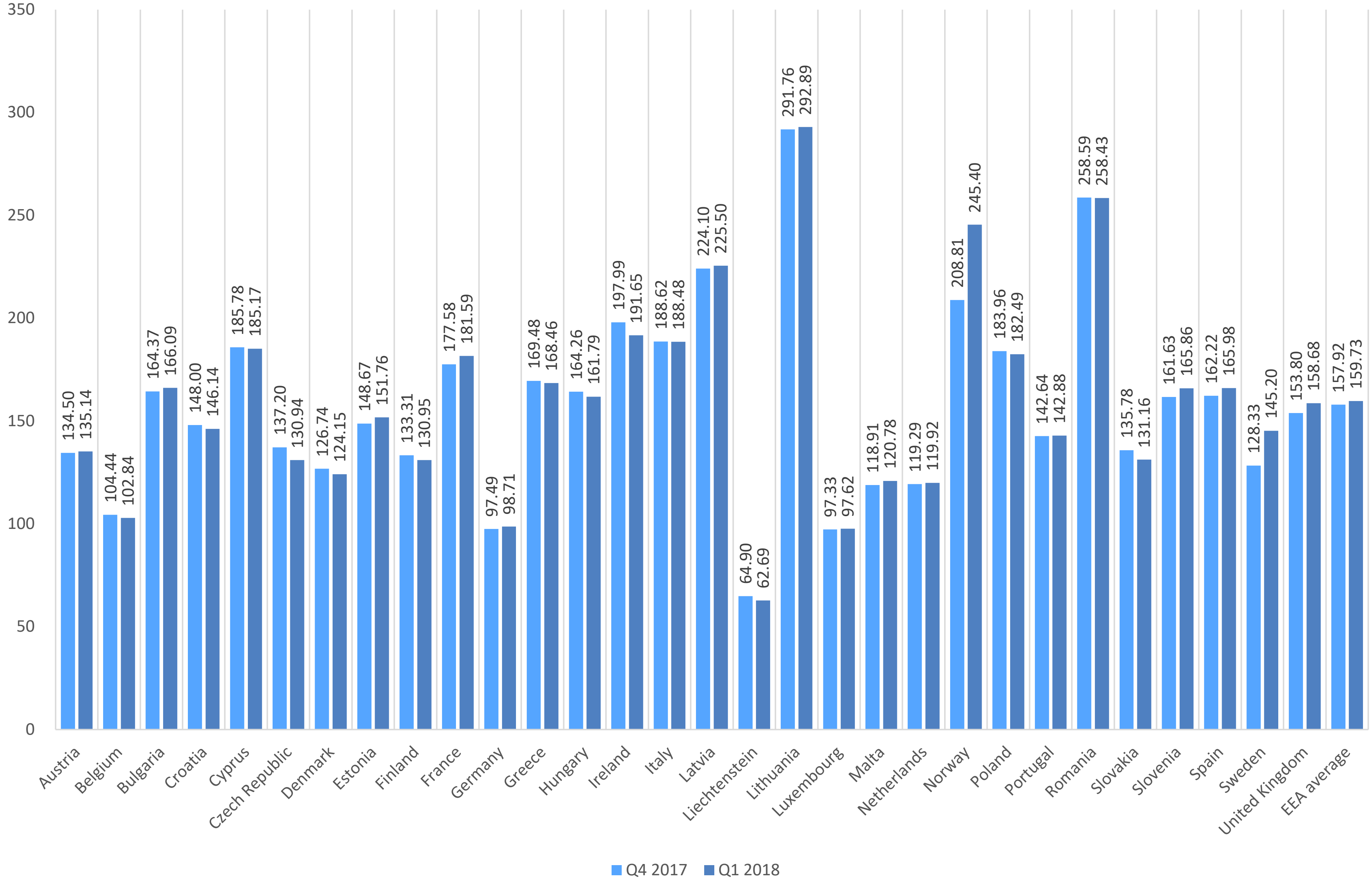


Figure 4: domestic calls received: average number of minutes per month per total number of subscribers

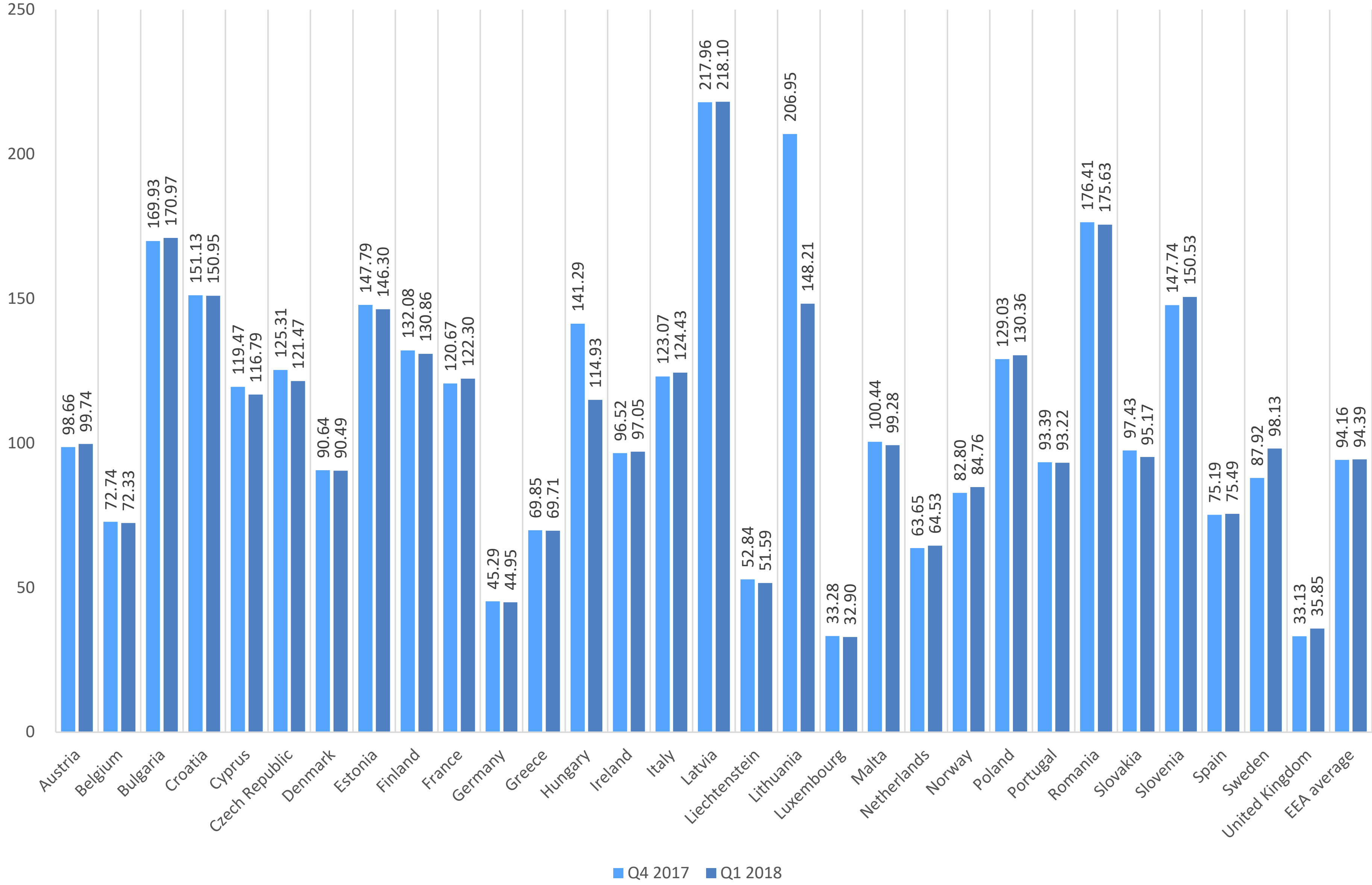


Figure 5: domestic SMS services: average number of SMS per month per total number of subscribers

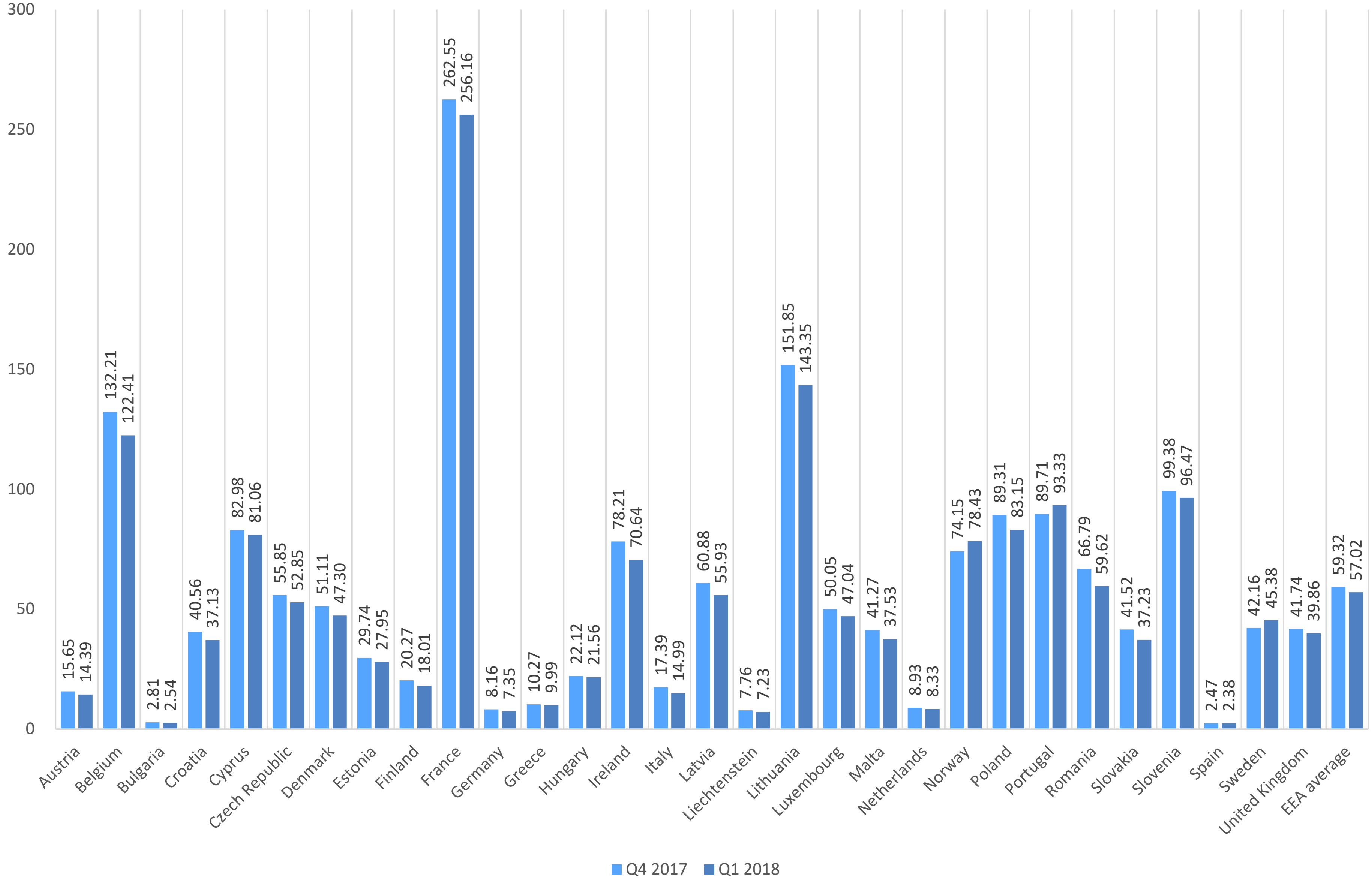
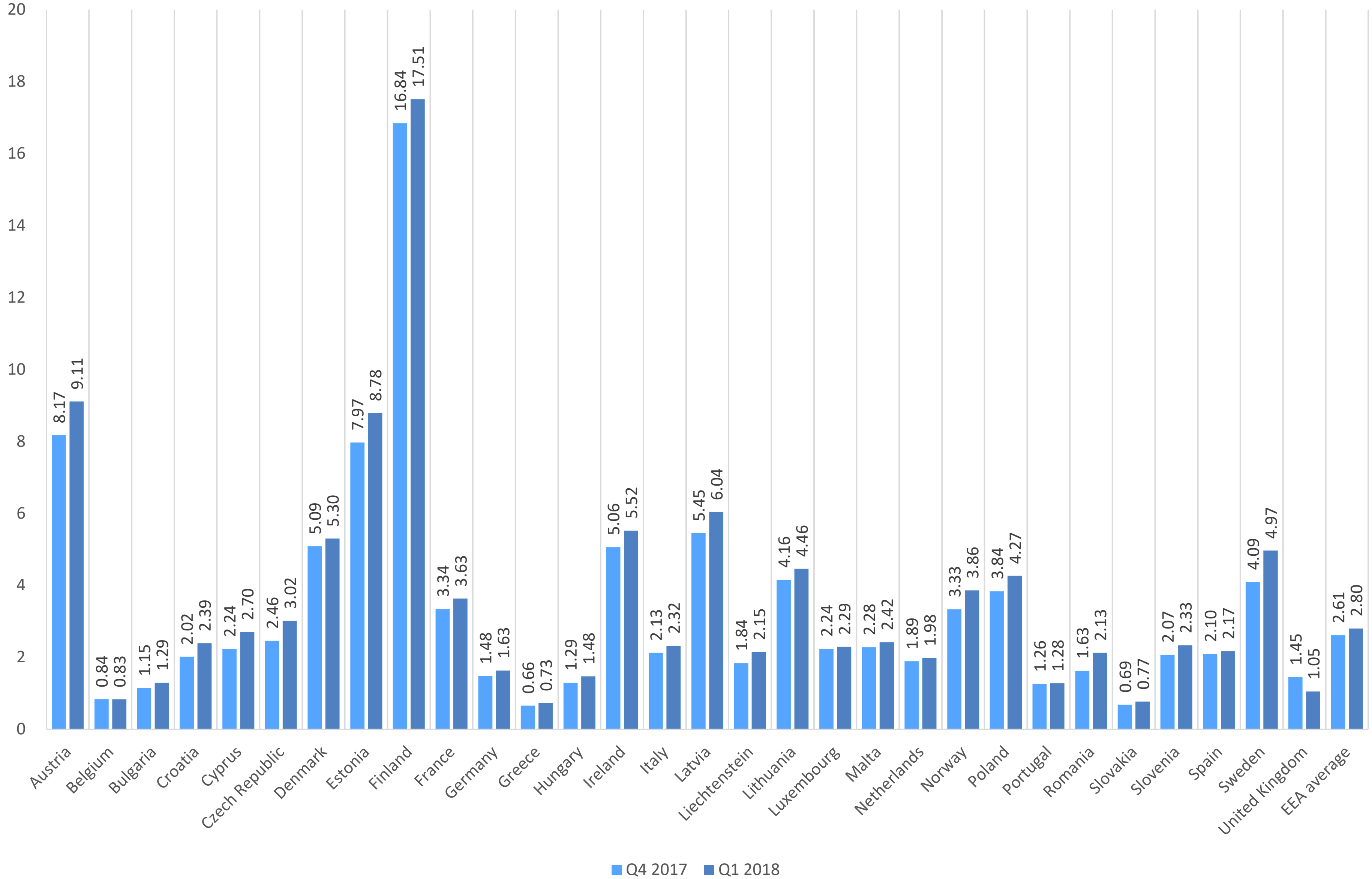


Figure 6: domestic data services: average consumption per month per total number of subscribers (GB)



5.1.3. Consumption patterns for RLAH services (voice, SMS and data)

Figure 7: RLAH, calls made: average number of RLAH minutes per month per total number of roaming subscriber, Q4'17 and Q1'18

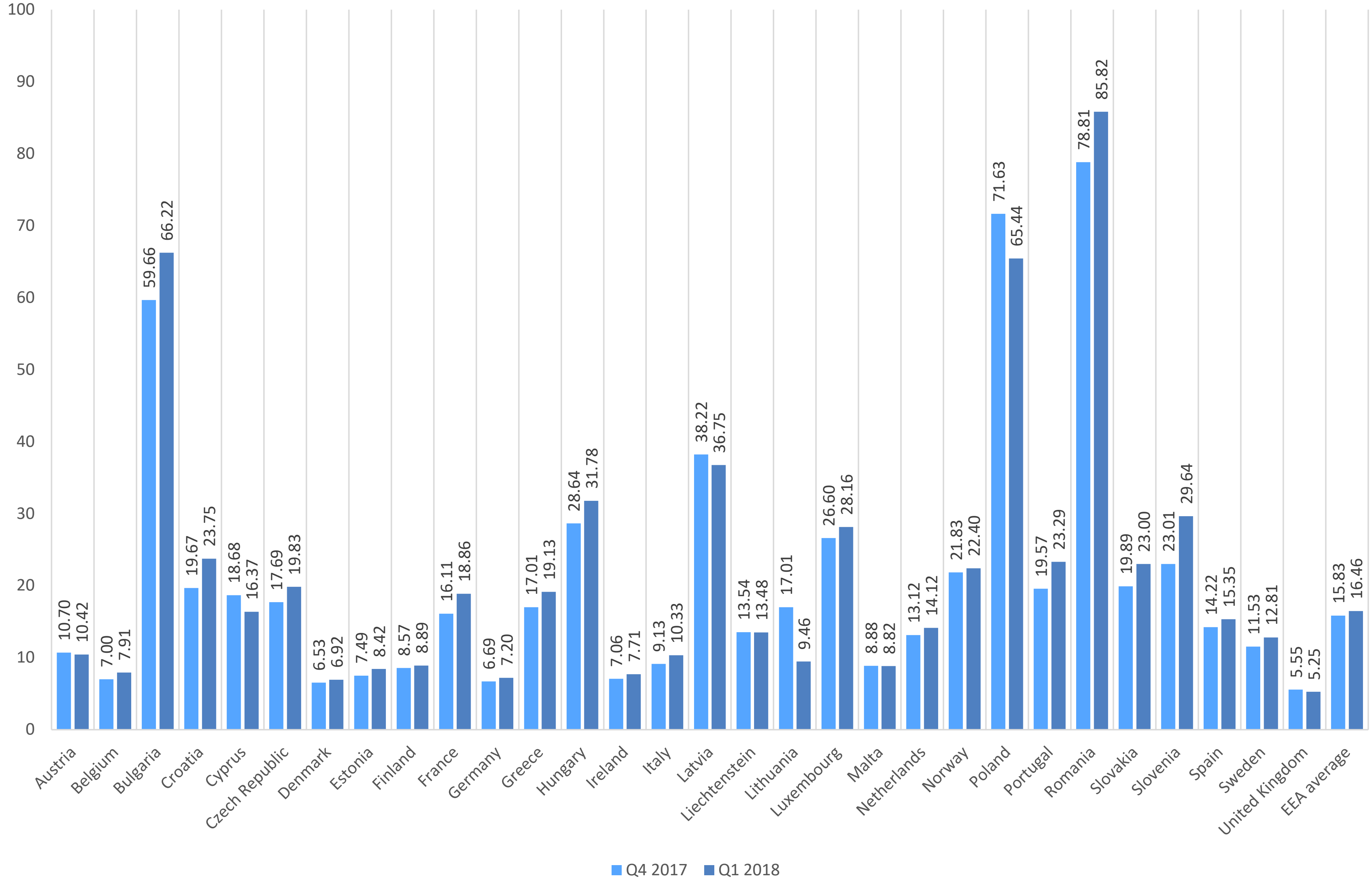


Figure 8: RLAH, calls received: average number of RLAH minutes per month per total number of roaming subscriber, Q4'17 and Q1'18

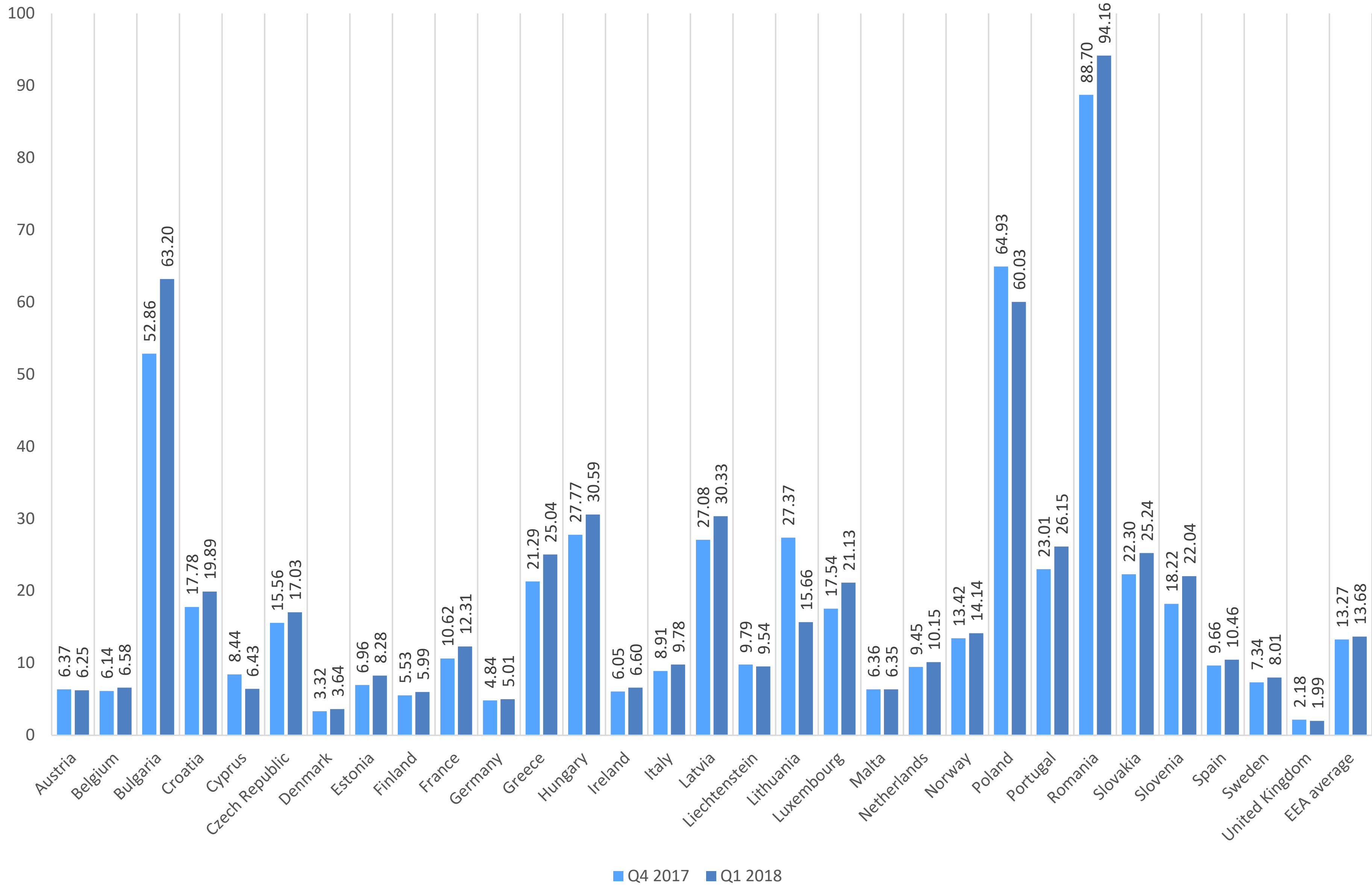


Figure 9: EEA average number of RLAH minutes per month per total number of roaming subscriber, Q4’17 and Q1’18

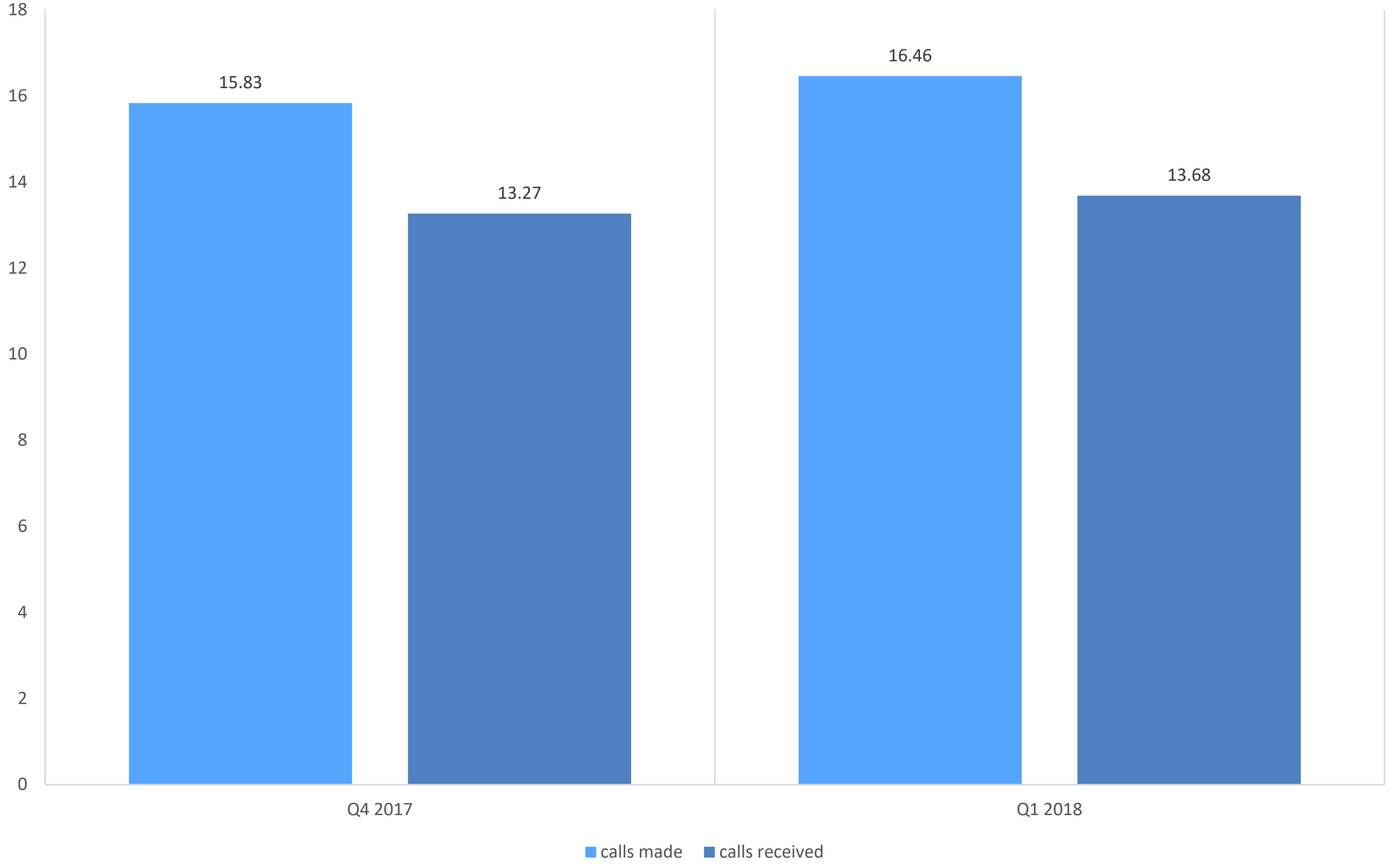


Figure 10: RLAH, SMS services: average number of SMS per month per total number of roaming subscriber, Q4'17 and Q1'18

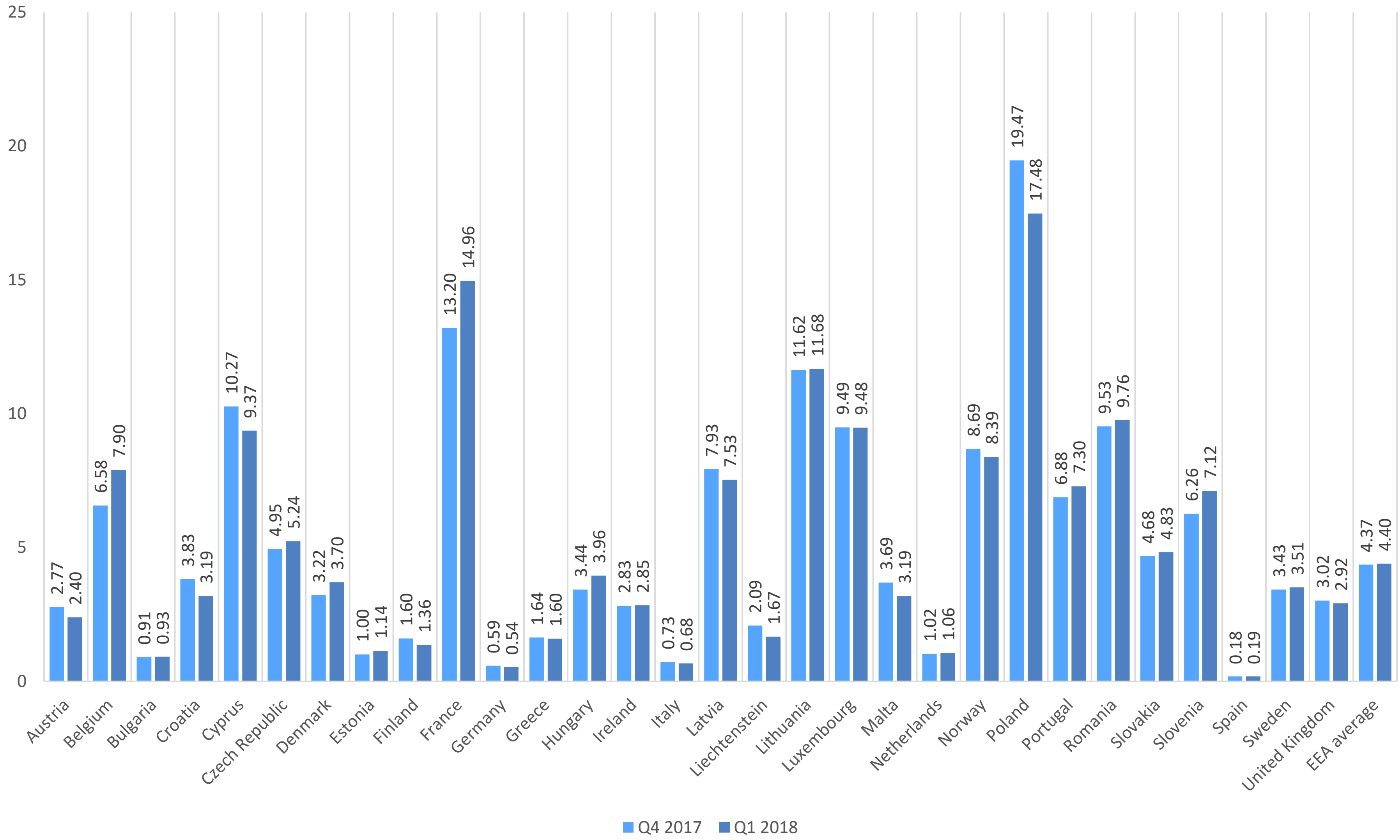


Figure 11: EEA average number of SMS per month per total number of roaming subscriber, Q4’17 and Q1’18

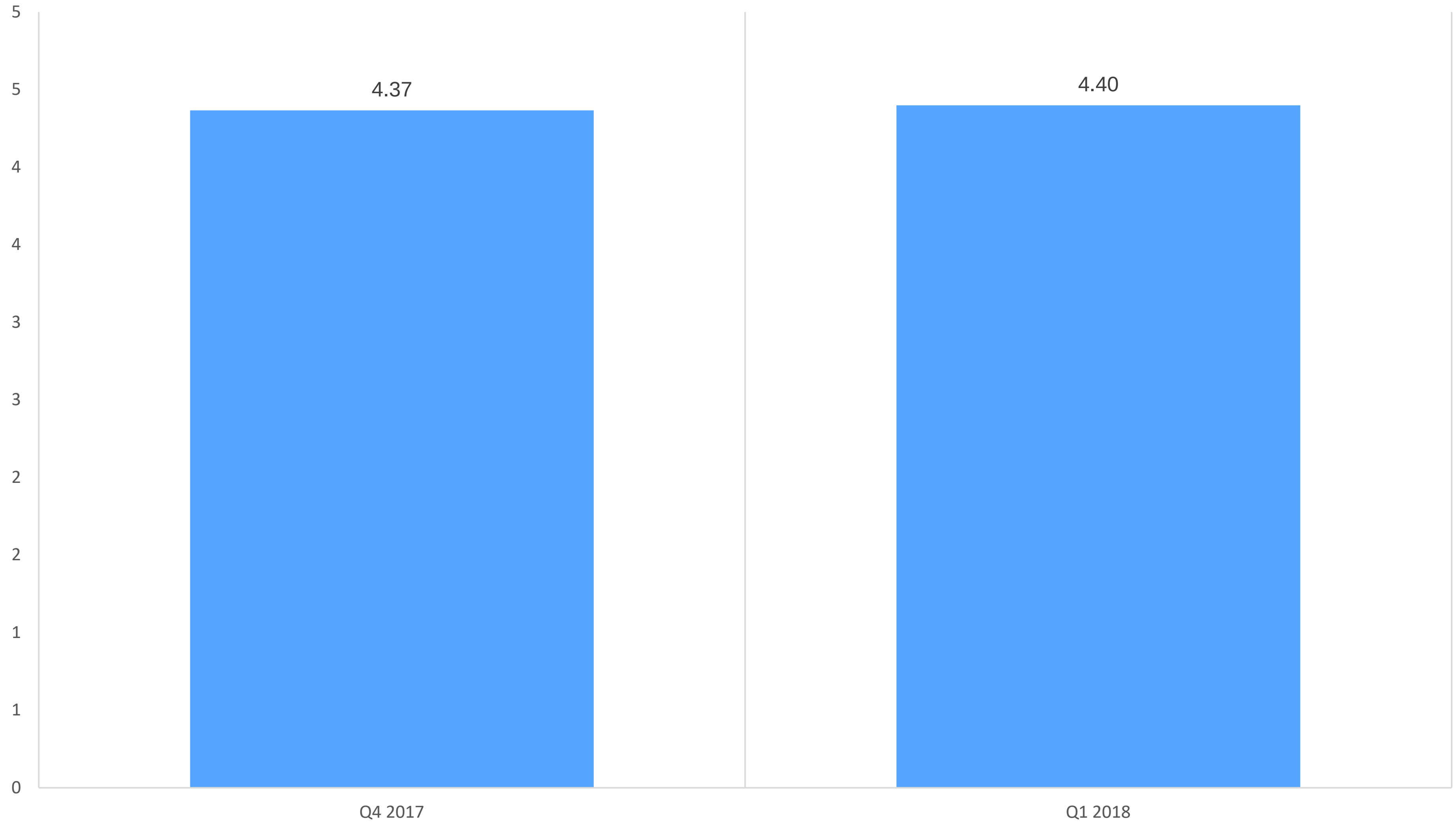


Figure 12: RLAH, data services: average consumption per month per total number of roaming subscriber (in MB)

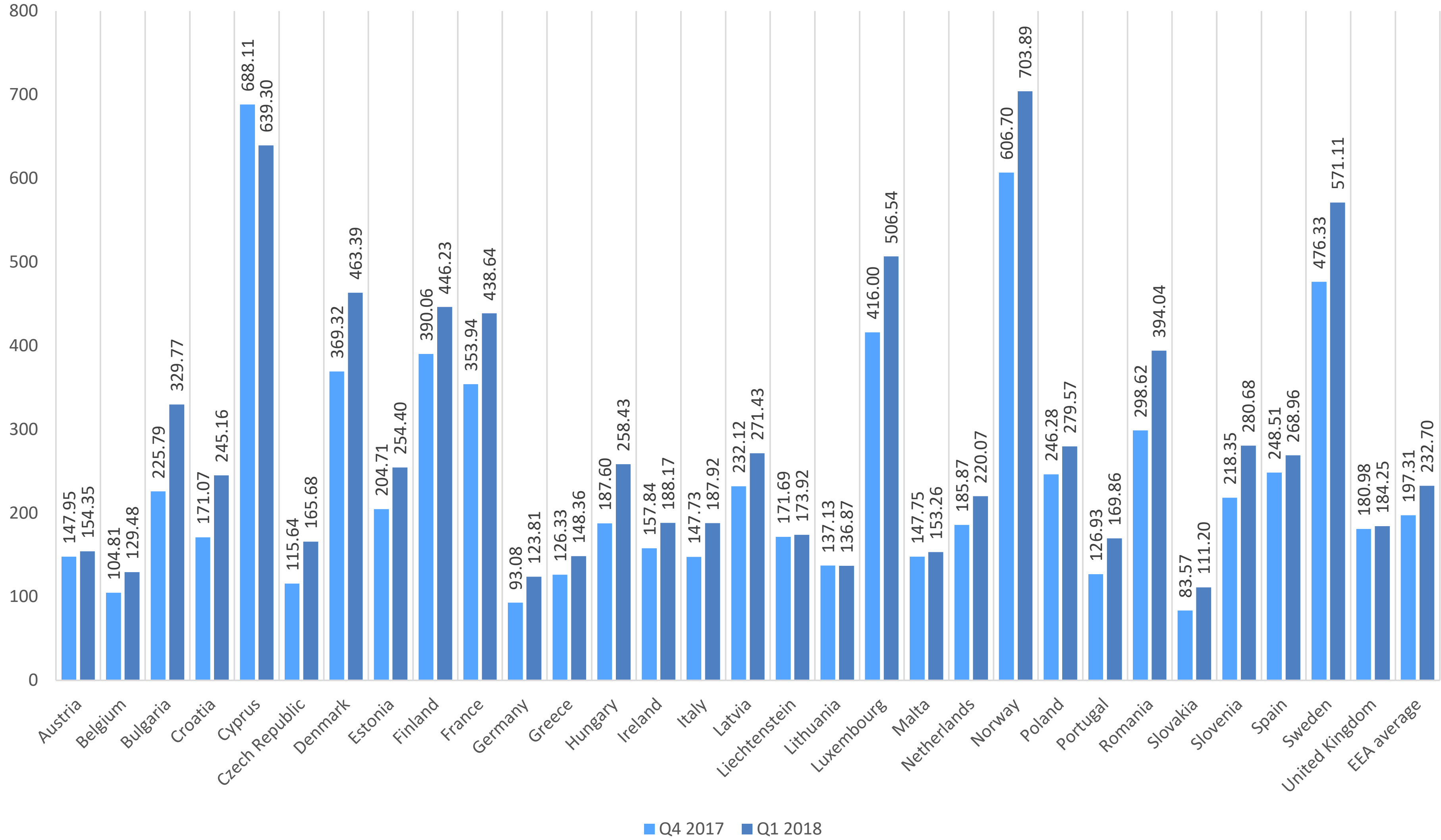


Figure 13: RLAH, data services: EEA average consumption per month per total number of roaming subscriber (in MB)

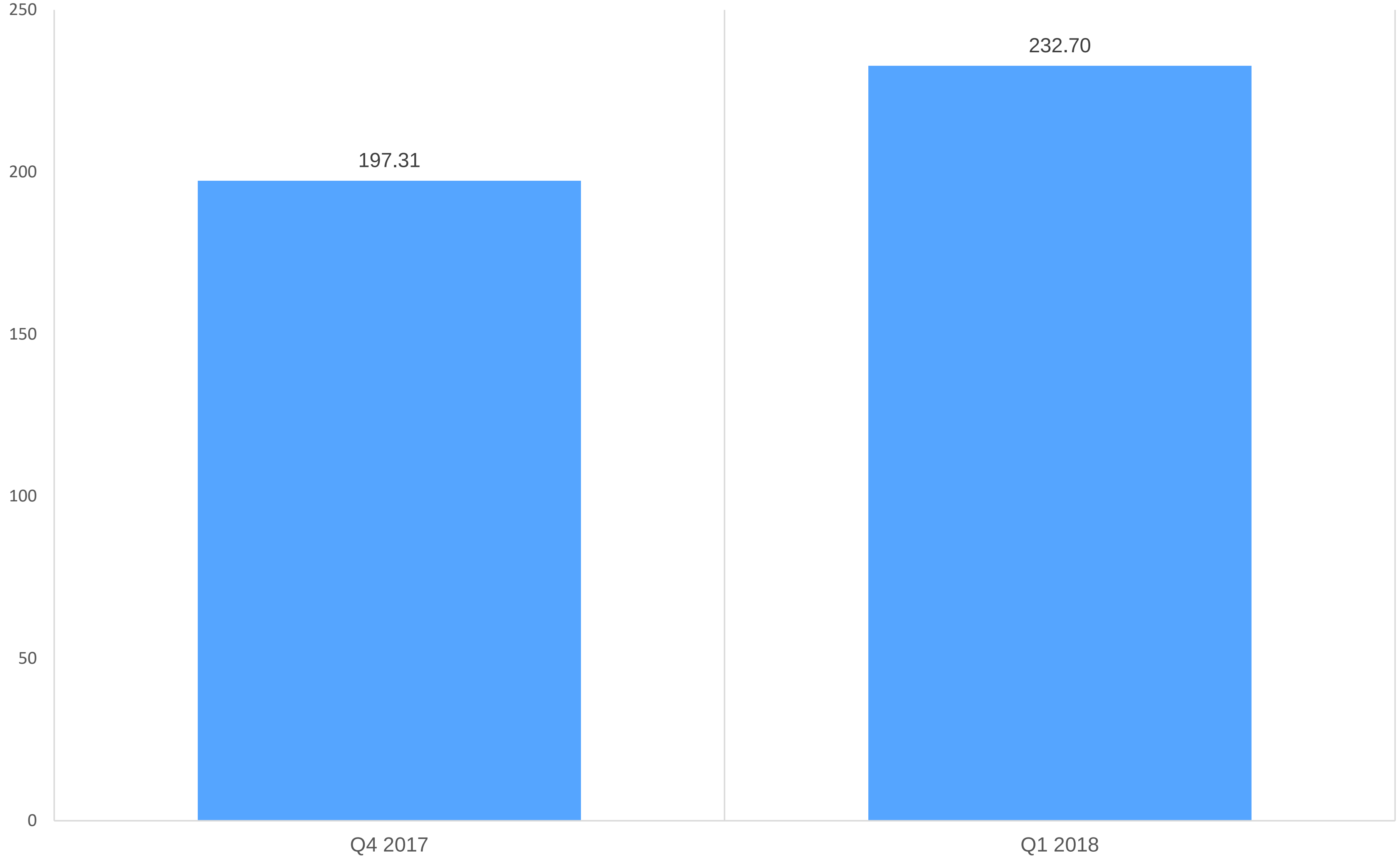


Figure 14: Share of total subscribers with EU/EEA roaming enabled, Q4 2017

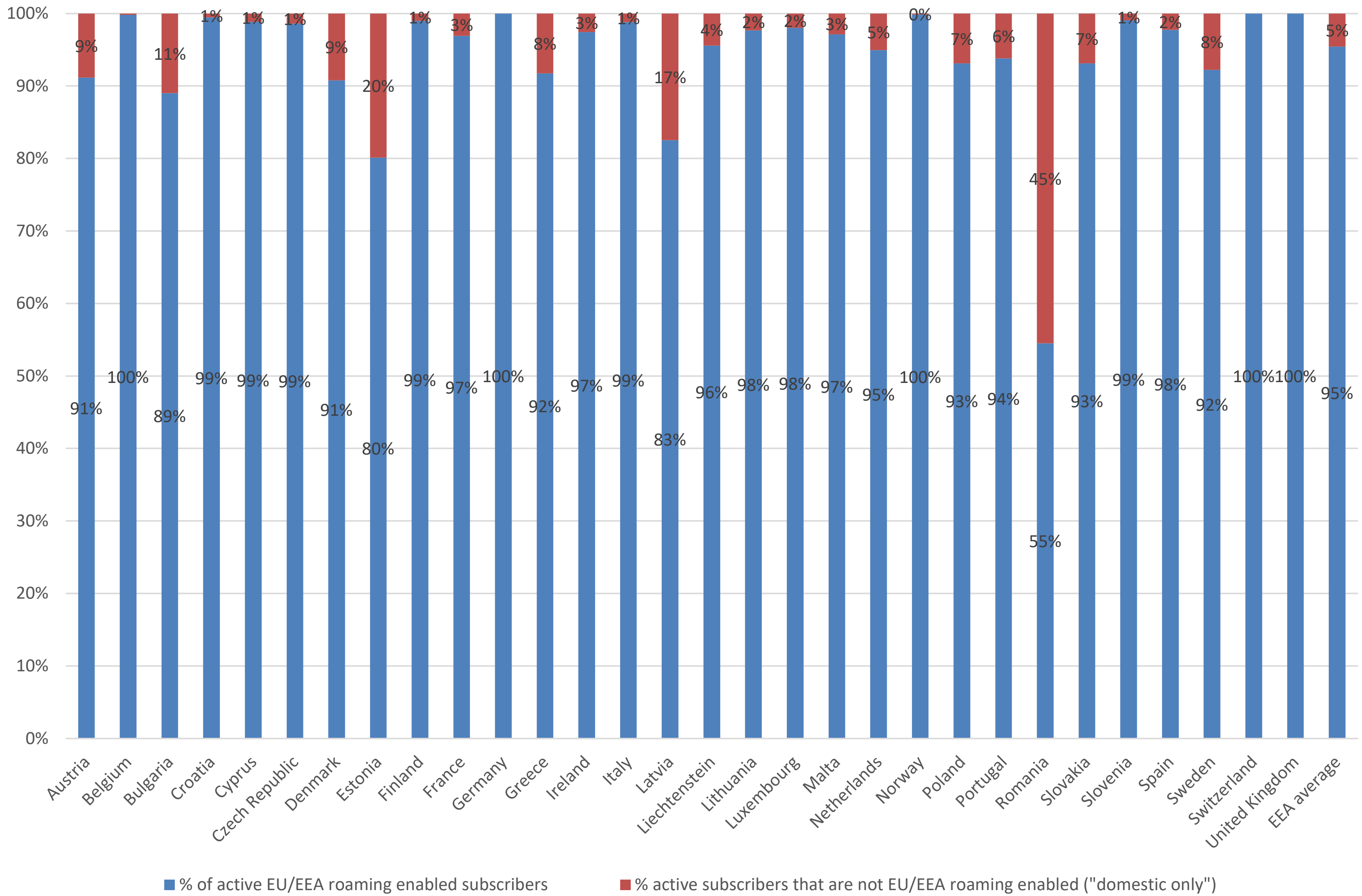
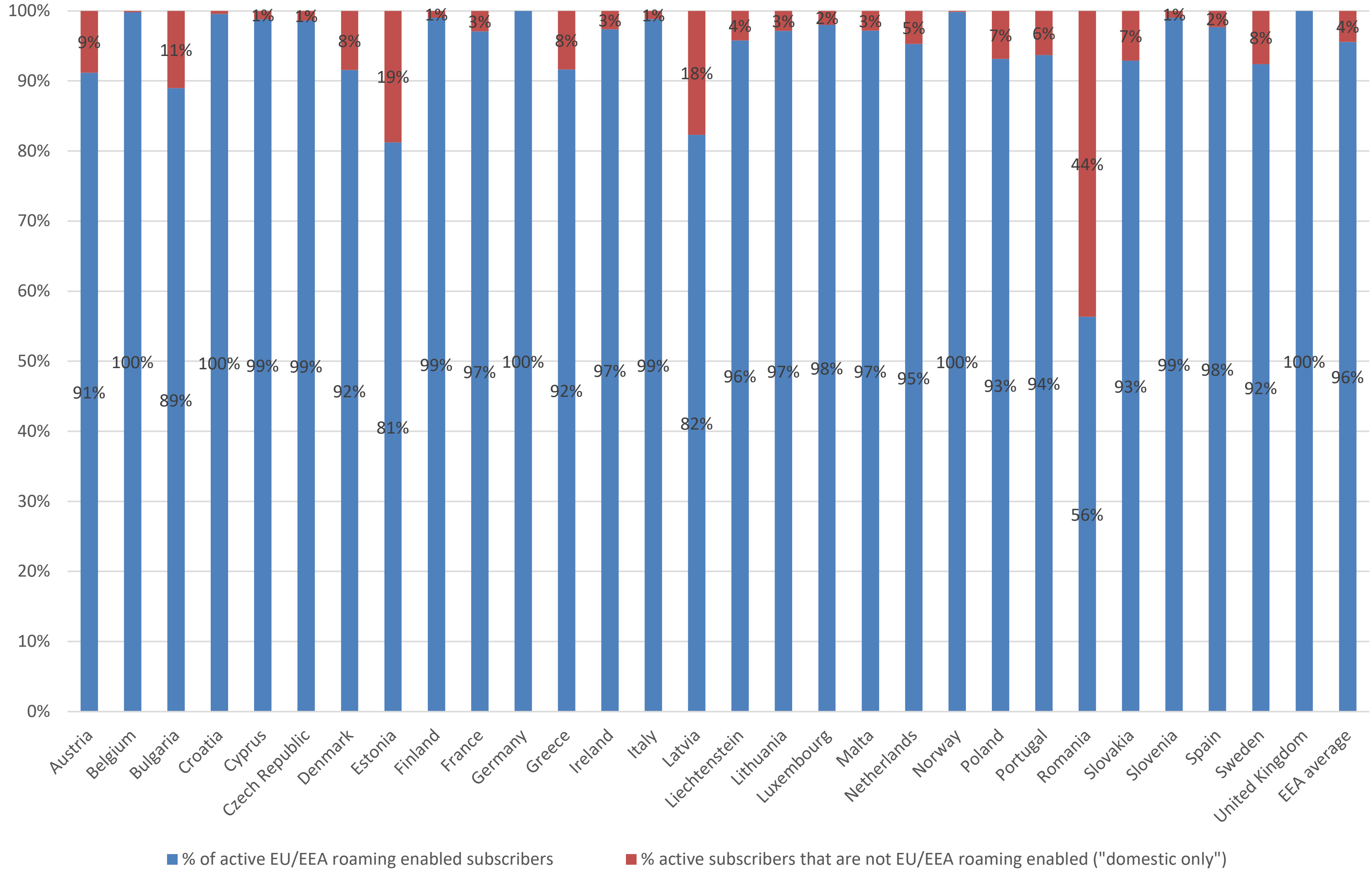


Figure 15: Share of total subscribers with EU/EEA roaming enabled, Q1 2018

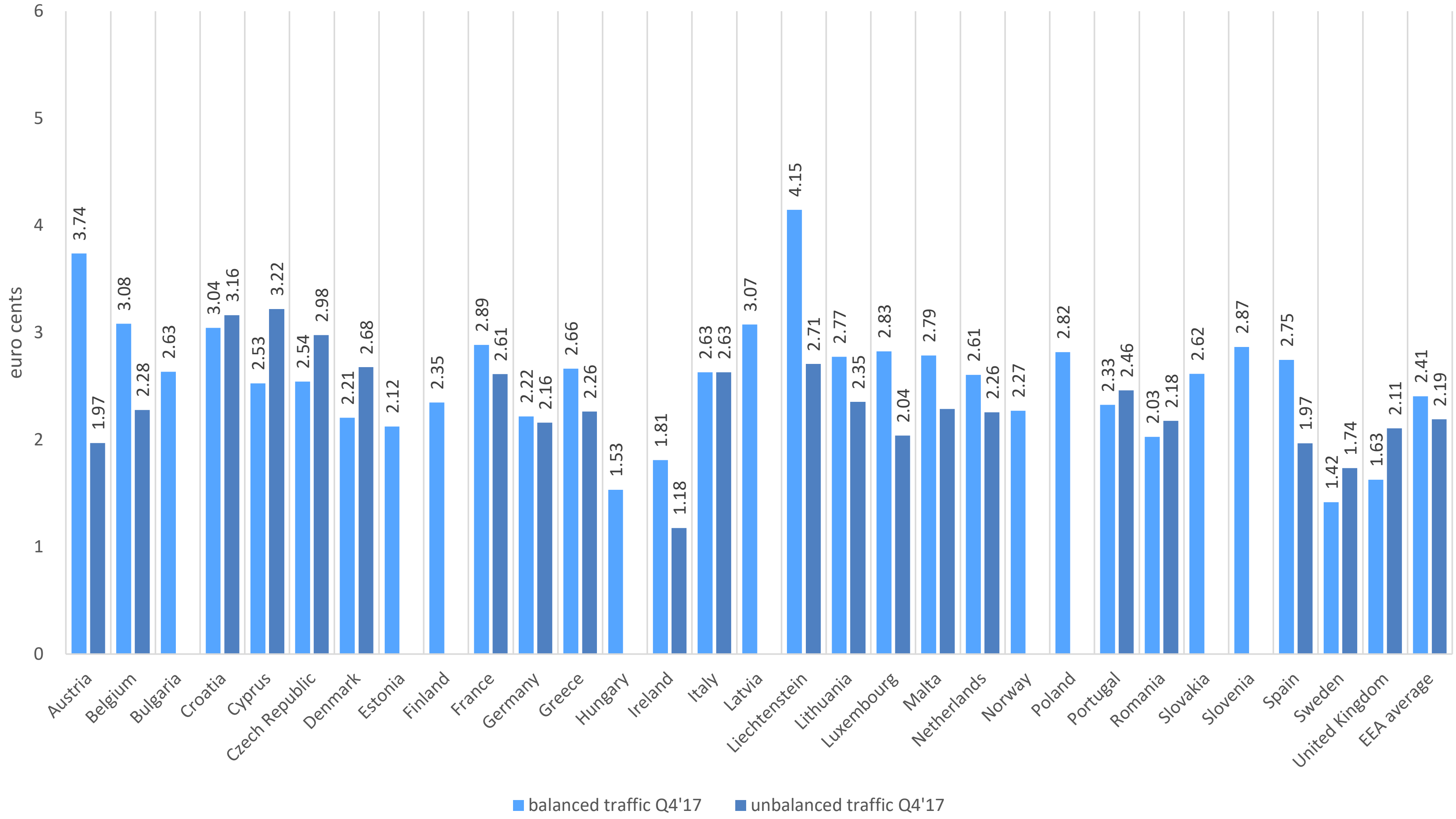


5.2. The development of Roaming Services

5.2.1. Voice roaming services

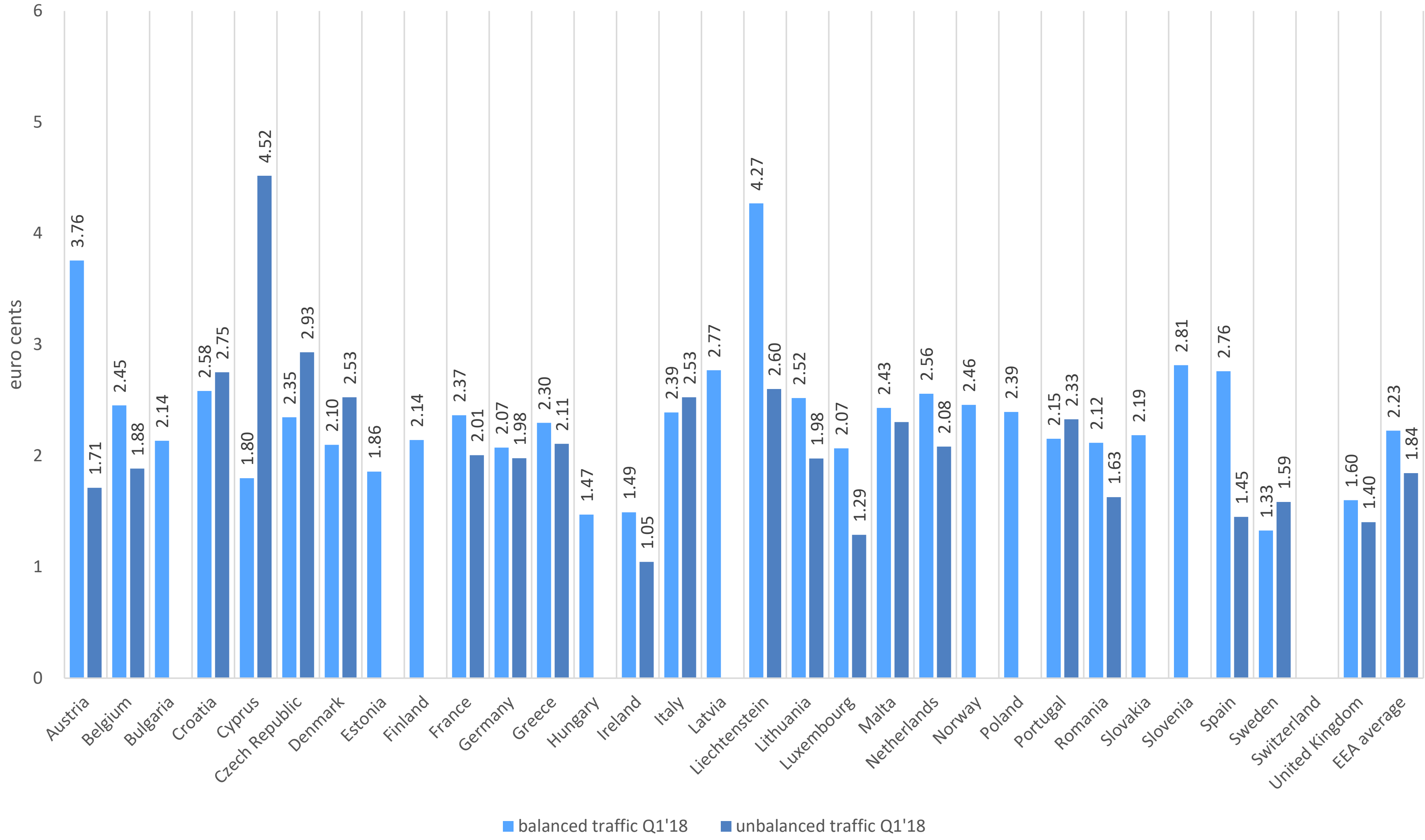
5.2.1.1 Wholesale prices

Figure 16: Average wholesale price per minute for roaming voice calls: charges for balanced and unbalanced traffic (wholesale roaming inbound), Q4 2017



