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IMPACT ASSESSMENT

Accompanying the document

**Proposal for a Regulation of the European Parliament and of the Council amending
Regulation (EU) No 531/2012 as regards rules for wholesale roaming markets**

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List of Acronyms

ARPM - Average Revenue Per Minute

ARRPU - Average Retail Revenue Per User

BEREC - Body of European Regulators in Electronic Communications

DG CNECT - Directorate General for Communications Networks, Content & Technology

EEA - European Economic Area

EU - European Union

EUR - Euro

EUR/PPP - EUR/Purchasing Power Parity

FUP - Fair Use Policy

GB - Gigabyte

GSM - Global System for Mobile communications

GSMA - GSM Association

HD - High Definition

IA - Impact Assessment

IMSI - International Mobile Subscriber Identity

IOT - Internet of Things

JRC - Joint Research Centre

LBO - Local Break Out

LTE - Long-Term Evolution

MB - Megabyte

MS - Member State

MNO - Mobile Network Operator

MTR - Mobile Termination Rate

MVNO - Mobile Virtual Network Operator

MWC - Mobile World Congress

M2M - Machine to Machine

NRA - National Regulatory Authority

OECD - Organisation for Economic Co-operation and Development

OTT - Over-the-top

VoIP - Voice over Internet Protocol

Q1 - Quarter 1

Q2 – Quarter 2

Q3 - Quarter 3

Q4 - Quarter 4

RLAH - Roaming Like At Home

SIM - Subscriber Identity Module

SME - Small and medium-sized enterprises

SMS - Short Message Service

STIRA - Standard Terms for International Roaming Agreements

US - United States

VAT - Value-added tax

VoIP - Voice over Internet Protocol

VoLTE - Voice over Long-Term Evolution

Wi-Fi - Wireless Fidelity

3G - 3rd Generation

4G - 4th Generation

€c - euro cent

Countries

BE - Kingdom of Belgium

BG - Republic of Bulgaria

CY- Cyprus

CZ - Czech Republic

DK - Kingdom of Denmark

DE - Federal Republic of Germany

EE - Republic of Estonia

IE - Ireland

EL - Hellenic Republic
ES - Kingdom of Spain
FR - French Republic
HR - Republic of Croatia
IS - Republic of Iceland
IT - Italian Republic
LI - Principality of Liechtenstein
LV - Republic of Latvia
LT - Republic of Lithuania
LU - Grand Duchy of Luxembourg
HU - Hungary
MT - Republic of Malta
NL - Kingdom of the Netherlands
NO - Kingdom of Norway
AT - Republic of Austria
PL - Republic of Poland
PT - Portuguese Republic
RO - Romania
SI - Republic of Slovenia
SK - Slovak Republic
FI - Republic of Finland
SE - Kingdom of Sweden
UK - United Kingdom of Great Britain and Northern Ireland

Executive Summary
Impact assessment on Wholesale roaming legislative proposal
A. Need for action
Why? What is the problem being addressed?
<p>The co-legislators agreed on ending retail roaming surcharges for periodic travels in the EU as of 15 June 2017 (RLAH¹ regime imposed by Regulation 531/2012 as amended by Regulation 2015/2120 of 25 November 2015, the 'Roaming Regulation'), on condition that, following a review of the wholesale roaming market in the EU by the Commission, the EU takes appropriate legislative measures on this market in order to enable RLAH from that date. The wholesale roaming review conducted by the Commission shows that national wholesale roaming markets are not well-functioning and that they are expected to remain so under the future RLAH retail obligation. This IA therefore seeks to determine the best option for regulating the wholesale roaming market in the EU in order to enable RLAH in 2017 while maintaining the sustainability of domestic charging models.</p> <p>Affected parties will mainly be EU mobile network operators. The main beneficiaries will be all customers of EU mobile operators using mobile communications services while travelling in the EU.</p>
What is this initiative expected to achieve?
<p>The initiative aims at proposing appropriate measures on the wholesale roaming market to make it compatible with the obligation upon EU mobile operators of providing retail roaming services at domestic prices as of 15 June 2017. In assessing such measures, the Commission has taken into account the need to ensure that roaming providers are able to recover all costs of providing regulated wholesale roaming services, including joint and common costs. The options are hence assessed against the policy objectives set out in the Roaming Regulation: (i) enabling a sustainable abolition of retail roaming surcharges for all, or virtually all, operators in the EU, avoiding distortions on the home markets, (ii) ensuring cost recovery at wholesale level, whilst preserving incentives to invest in visited networks and avoiding distortion of domestic competition in the visited markets.</p>
What is the value added of action at the EU level?
<p>The Roaming Regulation entrusted the Commission with the task to review the wholesale roaming market and make appropriate proposals to enable the abolition of retail roaming surcharges in the EU from 15 June 2017. The abolition of retail roaming surcharges mandated in the Roaming Regulation is conditioned to the adoption and applicability at that date of measures at wholesale level necessary to enable this abolition. Therefore, if no measure were proposed and given the foregoing evidence that the current wholesale market legislative regime is not a sufficient basis for the introduction of RLAH, the obligation laid down in the Roaming Regulation to abolish retail roaming surcharges from 15 June 2017 would not be applicable at that date.</p>
B. Solutions
What legislative and non-legislative policy options have been considered? Is there a preferred choice or not? Why?
<p>Further to implementation implications, the options are assessed based on: country-level estimate of the average cost of RLAH for retail roaming providers compared to their average domestic revenues; sustainability test at operator level; all relevant costs at wholesale level for visited networks by reference to cost estimates, current mobile termination rates' level, and domestic wholesale and retail prices.</p> <p>Four options are considered:</p> <p><i>Option 1-no action at Union level</i> (baseline scenario): RLAH would not be applicable from 15 June 2017 and consumers would continue to pay retail roaming surcharges after that date.</p> <p><i>Option 2-set EU-wide wholesale roaming caps at the current level</i>: RLAH would not be sustainable for at least 20% of the operators in our sample and/or in at least six Member States.</p> <p>Option 3-set EU-wide wholesale roaming cap at a lower level than today: The analysis shows that this option best fulfils the policy objectives.</p> <p><i>Option 4-set country-specific wholesale roaming caps</i>: This option does not significantly improve the sustainability of RLAH at operator level compared to Option 3, while entailing greater risks regarding cost recovery at wholesale level, as well as considerable implementation difficulties.</p>
Who supports which option?
The public consultation shows that operators are divided as to what is the most appropriate regulatory wholesale level

