



REPORT ON THE SEASONALITY OF WHOLESALE DATA ROAMING SERVICES IN SPAIN

7 July 2016

INF/DTSA/088/16

REPORT ON THE SEASONALITY VARIATION OF WHOLESALE DATA ROAMING SERVICES IN SPAIN

INF/DTSA/088/16

REGULATORY OVERSIGHT CHAMBER

Chairwoman

María Fernández Pérez

Directors

Eduardo García Matilla
Clotilde de la Higuera González
Diego Rodríguez Rodríguez
Idoia Zenarrutzabeitia Beldarraín

Chamber Secretary

Miguel Sánchez Blanco, Deputy Secretary

Madrid, 7 July 2016

The Regulatory Oversight Chamber agrees to issue the following report on the seasonality of wholesale data roaming service in the Spanish market and its impact on mobile networks.

TABLE OF CONTENTS

I. BACKGROUND	5
I.1 CNMC RESPONSE TO THE EUROPEAN COMMISSION'S PUBLIC CONSULTATION.....	6
I.2 EUROPEAN COMMISSION'S LEGISLATIVE PROPOSAL	7
II. PRICES OFFERED FOR ROAMING	9
II.1 EVOLUTION OF RETAIL OFFERS.....	9
II.2 EVOLUTION OF WHOLESALE CHARGES AND VOLUMES	10
III. TOURISM STATISTICS IN SPAIN.....	11
III.1 PREFERRED DESTINATIONS	12
III.2 TOURIST SEASON	13
IV. DATA ON TRAFFIC FOR WHOLESALE MOBILE ROAMING SERVICES	14
IV.1 CURRENT DEMAND FOR WHOLESALE ROAMING SERVICES.....	14
IV.2 DEMAND FORECAST FOR WHOLESALE DATA ROAMING SERVICES	16
V. ANALYSIS OF THE EUROPEAN COMMISSION PROPOSAL	18
VI. CONCLUSIONS	20
ANEXO I: ANALYSIS OF THE IMPACT OF THE COST OF SEASONALITY ON DOMESTIC DATA SERVICE.....	22
ANEXO II: RESULT OF THE COST MODEL	30

REPORT ON THE SEASONALITY OF WHOLESALE DATA ROAMING SERVICES IN SPAIN

The Regulatory Oversight Chamber of Spain's National Authority for Markets and Competition (hereinafter, CNMC), at its meeting on 7 July 2016, approved this report on the seasonality of wholesale data roaming services in Spain.

Pursuant to Regulation (EU) 531/2012¹ regarding roaming on public mobile communication networks in the European Union (hereinafter, the Roaming Regulation), users will not pay surcharges on mobile services while periodically travelling to other Member States as of 15 June 2017.

As stipulated in Article 19 of the Roaming Regulation, on 15 June 2016 the European Commission presented a report to the European Parliament and Council regarding its conclusions after having reviewed the wholesale market for roaming services. This technical report included a legislative proposal to modify the Roaming Regulation².

This report will analyse the measures proposed by the European Commission in view of the seasonality of the demand for wholesale roaming services, as well as the indirect impact on domestic mobile services provided in Spain.

The report is issued in exercise of the CNMC's powers of supervision and control of the correct operation of electronic communications markets, under Article 6 of Law 3/2013, of 4 June, which created it (hereinafter, LCNMC), and Articles 68 and 70 of Law 9/2014, of 9 May, on Telecommunications (hereinafter, LGTel).

¹ Regulation (EU) 531/2012 of the European Parliament and Council, of 13 June 2012, regarding roaming on public mobile communications networks in the European Union.

² <https://ec.europa.eu/digital-single-market/en/news/commission-prepares-ground-end-roaming-charges-june-2017>

I. BACKGROUND

Roaming services allow users to continue making and receiving communications when they travel outside the coverage area of the network they belong to for their domestic services, or in other words, when they travel outside their domestic network to a visited network. In the case of international roaming, the visited network belongs to an operator from another country.

Since 2007, international roaming services within the European Union have been subject to different Regulations, partly due to high prices, and also because these services are considered to be a key element for the functioning of the internal market.

On 26 November 2015 the Roaming Regulation was modified under Regulation (EU) 2015/2120³ (hereinafter, the Single Market Regulation) in order to introduce measures including the one that states that as of 15 June 2017, surcharges for retail roaming during users' periodic travels within the EEA would be abolished⁴, under the principle known as "*Roam Like at Home*" (hereinafter, RLAH).

On the other hand, the Roaming Regulation includes two exceptions to this general rule:

1. It allows operators to apply a 'fair use policy' to avoid abusive or anomalous usage of regulated roaming services, like permanent roaming.
2. Exceptionally, and prior authorisation from the national regulatory authority, a surcharge may be applied when the operator proves that it cannot recover the costs of providing the regulated retail roaming services at domestic prices.

The European Commission (hereinafter, the EC) will adopt implementing acts laying down detailed rules on the application of these exceptions before 15 December 2016.

The Regulation also stipulated that prior to 15 June 2016, the EC would perform a review of the wholesale roaming market and would identify the necessary

³ Regulation (EU) 2015/2120 of the European Parliament and Council, of 25 November 2015, establishing measures regarding open Internet access and modifying Directive 2002/22/EC on universal service and the rights of users in relation electronic communication services and networks; and Regulation (EU) 531/2012 regarding roaming on public mobile communications networks in the European Union.

⁴ EEA: European Economic Area. The Roaming Regulation covers EU countries and can be equally extended to other EEA countries (EU countries plus Iceland, Liechtenstein and Norway) once the guidelines have been incorporated into agreements with the other countries.

measures required to enable the abolition of retail roaming surcharges and, based on that analysis, would submit a legislative proposal. In accordance with the Roaming Regulation, these measures must both take into account the need to ensure that visited operators recover all costs for providing regulated retail roaming services, including joint and common costs, and the need to prevent permanent roaming and anomalous and abusive use of wholesale roaming services.

During a transitional period from 30 April 2016 to 14 June 2017, operators may apply a surcharge on the retail domestic rate, as long as this surcharge does not exceed the regulated wholesale rate (currently 5 €/minute, 2 €/SMS and 5 €/Mbyte).

I.1 CNMC RESPONSE TO THE EUROPEAN COMMISSION'S PUBLIC CONSULTATION

On 26 November 2015, the EC published a public consultation regarding the review of the wholesale roaming markets, fair use policy and the sustainability mechanism mentioned in the Roaming Regulation.

At its meeting on 11 February 2016, the CNMC Regulatory Oversight Chamber approved a report in response to this public consultation in which it detailed its position on the issues raised and highlighted those aspects that could help the EC in its review⁵.

The CNMC report stressed that it shares the goals established in the Single Market Regulation to the extent that abolishing these surcharges would significantly contribute towards the development of competitive roaming offers for European users and help building the internal market.

Fair use policy

The CNMC considers that any fair use policy must be broad enough so that users who regularly travel can make normal use of their domestic roaming rates. A good approach would be to use the average number of vacation days per year of European users and, in any event, CNMC indicated that the fair use policy should never be lower than the average number of days that EEA users travel to other neighbouring countries.

Wholesale market

The wholesale roaming market shows signs of being competitive, both for being

⁵ <http://www.cnmc.es/CNMC/Prensa/TabId/254/ArtMID/6629/ArticleID/1697/La-CNMC-opina-sobre-la-eliminaci243n-de-los-recargos-por-roaming-en-2017.aspx>

below the regulated maximum prices and for the prices being very responsive to the volume of negotiated traffic.

The CNMC stated that *“The fact that alternative rates are below regulated prices and in line with average prices in the EEA indicates that in the past two years there has been competitive pressure on both the retail and wholesale markets.”* The report also states that *“the wholesale charges negotiated between operators for voice, SMS and data roaming services have decreased by 44%, 24% and 45%, respectively, in the last year with prices in the third quarter of 2015 standing 31%, 36% and 65% below regulated wholesale charges.”*

The CNMC also noted that *“wholesale roaming markets are characterised by the negotiating capacity of their operators and by prices that are very responsive to negotiated volumes.”*

It also highlighted that *“The two main factors in reducing wholesale roaming prices are: (i) the elevated bargaining power of operators with a great demand for wholesale roaming services, reflected in better negotiated prices the higher the agreed-upon volume; and (ii) the existence of fourth operators with excess capacity.”*

In this context, the growing demand for roaming services, and especially for data service, gives operators confidence to offer competitive wholesale charges in the long term.