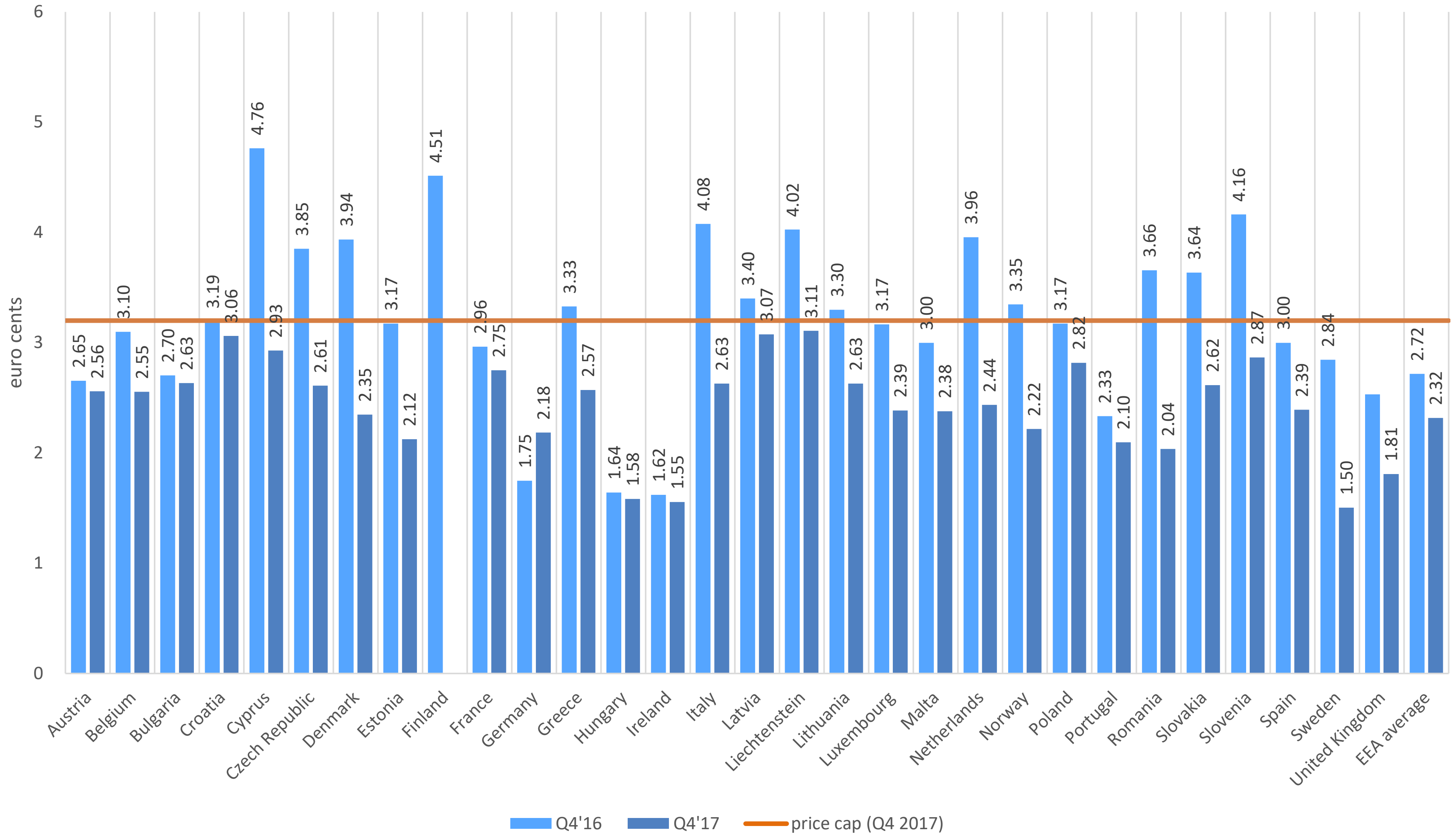
Portugal: the number of operators that reported data for calculating these estimates (disaggregated for balanced and unbalanced traffic) is different from the number of operators that reported data for calculating the estimates (non-disaggregated) in Figure 18 and Figure 19

Figure 17: Average wholesale price per minute for roaming voice calls: charges for balanced and unbalanced traffic (wholesale roaming inbound) Q1 2018



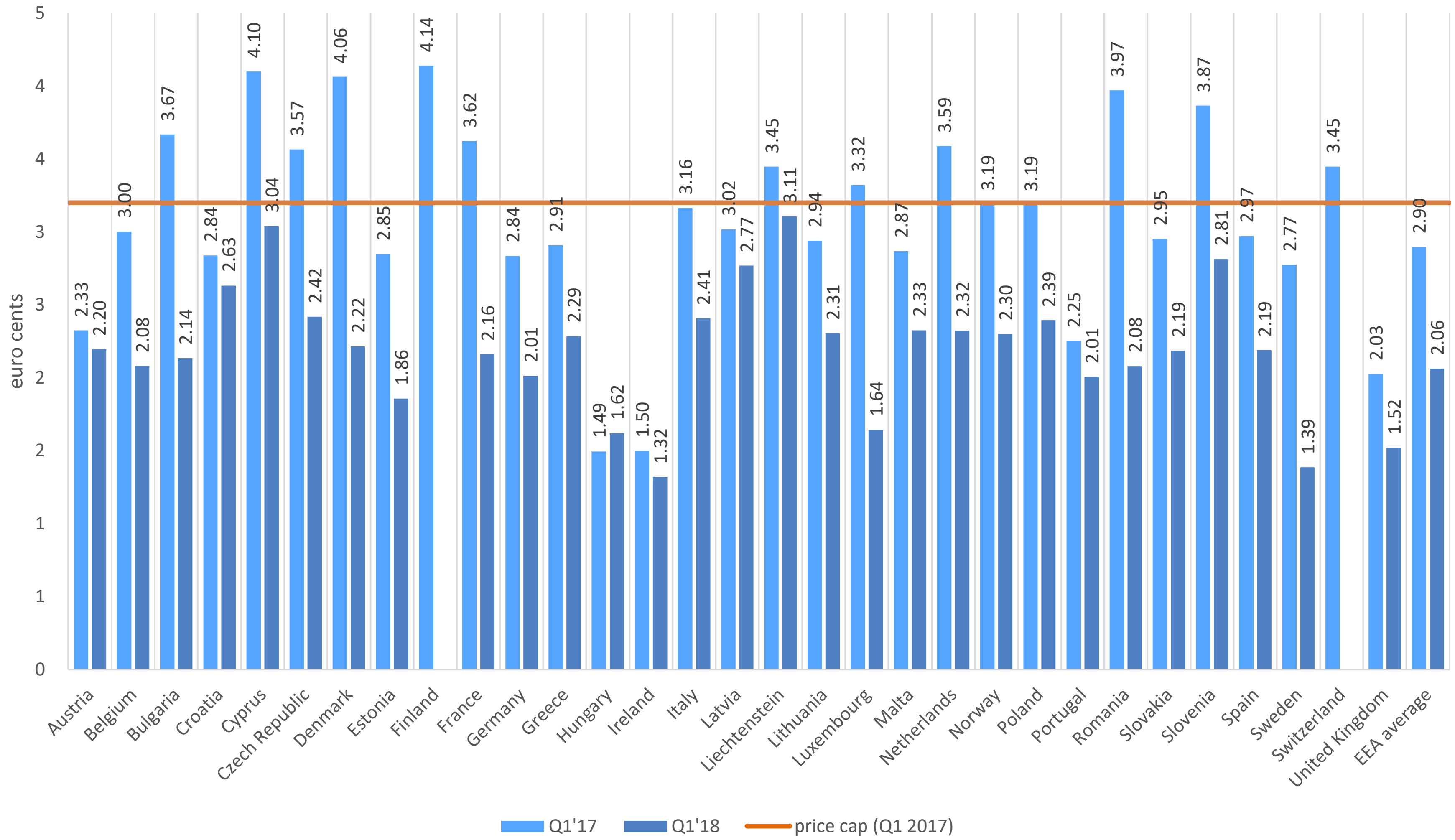
Portugal: the number of operators that reported data for calculating these estimates (disaggregated for balanced and unbalanced traffic) is different from the number of operators that reported data for calculating the estimates (non-disaggregated) in Figure 18 and Figure 19

Figure 18: Total traffic (wholesale roaming inbound): Average wholesale price per minute for roaming voice calls, Q4'16 and Q4'17



Portugal: the number of operators that reported data for calculating these estimates is different from the number of operators that reported data for calculating the estimates (disaggregated for balanced and unbalanced traffic) in Figure 16 and Figure 17

Figure 19: Total traffic (wholesale roaming inbound): Average wholesale price per minute for roaming voice calls, Q1 2017 and Q1 2018



Portugal the number of operators that reported data for calculating these estimates is different from the number of operators that reported data for calculating the estimates (disaggregated for balanced and unbalanced traffic) in Figure 16 and Figure 17

Figure 20: EEA average wholesale price per minute for wholesale roaming voice calls

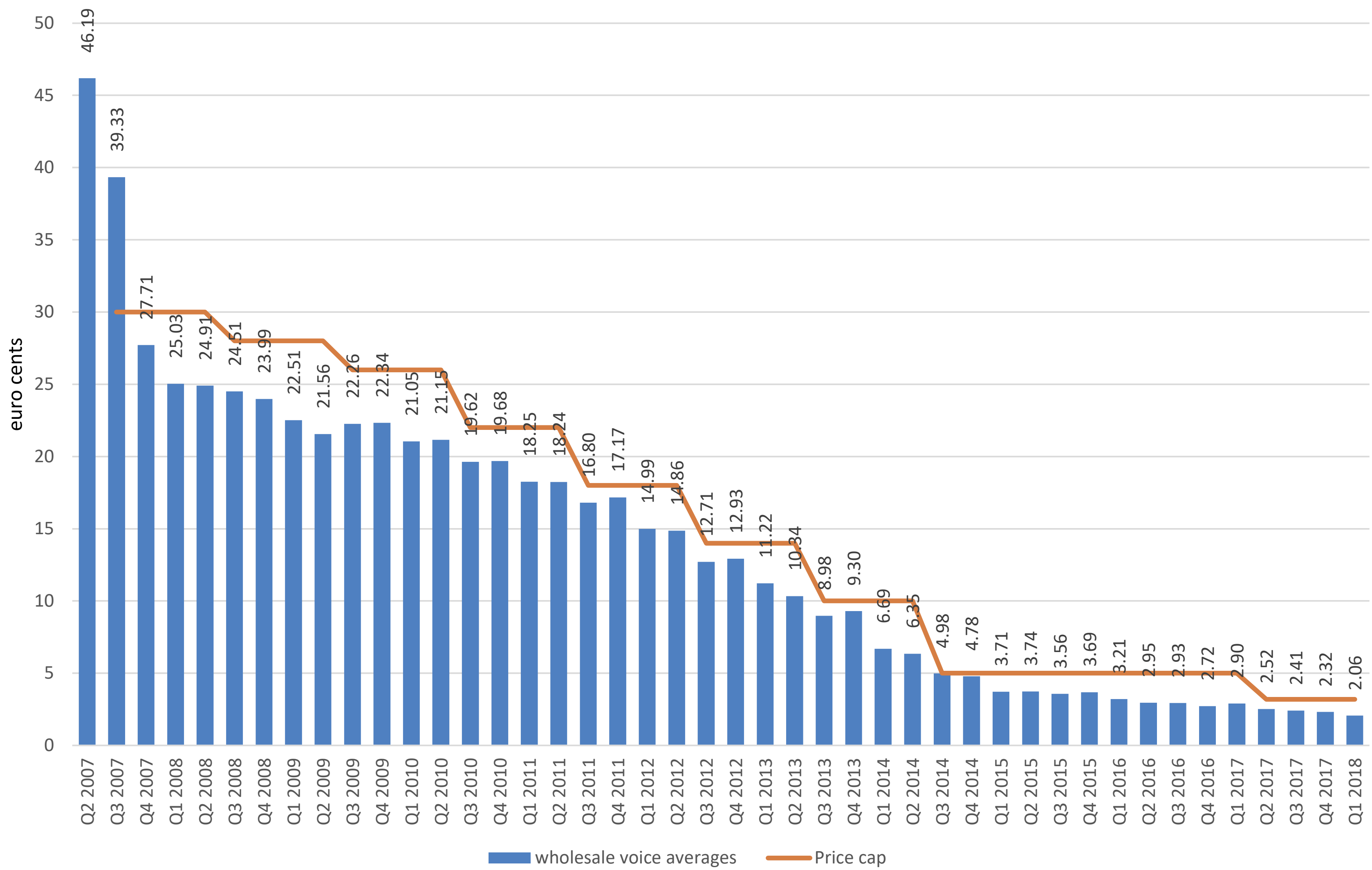


Figure 21: RoW traffic: average wholesale price charged by EEA operators per minute, Q4'17 and Q1'18

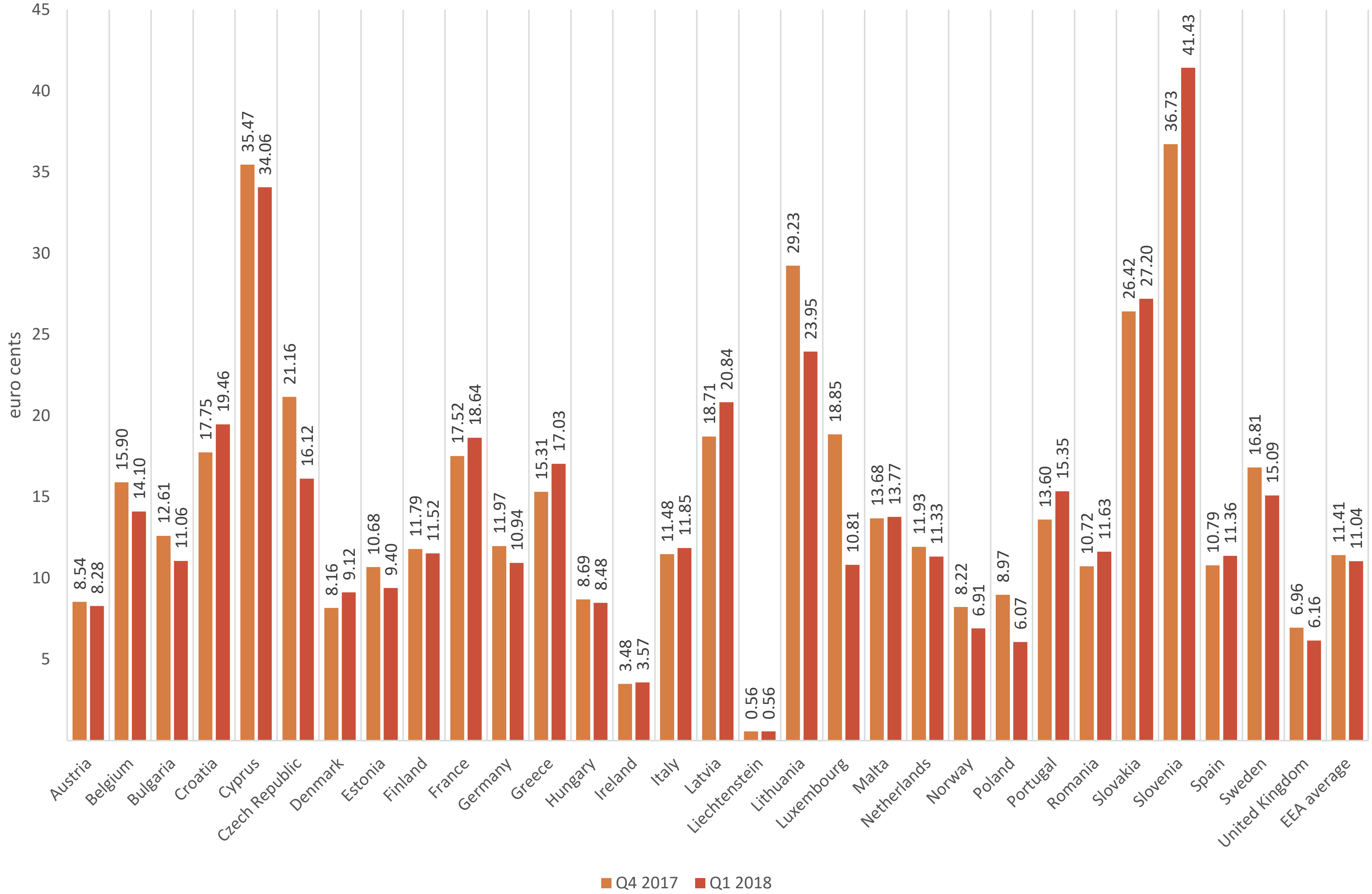


Figure 22: EEA and RoW average wholesale price per minute, Q2'16 – Q1'18 (balanced, unbalanced, total and RoW traffic)

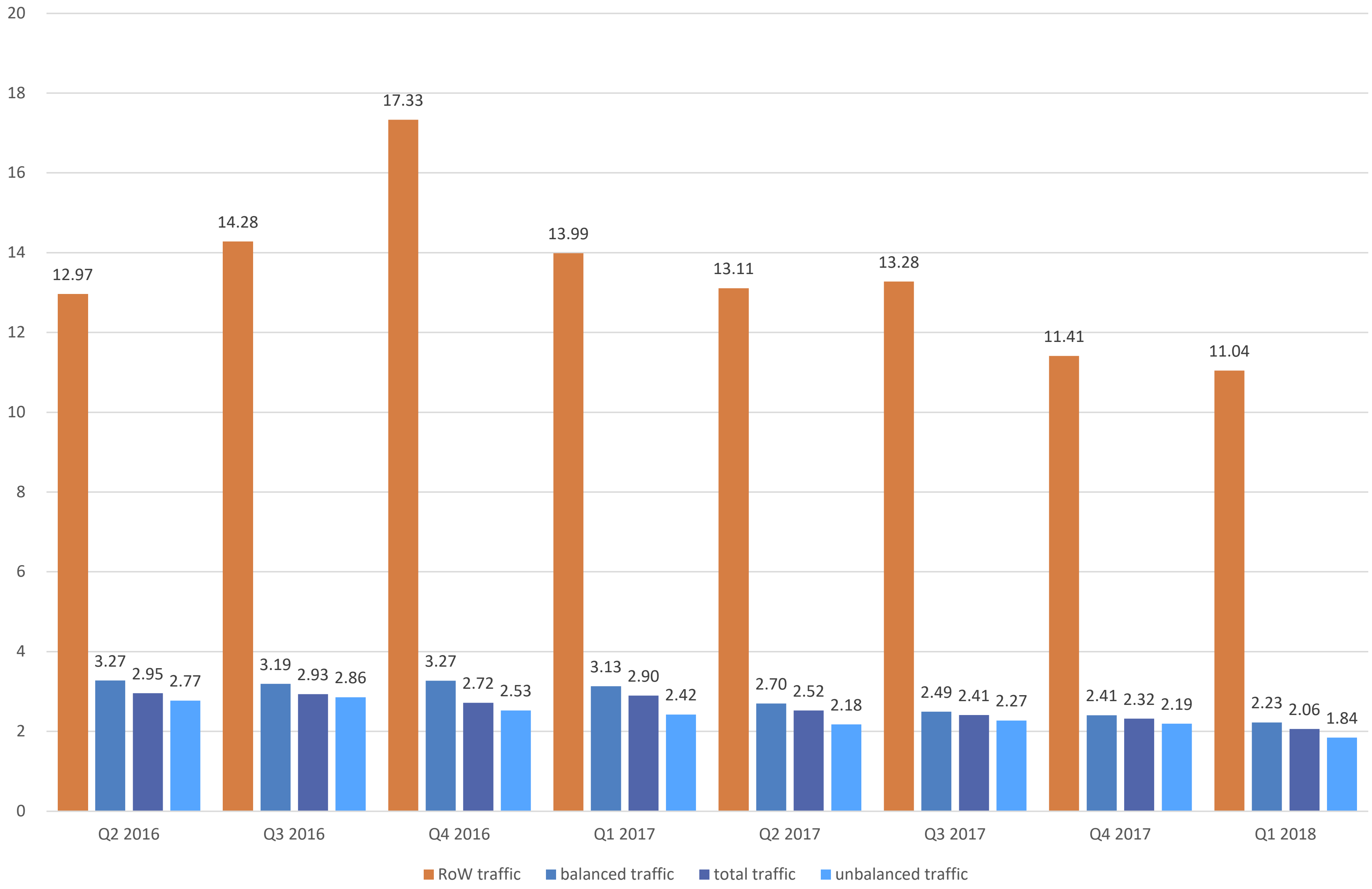
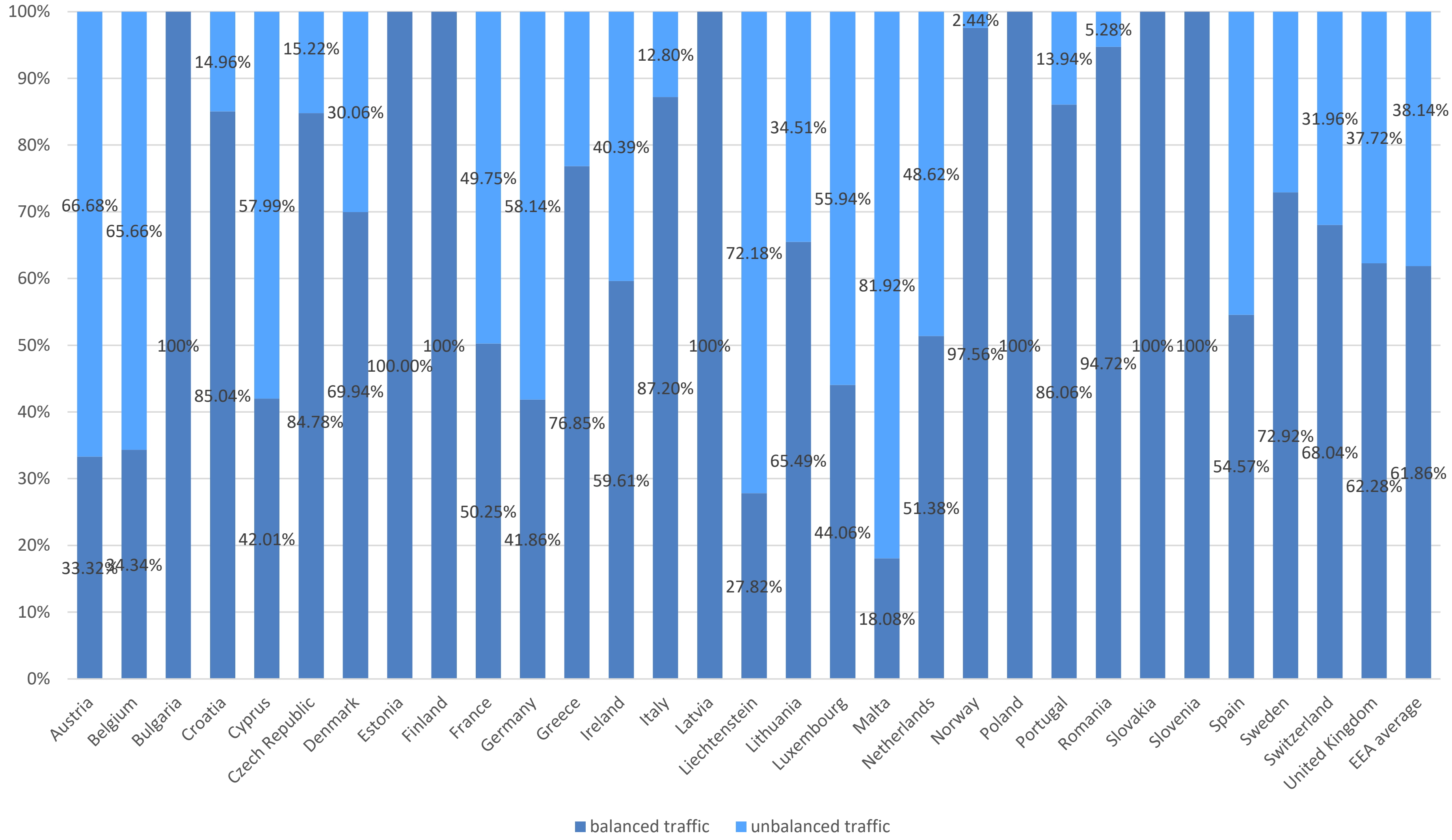
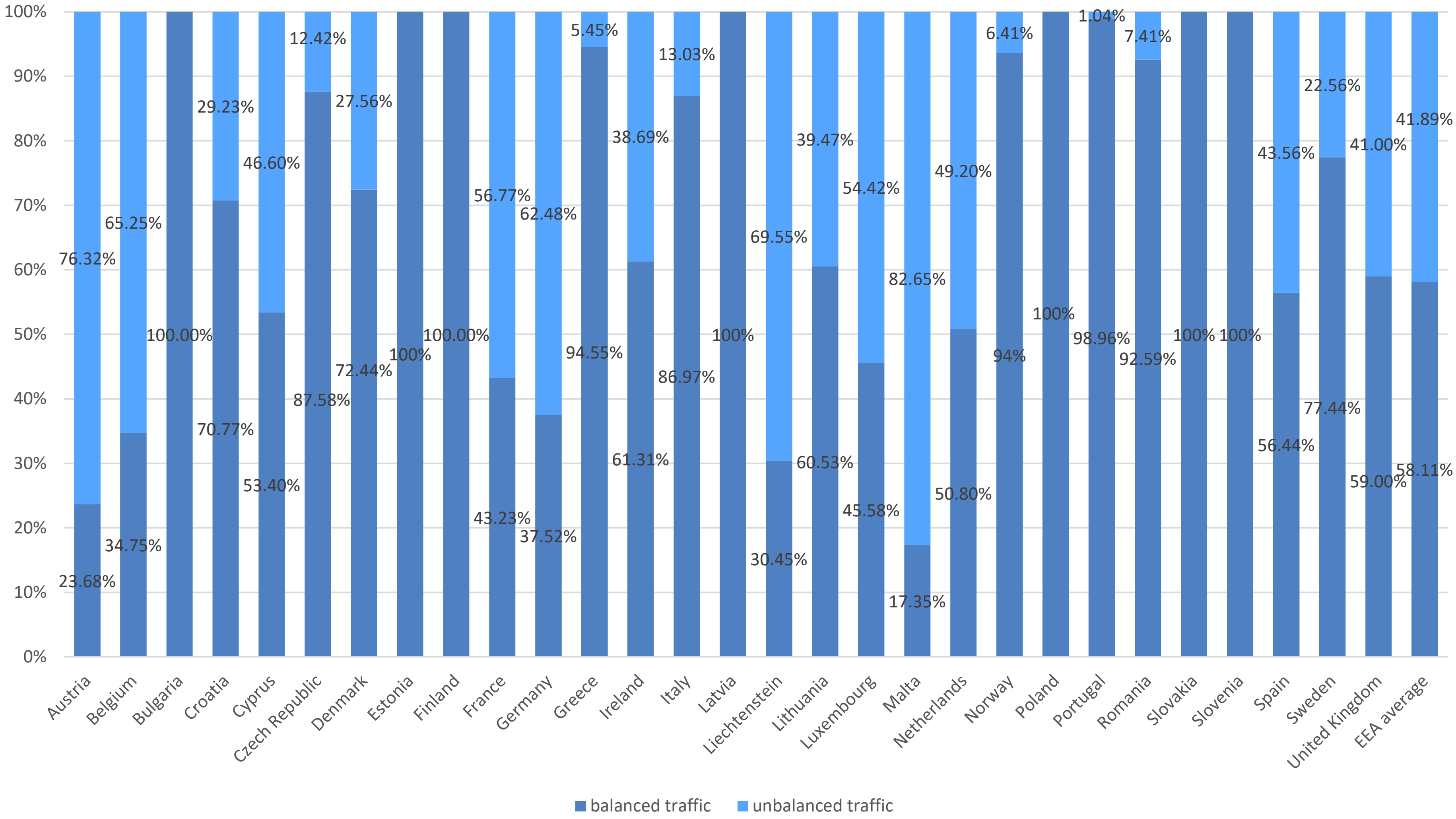


Figure 23: Wholesale roaming inbound (voice services): Proportion of balanced/unbalanced traffic within EEA countries, Q4 2017



Portugal: the number of operators that reported data for calculating these estimates (disaggregated for balanced and unbalanced traffic) is different from the number of operators that reported data for calculating the non-disaggregated estimates.

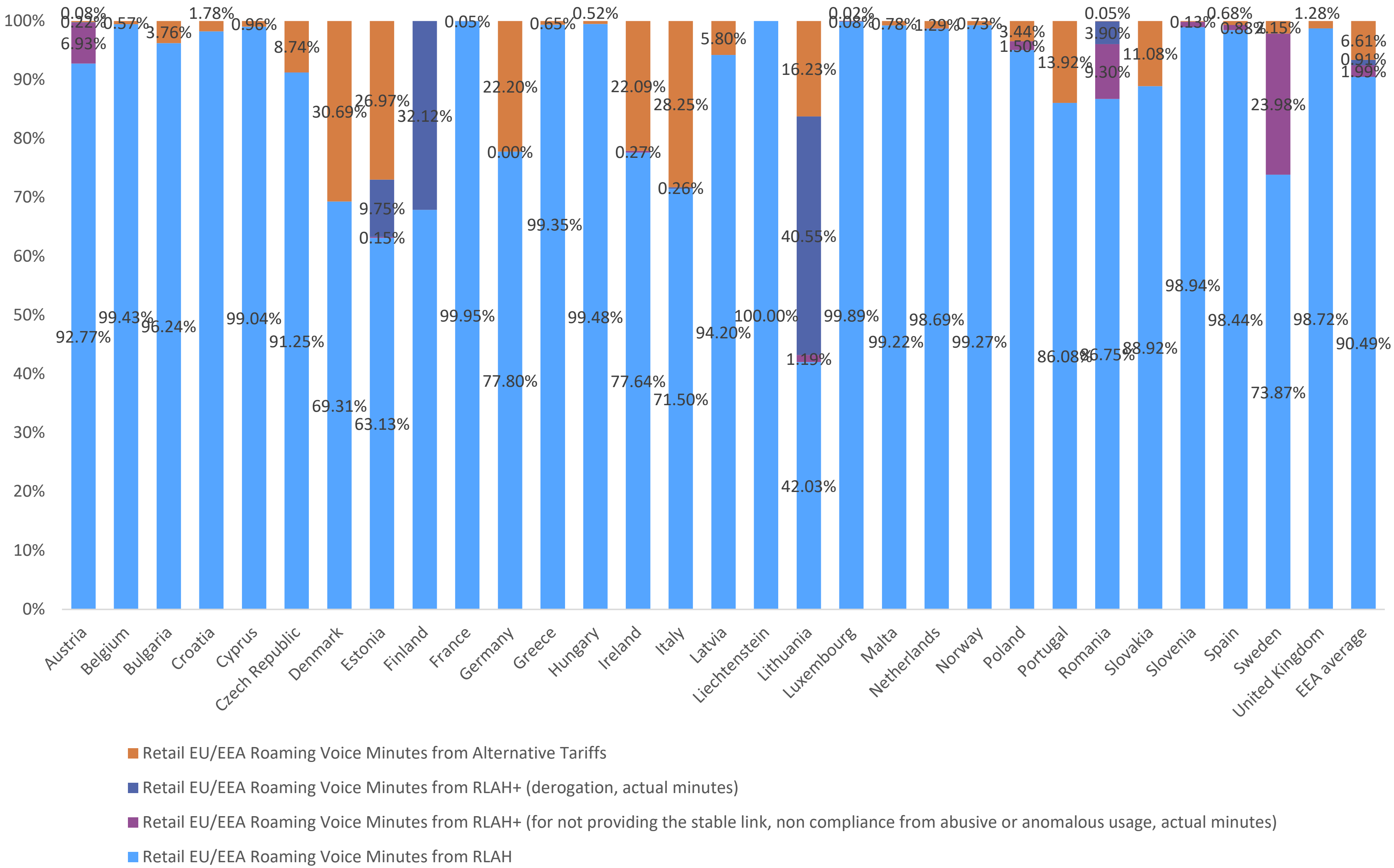
Figure 24 Wholesale roaming inbound (voice services): Proportion of balanced/unbalanced traffic within EEA countries, Q1 2018



Portugal: the number of operators that reported data for calculating these estimates (disaggregated for balanced and unbalanced traffic) is different from the number of operators that reported data for calculating the non-disaggregated estimates.

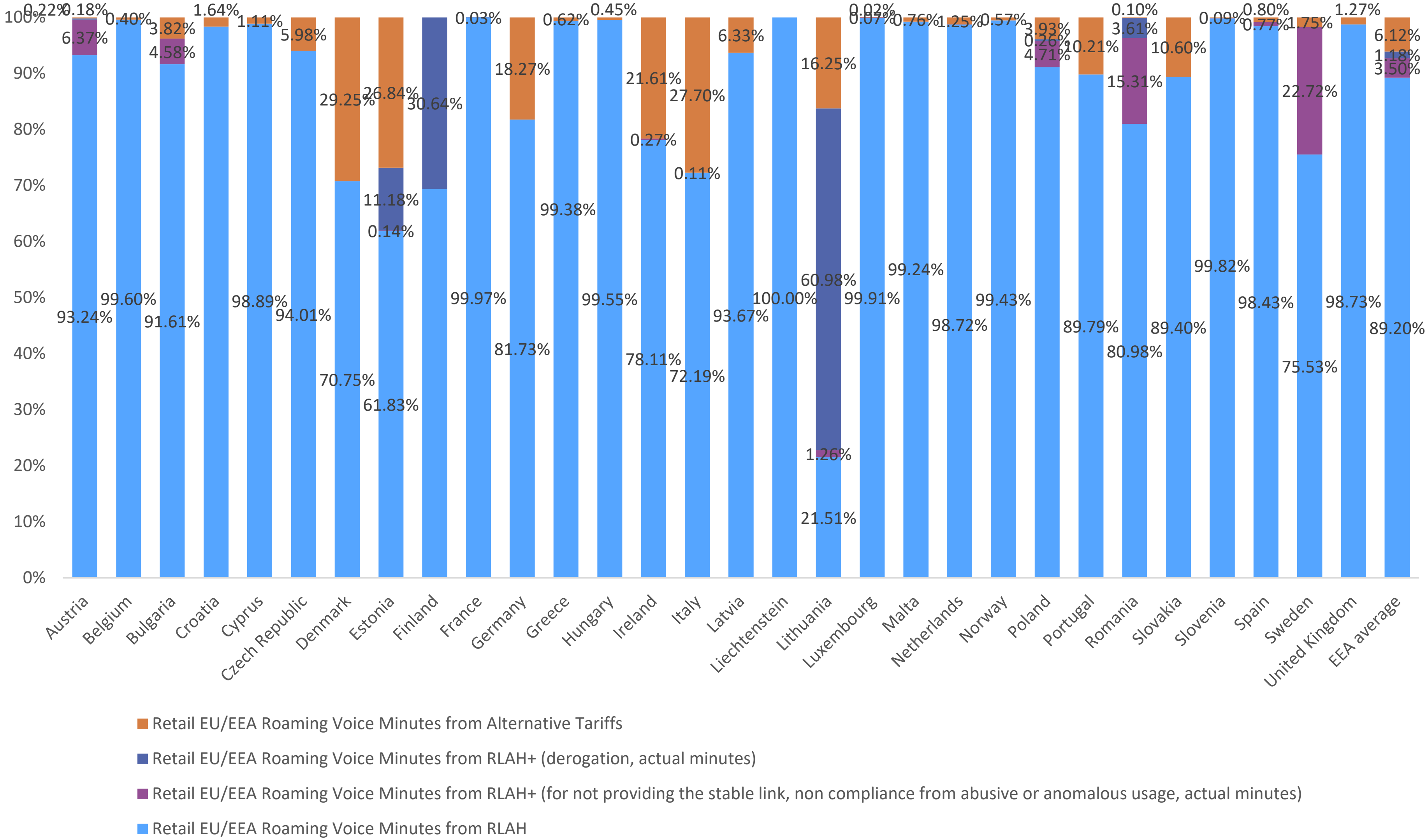
5.2.1.2 Consumption patterns

Figure 25: Percentage of total minutes of calls made, Q4 2017



Finland: RLAH+ (derogation) and Alternative tariffs has been combined as RLAH+ (derogation), alternative tariffs are not reported due to confidentiality reasons
EEA excludes: Finland

Figure 26: Percentage of total minutes of calls made, Q1 2018



Finland: RLAH+ (derogation) and Alternative tariffs has been combined as RLAH+ (derogation), alternative tariffs are not reported due to confidentiality reasons
EEA excludes: Finland

Figure 27: EEA percentage and volumes of total minutes of calls made, Q3'16 – Q1'18

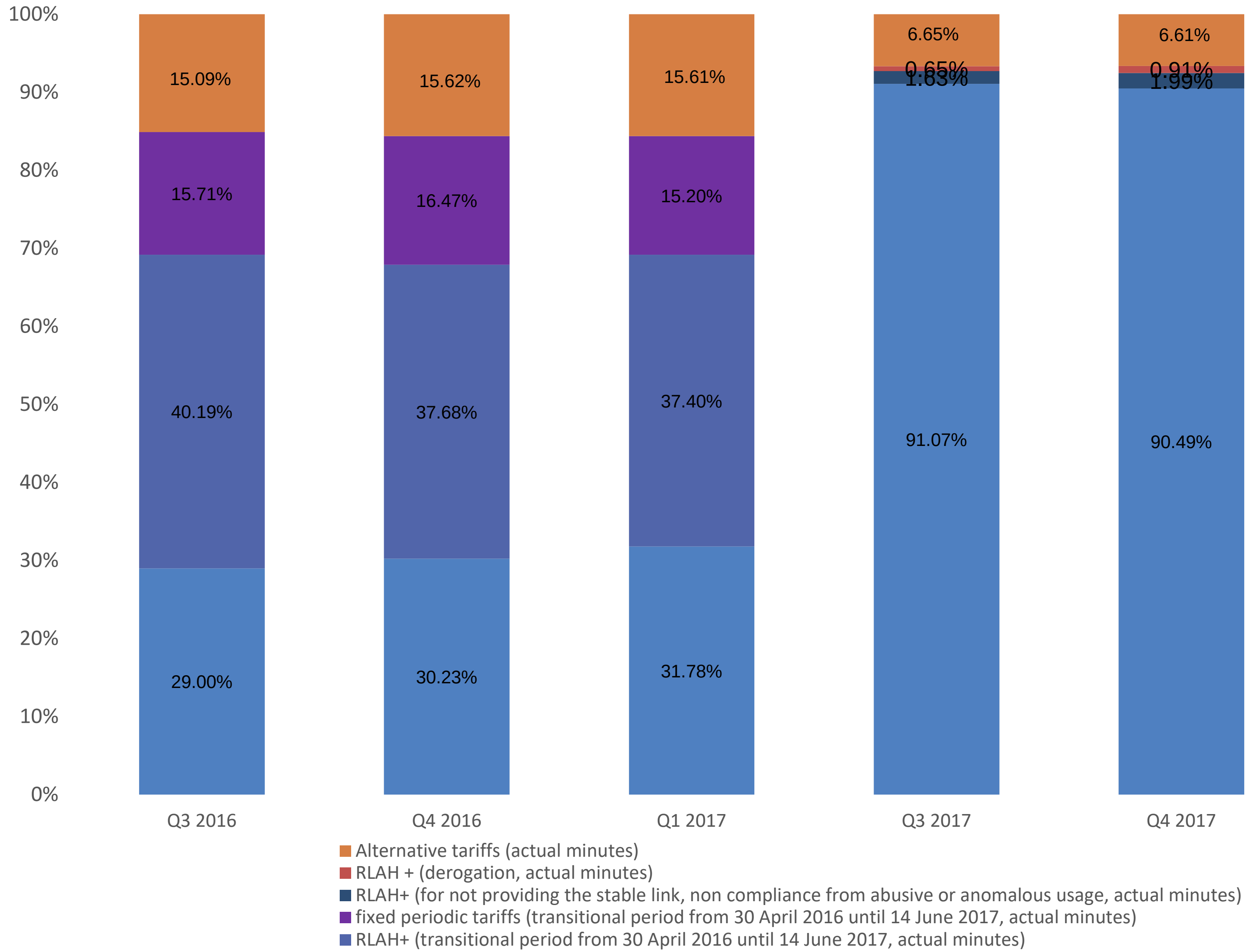


Figure 28: roaming calls made: average number of minutes per month per total number of roaming subscriber, Q3’17, Q4’17 and Q1’18

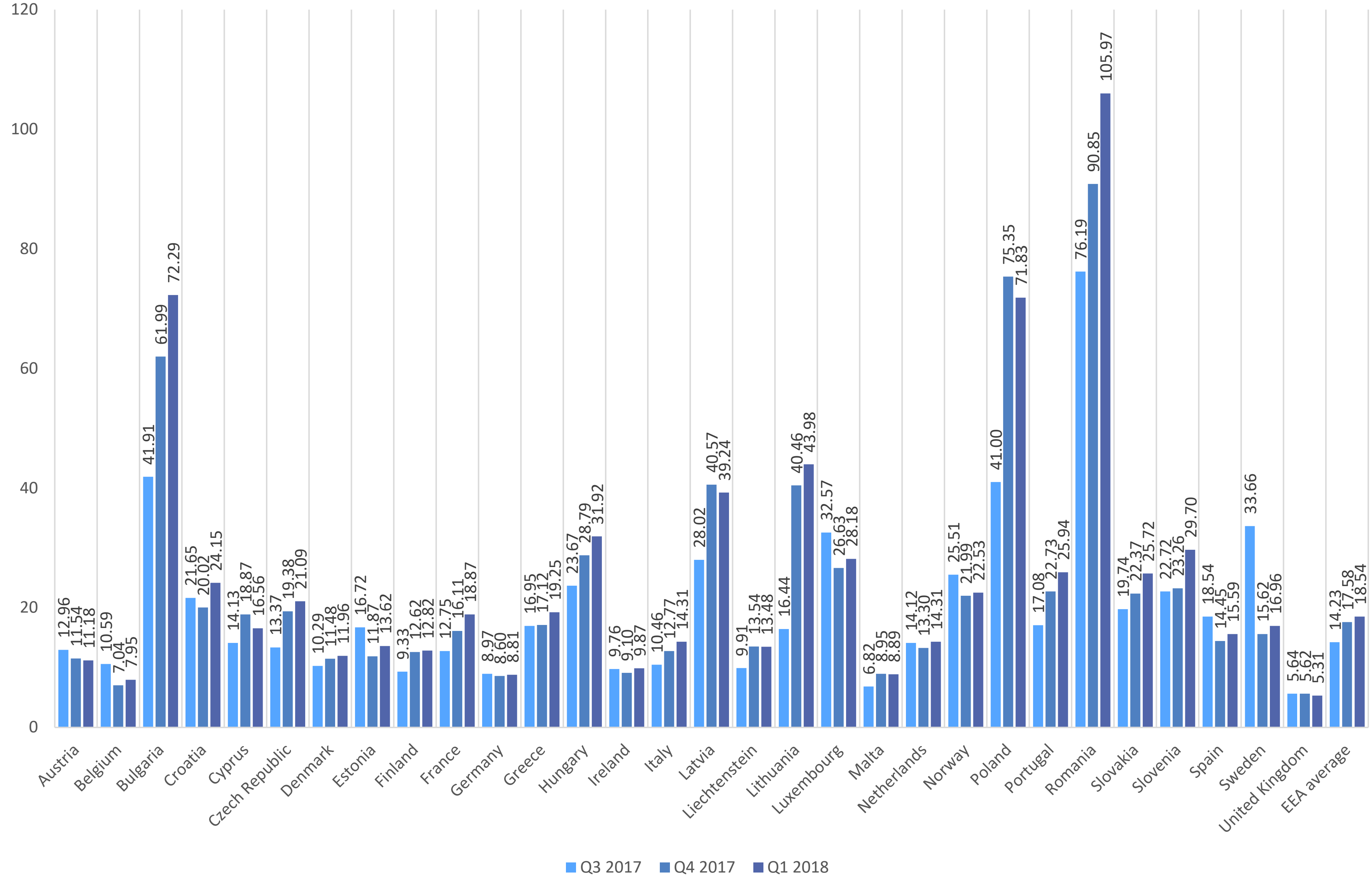


Figure 29: roaming calls made: EEA average number of minutes per month per total number of roaming subscriber Q2’16 – Q1’18

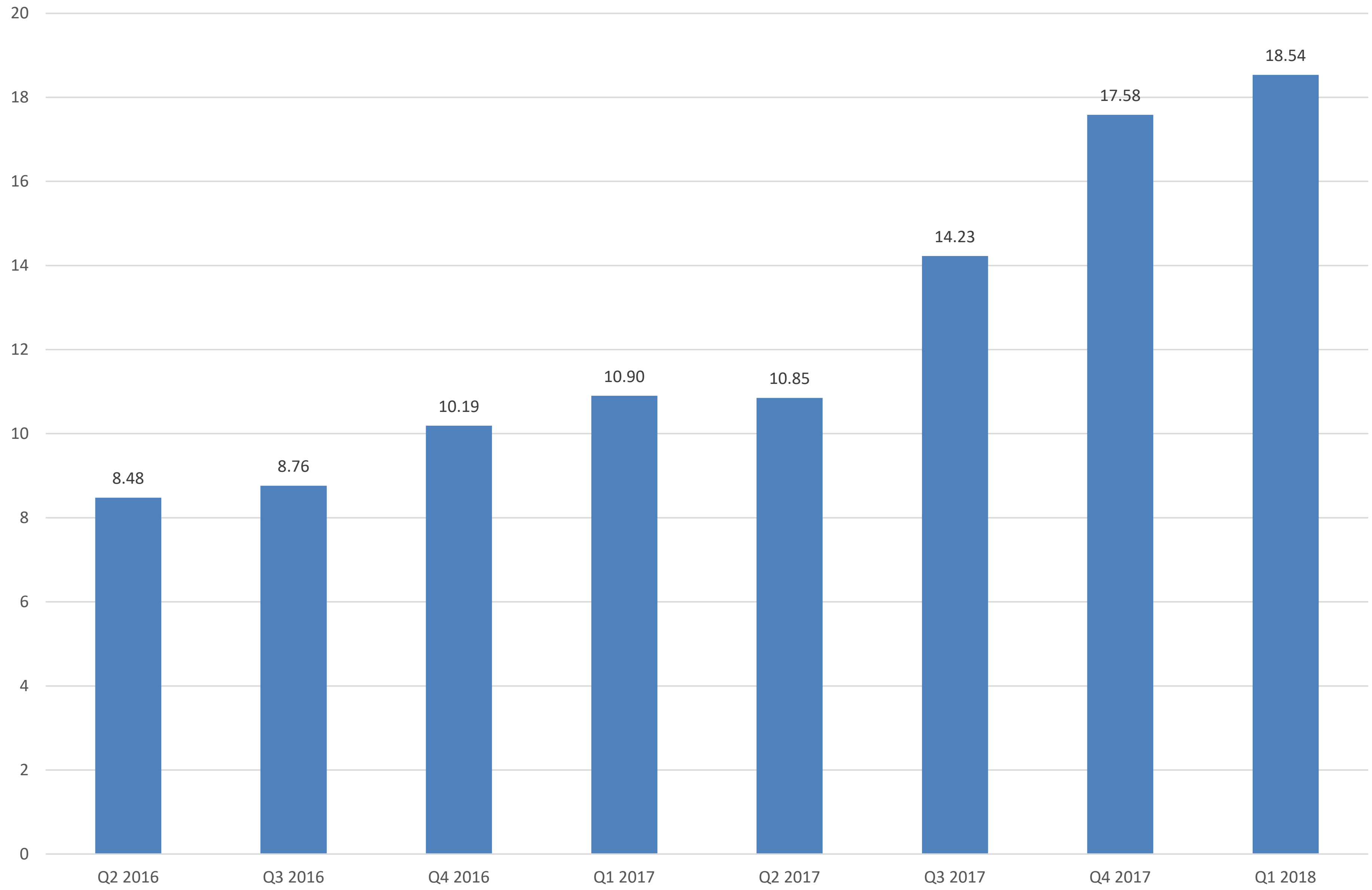
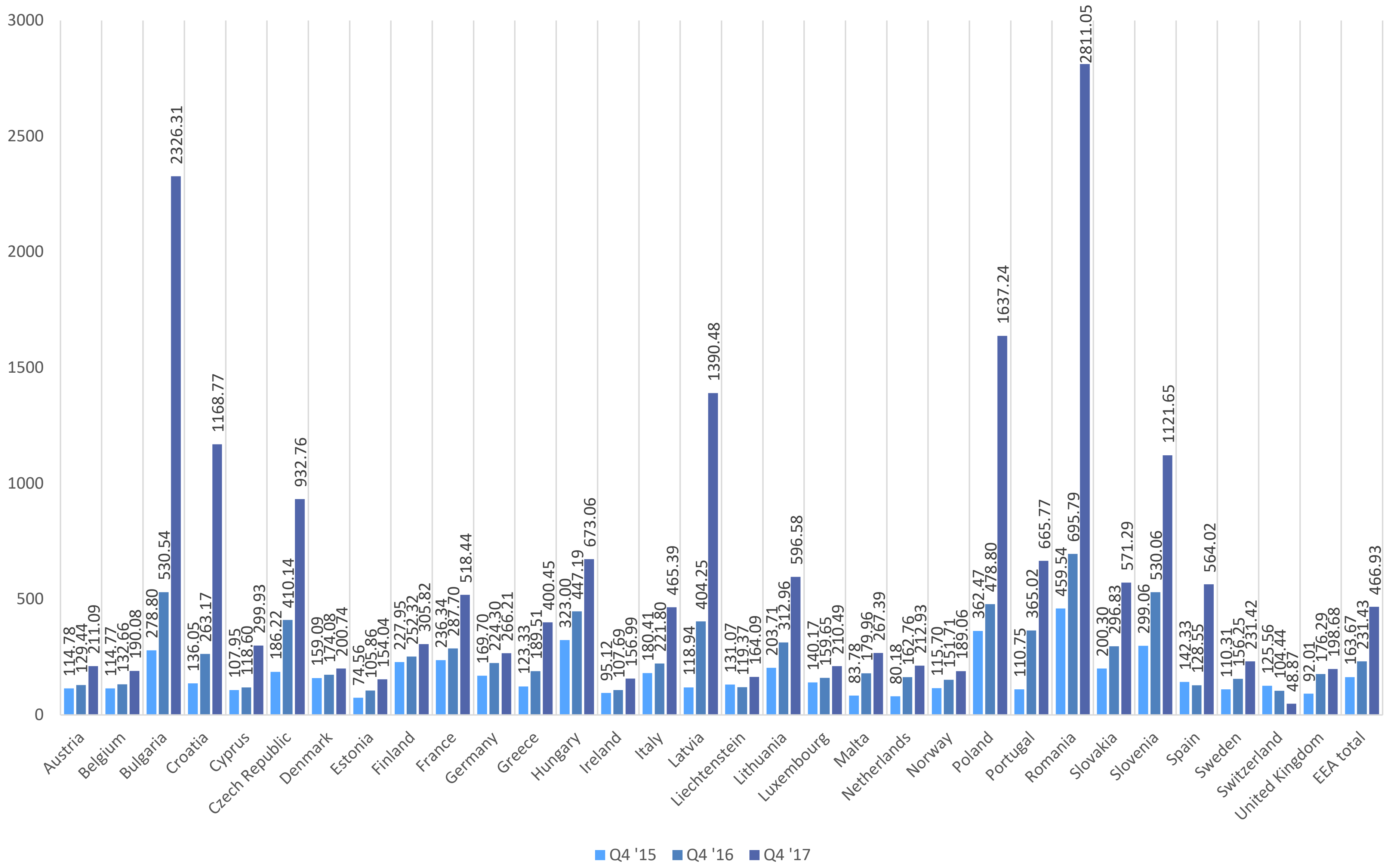
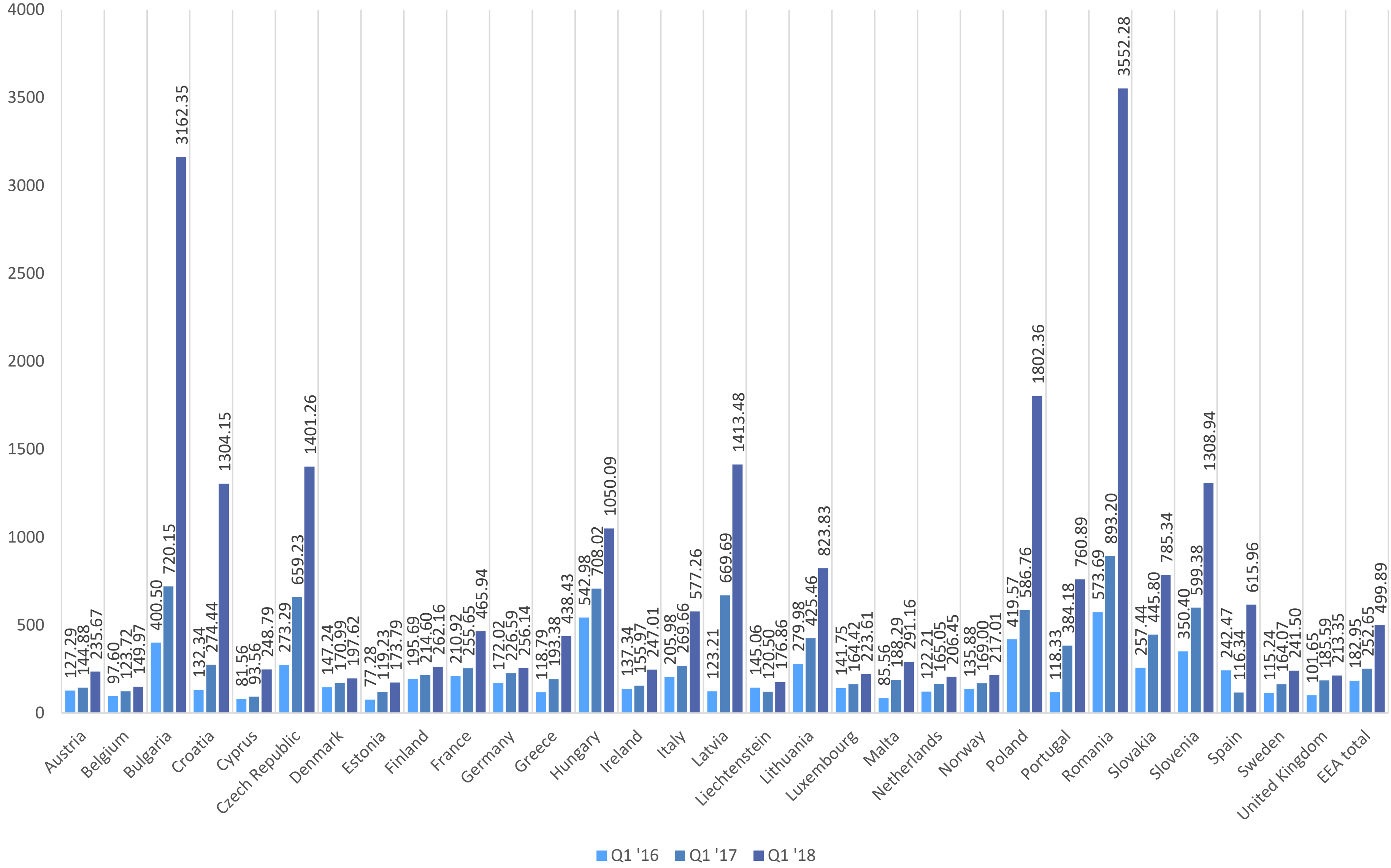


Figure 30: Roaming calls made traffic Index, Q4'15, Q4'16 and Q4'17*



*Reference period: Q4'12= 100, Croatia: Q4'13= 100

Figure 31: Roaming calls made traffic Index, Q1'16, Q1'17 and Q1'18*



*Reference period: Q1'12= 100, Croatia: Q1'14=100, Liechtenstein: Q1'13 = 100

Figure 32: EEA average: Roaming calls made traffic, (millions of minutes). Q2'17 – Q1'18

