

**International Roaming
BEREC Benchmark Data Report
October 2015 – March 2016**

Table of Contents

1. Introduction	3
2. Regulatory evolution.....	4
3. Data collection methodology.....	6
4. Main findings	8
5. Charts.....	12
5.1. Voice roaming services.....	13
5.1.1. Retail prices	13
5.1.2. Surcharge for roaming voice calls made.....	20
5.1.3. Wholesale prices.....	23
5.1.4. Surcharge for wholesale voice calls	27
5.1.5. Percentage of alternative tariffs on total volumes for calls made/received ..	30
5.1.6. Volumes of retail roaming voice calls.....	33
5.1.7. Retail and wholesale prices - outside EEA	38
5.2. SMS roaming services	44
5.2.1. Retail prices	44
5.2.2. Wholesale prices.....	48
5.2.3. Percentage of SMS from alternative tariffs on total roaming SMS messages	52
5.2.4. Volumes of retail roaming SMS	54
5.3. Data roaming services	57
5.3.1. Retail prices	57
5.3.2. Wholesale prices.....	61
5.3.3. Percentage of volumes of data from alternative tariffs over total data roaming volumes.....	65
5.3.4. Volumes of retail data services.....	67
5.4. Wholesale roaming (outbound): Agreements applying Article 3 of the Roaming Regulation.....	70

1. Introduction

This BEREC Benchmark Report on International Roaming (the “Report”) presents the results of the 17th round of data collection on European international roaming services undertaken by the Body of European Regulators for Electronic Communications (BEREC). The Report covers the period 1 October 2015 - 31 March 2016, i.e. the 4th quarter of 2015 and the 1st quarter of 2016. The Report also includes data from previous rounds of data collection conducted by BEREC and its predecessor, the European Regulators Group (ERG), to provide context for the current figures. The earliest data is from the 2nd quarter of 2007, when the Roaming Regulation was about to enter into force.

The applicable regulatory framework for this data collection is the Roaming Regulation (EU) No 531/2012 (Third Roaming Regulation) applied in the European Union (EU) and the EEA EFTA countries¹, with requirements for retail and wholesale regulated tariffs for voice, SMS and data roaming. The Regulation also included provisions on the separate sale of roaming services. In addition, Switzerland contributed to the data collections, although the 2007, 2009 and 2012 Roaming Regulation is not applicable there².

BEREC is required to regularly collect data from national regulatory authorities on the development of retail and wholesale charges for voice, SMS and data roaming services and to notify this data to the Commission under Article 19, paragraph 4 of the Roaming Regulation.

BEREC believes that the information collected in existing and subsequent reports provides a sound basis for any decisions regarding future regulation. In addition, BEREC considers it important to collect and publish a wider range of information in order to give a better picture of the effect of the EU Roaming Regulation and to present the evolution of roaming services.

While the monitoring obligations are addressed to individual NRAs, BEREC considers that by pursuing the following objectives it can add value through:

- simplifying the process, not only for NRAs as BEREC acts as a central point for the data collection, but also for the Commission, as the data is received from a single source and following data processing;
- coordinating the actions 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 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.

¹ For the purposes of this Report, ‘EEA EFTA’ (European Economic Area, European Free Trade Association) refers to Liechtenstein, Norway and Iceland.

² Figures from Switzerland are excluded from both “EEA” and “EEA EFTA” averages.

2. Regulatory evolution

The 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. The ERG called upon the 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 the 'Eurotariffs' 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 2007³.

The 2009 amended Regulation

On 7 May 2008, the Commission launched a public consultation on the functioning of the 2007 Regulation. ERG's views expressed in response to the consultation were substantially reflected in the Commission's legislative proposals,⁴ published on 23 September 2008, to extend the 2007 Regulation in duration and scope.

On 22 April 2009, the European Parliament 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 approved by the European Parliament. The final 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 controls, applicable from 1 July 2009 to 30 June 2012:

- an extension of wholesale and retail price regulation for voice, 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:

³ In Norway and Iceland the 2007 Regulation was in force from the end of 2007 to the 2nd quarter of 2010.

⁴ http://ec.europa.eu/information_society/activities/roaming/docs/regulation/reg_en.pdf

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.

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

The 2012 Regulation

On 29 June 2010, the Commission published an interim report⁷ on the functioning of the 2009 Regulation. The Commission’s Digital Agenda for Europe⁸ also included a target for roaming, where ‘the difference between roaming and national tariffs should approach zero by 2015’.

In accordance with the 2009 Regulation, BEREC provided advice to the Commission on the functioning of the Regulation and future regulatory options in its December 2010 Report⁹, supplemented by its February 2011 response to the Commission’s public consultation¹⁰.

The Commission then published a full review of the functioning of the Regulation and legislative proposals for a new Regulation in July 2011¹¹.

On 30 May 2012 the Council of the European Union approved the International Roaming Regulation III¹², which entered into force on 1 July 2012¹³.

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 2016¹⁴;
- an extension of wholesale price regulation for data roaming services 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 2016¹⁴;
- the obligation for 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.

⁷ http://ec.europa.eu/information_society/activities/roaming/docs/interim_report2010.pdf

⁸ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0245:FIN:EN:PDF>

⁹ http://erg.eu.int/doc/berec/bor_10_58.pdf

¹⁰ http://ec.europa.eu/information_society/activities/roaming/docs/cons11/Berec.pdf

¹¹ http://ec.europa.eu/information_society/activities/roaming/index_en.htm

¹² <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:172:0010:0035:EN:PDF>

¹³ 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.

¹⁴ In line with the mandate, the European Commission has undertaken a review of the wholesale roaming market, and proposed the new legislation in June 2016:

<http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52016SC0200>

<https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/1-2016-399-EN-F1-1.PDF>

The 2015 Regulation

On 26 November 2015, two years after the first draft text was introduced by the EC¹⁵, the Regulation (EU) No. 2015/2120 of the European Parliament and of the Council laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union was published¹⁶.

This amendment to the Regulation (EU) No 531/2012 sets out the principle of "Roam like at Home" (RLAH) where, from 15 June 2017, surcharges are to be abolished for regulated retail roaming services - until a yet to be defined minimum fair use limit (FUP) has been reached – provided that the issues identified at the wholesale level have been addressed and the proposed solutions are applicable by then.

Specifically regarding this Benchmark Report, the applicable provisions of the Roaming Regulation (EU) No 531/2012 were kept unchanged and therefore the basis for this data collection is maintained.

3. Data collection methodology

The ERG first consulted on a draft version of its data questionnaire during September 2007. Following comments received, the ERG amended the data questionnaire sent to providers, with an accompanying Explanatory Memorandum in October 2007.

In order to verify the operators' compliance with the Roaming III Regulation, BEREC updated the questionnaire. NRAs and the Commission were informally consulted on subsequent revisions of the template.

The information gathered for this Report covers both retail and wholesale prices and volumes for voice, SMS and data roaming services. Each NRA aggregated the individual provider data to provide a national aggregate to BEREC. Therefore, only national aggregated data appear in this Report.

Over 150 providers of international roaming services delivered information for this Report. These include virtually all of the mobile network operators in the EU, as well as a significant number of MVNOs that provide EU roaming services. BEREC estimates that this covers around 95% of EU consumers using international roaming services today.

There are a limited number of operators having difficulties to supply reasonable quality data. This is not at all unusual for a comprehensive data collection of this type. In most cases the NRA was able to work with the company to resolve or alleviate the problem. In other cases, where system upgrades were necessary to comply with the new format of the data collection, the company was asked to provide the best possible estimate currently available and to complete upgrades in time to provide high quality data in the future.

¹⁵ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2013:0627:FIN>

¹⁶ <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32015R2120>

The prices for the Eurotariff¹⁷ may exceed the price caps due to the 30 second minimum initial charging interval and in some cases non-regulated calls have been included due to problems with reporting.

Some operators could not split between EEA¹⁸ countries and other European countries and this may affect certain graphs showing the surcharge as a result of billed minutes for intra-EEA roaming voice calls.

The reason for negative surcharges in Figures 8,12 and 13 may result from data that include domestic post-paid tariffs with bundles of the roaming services (voice, SMS, data) applicable in EEA countries.

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 price between quarters. This can also lead to strong volume changes.

The reason why in some cases the wholesale prices are above the price caps, is that the average price used to assess the compliance with the regulation is based on the annual price rather than on the quarterly price, thus allowing some quarters to compensate for other quarters. Another reason may also be inaccuracies in the data collection itself.

For ease of comparison, the prices are determined in Euros 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.

With regard to wholesale roaming resale access according to Article 3 para. 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 para. 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). In one case, annexes to contracts signed by the MNO and its MVNO/ MVNE, which introduce (among other aspects) new maximum rates under the EU regulation, were agreed between the parties and are currently in the signing process. Once the annexes have been signed, the regulated rates will be applied retroactively (i.e. from 01.07.2013).

¹⁷ Roaming providers are required to make available to their customers in the countries listed above the Eurotariff that may be combined with any retail tariff. The roaming provider must apply the Eurotariff automatically to all current roaming customers, with the exception of customers who deliberately select a special roaming tariff (e.g. a roaming package).

¹⁸ European Economic Area: Roaming regulation applies to all Member States from the European Union and three of four member states of the European Free Trade Association (EFTA) (Iceland, Liechtenstein and Norway).

In the case of EFTA countries, the Roaming Regulation applies in these countries as of 7 December 2012 (Norway and Liechtenstein) and 21 December 2012 (Iceland).

The Report includes data from Croatia where the Roaming Regulation applies as of 1 July 2013 as historical data is not available.

This Report also updates previously published estimates, especially in terms of the Eurotariff and alternative tariffs. Newly submitted data allows for more precise estimates.

4. Main findings

The information gathered by BEREC continues to show a good level of compliance with the Roaming Regulation in all EU Member States. At the retail level, all consumers have access to a Euro-voice, Euro-data and Euro-SMS tariff. At the wholesale level, the voice, SMS and data roaming charges set between operators are in line with the declining regulated average caps. Some countries reported average prices slightly above the price caps.¹⁹

Evolution of prices

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

Service at Retail level (no VAT)	Q4 2015		Q1 2016	
	Price Cap	EEA Average	Price Cap	EEA Average
Eurotariff voice (making call) (€/min)	19	12.0	19	11.2
Eurotariff voice (receiving call) €/min)	5	2.8	5	2.6
Euro-SMS sent (€/SMS)	6	4.9	6	4.7
Data transfer (€/MB)	20	4.9	20	4.7

Service at wholesale level (no VAT)	Q4 2015		Q1 2016	
	Price Cap	EEA Average	Price Cap	EEA Average
Wholesale voice (€/minute)	5	3.7	5	3.2
Wholesale SMS (€/SMS)	2	1.3	2	1.1
Wholesale data (€/MB)	5	1.7	5	1.4

Calls made (retail)

In general, average Eurotariff retail voice roaming rates (Figures 1 - 3) remained fairly below the regulated caps in most EEA countries during the data collection period. For calls made, the EEA average Eurotariff was €0.120 in Q4 2015 and €0.112 in Q1 2016 compared to a cap of €0.190. The EEA average unregulated prices for alternative tariffs (Figures 1 - 3) were lower than during

¹⁹ The reasons for most such cases are explained in the Methodology Chapter. Moreover, NRAs are monitoring compliance with the provisions of the Regulation to gather further information on possible reasons for reported prices that are higher than the caps. BEREC will keep monitoring this issue closely.

the equivalent period one year before: €0.164 and €0.138 respectively in Q4 2015 and Q1 2016 compared to €0.248 and €0.227 in Q4 2014 and Q1 2015.

Calls received (retail)

For calls received (Figures 4 - 5), the EEA average Eurotariff rate was further from the cap (€0.050) at €0.028 during Q4 2015 and €0.026 during Q1 2016. For calls received (Figure 6) unregulated prices were lower than during the equivalent period one year before: €0.056 during Q4 2015 and €0.046 during Q1 2016 compared to €0.098 and €0.093 in Q4 2014 and Q1 2015.

Surcharge for voice calls (retail)

Regarding the effects of standardisation of billing units for Eurotariff voice calls (Figures 7-8), the 2012 Regulation (the mechanism introduced in the amended 2009 Regulation) requires per second billing for Eurotariff voice calls made, with the possibility of charging for an initial minimum period of up to 30 seconds to cover the costs of setting up the call. This has led to a significant drop in the EEA average surcharge for calls made, from around 22% in Q2 2009 to 5.30% in Q4 2015 and 5.54% in Q1 2016.

Calls made (wholesale)

At the wholesale level, (Figures 9-10) the EEA average Eurotariff was €0.037 in Q4 2015 and €0.032 in Q1 2016 compared to a cap of €0.050. Regarding the average EEA wholesale prices for intra-EEA roaming voice calls (Figure 11), the regulation has led to a constant reduction over the previous years and a rather flat trend during the last year.

Surcharge for voice calls (wholesale)

At the wholesale level, the surcharge for voice calls (Figures 12-13) decreased to 3.29% in Q4 2015 and to 3.47% in Q1 2016.

Prices rest of the world (RoW)

With regard to 'Rest of World' retail voice roaming calls (Figures 20-24), typical prices were significantly higher than for calls within the EEA countries. Comparing the medium-term trends (Figure 24), a decreasing trend coupled with a yearly constant oscillation (Q1 > Q2 > Q4 > Q3) for calls made and received is shown. There are no indications that operators have in general tended to raise the prices of unregulated 'Rest of World' roaming calls to make up for the loss of revenue due to lower regulated price caps.

SMS (retail)

The introduction of the Euro-SMS in the EEA in accordance with the 2009 Regulation continued in the 2012 Regulation and led to an EEA average Euro-SMS price (Figures 25-26) of around €0.049 in Q4 2015 and €0.047 in Q1 2016, compared to a regulated cap of €0.06. The EEA average price for unregulated SMS was higher, at €0.061 in Q4 2015 and €0.056 in Q1 2016. Before the 2009 Regulation, the EEA average SMS price was around €0.27 in Q1 2009 (Figure 27).

SMS (wholesale)

At the wholesale level, the 2012 Regulation led to a reduction in the average EEA SMS price (Figures 28-30) to €0.013 in Q4 2015 and €0.011 in Q1 2016. In comparison, the EEA average price was €0.136 in Q1 2009, before the 2009 Regulation came into force.

Data (retail)

The 2012 Regulation introduced new retail price caps for data services. This has led to a progressive drop in retail prices (Figures 34-35). There is a slight difference between the data Eurotariff and alternative tariffs for retail data services for the relevant period: €0.049 in Q4 2015 and €0.047 Q1 2016 for the Eurotariff compared to €0.053 and €0.048 for alternative tariffs.

Data (wholesale)

At the wholesale level, the average data cap of €0.05 in Q4 2015 and Q1 2016 applies in the EEA under the 2012 Regulation. The EEA average price for non-group wholesale data (Figures 37-39) fell to €0.017 per MB in Q4 2015 and €0.014 per MB in Q1 2016, compared to €0.026 and €0.019 in Q4 2014 and Q1 2015.

Wholesale agreements (Article 3)

In the case of wholesale agreements based on Article 3 of the Roaming Regulation, only some operators submitted this data. BEREC's International Roaming Compliance Report²⁰ 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. As set out on page 7, the wholesale resale charges can exceed the caps as these may be subject to fair and reasonable prices for additional components not covered by Article 3 of the Roaming Regulation (figures 43-45).

Evolution of volumes

In respect of EEA volumes of voice, SMS and data roaming services (Figures 16-19, 32-33 and 41-42), one particular issue stands out, which is the significant difference between these services. While volumes for voice and SMS services show a minimal or small increase from 2008 (1.70 times for calls made, 2.35 times for calls received and 1.34 times for SMS sent comparing Q1 2016 and Q1 2008), data service volumes increased up to around 153 times in Q1 2016 compared to Q1 2008 correspondent quarters.²¹

²⁰ 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

²¹ It should be noted that the results displayed in the charts might take into account values from a different number of operators that submitted data in the relevant quarters. In this Report Croatia is also included which could affect total volumes as well.

Evidence of market forces at work

For voice roaming services, the average EEA prices are close to the regulated caps. This suggests that providers see little attraction in competing on Eurotariff rates, despite the fact that there is a significant margin between typical wholesale prices and retail caps.

Differing from the previous Benchmark Reports, the European average alternative price for calls made in Q4 2015 and Q1 2016 were below the regulated price cap (Figure 3).

Although the Eurotariffs generally account for the majority of voice and SMS traffic, customers opt for alternative tariffs, and in Q1 2016, 46.1% of calls made and 32.4% for calls received were based on alternative tariffs (Figures 14-15). For text messages sent while roaming within EEA countries, unregulated non-Euro SMS tariffs accounted for 26% of the total volume (Figure 31).

There is a significant different trend in the case of data roaming services. In Q1 2016 around 51.7% of data traffic was based on the non-Euro data tariff while roaming (Figure 40)²². In this regard, the BEREC Reports on Transparency and Comparability of International Roaming Tariffs²³ also showed that a large number of operators offered a variety of packages for roaming data services. Positive outcomes of competition dynamics for data roaming are also signalled by the much larger differential (compared to voice calls and SMS) between the regulated caps and the average Euro and non-Euro data price for 1 MB both at retail and wholesale level.

LBO services

In 2014 Articles 4 and 5 (Separate sale of retail roaming services) of the Roaming III Regulation entered into force. Until now only one operator from Lithuania offering LBO services submitted data to BEREC for Q4 2015 and Q1 2016.

²² It must be noted that not all countries provided data for prepaid or post-paid alternative tariffs and care should be taken when comparing percentages with voice and SMS services.

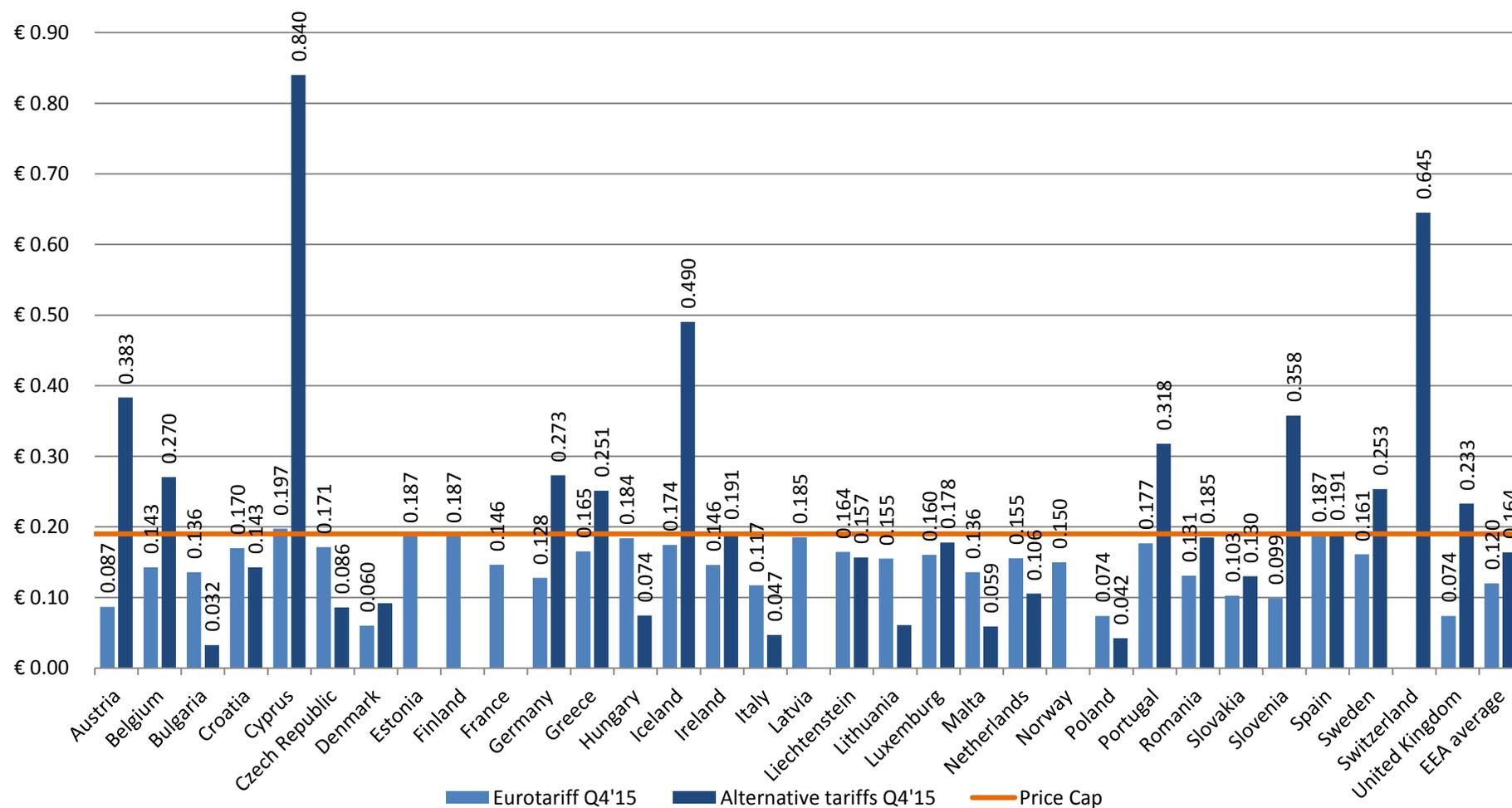
²³ BEREC Reports on transparency and Comparability of International Roaming Tariffs: 2013: http://berec.europa.eu/eng/document_register/subject_matter/berec/reports/3903-report-on-transparency-and-comparability-of-international-roaming-tariffs
2014: http://berec.europa.eu/eng/document_register/subject_matter/berec/reports/4787-report-on-transparency-and-comparability-of-international-roaming-tariffs
2015: http://berec.europa.eu/eng/document_register/subject_matter/berec/reports/3903-report-on-transparency-and-comparability-of-international-roaming-tariffs

5. Charts

5.1. Voice roaming services

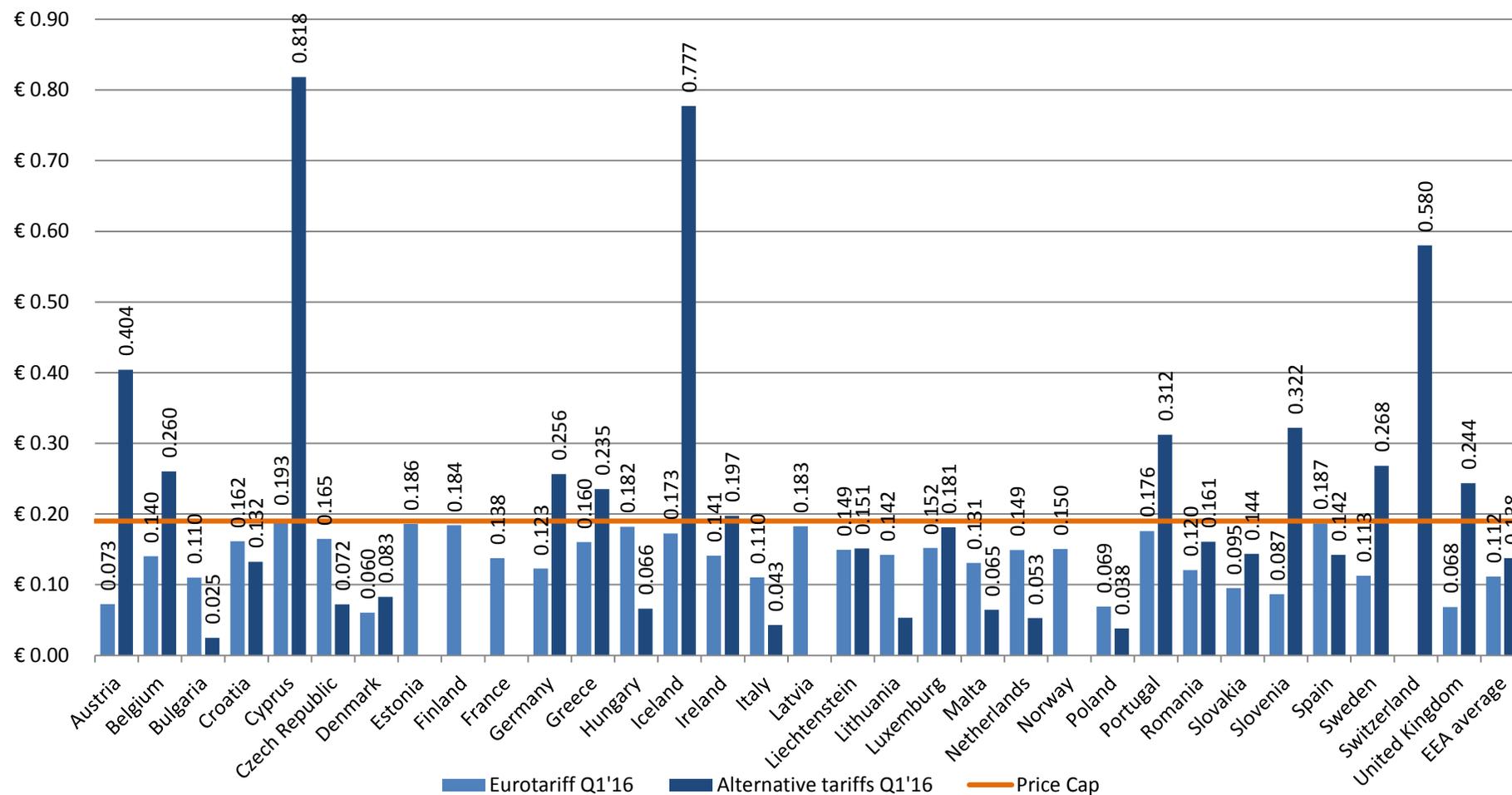
5.1.1. Retail prices

**Figure 1: Average retail price per minute for intra-EEA roaming voice calls made:
Eurotariff and alternative tariffs (Q4 2015)**



Data for alternative tariffs for some countries have not been reported and for others there are no alternative tariffs.