However, the expected rise in demand when RLAH becomes reality in June of 2017 will mean that operators must make the necessary investments to adapt their networks, and especially to ensure there is sufficient capacity available for the peak tourist season. One of the costs considered to be most significant for providing roaming services has to do with the seasonality of the demand, as the additional capacity necessary for peak tourist months would be underused during the rest of the year.

That is why setting maximum wholesale charges for roaming services must also take these costs into account, and they must promote investment in order to prevent distortions in the domestic markets that could end up leading to price increases for end users in Spain.

I.2 EUROPEAN COMMISSION’S LEGISLATIVE PROPOSAL

I.2.1 General aspects

On 15 June 2016, the EC issued a legislative proposal to review current maximum wholesale roaming charges (caps) for voice, SMS and data services. This proposal included a technical report analysing the functioning of the wholesale market.

Table 1. Maximum wholesale charges currently included in the Roaming Regulation and new limits proposed by the European Commission.

	Current maximum wholesale charges (caps)	Maximum wholesale charges proposed by the EC	Reduction in wholesale caps
Outgoing calls	5 €/minute	4 €/minute	-20%
SMS	2 €/SMS	1 €/SMS	-50%
Data	5 €/Mbyte	0.85 €/Mbyte	-83%

I.2.2 Seasonality cost

Recital 14 of the Regulation's proposal recognises that maximum wholesale charges must ensure that operators can recover their costs, including joint and common costs.

However, recital 15 rules out costs derived from the seasonality of data roaming traffic. Although it indicates that the EC “took into consideration” the potential impact of the seasonal nature of roaming traffic in order to mitigate any cost increases caused by seasonal traffic variability, it roundly rejects taking seasonality into account for data services.

The justification included in the EC proposal is that, given that domestic data traffic is experiencing an upward trend, any seasonal traffic peaks in a year would be outweighed by the total domestic traffic demand in the future. That is, the EC is of the opinion that the networks are dimensioned to support the increased domestic traffic demand for upcoming years, and so traffic peaks would not be relevant in dimensioning the mobile network. Therefore, the EC did not take the cost of the seasonality of data service into account.

The reference cost of the EC approach does not consider all the relevant cost elements, and that is therefore below the cost for efficiently providing the service.

In fact, as evidenced in this Report, the analysis performed by CNMC shows that, at least in regard to the specific circumstances of the Spanish market, seasonality has a clear and very significant impact on costs, and therefore on the necessary investment to dimension the network to be able to adequately respond to the required capacity for roaming traffic. These specific needs for providing roaming services come in addition to the requirements derived from domestic use and, in any case, one subsumes the other.

II. PRICES OFFERED FOR ROAMING

II.1 EVOLUTION OF RETAIL OFFERS

During a transitional period from 30 April 2016 to 14 June 2017 operators are able to choose to establish a surcharge on the retail domestic rate, as long as the surcharge does not exceed the regulated wholesale charges (currently 5 €/minute, 2 €/SMS and 5 €/Mbyte). Receiving calls during the transitional period is priced at a maximum of 1.14 €/minute⁶.

Mobile network operators in Spain and some MVNOs have chosen to fix their default roaming rates (regulated) directly equal to the surcharge prices (5 €/minute, 2 €/SMS and 5 €/Mbyte), in other words, without adding the price for the domestic service. This represents a reduction of around 75% on the former regulated retail rate.

Moreover, there are now operators offering tariff plans including roaming rates at domestic prices (final objective of RLAH or Roam Like at Home):

- Since 18 April 2016 Vodafone⁷ has been offering plans without roaming surcharges for all rates (except pre-paid rates) including EEA countries and others such as Turkey and the United States, with no fair use limits.
- Orange offers RLAH in its Ballena tariff, including consumption in the EEA and in Spain, also with no fair use limits⁸.
- The mobile operator Lycamobile⁹ provides its subscribers with a number of minutes and SMS based on their national plans, to be consumed in 18 countries of the EU, the EEA, the United States, Australia and Hong Kong without roaming surcharges and with an annual fair use limit.

The case of Spain is not an exception in the European Union. It is worth mentioning that in countries as diverse as Germany¹⁰, Italy¹¹, United Kingdom¹², Holland¹³ and France¹⁴ operators have also started to offer rates without

⁶ This maximum price corresponds to the average mobile termination price in the EU and it is updated yearly by the EC, see Implementing Regulation (EU) 2015/2352 of the Commission, of 16 December 2015, which sets the weighted average of maximum mobile telephone termination rates throughout the Union.

⁷ <http://www.vodafone.es/particulares/es/tienda/movil/contrato/tarifas-contrato/>

⁸ <http://tiendaonline2.orange.es/tarifas/contrato/ballena>

⁹ <http://www.lycamobile.es/es/viaja-sin-roaming>

¹⁰ https://www.t-mobile.de/roaming/fuer-vertragskunden/0,27633,29094-_,00.html?WT.svl=100

¹¹ <http://www.tre.it/opzioni/estero>

¹² http://www.three.co.uk/Discover/Phones/Feel_At_Home

¹³ <https://www.vodafone.nl/shop/mobiel/abonnement/black.shtml>

¹⁴ <http://mobile.free.fr/>

surcharges in the transitional period, including in some cases territories outside the EU.

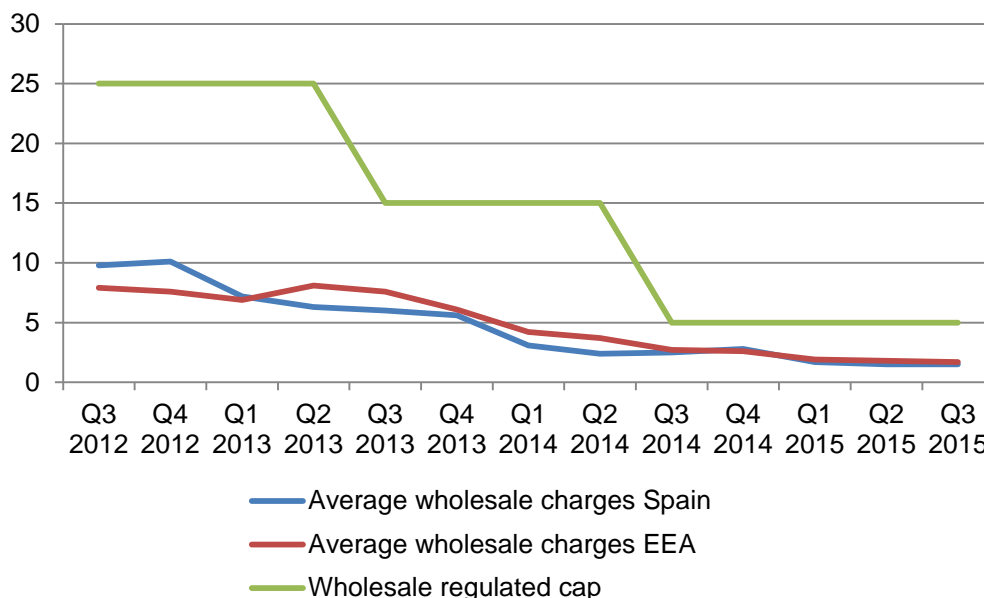
This significant reduction in retail roaming prices, combined with the appearance of RLAH offers, both inside and outside Europe, has occurred at today's regulated wholesale price levels.

II.2 EVOLUTION OF WHOLESALE CHARGES AND VOLUMES

According to data published in the latest BEREC report¹⁵, the evolution of wholesale roaming prices offered by Spanish operators is below the average for EEA countries. In particular, the average wholesale price in the third quarter of 2015 for data service was 1.5 €/MB, compared to the average price of 1.7 €/MB contracted by Spanish operators in other countries.

Also, in the following graph of the evolution of these wholesale charges since 2012 (first imposition of maximum wholesale charges for data) we can see a clear downward trend in negotiated prices to our current minimums (1.5€/Mb), as well as a considerable difference with respect to regulated caps (5€/Mb), though still above the EC proposal (0.85 €/MB).