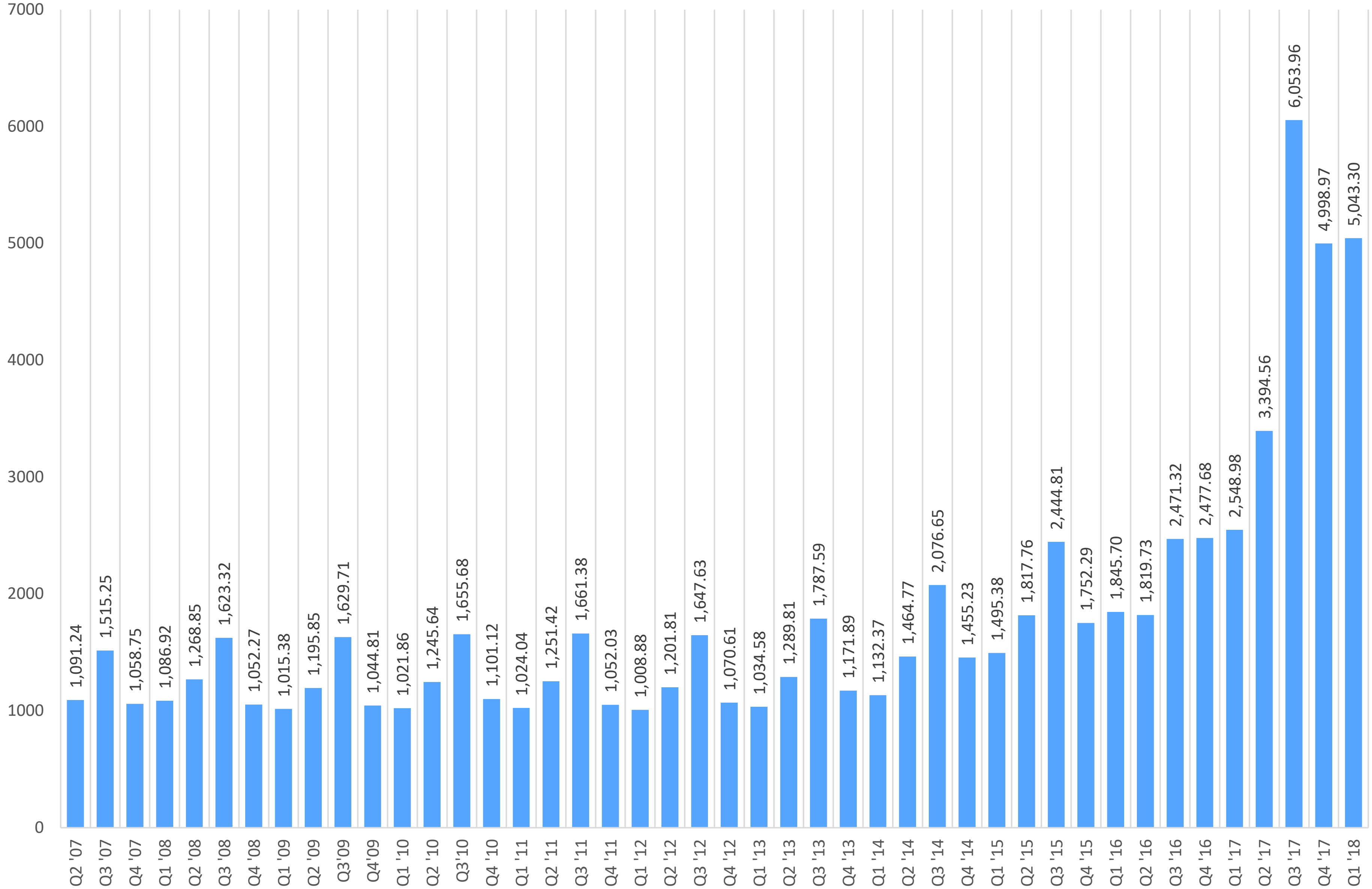
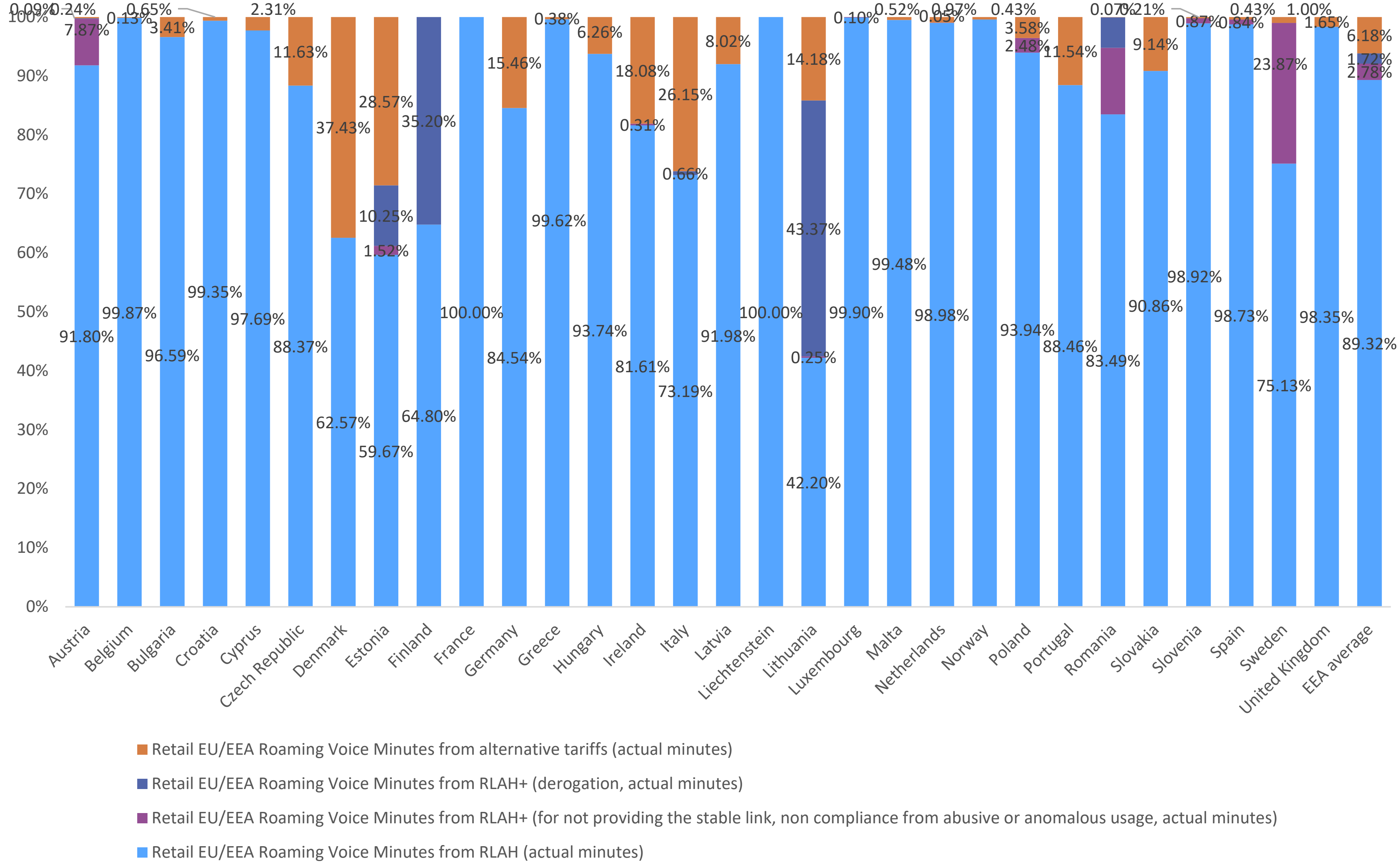
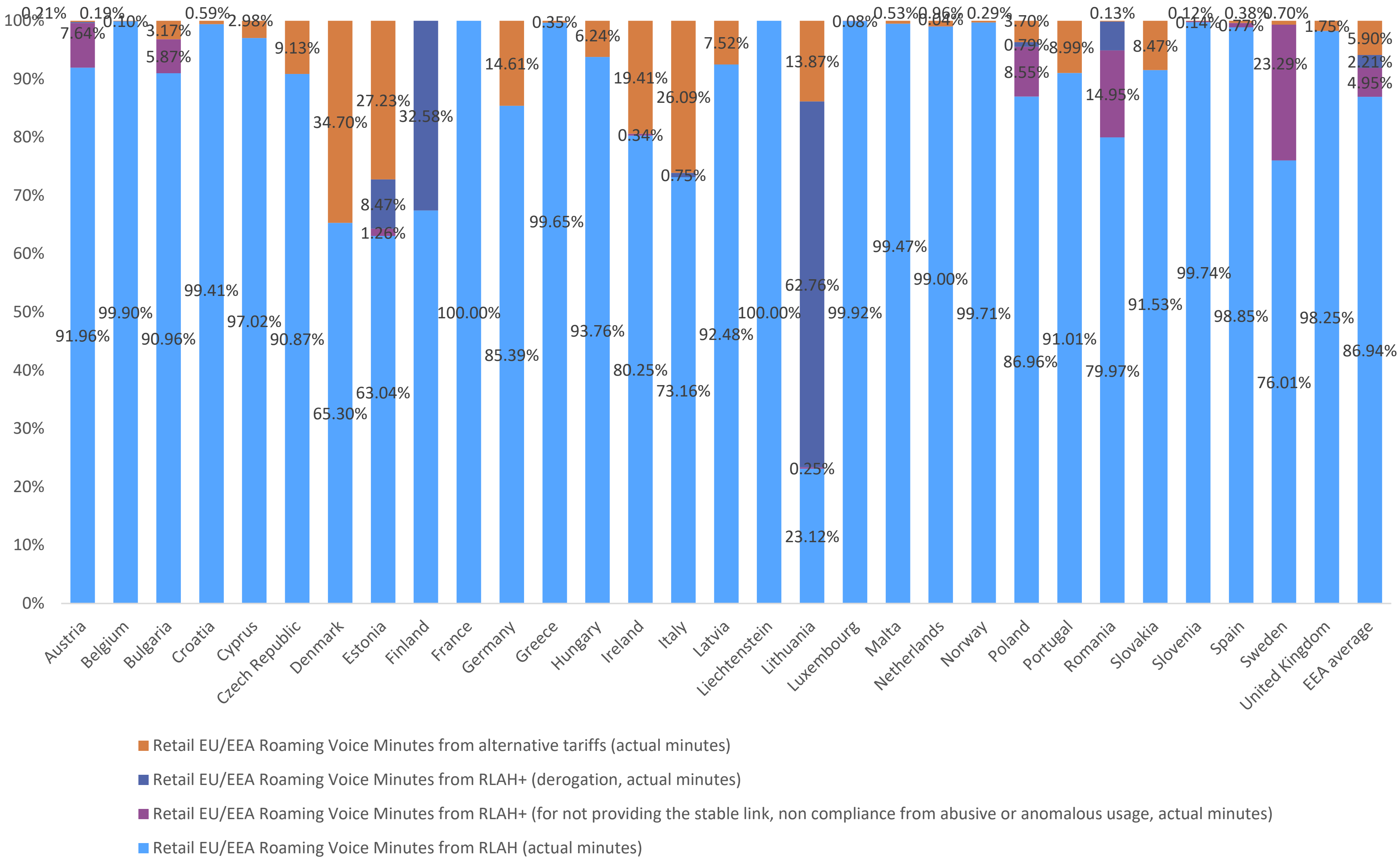


Figure 33: Percentage of total minutes calls of received, Q4 2017



Finland: RLAH+ (derogation) and Alternative tariffs has been combined as RLAH+ (derogation), alternative tariffs are not reported due to confidentiality reasons
EEA excludes: Finland

Figure 34: Percentage of total minutes calls of received, Q1 2018



Finland: RLAH+ (derogation) and Alternative tariffs has been combined as RLAH+ (derogation), alternative tariffs are not reported due to confidentiality reasons
EEA excludes: Finland

Figure 35: EEA Volumes and percentage of total minutes calls received, Q3'16 – Q1'18

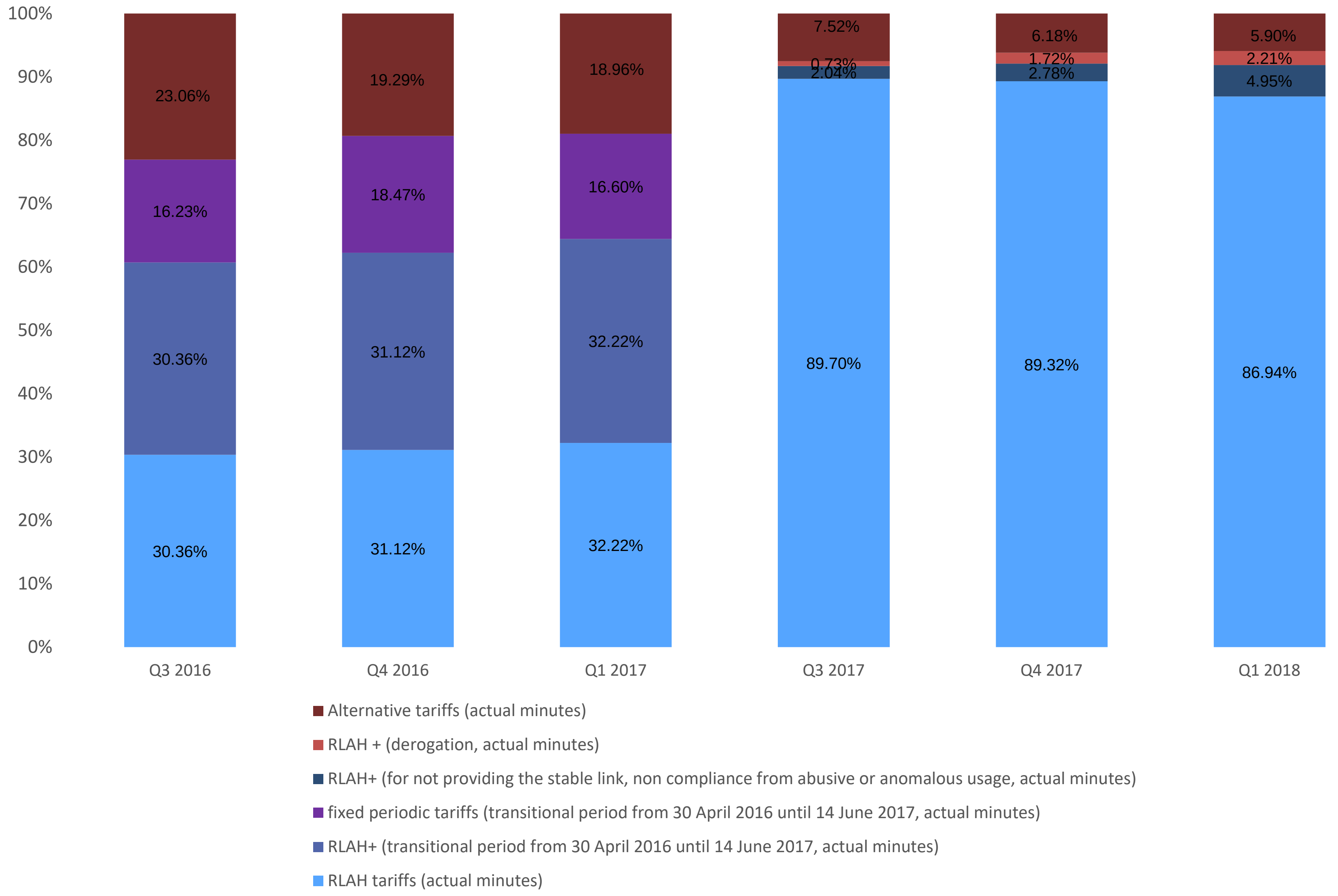


Figure 36: roaming calls received: average number of minutes per month per total number of roaming subscriber, Q3'17, Q4'17 and Q1'18

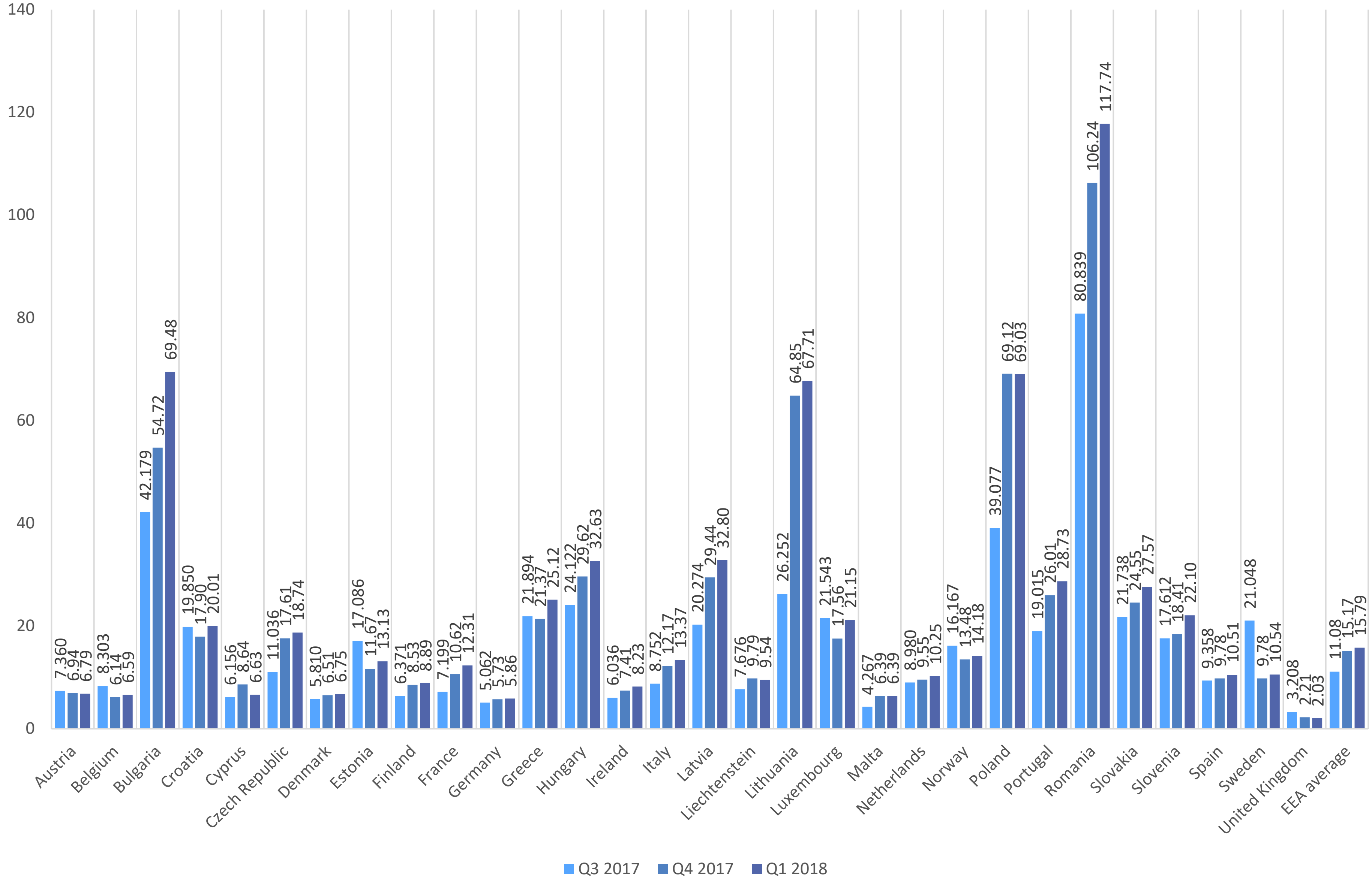


Figure 37: roaming calls received: EEA average number of minutes per month per total number of roaming subscriber, Q2'16 – Q1'18

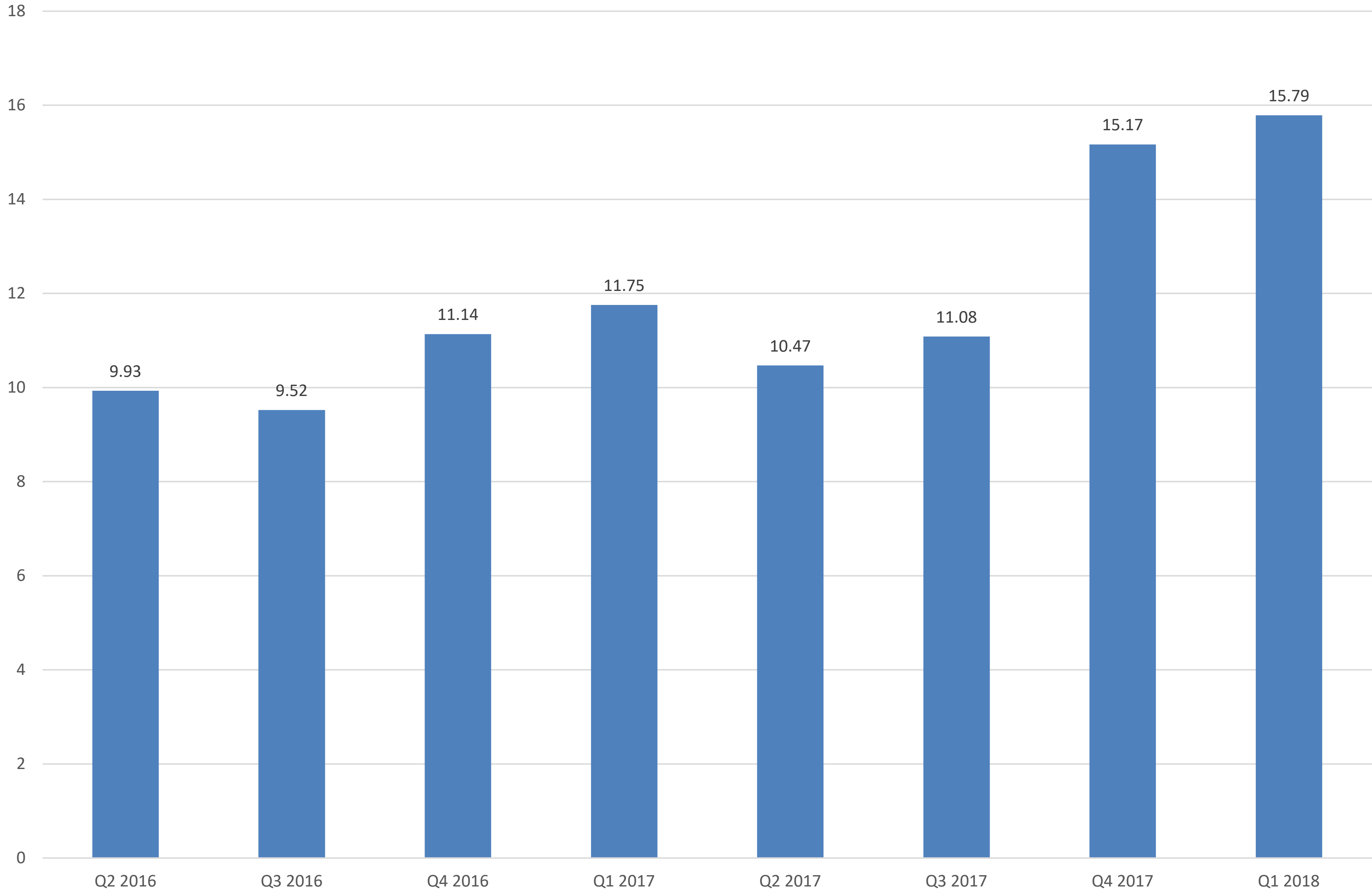
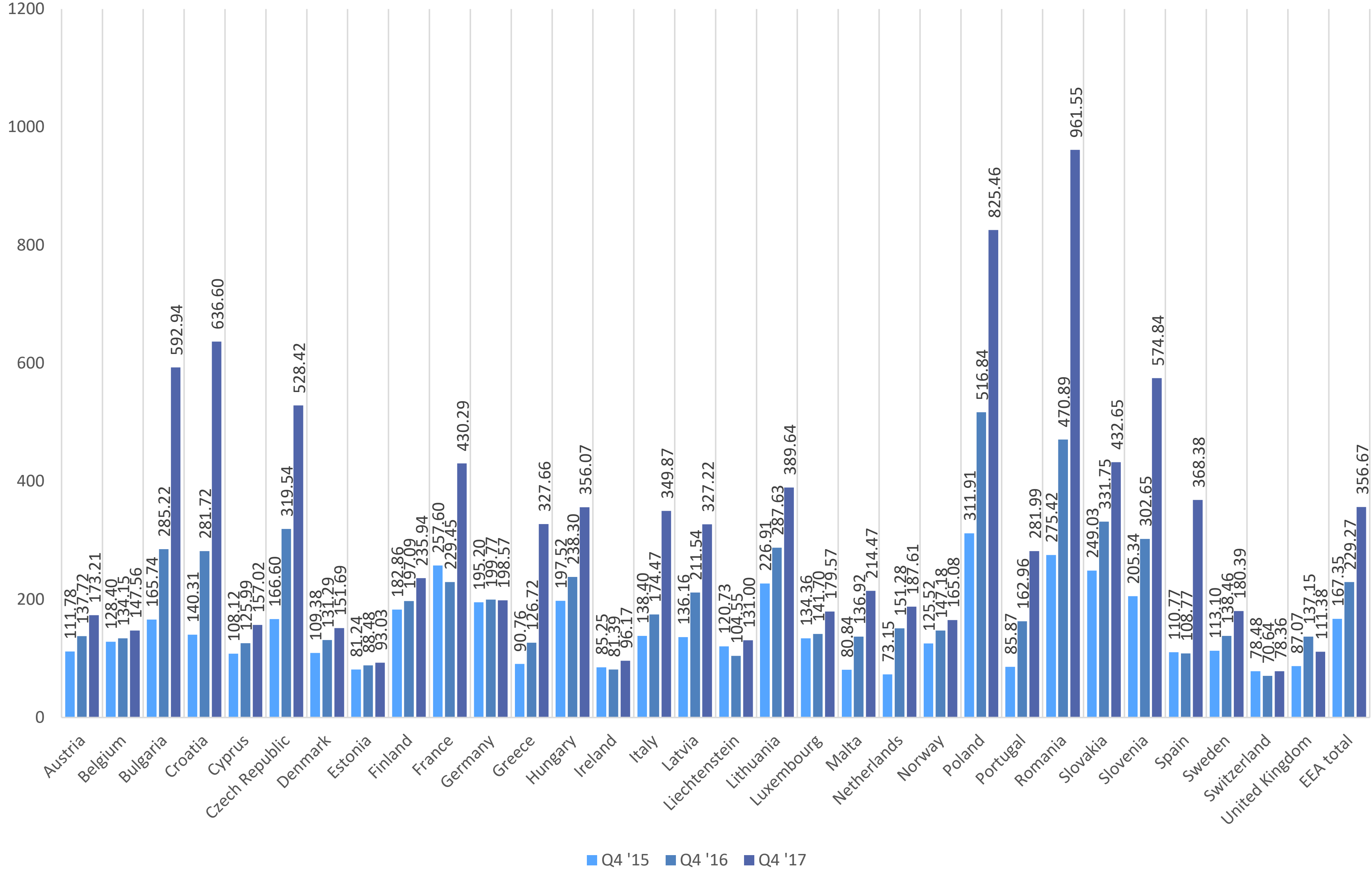
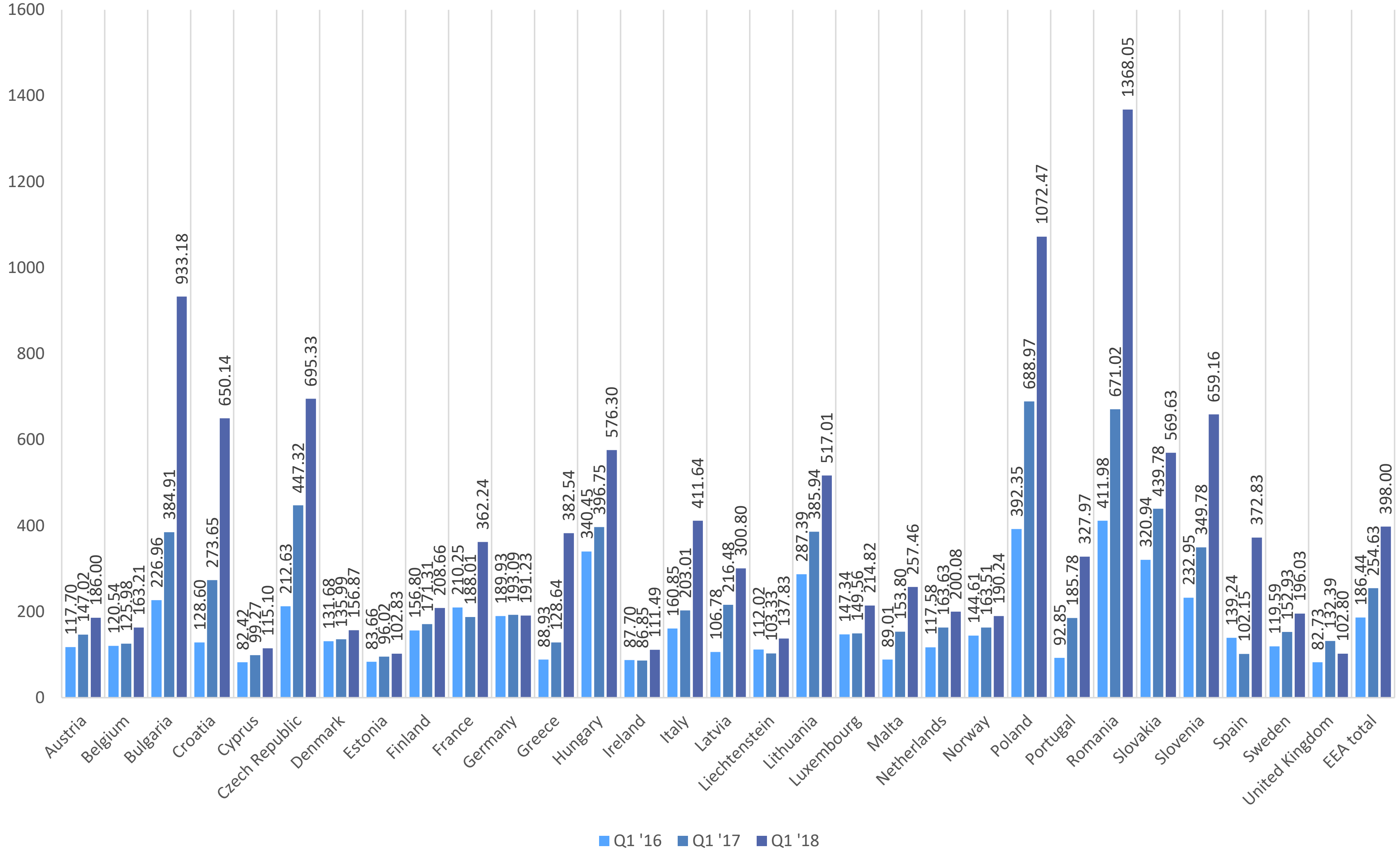


Figure 38: Incoming international roaming traffic Index, Q4'15, Q4'16, Q4'17*



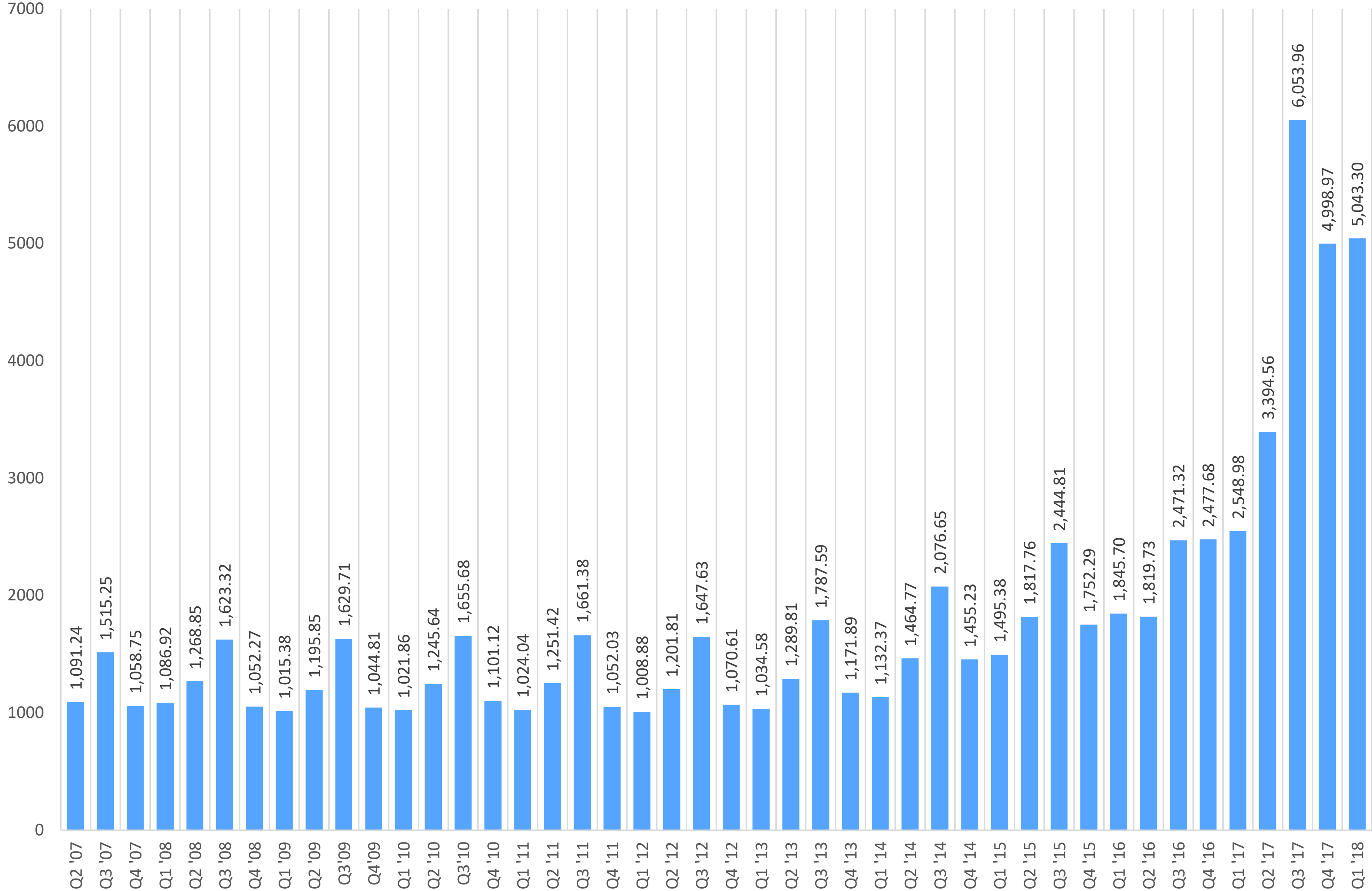
*Reference period: Q4'12= 100, Croatia: Q4'13= 100

Figure 39: Incoming international roaming traffic Index, Q1'16, Q1'17, Q1'18*



*Reference period: Q1'12= 100, Croatia: Q1'14=100, Liechtenstein: Q1'13 = 100

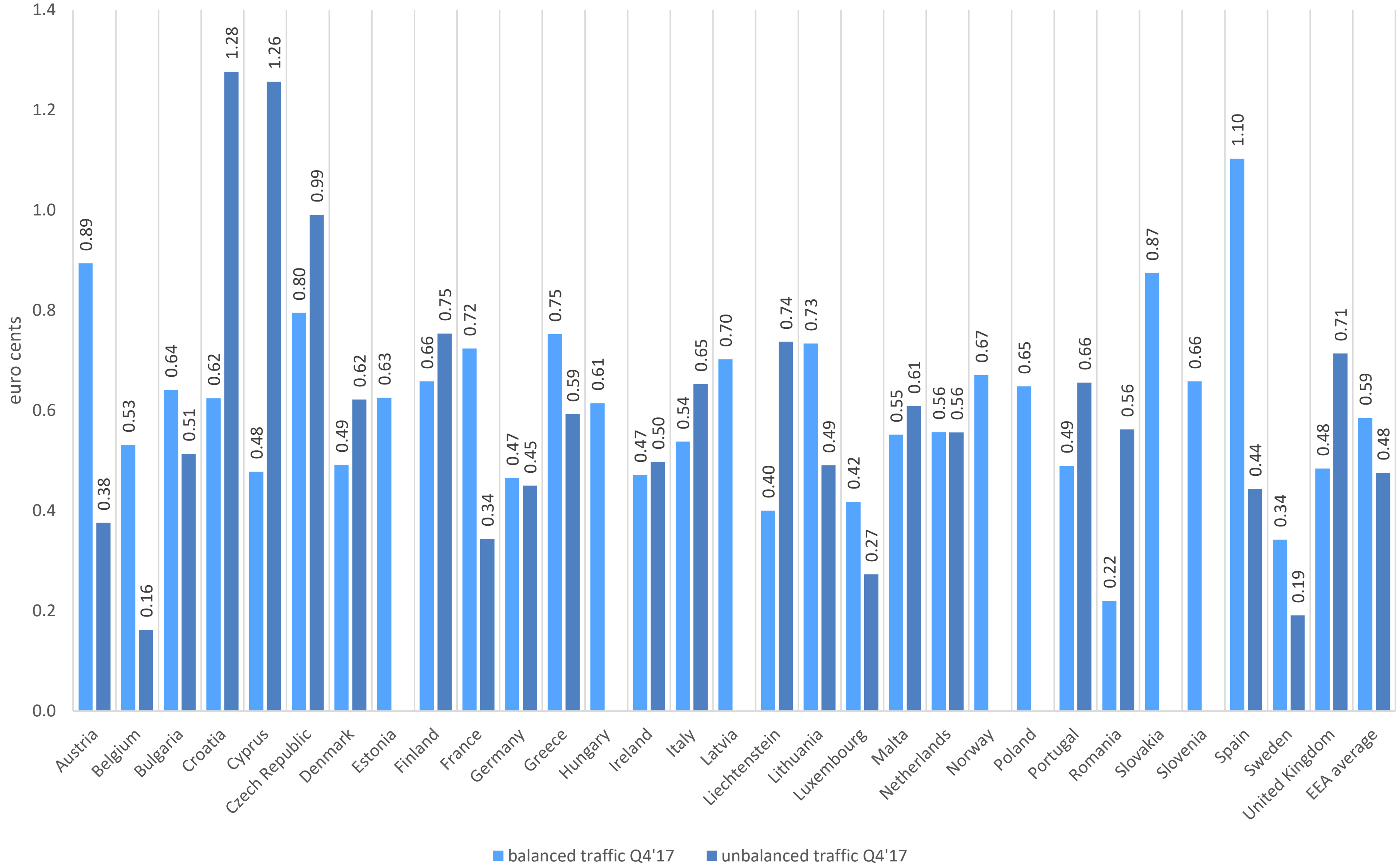
Figure 40: EEA roaming calls received traffic, Q2'07 – Q1'18 (millions of minutes)



5.2.2. SMS roaming services

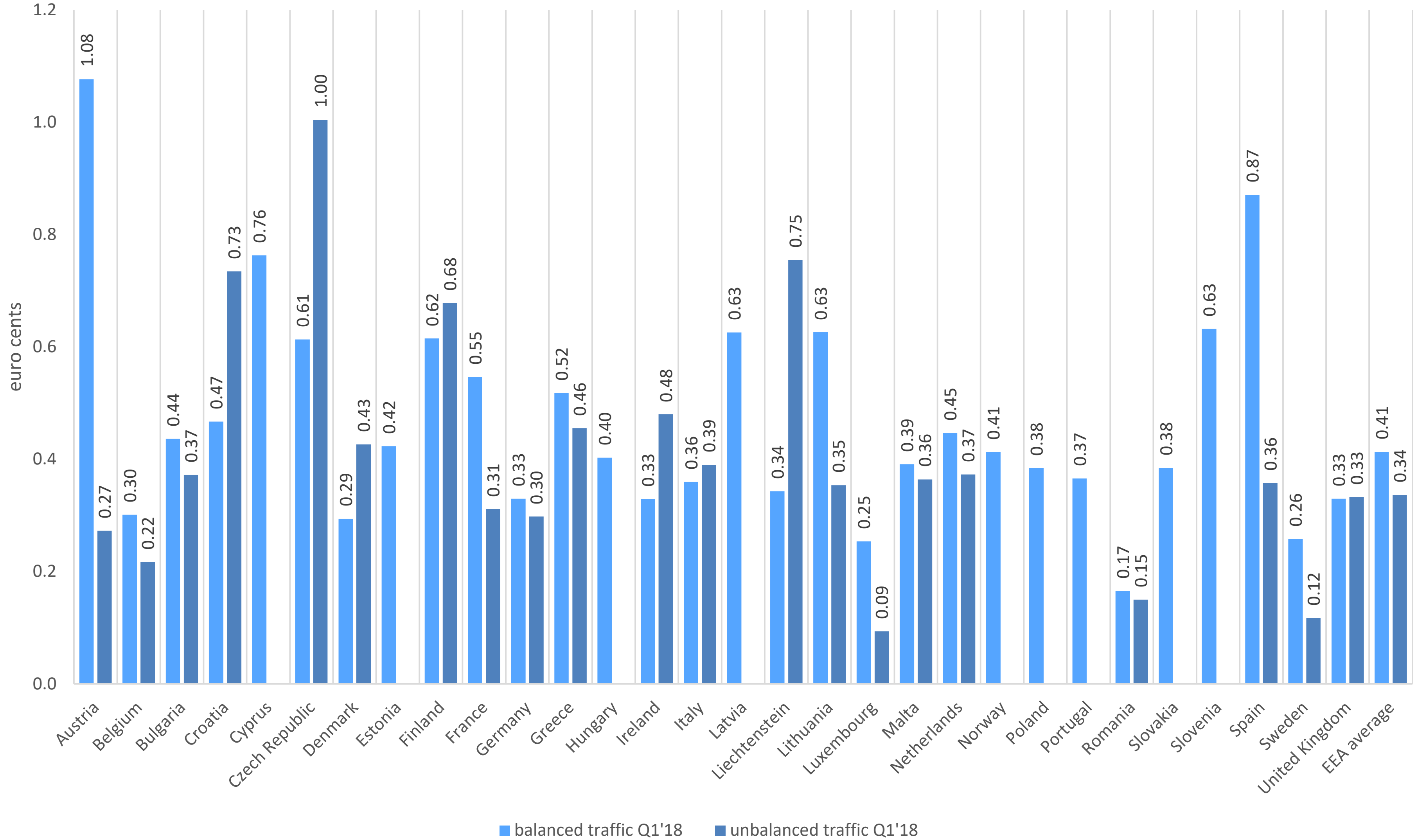
5.2.2.1 Wholesale prices

Figure 41: Average wholesale price per roaming SMS, Q4'17 (balanced and unbalanced traffic)



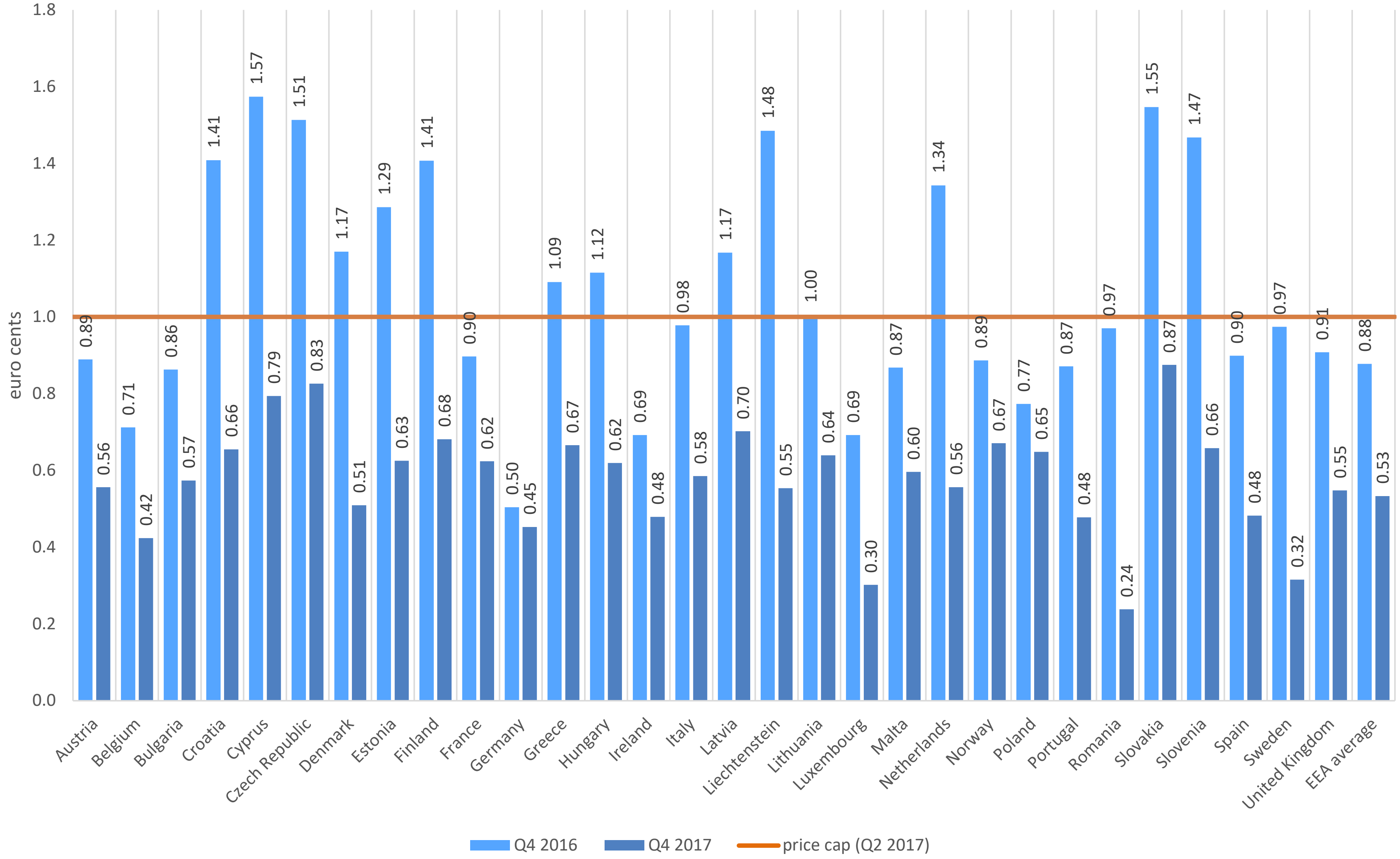
Portugal: the number of operators that reported data for calculating these estimates (disaggregated for balanced and unbalanced traffic) is different from the number of operators that reported data for calculating the estimates (non-disaggregated) in Figure 43 and Figure 44.

Figure 42: Average wholesale price per roaming SMS, Q1’18 (balanced and unbalanced traffic)



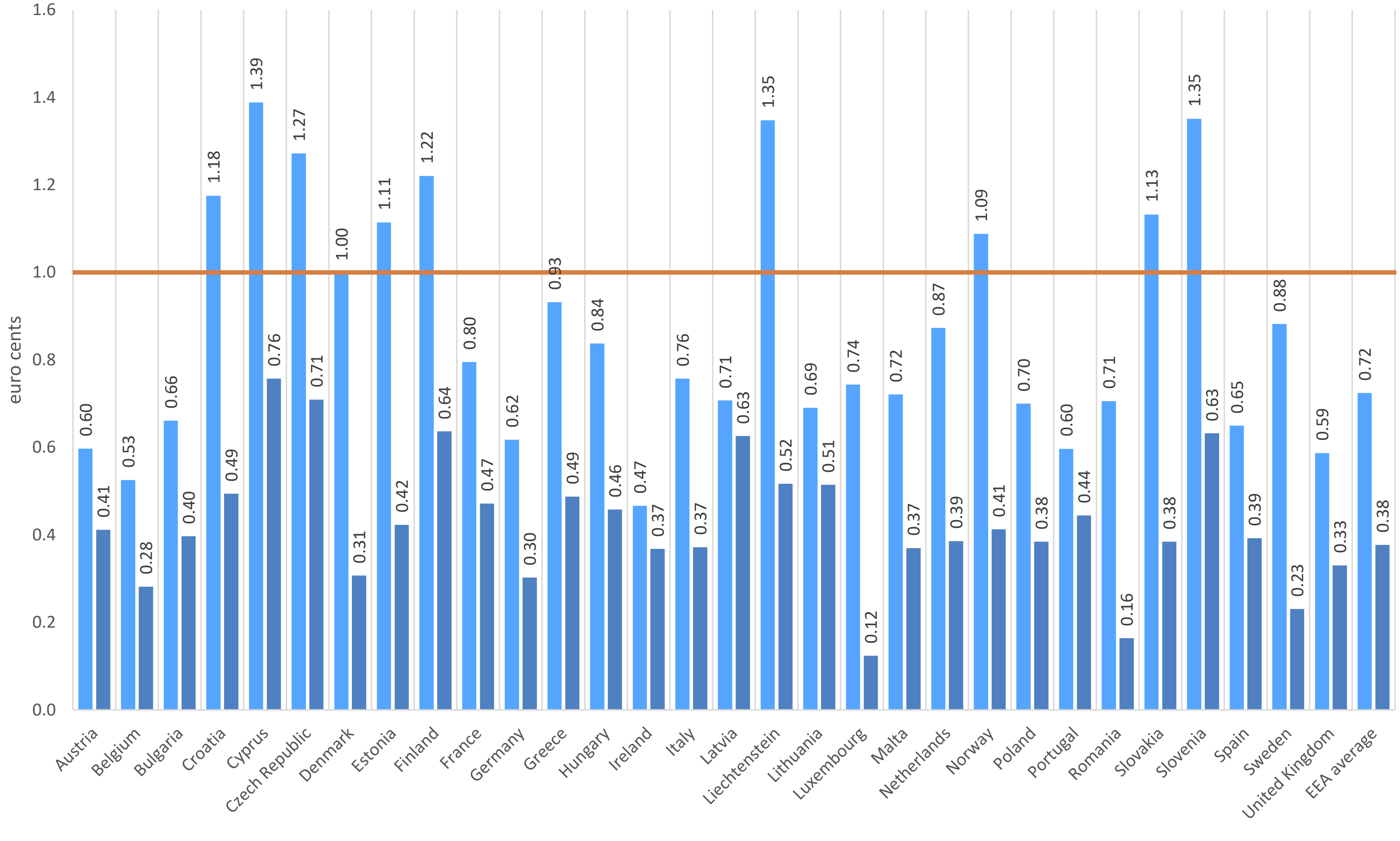
Portugal: the number of operators that reported data for calculating these estimates (disaggregated for balanced and unbalanced traffic) is different from the number of operators that reported data for calculating the estimates (non-disaggregated) in Figure 43 and Figure 44.

Figure 43: Total traffic: average wholesale price per roaming SMS, Q4 2016 and Q4 2017



Portugal: the number of operators that reported data for calculating these estimates is different from the number of operators that reported data for calculating the estimates (disaggregated for balanced and unbalanced traffic) in Figure 41 and Figure 42.

Figure 44: Total traffic: average wholesale price per roaming SMS, Q1 2017 and Q1 2018



Portugal: the number of operators that reported data for calculating these estimates is different from the number of operators that reported data for calculating the estimates (disaggregated for balanced and unbalanced traffic) in Figure 41 and Figure 42.