**Figure 2: Average retail price per minute for intra-EEA roaming voice calls made:
Eurotariff and alternative tariffs Q1 2016**



Data for alternative tariffs for some countries have not been reported and for others there are no alternative tariffs.

Figure 3: EEA average retail price per minute for intra-EEA roaming voice calls made

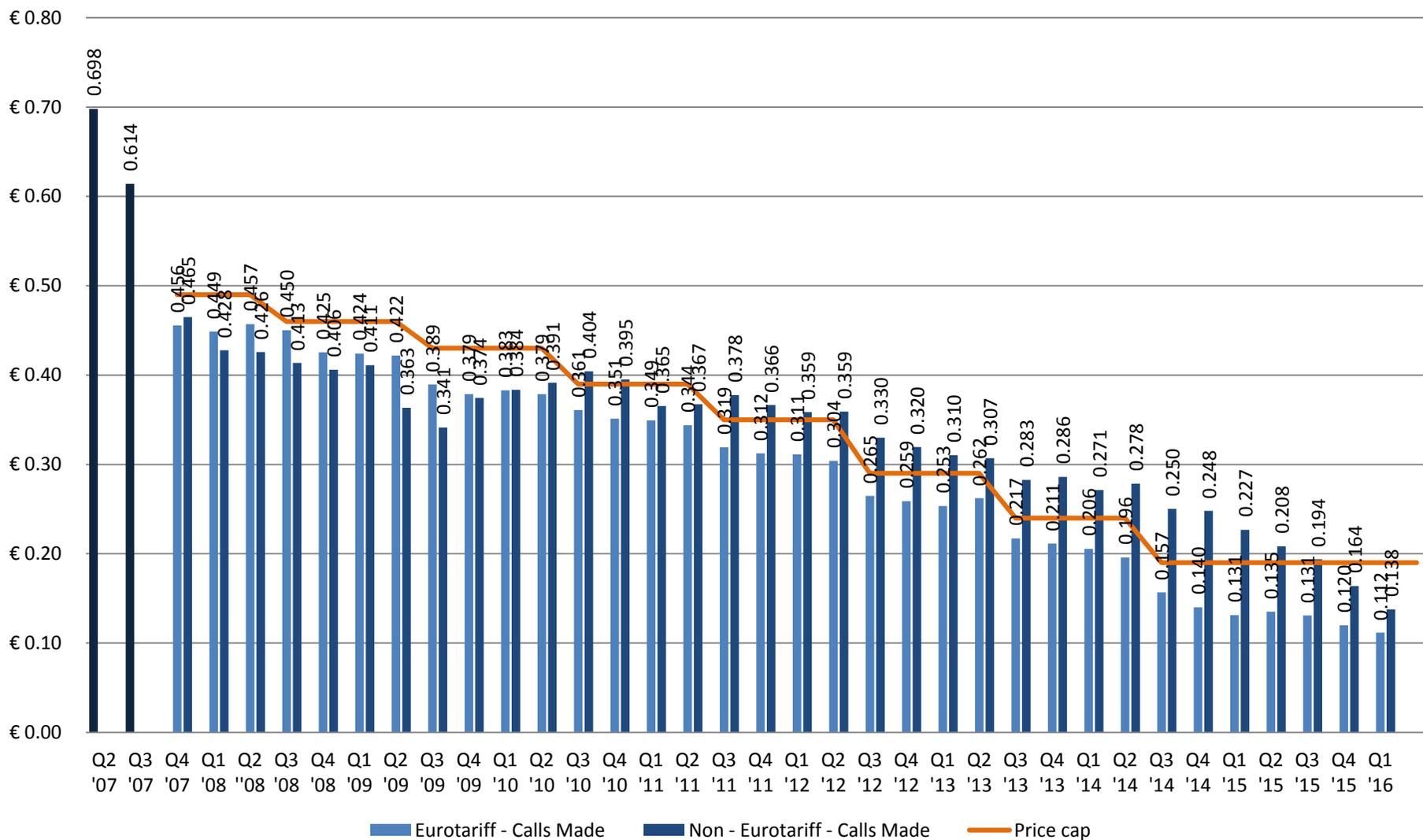
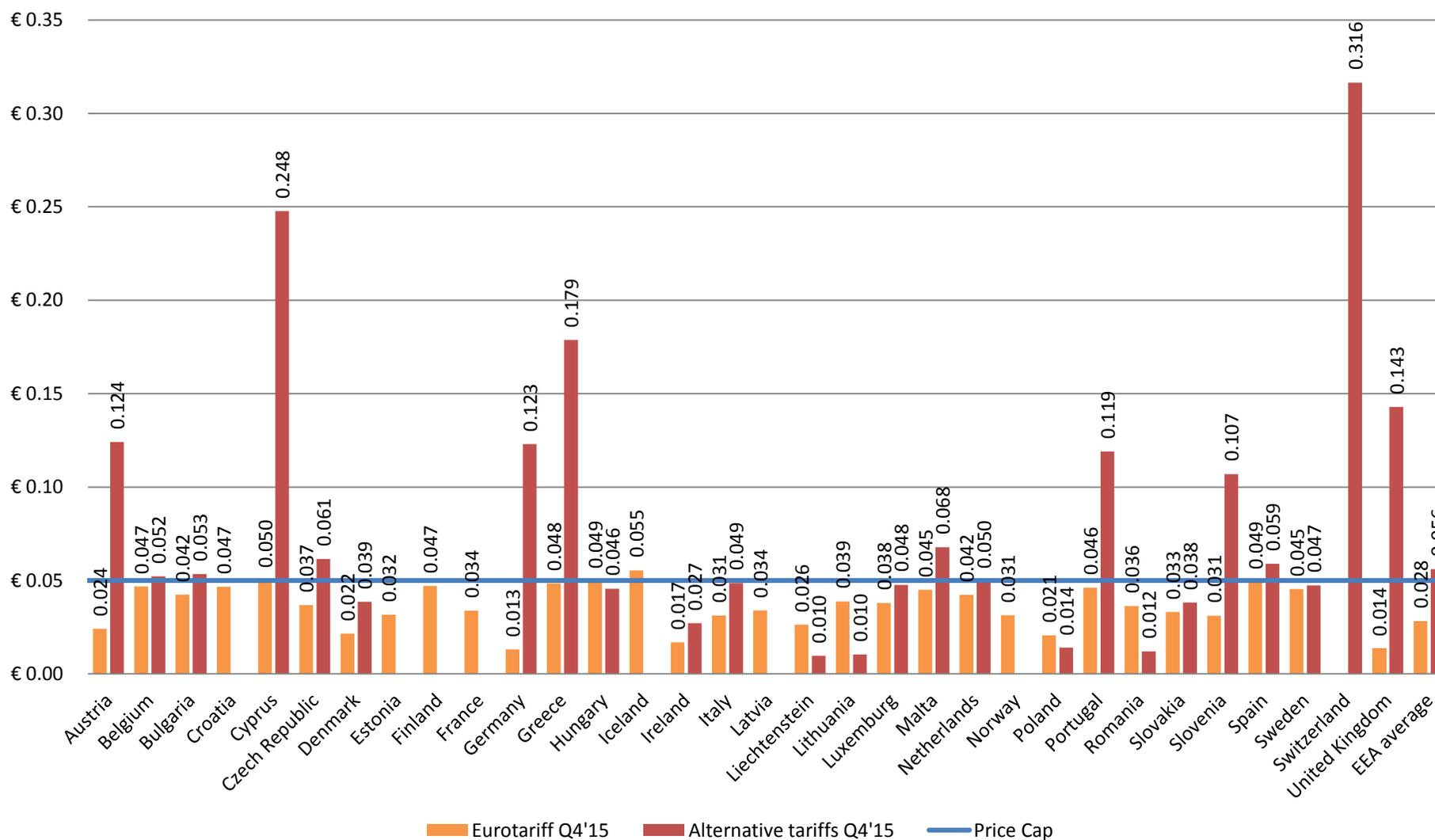
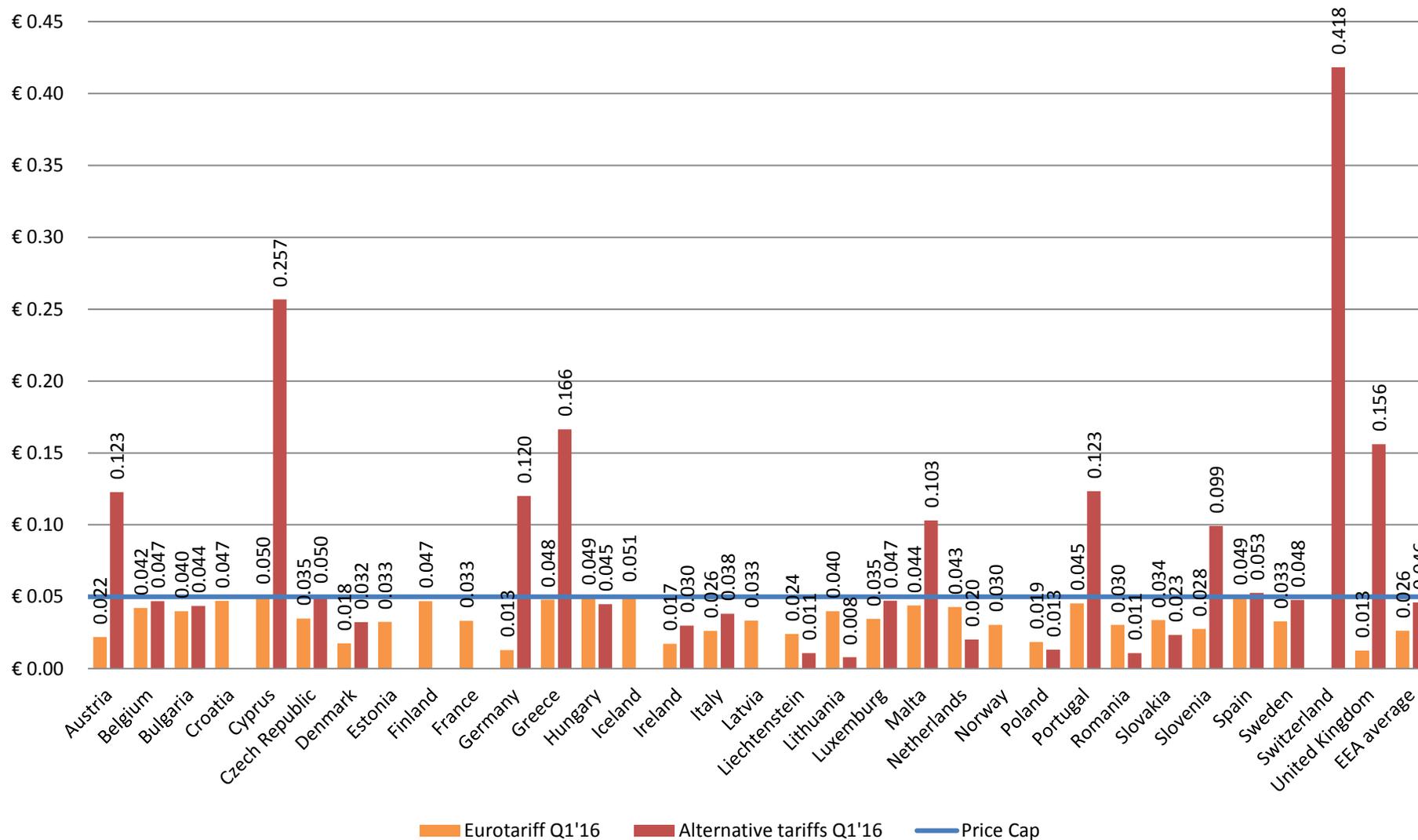


Figure 4: Average retail price per minute for intra-EEA roaming voice calls received: Eurotariff and alternative tariffs Q4 2015



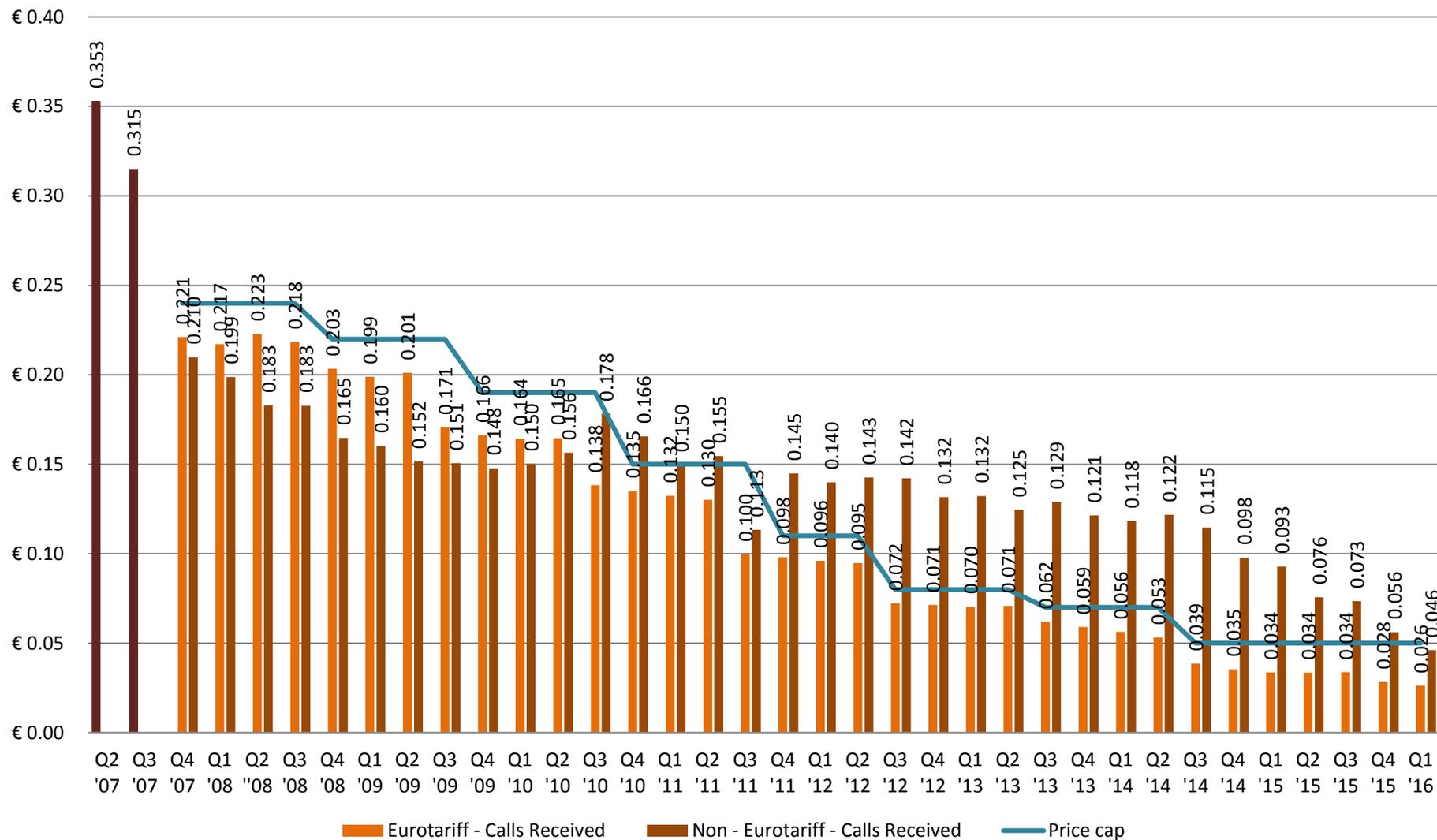
Data for alternative tariffs for some countries have not been reported and for others there are no alternative tariffs

Figure 5: Average retail price per minute for intra-EEA roaming voice calls received: Eurotariff and alternative tariffs Q1 2016



Data for alternative tariffs for some countries have not been reported and for others there are no alternative tariffs.

Figure 6: EEA average retail price per minute for intra-EEA retail roaming voice calls received



5.1.2. Surcharge for roaming voice calls made

Figure 7: Surcharge as a result of billed minutes for intra-EEA roaming voice calls made: Eurotariff Q4 2015

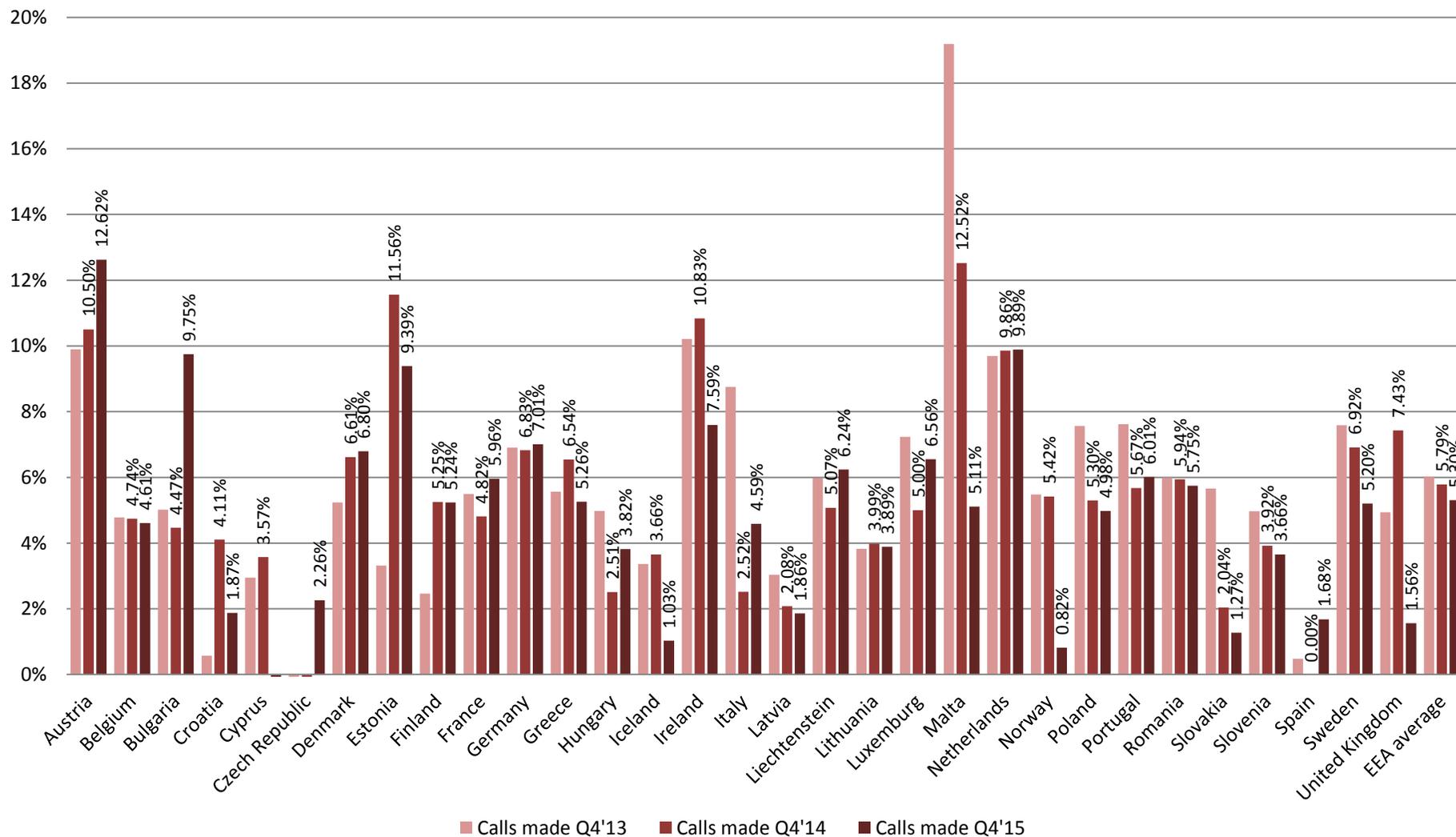
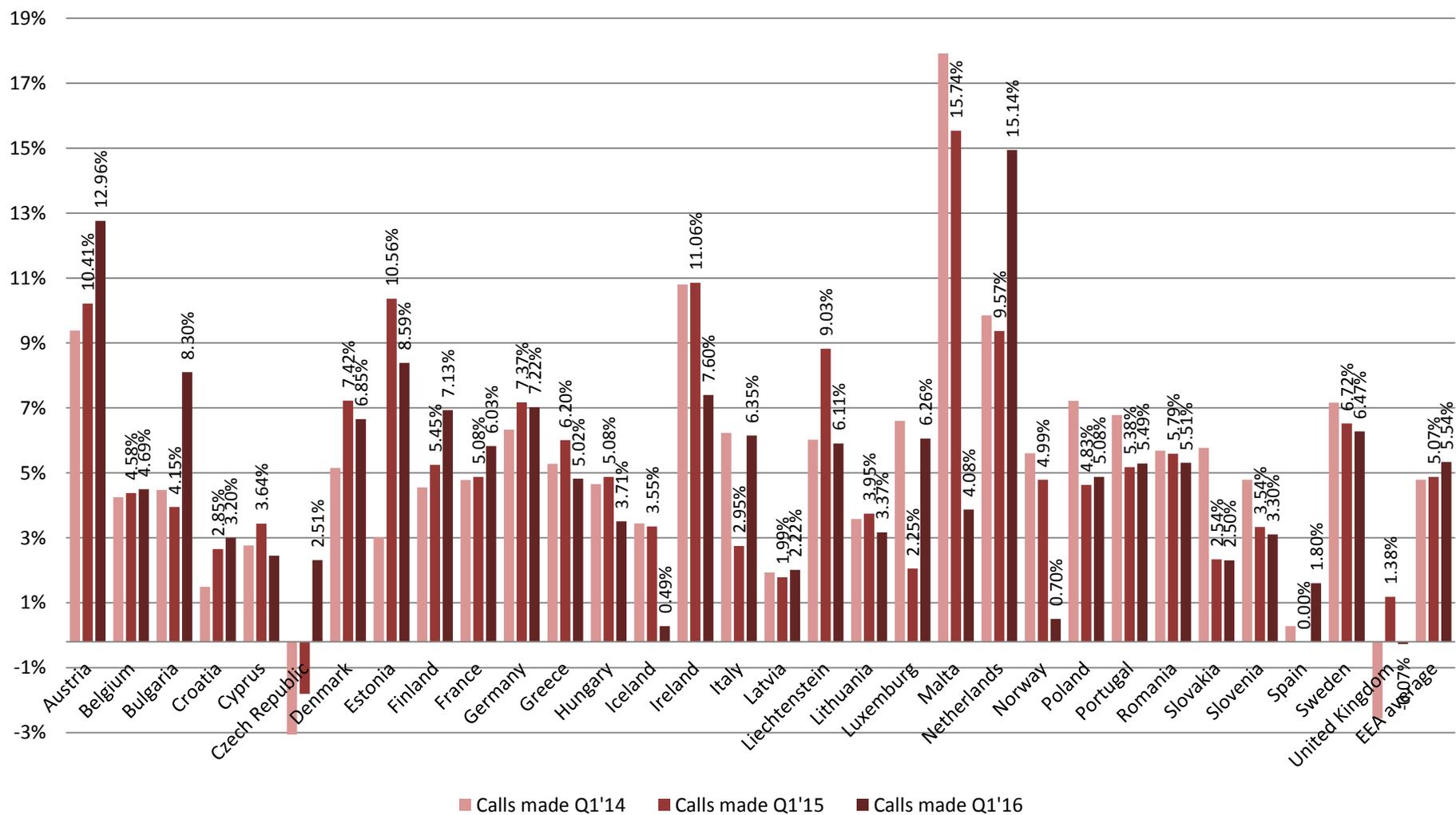