Graph 1: Comparison of the average wholesale charges for data roaming service offered by Spanish network operators compared to the average charges contracted in the EEA for the same service.

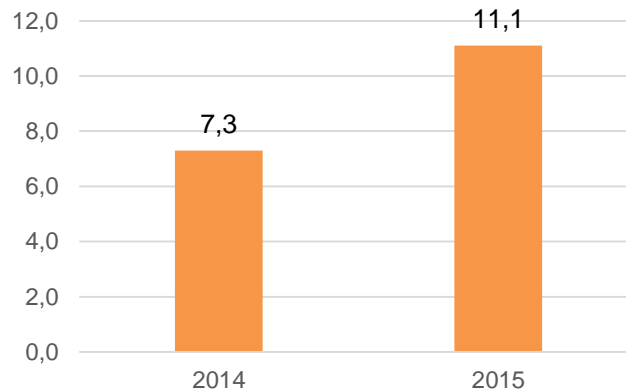


Source: BEREC.

¹⁵ http://berec.europa.eu/eng/document_register/subject_matter/berec/download/0/5760-international-roaming-berec-benchmark-da_0.pdf. Data up to September 2015.

In terms of the volume of traffic, Spanish operators received up to 7.3 times more data traffic in 2014 than its users consumed on other networks in the EEA, increasing to 11.1 times in 2015.

Graph 2: Comparison of the volume of wholesale roaming data offered by Spanish operators to other EEA operators and the contracted wholesale volume.



Source: operator information for the BEREC.

In light of the above, we can see that Spanish operators are net receivers of roaming traffic and that this trend is growing over time. For that reason, until now there had been significant competitive pressure among network operators to capture wholesale traffic, leading to a systematic reduction of negotiated wholesale charges.

However, as mentioned in the response to the public consultation, and as will be described below, the reduction of maximum wholesale charges to levels that do not allow for cost recovery could eliminate incentives to invest in the extra capacity necessary for the introduction of RLAH, not to mention the impact on national markets if the new proposed levels do not allow for cost recovery.

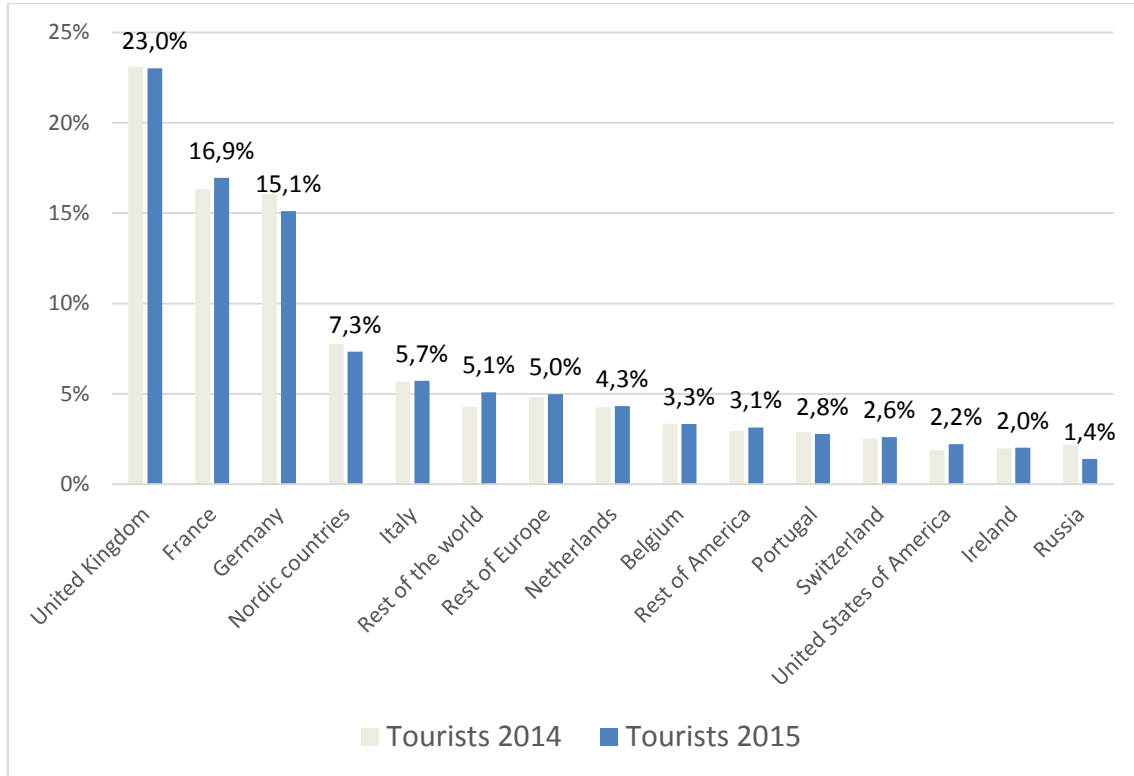
III. TOURISM STATISTICS IN SPAIN

According to data published as part of the Statistics of Tourist Movements at Borders (Frontur) by the National Statistics Institute (INE)¹⁶, in 2015 Spain welcomed a total of 68.1 million tourists, a 4.9% increase over the previous year and a new historical record.

The highest number of tourist arrivals (81% of the total) came from European Union (EU) countries and Norway, with the United Kingdom being the main country of origin with an increase of 4.5% over the previous year, closely followed by France and Germany.

¹⁶ <http://www.ine.es/daco/daco42/frontur/frontur1215.pdf>

Graph 3: Arrival of international tourists by country of residence. Percentage of the total.



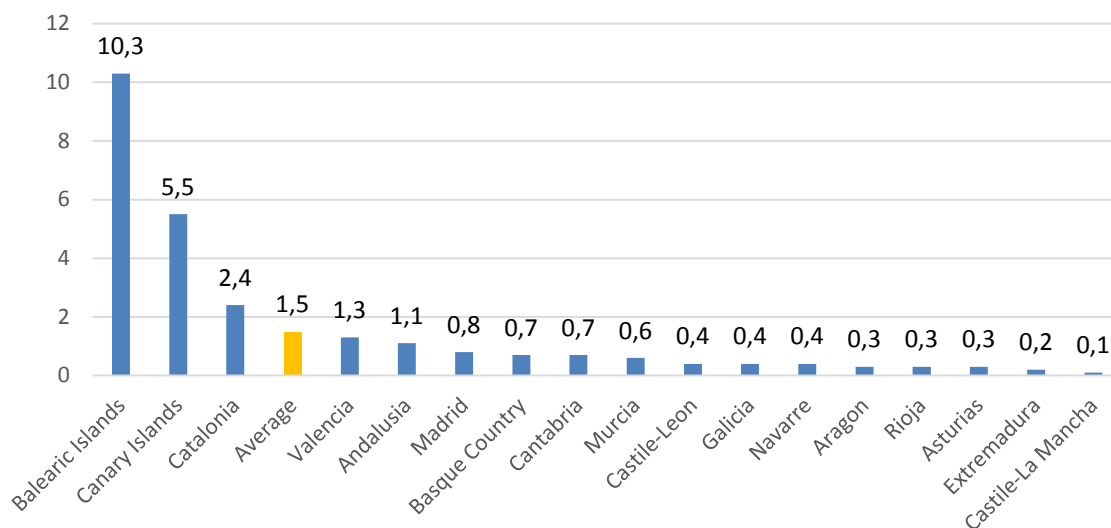
Source: INE. Tourist movements across borders December 2015.

III.1 PREFERRED DESTINATIONS

The preferred destinations of tourists are the coastal regions and the Autonomous Region of Madrid. According to INE data for 2015, six of the 17 Autonomous Regions and two autonomous cities (Andalusia, Catalonia, Autonomous Region of Madrid, Autonomous Region of Valencia, Balearic Islands and Canary Islands) together account for more than 90% of all visits to Spain, with 4.6% growth compared with the previous year.

An important statistic showing the potential impact on mobile operator networks in terms of congestion at certain times of year is the ratio between the number of visits and the local population, as represented in the following graph:

Graph 4: Annual arrival of tourists compared to the total population (tourists per resident).



Source: INE.

Significantly, the number of annual visits to the autonomous regions with the most tourism exceeds the local population, multiplying it by a factor of up to ten times in the case of the Balearic Islands.