Figure 45: EEA average wholesale price per roaming SMS, Q2'16 – Q1'18 (balanced, unbalanced total and Row traffic)

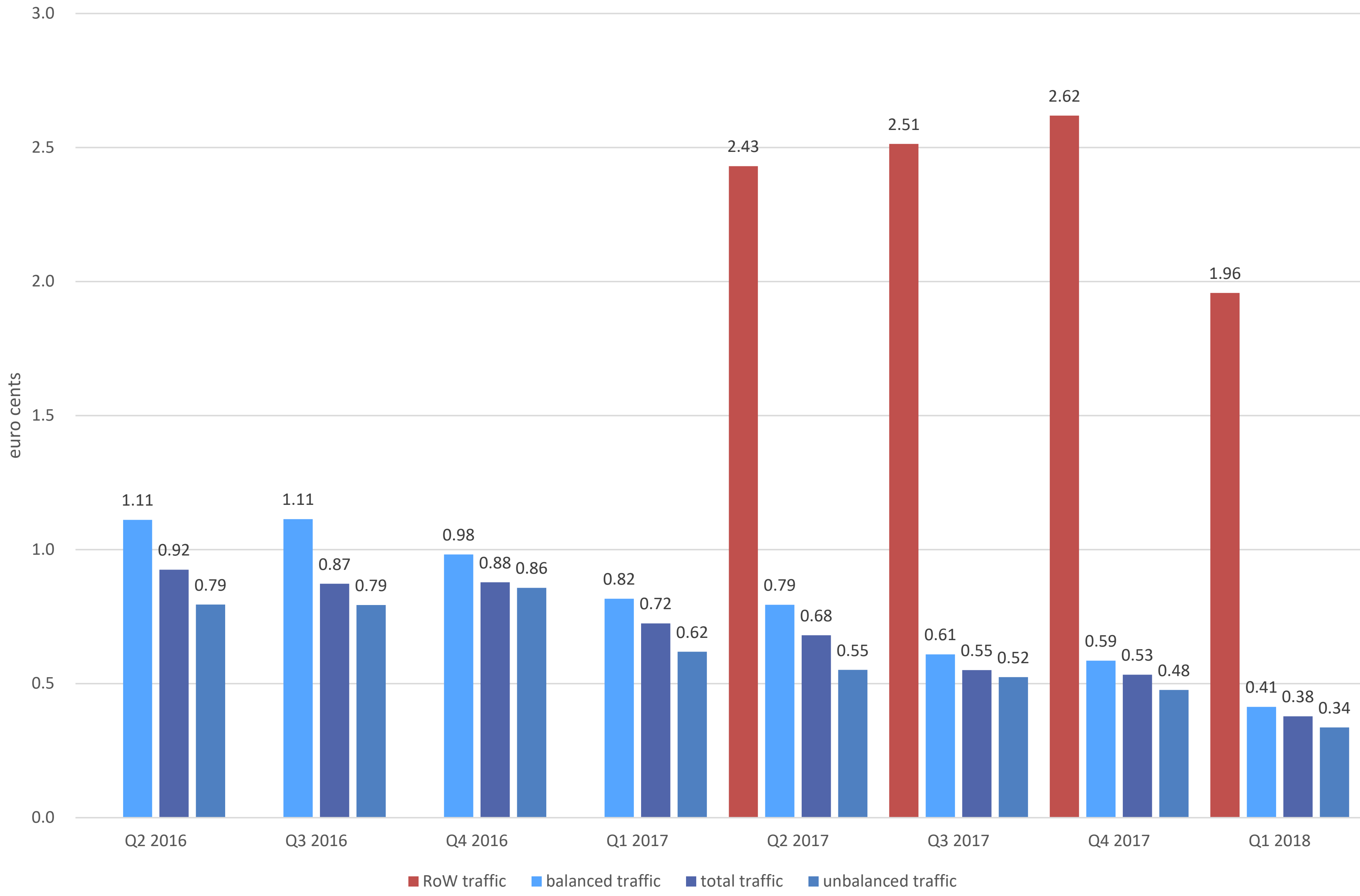


Figure 46: EEA average wholesale price per roaming SMS

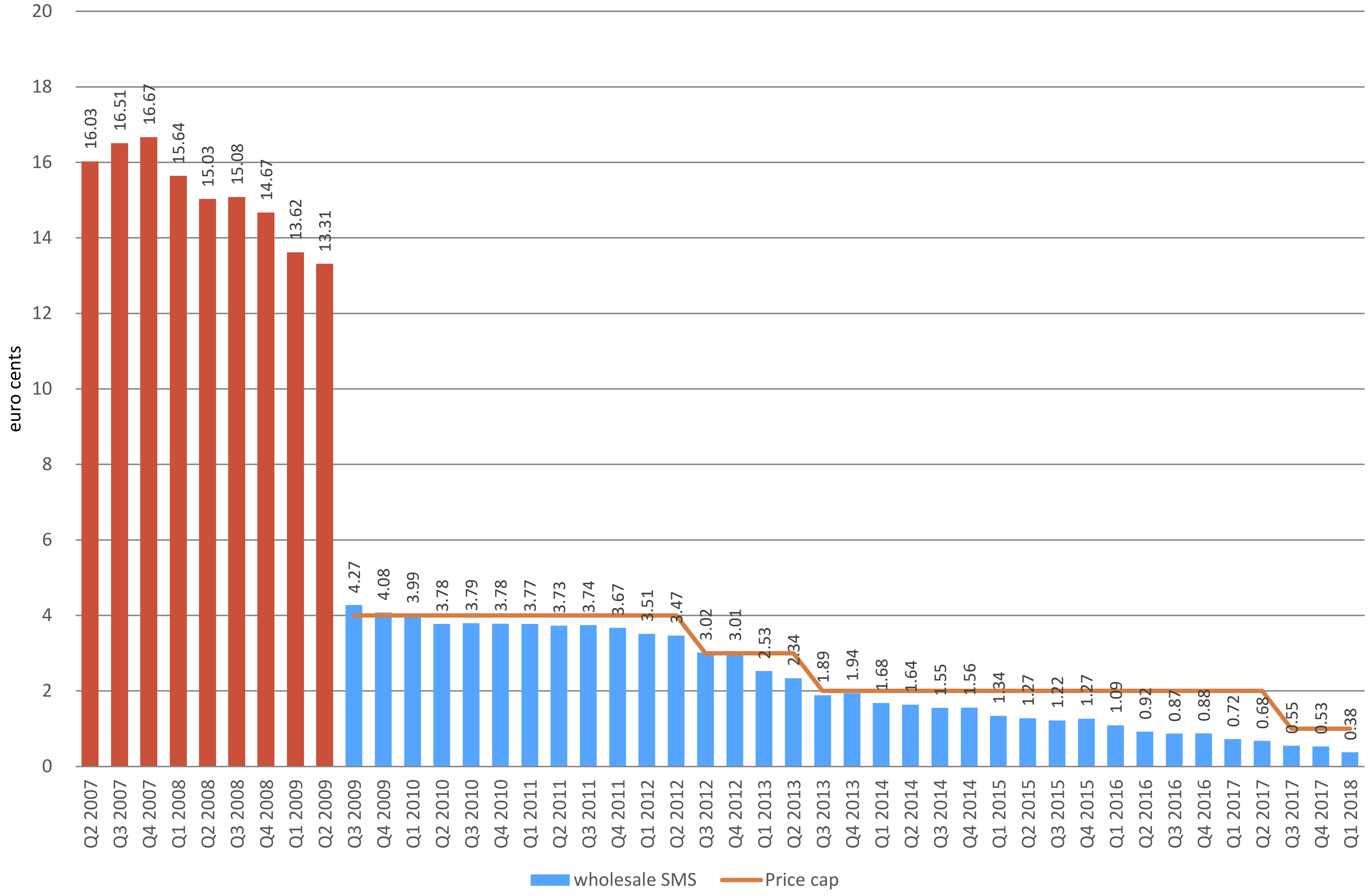
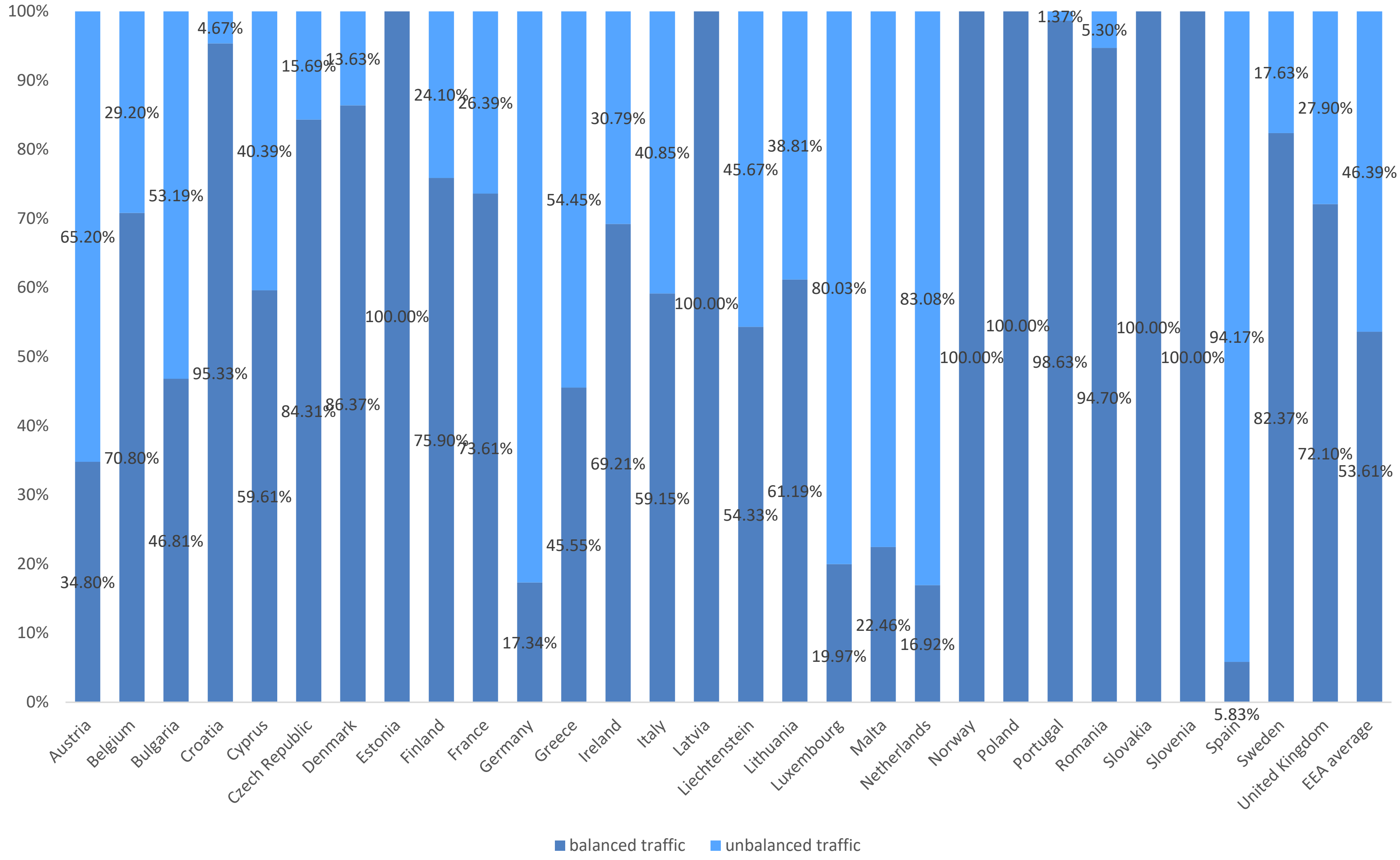
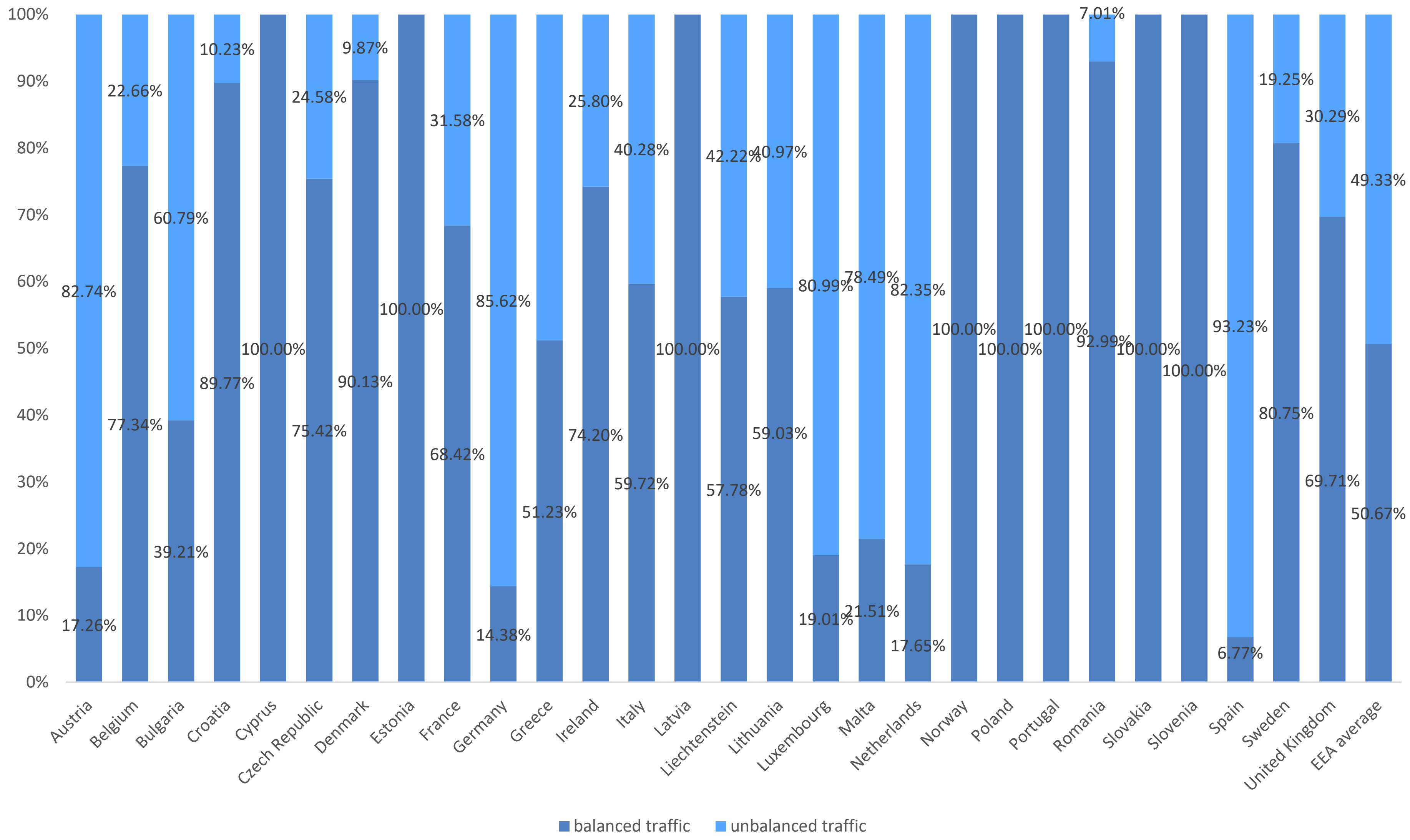


Figure 47: Proportion of balanced/unbalanced traffic within EEA countries (SMS services), wholesale roaming inbound, Q4 2017



Portugal: the number of operators that reported data for calculating these estimates (disaggregated for balanced and unbalanced traffic) is different from the number of operators that reported data for calculating the non-disaggregated estimates.

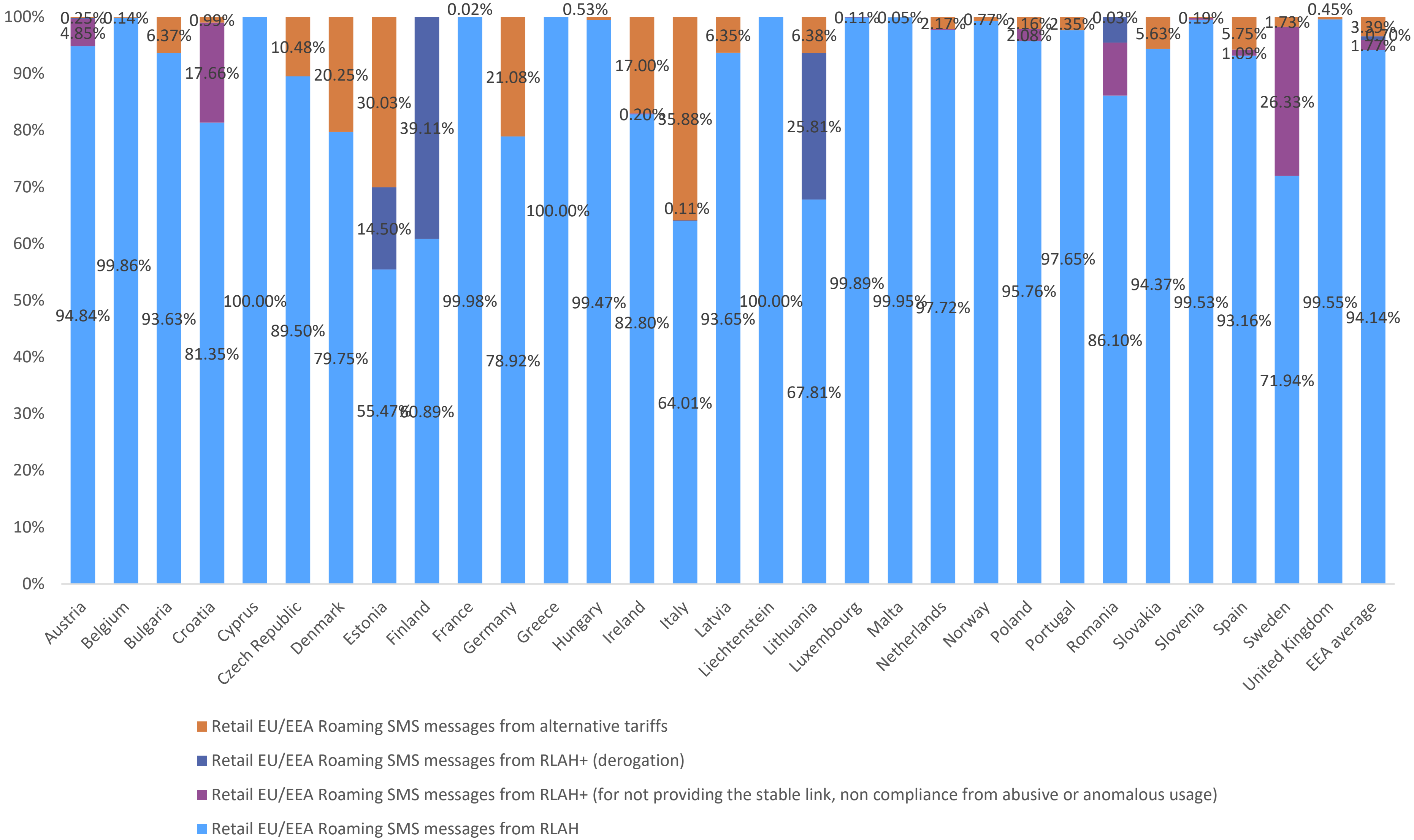
Figure 48: Proportion of balanced/unbalanced traffic within EEA countries (SMS services), wholesale roaming inbound, Q1 2018



Portugal: the number of operators that reported data for calculating these estimates (disaggregated for balanced and unbalanced traffic) is different from the number of operators that reported data for calculating the non-disaggregated estimates.

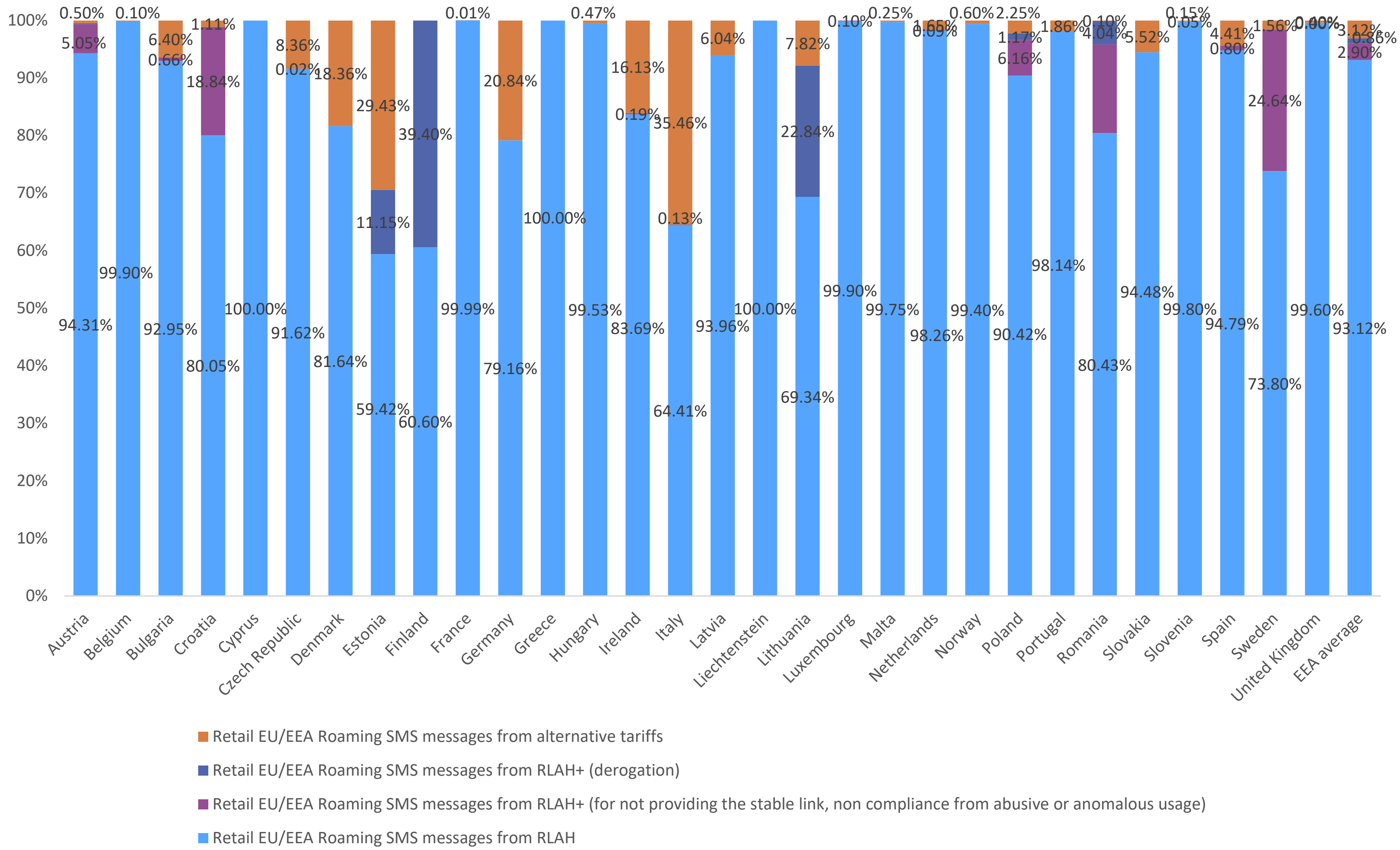
5.2.2.2 Consumption patterns

Figure 49: Percentage of EEA roaming SMS, Q4 2017



Finland: RLAH+ (derogation) and Alternative tariffs has been combined as RLAH+ (derogation), alternative tariffs are not reported due to confidentiality reasons
EEA average excludes: Finland

Figure 50: Percentage of EEA roaming SMS, Q1 2018



Finland: RLAH+ (derogation) and Alternative tariffs has been combined as RLAH+ (derogation), alternative tariffs are not reported due to confidentiality reasons
EEA excludes: Finland

Figure 51: EEA percentage of SMS sent, Q3'16 – Q1'18

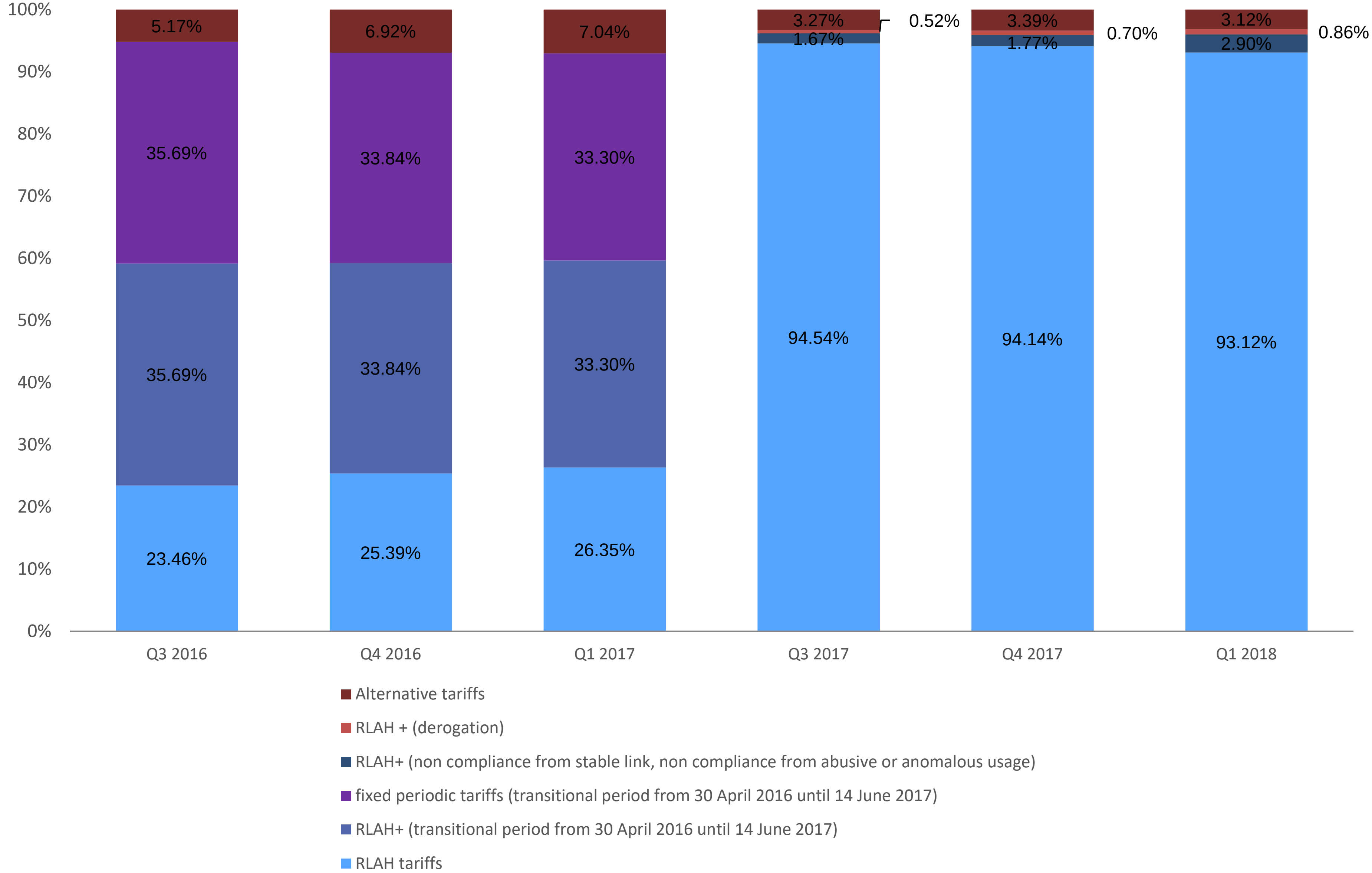


Figure 52: Average number of SMS per month per total number of roaming subscriber, Q3'17 – Q1'18

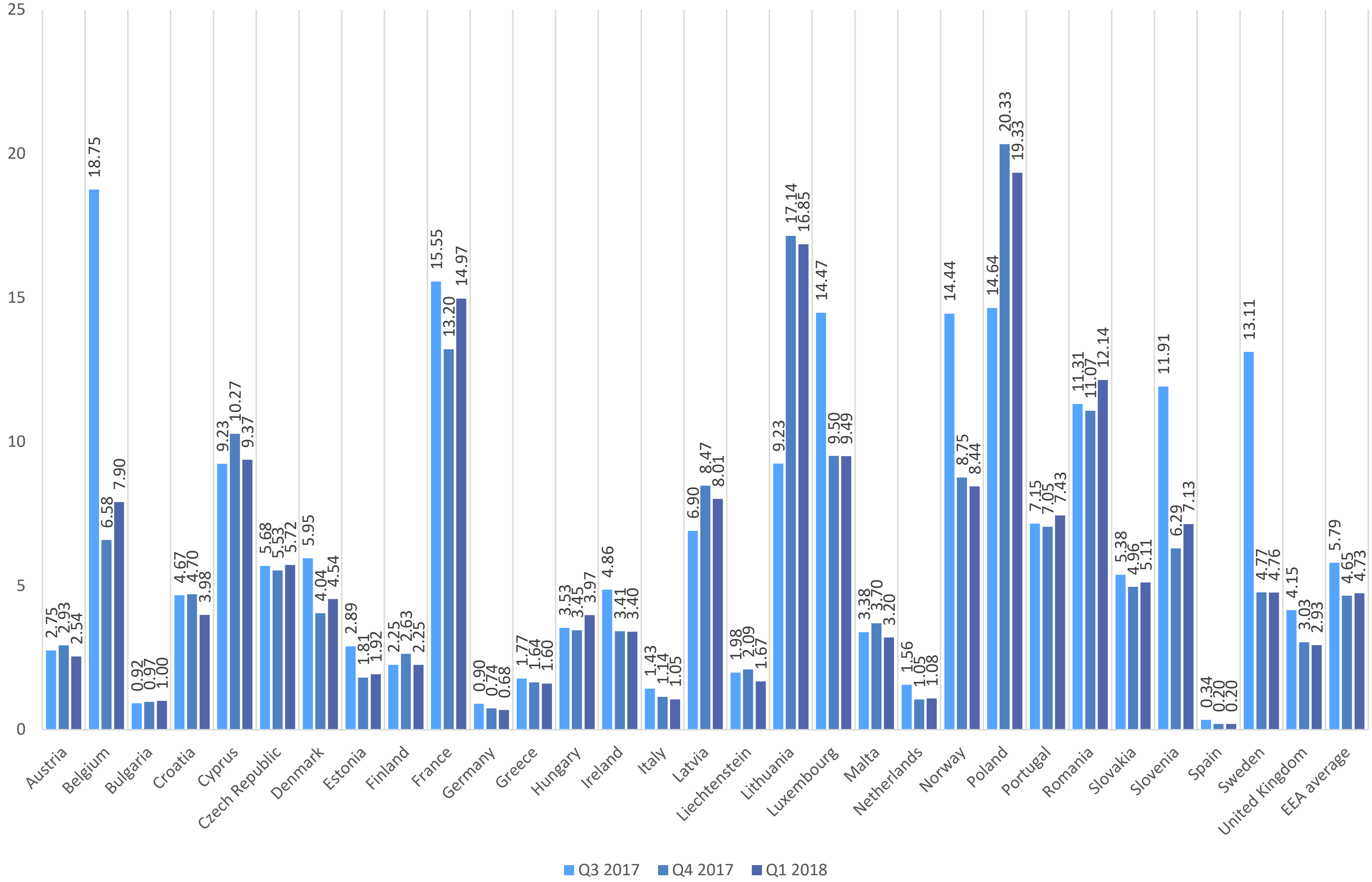


Figure 53: EEA average number of SMS per month per total number of roaming subscriber

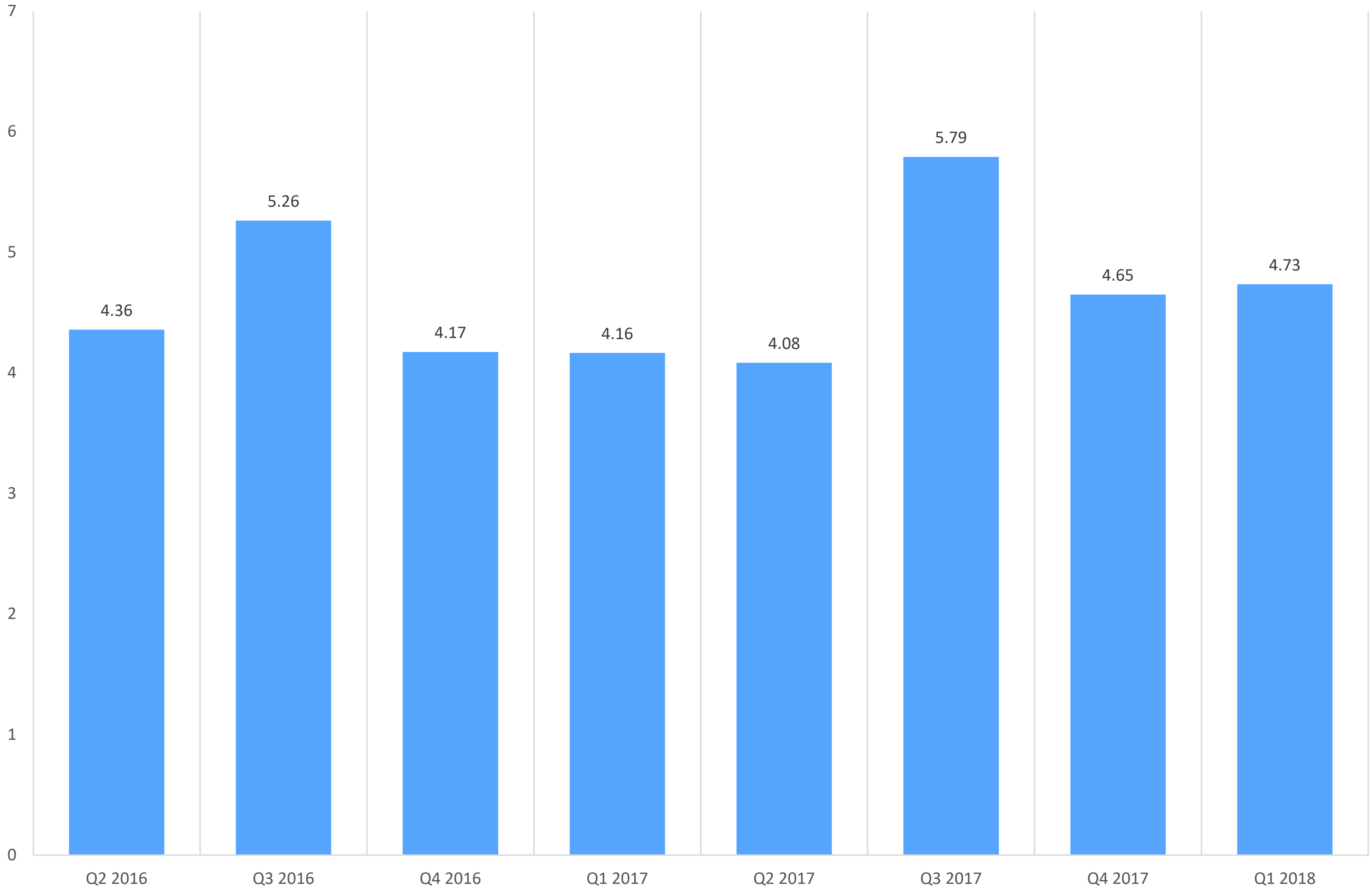
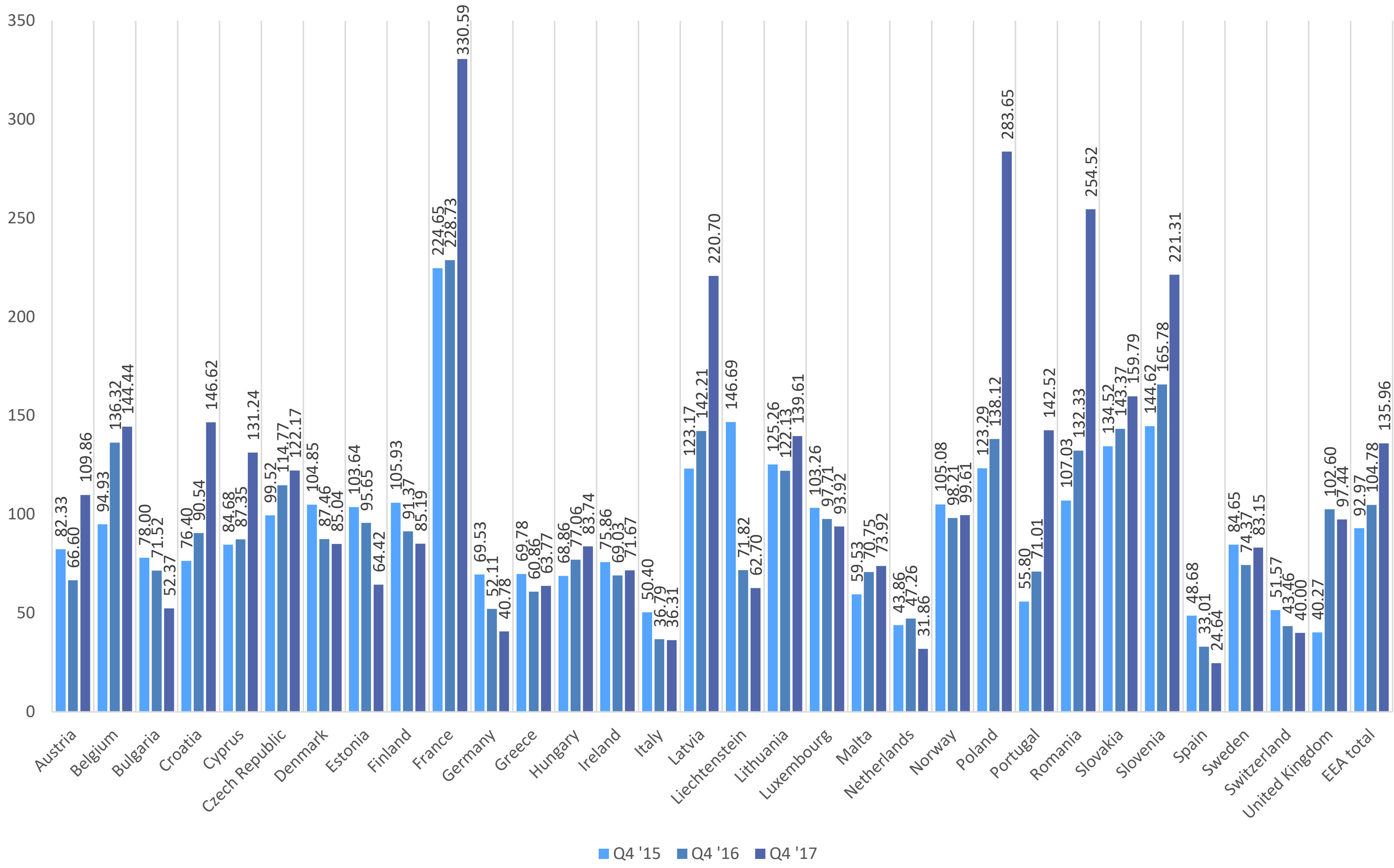
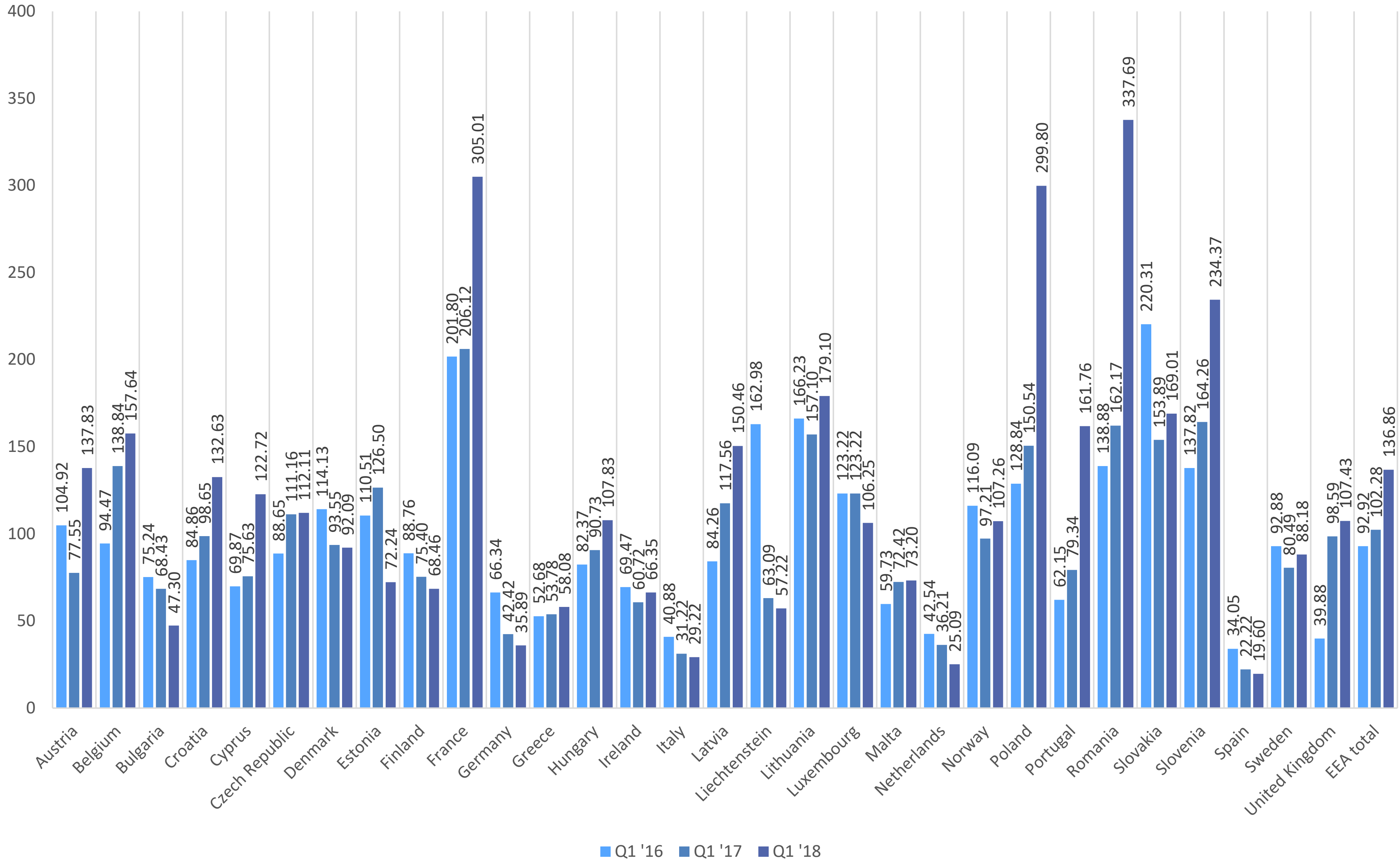


Figure 54: Retail SMS traffic Index, Q4'15, Q4'16 and Q4'17*



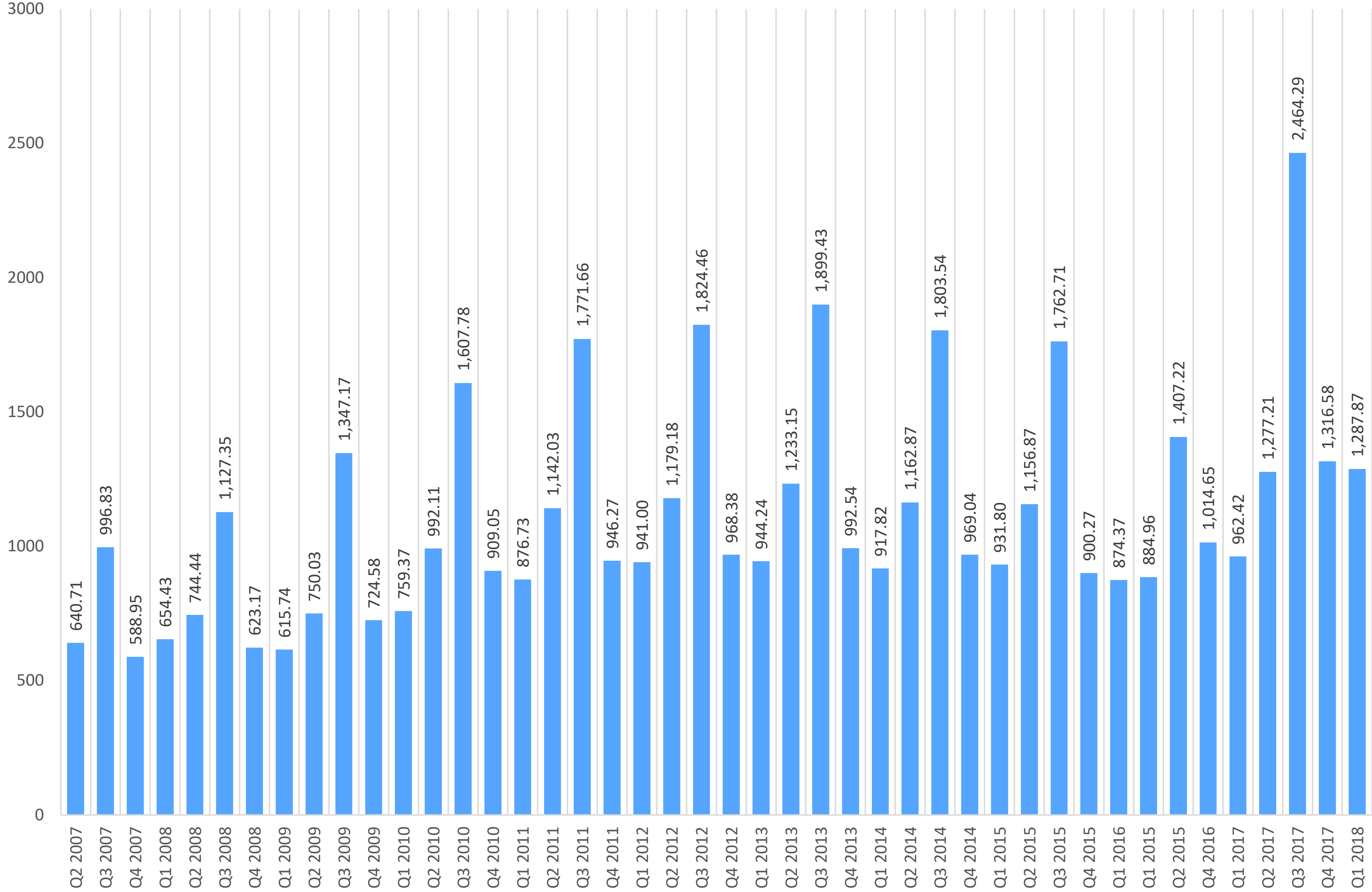
*Reference period: Q4'12= 100, Croatia: Q4'13= 100

Figure 55: Retail SMS traffic Index, Q1'16, Q1'17 and Q1'18*



*Reference period: Q1'12= 100, Croatia: Q1'14=100, Liechtenstein: Q1'13 = 100

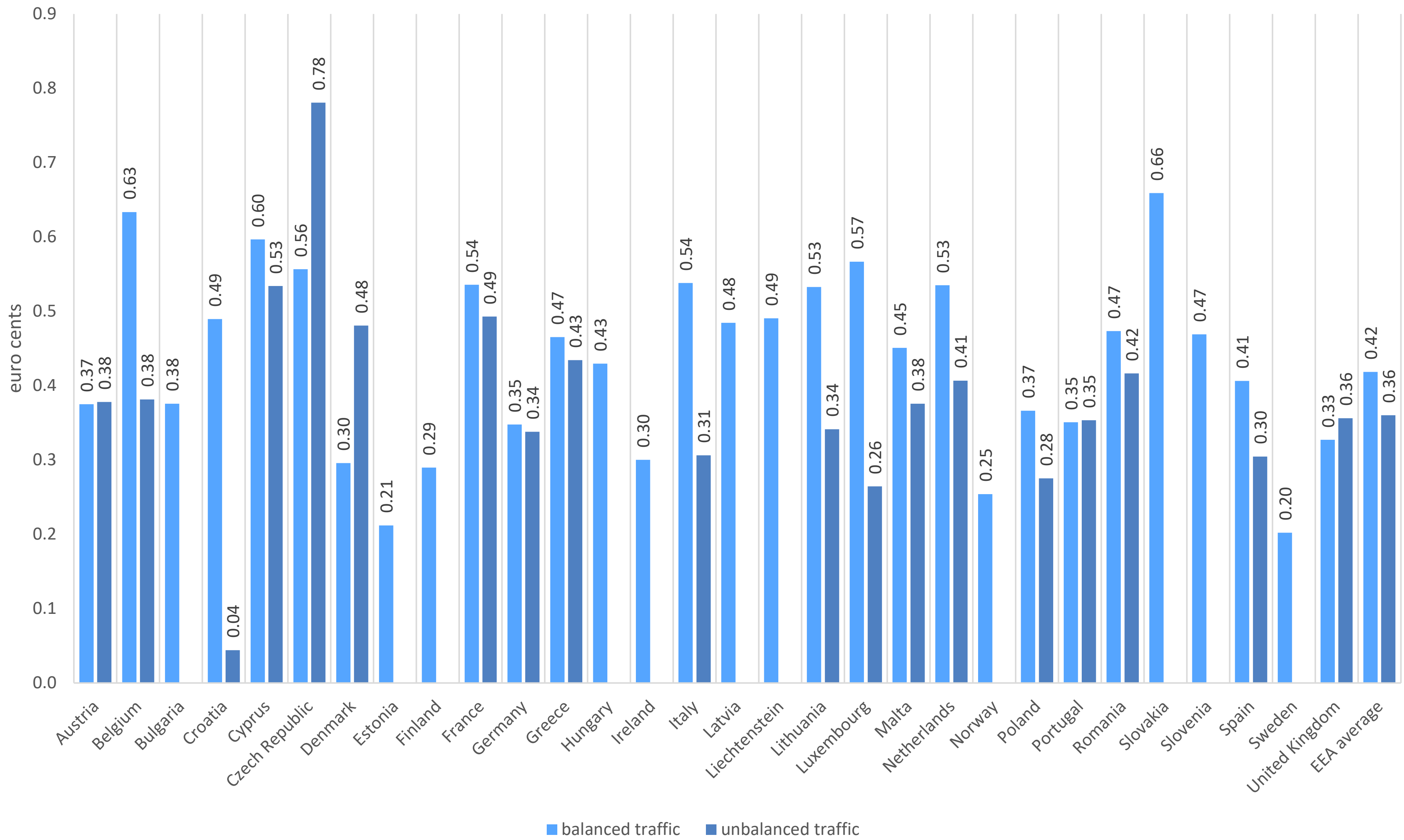
Figure 56: EEA retail SMS traffic, Q2’07 – Q1’18 (millions of messages)



5.2.3. Data roaming services

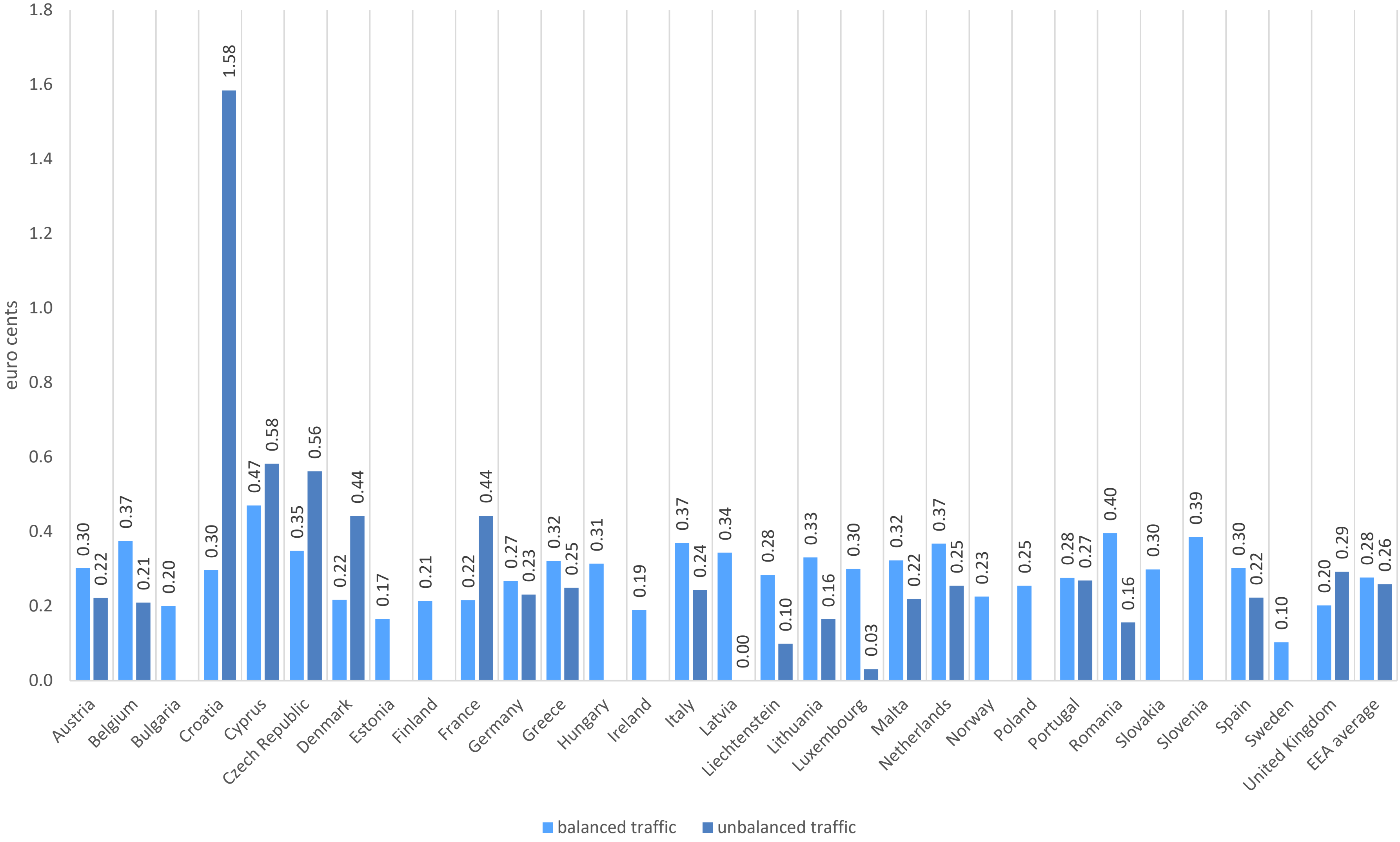
5.2.3.1 Wholesale prices

Figure 57: balanced and unbalanced traffic: average wholesale data price per MB, Q4 2017



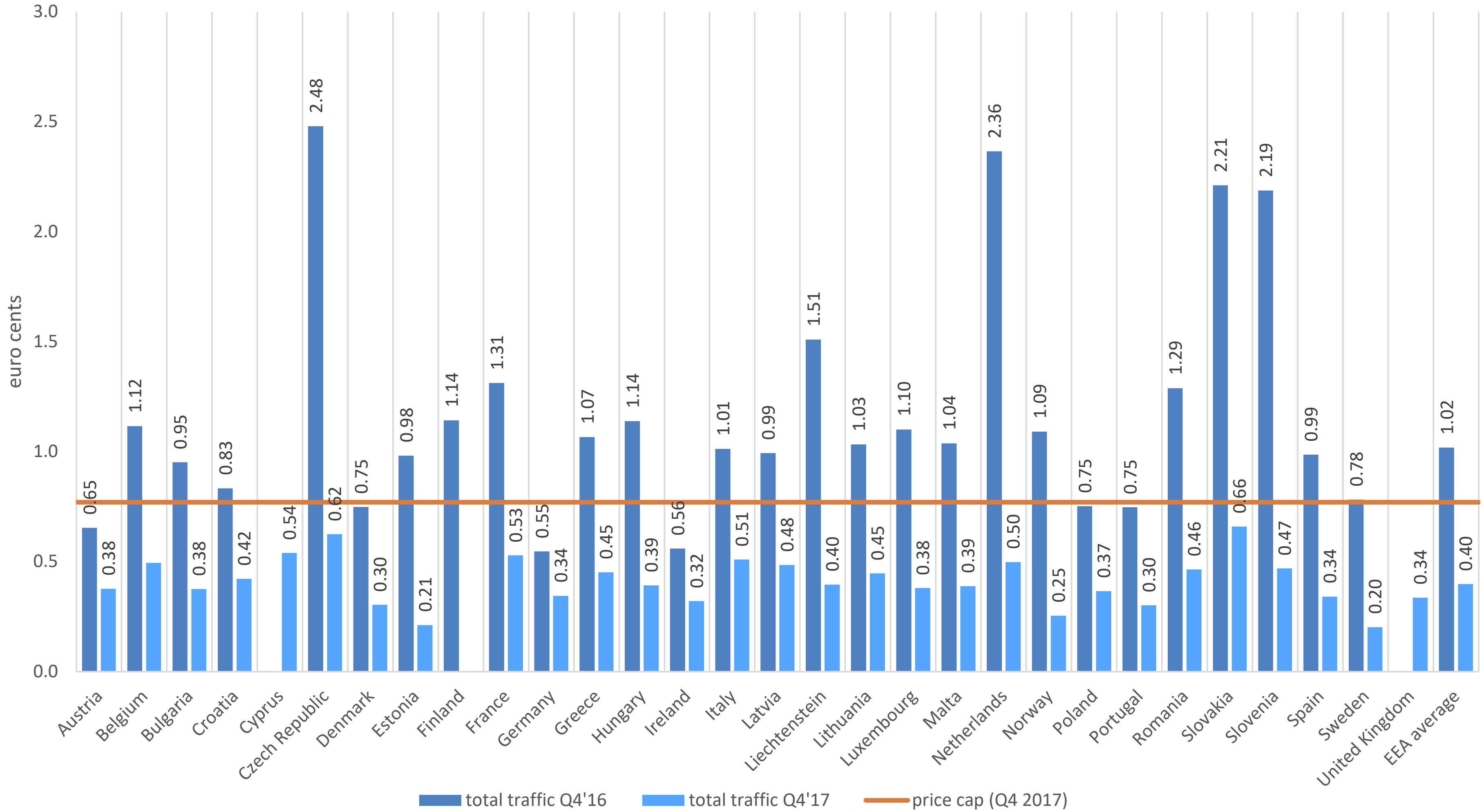
Portugal: the number of operators that reported data for calculating these estimates (disaggregated for balanced and unbalanced traffic) is different from the number of operators that reported data for calculating the estimates (non-disaggregated) in Figure 59 and Figure 60.
EEA average excludes (unbalanced traffic): Ireland

Figure 58: balanced and unbalanced traffic: average wholesale data price per MB, Q1 2018



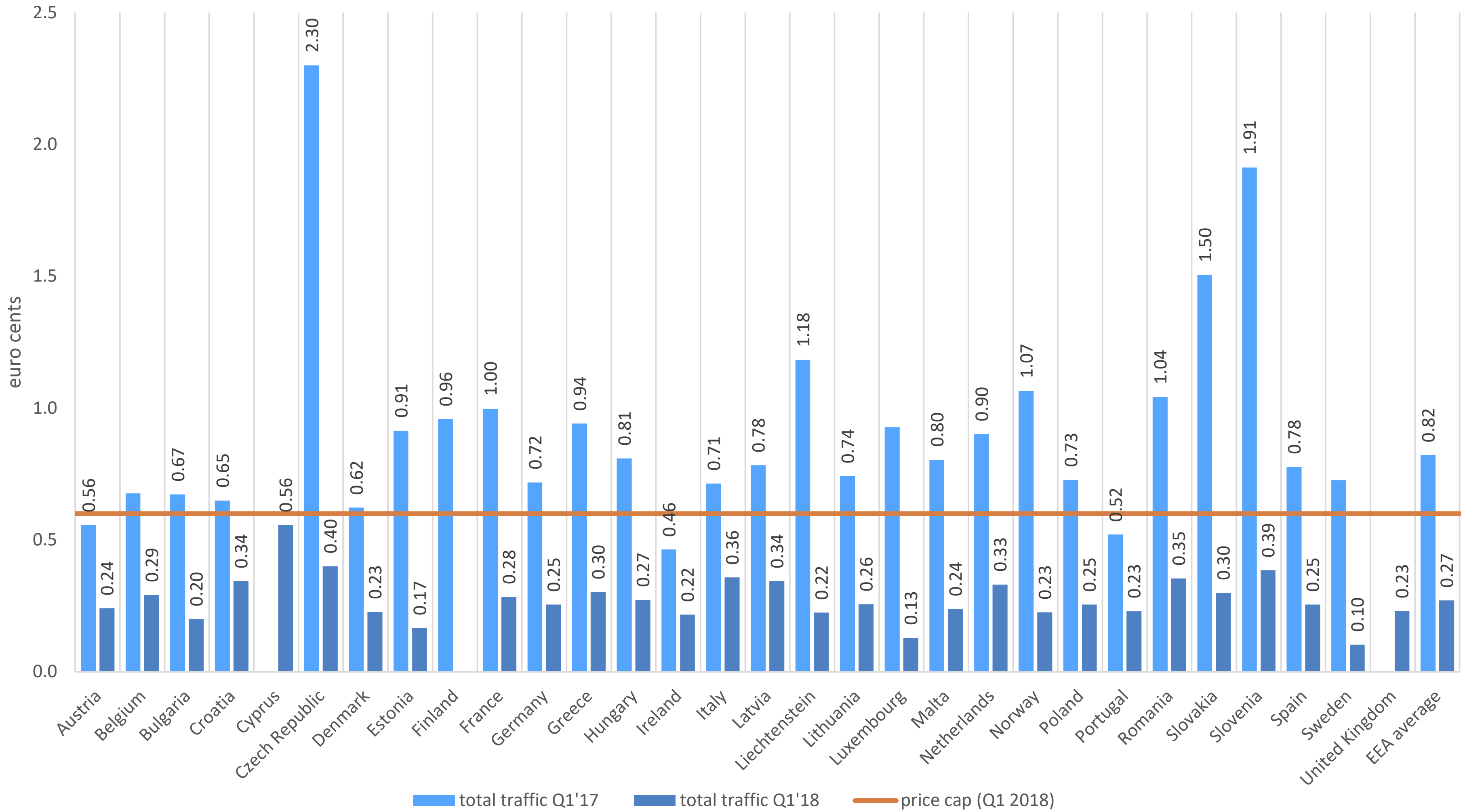
Portugal: the number of operators that reported data for calculating these estimates (disaggregated for balanced and unbalanced traffic) is different from the number of operators that reported data for calculating the estimates (non-disaggregated) in Figure 59 and Figure 60.
EEA average excludes (unbalanced traffic): Ireland

Figure 59: Total traffic: average wholesale data price per MB, Q4 2016 and Q4 2017



Portugal: the number of operators that reported data for calculating these estimates is different from the number of operators that reported data for calculating the estimates (disaggregated for balanced and unbalanced traffic) in Figure 57 and Figure 58.