Figure 8: Surcharge as a result of billed minutes for intra-EEA roaming voice calls made: Eurotariff Q1 2016



5.1.3. Wholesale prices

Figure 9: Average wholesale price per minute for intra-EEU roaming voice calls: charges to non-group companies (wholesale roaming inbound) Q4 2015

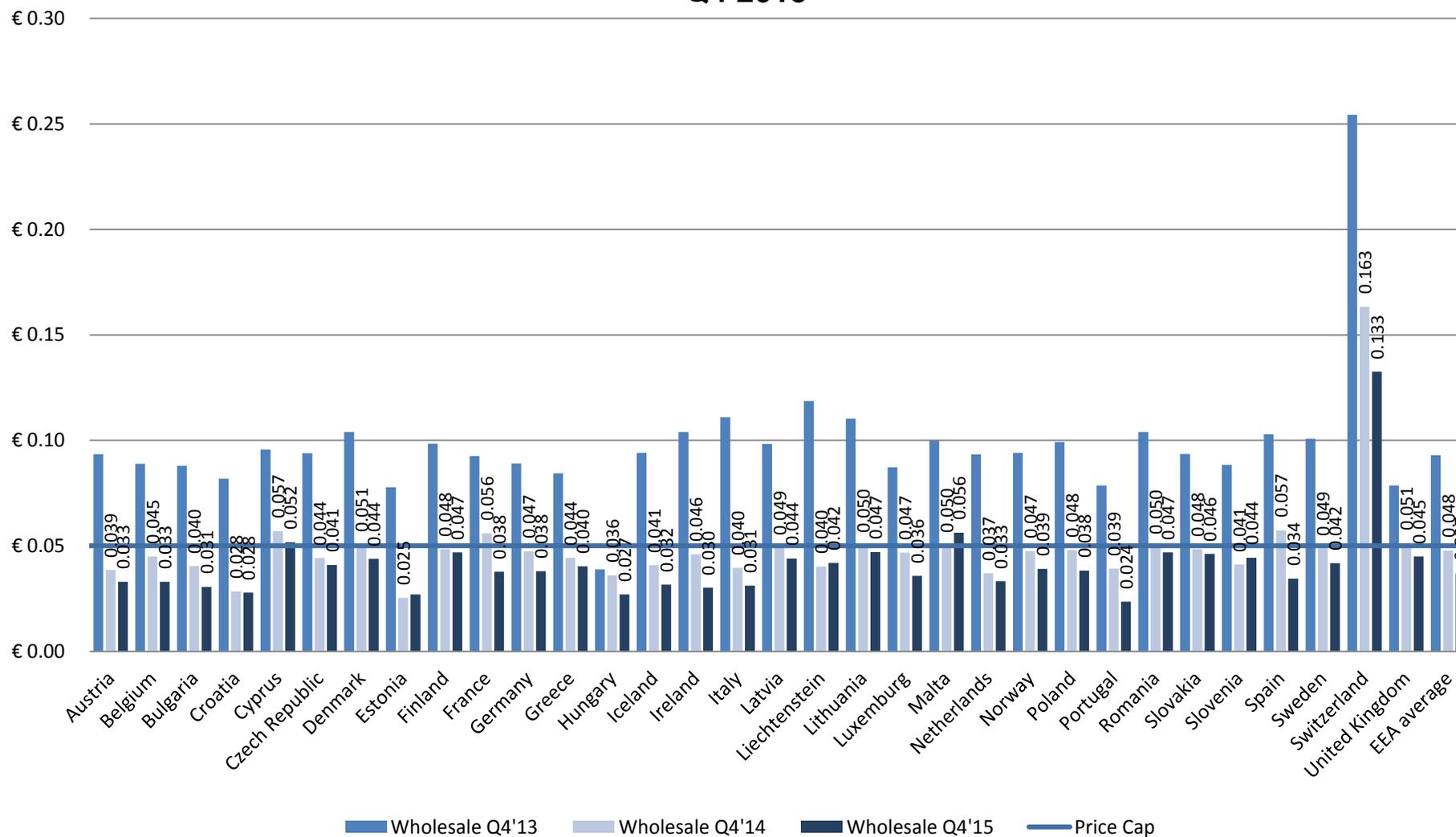


Figure 10: Average wholesale price per minute for intra-EEU roaming voice calls: charges to non-group companies (wholesale roaming inbound) Q1 2016

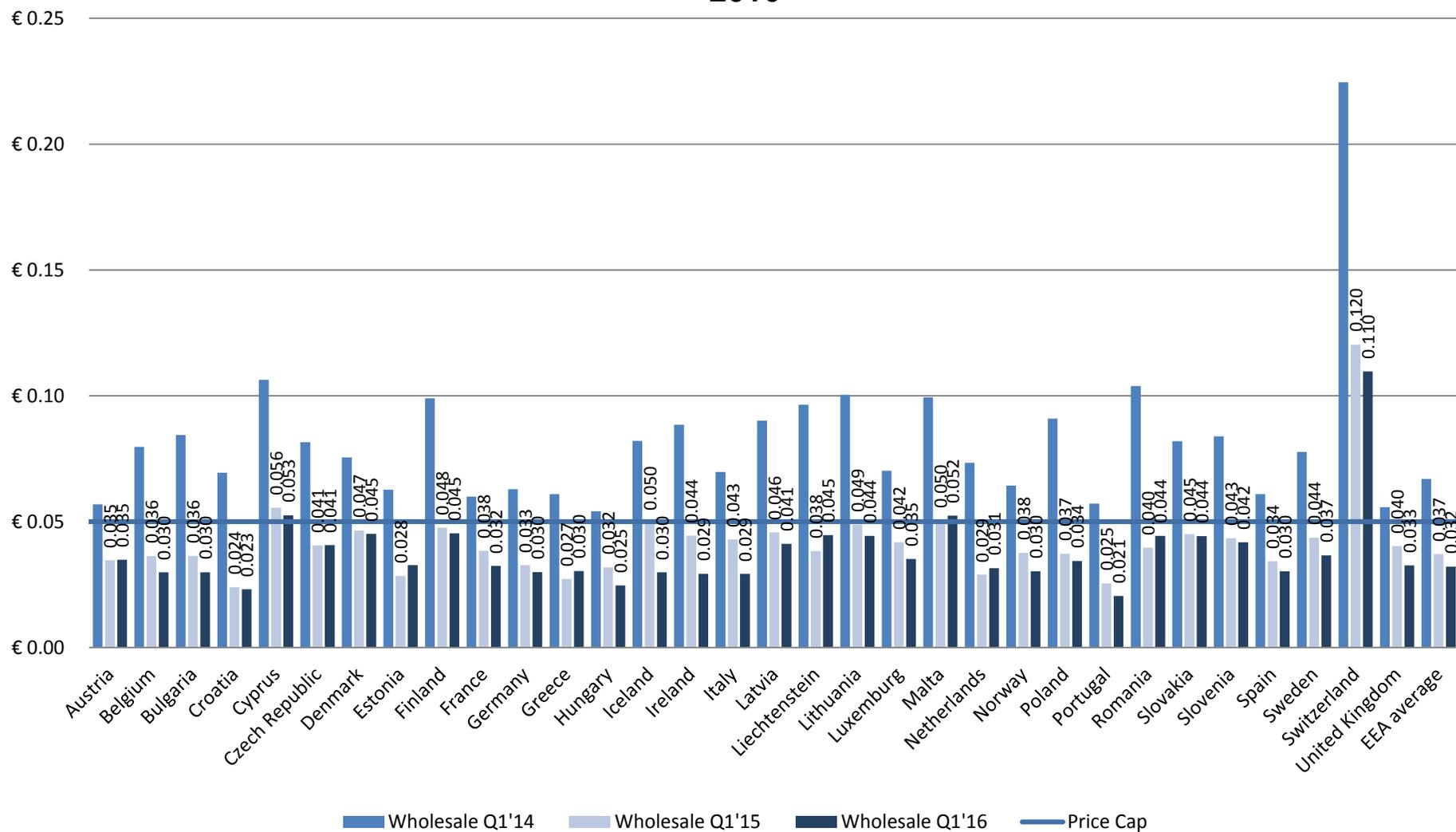
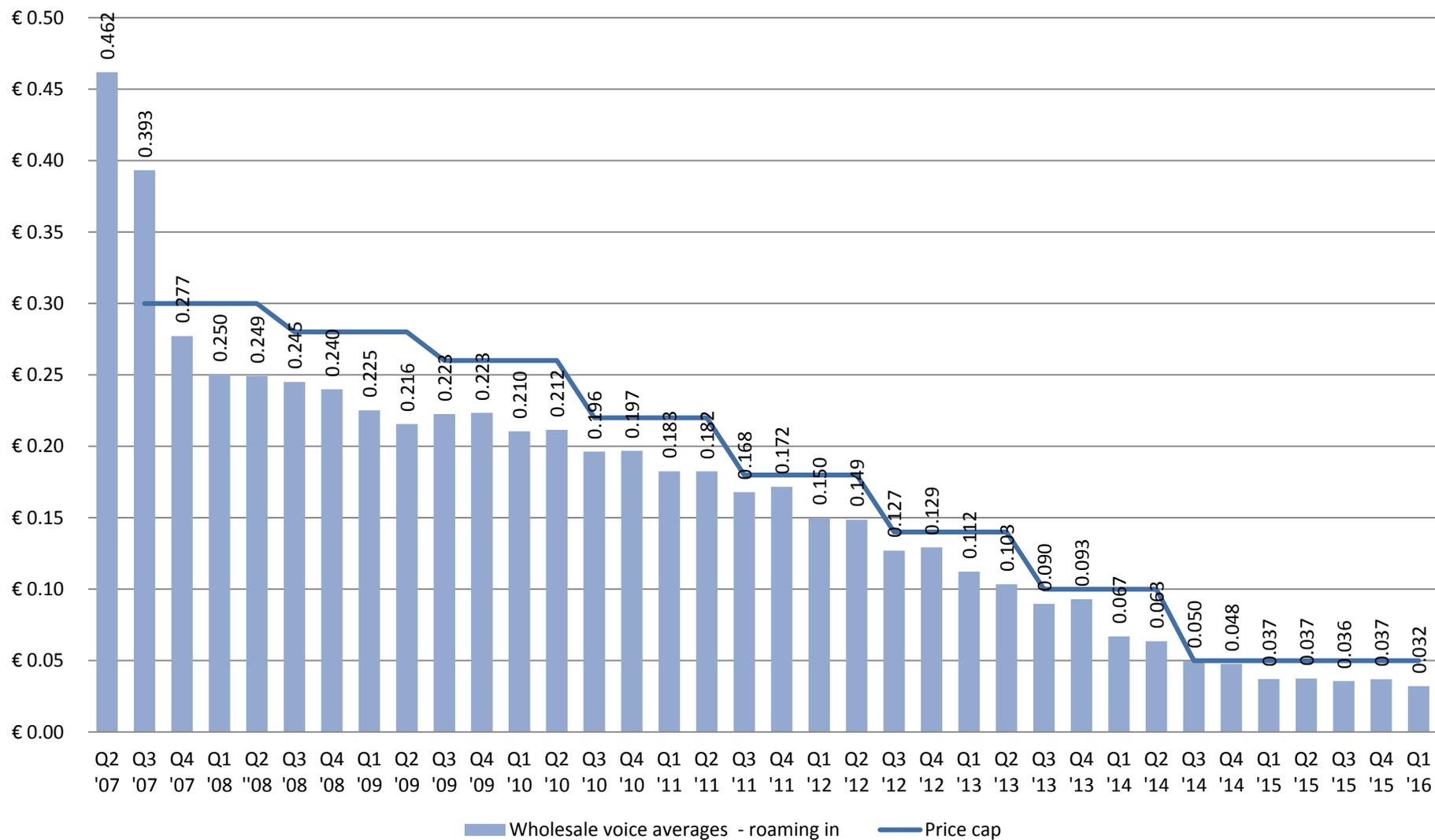


Figure 11: EEA average price per minute for wholesale non-group roaming voice calls



5.1.4. Surcharge for wholesale voice calls

Figure 12: Surcharge as a result of billed minutes for intra-EEA wholesale voice calls (non-group companies) Q4 2015

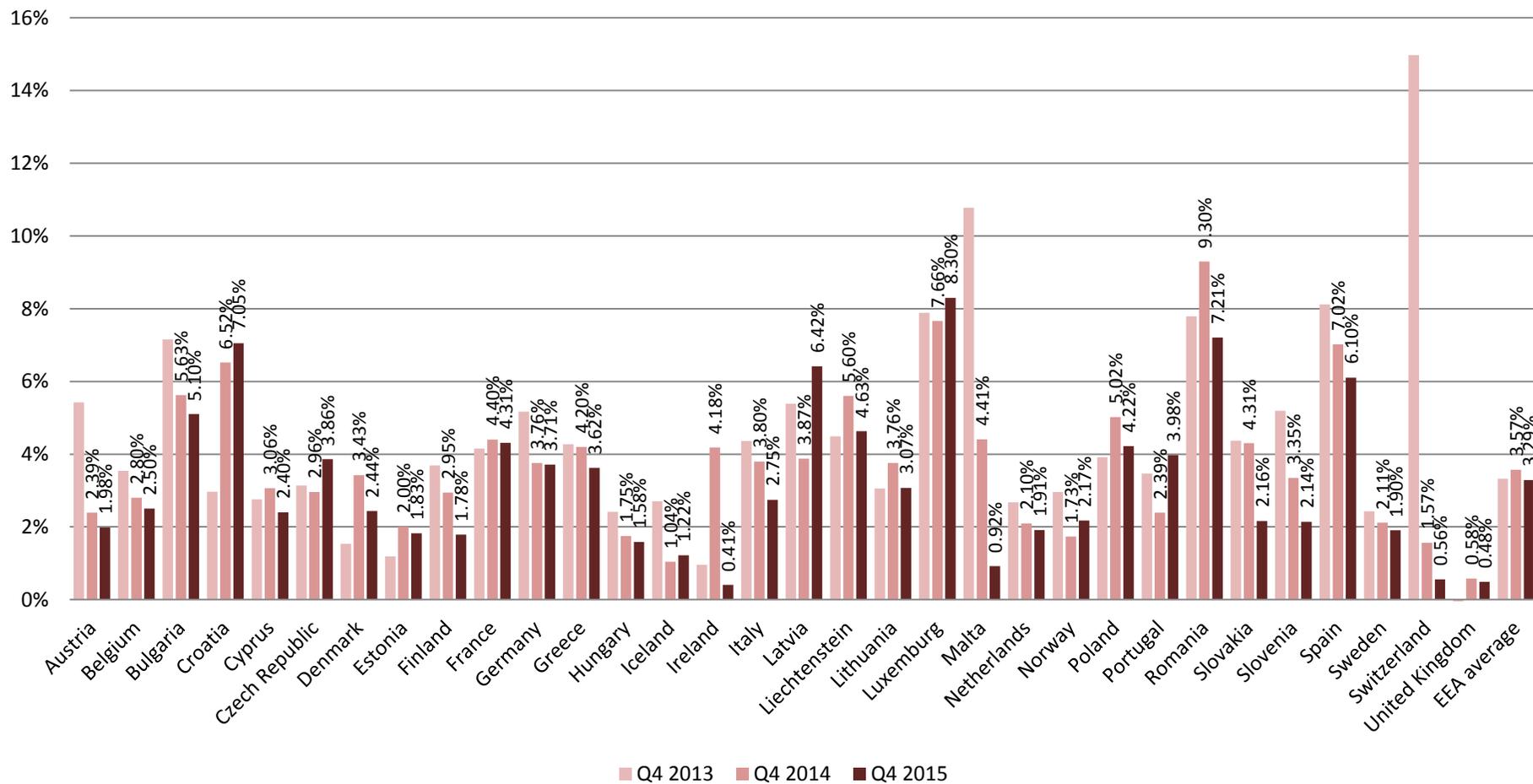
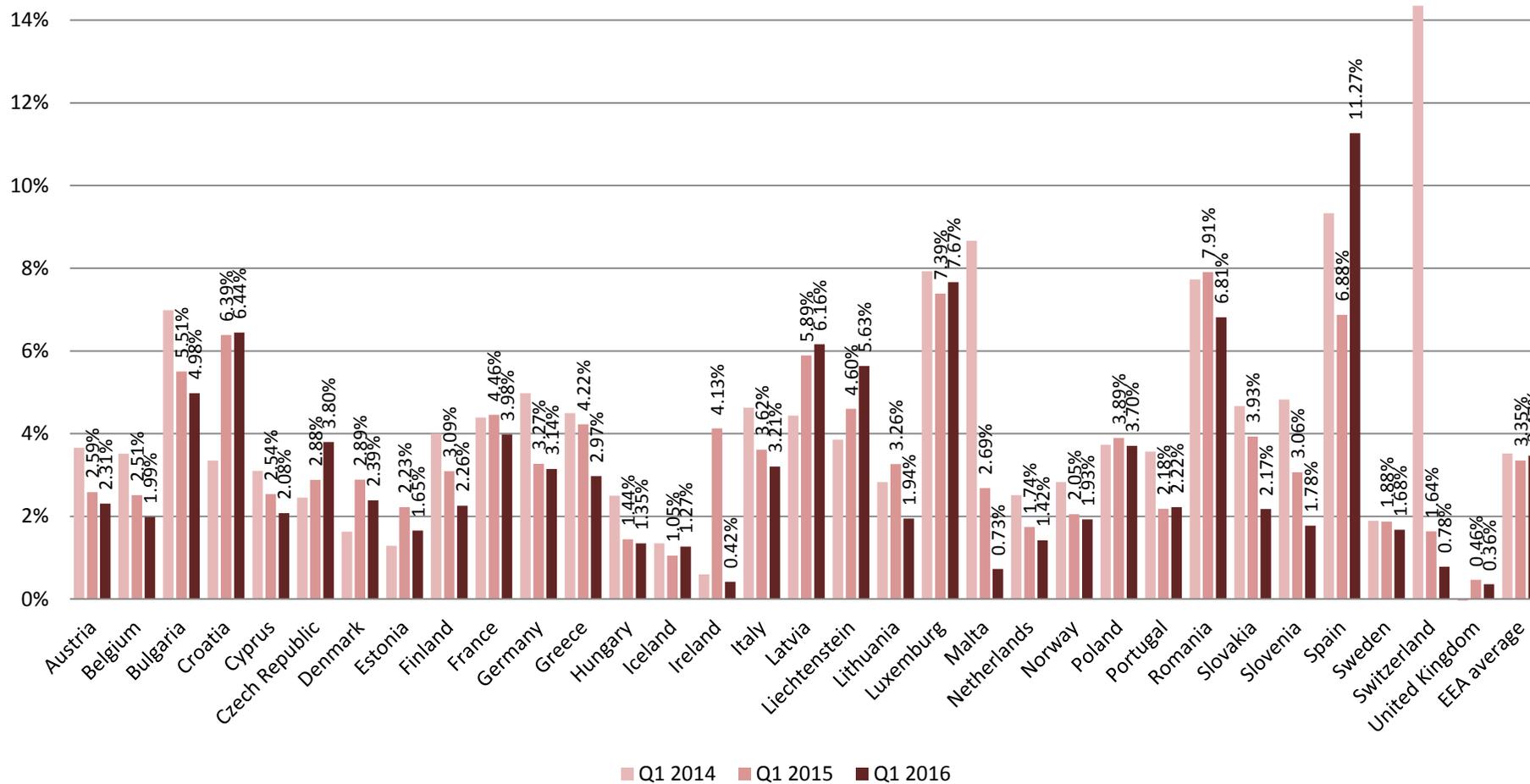
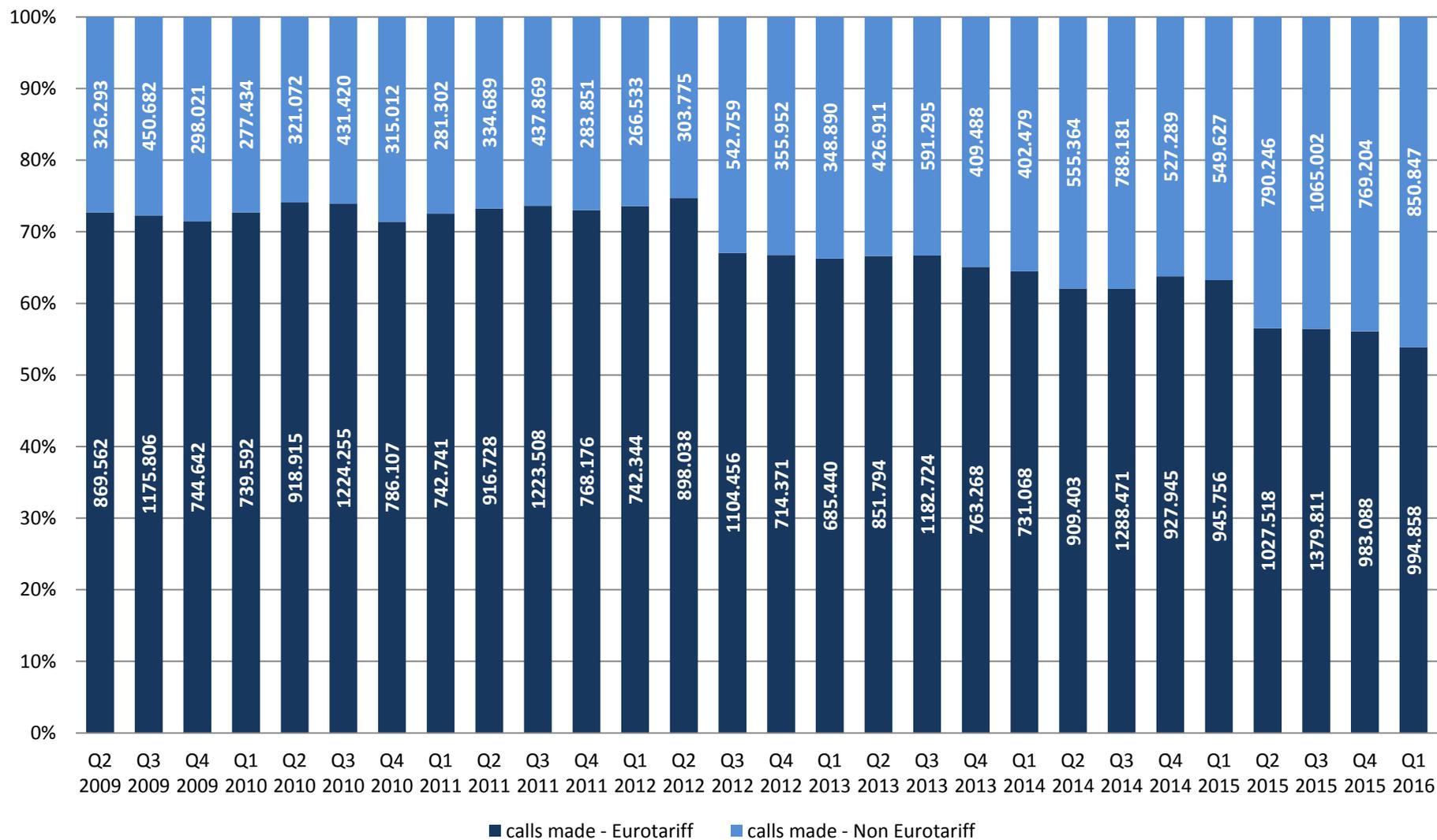


Figure 13: Surcharge as a result of billed minutes for intra-EEA wholesale voice calls (non-group companies) Q1 2016