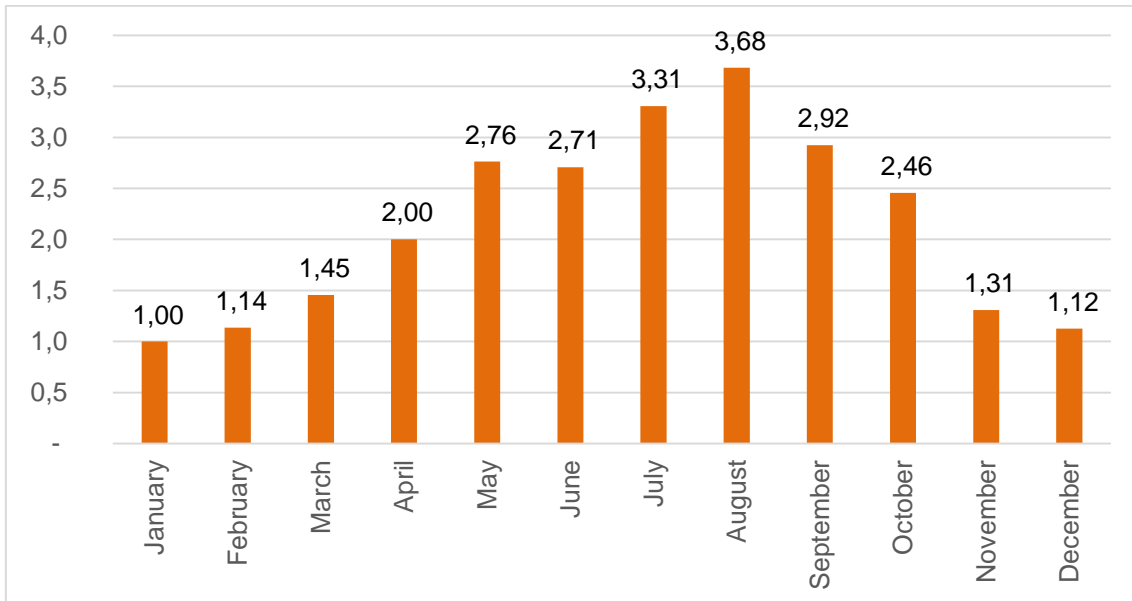
III.2 TOURIST SEASON

Although business trips to Spain have increased, according to INE data 85% of visitors choose Spain for leisure, recreation and holidays.

Therefore, it is not surprising that the months of July and August get the maximum number of tourists. In particular, in August the number of visits nearly quadruples (3.7x) the number of visits in the month with the least tourists, and nearly doubles the annual average (1.7x)¹⁷.

¹⁷ The figures take into account INE surveys for 2015 on occupancy rates in different types of accommodations (hotels, camp sites, hostels, tourist apartments and rural tourist accommodations) by residents of the European Union (not counting Spain) and Norway.

Graph 5: Visits from residents of EU and Norway with January 2015 as a benchmark



Source: CNMC based on INE surveys on occupancy rates in different types of accommodations (hotels, camp sites, hostels, tourist apartments and rural tourist accommodations) by residents of the European Union and Norway.

Data published by Eurostat show that the seasonality of tourism in summer months is very pronounced in coastal countries, such as Croatia, Bulgaria and Greece, where the ratio between August and the month with the least tourism was 35x, 24x and 21x, followed by Malta (9x).

IV. DATA ON TRAFFIC FOR WHOLESALE MOBILE ROAMING SERVICES

IV.1 CURRENT DEMAND FOR WHOLESALE ROAMING SERVICES

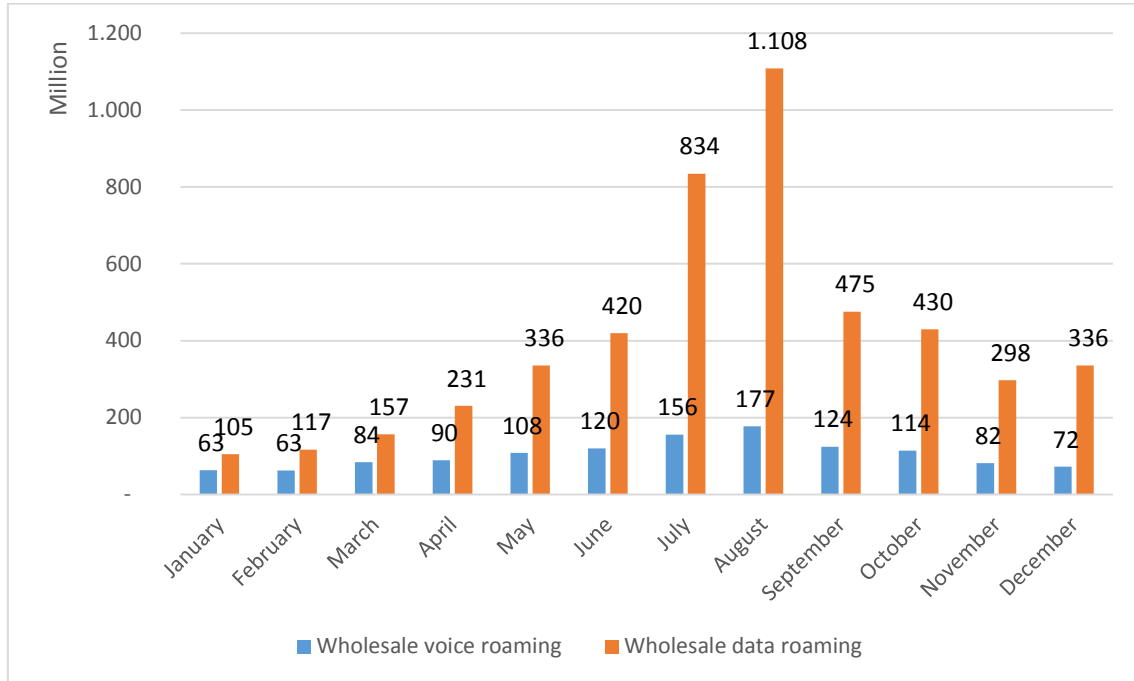
In terms of wholesale mobile roaming services, as might be expected, we can see that the traffic pattern follows a seasonal evolution that mirrors the pattern for number of visits.

Data provided by operators and available on the CNMC website¹⁸ confirm that the third quarter is the time of the year with the highest amount of wholesale roaming traffic, not just for voice services but also, and even more significantly, for data services. In fact, operators must make investments to increase the capacity of their mobile networks to support the increased traffic, as concluded from the elementary rules of dimensioning network elements and as has been published in different media outlets¹⁹.

¹⁸ http://data.cnmc.es/datagraph/jsp/inf_trim.jsp

¹⁹ http://cincodias.com/cincodias/2016/06/24/empresas/1466793946_724471.html
<http://www.expansion.com/empresas/tecnologia/2016/06/25/576e626aca4741e9248b45e6.html>

Graph 6: Wholesale roaming traffic (millions of minutes and millions of MB) in 2015.



The ratio between traffic in the month with the highest amount of traffic (August) and the average monthly value (hereinafter, seasonality factor) is an essential indicator in the relationship between the costs of providing service (looking at the peak traffic month) and the virtual cost without seasonality (average)²⁰.

Indeed, the network is dimensioned based on maximum traffic peaks in order to guarantee quality of service at all times. Otherwise, the service could be affected in seasons when there is a greater influx of visitors and increased use.

In other words, because traffic volume is not constant, the unit cost is much higher. If the seasonality costs were not covered by wholesale roaming prices, this would violate the provisions of Regulation 2015/2120 which require that operators can recover their costs, including joint and common costs. Moreover, if a maximum price was set that was below the cost of providing the service, there would be a clear risk that the necessary investments would not be made to enable service in the months with the most tourism, or else these costs would be passed on, to a greater or lesser extent, to the retail services provided to domestic subscribers (for more detail see annexes I and II).

²⁰ To determine a price without seasonality, the annualised cost is imputed to services and divided between the total network traffic without taking fluctuations into consideration.

The mobile operator networks in Spain see wholesale volumes in August that are nearly double (1.7x) or triple (2.7x) the average annual traffic for voice and data roaming services, respectively.

Table 2: Multiplier for wholesale voice and data traffic in August compared to January and the average.