Figure 60: Total data traffic: average wholesale data price per MB, Q1 2017 and Q1 2018



Portugal: the number of operators that reported data for calculating these estimates is different from the number of operators that reported data for calculating the estimates (disaggregated for balanced and unbalanced traffic) in Figure 57 and Figure 58.

Figure 61: Total traffic traffic: EEA average wholesale data price per MB, Q4'08 – Q1'18

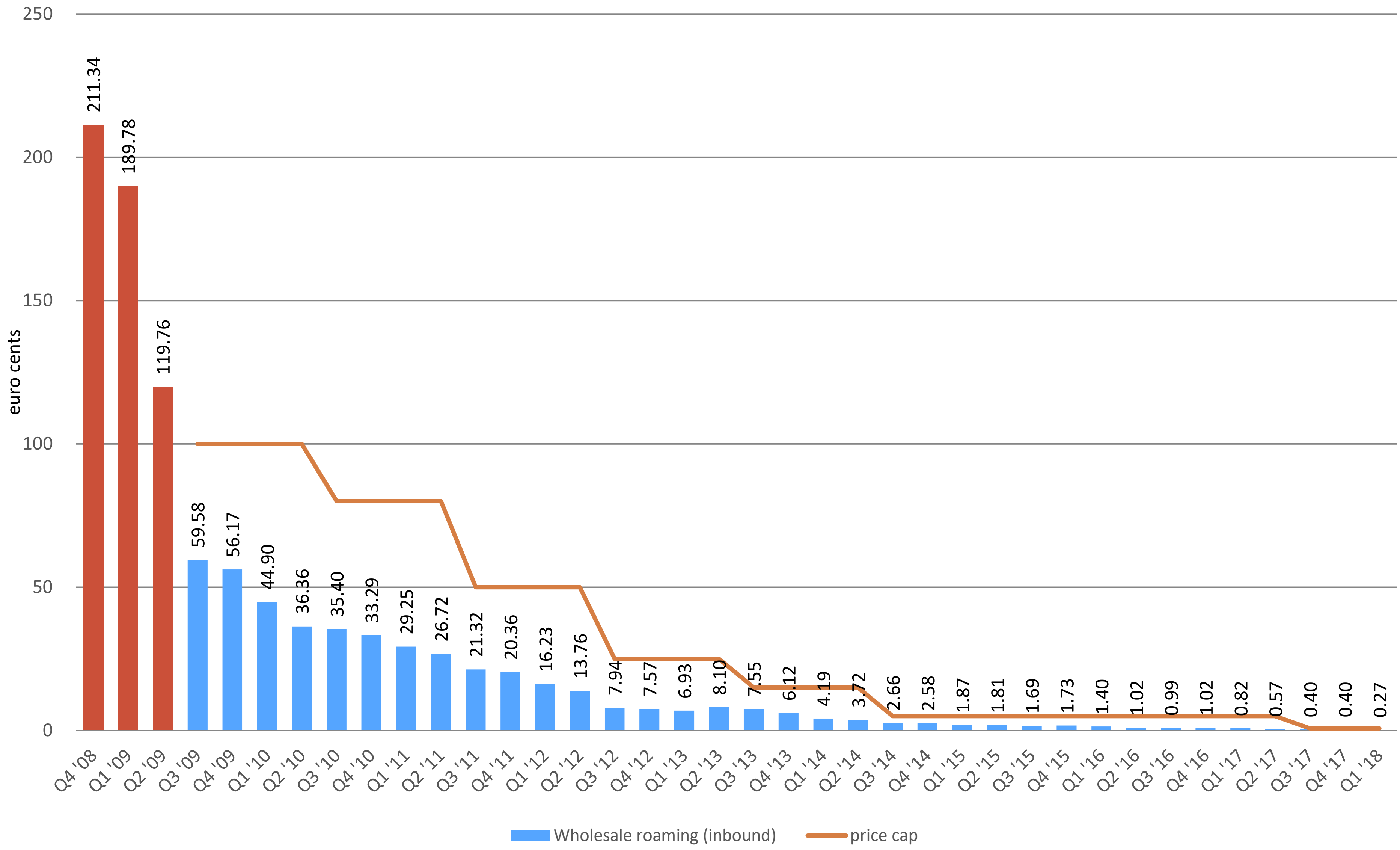


Figure 62: RoW traffic: Average wholesale data price charged by EEA operators per MB (inbound roaming), Q4 2017 and Q1 2018

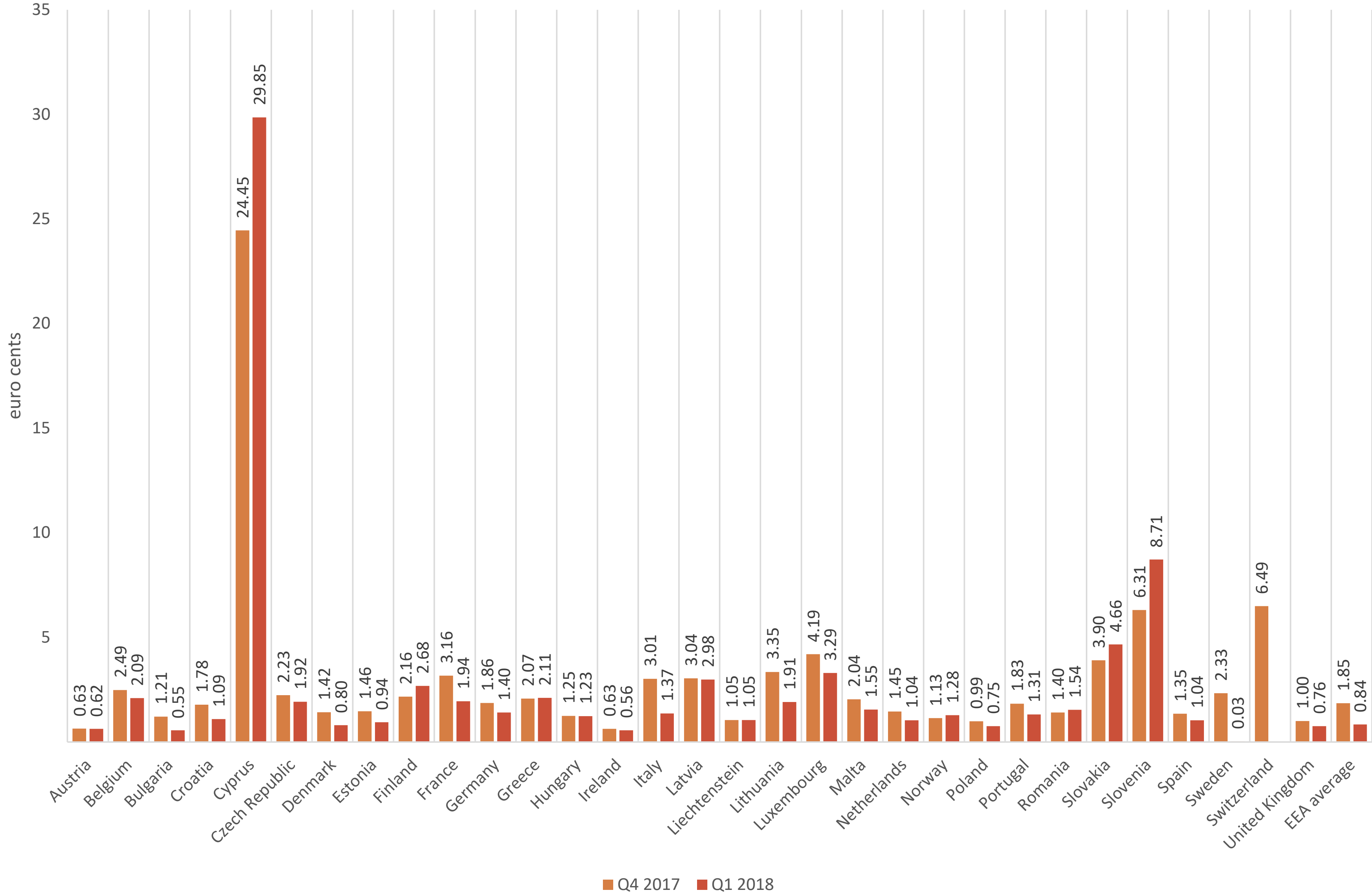


Figure 63: balanced, unbalanced, total traffic, RoW traffic: EEA average wholesale data price per MB, Q2'16 – Q1'18

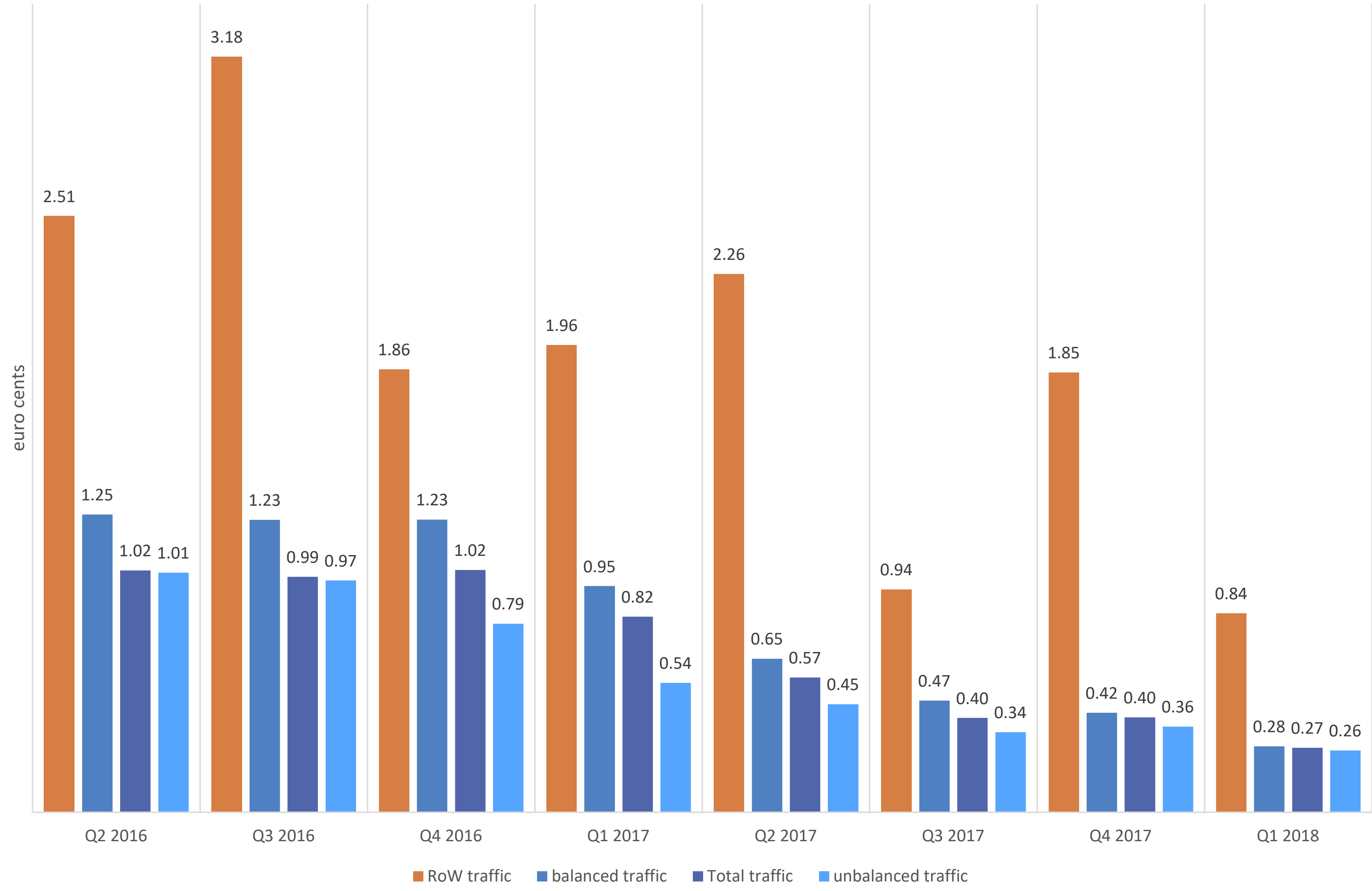
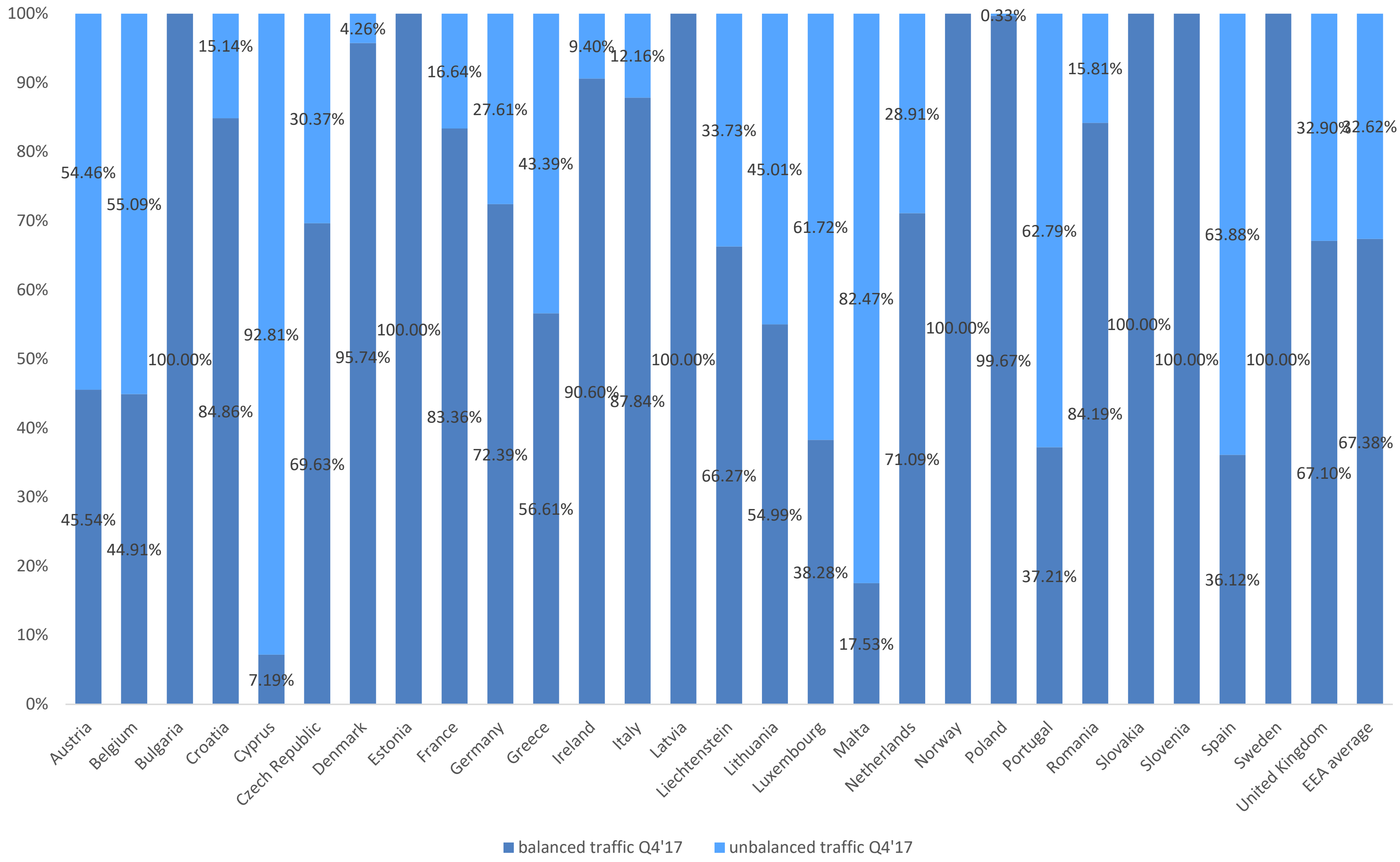
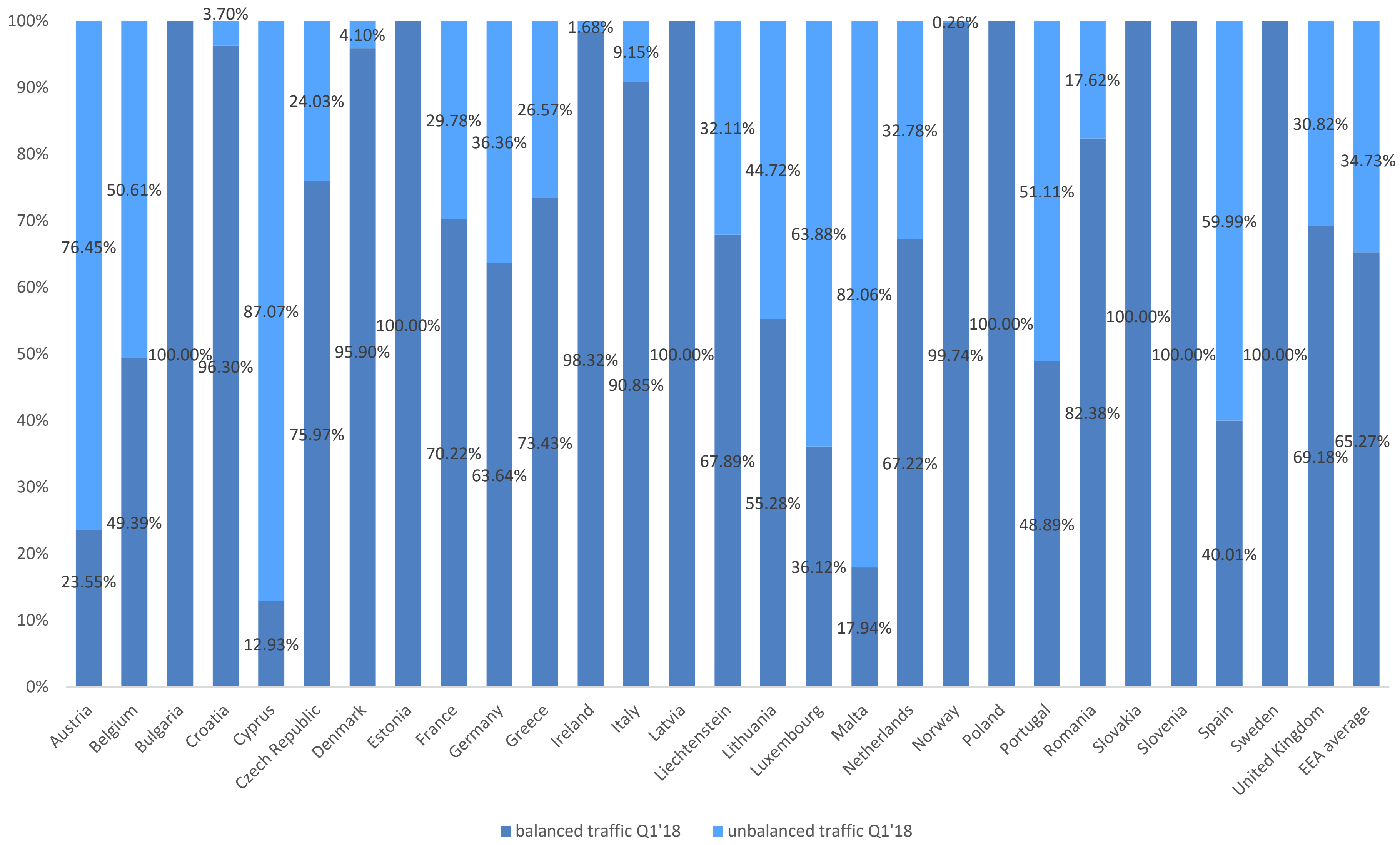


Figure 64: Proportion of balanced/unbalanced traffic within EEA countries, data services, wholesale roaming inbound, Q4 2017



Portugal: the number of operators that reported data for calculating these estimates (disaggregated for balanced and unbalanced traffic) is different from the number of operators that reported data for calculating the non-disaggregated estimates.

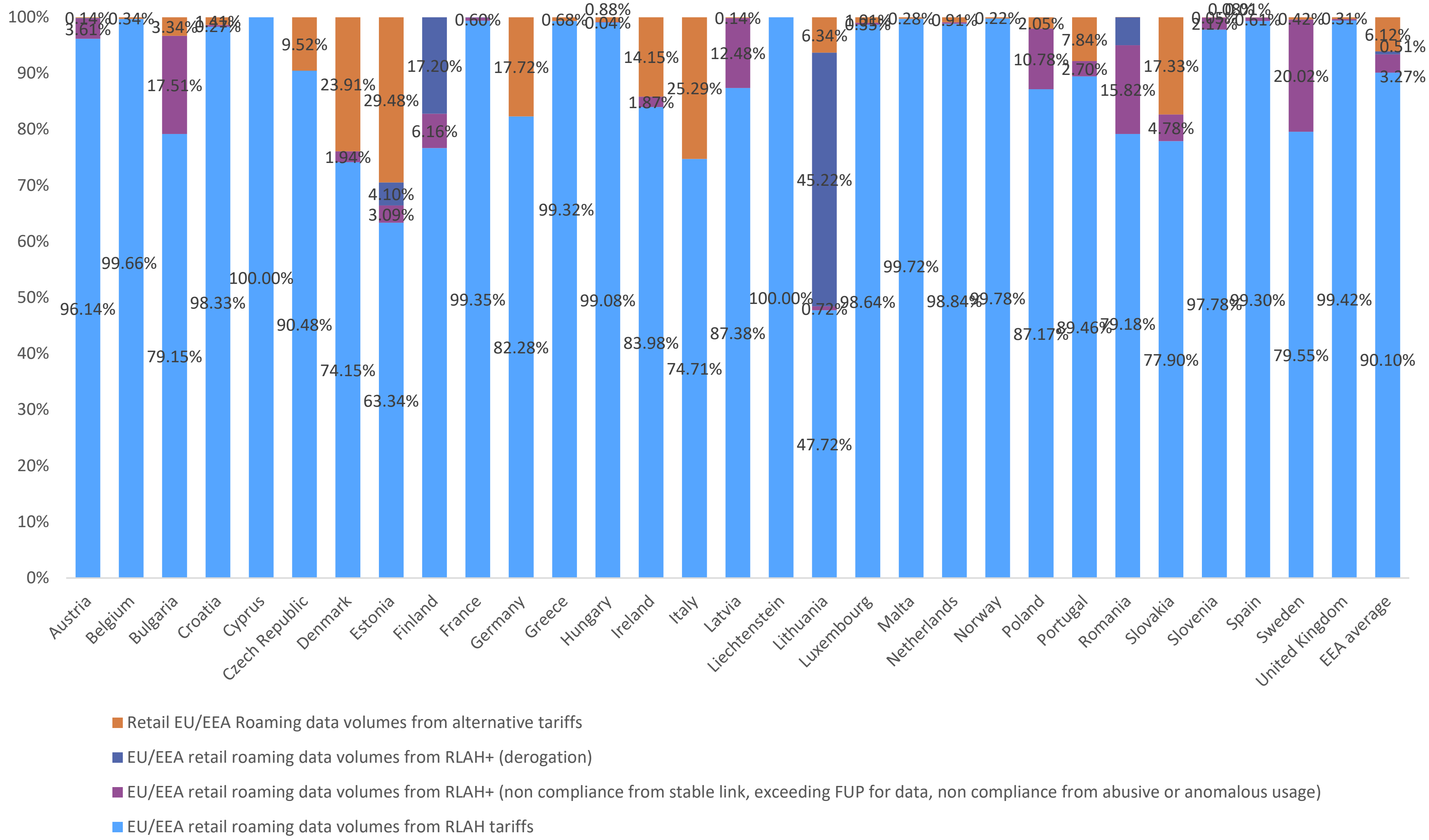
Figure 65: Proportion of balanced/unbalanced traffic within EEA countries, data services, wholesale roaming inbound, Q1 2018



Portugal: the number of operators that reported data for calculating these estimates (disaggregated for balanced and unbalanced traffic) is different from the number of operators that reported data for calculating the non-disaggregated estimates.

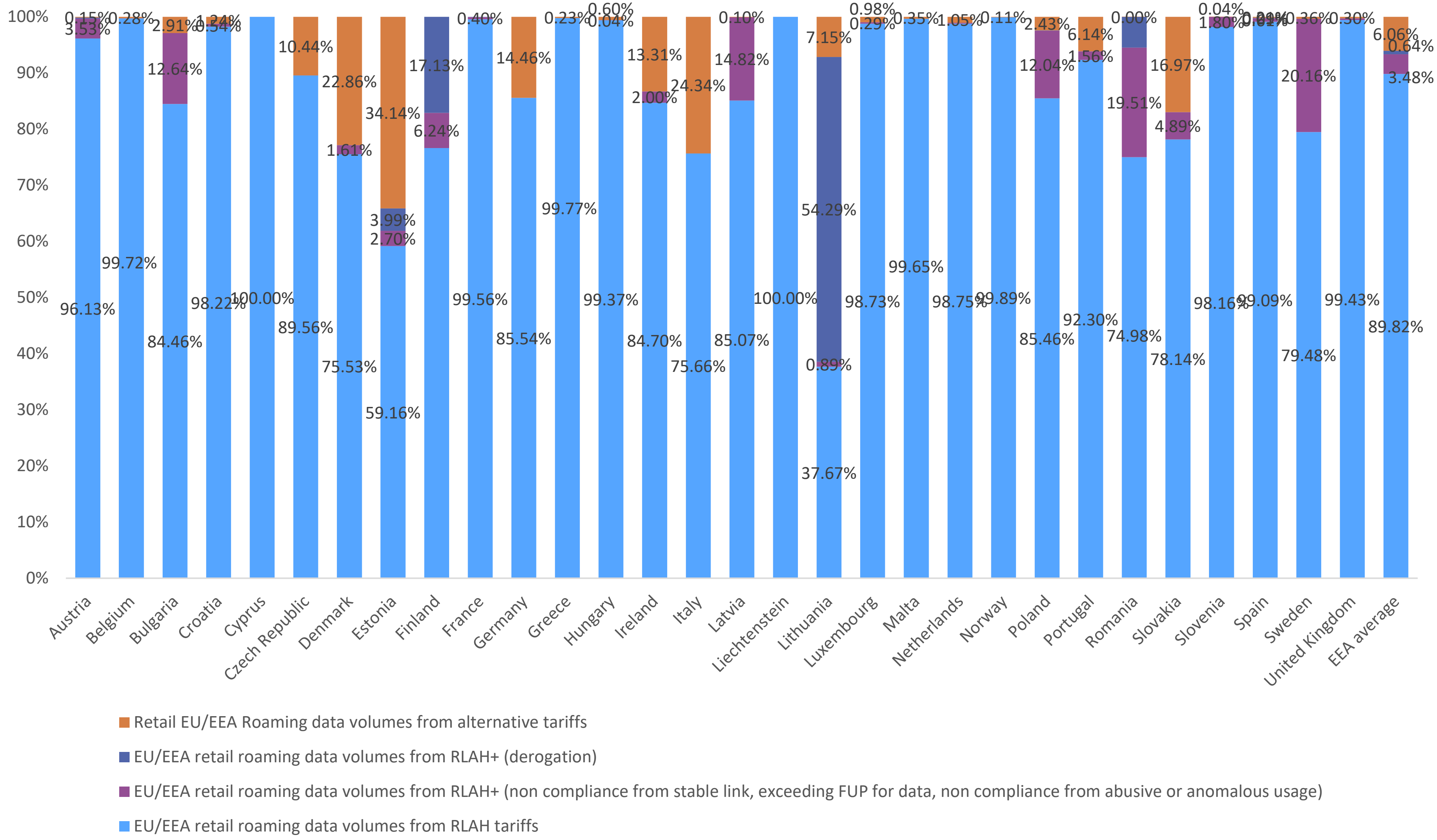
5.2.3.2 Consumption patterns

Figure 66: Percentage of retail data roaming services, Q4 2017



Finland: RLAH+ (exceeding FUP for data) and Alternative Tariffs has been combined, alternative tariffs are not reported due to confidentiality reasons
EEA average excludes: Finland

Figure 67: Percentage of retail data roaming services, Q1 2018



Finland: RLAH+ (exceeding FUP for data) and Alternative Tariffs has been combined, alternative tariffs are not reported due to confidentiality reasons
EEA average excludes: Finland

Figure 68: EEA average: percentage of retail data roaming services, Q3'16 – Q1'18

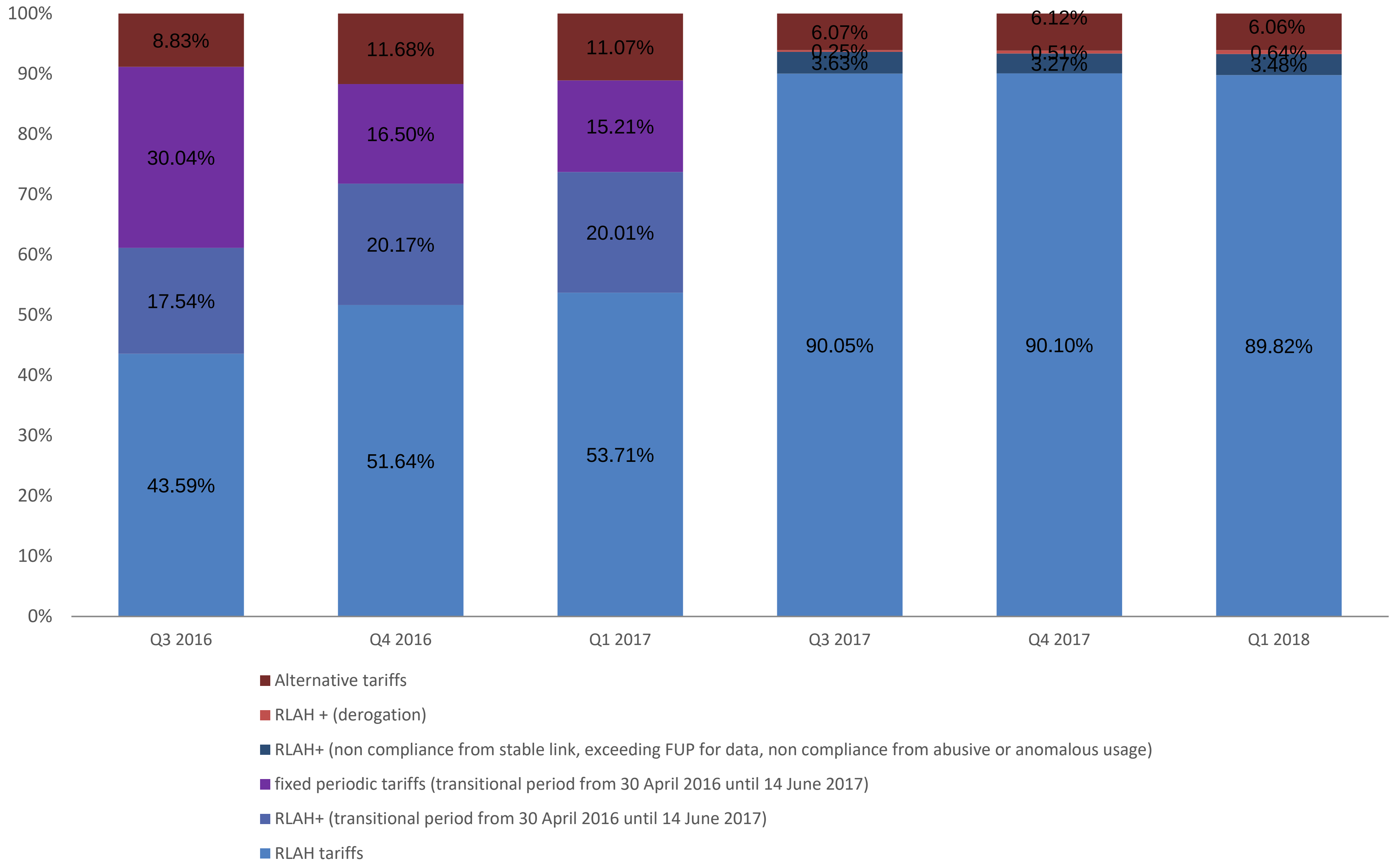
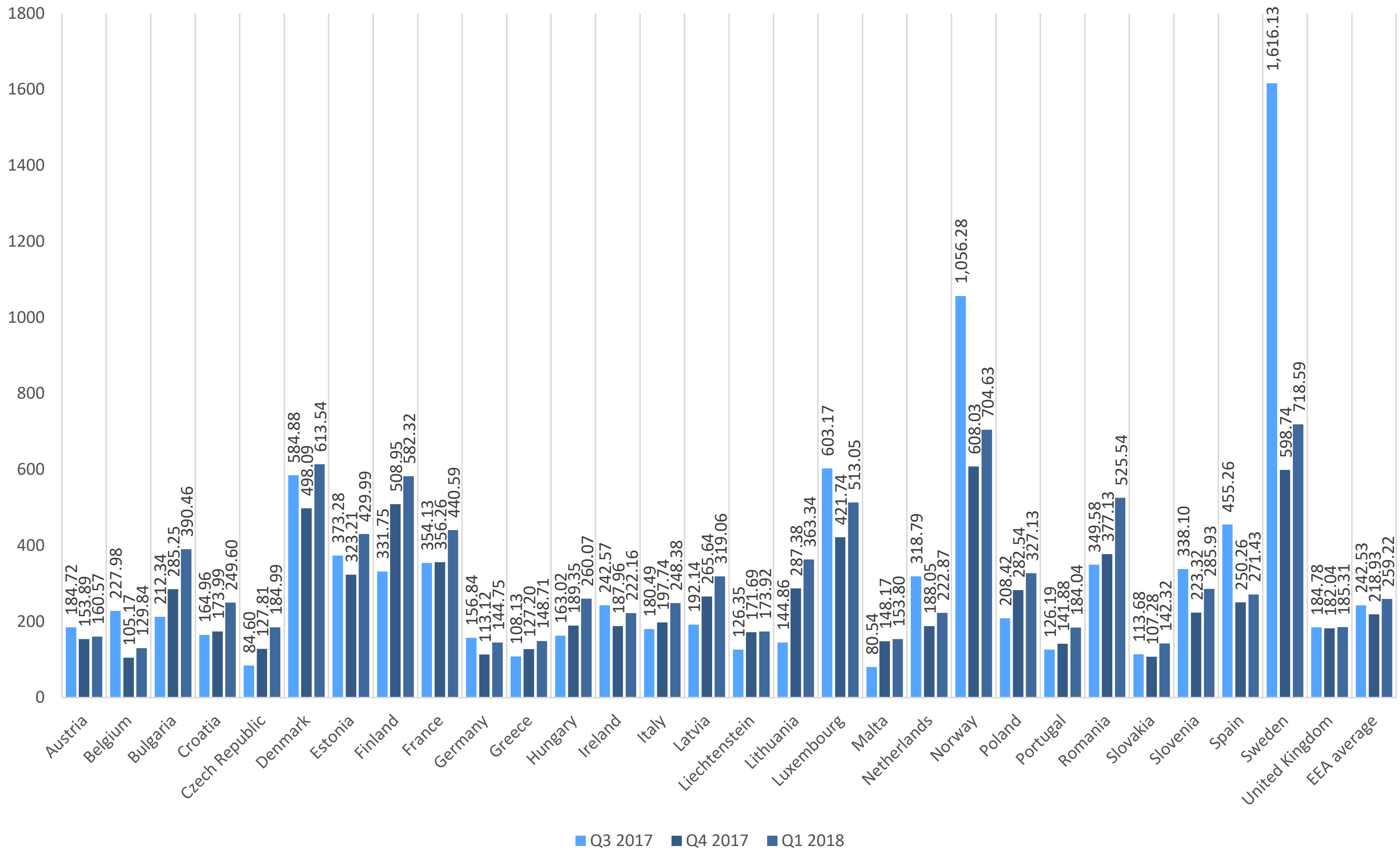


Figure 69: Average data consumption per month per total number of roaming subscriber (in MB), Q3'17 – Q1'18



EEA average excludes: Cyprus

Figure 70: EEA average consumption per month per total number of roaming subscriber (in MB), Q2'16 – Q1'18

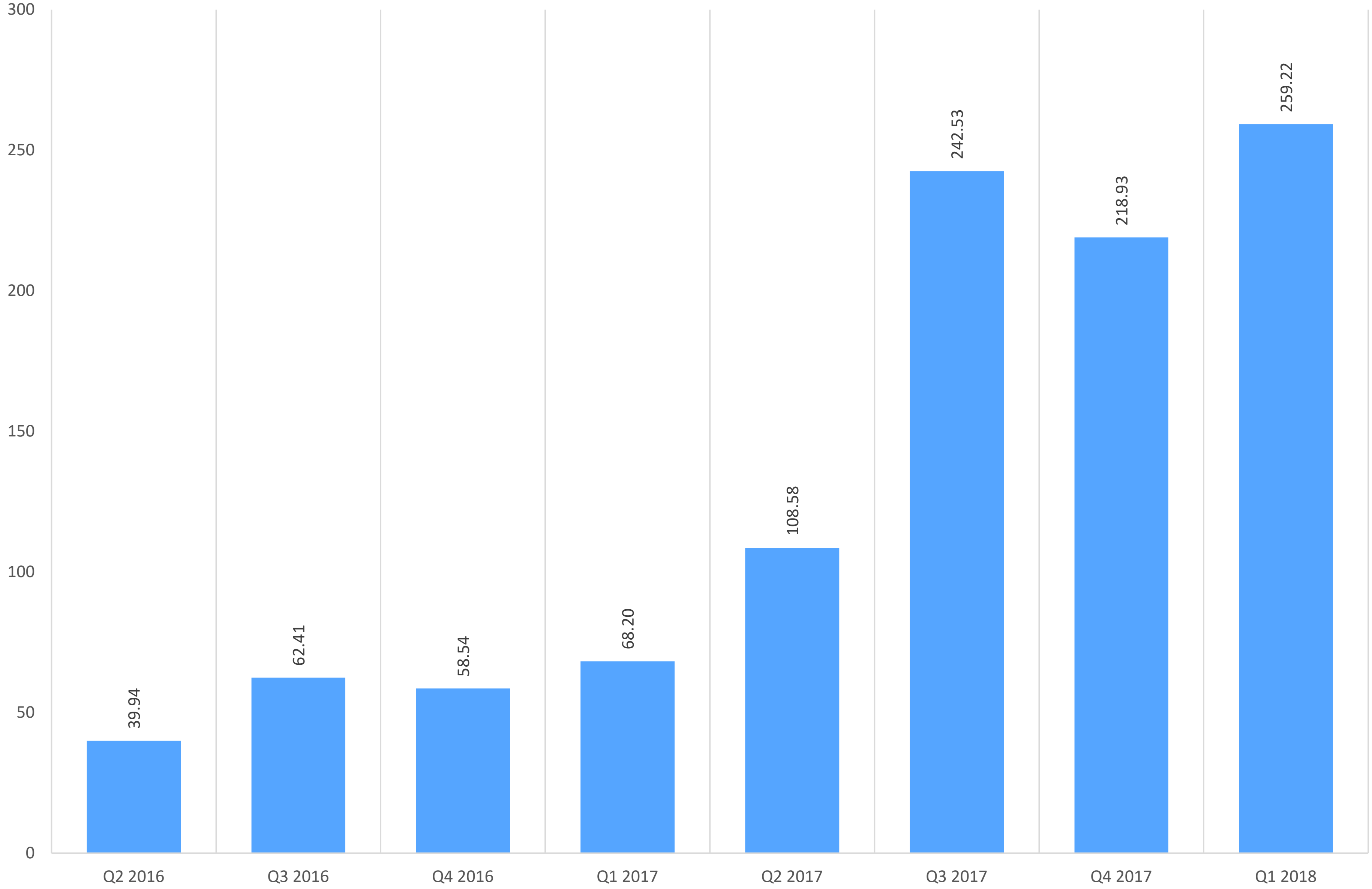
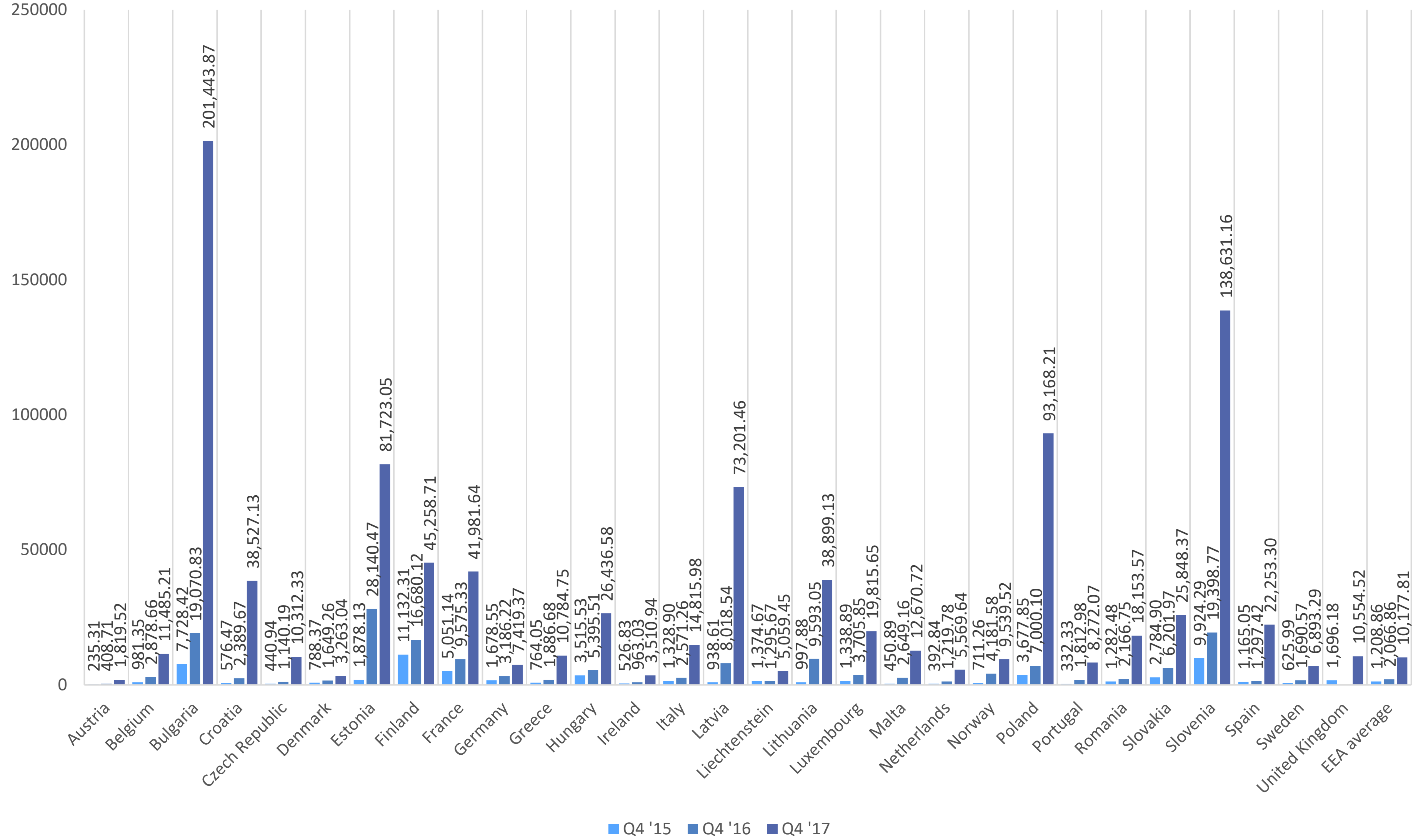
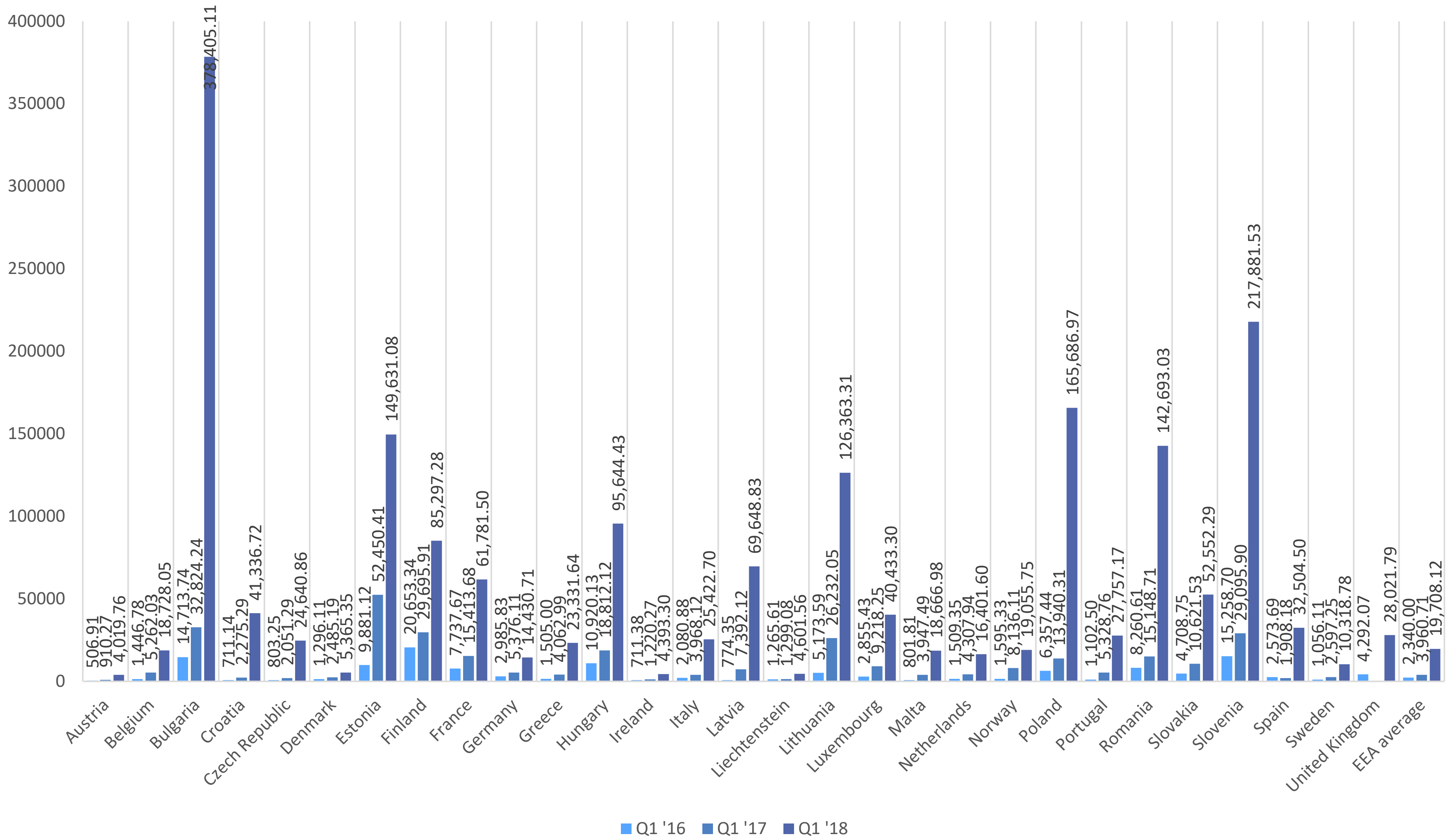


Figure 71: Retail Data traffic Index, Q4’15, Q4’16 and Q4’17*



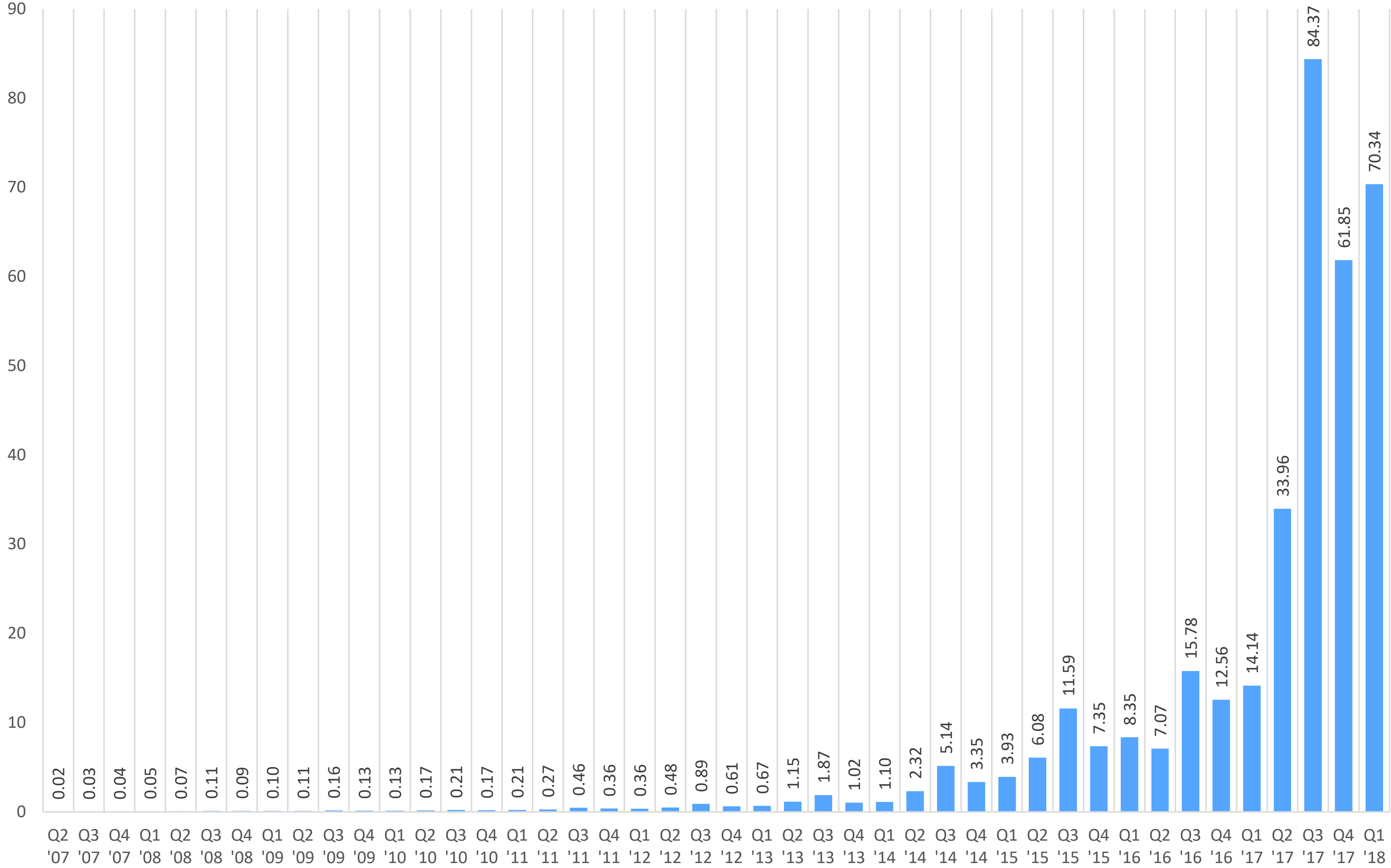
*Reference period: Q4’12= 100, Croatia: Q4’13= 100
EEA average excludes: Cyprus

Figure 72: Retail Data traffic Index, Q1'16, Q1'17 and Q1'18*



*Reference period: Q1'12= 100, Croatia: Q1'14=100, Liechtenstein: Q1'13 = 100
EEA average excludes: Cyprus

Figure 73: EEA Retail data traffic, Q2'07 – Q1'18 (millions of GB)



EEA average (Q4'17 and Q1'18) excludes: Cyprus

5.2.4. Row retail roaming prices

Figure 74: Average retail price per minute for RoW roaming voice calls made, Q4'17 and Q1'18

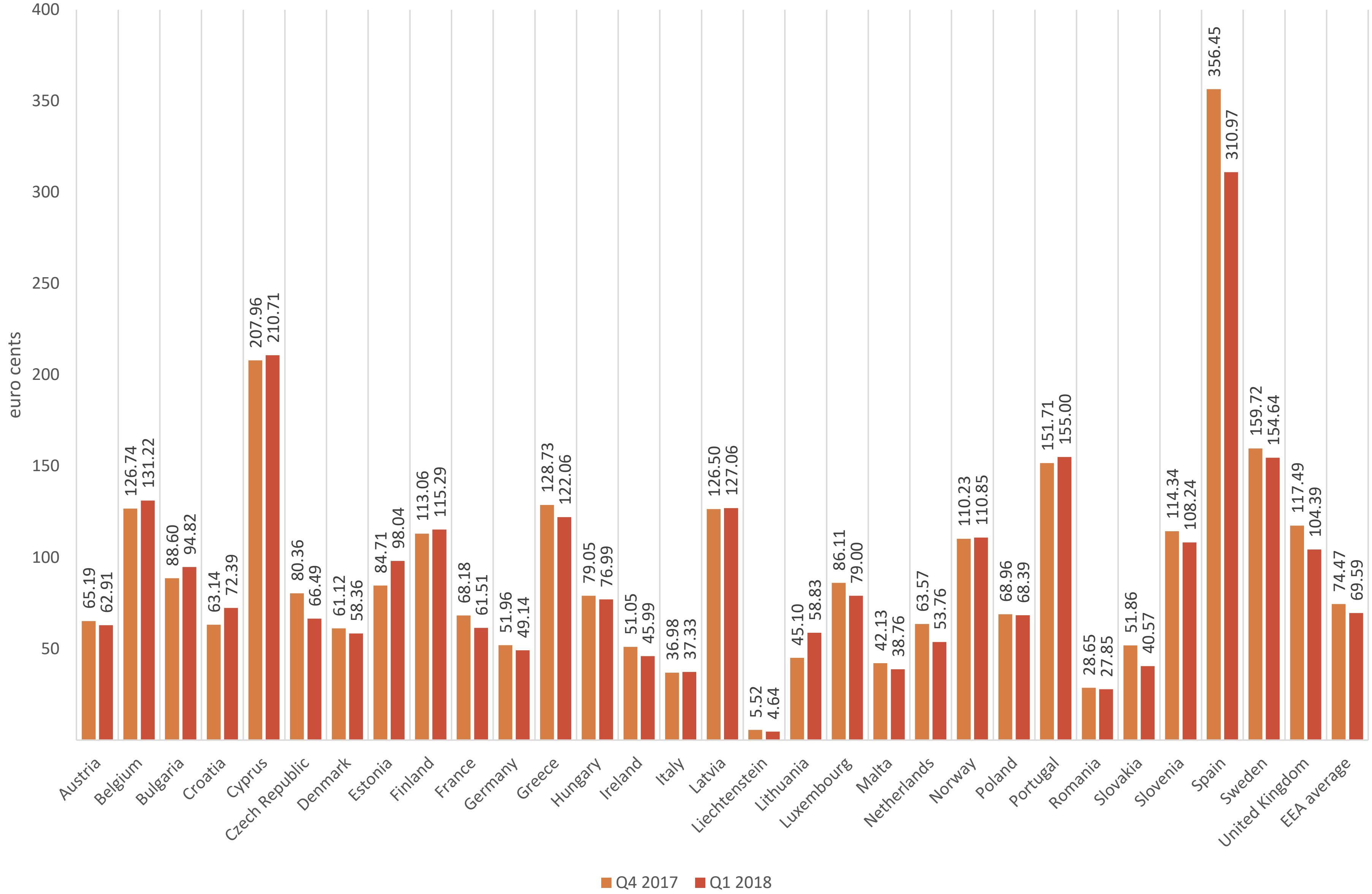


Figure 75: EEA average retail price per minute for RoW roaming voice calls made

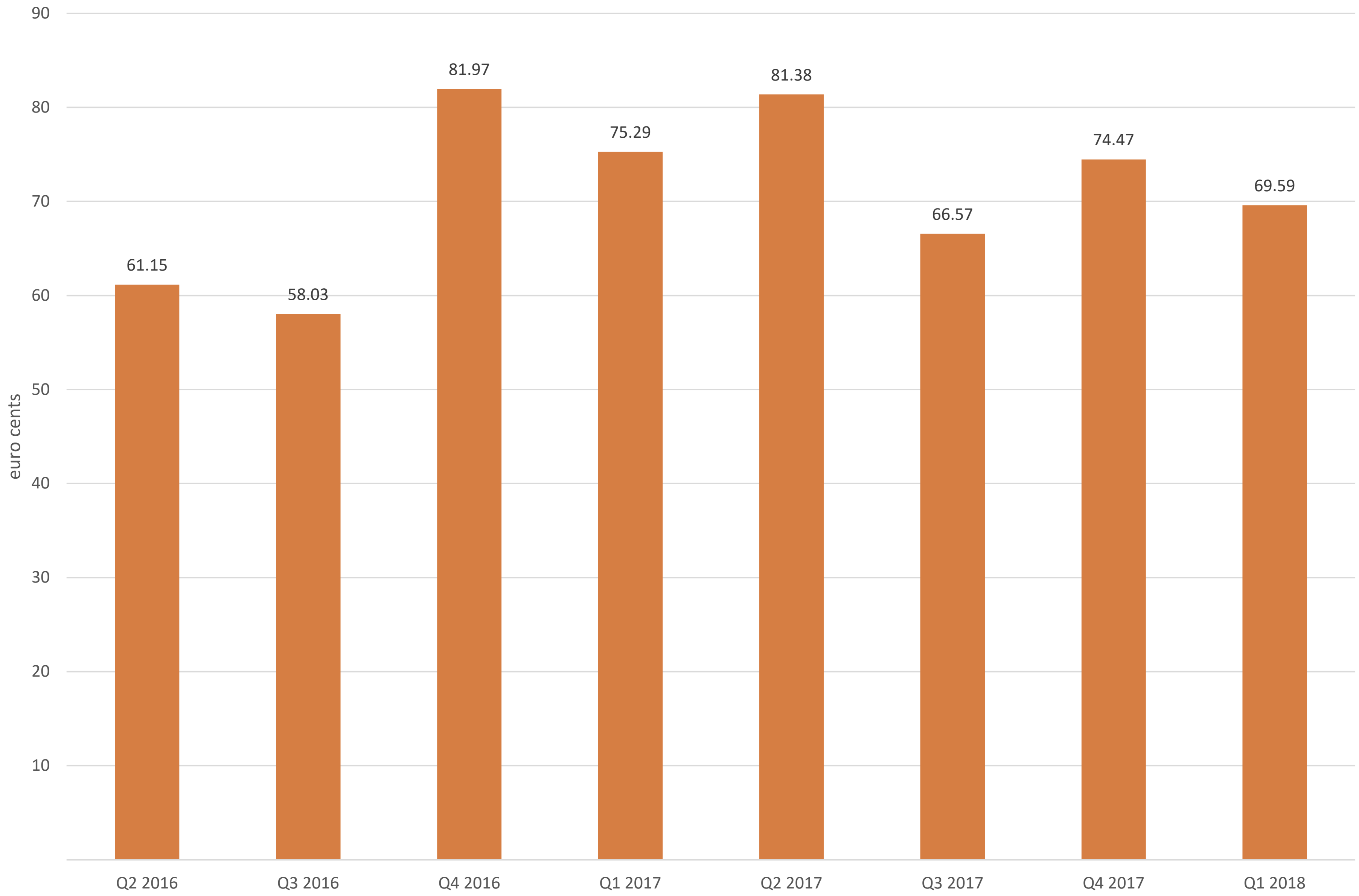


Figure 76: Average retail price per minute for RoW roaming voice calls received, Q4'17 and Q1'18