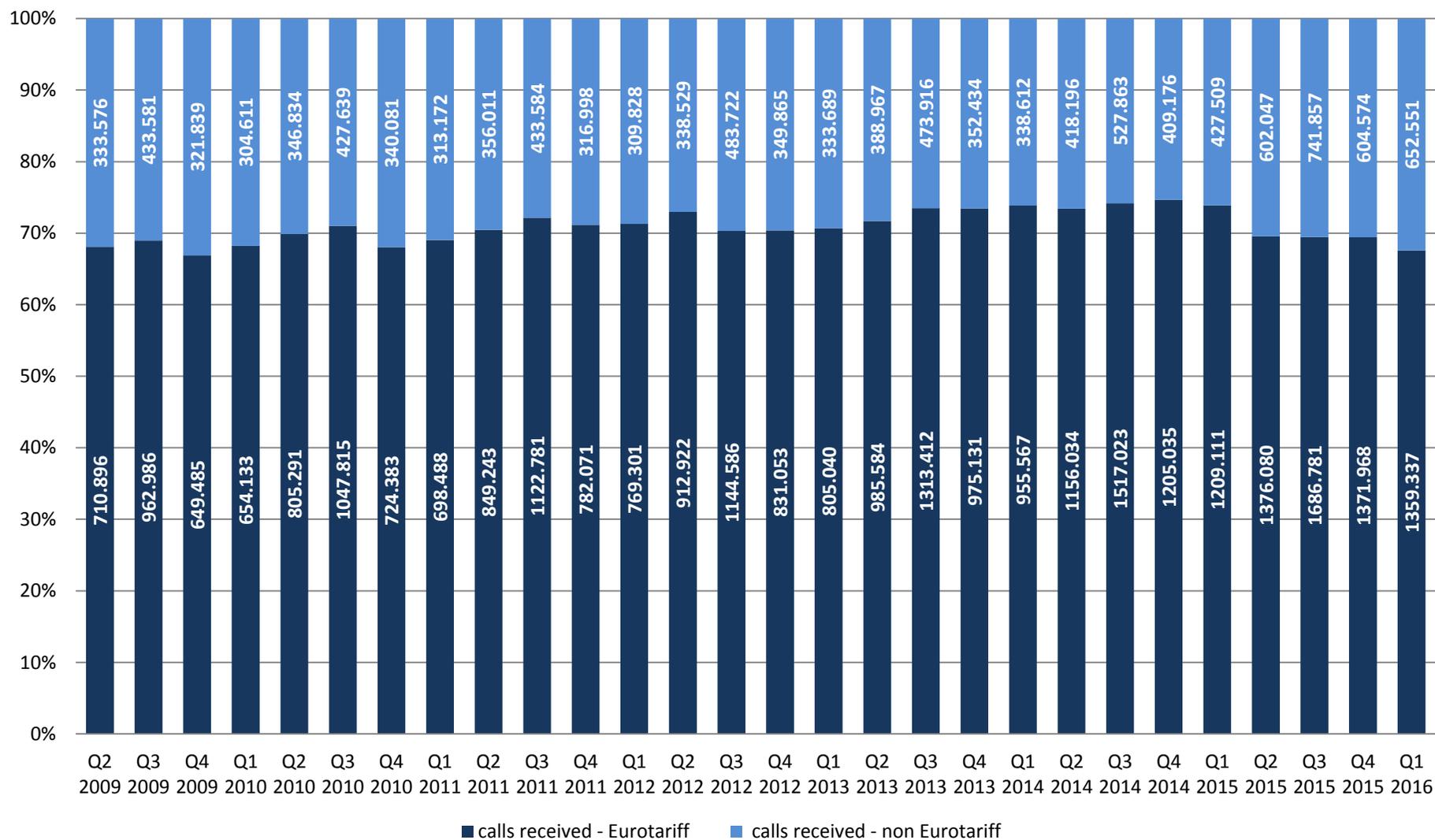


5.1.5. Percentage of alternative tariffs on total volumes for calls made/received

Figure 14: EEA percentage of calls made: Eurotariff and alternative tariffs (millions of minutes)

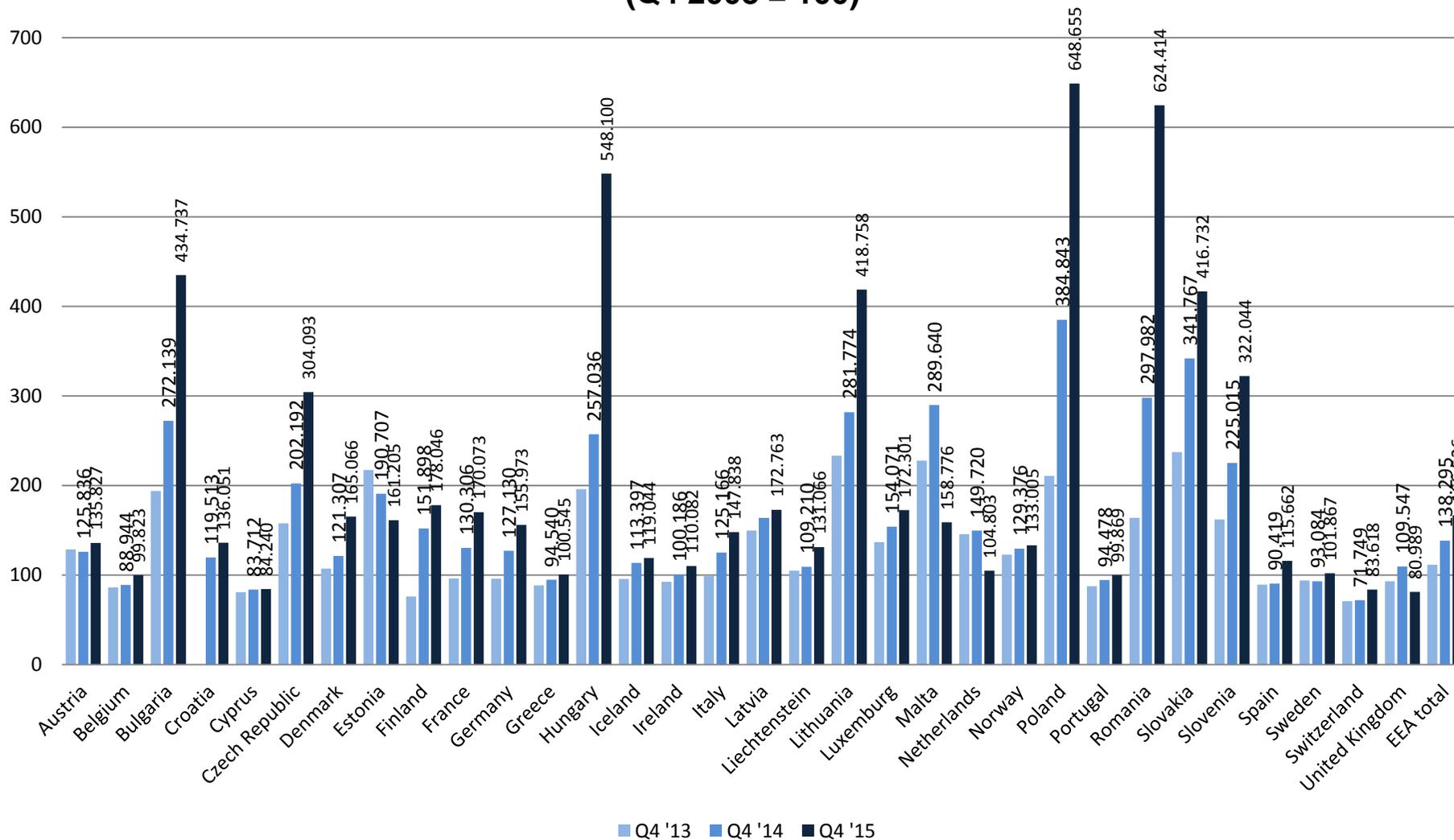


**Figure 15: EEA percentage of calls received: Eurotariff and alternative tariffs
(millions of minutes)**



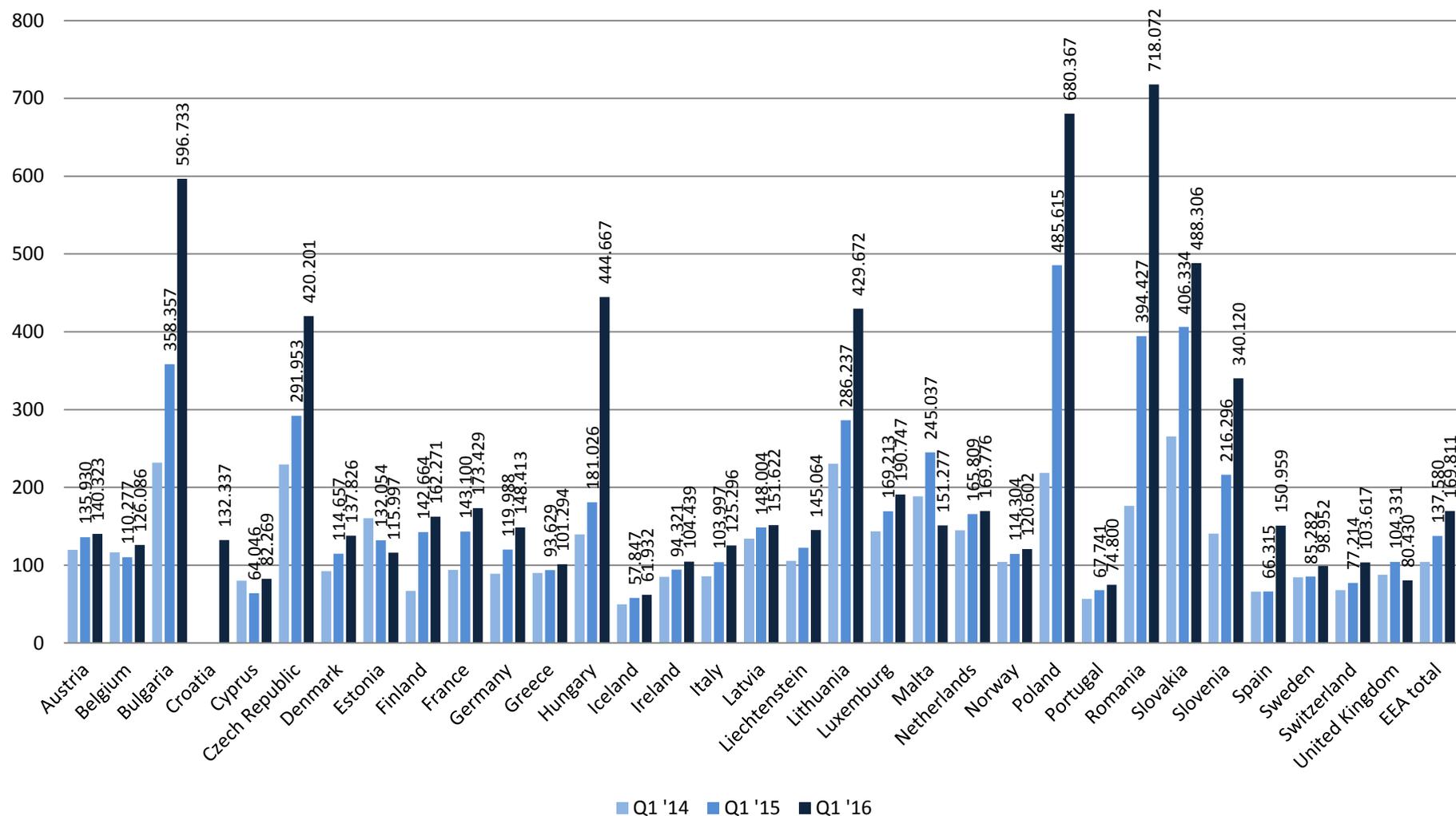
5.1.6. Volumes of retail roaming voice calls

Figure 16: Outgoing international roaming traffic Index, intra-EEA roaming calls in Q4 2015 (Q4 2008 = 100)



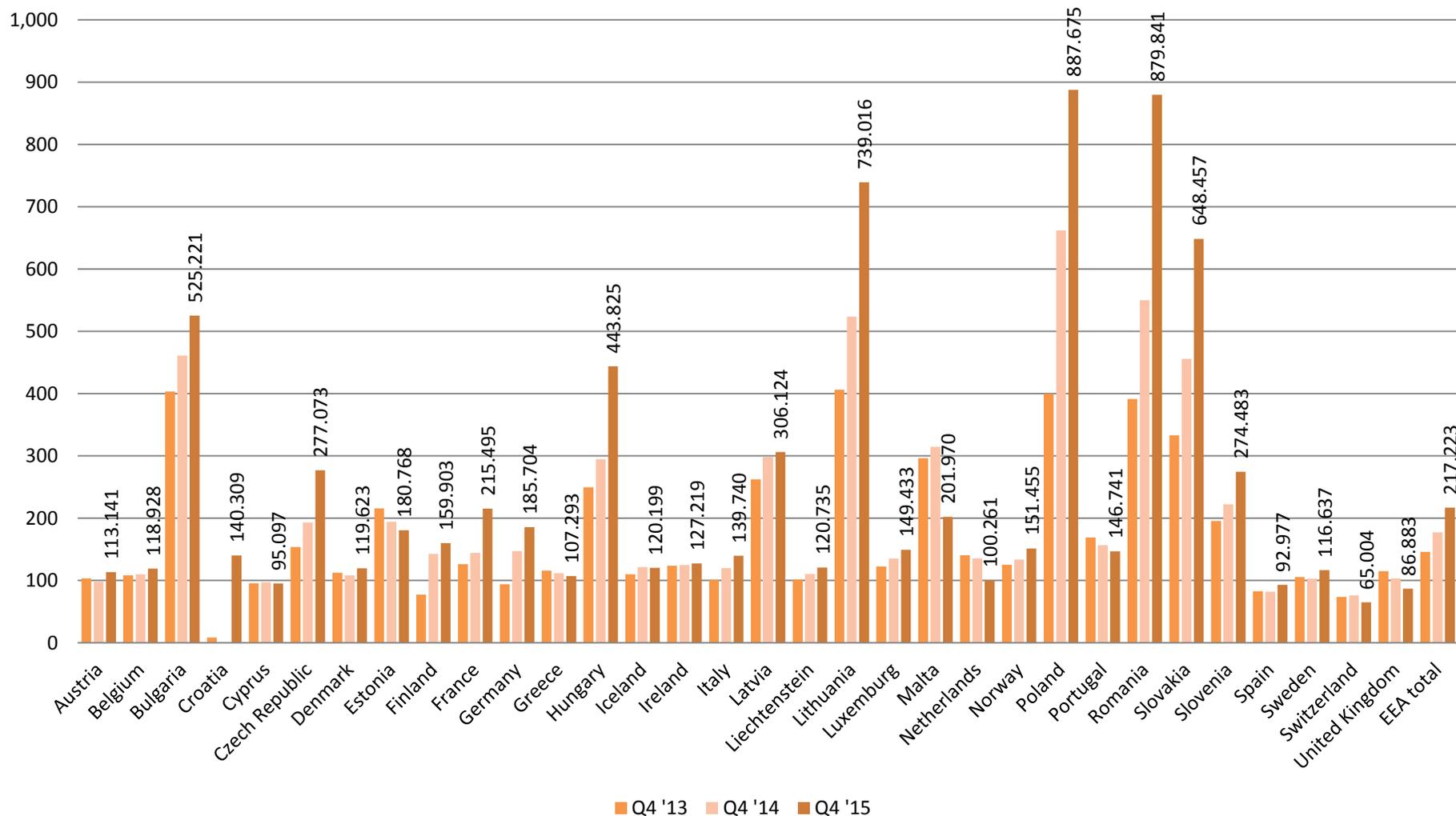
Liechtenstein based on Q4 2012 = 100 and Croatia based on Q4 2013 = 100, Malta: one of the operators was not able to submit data on post-paid volumes

**Figure 17: Outgoing international roaming traffic Index,
intra-EEA roaming calls in Q1 2016
(Q1 2008 = 100)**



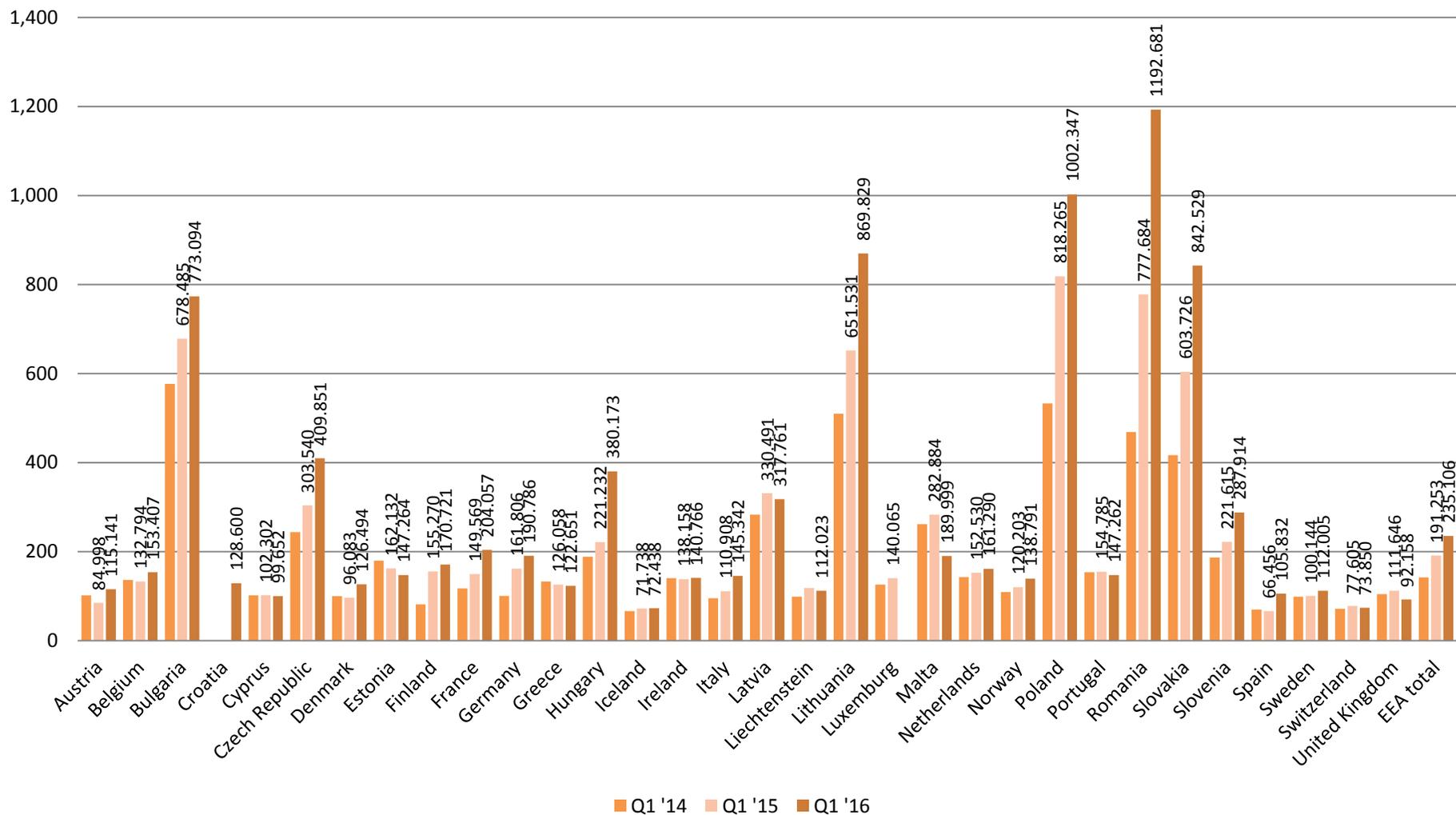
Switzerland based on Q1 2009 = 100, Liechtenstein based on Q1 2013 = 100 and Croatia based on Q1 2014 = 100, Malta: one of the operators was not able to submit data on post-paid volumes

Figure 18: Incoming international roaming traffic Index, intra-EEA roaming calls in Q4 2015 (Q4 2008 = 100)



Switzerland based on Q2 2009 = 100, Liechtenstein based on Q2 2013 = 100 and Croatia based on Q2 2014 = 100, Malta: one of the operators was not able to submit data on post-paid volumes

Figure 19: Incoming international roaming traffic Index, intra-EEA roaming calls in Q1 2016 (Q1 2008 = 100)



Switzerland based on Q3 2009 = 100, Liechtenstein based on Q3 2012 = 100 and Croatia based on Q3 2013 = 100, Malta: one of the operators was not able to submit data on post-paid volumes

5.1.7. Retail and wholesale prices - outside EEA

Figure 20: Average retail price per minute for roaming voice calls made by EEA customers outside EEA Q4 2015

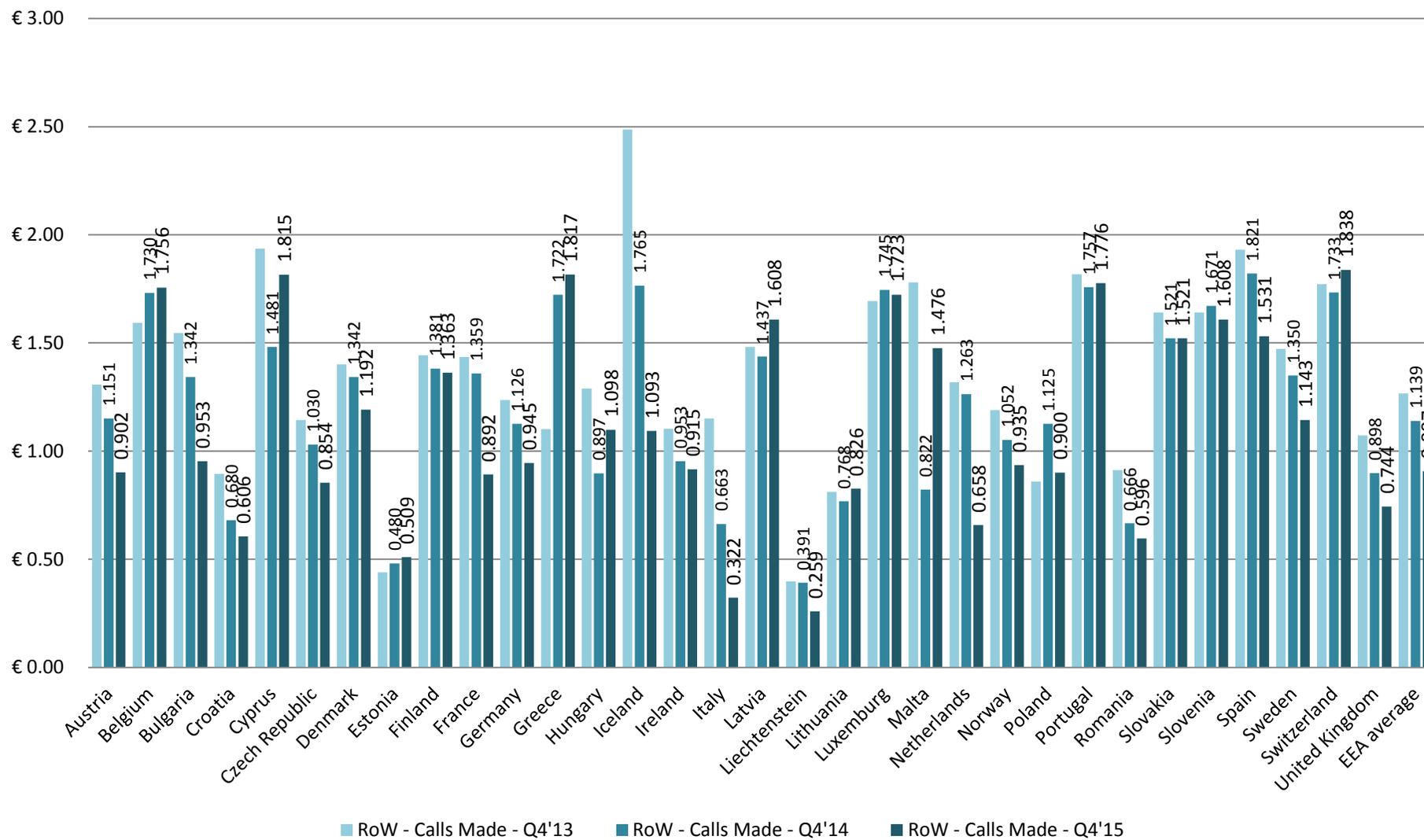


Figure 21: Average retail price per minute for roaming voice calls made by EEA customers outside EEA Q1 2016