Wholesale service	Ratio of August traffic compared to January	Ratio of August traffic compared to the average
Voice	2.8x	1.7x
Data	11x	2.7x

Source: CNMC.

IV.2 DEMAND FORECAST FOR WHOLESALE DATA ROAMING SERVICES

The growth rate for wholesale data roaming services was 156% in 2015, or in other words, the traffic for this service was 2.56 times that of the previous year²¹.

With the introduction of RLAH, as it does not impose extra costs on users, roaming consumption will tend to quickly draw level with the domestic consumption of the country of origin starting in June 2017.

From this perspective, the growth potential of traffic volume would reach about five times the current consumption (~5x), because while the average daily consumption of roaming subscribers from other countries in the EEA was 9.5 MB/user/day²² on Spanish operator networks in 2015, their average consumption in their respective countries of origin was 46 MB/user/day²³.

Although this average consumption (46 MB/user/day) in 2015 matches the average consumption in neighbouring countries like France and Portugal²⁴,

²¹ Calculated by dividing the traffic in August 2015 by the traffic in August 2014.

²² Based on annual wholesale roaming traffic for EU countries from CNMCDATA, number of annual visits from EU residents and average duration of stay provided by Eurostat http://ec.europa.eu/eurostat/statistics-explained/index.php/Tourism_statistics_-_intra-EU_tourism_flows#Europeans_stay_on_average_one_week_when_visiting_other_EU_countries

²³ Equivalent to 1.23 GB/user/month, based on CISCO traffic data for 2015 in Western Europe and a mobile broadband penetration rate of 78%: http://www.cisco.com/c/dam/assets/sol/sp/vni/forecast_highlights_mobile/index.html

²⁴ Based on information published by the national regulatory authorities of Portugal and France (ANACOM and ARCEP), the average consumption of each user of broadband services in 2015 was 1.2 GB/month, equivalent to 46 MB/user/day:

ARCEP: [http://www.arcep.fr/index.php?id=8571&no_cache=0&no_cache=0&tx_gsactualite_pi1\[uid\]=1863&tx_gsactualite_pi1\[annee\]=&tx_gsactualite_pi1\[theme\]=&tx_gsactualite_pi1\[motscle\]=&tx_gsactualite_pi1\[backID\]=26&cHash=a1dce7dba93f56d4dc2a76f95d0c930b&L=1](http://www.arcep.fr/index.php?id=8571&no_cache=0&no_cache=0&tx_gsactualite_pi1[uid]=1863&tx_gsactualite_pi1[annee]=&tx_gsactualite_pi1[theme]=&tx_gsactualite_pi1[motscle]=&tx_gsactualite_pi1[backID]=26&cHash=a1dce7dba93f56d4dc2a76f95d0c930b&L=1)

ANACOM: <http://www.anacom.pt/render.jsp?contentId=1380922#.V2LBSLuLS-s>

other countries had much higher average consumption in 2015, such as Norway with 167 MB/user/day²⁵.

To this specific potential growth in demand for roaming services we should add the forecast normal growth in demand for data services (1.7x).

Considering the previous observations, and assuming demand growth for 2016 to be similar to that observed in 2015 (2.6x), when it arrives in June 2017 RLAH is expected to bring with it roaming data traffic volumes that will be six times the volumes of the months prior (6x).

The following table summarises the estimated growth rates for wholesale data roaming traffic for 2015, 2016 and cumulatively since 2015:

Table 3. Growth of the demand for wholesale data roaming service.

Increased demand ²⁶	2015-2016	2016-2017	TOTAL (2015-2017)
Additional growth potential	1.5x	3.3x	5x
Annual data growth	1.7x	1.7x	2.9x
TOTAL	2.6x	6x	14x

Source: CNMC.

It is worth pointing out these growth projections are considered conservative, given that it is a known fact that users use their mobile devices more during their leisure time to search maps, look up things to do, find/book restaurants, search for hotels and other related activities²⁷. Because they are away from their homes and mostly outside the range of a good Wi-Fi connection, the mobile broadband connection is the best alternative for getting online. In June of 2017, this behaviour can be expected for users of roaming services once they no longer have to worry about the additional cost, and therefore we would be right to expect volumes that are significantly higher than those shown in the table above.

As has already been mentioned in the response to the public consultation, the expected traffic increase is going to require additional investments from operators to build additional capacity and new infrastructure in the tourist areas, which are foreseen to entail major costs in light of the demand forecast growth.

²⁵ Data published by the Norway regulatory authority Nkom for the first half of 2015 show that the average consumption of the residential sector and businesses would be 5 GB/user/month: <http://eng.nkom.no/market/telecom-services/statistics/the-norwegian-ecom-market-reports/attachment/21447?ts=151af634b25>

²⁶ The same growth was used for the 2016-2017 period as for the 2015-2016 period (2.6x, CAGR: 156%).

²⁷ <http://www.xatakamovil.com/n/los-13-graficos-que-demuestran-como-el-movil-ha-transformado-como-viajamos>

This involves the need for new equipment for the additional network under the usual dimensioning rules.

V. ANALYSIS OF THE EUROPEAN COMMISSION PROPOSAL

As established in Article 19 of the Regulation, the objective of the proposed review of the wholesale roaming market is to assess measures necessary to enable abolition of retail roaming surcharges.

In this context, the study that accompanies the European Commission proposal concludes that currently 80%²⁸ of operators could provide RLAH under the terms of the Regulation at current maximum wholesale charges (caps). Around 20% of mobile operators would not be in conditions to offer RLAH in a sustainable way. This is mainly due to these operators' reduced ability to negotiate the discounts that larger operators benefit from. In consideration of this 20% of operators for which it would not be sustainable to offer RLAH, the EC proposes reducing the caps of the different regulated roaming services, especially the data service.

The CNMC, meanwhile, like other regulatory authorities, has vast experience in BULRIC-type cost models²⁹. Since 2010 the CNMC has had a cost model that can calculate the cost of providing wholesale call termination services on the network of an efficient mobile operator. In addition to the costs of the mobile call termination service, the model provides results for other services (outgoing voice calls, data, SMS, MMS and video calls), differentiating between domestic retail services and wholesale services for MVNOs, as well as for foreign operators that provide roaming services in Spain.

This model has been recently updated and adapted for the latest technologies by Axon Partners consulting company, and is currently in the public consultation phase until 23 July 2016. According to the results obtained (see Annex II), the wholesale cost of the wholesale data roaming service would be 1.11 €/Mbyte³⁰. In other words, the maximum price value proposed by the EC (0.85 €/Mbyte) is below the cost for efficiently providing the service.

The EC deems that this price is not below cost because it has commissioned a cost model³¹ that offers significantly lower results.

²⁸ Page 52 of the European Commission's working document that accompanies the proposed modification to the wholesale roaming market:

<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016SC0202&from=EN>

²⁹ Bottom-Up Long-Run Incremental Cost Model.

³⁰ Including 0.22€/MB of commercial costs and 0.30€/MB associated with seasonality.

³¹ "Assessment of the cost of providing wholesale roaming services in the EU", accessible at <https://ec.europa.eu/digital-single-market/en/news/commission-publishes-study-cost-providing-wholesale-roaming-services-eu>

The discrepancies between the two models are partly due to the fact that, in setting the new proposed limit for wholesale data service, the EC would not have taken into account the costs associated with the seasonality of data traffic.

The study commissioned by the EC recognises the clear seasonality of this traffic, but chooses not to consider it when allocating costs because it believes that the peak data traffic value in August generated by roaming traffic is not the reference for dimensioning the network³². But this criterion flagrantly violates the principle of cost causation by allocating costs as if data traffic were uniformly distributed throughout the year, and does not consider the impact of the seasonality of this traffic.

In fact, the impact of seasonality on roaming costs can be seen in the fact the unit cost for wholesale service is 51% higher than the unit cost for domestic service, according to CNMC calculations.

Annex I shows the additional cost of wholesale data service by autonomous region, after having analysed the monthly traffic for each municipality in 2015. As could be expected, the cost of seasonality is highest in areas where traffic is most concentrated in summer (Balearic Islands, Catalonia, Autonomous Region of Valencia and Andalusia). The annex also details what the extra charge on domestic services would be in a scenario in which operators were not able to recover the cost of the seasonality of data. In particular, it reaches the conclusion that domestic service would be subject to a nationwide cost increase of up to 7% starting in 2017.