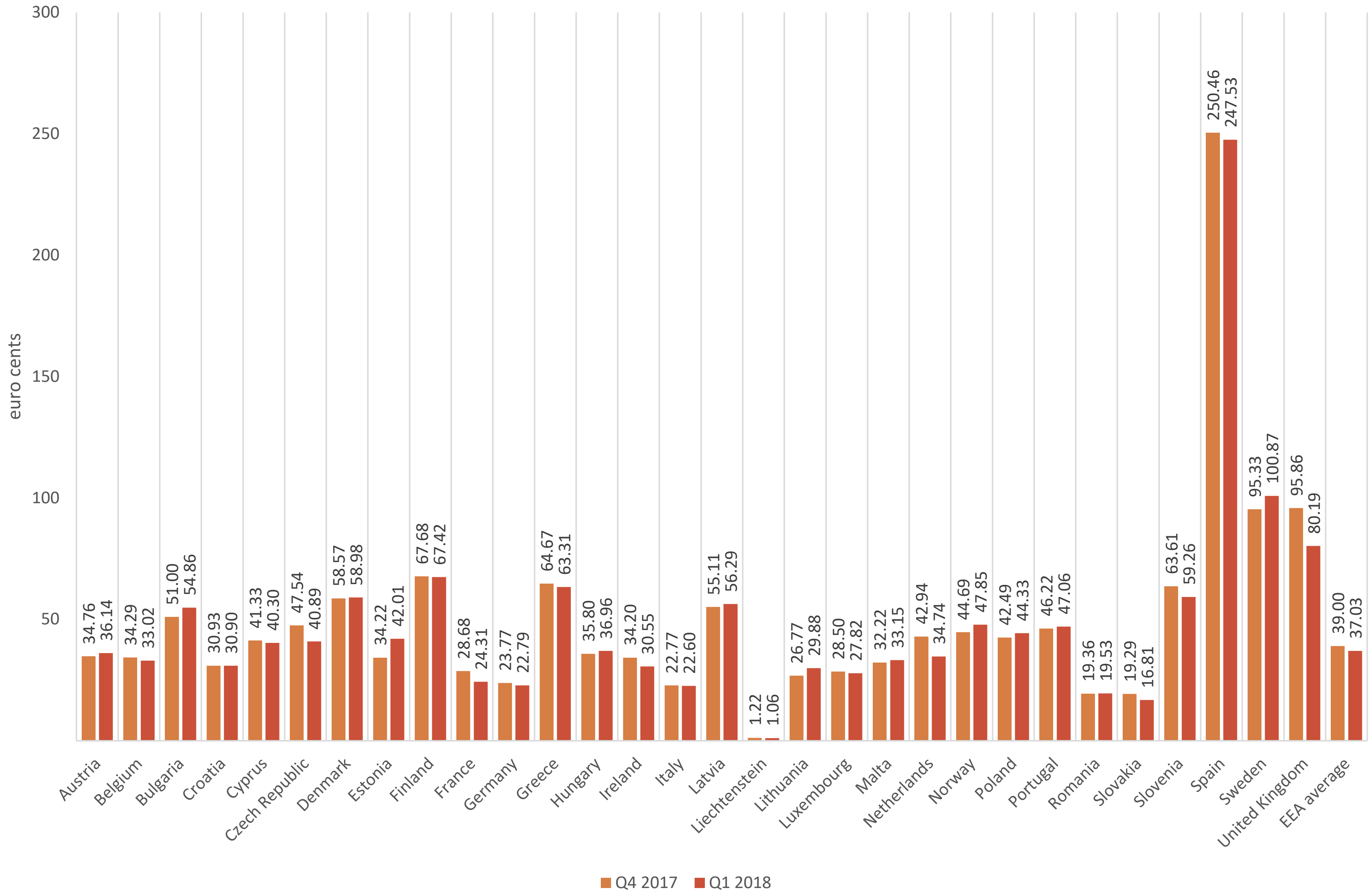


Figure 77: EEA average retail price per minute for RoW roaming voice calls received

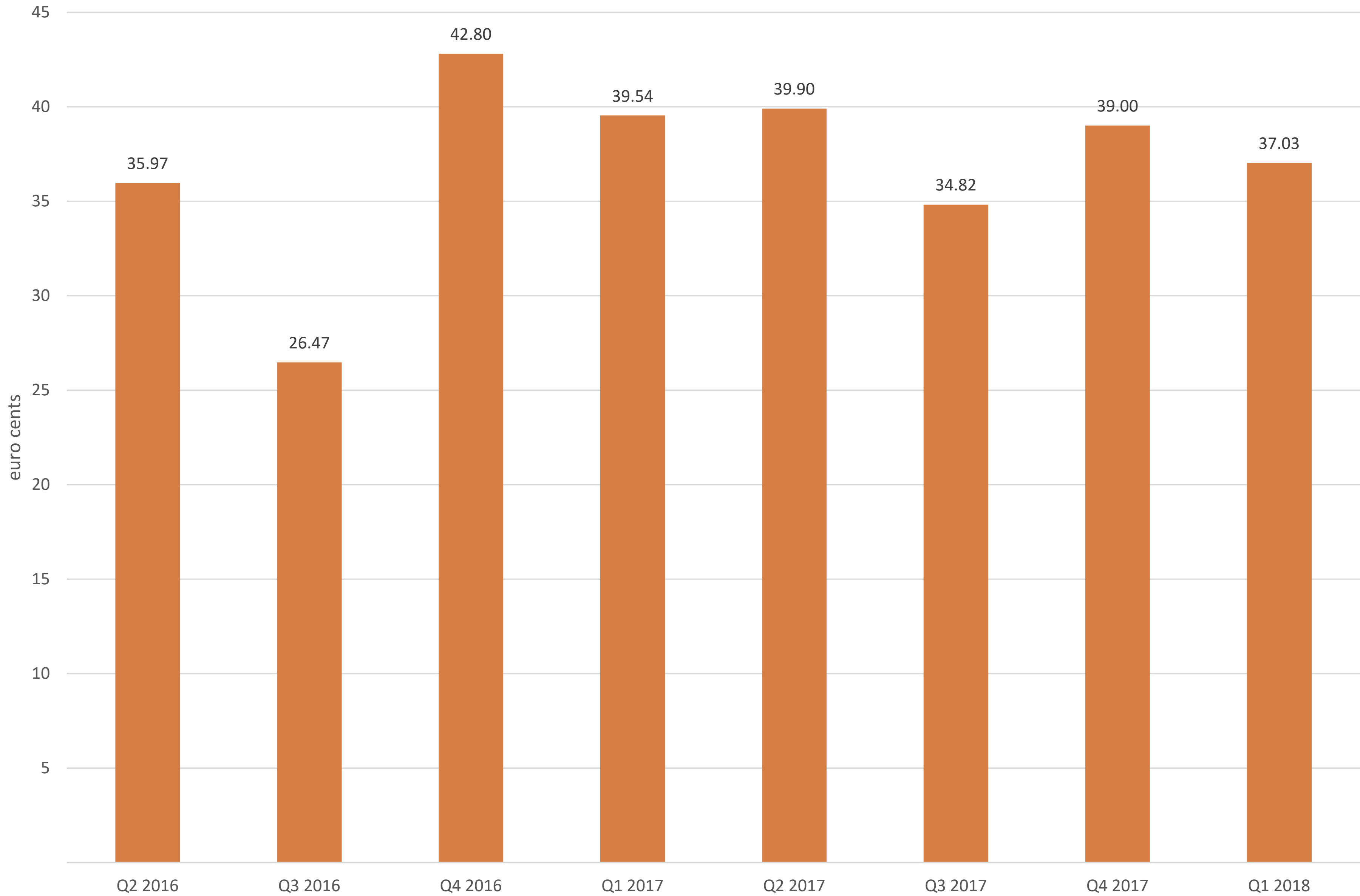


Figure 78: Average retail price for RoW roaming SMS services, Q4'17 and Q1'18*

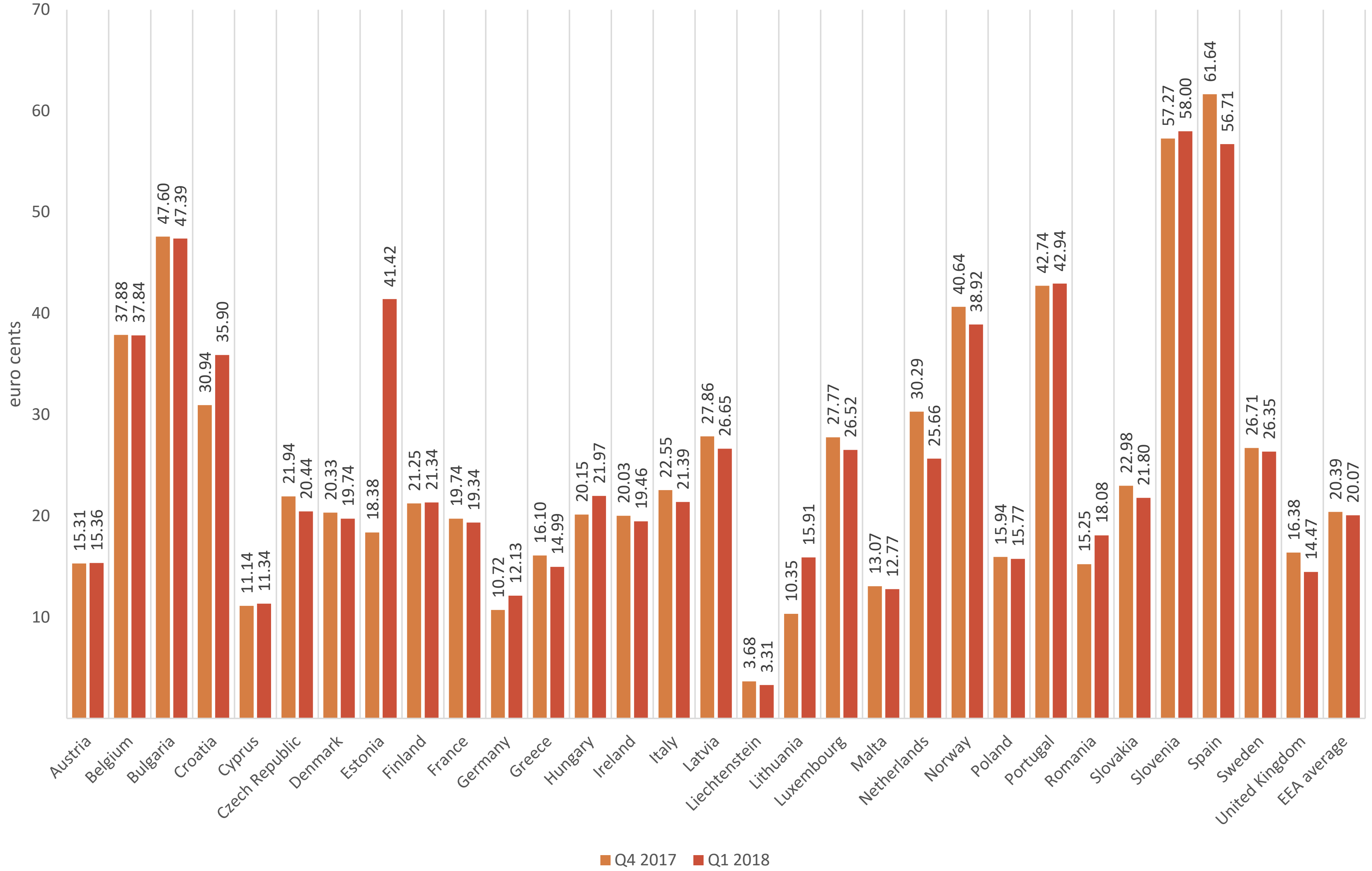


Figure 79: EEA average retail price for RoW roaming SMS services, Q2’16 – Q1’18

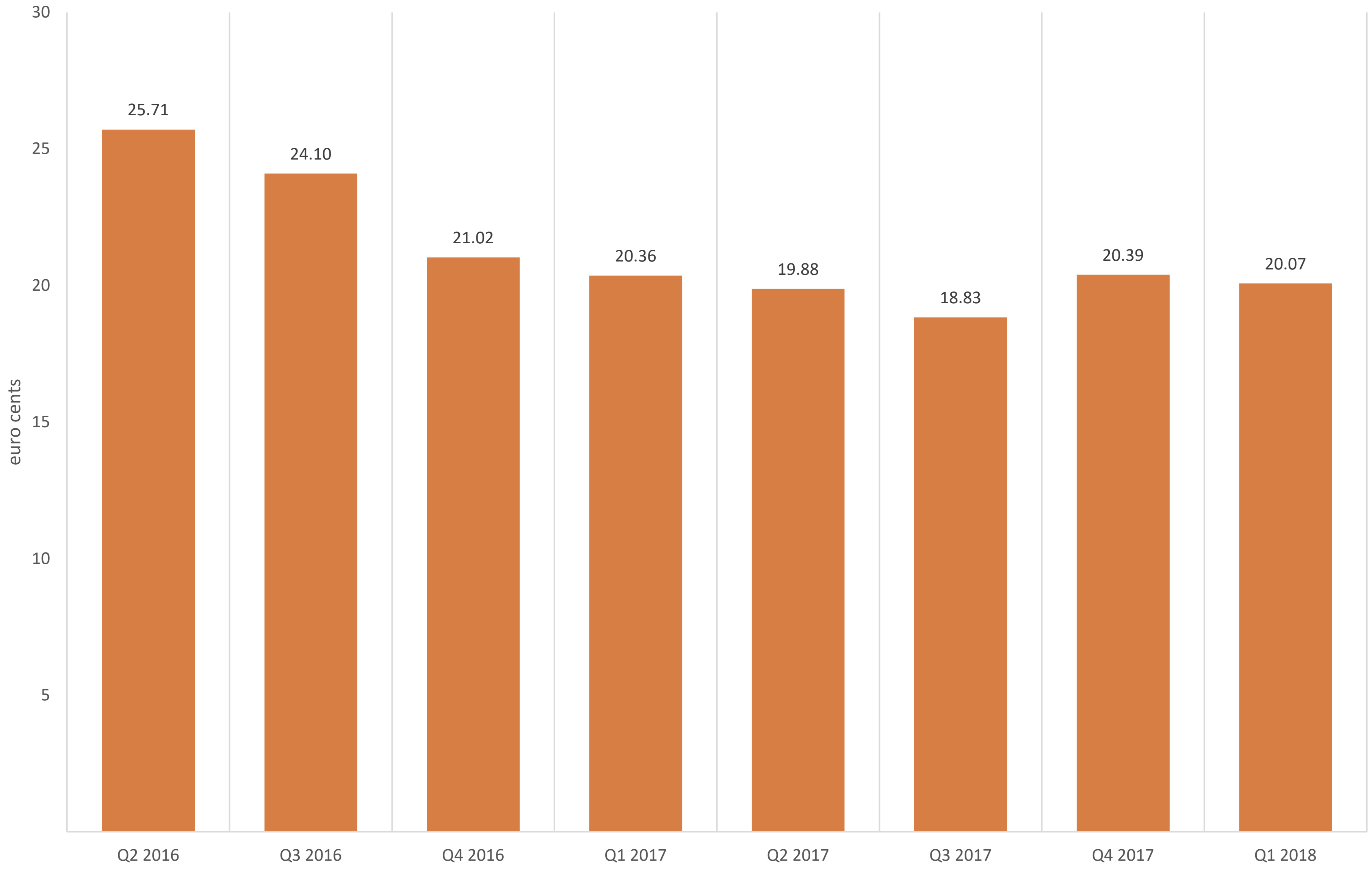
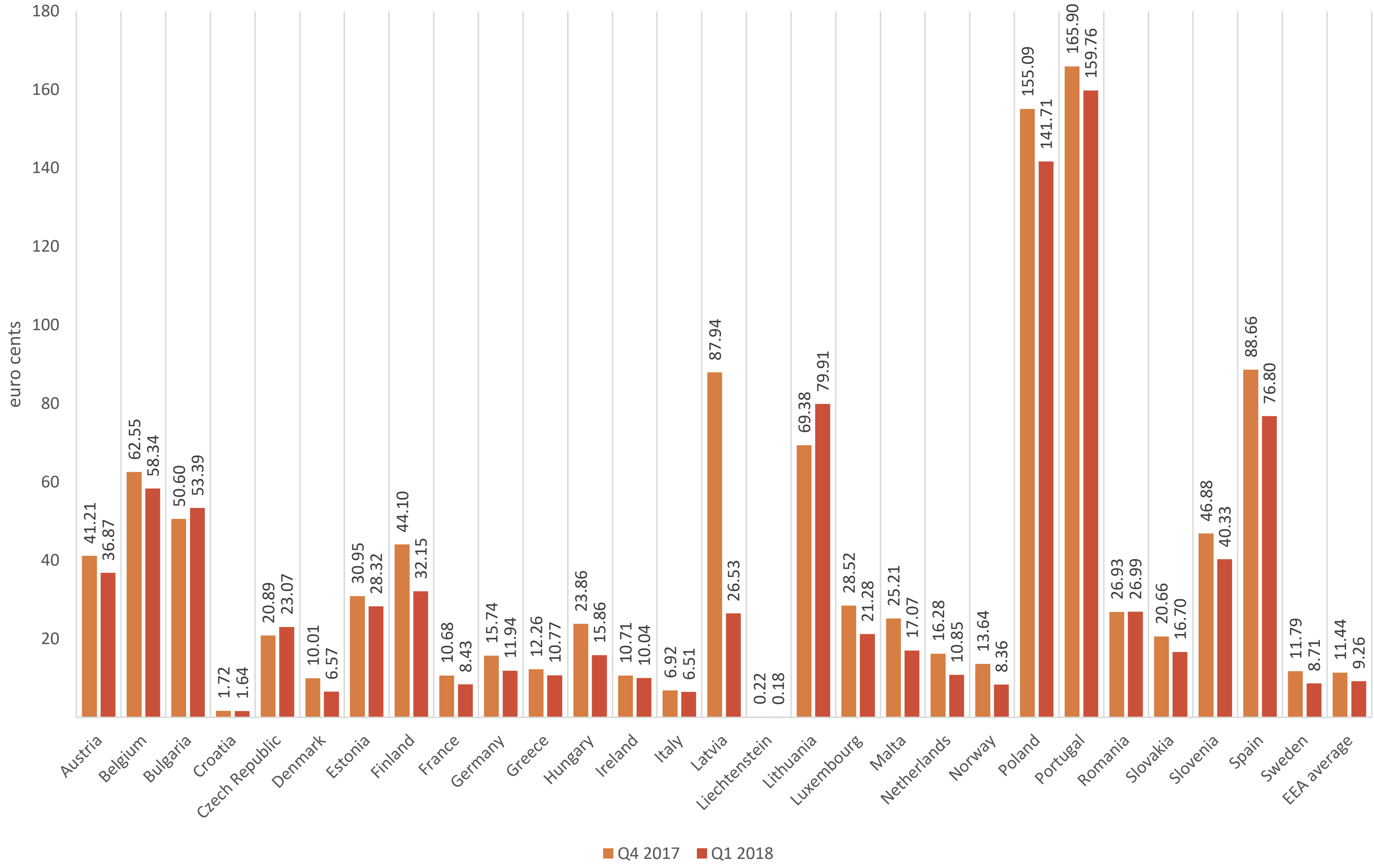


Figure 80: Average retail price per MB for RoW roaming data services, Q4’17 and Q1’18



EEA average excludes: Cyprus

Figure 81: EEA average retail data price per MB for RoW roaming data services, Q2'16 – Q1'18

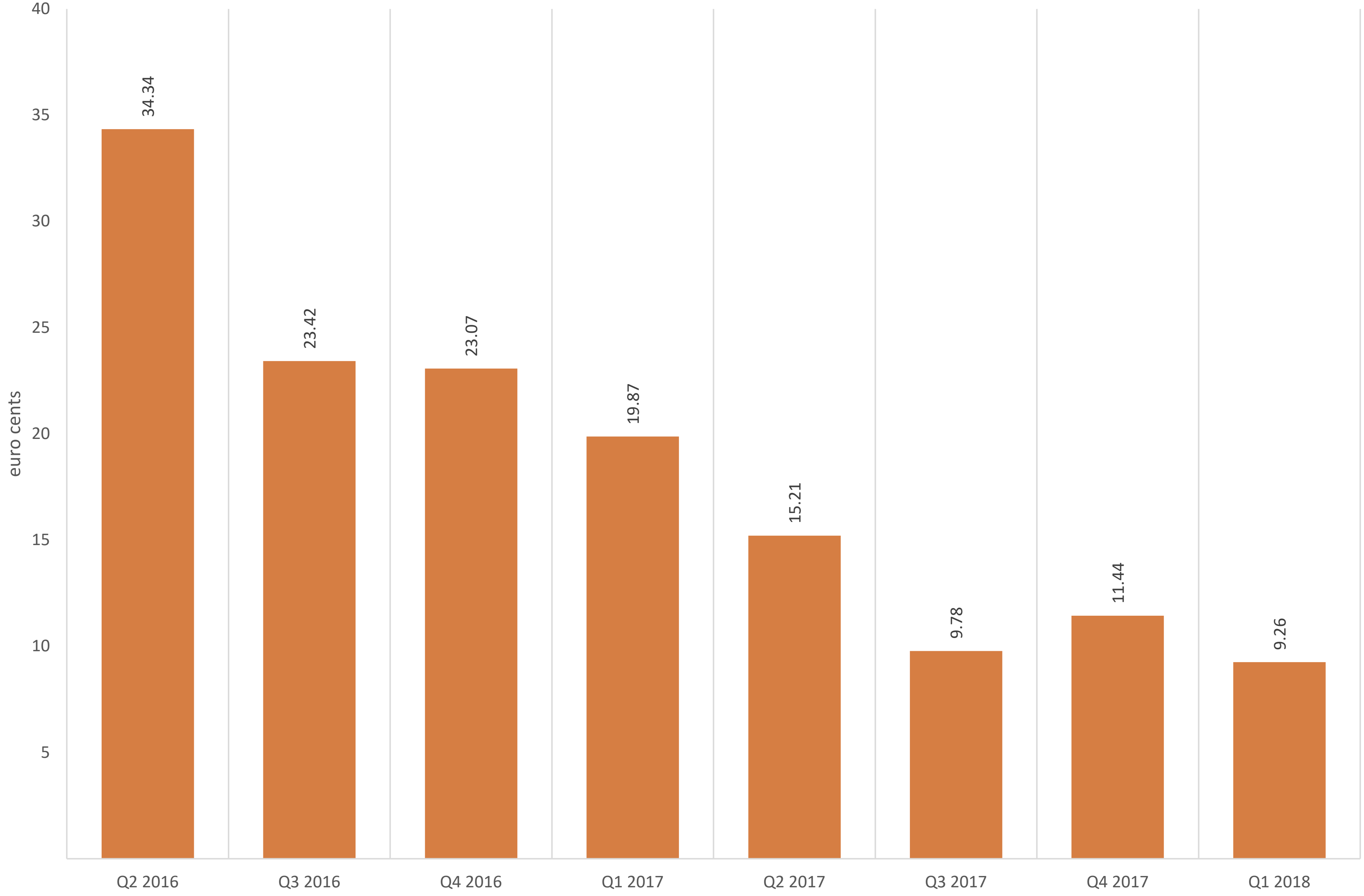
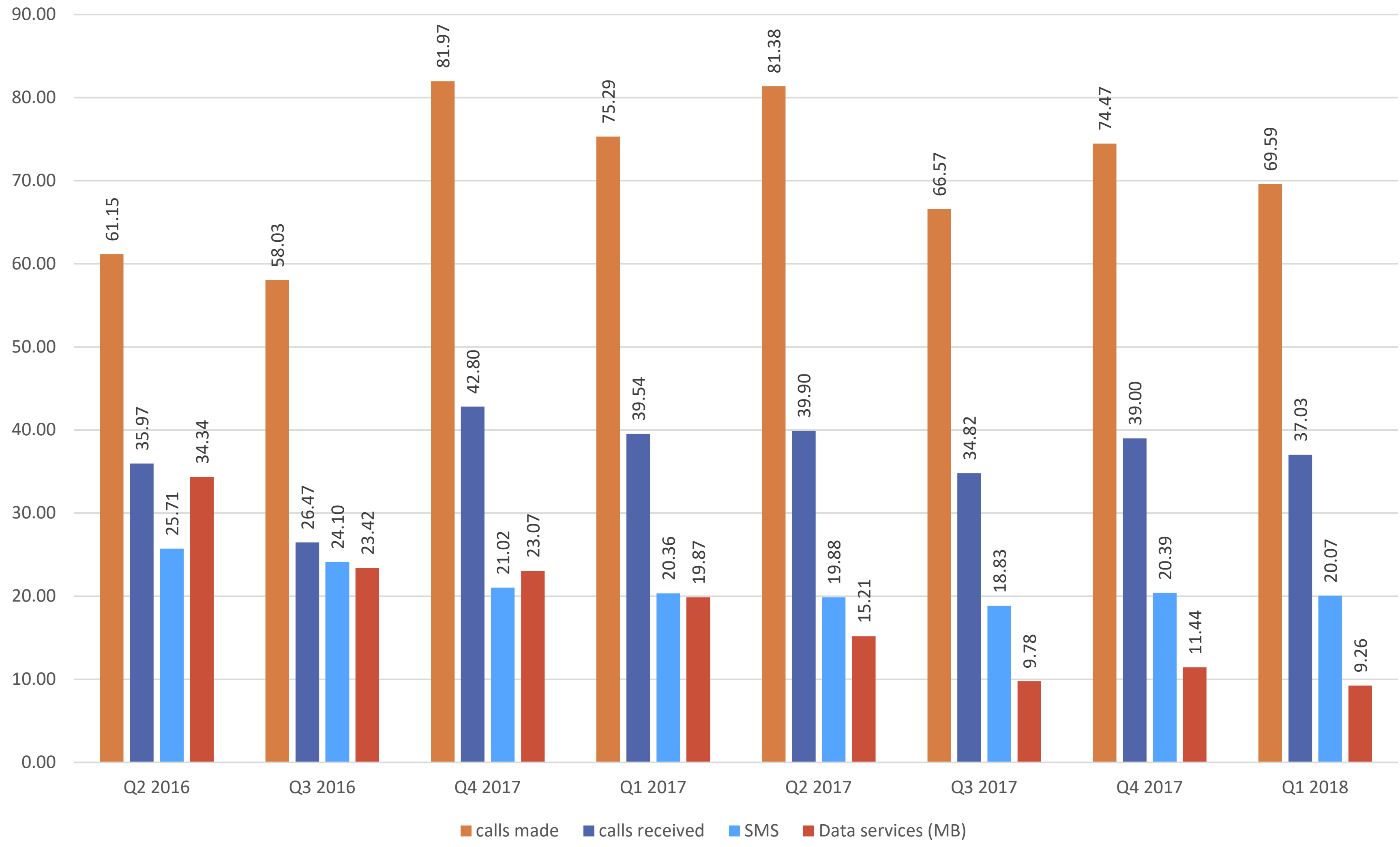


Figure 82: EEA average retail prices for RoW roaming services. Q2'16 – Q1'18



5.3. Wholesale roaming (outbound): Agreements

Figure 83: Wholesale averages outbound roaming: Voice: Agreements applying Article 3 Roaming Regulation, Q2'13 – Q1'18

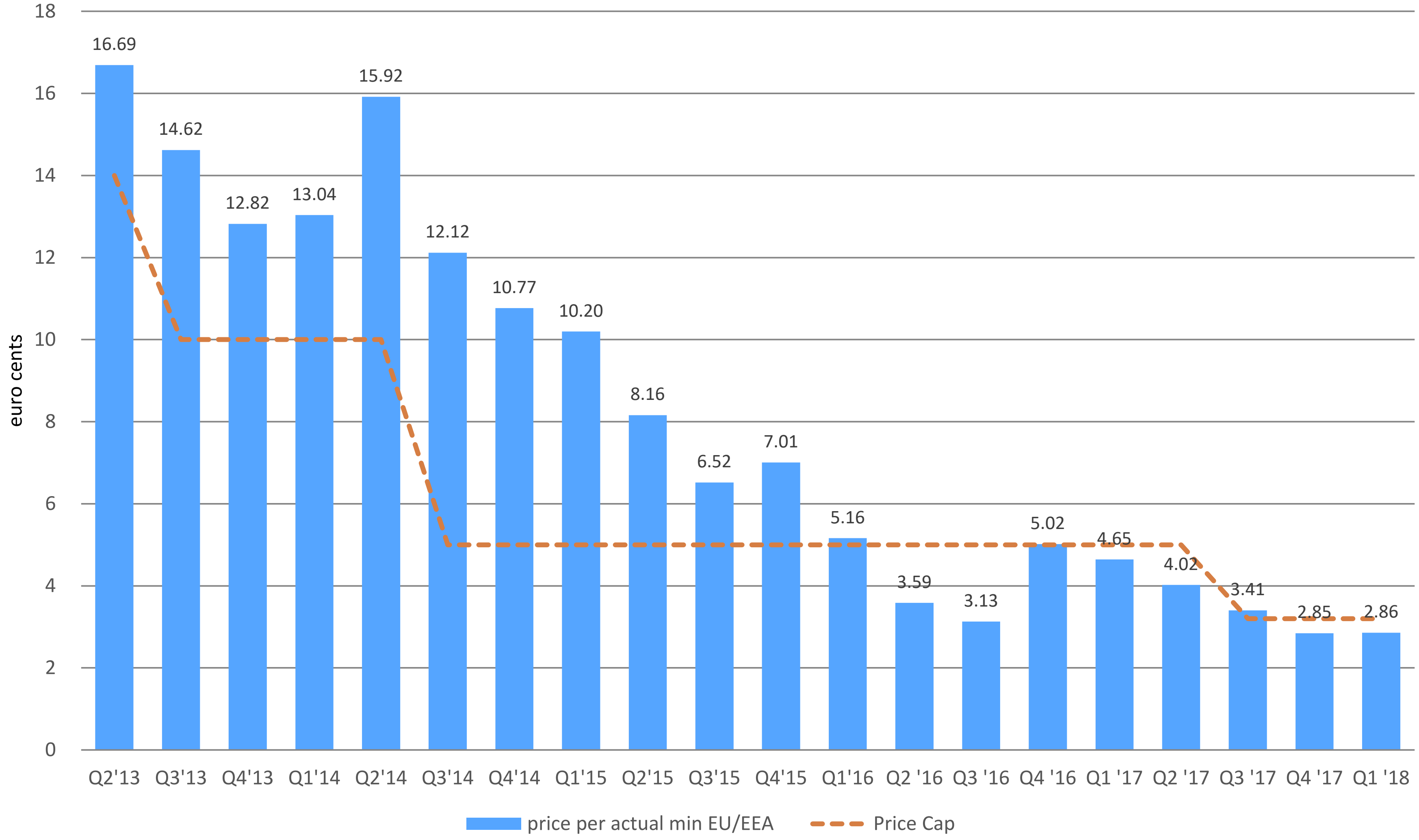


Figure 84: Wholesale averages outbound roaming: SMS Agreements applying Article 3 Roaming Regulation, Q2’13 – Q1’18

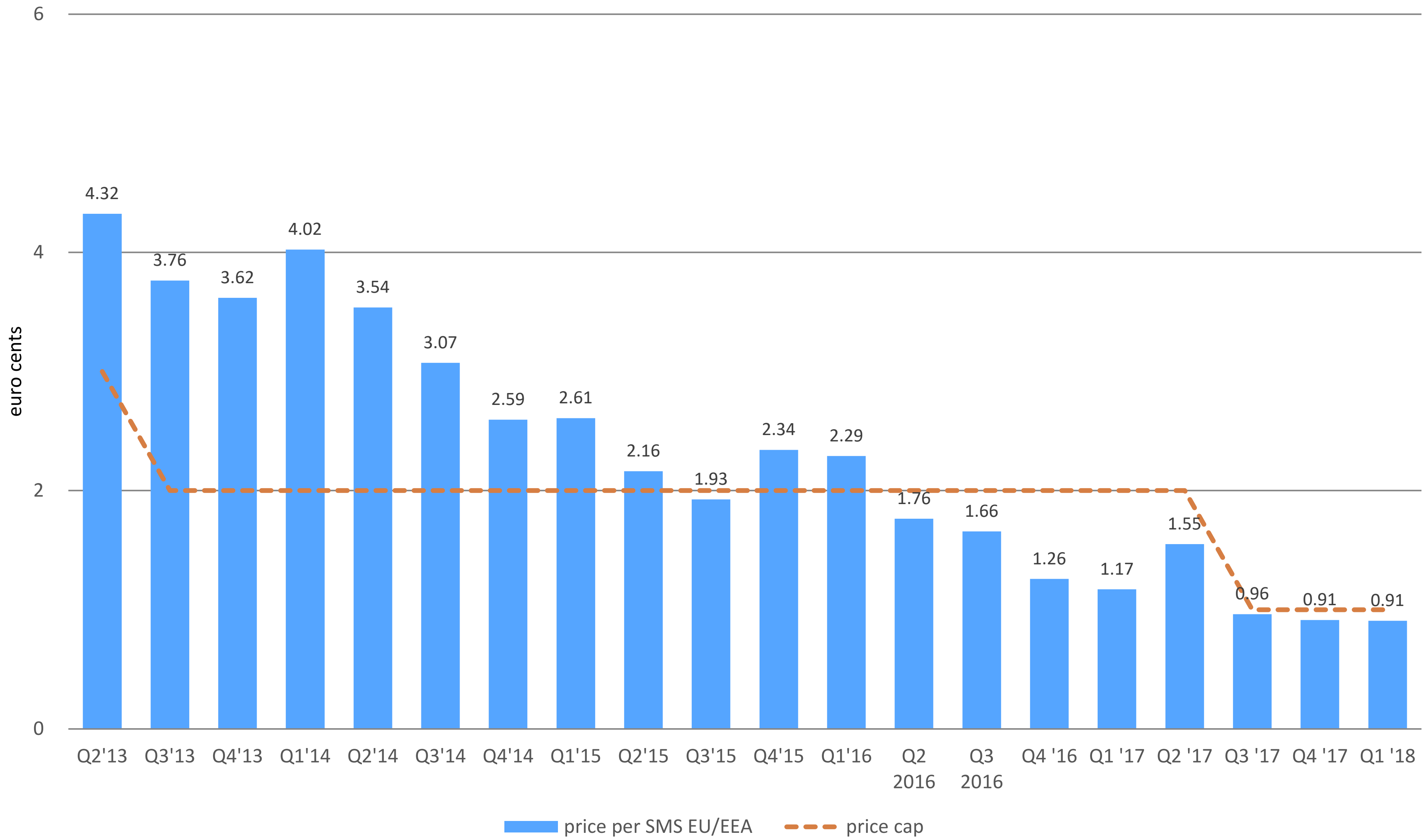
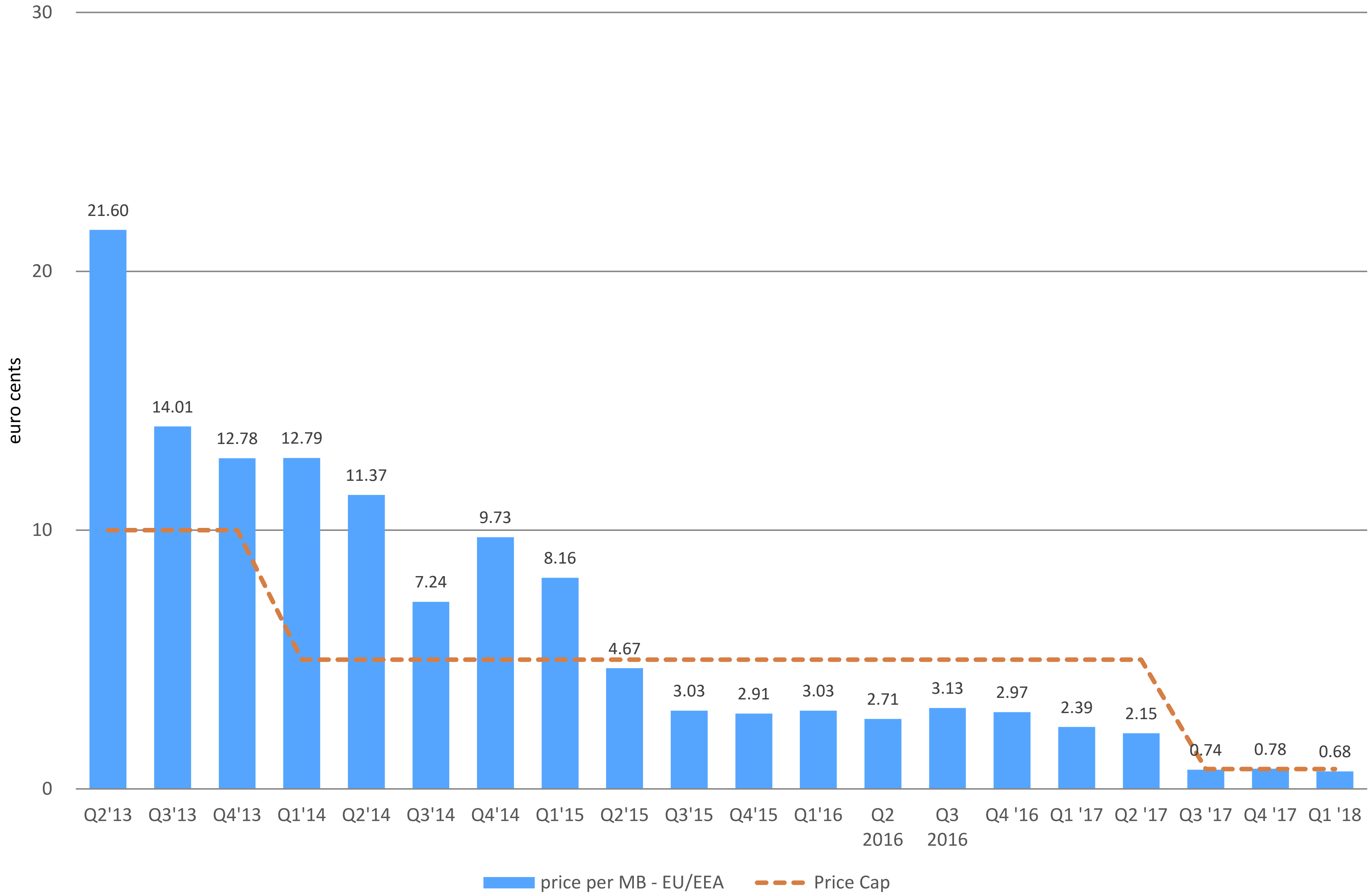
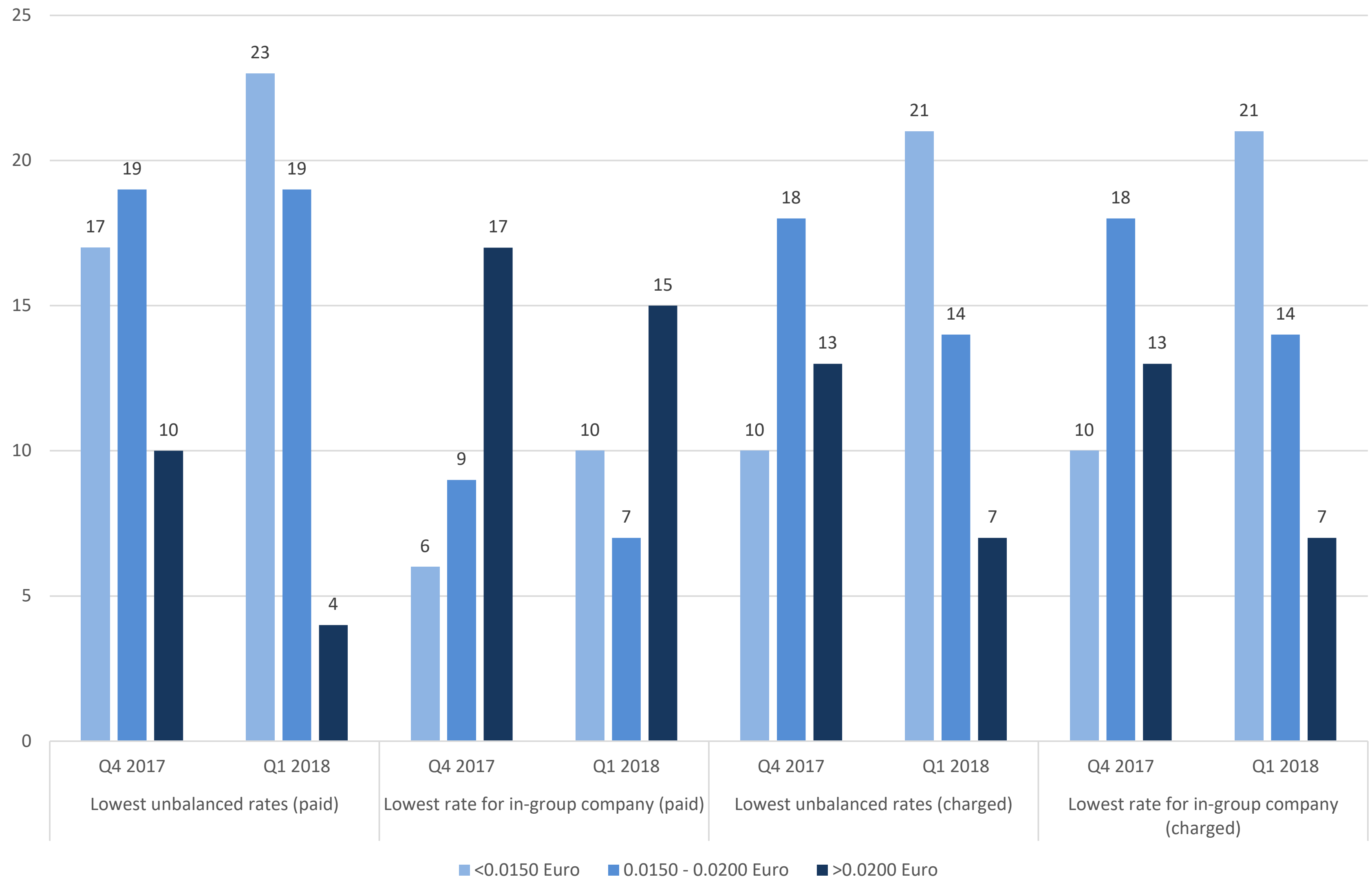


Figure 85: Wholesale EEA average outbound roaming: DATA, Agreements applying Article 3 Roaming Regulation, Q2’13 – Q1’18



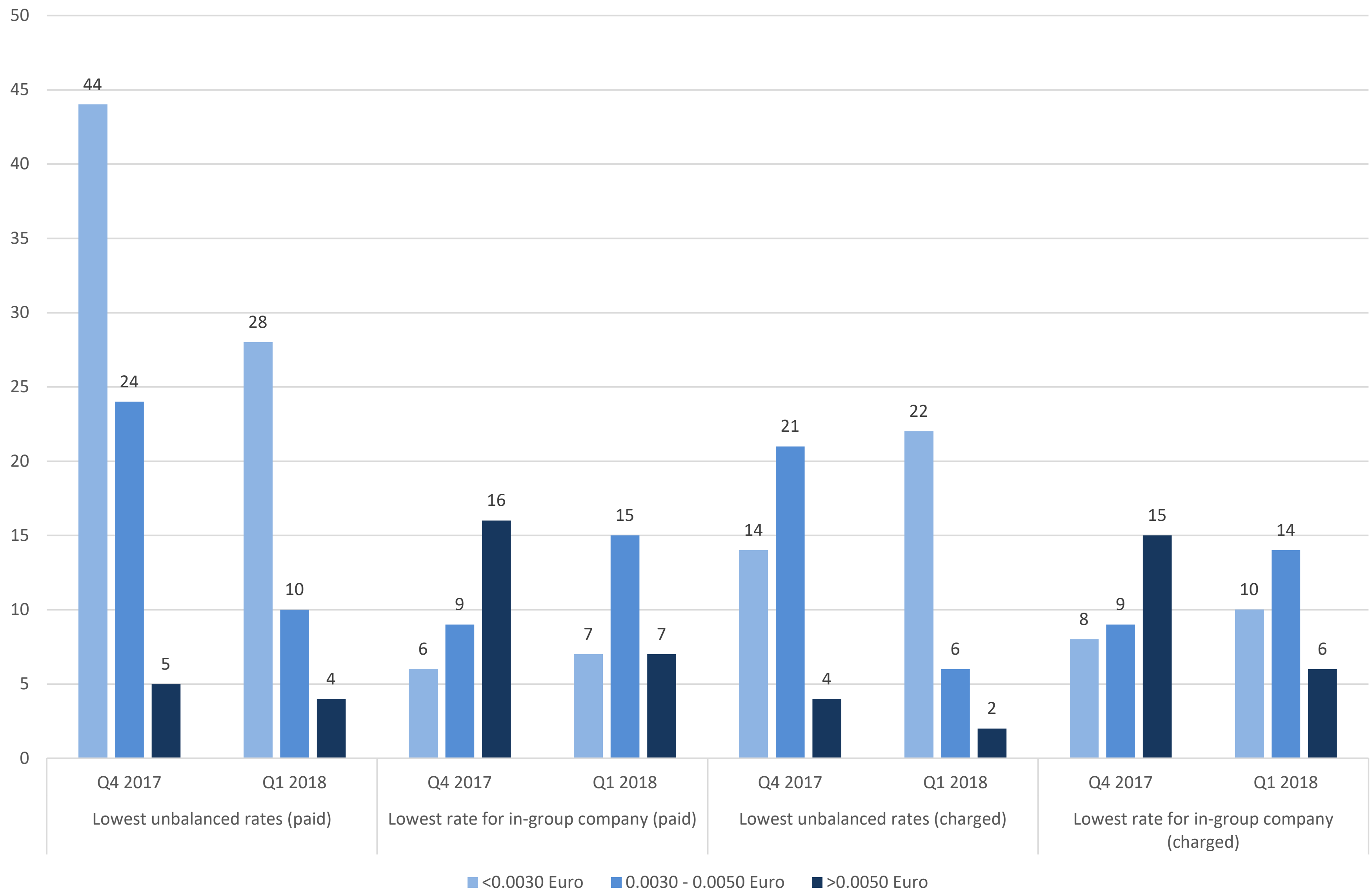
5.4. Rates for unbalanced wholesale roaming traffic

Figure 86: Lowest paid/charged unbalanced rates* for calls made (number of operators), Q4 2017 and Q1 2018



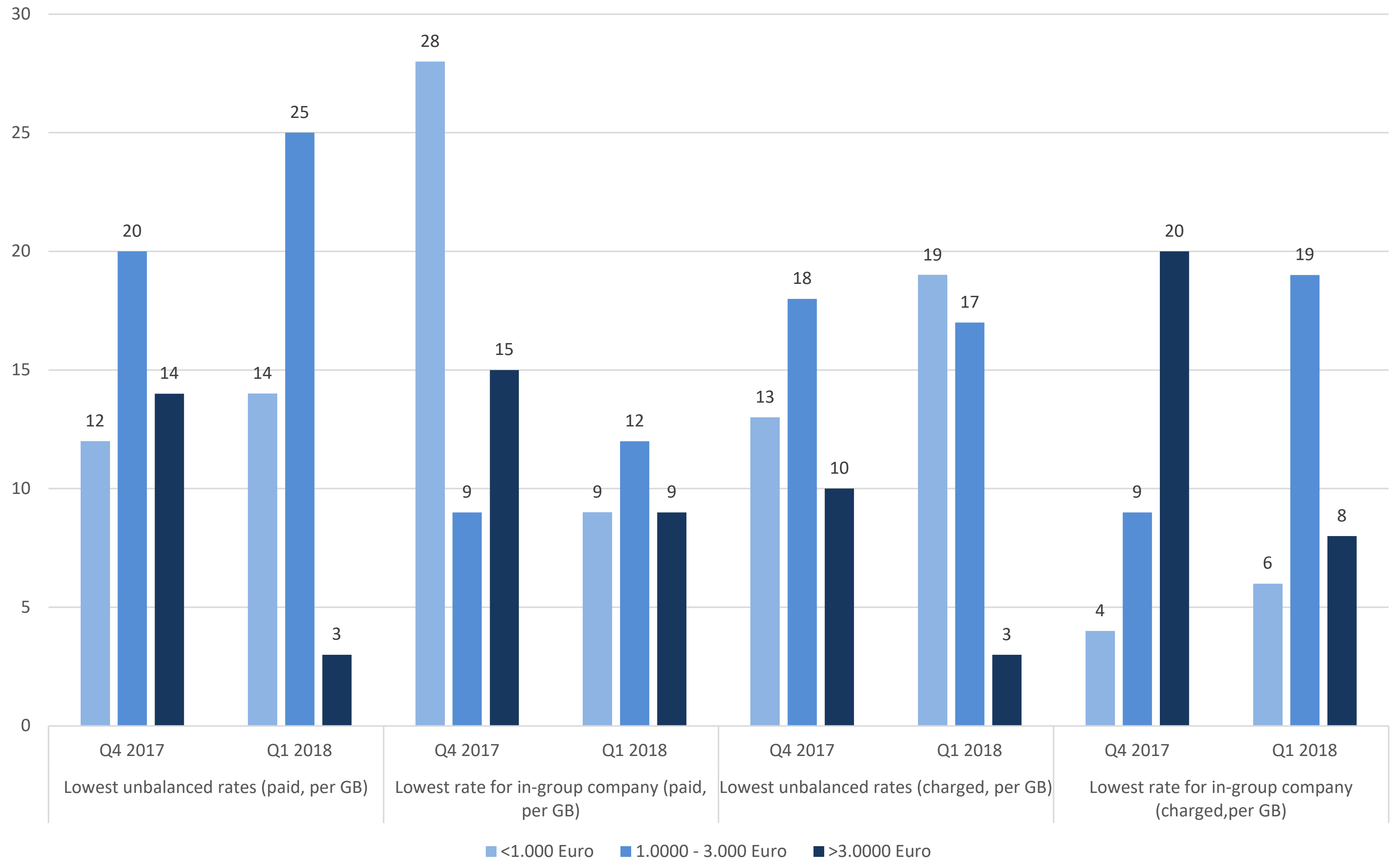
*The rates are calculated on the basis of its costs/charges per unit (per minute)

Figure 87: Lowest paid/charged unbalanced rates* for SMS services (number of operators) Q4 2017 and Q1 2018



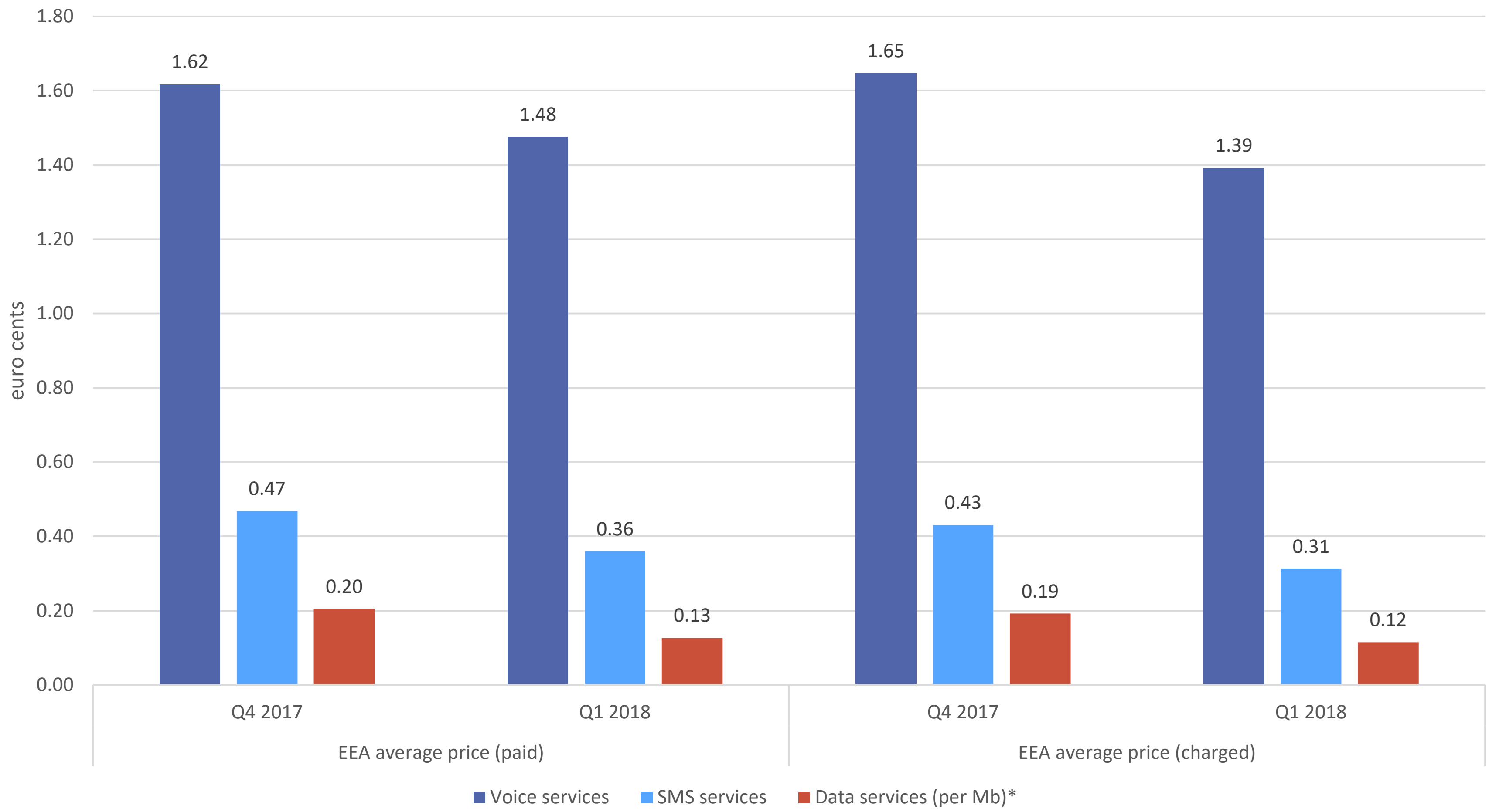
*The rates are calculated on the basis of its costs/charges per unit (per SMS)

Figure 88: Lowest paid/charged unbalanced rates* for data services, (number of operators), Q4 2017 and Q1 2018



*The rates are calculated on the basis of its costs/charges per unit (per GB)

Figure 89: EEA average: wholesale roaming prices paid/charged by operators*



*The prices calculated based on the average of the 5 lowest unbalanced rates provided by each operator

Conversion of gigabytes to megabytes was done in line with Recital 17 of the Regulation (EU) 2017/920 of the European Parliament and of the Council of 17 May 2017 amending Regulation (EU) No 531/2012, which results in 1 gigabyte being equal to 1000 megabytes. Operators may apply a different formula which can slightly affect the accuracy of data.