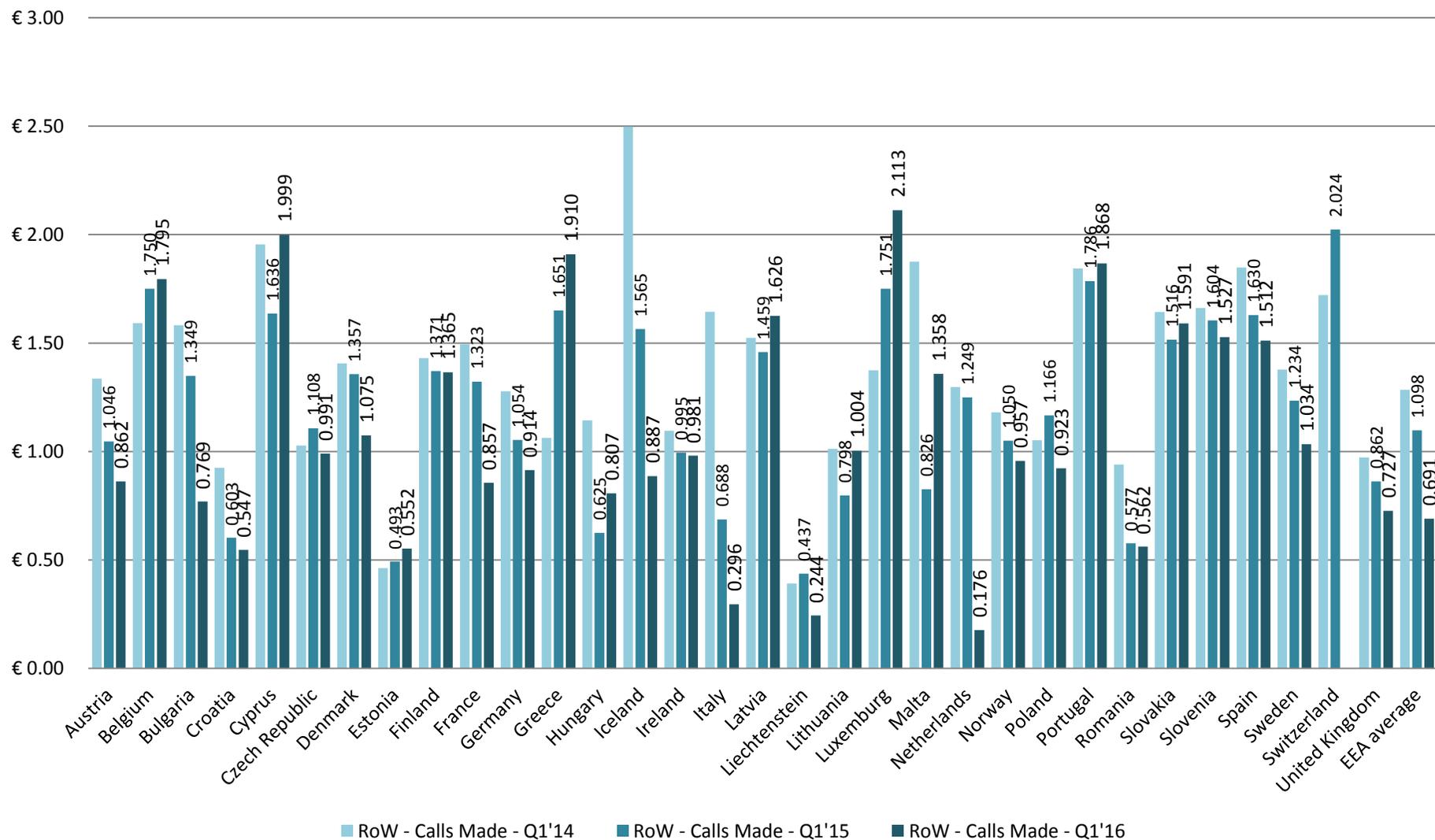


Figure 22: Average retail price per minute roaming voice calls received by EEA customers outside EEA Q4 2015

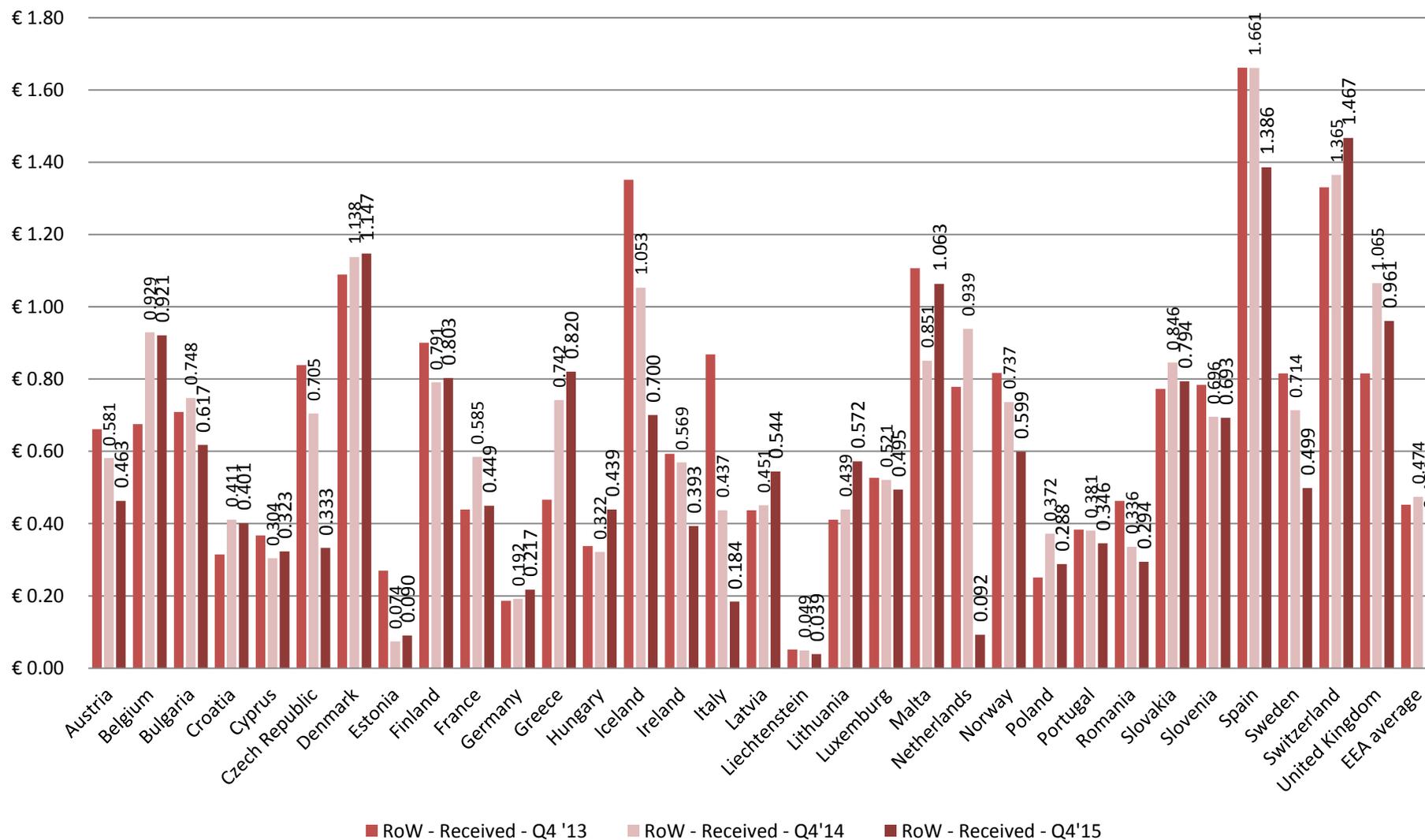


Figure 23: Average retail price per minute roaming voice calls received by EEA customers outside EEA Q1 2016

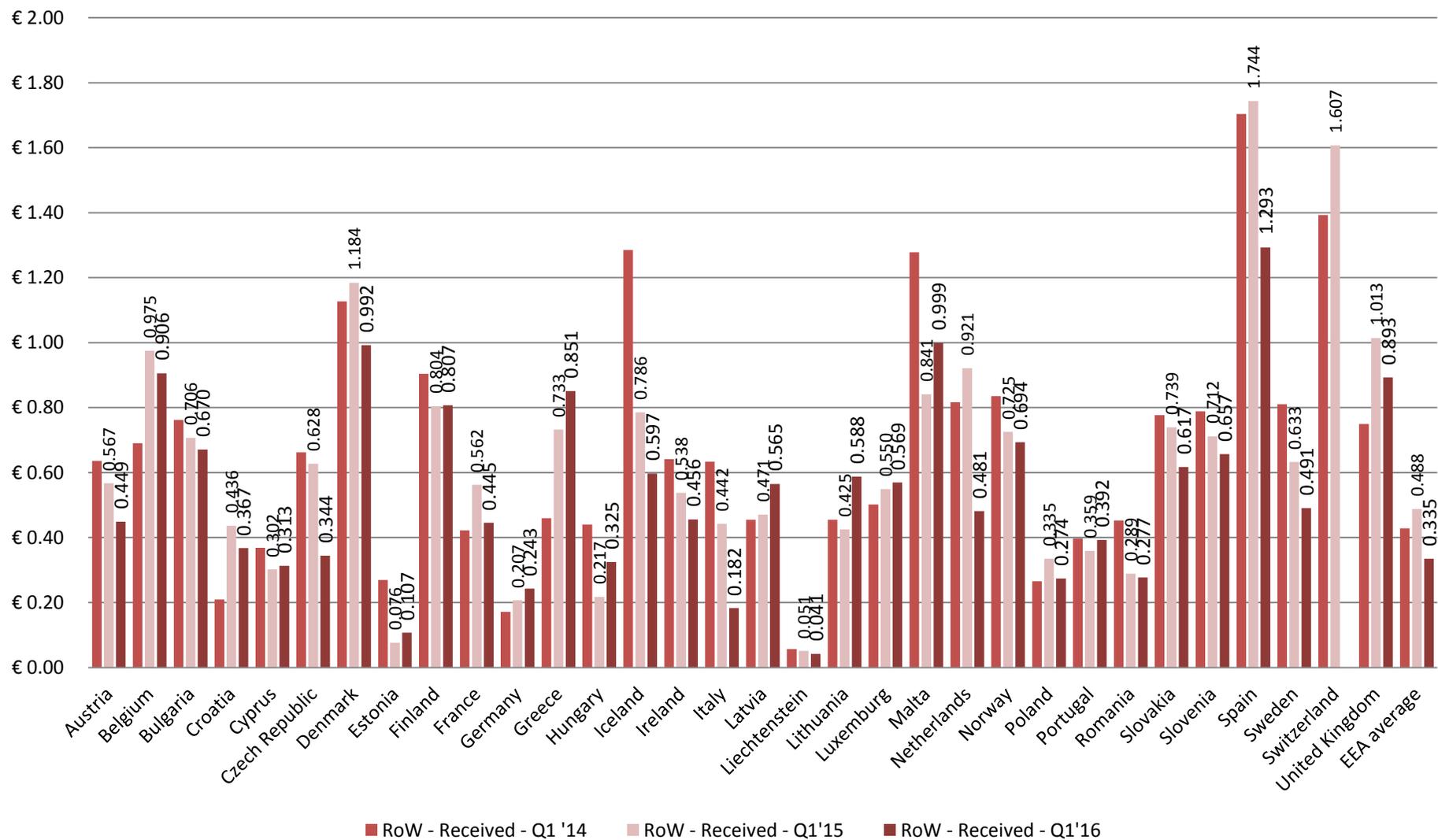
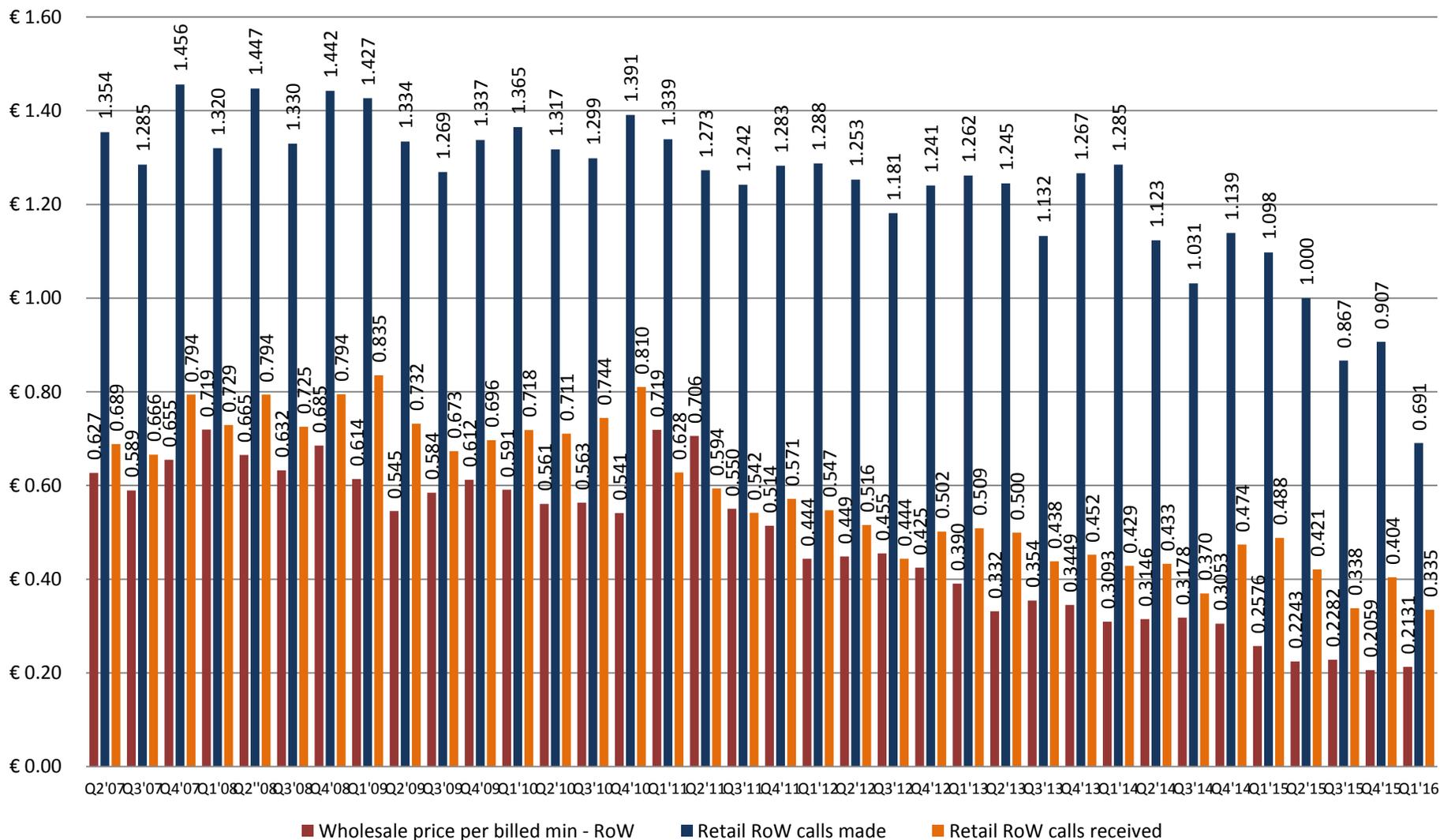


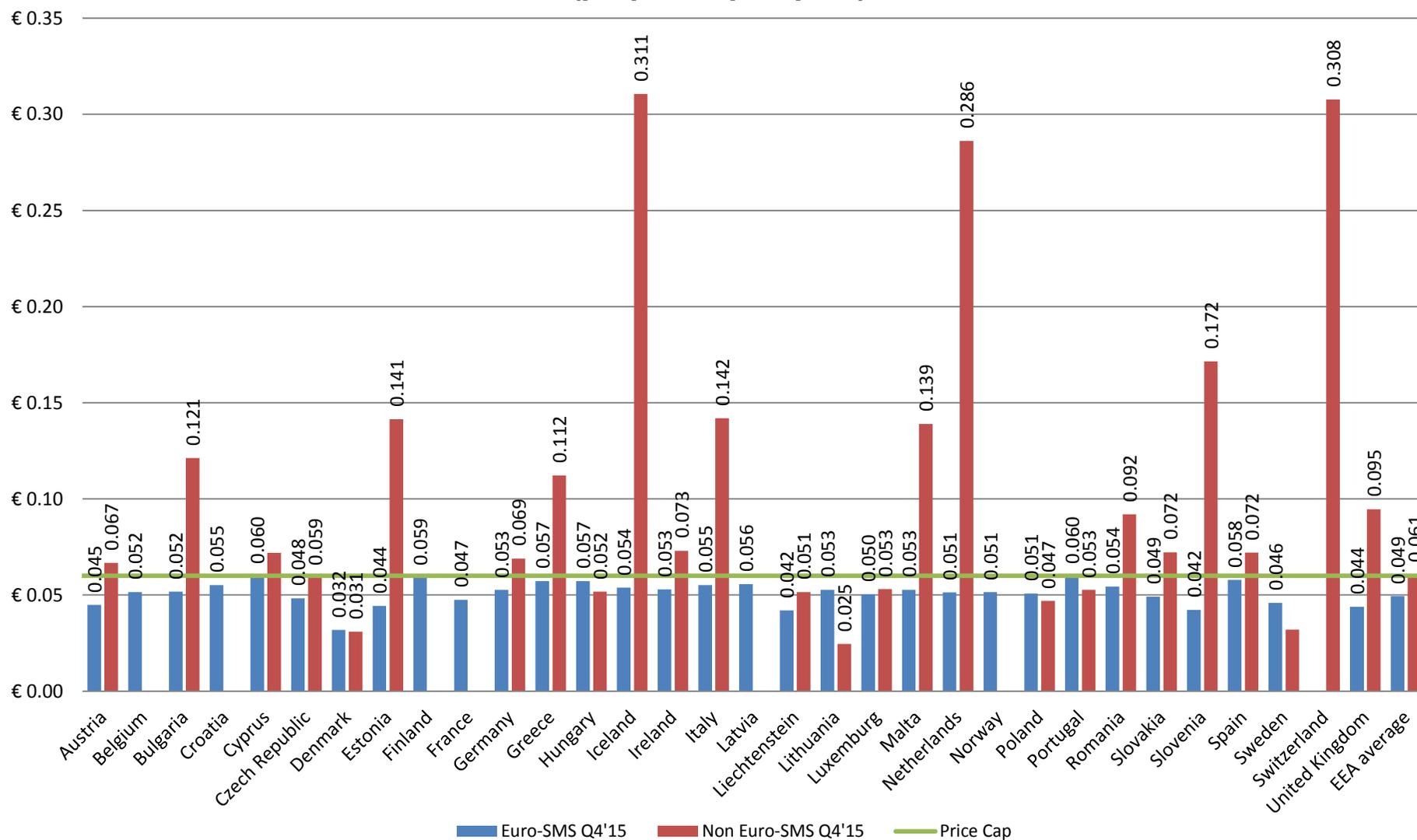
Figure 24: Average wholesale and retail prices for roaming calls made and received by EEA customers outside EEA (EU only for Q2 2009 - Q1 2010)



5.2. SMS roaming services

5.2.1. Retail prices

**Figure 25: Average price for Euro-SMS and Non Euro-SMS in Q4 2015
(prepaid + postpaid)**



**Figure 26: Average price for Euro-SMS and Non Euro-SMS in Q1 2016
(prepaid + postpaid)**

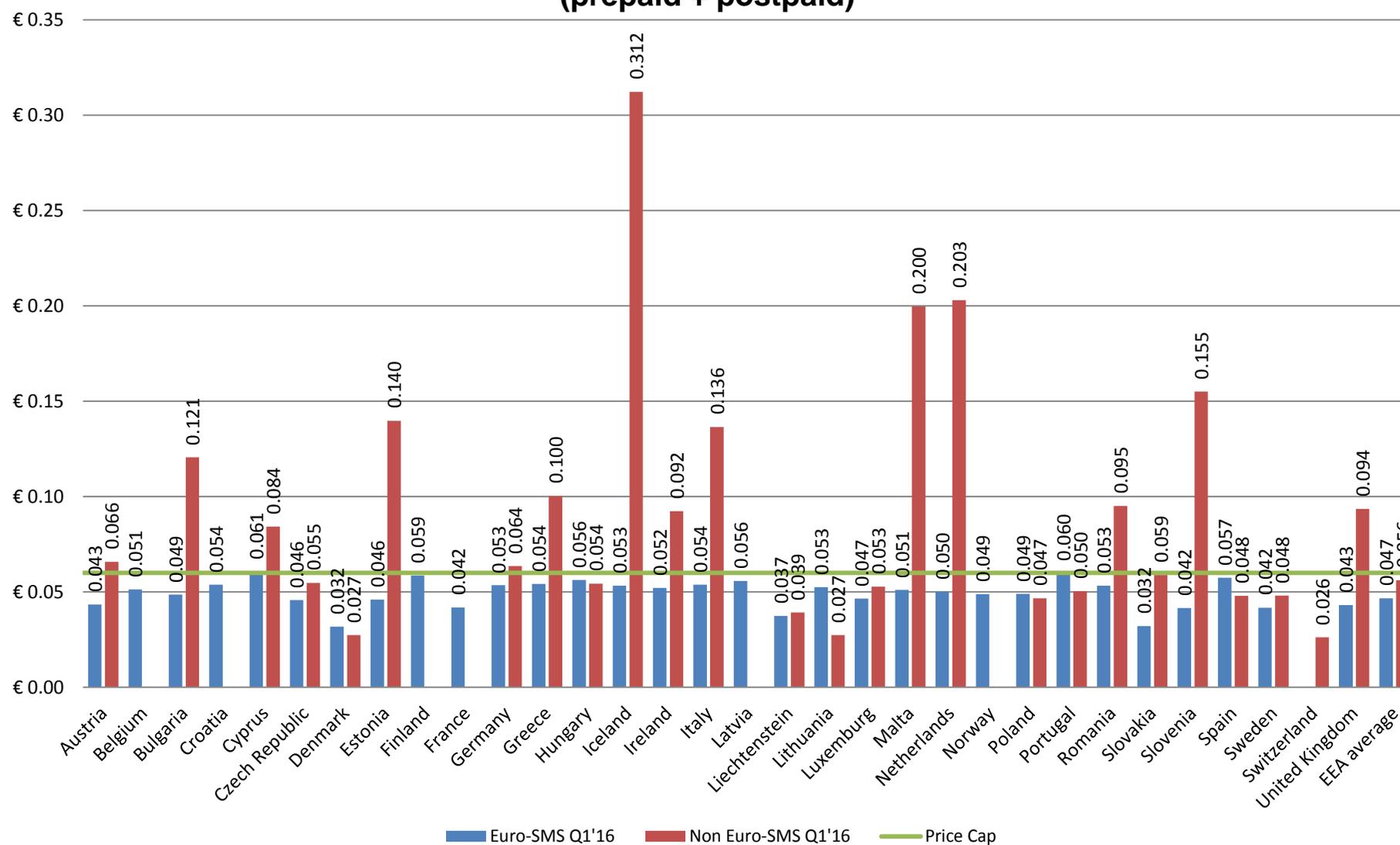
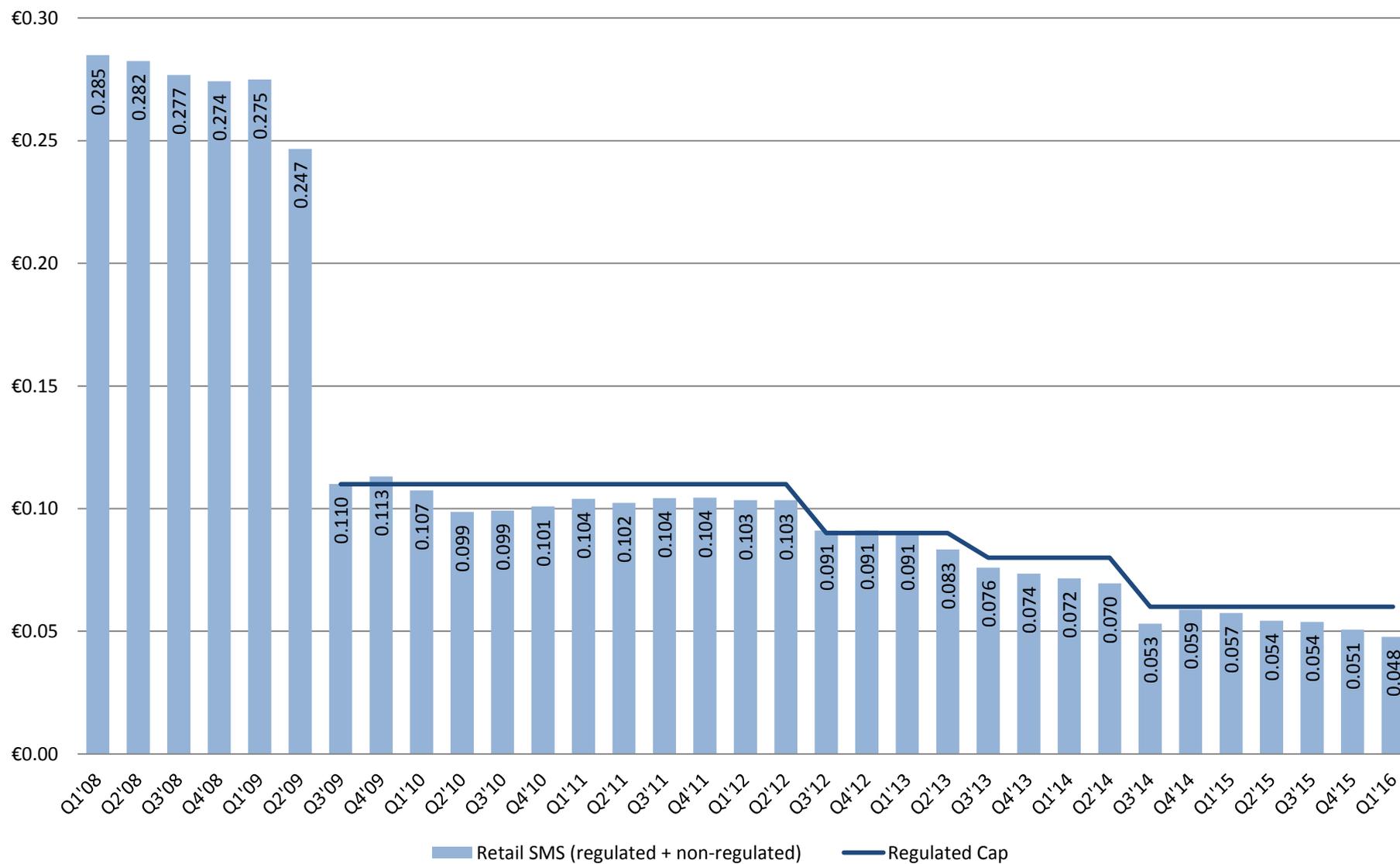