The regulation establishes sustainability measures in the case of retail roaming services: the possibility of applying a surcharge to ensure sustainability in exceptional cases, and the setting of fair use limits. However, in the case of wholesale markets none of these safeguarding measures has been envisaged. In this context, setting wholesale charges below the cost of providing services would create a high risk of distortion in other services and markets.

Specifically, setting maximum limits below the cost of providing service could have the following impacts:

- Impact of non-recovered costs on retail prices for national users.
Costs could be passed on, to a greater or lesser extent, to national users, increasing the prices for the different services they have subscribed to.

³² *“Mobile networks are not dimensioned for data based on the peak month but on forecasts of data traffic because data traffic is fast increasing (compared to voice).”*

- Compensation of losses due to non-recovered costs in the domestic wholesale mobile market, affecting mobile virtual network operators (MVNOs) with their host operators.

The network operators (hosts) that provide national wholesale services could compensate for part of the costs that they cannot recover through wholesale roaming prices through wholesale contract conditions with MVNOs.

- Deterioration of the quality of service for users in tourist areas.

As mentioned above, the characteristics of roaming services require specific investments in order to be able to ensure the quality of service once RLAH has been introduced. One possible consequence of introducing prices below cost is the lack of incentive to make these investments, with the resulting deterioration of the quality of services. In particular, in the Balearic Islands a risk of congestion is expected with the introduction of RLAH, as well as a lack of investment incentive to make the necessary investments to not see a decline in quality of service.

Finally, the Regulation's proposal also fails to include any provision that enables MVNOs to gain access to competitive wholesale roaming prices with the argument that any measure of that kind could distort the conditions these operators have with their hosts in the domestic market.

VI. CONCLUSIONS

The CNMC shares the goals set in the Single Market Regulation to the extent that the elimination of retail surcharges (*Roam like at Home*) in June of 2017 would significantly help building the internal market.

In this regard it is essential to ensure that any fair use policy that limits the consumption of roaming services at domestic prices is sufficiently broad so that users who travel regularly can use their domestic rates while roaming just as if they were in their home country.

In terms of the wholesale measures proposed by the European Commission to ensure the sustainability of the 20% of European operators that do not have access to the same wholesale conditions as the other 80%, the CNMC understands that these measures must be proportionate to the problem identified, and in accordance with the conditions set in Article 19 of the Roaming Regulation. That is, avoiding any observable risk of distortion of competition and investment incentives in national and visited markets, as well as the need to ensure that the operators of visited networks can recover all the costs of providing regulated wholesale roaming services, including joint and common costs.

The CNMC has shown that the proposed wholesale price for wholesale data roaming services would not allow the operators that provide this service in Spain to recover their costs. In that case, it could cause distortions in the

national markets: a redistribution of losses to the domestic retail market and its services, with the resulting price increases; the deterioration of contractual conditions of the MVNOs; or even an impact on the quality of service if the necessary investments are not made to handle the increased demand for retail roaming services.

The CNMC considers that more proportionate measures could be introduced to address the sustainability of the group of operators that do not have the capacity to negotiate wholesale roaming agreements independently, which limits their ability to access discounts with negotiated prices. These include guaranteeing that NRAs can intervene to solve these potential anomalies or, ultimately, using the authorised surcharge on the retail price provided for in the Regulation.

In that regard, it is essential for the discussions of the European Commission Parliament and Council to include an analysis of the specific demand in tourist countries like Spain in order to ensure that there is no indirect impact on national markets and that users of mobile services in Spain are not adversely affected.

This document has been signed electronically by Chamber Secretary Miguel Sánchez Blanco, with the approval of Chamber President María Fernández Pérez.

ANEXO I: ANALYSIS OF THE IMPACT OF THE COST OF SEASONALITY ON DOMESTIC DATA SERVICE

“Seasonality cost” is the cost that network operators must assume due to having unused resources during most of the year and additional capacity to meet the demand during a specific time of year.

The subsequent analysis is based on the European Commission premise in its legislative proposal that these costs must be assumed by the operators offering wholesale data service, and so it calculates what the extra cost would be for domestic services.

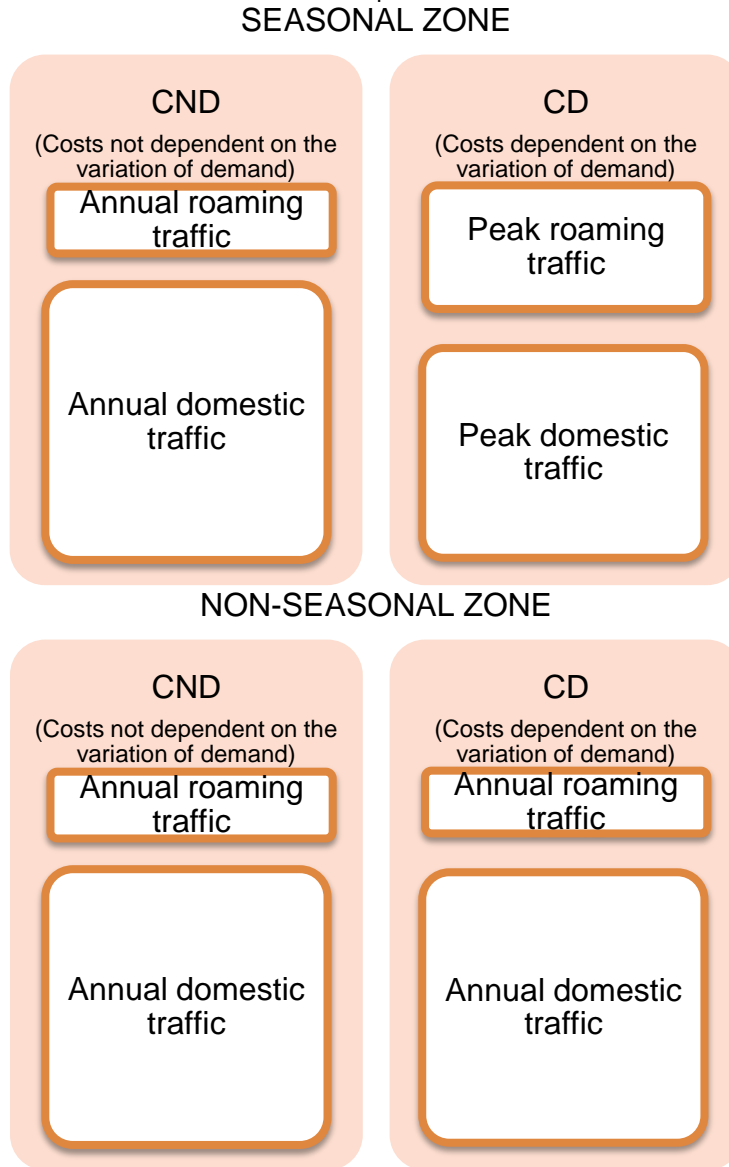
To perform the calculations, we consider a simplified model of an operator that provides only two mobile services: (A) international wholesale data roaming service (hereinafter, roaming service) and (B) retail data service to national consumers (hereinafter, domestic service); and in two different areas: (1) a tourist area where the traffic at one time of year is much higher than in the rest of the year (August); and (2) a non-tourist area where the traffic follows a more uniform pattern.

In the tourist area (1) the operator networks require additional capacity due to the additional demand for service at the time of peak demand, while there are other times of the year with low demand when the installed capacity is over-dimensioned. In other words, a basic rule of network design is to consider peak demand (August) instead of the monthly average for the year, so that the quality of service does not deteriorate during peak demand time.

To correctly allocate the costs, they are allocated by zone:

- Costs not dependent on demand (CND), or those that do not depend on traffic, which include costs related to coverage, are allocated based on the proportion of annual traffic for the service (roaming or domestic) compared to the total annual traffic.
- However, costs dependent on demand (CD), or those related to traffic, are allocated based on the proportion of traffic in the peak period, because that is when capacity needs are determined. This criterion only affects tourist areas where we can assume the existence of a peak period. For non-tourist areas, on the other hand, CDs are allocated between services just like CND costs: according to the percentage of annual traffic, assuming a regular distribution of traffic throughout the year.