Sample: MNOs from the EEA countries.

5.5. MNOs and MVNOs data

5.5.1. Domestic average Retail Mobile Revenue per User (ARRPU)

Figure 90: MNOs and MVNOs: domestic mobile service: monthly retail revenue per total number of subscribers (ARRPU), Q4'17

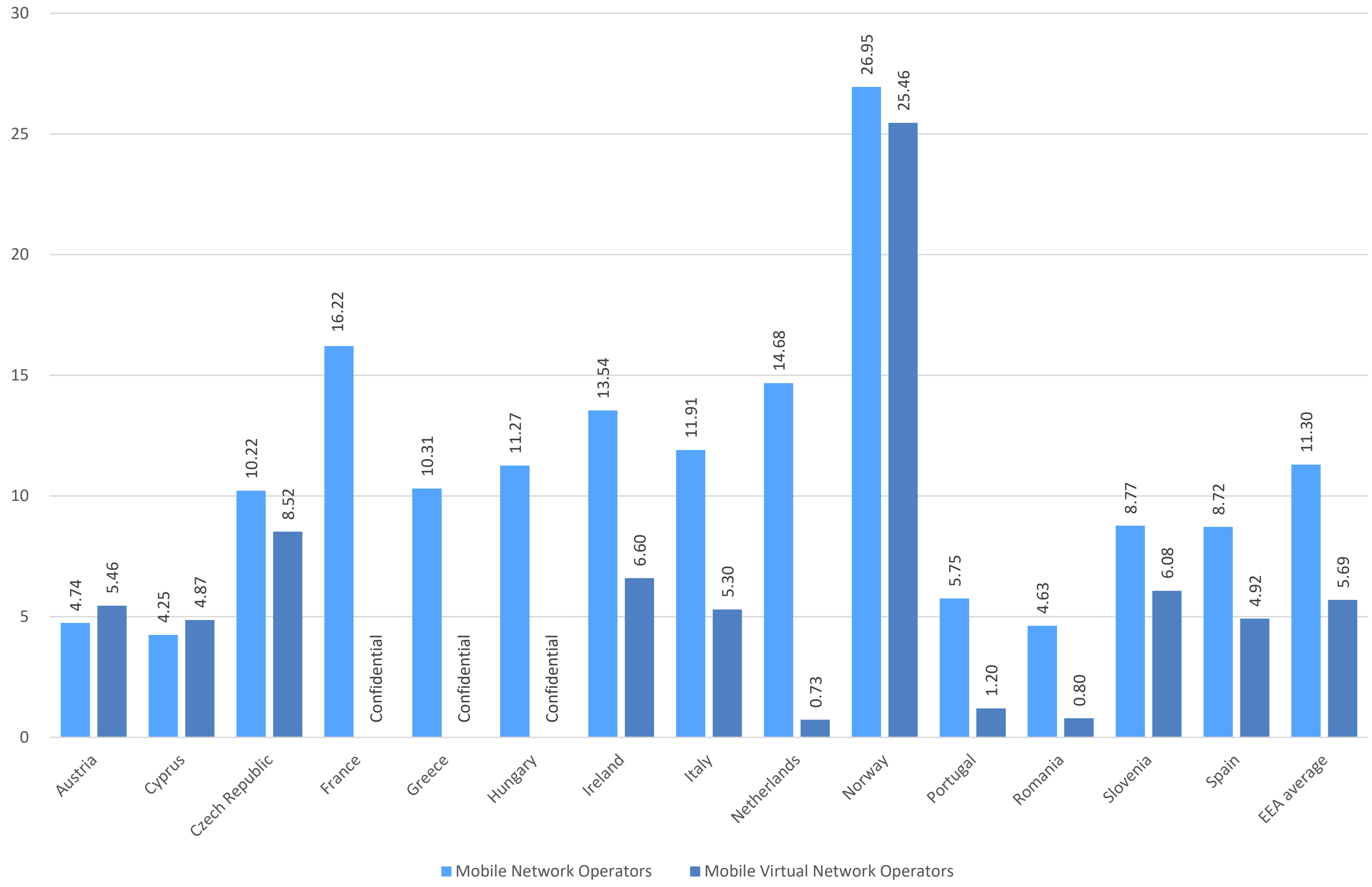
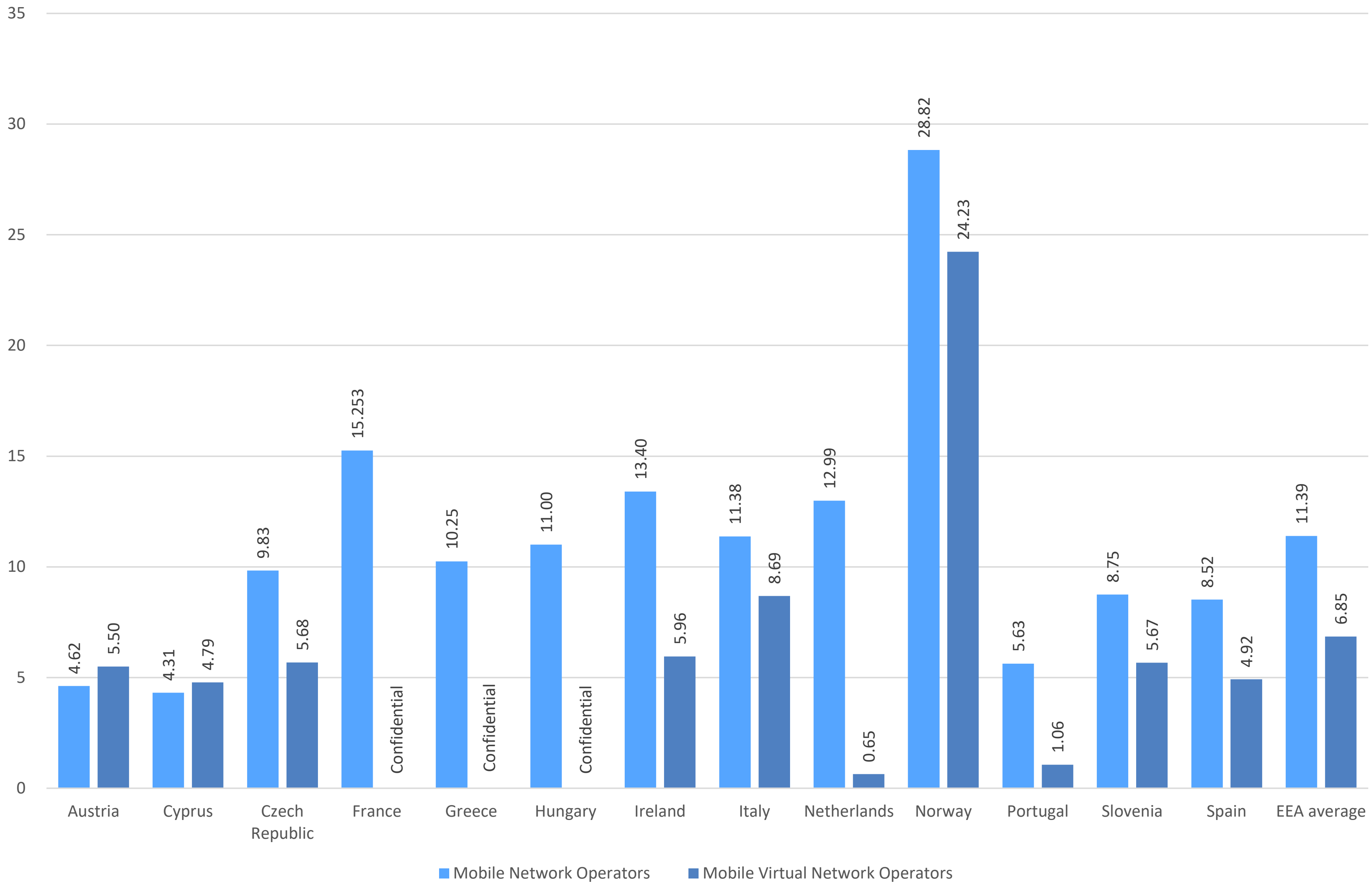


Figure 91: MNOs and MVNOs: domestic mobile service: monthly retail revenue per total number of subscribers (ARRPU), Q1'18



5.5.2. Consumption patterns for domestic mobile retail services

Figure 92: domestic calls made, average number of minutes per month per total number of subscribers, MNOs and MVNOs, Q4'17

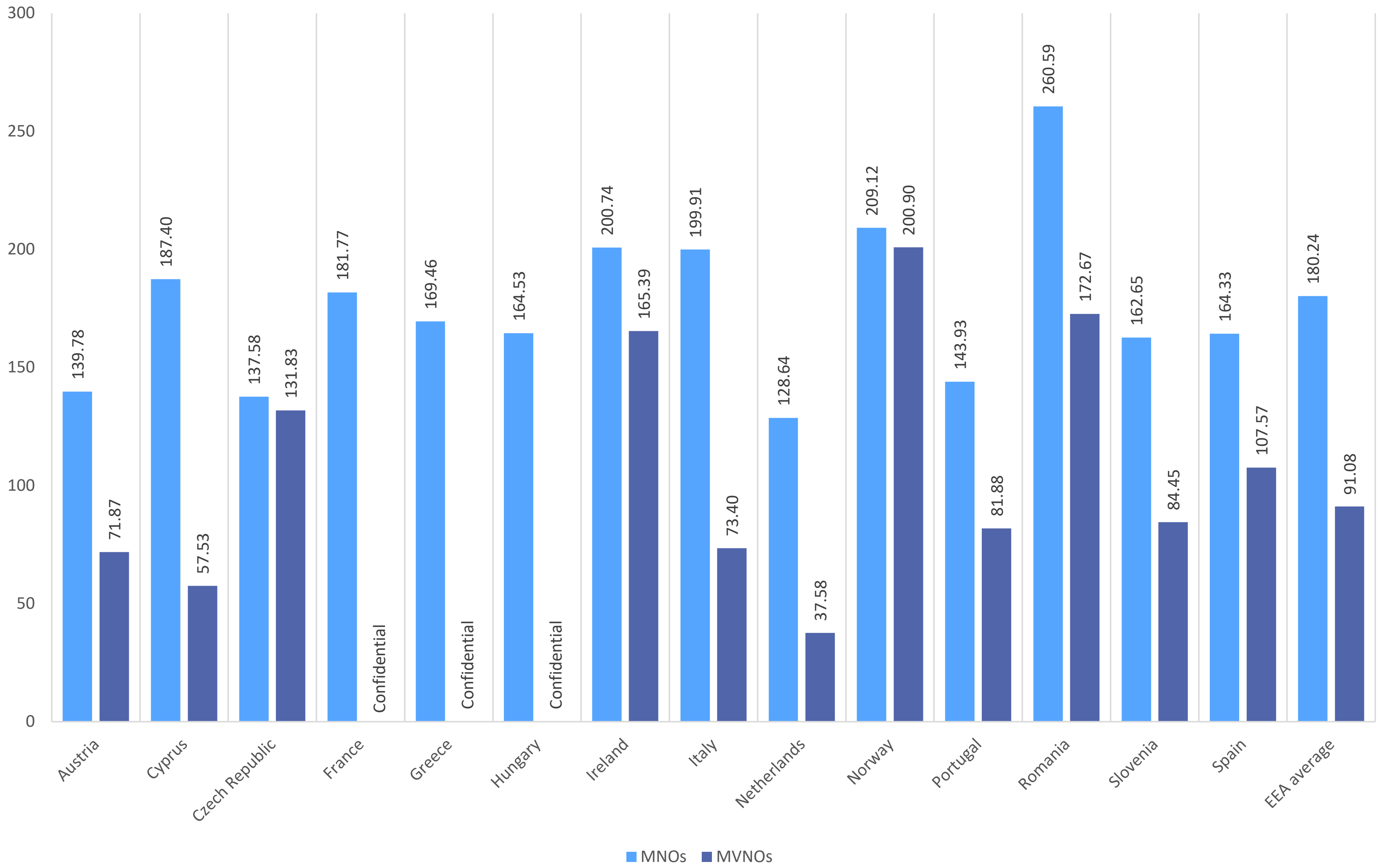


Figure 93: domestic calls made, average number of minutes per month per total number of subscribers, MNOs and MVNOs, Q1'18

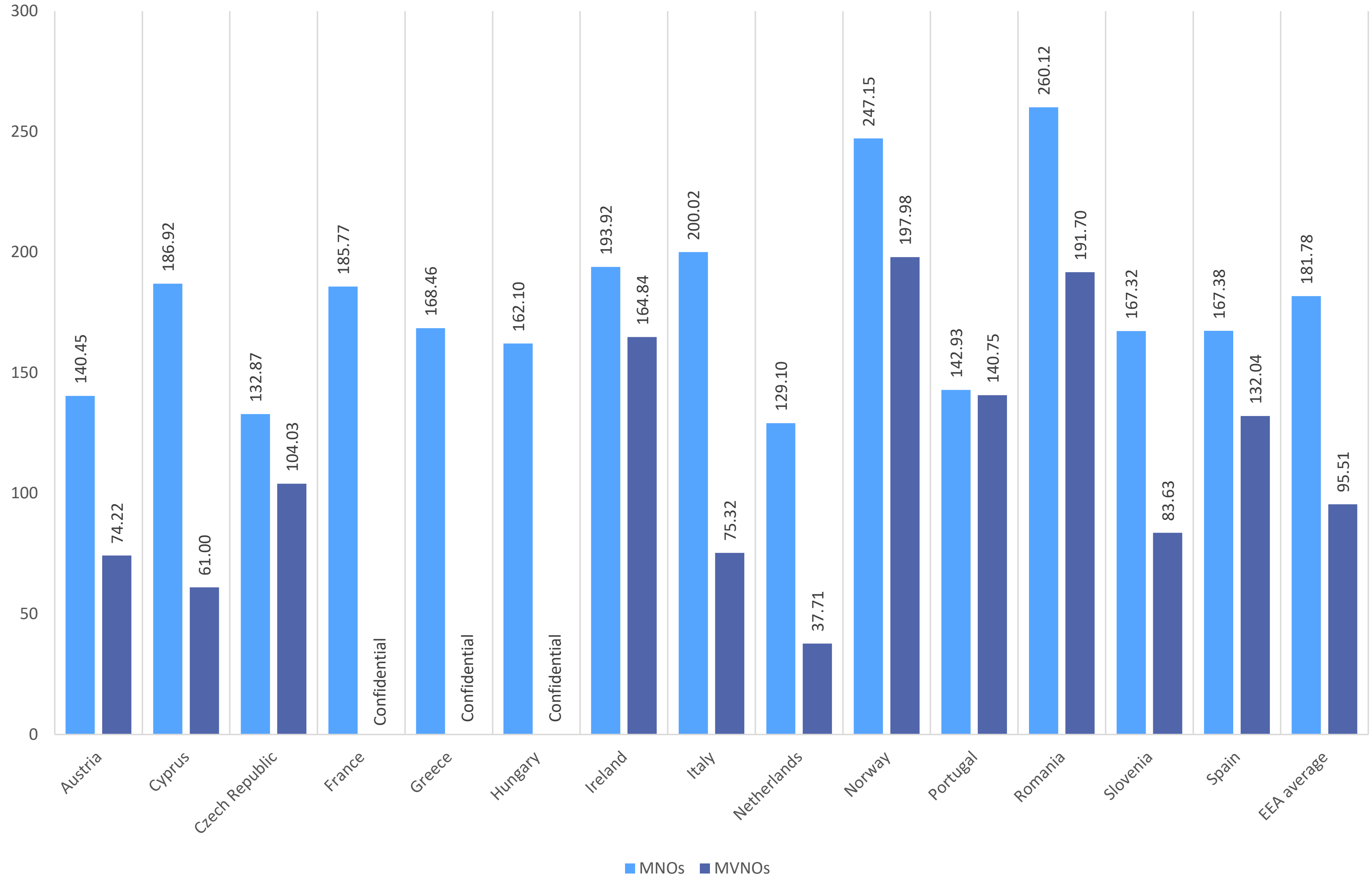


Figure 94: domestic calls received, average number of minutes per month per total number of subscribers, MNOs and MVNOs, Q4'17

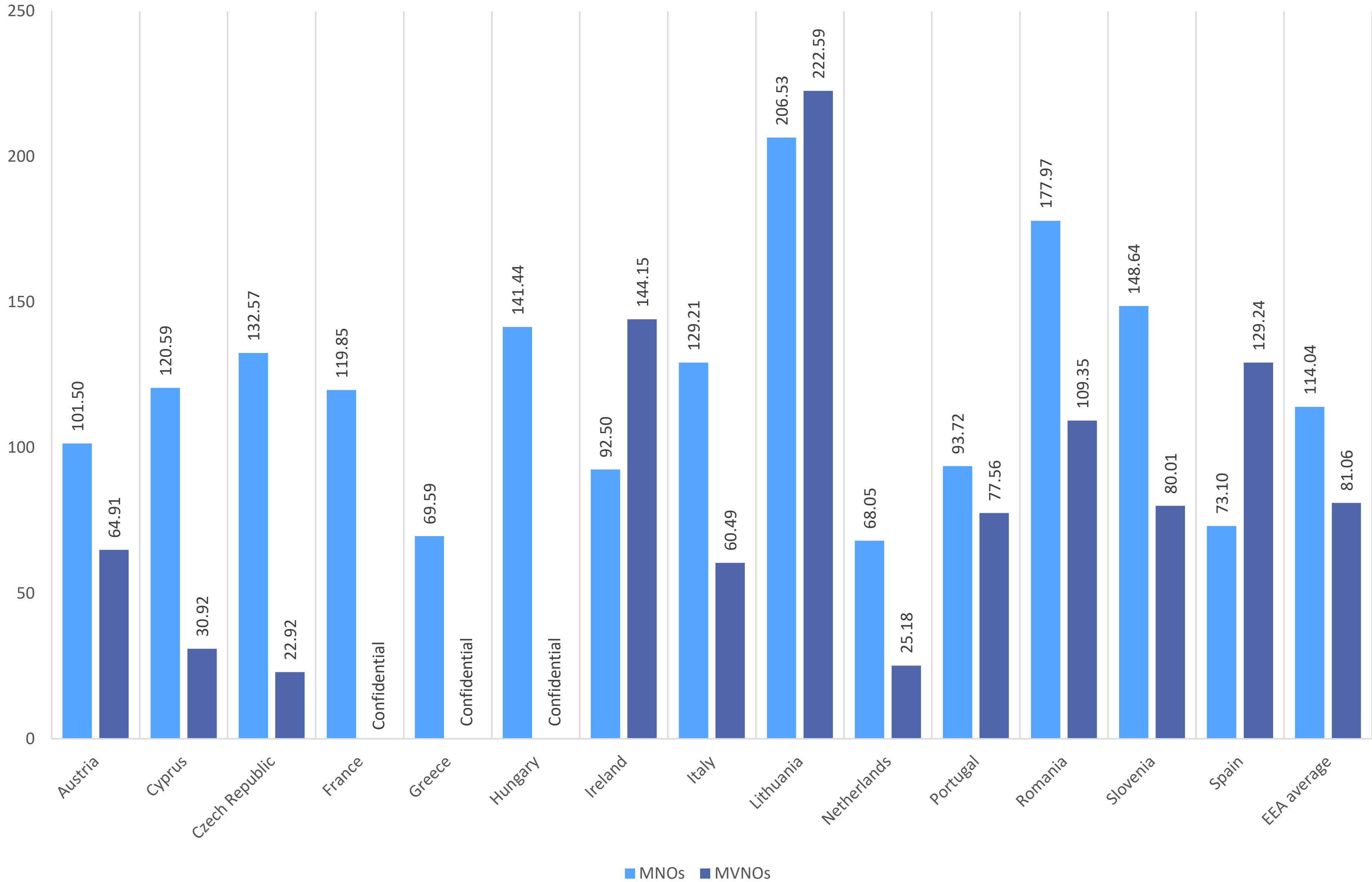


Figure 95: domestic calls received, average number of minutes per month per total number of subscribers, MNOs and MVNOs, Q1’18

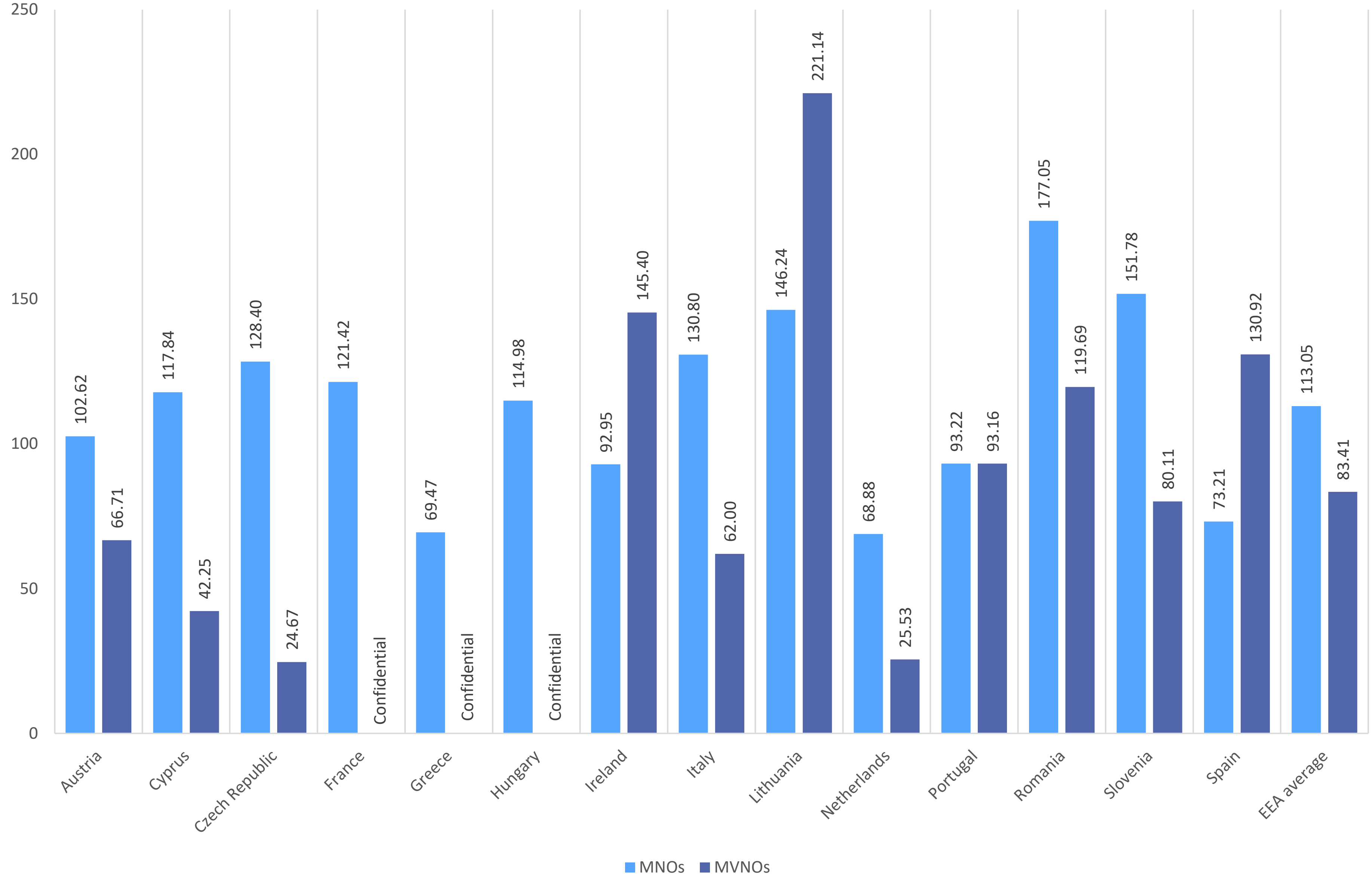


Figure 96: domestic SMS, average number of SMS per month per total number of subscribers, MNOs and MVNOs, Q4'17

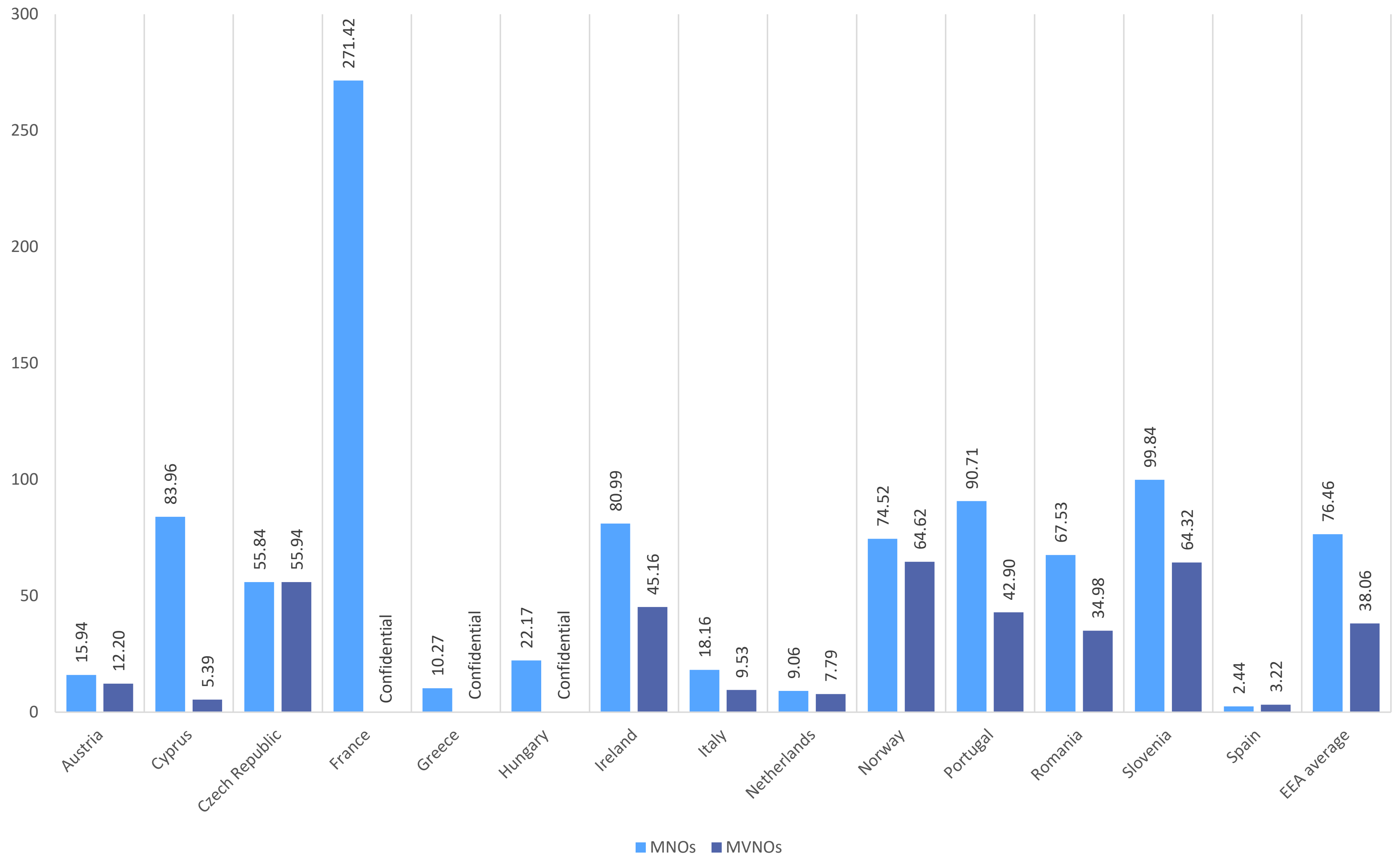


Figure 97: domestic SMS, average number of SMS per month per total number of subscribers, MNOs and MVNOs, Q1'18

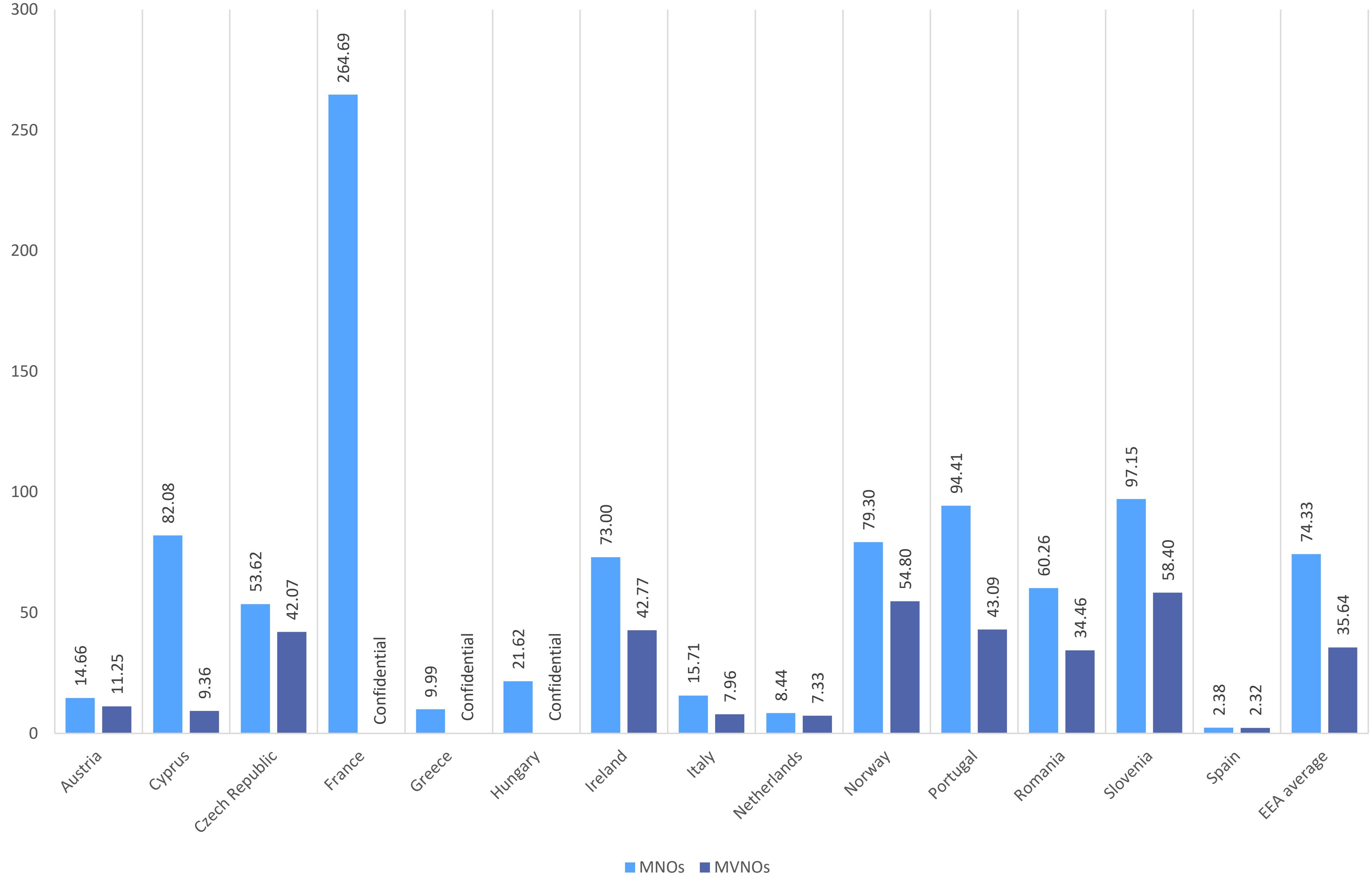


Figure 98: domestic data services, average consumption per month per total number of subscribers (GB), MNOs and MVNOs, Q4’17

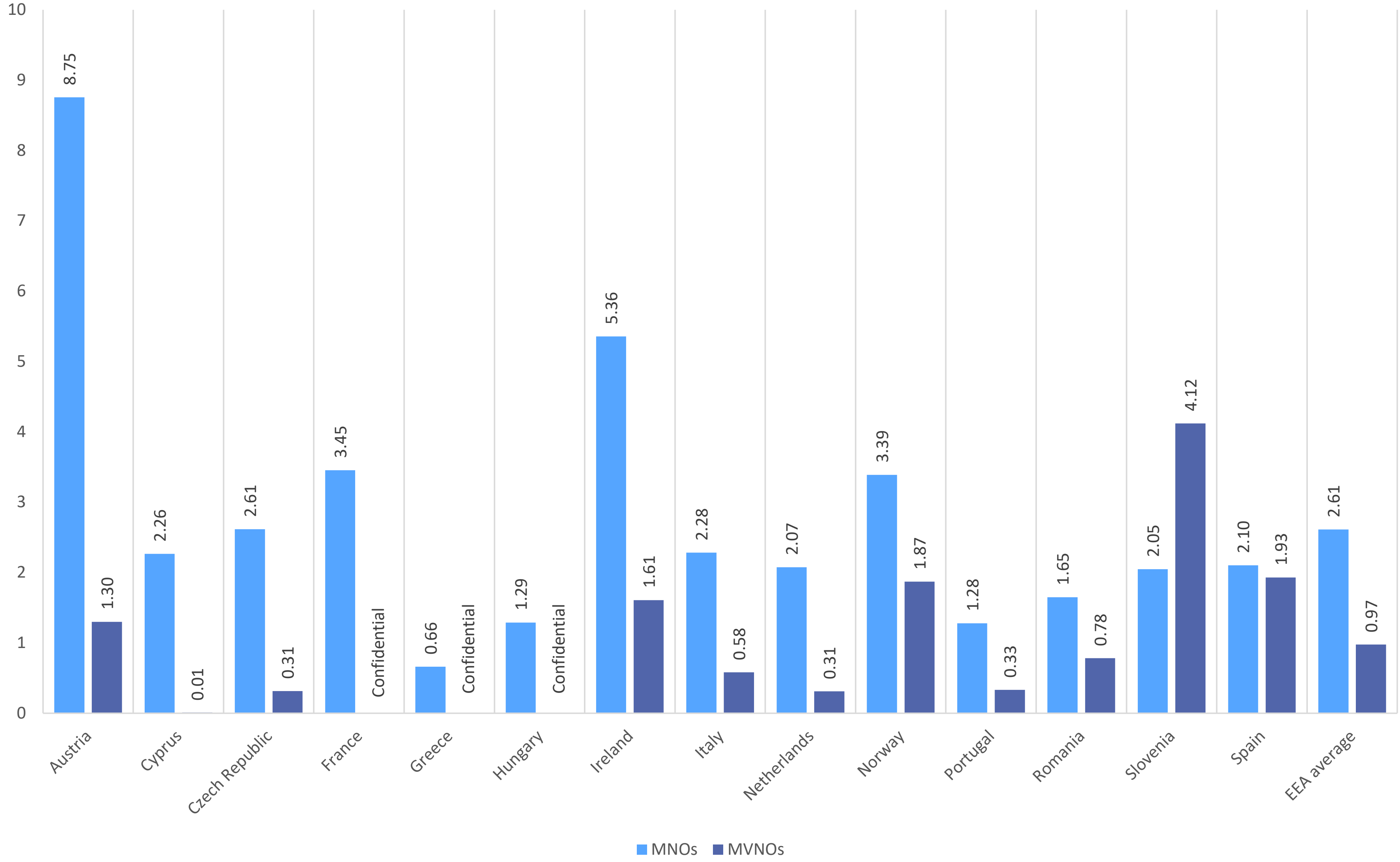


Figure 99: domestic data services, average consumption per month per total number of subscribers (GB), MNOs and MVNOs, Q1'18

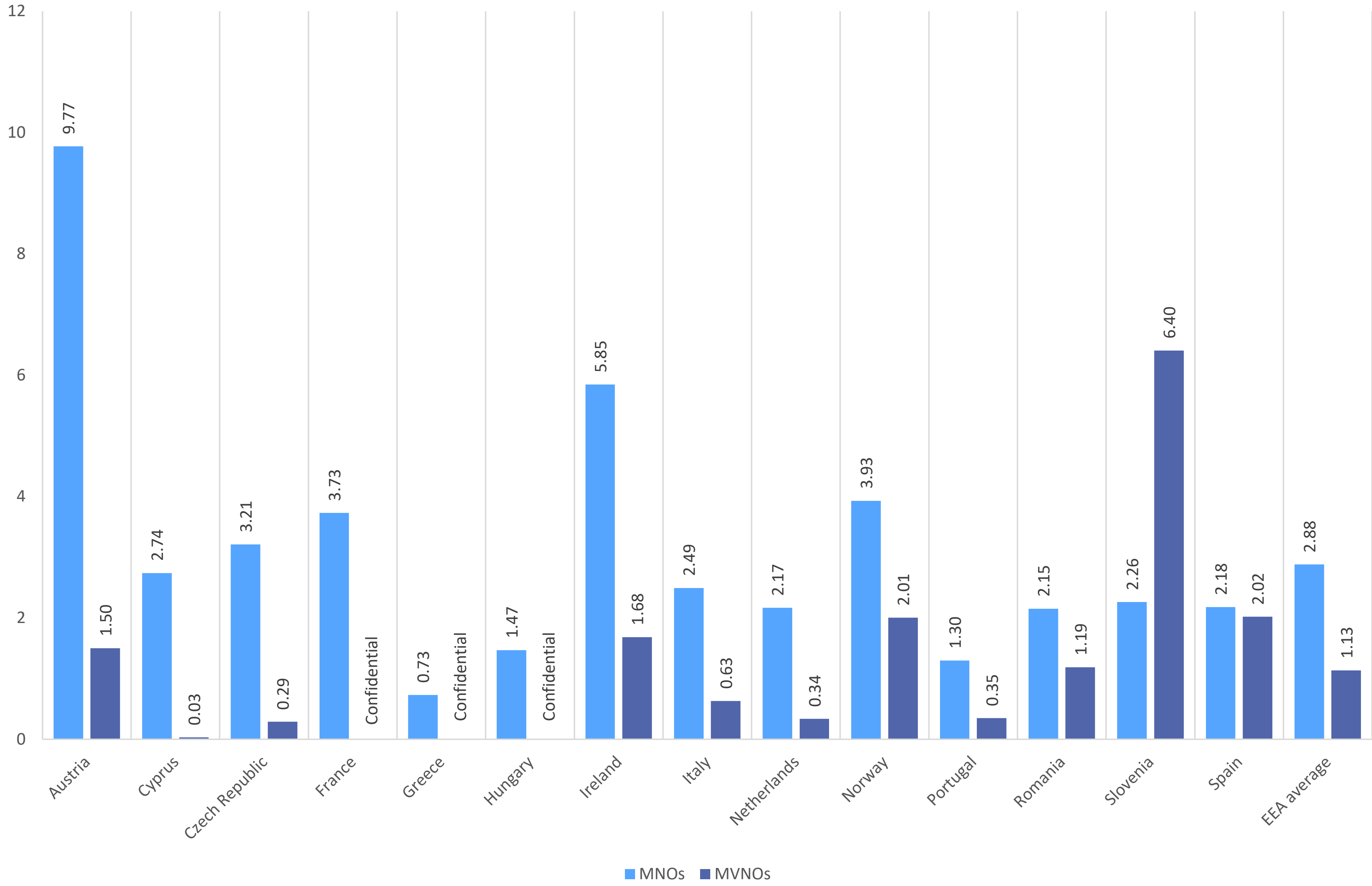


Figure 100: EEA average mobile services consumption per month per total number of subscribers, Q4'17 and Q1'18

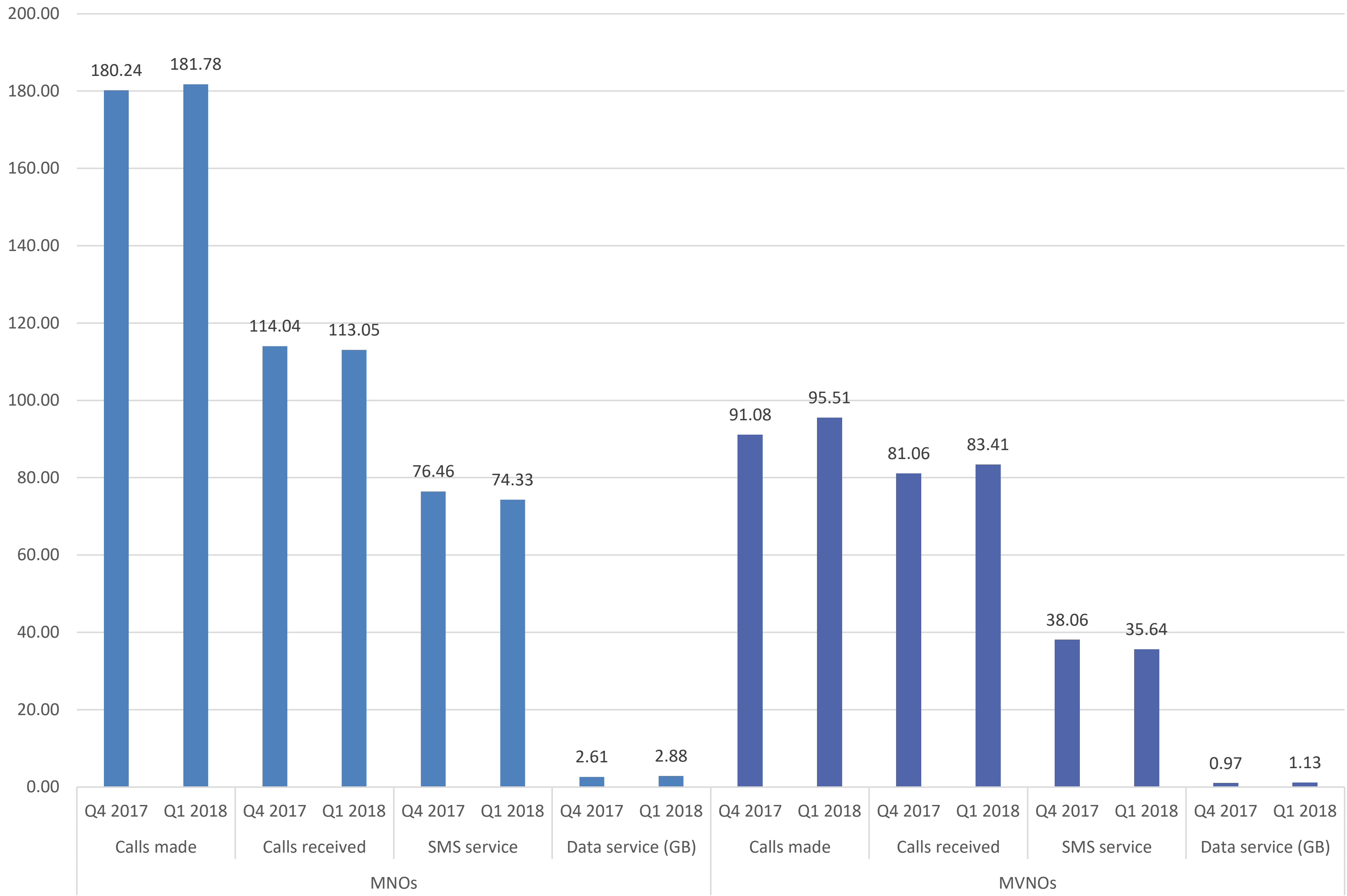


Figure 101: MNOs: share of total subscribers with UE/EEA roaming enabled, Q4'17

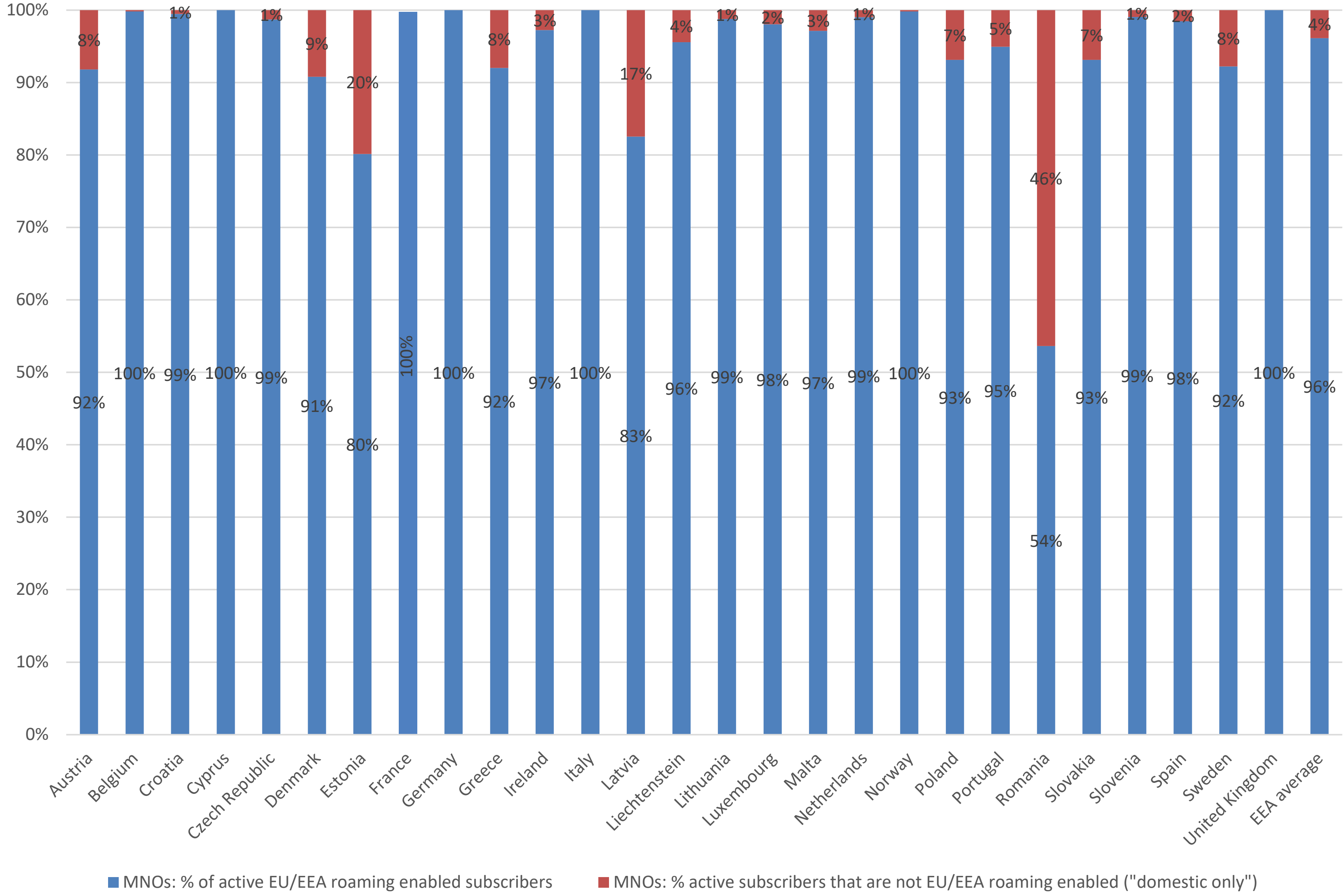


Figure 102: MNOs: share of total subscribers with UE/EEA roaming enabled, Q1'18

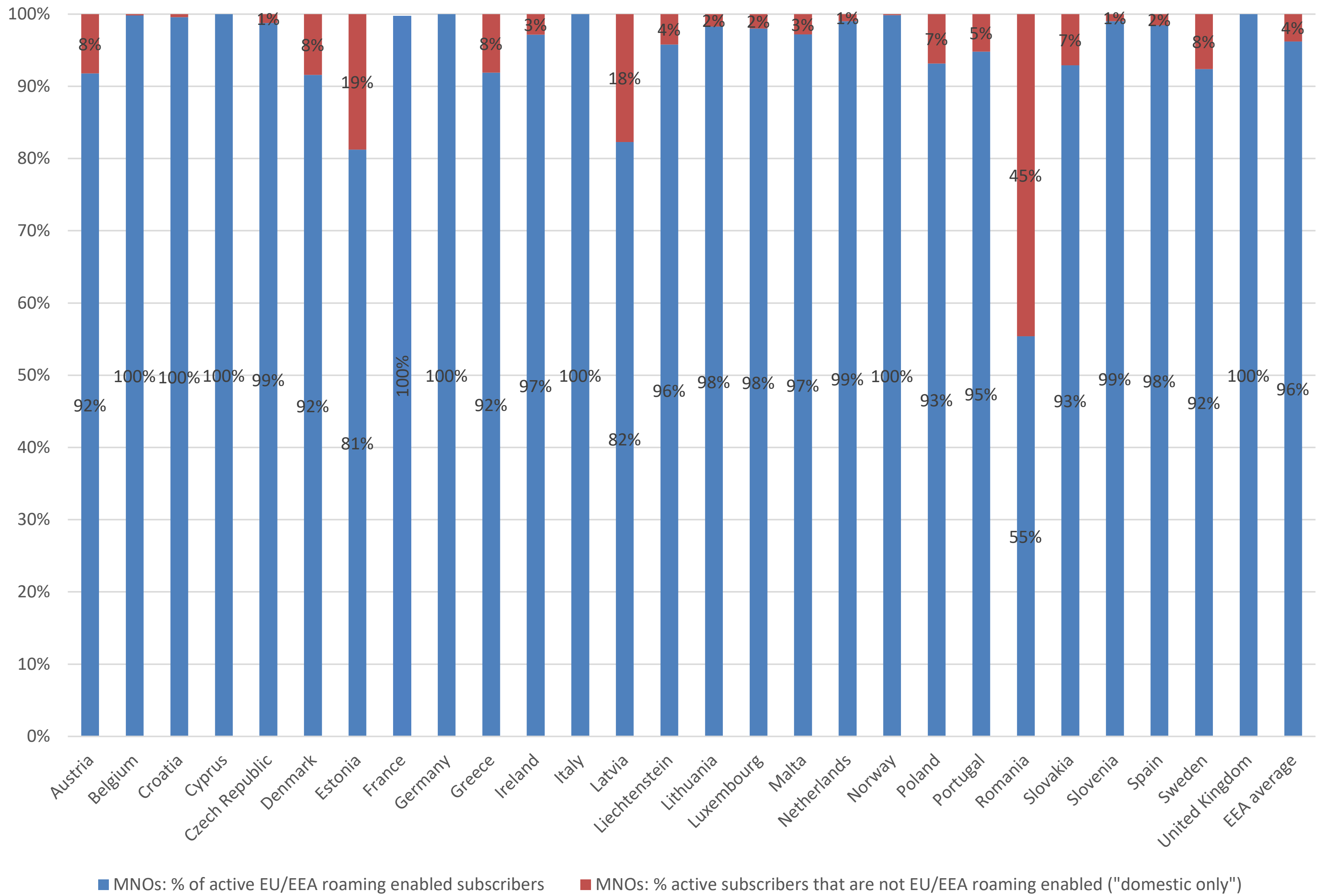


Figure 103: MVNOs: share of total subscribers with UE/EEA roaming enabled, Q4'17

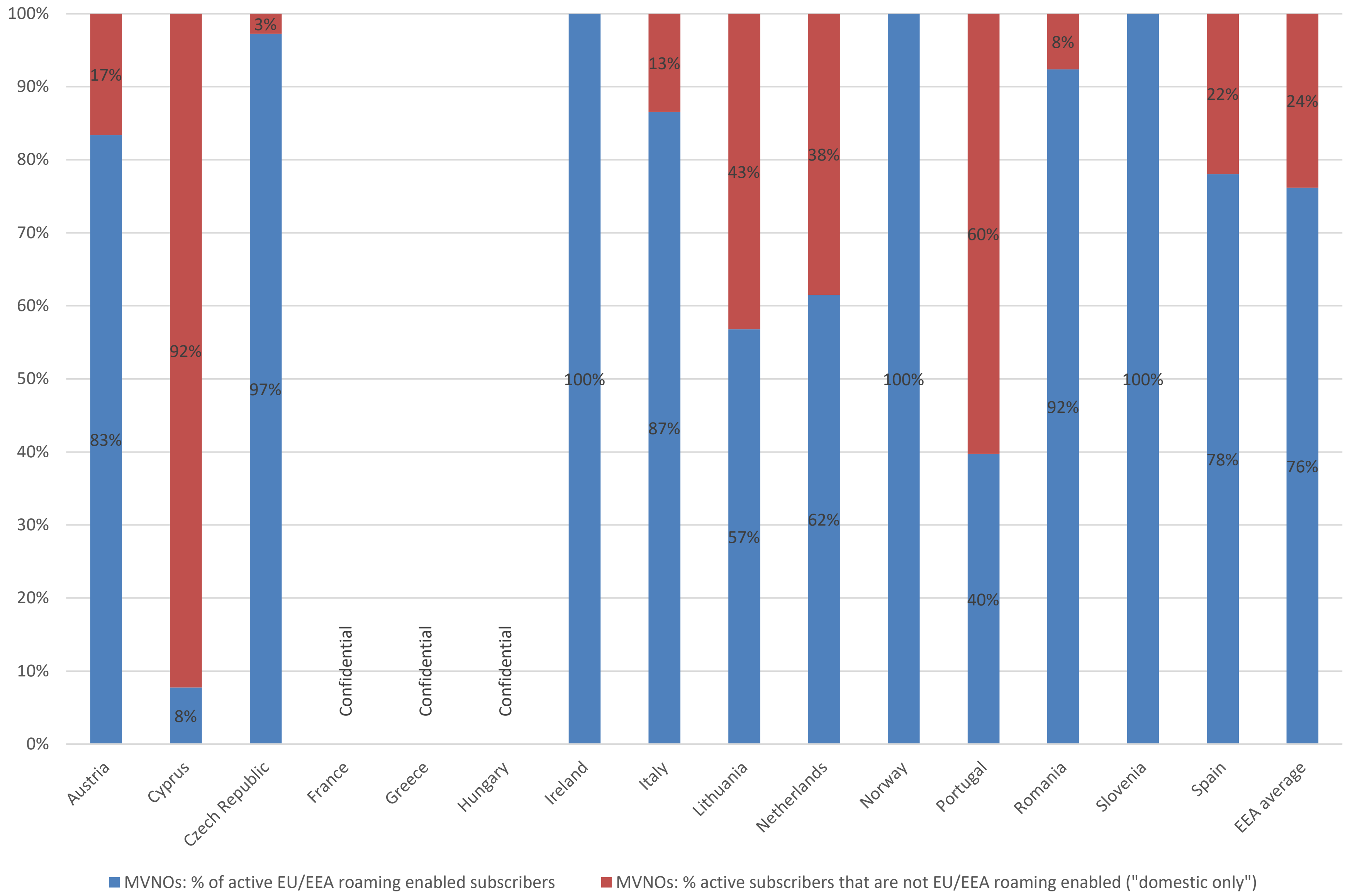
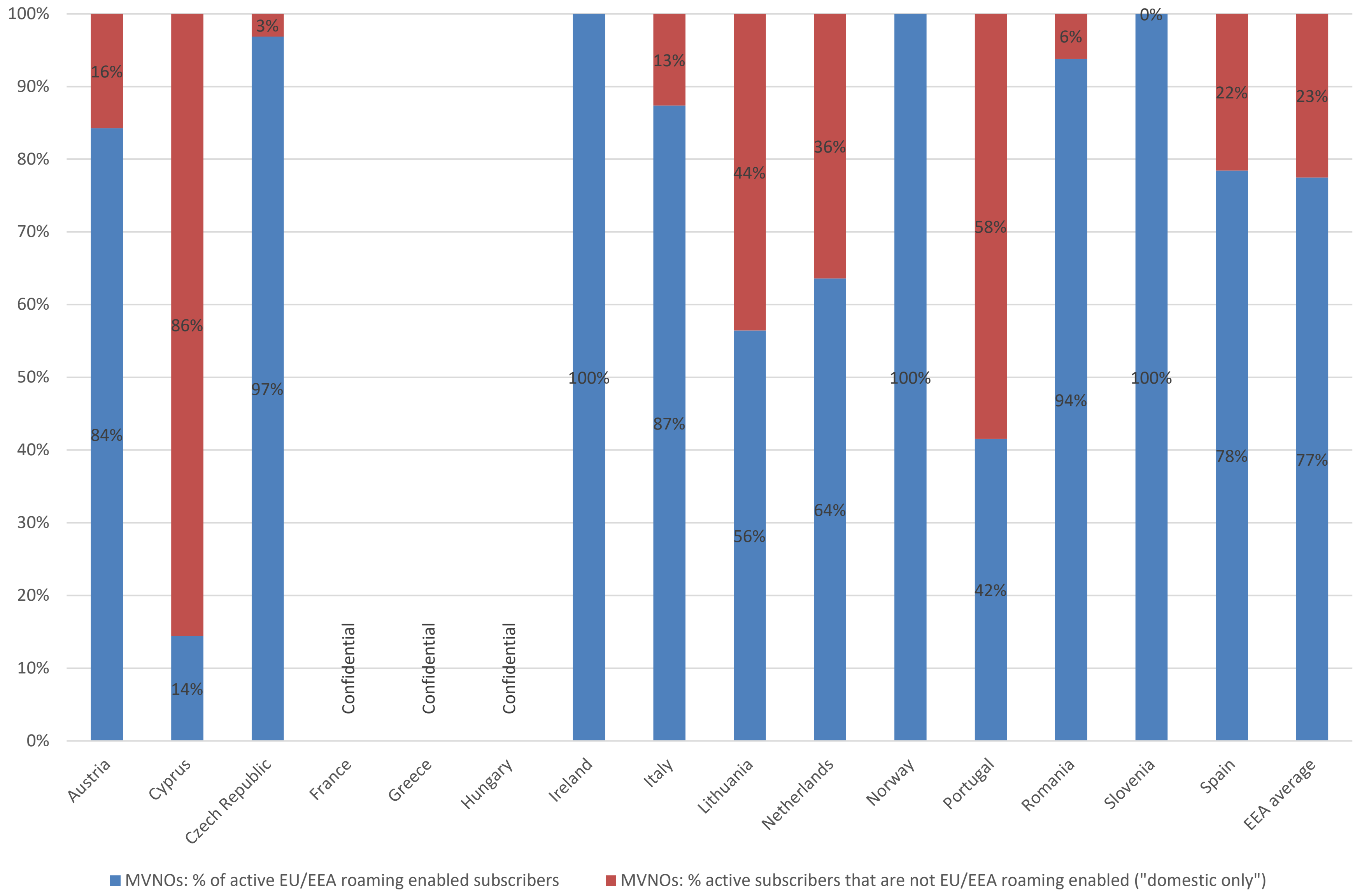