Figure 27: Average EEA price per retail SMS (Euro + Non Euro SMS tariffs)



5.2.2. Wholesale prices

Figure 28: Average wholesale price per intra-EEA roaming SMS: charges to non-group companies

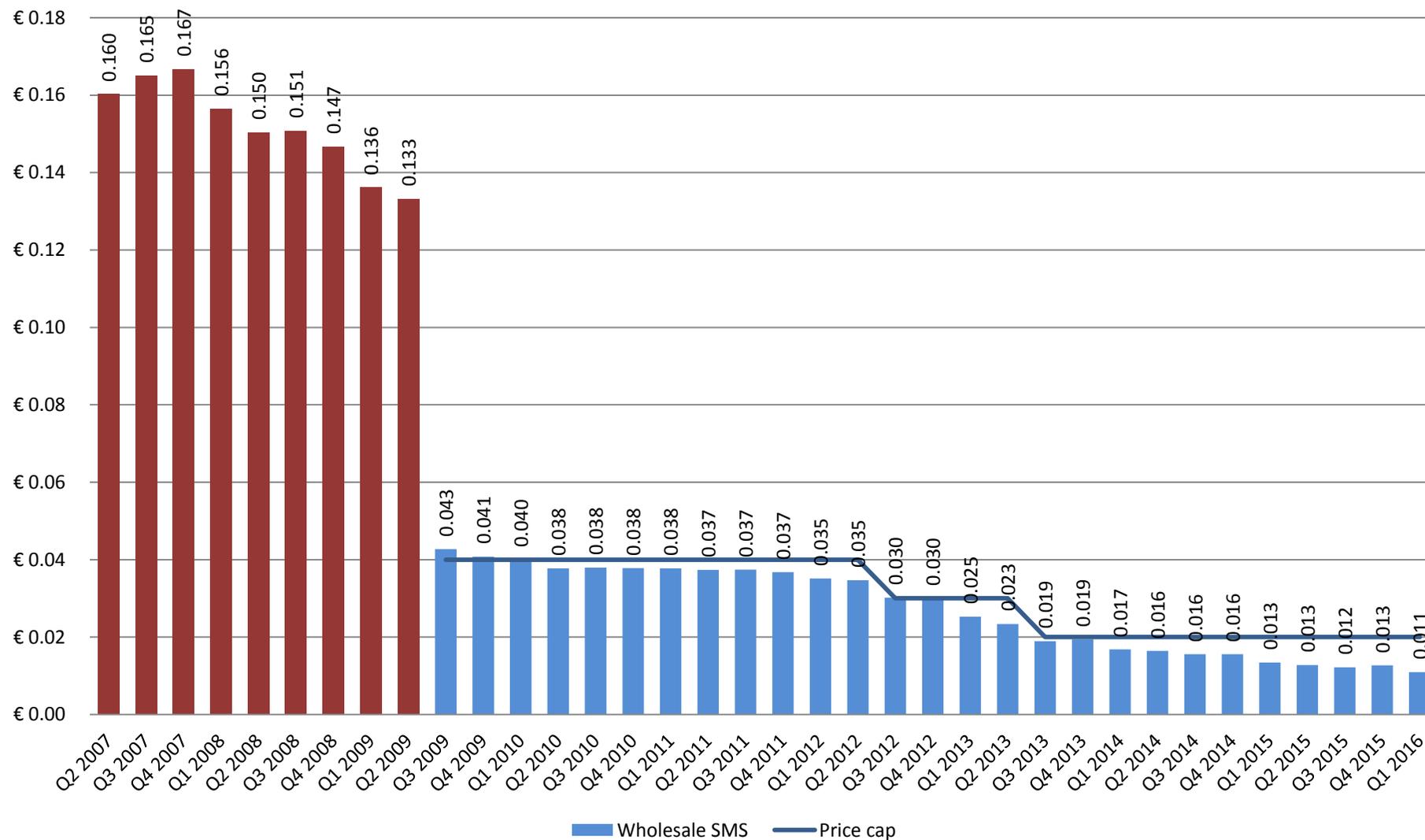


Figure 29: Average wholesale price per intra-EEA roaming SMS: charges to non-group companies in Q4 2015

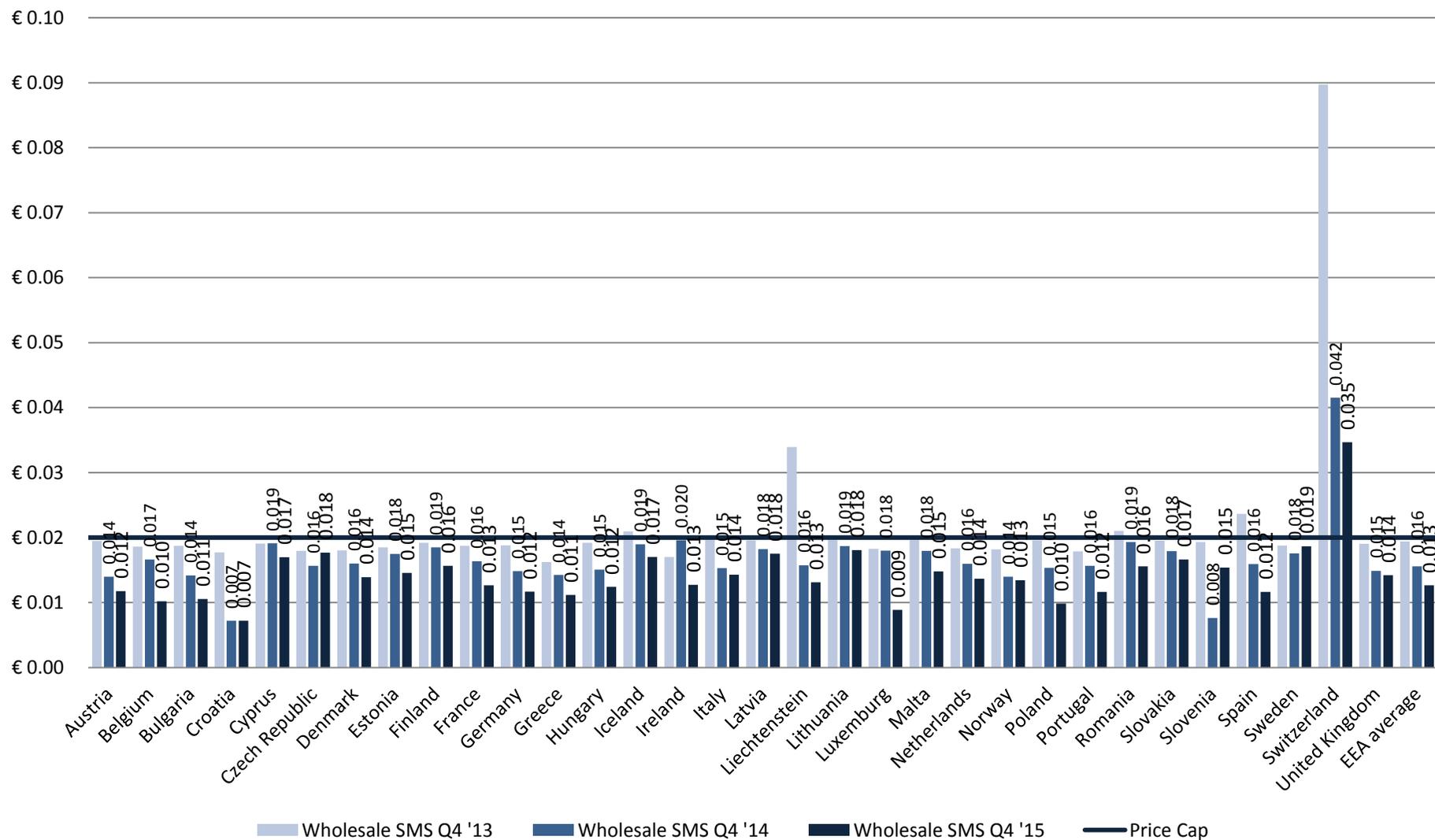
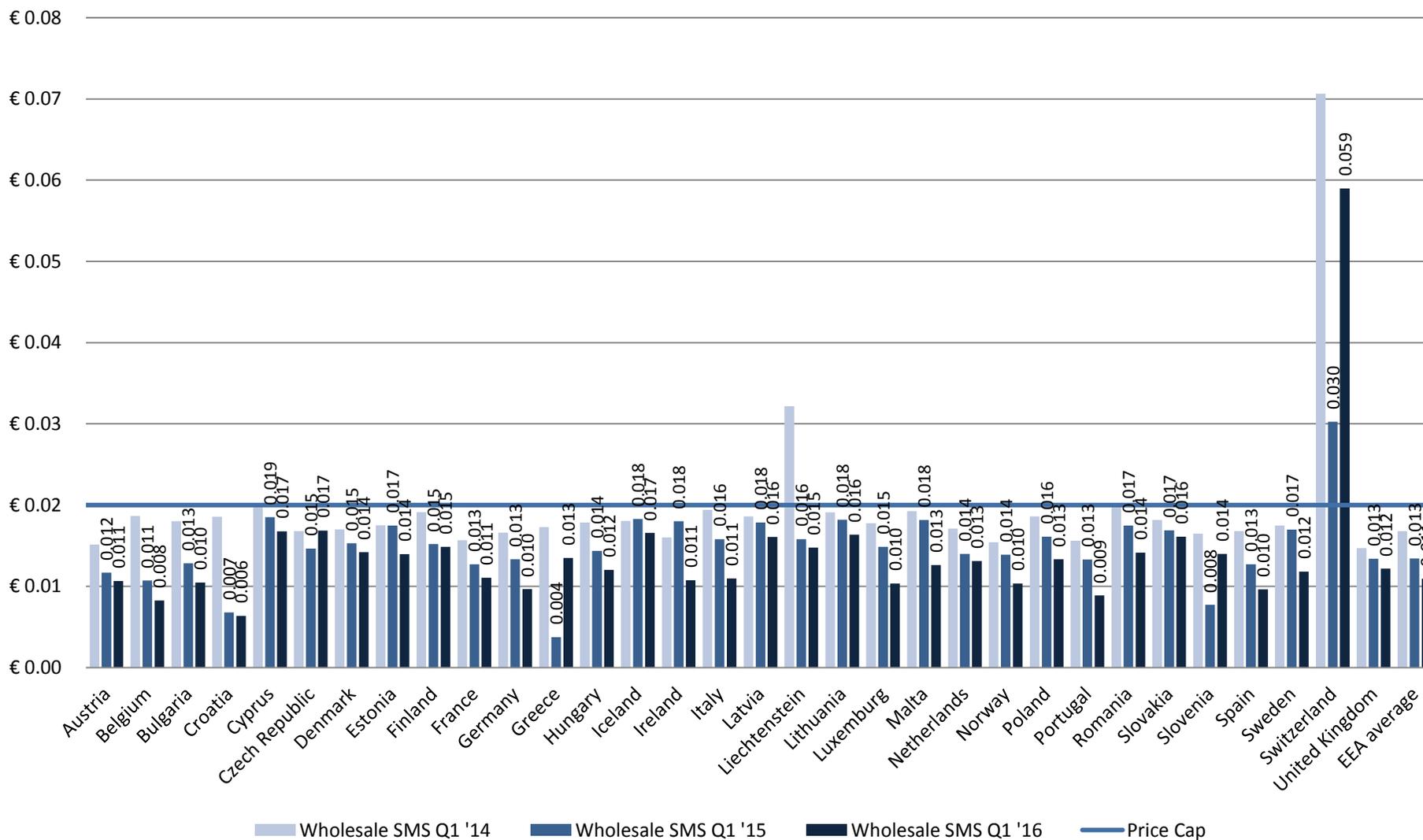
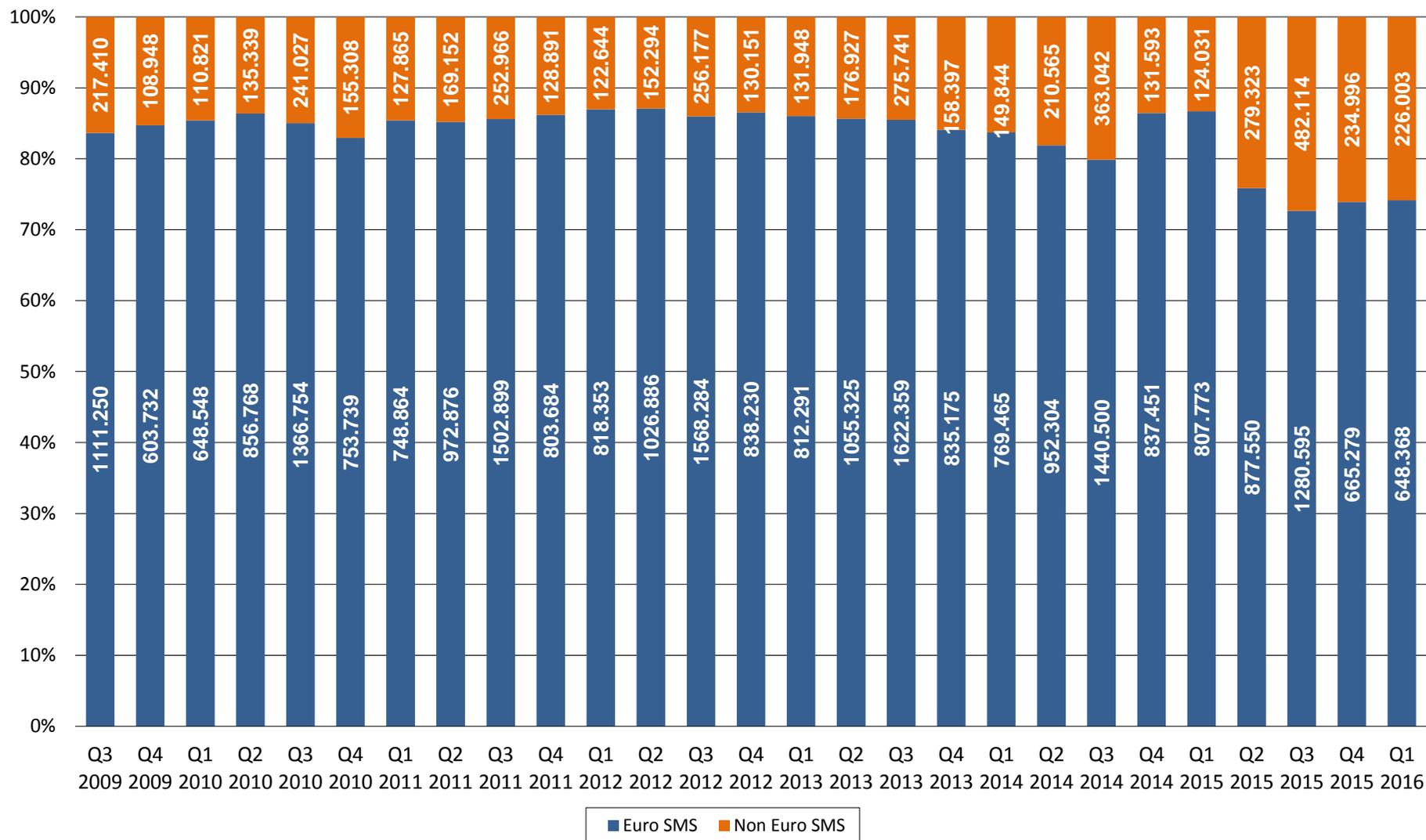


Figure 30: Average wholesale price per intra-EEA roaming SMS: charges to non-group companies in Q1 2016



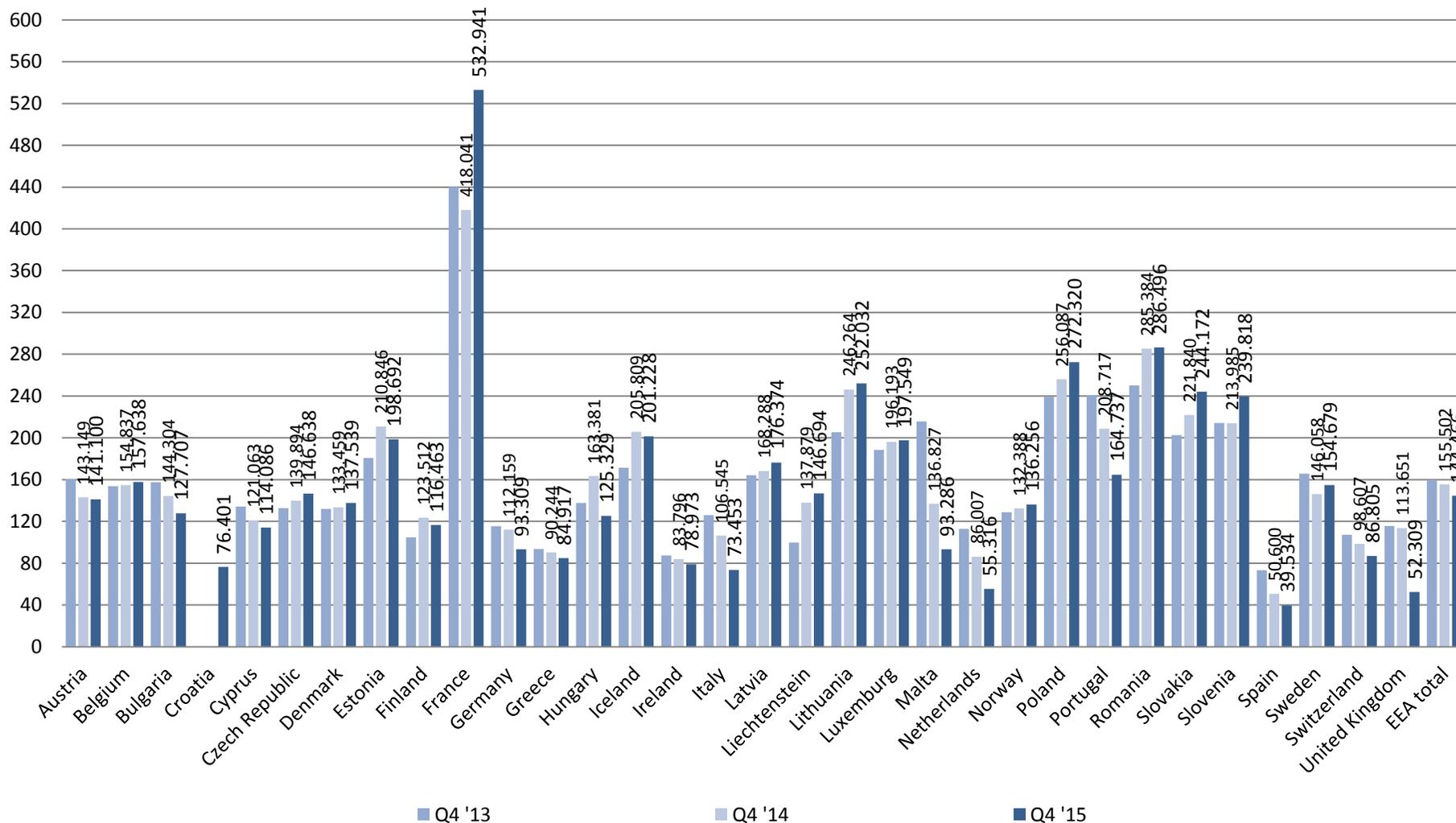
5.2.3. Percentage of SMS from alternative tariffs on total roaming SMS messages

**Figure 31: EEA percentage of SMS messages: Euro SMS and Non Euro SMS
(millions of messages)**



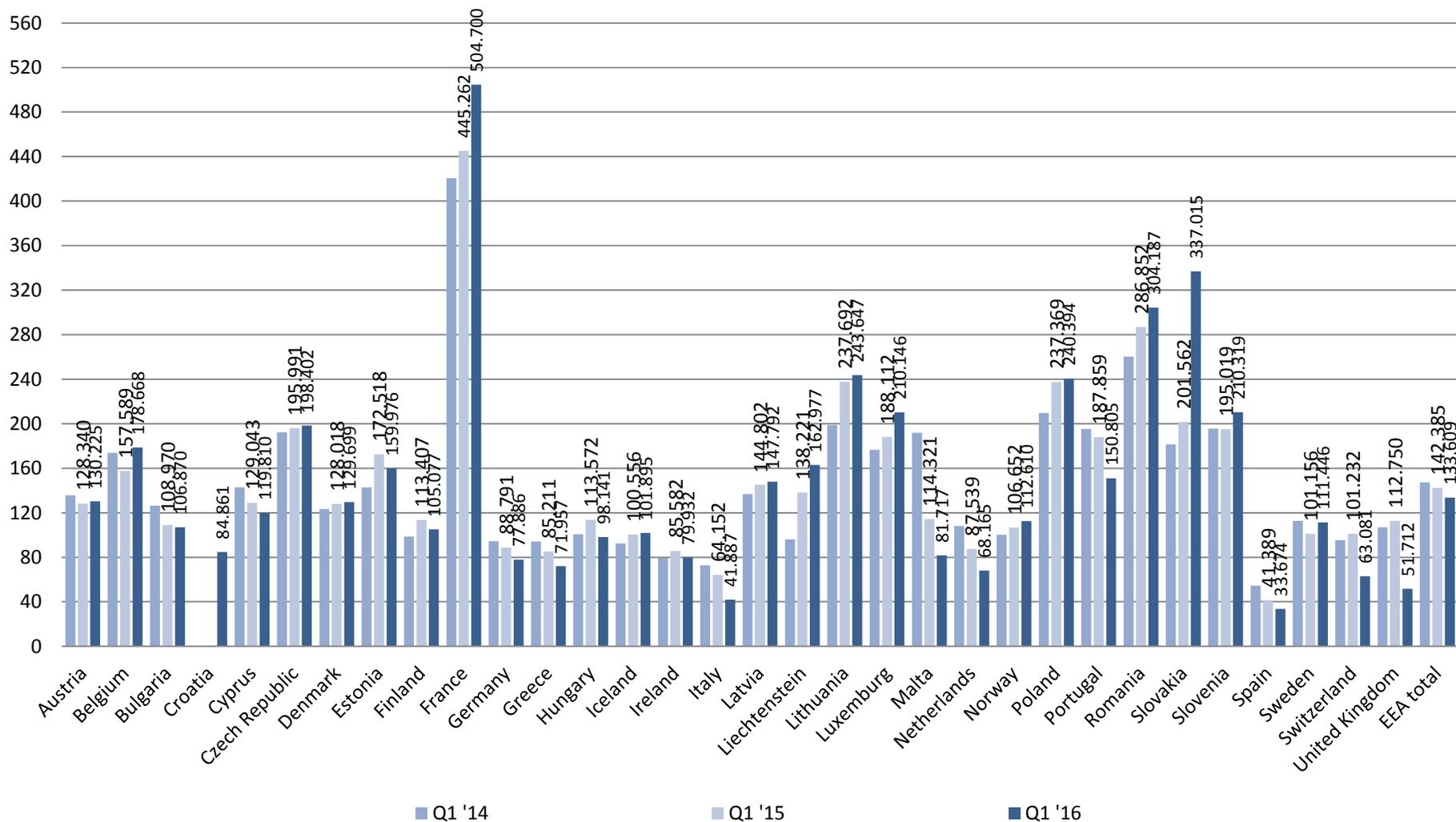
5.2.4. Volumes of retail roaming SMS

**Figure 32: Retail SMS sent traffic Index
Q4 2015
(Q4 2008 = 100)**



Liechtenstein based on Q4 2012 = 100 and Croatia based on Q4 2013 = 100, Malta: one of the operators was not able to submit data on post-paid volumes

**Figure 33: Retail SMS sent traffic Index
Q1 2016
(Q1 2008 = 100)**



Switzerland based on Q1 2009 = 100, Liechtenstein based on Q1 2013 = 100 and Croatia based on Q1 2014 = 100, Malta: one of the operators was not able to submit data on post-paid volumes

5.3. Data roaming services

5.3.1. Retail prices

Figure 34: Average retail data price per Mb in Q4 2015 (prepaid+postpaid)