Graph 7: Illustrative example of the cost allocation between roaming and domestic services based on annual and peak traffic.



The unit cost (€/MB) of roaming (r) and domestic (d) services **for the seasonal zone** would be as follows³³:

$$Unit\ cost_{(r/d)} = \frac{CND * \%Annual\ T_{(r/d)} + CD * \%Peak\ T_{(r/d)}}{Annual\ T_{(r/d)}}$$

³³ The same formula is used to describe the unit cost of roaming and domestic traffic (r/d) based on the respective proportions of annual and peak traffic.

Where:

$$\%Annual T_{(r/d)} = \frac{Annual T_{(r/d)}}{Annual T_r + Annual T_d}$$

$$\%Peak T_{(r/d)} = \frac{Peak T_{(r/d)}}{Peak T_r + Peak T_d}$$

Seasonality cost is defined to be the additional cost per MB for the wholesale data service compared to the cost per MB for the domestic service:

$$Seasonality\ cost = \frac{Unit\ cost_r}{Unit\ cost_d} - 1$$

Multiplying numerator and denominator by the sum of annual traffic (Annual $T_r + Annual T_d$) and dividing also both by costs not dependent on demand (CND) gives us the equation:

$$Seasonality\ cost = \frac{\frac{Annual T_r + Annual T_d}{Annual T_r} (\%Annual T_r + \frac{CD}{CND} * \%Peak T_r)}{\frac{Annual T_r + Annual T_d}{Annual T_d} (\%Annual T_d + \frac{CD}{CND} * \%Peak T_d)} - 1$$

We get the following formula:

$$Seasonality\ cost = \frac{1 + \frac{CD}{CND} * \frac{Annual T_r + Annual T_d}{Peak T_r + Peak T_d} * \frac{Peak T_r}{Annual T_r}}{1 + \frac{CD}{CND} * \frac{Annual T_r + Annual T_d}{Peak T_r + Peak T_d} * \frac{Peak T_d}{Annual T_d}} - 1$$

Considering that annual and peak domestic traffic is significantly higher than roaming traffic, and taking into account the definition of seasonality factors as the ratio between peak monthly traffic and average monthly traffic for the year as shown below³⁴:

$$Seasonality\ F_{(r/d)} = \frac{Peak T_{(r/d)}}{Annual T_{(r/d)}/12}$$

We get the following expression for the seasonality cost by calculating the additional cost per MB for the wholesale data service compared to the cost per MB for the domestic service:

$$Seasonality\ cost \approx \frac{1 + \frac{CD}{CND} * \frac{Seasonality\ F_r}{Seasonality\ F_d}}{1 + \frac{CD}{CND}} - 1$$

³⁴ The same formula is used to describe the seasonality factor for roaming and domestic traffic (r/d) based on the ratio of peak traffic (August) and monthly average for the year.

The formula above shows that the impact of seasonality is greater i) the greater the difference between the seasonality factors and ii) the greater the ratio between costs dependent and not dependent on variation of demand.

Given that the regulation will affect all roaming traffic, we must take both zones (1) and (2) into account simultaneously in order to find a single nationwide cost for seasonality.

Note that a seasonality factor of 1 would be the same as a seasonality cost of zero. With this in mind, we can find an average seasonality factor for the two zones and for both services (roaming and domestic), weighted by the total traffic for each zone and service.

The table below shows the average seasonality factor for roaming data in the different autonomous regions, dividing them into a seasonal Zone 1 and a non-seasonal Zone 2:

Table 4: Seasonality factor for the wholesale data roaming service (*Seasonality F_r*). Source: CNMC according to 2015 operator data³⁵.

	Area 1 (seasonal)		Area 2 (non-seasonal)		Average Seasonality factor for roaming
	% Traffic	Seasonality Factor	% Traffic	Seasonality factor	
Balearic Islands	99%	3.4	1%	1.0	3.3
Catalonia	54%	3.8	46%	1.0	2.5
Andalusia	69%	2.7	31%	1.0	2.2
Canary Islands	68%	2.0	32%	1.0	1.7
Autonomous Region of Valencia	75%	2.9	25%	1.0	2.4
Other Autonomous Regions	37%	3.1	63%	1.0	1.8
TOTAL	68%	3.1	32%	1.0	2.40

In particular, zone 1 (tourist or seasonal zone) would encompass 68% of the wholesale roaming traffic, and in the Balearic Islands practically all municipalities belong to the seasonal zone.

³⁵ For the Canary Islands the seasonal month was chosen to be December, as it has slightly higher above-average traffic than August.

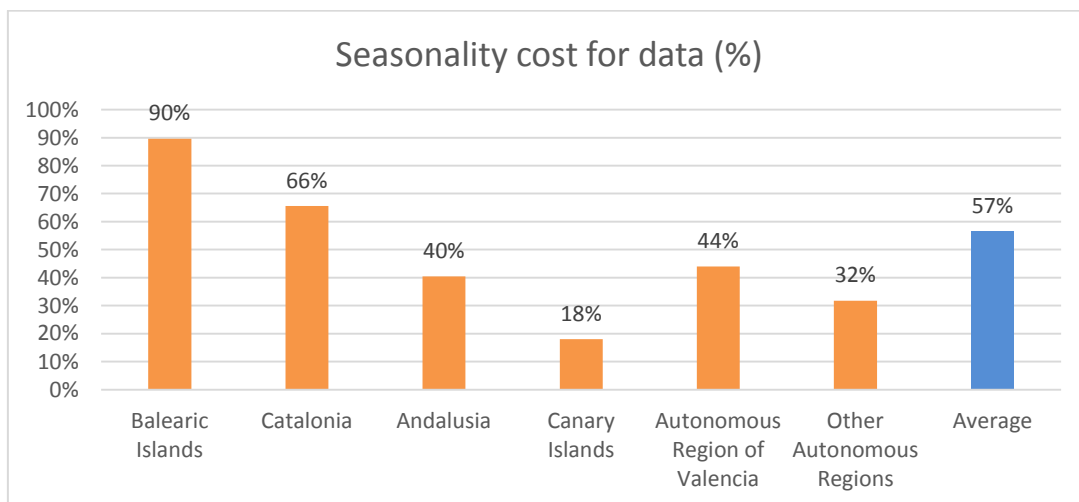
The effect of seasonality is less pronounced for domestic mobile data service: the traffic in the seasonal zone goes down by 42% and the average seasonality factor is lower (1.23x).

Table 5: Seasonality factor for domestic mobile data service (*Seasonality F_d*). Source: CNMC according to 2015 operator data.

	Area 1 (seasonal)		Area 2 (non-seasonal)		Average Seasonality factor for domestic
	% Traffic	Seasonality factor	% Traffic	Seasonality factor	
Balearic Islands	94%	1.4	6%	1.0	1.3
Catalonia	30%	1.7	70%	1.0	1.2
Andalusia	54%	1.6	46%	1.0	1.3
Canary Islands	78%	1.4	22%	1.0	1.3
Autonomous Region of Valencia	56%	1.7	44%	1.0	1.4
Other Autonomous Regions	31%	1.5	69%	1.0	1.2
TOTAL	42%	1.6	58%	1.0	1.23

The following graph shows the additional cost of wholesale roaming service compared to domestic service, using the formula above, for the most tourism-heavy autonomous regions as well as the average for the entire country (57%)³⁶.

Graph 8: Seasonality cost: additional cost per MB with the wholesale data service compared to the cost per MB with the domestic service. Source: CNMC according to 2015 operator data.



³⁶ To decide how to break down the costs, we used the study conducted by Analysys consulting company for the Dutch regulator OPTA. In this study, Analysys estimated that 60% of costs were dependent on demand (page 93).

<https://www.acm.nl/nl/download/bijlage/?id=9279>

It should be noted that the results are consistent in that the autonomous region with the highest concentration of summer tourism (Balearic Islands) is where there is the greatest additional cost, while in the autonomous region of the Canary Islands, where tourism is more uniformly distributed throughout the year, the additional costs would be less significant.

Note that the autonomous region of the Balearic Islands alone would account for 21% of the total annual roaming traffic provided in Spain in 2015, while it accounts for only 4% of domestic traffic. The autonomous regions with the most tourism accounted for 85% of roaming traffic, although their percentage of domestic traffic was more modest (55%), clearly related to the greater concentration of tourism from EEA countries to these areas.