Figure 104: MVNOs: share of total subscribers with UE/EEA roaming enabled, Q1'18



5.5.3. Consumption patterns for RLAH services (voice, SMS and data)

Figure 105: RLAH, calls made: average number of RLAH minutes per month per roaming subscribers, MNOs and MVNOs, Q4' 17

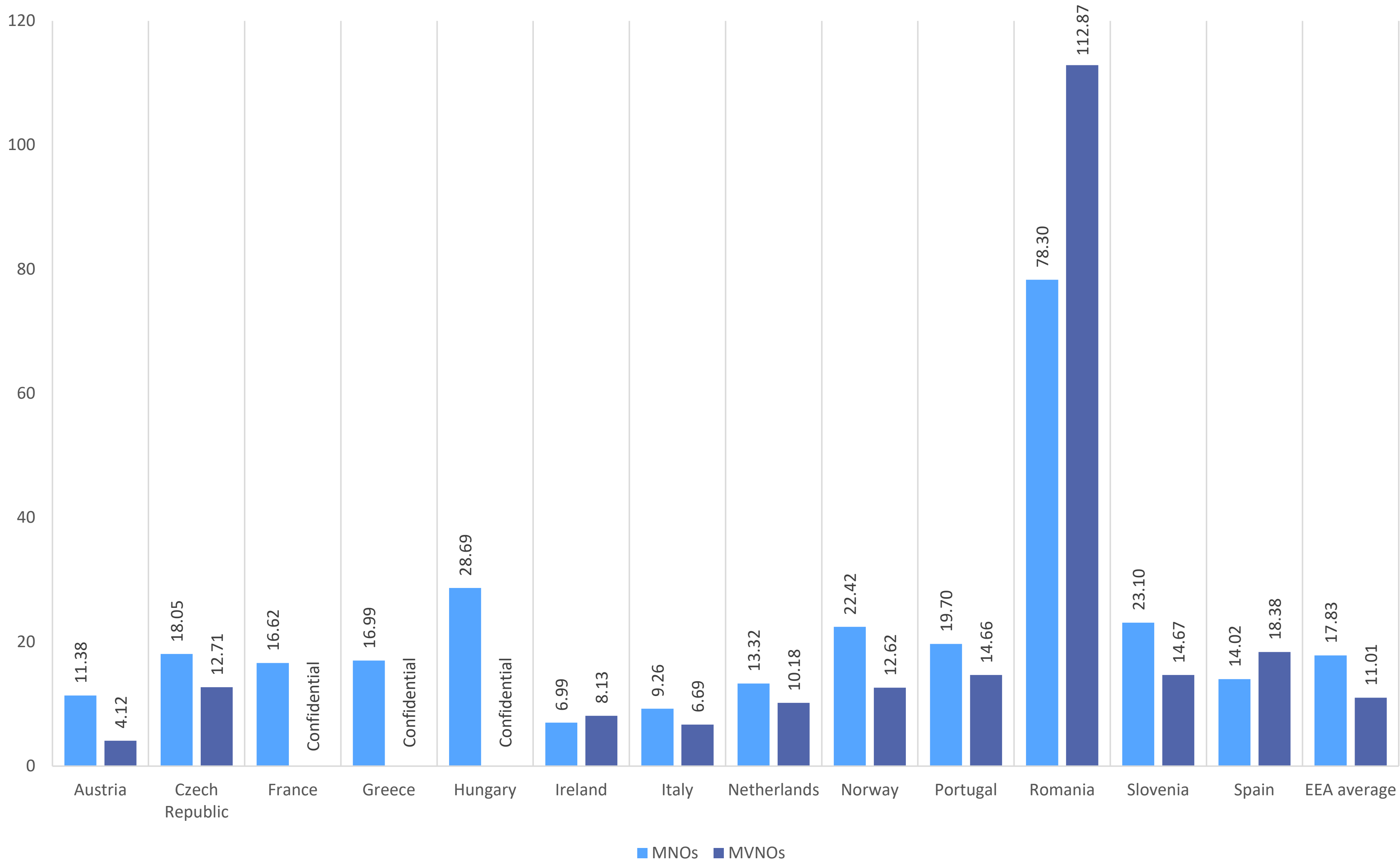


Figure 106: RLAH, calls made: average number of RLAH minutes per month per roaming subscribers, MNOs and MVNOs, Q1' 18

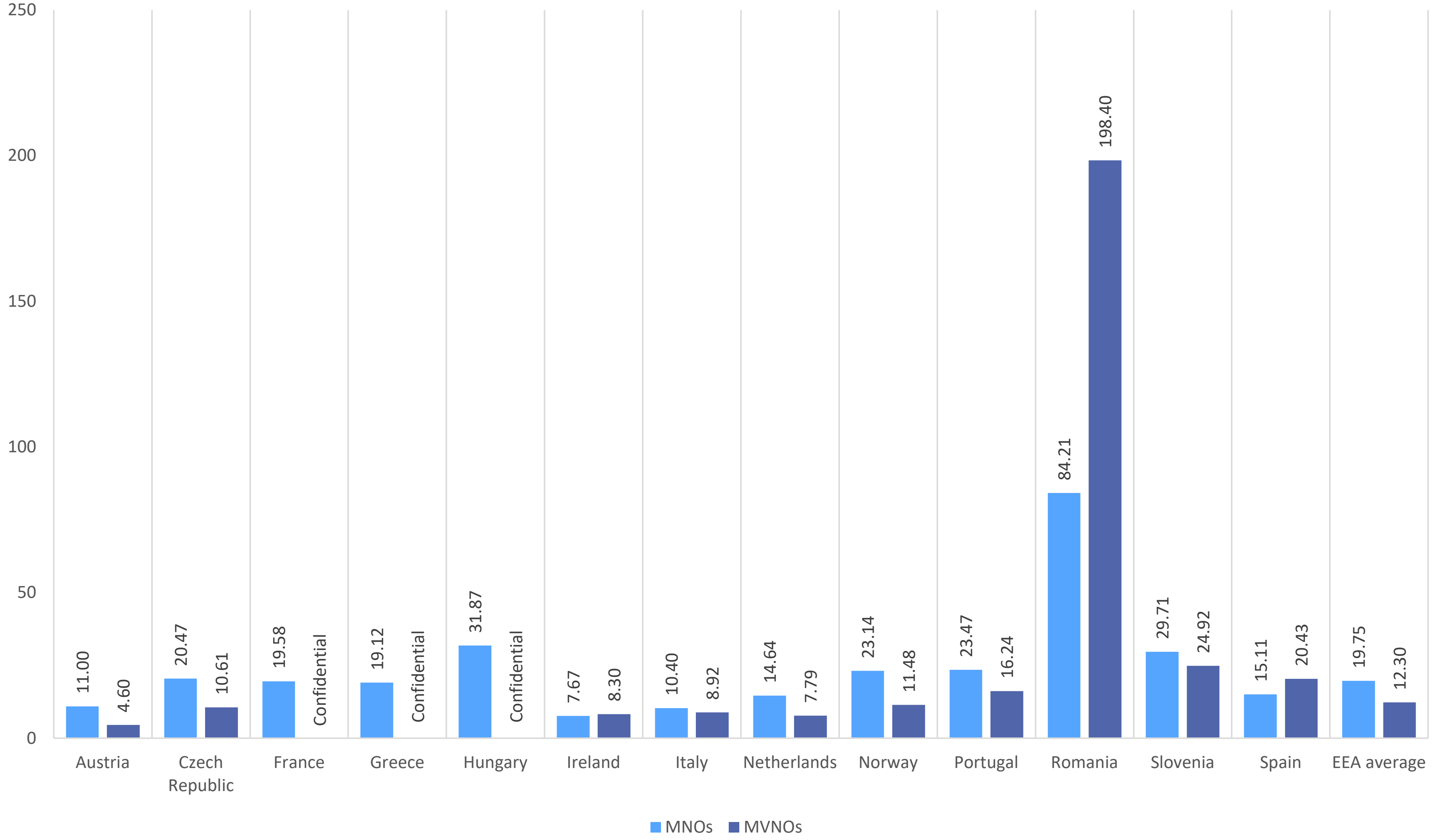


Figure 107: RLAH, calls received: average number of RLAH minutes per month per roaming subscribers, MNOs and MVNOs Q4'17

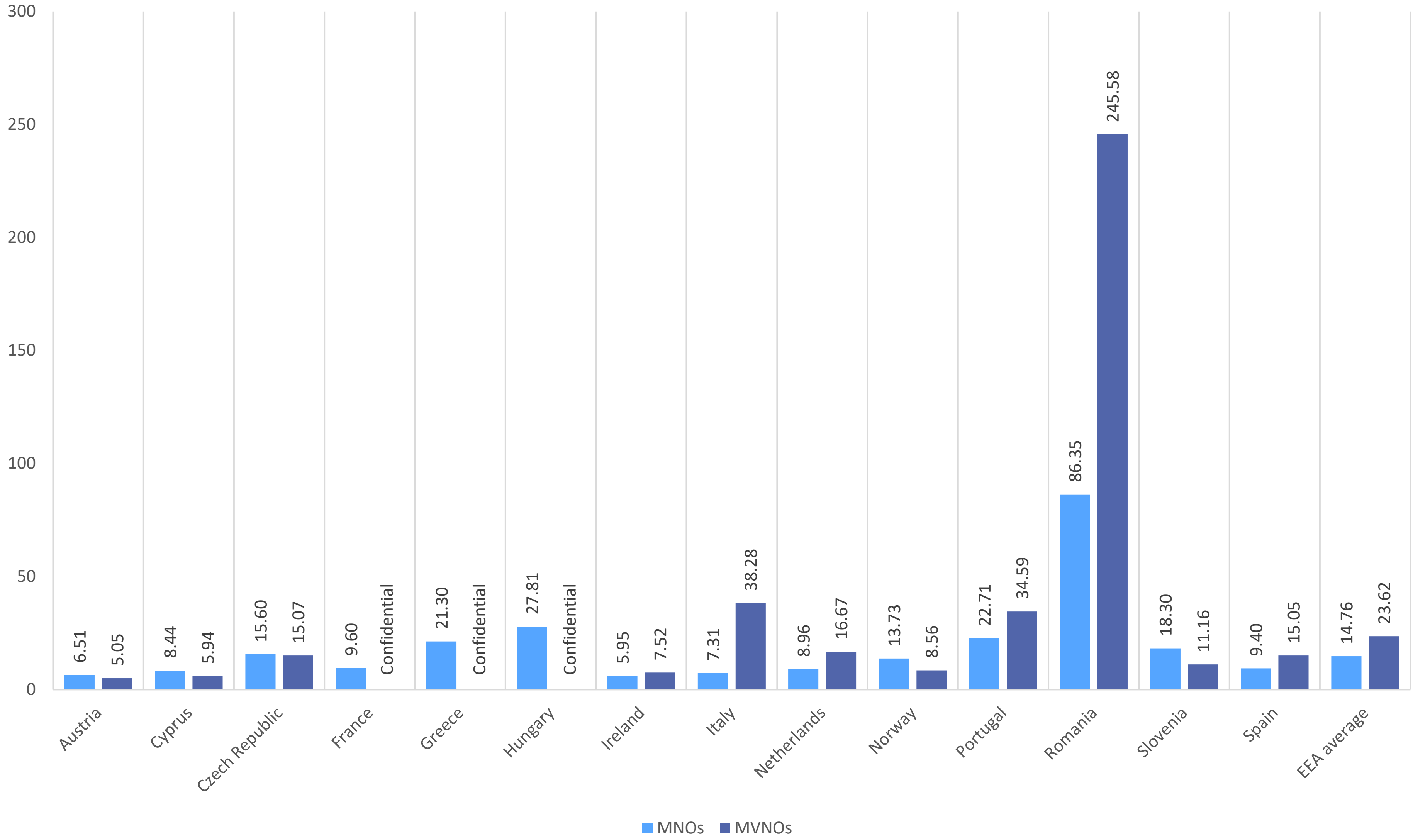


Figure 108: RLAH, calls received: average number of RLAH minutes per month per roaming subscribers, MNOs and MVNOs Q1'18

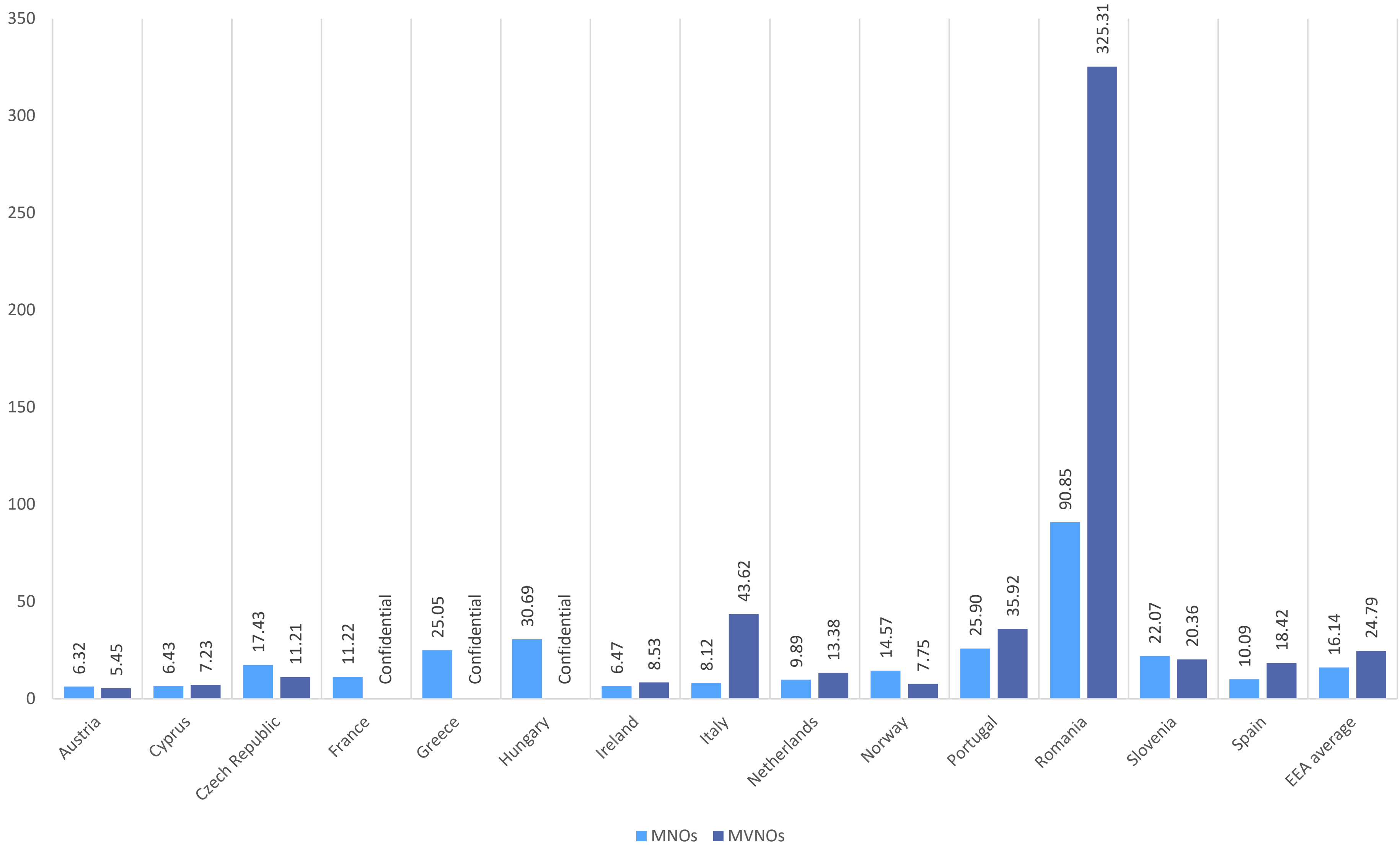


Figure 109: RLAH, calls made and calls received: EEA average number of RLAH minutes per month per roaming subscribers, MNOs and MVNOs, Q4'17 and Q1'18

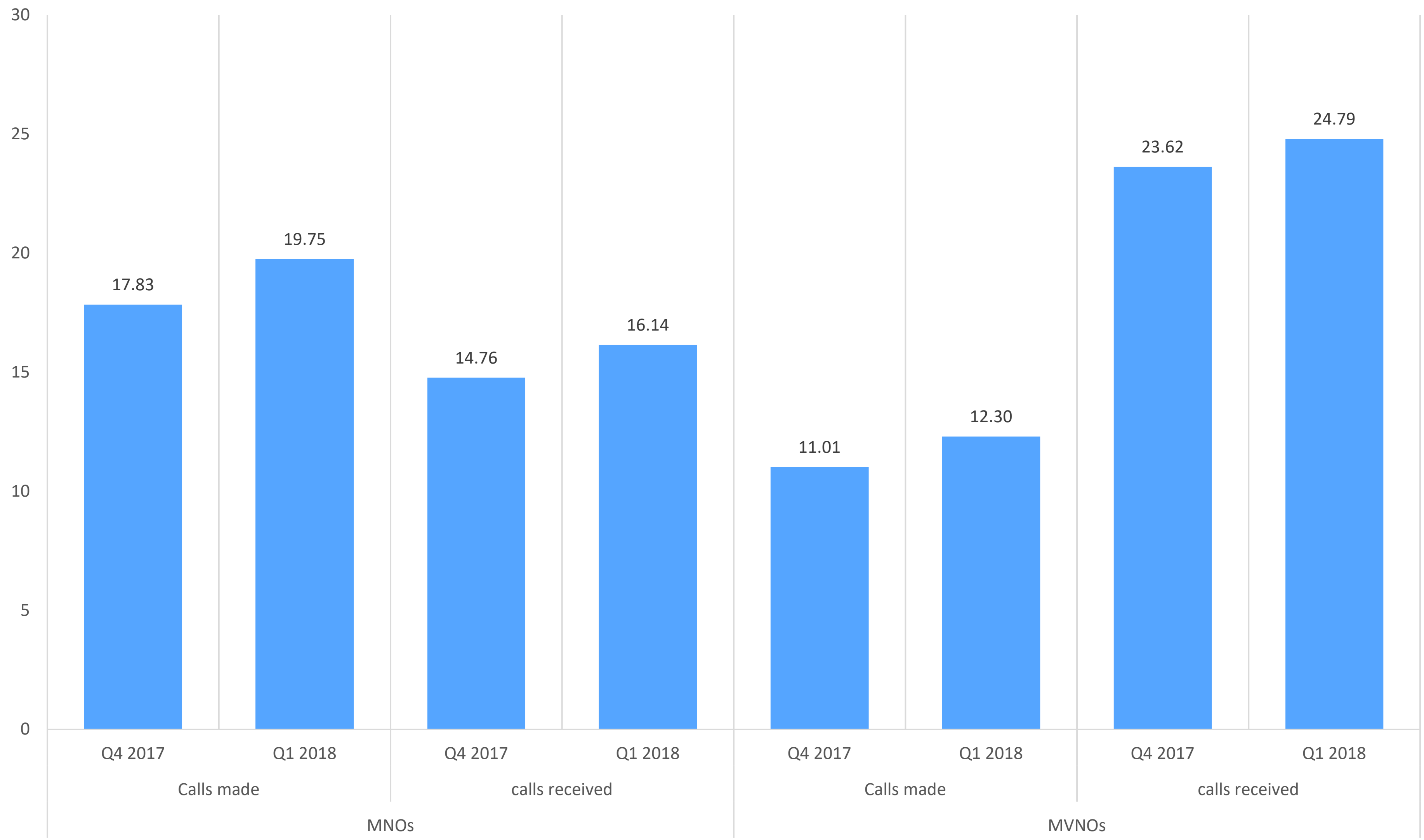


Figure 110: RLAH, SMS services: average number of SMS per month per total number of roaming subscribers, MNOs and MVNOs, Q4'17

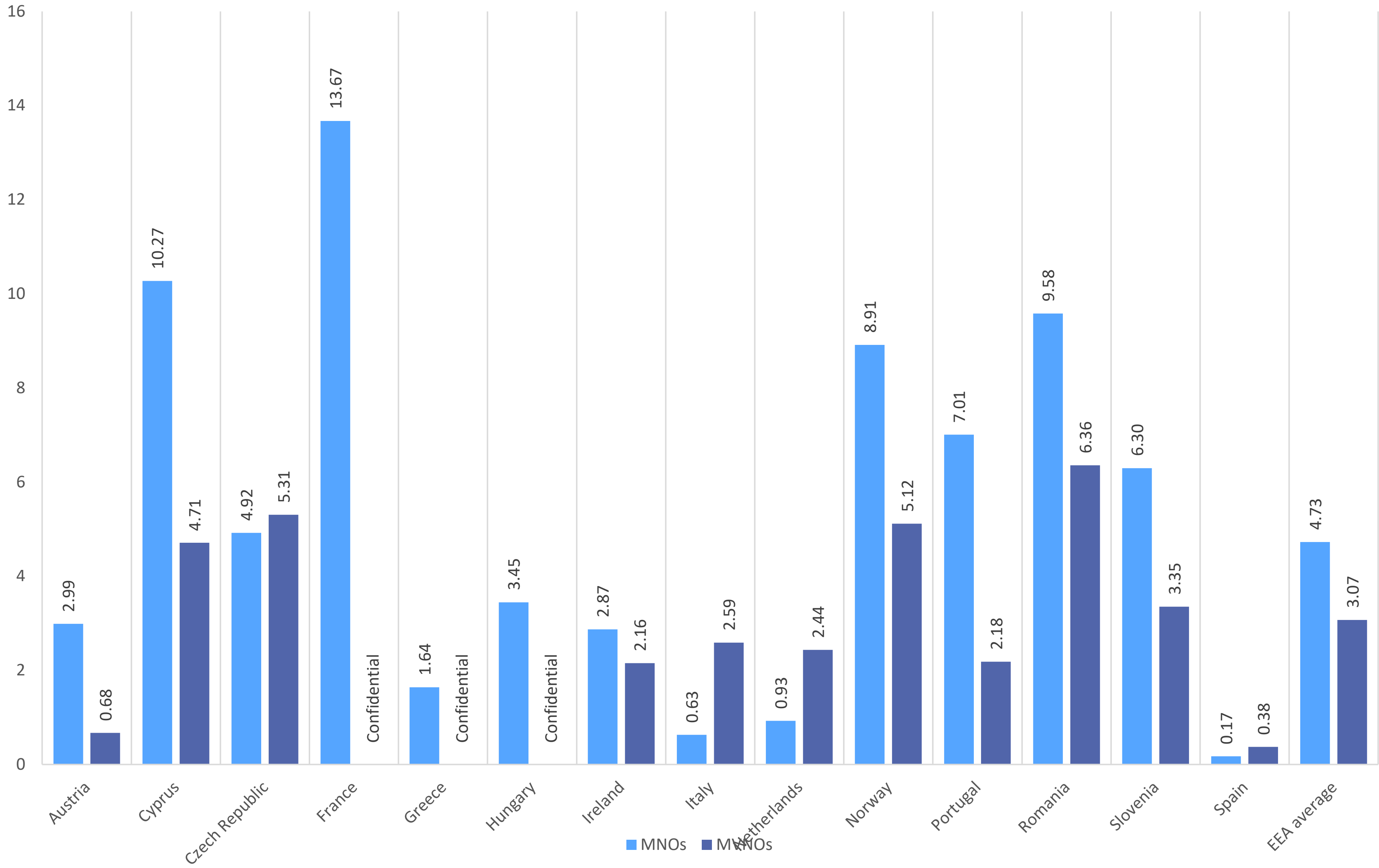


Figure 111: RLAH, SMS services: average number of SMS per month per total number of roaming subscribers, MNOs and MVNOs, Q1'18

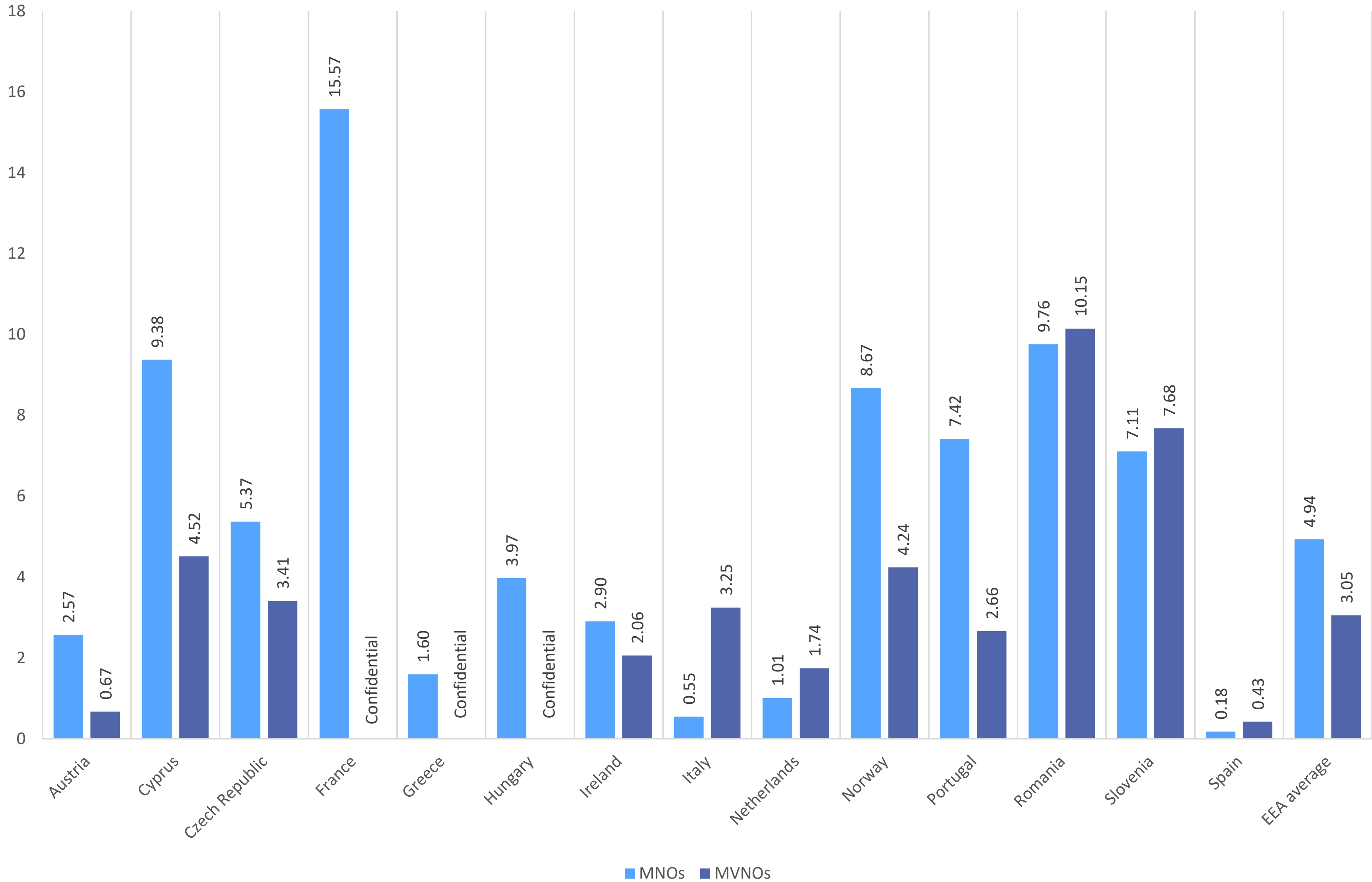


Figure 112: RLAH, SMS services: EEA average number of SMS per month per total number of roaming subscribers, MNOs and MVNOs, Q4'1 and Q1'18

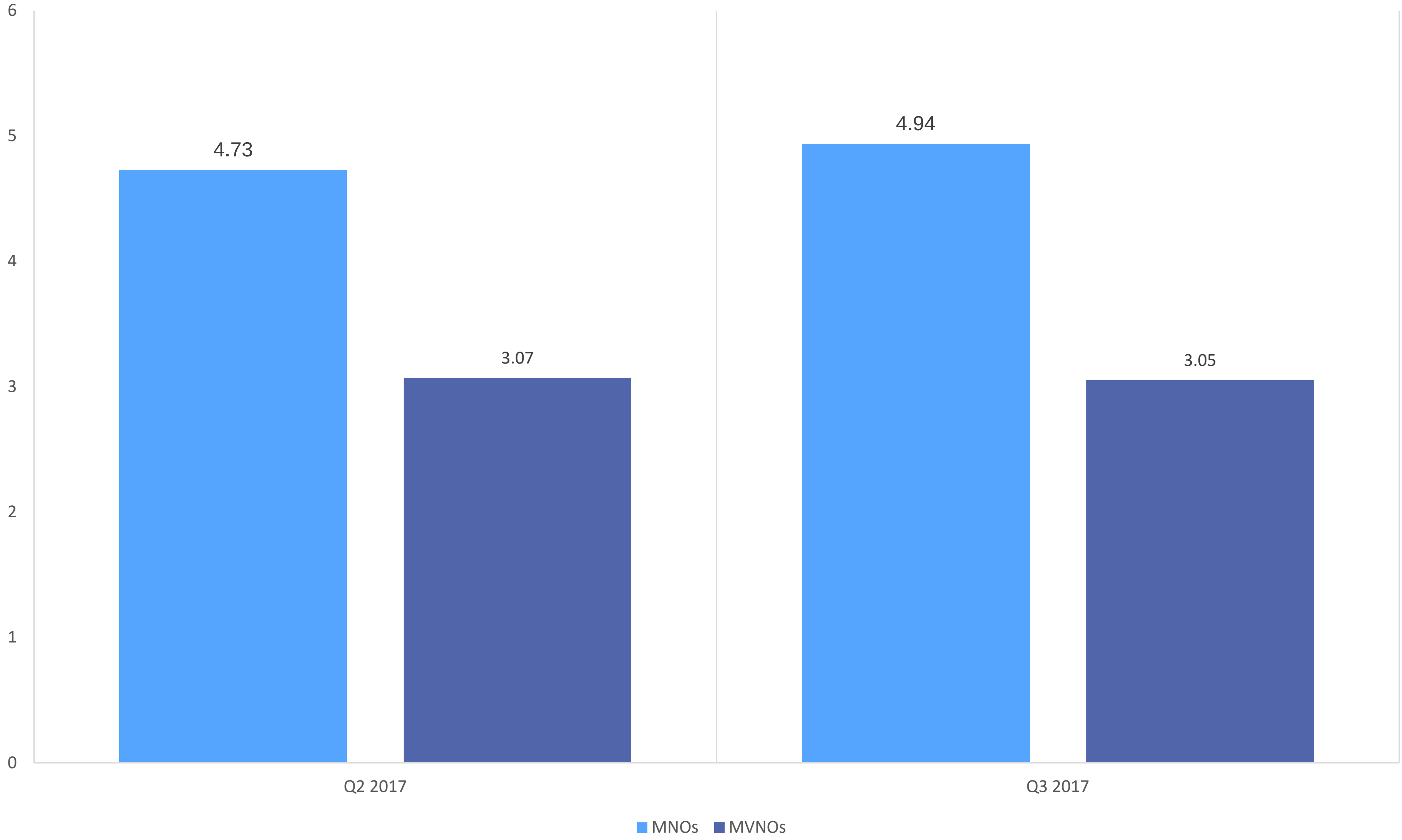


Figure 113: RLAH, data services: average number of MB per month per total number of roaming subscribers, MNOs and MVNOs, Q4’17

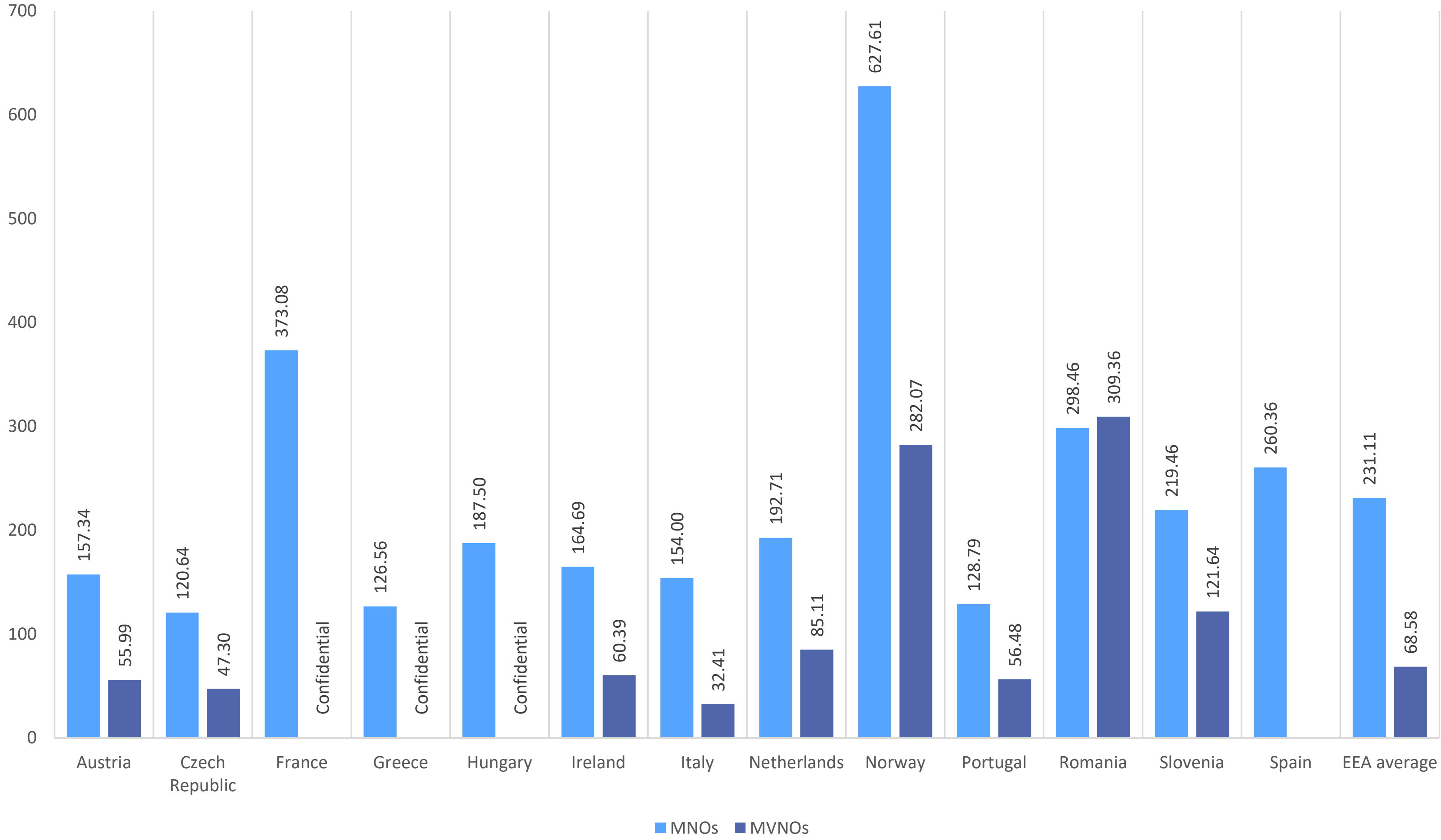


Figure 114: RLAH, data services: average number of MB per month per total number of roaming subscribers, MNOs and MVNOs, Q1'18

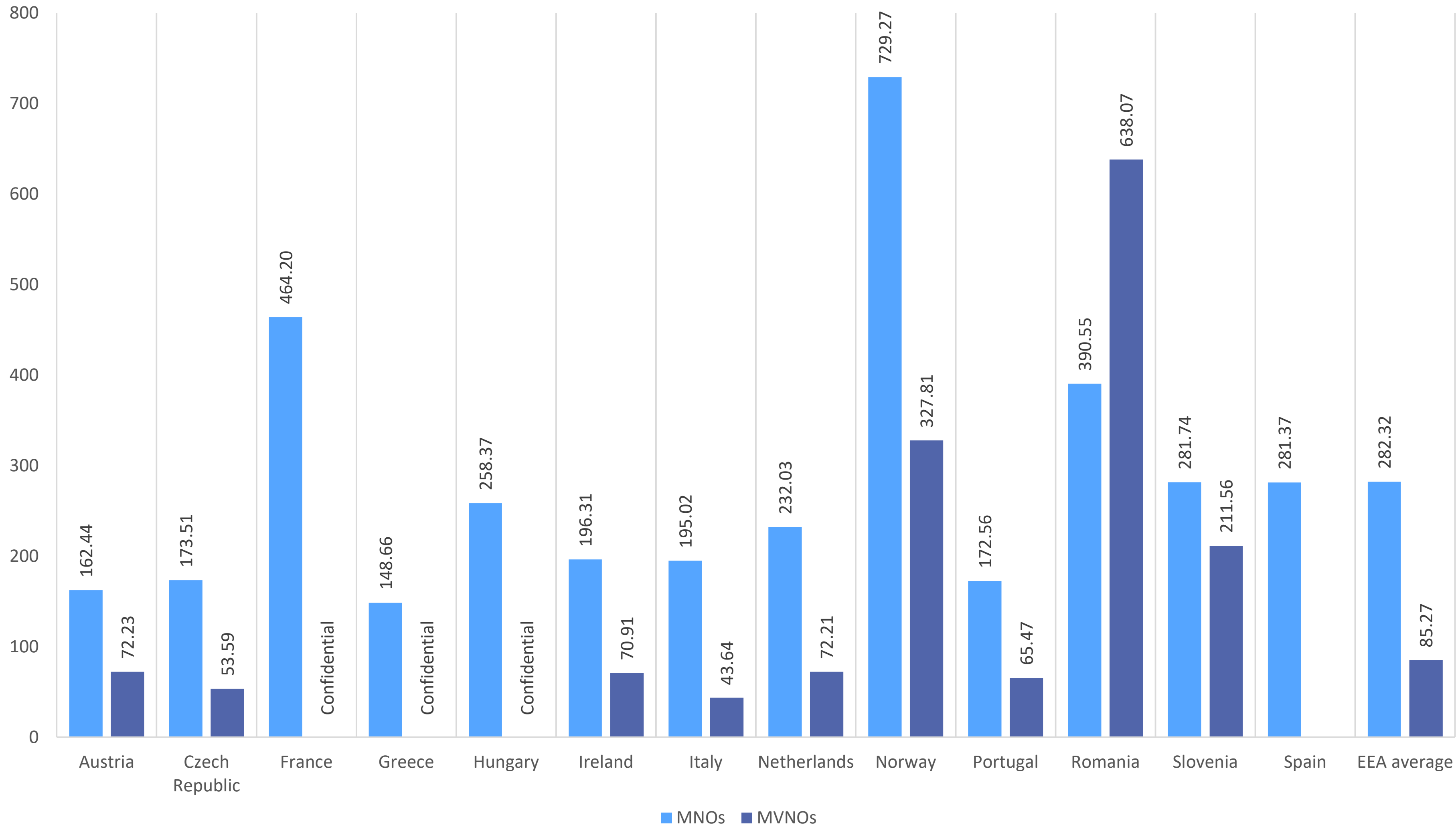
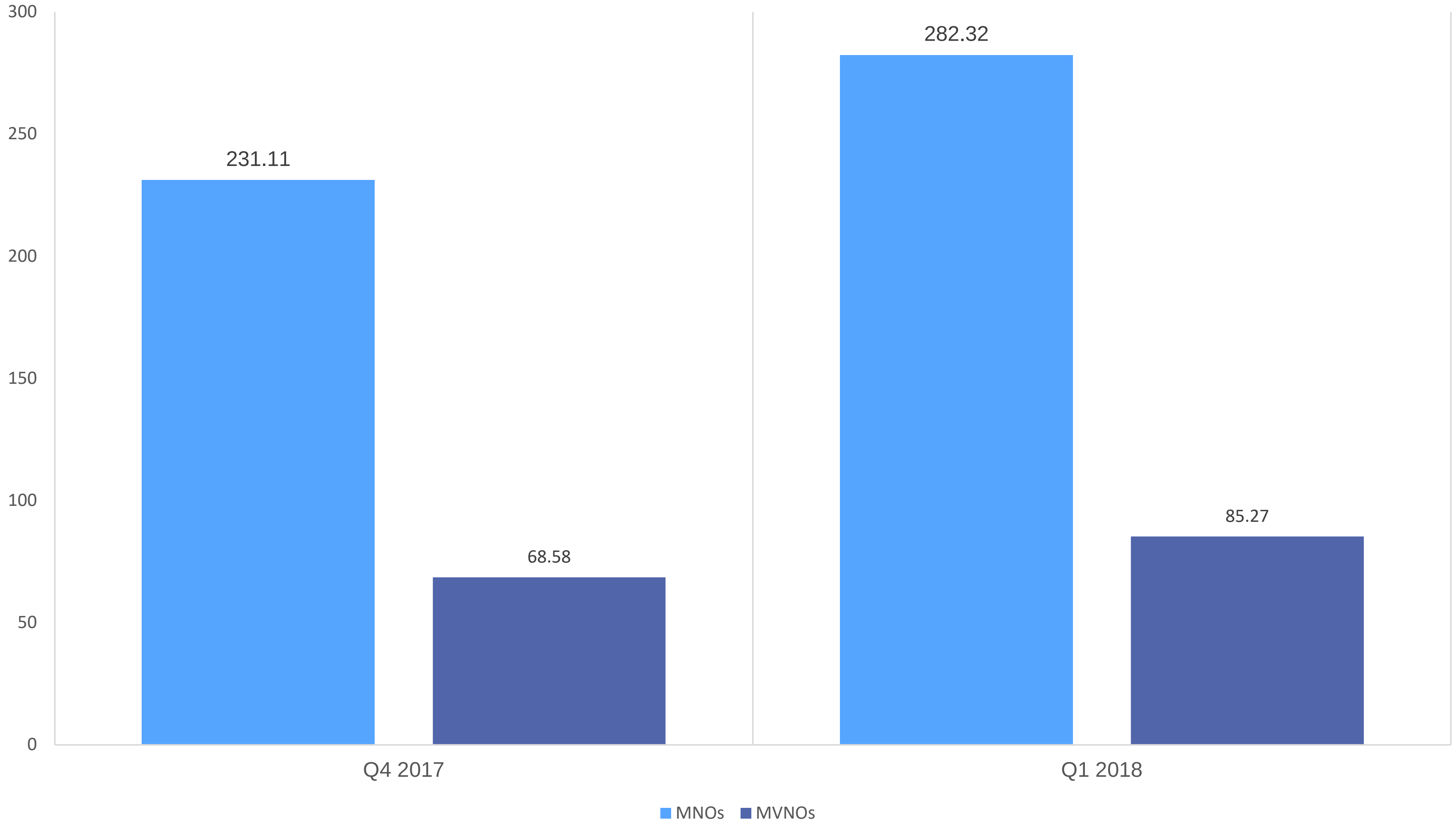


Figure 115: RLAH, data services: EEA average number of MB per month per total number of roaming subscribers, MNOs and MVNOs, Q4'17 and Q1'18



Annex I: Methodology for the data collection

Because of the broad scope and complexity of the new requirements stemming from the Roaming Regulation, new key indicators have been developed for the data collection. In addition, while the results are derived from the same questionnaire, the methodology used for some data from these new key indicators can differ between countries for a number of reasons. Particularly relevant are the following reasons:

- Differences in the methods used by operators to allocate volumes for the different roaming services. Therefore, comparability of data between different tariffs is affected by a number of reporting criteria, including roaming consumption from the volumes in the domestic mobile tariff plan (RLAH), the use of roaming services exceeds the limits of the FUP or if roaming is not periodic (RLAH+, non-compliance from abusive or anomalous usage),
- Difficulties in estimating the actual revenues for the roaming services and the mobile domestic services. As most of the operators provide domestic bundled services:
  - o it is therefore difficult to allocate revenues to the different domestic individual services (e.g.: fixed voice, mobile, internet, TV).
- Besides, after the introduction of Roam Like at Home rules, it is therefore difficult to determine, for these bundled tariff plans, the part of the domestic revenues only relative to intra-EEA roaming communications. For these tariffs, it is only possible to separate the revenues relative to the roaming surcharge applied (eg. when the roaming Fair use Policy is exceeded).

Therefore, considering these difficulties, in the Report the following assumptions were considered:

- all revenues resulting from bundles that include mobile services are allocated to domestic services regardless of whether the mobile service is provided in the domestic network (domestic service) or in a visited network (roaming service). So, the domestic revenues now include the intra-EEA roaming component from RLAH tariffs. Any other type of revenue (such as those originating from fixed telephone service or fixed internet service, sale of mobile devices, the initial one-time charge for a new/renewed subscription, subscription fees to other non-telecommunication services, etc) should not be considered, despite the difficulties in allocating the revenues only relative to mobile services. Revenues from international calls could also be included;
- the retail intra-EEA roaming revenues are only relative to the revenues resulting from the roaming surcharges (the domestic price component of the roaming service is excluded from the “retail intra-EEA roaming revenues)” and were included in the “Retail domestic revenues”).

The results presented in the Report should be taking into account the operators’ problems with data reporting. In particular, the comparability of the intra-EEA roaming revenues, before and after the introduction of the Roam Like at Home rules, must be carefully analysed, as well as the evolution of the domestic mobile revenues and of the intra-EEA roaming data (for traffic and for revenues), in terms of the different types of roaming tariffs.

While the measurement of balanced/unbalanced traffic should include volumes and revenues from all operators per country, such information is currently only available for a limited number of NRAs. For some countries, even if a data set is available, not all operators are included. The results related to the EEA average wholesale prices should be subject to cautious interpretation, because some countries were not able to submit comparable data on balanced/unbalanced and total traffic. Therefore, the EEA averages shown at Figures: voice services: 20, 21, 22, 23 and 24; SMS services: 47, 48, 49, 50 and 51; data services: 65, 66, 67, 68 and 69 may not be directly comparable.

The assessment of the international roaming market was based on the requirements set out in Article 19 (4) of the Roaming Regulation. In order to assess the competitive developments in the Union-wide roaming markets, BEREC has to collect data regularly from national regulatory authorities (NRAs) on the development of retail and wholesale charges for regulated voice, SMS and data roaming services. On the basis of the collected data, BEREC also has to report regularly on the evolution of pricing and consumption patterns in the Member States for both domestic and roaming services and the evolution of actual wholesale roaming rates for unbalanced traffic between roaming providers.

With effect from 15 June 2017 roaming providers shall not levy any surcharge in addition to the domestic retail price on roaming customers in any Member State for any regulated roaming service (Article 6 a Roaming Regulation). With the abolition of retail roaming surcharges in the Union, the same tariff conditions apply for the use of mobile services while roaming abroad in the Union and at home (i.e. in the country of the mobile subscription of the customer), subject to the conditions set out in a FUP (Fair Use Policy). Accordingly, wherever regulated roaming services are offered, the implementation of “Roam Like at Home” (RLAH) allows the customer to use services while travelling in other EEA Member States in the same way as in their home country, i.e. that RLAH tariff effectively includes roaming services in the domestic bundle.

Where roaming customers exceed the FUP, they may be required by the roaming provider to pay a surcharge for the consumption of any further regulated roaming service. However, Article 6 e (1) Roaming Regulation limits the amount of any such surcharge.

International Roaming Traffic Index reflects the changes in volumes between different periods of times.

Moreover, according to Article 6c Roaming Regulation, in specific and exceptional circumstances, with a view to ensuring the sustainability of its domestic charging model, a roaming provider may apply for authorisation to apply a surcharge. The Roaming Regulation lays down detailed rules on the methodology for assessing the sustainability of the abolition of retail roaming surcharges and on the application to be submitted by a roaming provider for the purposes of that assessment.

Due to the complexity of tariffs offered by operators, the current BEREC Benchmark Report includes an assessment of these tariffs with respect to consumption patterns.

BEREC also has to report about the evolution of actual wholesale roaming rates for unbalanced traffic between roaming providers. This requirement is also reflected in the current BEREC Benchmark Report.

Furthermore, BEREC also reports about the evolution of pricing and consumption patterns in the Member States for domestic services.

Considering the aforementioned difficulties in obtaining reliable and comparable data, for some indicators, there is a limited number of countries which have opted for not supplying the data relative to those indicators. This is not at all unusual for a comprehensive data collection of this type. In most cases the NRA was able to work with each company to resolve or alleviate the problem. In other cases, where system upgrades are necessary to comply with the new format of the data collection, the operator was asked to provide the best possible estimate currently available and to complete upgrades in time to provide high quality data for the next data collection. Some NRAs expressed major data quality challenges at the national operators' level as well as the use of different reporting systems by operators.

At the wholesale level, operators often receive discounts based on variables like volume of traffic, calculated at the end of a 12-month period. When providing data for these reports, operators may estimate the effect of such discounts on data for each quarter. Because the actual discount may vary from the estimate, there may be an apparently 'anomalous' result for the quarter when the discount is actually applied. This should be kept in mind when comparing wholesale figures for different quarters in the same year.

In a few cases, the number of operators changed, which may cause an apparent change in prices between quarters. This can also lead to strong volume changes.

When wholesale prices are above the price caps, in most cases the reason is that the average price to comply with the Regulation is the annual price and not a quarterly one, and in such cases some quarters compensate for others. Another reason may also be inaccuracies in reporting for the data collection itself.

For ease of comparison, the Euro is used throughout this Report. Within the EEA, currency fluctuations between the Euro and other national currencies are likely to have affected the average prices reported for EEA countries outside the Euro zone.

Conversion of gigabytes to megabytes was done in line with Recital 17 of the Regulation (EU) 2017/920 of the European Parliament and of the Council of 17 May 2017 amending Regulation (EU) No 531/2012, which results in 1 gigabyte (GB) being equal to 1000 megabytes (MB). Operators may apply a different formula which can slightly affect the accuracy of data.

All retail prices included in the charts below exclude VAT. They are an average of prices paid by postpaid and prepaid tariff plan customers. All averages are based on billed minutes of voice calls or billed megabytes of data, unless expressly stated otherwise.

With regard to wholesale roaming resale access according to Article 3 (4) of the Roaming Regulation, MNOs may charge fair and reasonable prices for components not covered by para. 3. Thus prices may be higher than the price caps given in Article 7 (1). Some data also include volumes and tariffs coming from roaming in non-EU countries in Europe. It should also be noted that the average wholesale roaming voice tariff for agreements applying Article 3 of the Roaming Regulation might be above the cap because the calculation is based on actual minutes (the Regulation permits to invoice 30 seconds for calls that are shorter).

The EU Roaming Regulation also applies to the EEA EFTA States Norway, Iceland and Liechtenstein. In this respect, the Report includes indicators from Norway and Liechtenstein.

In addition, Switzerland contributed to the data collections, although the 2007, 2009 and 2012 Roaming Regulation is not applicable there[21].

[21] Figures from Switzerland are excluded from both "EEA" and "EEA EFTA" averages.

Annex II: List of respondents

Operators that provided data for the period 1 October 2017 – 31 March 2018:

Austria
A1 Telekom Austria
ATK
HoT Telekom
Hutchison 3G Austria
LTK
Lycamobile
Mass Response
RTK
Russmedia
T-Mobile Austria
UPC

Belgium
Proximus
Telenet Group
Orange Belgium

Bulgaria
Bulgarian Telecommunication Company (Vivacom)
Telenor Bulgaria
Mobiltel

Croatia
Hrvatski Telekom
Vipnet
Tele2

Cyprus
Cyta
MTN Cyprus
Primetel

Czech Republic
O2 Family
Air Telecom
ČEZ Prodej
DH Telecom
O2 Czech Republic
SAZKA
TERMS
Tesco Mobile ČR
T-Mobile Czech Republic
Vodafone Czech Republic

Denmark
Hi3G Denmark
TDC
Telenor
TeliaDanmark

Estonia
AS EMT
Elisa Eesti
OÜ Top Connect
TELE 2 Eesti

Finland
Ålands Telekommunikation
DNA
Elisa Corporation
Telia Finland
European Mobile Operator (MOI)

France
EI Telecom
Free Mobile
Lycamobile
Orange Caraïbe
Orange France
SFR
SRR

Germany
Telekom Deutschland GmbH
Telefónica Germany GmbH & Co. OHG
Vodafone GmbH

Greece
COSMOTE Mobile
Vodafone Panafon
Wind HellasTelecommunications

CYTA HELLAS TILEPIKINONIAKI SA

Hungary
Telenor Magyarország
T-Mobile
Vodafone Magyarország
UPC Mobile

Iceland
Nova
Síminn
Vodafone Iceland

Ireland
Eircom Limited
Hutchison 3G Ireland
Tesco Mobile Ireland
Vodafone Ireland

Italy
Digi Italy
ERG Mobile
Fastweb
Tre
Lycamobile
Poste Mobile
Tim
Tiscali
Vodafone
Wind

Latvia
Bite Latvia
LatvijasMobilaisTelefons
Tele2

Liechtenstein
Salt (Liechtenstein)
Telecom Liechtenstein
Swisscom (Schweiz)

Lithuania
BitėLietuva
Eurocom
Omnitel
Tele2
Teledema

Luxembourg
POST
Tango
Orange Communications Luxembourg

Malta
Melita Mobile,
Mobisle Communications (GO Mobile)
Vodafone Malta

Netherlands
KPN
Lebara
Lycamobile Distribution
Tele2 Netherlands
T-Mobile Netherlands
Vodafone Libertel

Norway
Lycamobile
Phonero
Telenor
Telia Norge

Poland
P4
Polkomtel
T-Mobile Polska
Orange Polska

Portugal
CTT – Correios de Portugal
NOS Comunicações, S.A
MEO – Serviços de Comunicações e Multimédia,S.A.
Vodafone Portugal – Comunicações Pessoais.S.A.
NOWO Communications, S.A
ONITELECOM - Infocomunicações, S.A
Lycamobile Portugal, Lda

Romania
Orange Romania
RCS&RDS
Vodafone Romania
Lycamobile
Telekom RC
Telekom RMC

Slovak Republic
O2 Slovakia
Orange Slovensko
Slovak Telekom
SWAN Mobile

Slovenia
TELEKOM SLOVENIJE, D.D.
A1 Slovenija d.d.
TELEMACH D.O.O.
T-2 d.o.o.
IZI mobil, d.d.
HOT mobil, telekomunikacije in storitve d.o.o.
Mega M d.o.o.
SoftNET d.o.o.

Spain
Digi Spain
Euskaltel
Orange
TelefónicaMóviles de España
Vodafone
Yoigo

Sweden
Hi3G Access
Telenor Sverige
Telia Company
Tele2 Sverige

Switzerland
Orange Communications
Sunrise Communications
Swisscom (Schweiz)

United Kingdom
Vodafone UK
O2 UK
Everything Everywhere
Three UK
Tesco Mobile