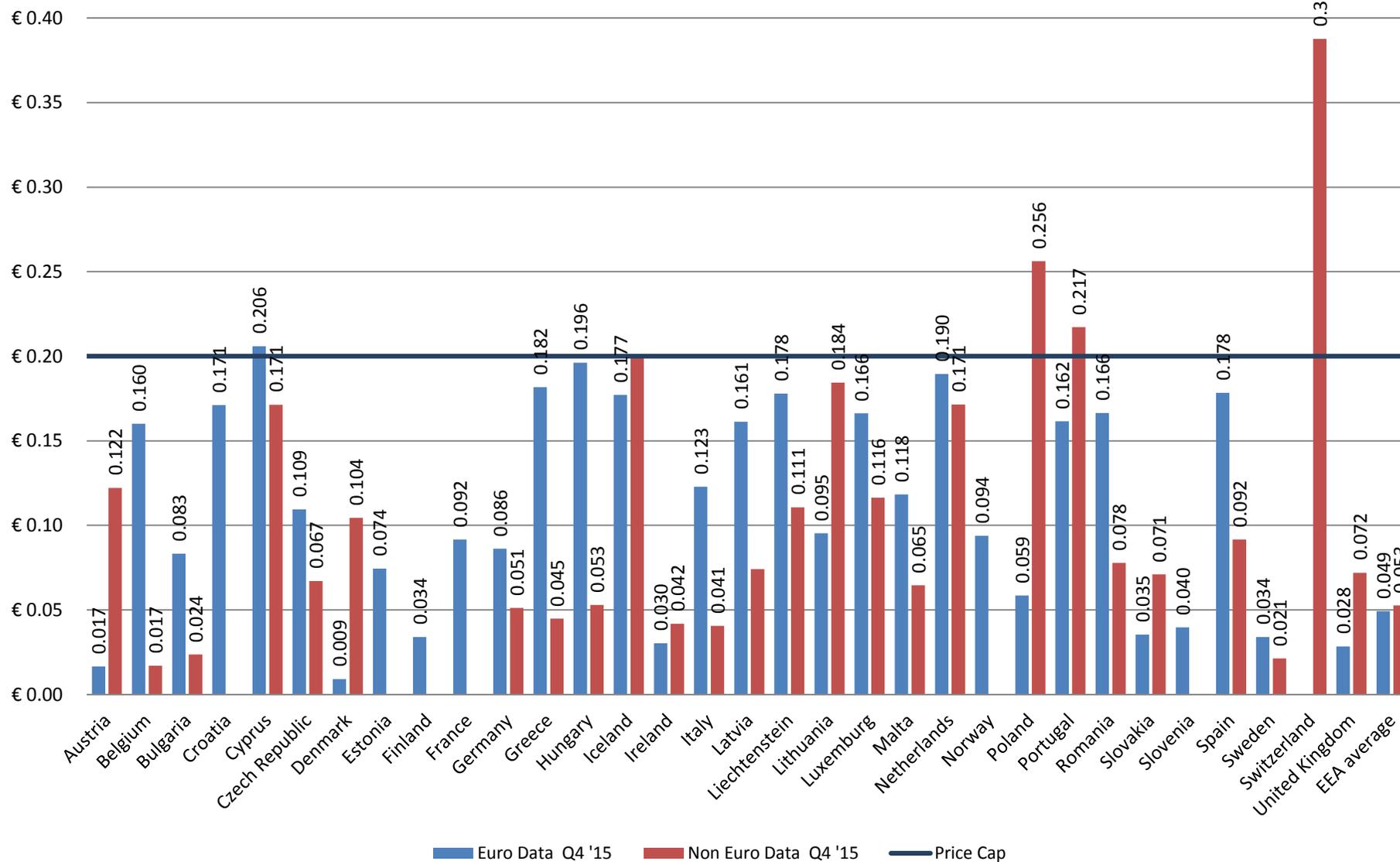


Figure 35: Average retail data price per Mb in Q1 2016 (prepaid+postpaid)

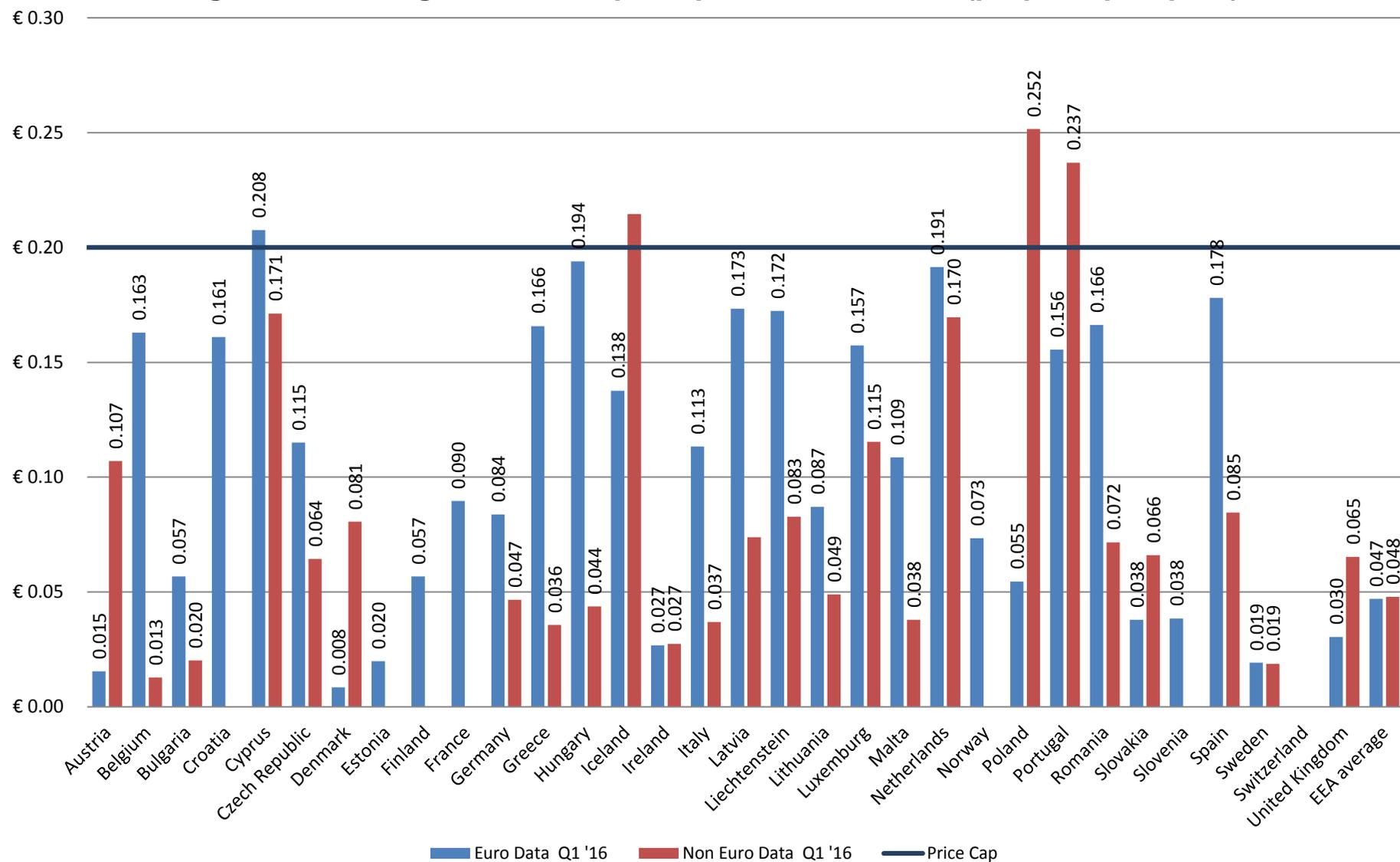
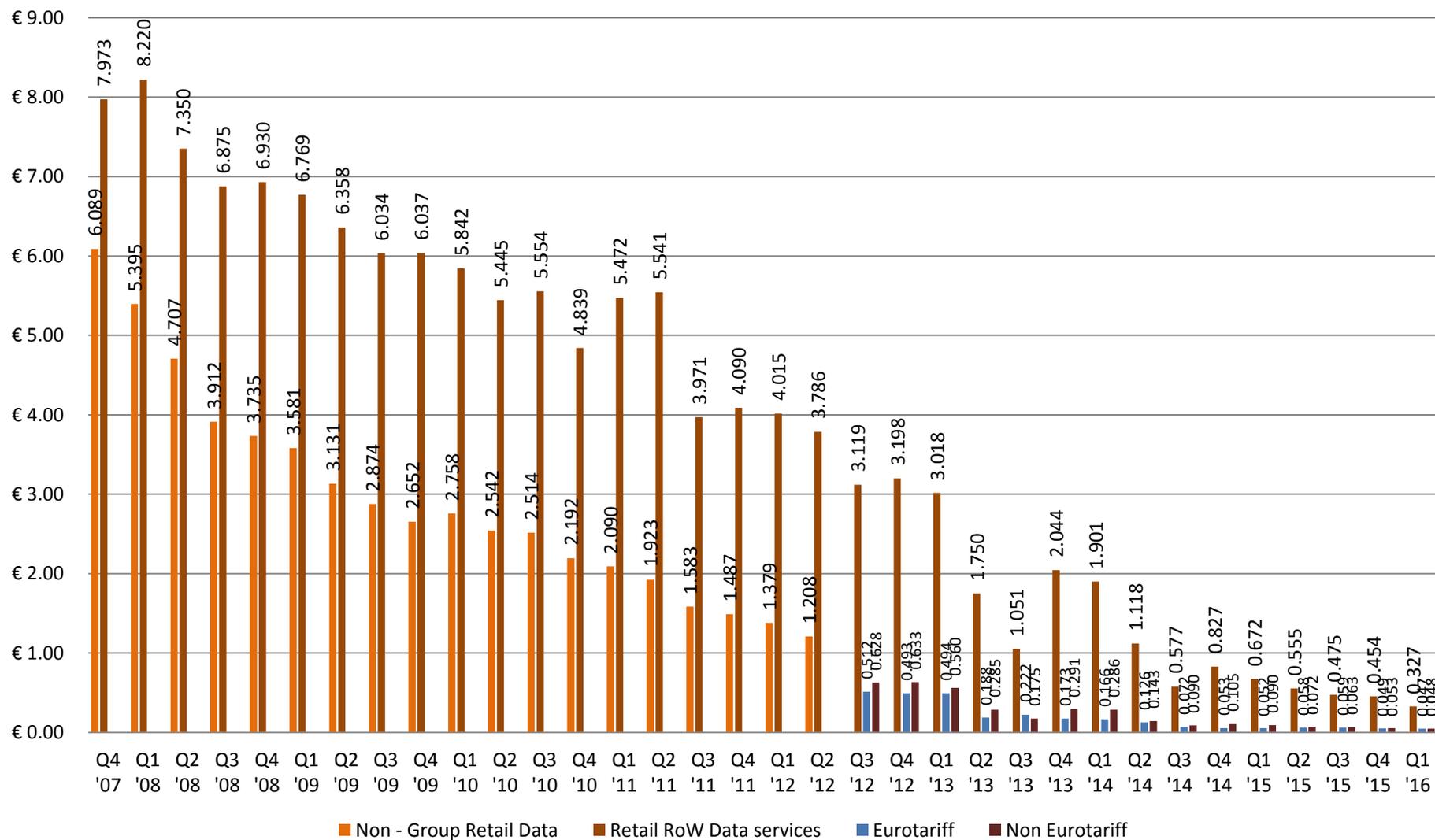


Figure 36: EEA average price per Mb for retail EU/EEA and RoW data (Eurotariff and Non Eurotariff: prepaid + postpaid)



5.3.2. Wholesale prices

**Figure 37: Average wholesale data price per Mb (prepaid+postpaid)
EEA average**

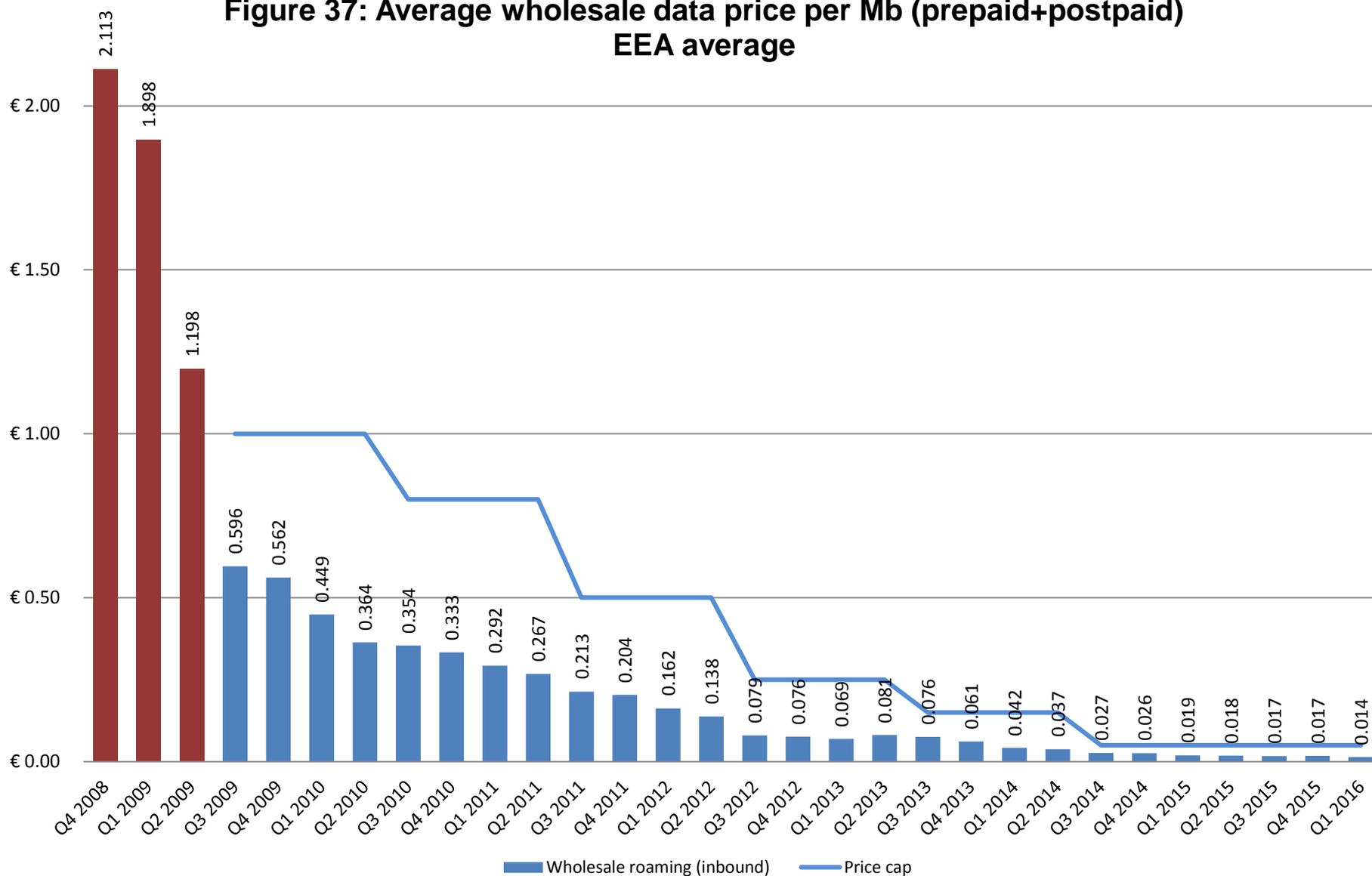
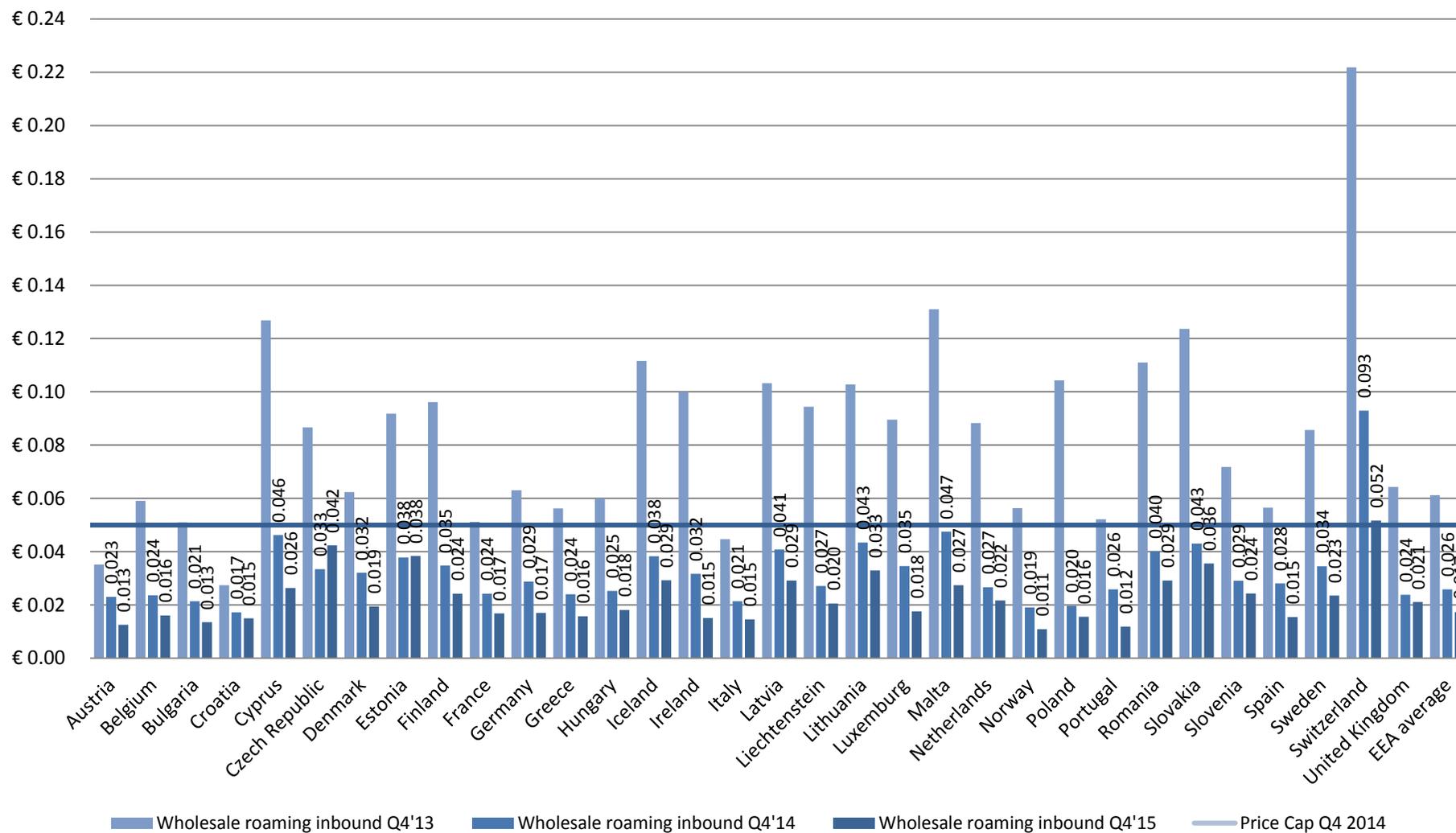
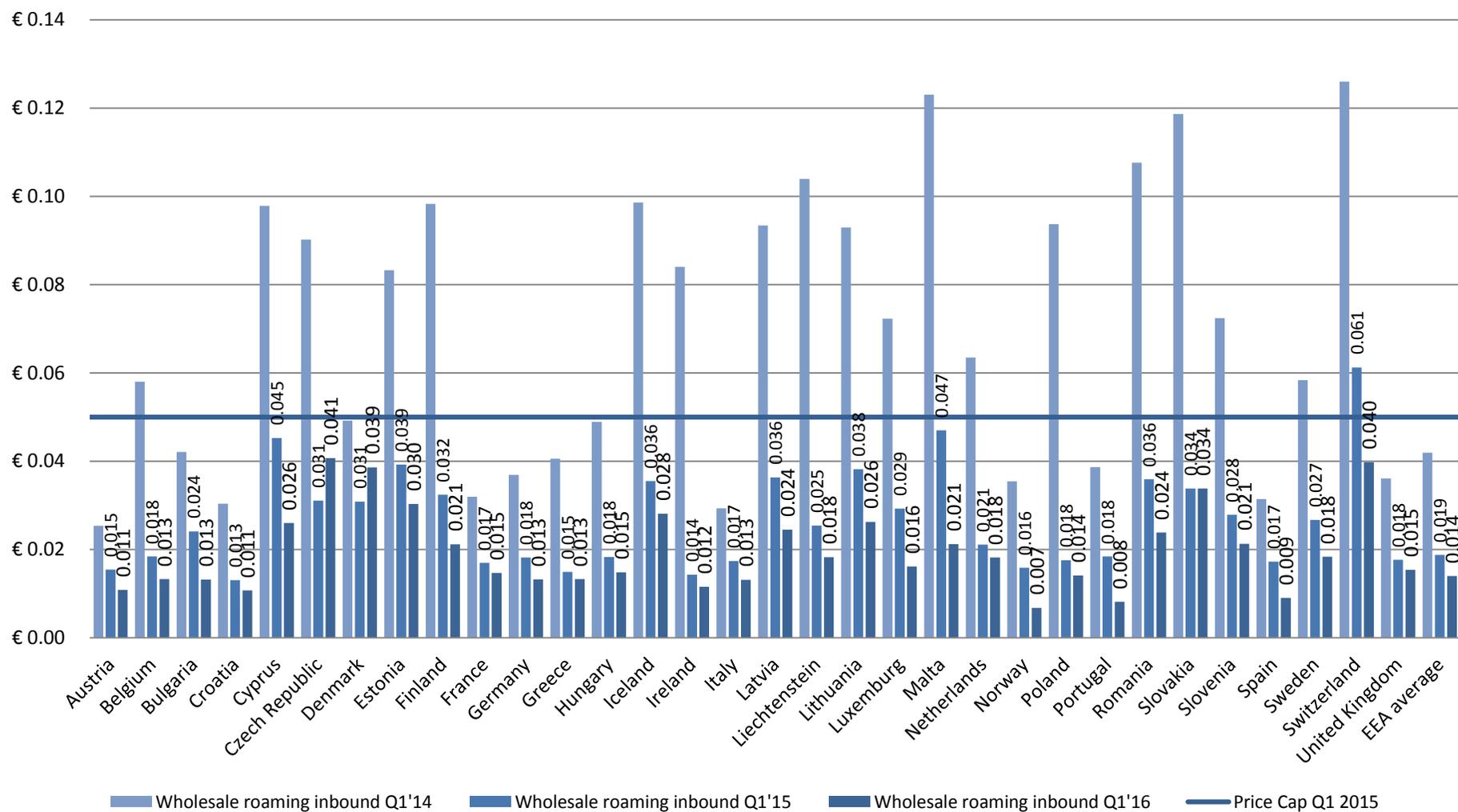


Figure 38: Average wholesale data price per Mb in Q4 2015 (prepaid+postpaid)