Autonomous Regions	% Roaming traffic	% Domestic traffic
Balearic Islands	21%	4%
Catalonia	22%	19%
Andalusia	16%	19%
Canary Islands	15%	6%
Autonomous Region of Valencia	11%	7%
Other Autonomous Regions	15%	45%
TOTAL	100%	100%

Furthermore, the robustness and consistency of the methodology used is evident when comparing the average seasonality cost (57%) with that obtained using the cost model referred to in Annex 2, which results in a very similar average cost (52%).

In any case, there is no doubt that seasonality costs for data services are very significant. If they are not taken into account for roaming services, the model that we are analysing would impute them to the domestic service, given that the sum total of costs must remain constant:

$$Cost = Unit\ cost_r * Annual\ T_r + Unit\ cost_d * Annual\ T_d$$

Given the fact that the cost of roaming services corresponds to the cost of domestic service plus the seasonality cost, the formula above could be rewritten as follows:

$$Cost = Unit\ cost_d(1 + Seasonality\ cost) * Annual\ T_r + Unit\ cost_d * Annual\ T_d$$

$$Cost = Unit\ cost_d * Annual\ T_i + \{Unit\ cost_d * Seasonality\ cost * Annual\ T_r + Unit\ cost_d * Annual\ T_d\}$$

As can be seen, the redistribution of seasonality costs to domestic service entails a new allocation of unit costs. The new unit cost for wholesale roaming would be the same as the domestic unit cost (after being divided by Annual T_r):

$$Unit\ cost'_r = Unit\ cost_d$$

Meanwhile the new domestic unit cost would include the seasonality costs (after being divided by Annual T_d)

$$Unit\ cost'_d = Unit\ cost_d * Seasonality\ cost * \frac{Annual\ T_r}{Annual\ T_d} + Unit\ cost_d$$

As a result, the additional cost for domestic service would be:

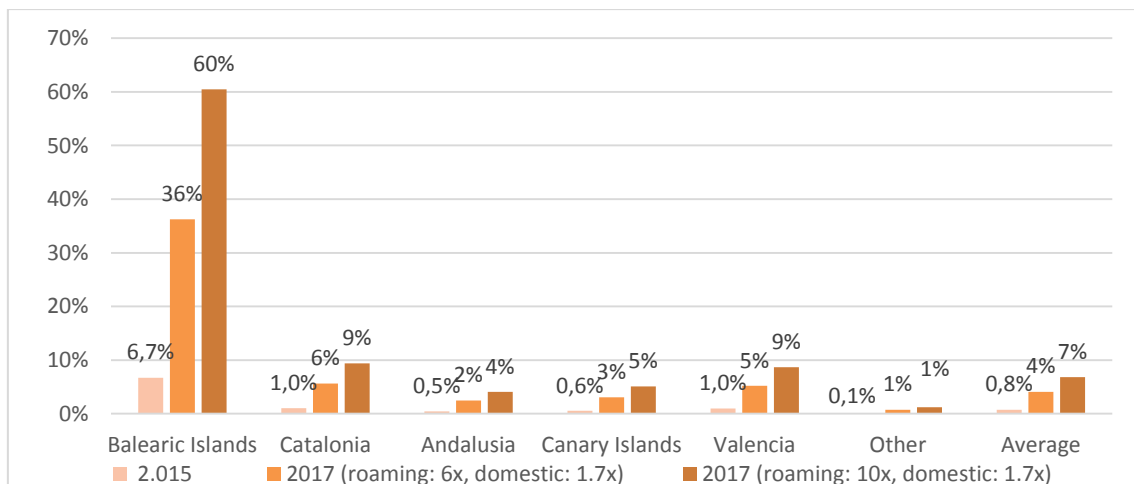
$$Additional\ cost\ per\ unit_d = Unit\ cost_d * Seasonality\ cost * \frac{Annual\ T_r}{Annual\ T_d}$$

The following formula shows the rate of increase for domestic costs:

$$Increased\ domestic\ costs = Seasonality\ cost * \frac{Annual\ T_r}{Annual\ T_d}$$

As could be expected, the redistribution of costs to the domestic service is proportional to the percentage of the operator's roaming traffic compared to its domestic traffic. The following graph shows the increased costs by autonomous region for: i) 2015; ii) 2017 with an expected sixfold (6x) increase in demand for roaming services compared to 2016; and iii) 2017 for a scenario with tenfold growth in demand (10x)³⁷.

Graph 9: Increased domestic costs due to not taking into account the seasonality cost of wholesale roaming services.



Source: CNMC

³⁷ The expected growth projections for wholesale roaming traffic can be found in Table 3 of section IV.2 Demand forecast for wholesale data roaming service.

As we can see, although there would be a limited impact in 2015 (in fact it would be non-existent because the wholesale margin is high enough to recover investments), in 2017 the impact could become considerable (specifically, a tenfold increase in demand would lead to a 7% cost increase nationwide).

Non-recovery of costs translates into a lack of suitable economic incentives to make the necessary investments to cover the additional demand in certain autonomous regions. If these investments are carried out, the associated cost could end up being passed on to domestic consumers in the form of higher retail prices.

ANEXO II: RESULT OF THE COST MODEL

In accordance with the criteria set in the European Commission Recommendation of 7 May 2009 on the regulatory treatment of termination rates for fixed and mobile telephone services in the EU (Recommendation on termination rates)³⁸, the CNMC has a long-term incremental cost model³⁹ that can calculate the cost of providing wholesale call termination service on the network of an efficient national mobile operator with network deployment in line with the latest technologies and growing demand for mobile broadband.

Currently the CNMC has released an updated version of the cost model to public consultation⁴⁰, to serve as a reference for the next round of analysis of call termination markets on mobile networks, which includes the following important characteristics:

- Calculating different cost standards: fully allocated costs (FAC), pure long-run incremental costs (LRIC), and incremental costs including joint and common costs (LRIC+).
- Obtaining results for different services: outgoing voice calls, call termination, retail and wholesale data service, SMS, MMS and video calls.
- Differentiating between retail services, wholesale services available to full MVNOs and wholesale roaming services.
- Using more recent technologies (Single RAN, Ethernet, IMS, VoLTE).
- Using the latest available frequencies (800 MHz, 2,600 MHz) and anticipating the gradual transfer to LTE frequencies.

The model can also simulate the effect of seasonality on demand by geotype. The model can also take into account different busy hours (BH⁴¹) for wholesale roaming services with respect to domestic services to allow for the fact that there is more intensive use of network resources by users of roaming services during tourist season.

³⁸ <http://www.boe.es/doue/2009/124/L00067-00074.pdf>

³⁹ Based on the resulting pure LRIC unit cost for 2014 of the bottom-up LRIC model, the Commission's Resolution on the mobile termination market established a glide-path of prices applicable to mobile operators with networks and complete MVNOs to reach a target mobile termination price of 1.09 €/c/minute, as of 1 July 2013.

⁴⁰ The public consultation document details the main characteristics of the model. <http://goo.gl/8vTX7X>

⁴¹ Busy hour: 60-minute period during which the network is at highest occupation in a 24-hour interval.

To calculate the difference between the BH for wholesale data service and the BH for domestic data service, an analysis was conducted of monthly traffic by municipality, comparing the peaks for the two services. Only municipalities whose traffic during high season for both services was not exceeded in any other month were considered to be subject to seasonality. The result is a BH for wholesale data roaming services that is 1.52 times higher⁴² than for domestic data service.

Using the BH ratio in the CNMC cost model, the resulting cost of wholesale data roaming service for 2017 would be 1.11 €/MB, of which 0.22 €/MB corresponds to wholesale commercial costs⁴³ and 0.30 €/MB corresponds to costs associated with the seasonality of demand.

As a consequence, the total unit cost of 1.11 €/MB would be higher than that proposed by the European Commission (0.85 €/MB) based on a cost model that does not take seasonality into account for wholesale data roaming services.

⁴² Because there is not a specific geotype for “tourism” in the cost model, the factor of 1.52x does not exactly match the ratio between the seasonal variation factors (1.88x).

⁴³ Specific commercial costs of the wholesale roaming service based on audited cost accounting of the three main mobile network operators.