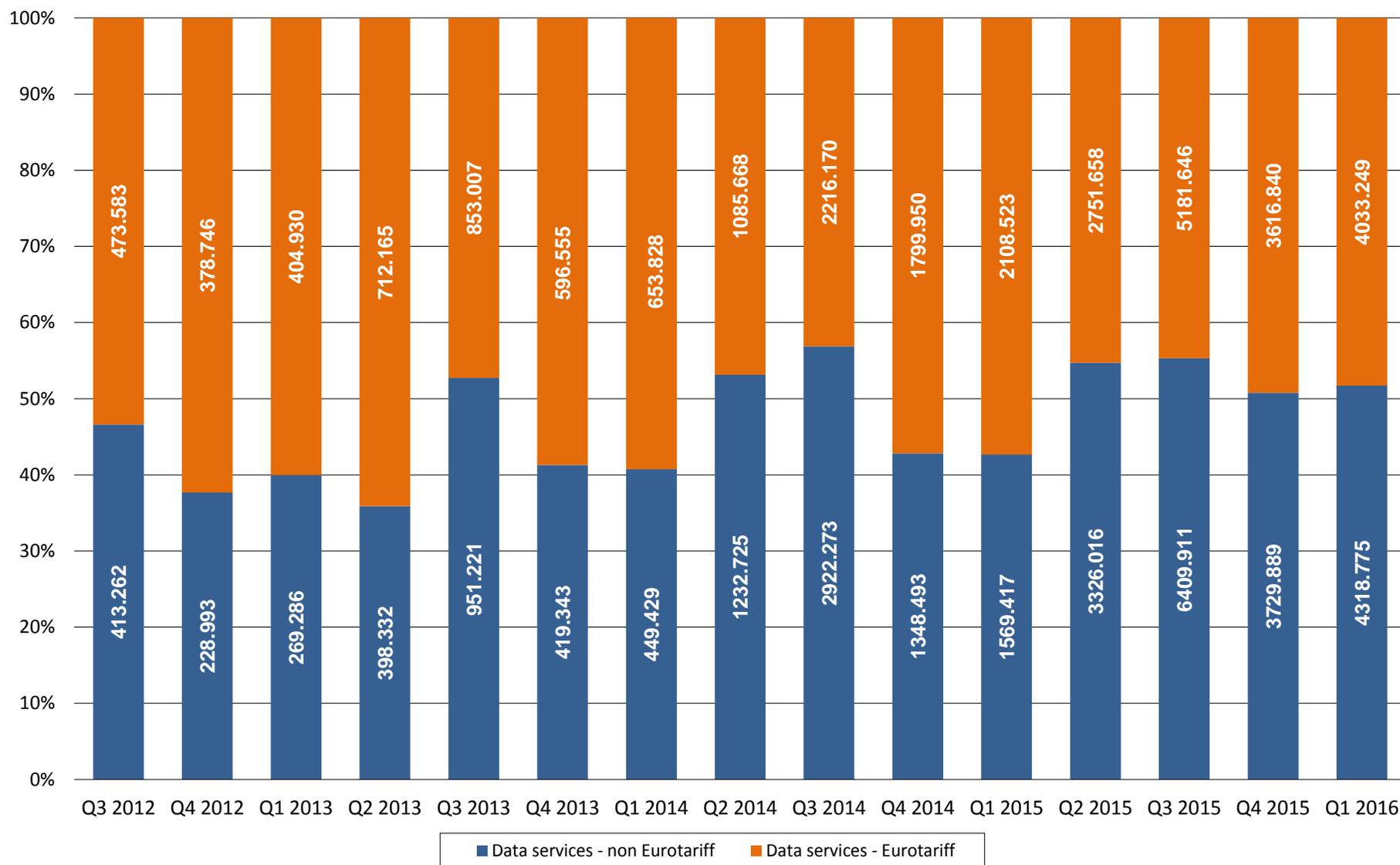


**Figure 39: Average wholesale data price per Mb in Q1 2016
(prepaid+postpaid)**



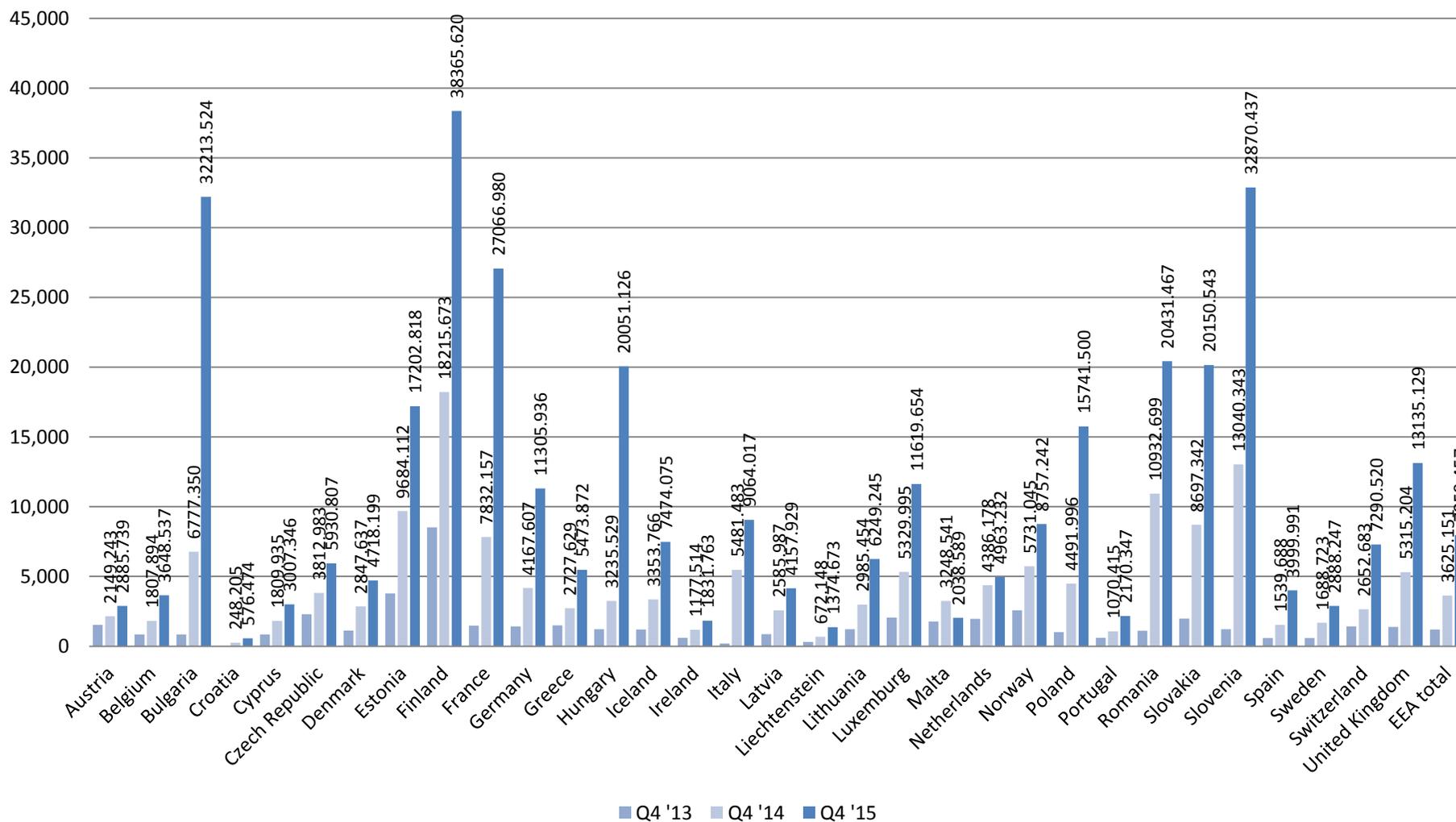
5.3.3. Percentage of volumes of data from alternative tariffs over total data roaming volumes

Figure 40: EEA percentage of Data service: Eurotariff and Non Eurotariff



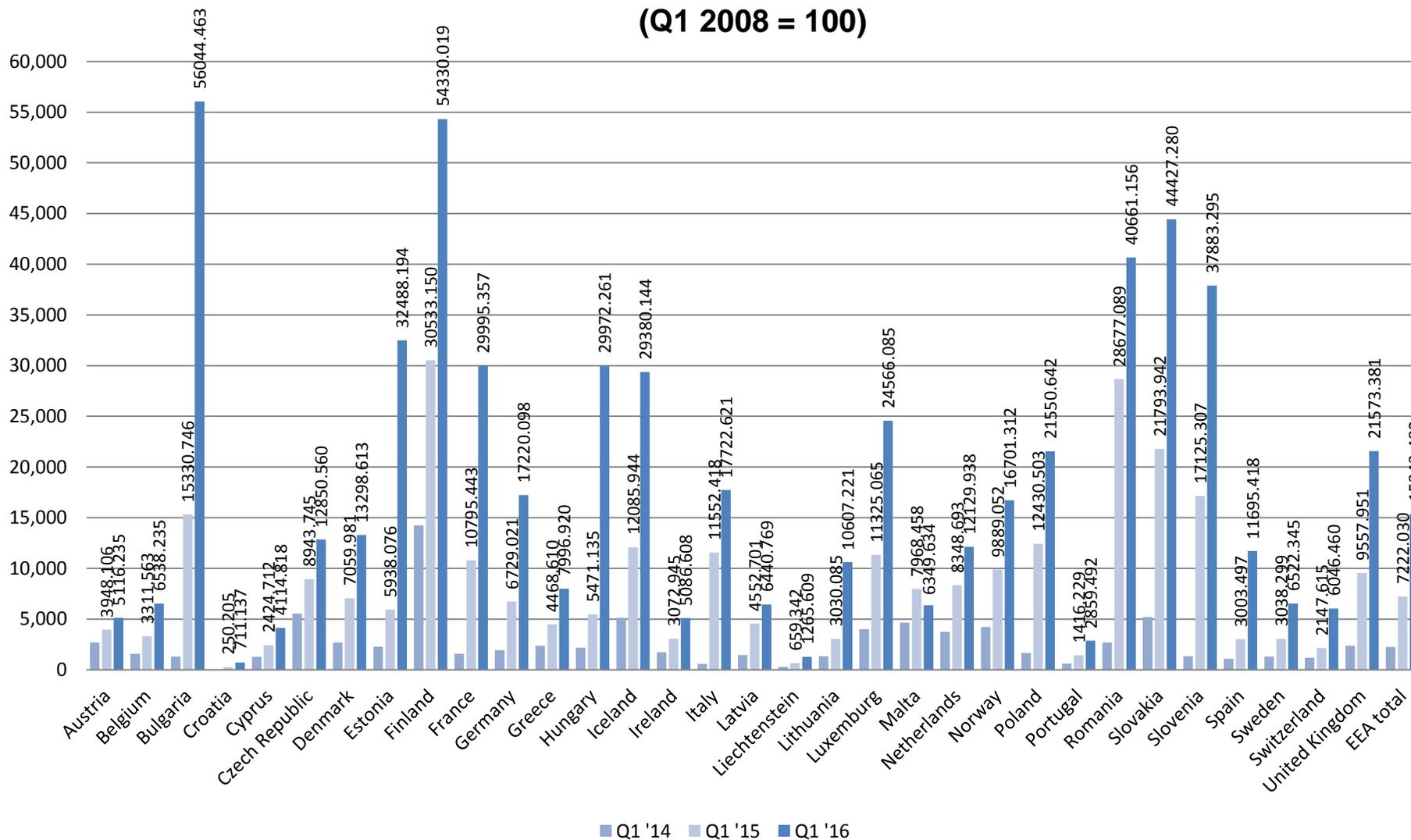
5.3.4. Volumes of retail data services

**Figure 41: Retail data traffic Index (prepaid+postpaid)
Q4 2015
(Q4 2008 = 100)**



Liechtenstein based on Q4 2012 = 100 and Croatia based on Q4 2013 = 100, Malta: one of the operators was not able to submit data on post-paid volumes

**Figure 42: Retail data traffic Index (prepaid+postpaid)
Q1 2016
(Q1 2008 = 100)**



Switzerland based on Q1 2009 = 100, Liechtenstein based on Q1 2013 = 100 and Croatia based on Q1 2014 = 100, Malta: one of the operators was not able to submit data on post-paid volumes

5.4. Wholesale roaming (outbound): Agreements applying Article 3 of the Roaming Regulation

Figure 43: Wholesale averages outbound roaming: Voice: Agreements applying Article 3 Roaming Regulation

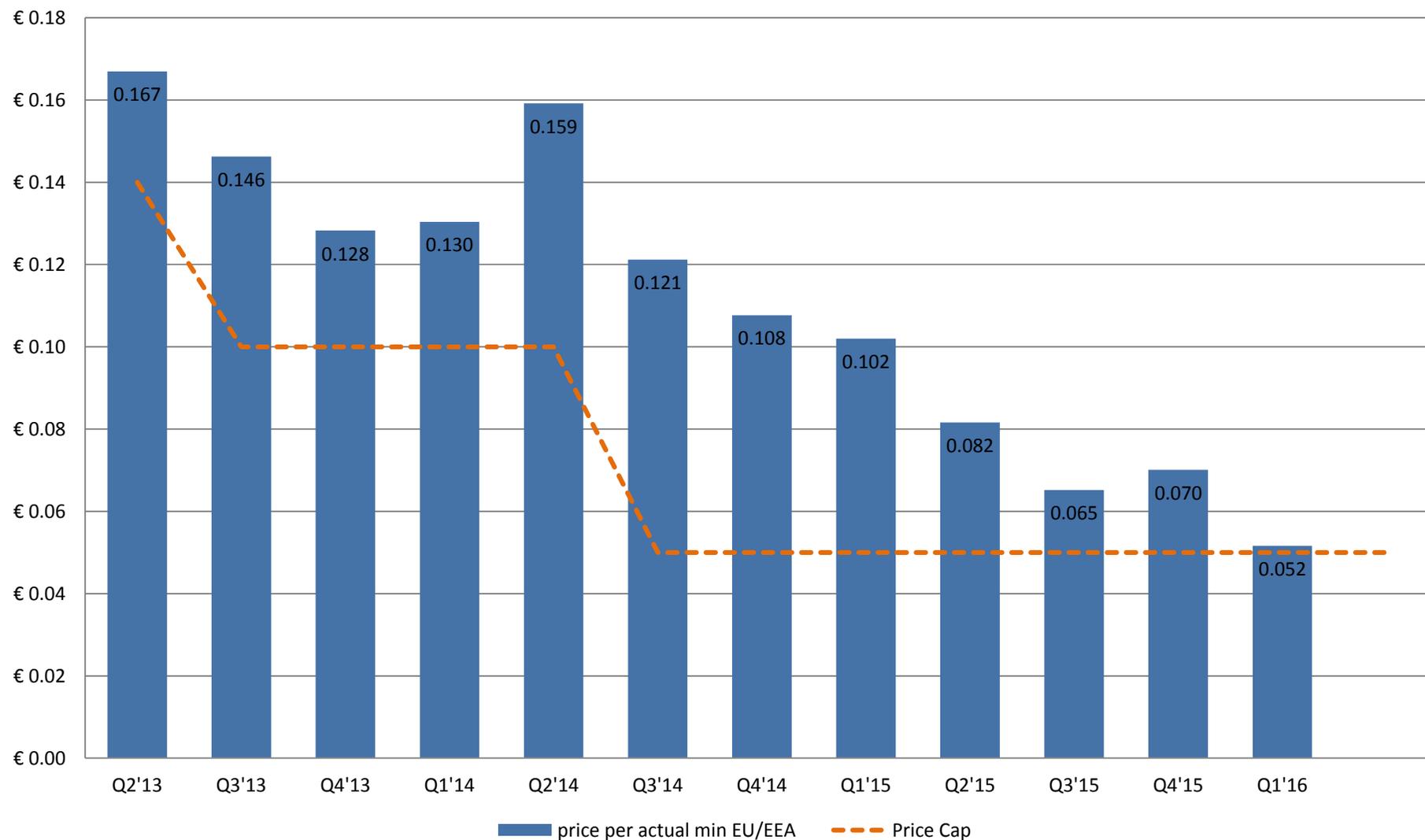


Figure 44: Wholesale averages outbound roaming: SMS Agreements applying Article 3 Roaming Regulation

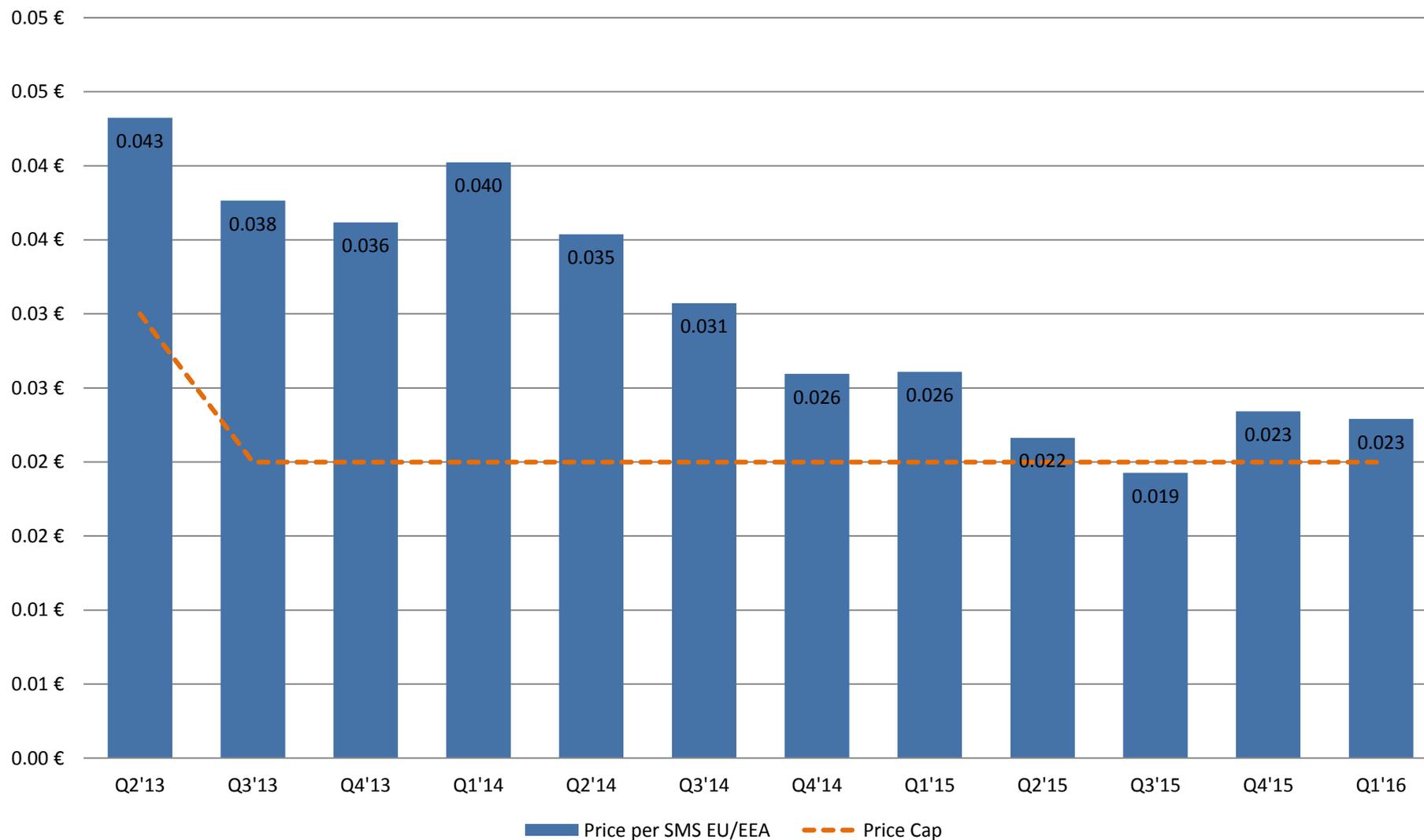
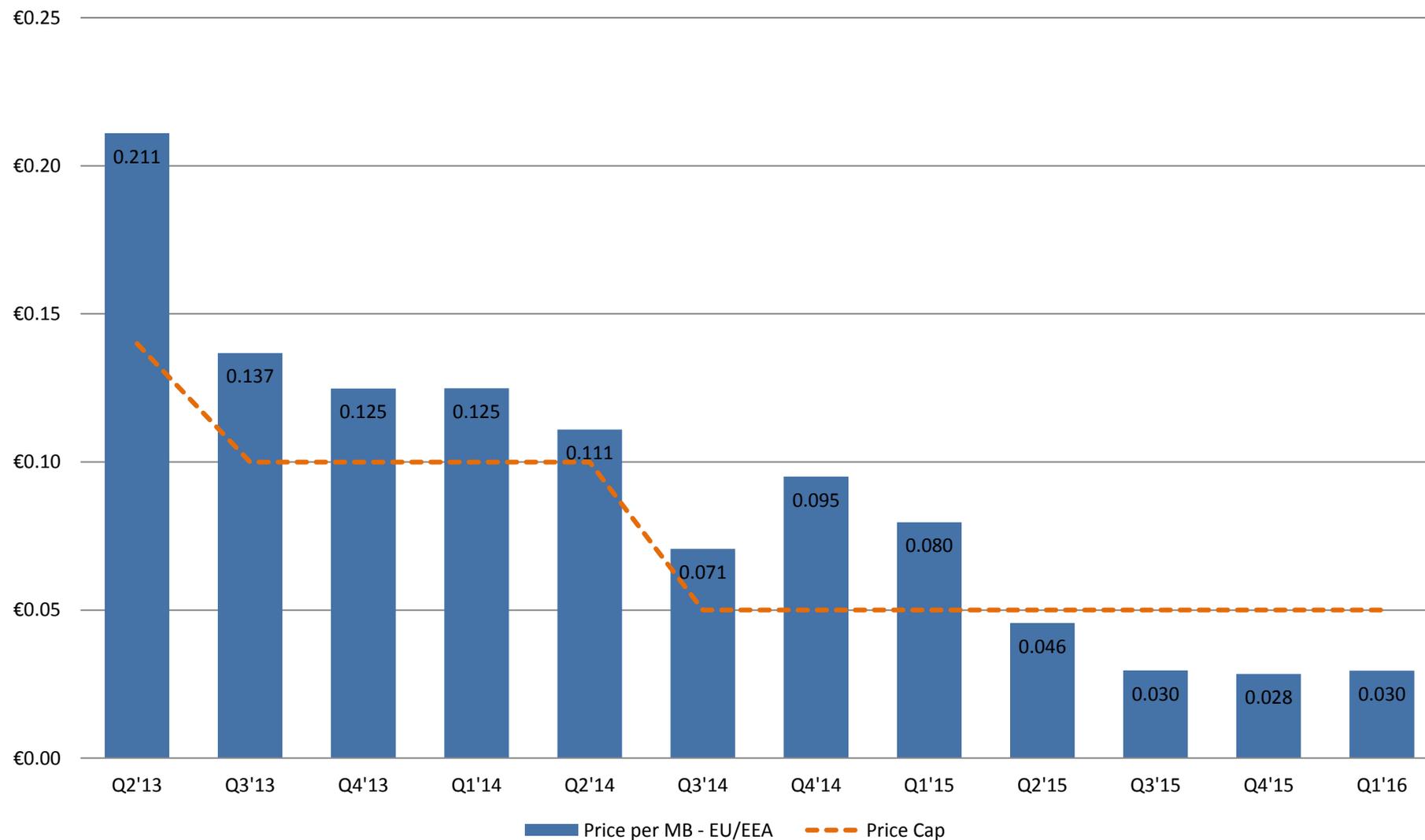


Figure 45: Wholesale EEA average outbound roaming: DATA, Agreements applying Article 3 Roaming Regulation



List of respondents

Operators that provided data for the period 1 October
2015 – 31 March 2016:

Austria

A1 Telekom Austria
ATK
HoT Telekom
Hutchison 3G Austria
Lycamobile
Mass Response
Russmedia
Tele2
T-Mobile Austria

Belgium

Belgacom Mobile
KPN Group Belgium (Base
Orange Belgium

Bulgaria

Bulgarian Telecommunication Company
(Vivacom)
Telenor Bulgaria
Mobiltel

Croatia

Hrvatski Telekom
Vipnet
Tele2

Cyprus

Cyta
MTN Cyprus
Primetel

Czech Republic

O2 Family
Moraviatel
ČEZ Prodej
DH Telecom
O2 Czech Republic
Relax Mobil
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
TeliaSonera Finland

France

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

Germany

Telefónica Germany
Telekom Deutschland
Vodafone D2

Greece

COSMOTE Mobile
Vodafone Panafon
Wind HellasTelecommunications
CYTA Hellas

Hungary

Telenor Magyarország
T-Mobile
Vodafone Magyarország
UPC

Iceland

Nova
Síminn
Vodafone Iceland

Ireland

Eircom Limited/E Mobile
Hutchison 3G Ireland
Meteor Mobile Communications
Tesco Mobile Ireland
Vodafone Ireland

Italy

Telecom Italia
Vodafone
WIND
H3G
Poste Mobile
Fastweb
Tiscali
ERG Mobile
Digi Italy
GREE ICN
Lyca Mobile

Latvia

Bite Latvia
Latvijas Mobilais Telefons
Tele2

Liechtenstein

Datamobile
Salt (Liechtenstein)
Telecom Liechtenstein
Swisscom (Schweiz)

Lithuania

Bitė Lietuva
Eurocom
Omnitel
Tele2
Teledema

Luxembourg

Entreprise des postes et télécommunications
Post Télécom
Tango
Orange Communications Luxembourg

Luxembourg Online Mobile
Transatel Lux.

Malta

Melita Mobile
Mobisile Communications (GO Mobile)
Vodafone Malta

Netherlands

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

Norway

Telenor
Tel
Phonero
Lyca

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.
LycaMobile Portugal, Lda
Mundio Mobile (Portugal) Limited

Romania

Telekom RMC
Orange Romania
RCS&RDS
Vodafone Romania
Telekom RC

Slovak Republic

O2 Slovakia
Orange Slovensko

Slovak Telekom
SWAN Mobile

Slovenia

Debitel
Izi mobil
Si.mobil
T-2
Telekom Slovenije
Telemach
Tušmobil

Spain

Euskaltel
Orange
TelefónicaMóviles de España
Vodafone
Yoigo

Sweden

Hi3G Access
Telenor Sverige
TeliaSonera
Tele2 Sverige

Switzerland

Orange Communications
Sunrise Communications
Swisscom (Schweiz)

United Kingdom

3 UK
O2 UK
Everything Everywhere
Vodafone UK
Tesco Mobile
Virgin Mobil