¹ Roam Like at Home

measure to enable sustainable RLAH: certain historic incumbents and operators with a large footprint, and generally operators with large inbound roaming traffic, defend the view that RLAH is sustainable under current wholesale roaming price caps (Option 2), while other operators, in particular smaller ones, mobile virtual network operators, and operators with large outbound roaming traffic argue that wholesale roaming price caps must be significantly lowered in order to enable sustainable RLAH (Option 3). Virtually no support of Option 4 has emerged from the public consultation.

C. Impacts of the preferred option

What are the benefits of the preferred option (if any, otherwise main ones)?

Under Option 3 (lowered EU-wide wholesale roaming caps), *setting the EU-wide wholesale roaming caps at 4 €/min, 1 €/SMS and 0.85 €/MB* enables sustainable RLAH in the EU, including for operators with less bargaining power, while ensuring the recovery of visited operators' foreseeable costs of providing wholesale roaming services and keeping investment incentives in the visited markets. The cap level under Option 3 also leaves space for competition below the cap, allowing in particular to derive economic advantages from scale and the associated ability to negotiate lower tariffs.

The analysis also shows that allowing the visited and visiting operators to agree together to opt out from the cap regulation in favour of an unregulated contract, e.g. capacity-based pricing or any other contractual form, would bring a positive impact to the wholesale roaming market, and thus is proposed as a complementary measure.

By enabling RLAH from June 2017, Option 3 achieves the significant positive impact of aligning roaming prices to domestic prices for consumers travelling in the EU, as decided by the co-legislator in 2015.

What are the costs of the preferred option (if any, otherwise main ones)?

The preferred option does not create additional administrative or technical costs compared to current regulation applicable to the wholesale roaming market in the EU. By imposing lower wholesale roaming prices to mobile operators, it may in the short term reduce wholesale roaming revenues of operators when they host roaming customers of foreign operators, while reducing at the same time the wholesale costs they incur when they provide retail roaming services to their own customers. However the resulting higher demand for mobile services on travels in the EU, in particular for data, should mitigate and counterbalance both effects to a large extent. Unleashing the development of new usages of connected devices and applications on travels in the EU will in turn trigger considerable new revenues for EU mobile operators, exceeding largely in the medium term those of today's limited EU roaming mobile usage, fully in line with other initiatives under the Commission's DSM Strategy.

How will businesses, SMEs and micro-enterprises be affected?

Smaller mobile network operators and mobile virtual network operators: significant positive impact expected as these operators have more difficulty in having access to favourable wholesale roaming deals. The initiative will enable them to benefit from wholesale roaming prices facilitating their providing of retail roaming services at domestic prices.

Online businesses and start-ups: significant positive impact; usage of their services while roaming in the EU will grow, which means more opportunities for them to provide services to consumers when they travel in the EU. The initiative will promote cross-border use of connected devices/services/mobile apps, favouring innovation.

SMEs: significant positive impact for those having employees travelling in the EU for business (reduced bills).

Will there be significant impacts on national budgets and administrations?

This initiative as such will not impact on national public administrations. National regulatory authorities (NRAs) will monitor and supervise compliance with the Roaming Regulation as amended by Regulation 2015/2120.

Will there be other significant impacts?

No significant impact expected on third countries, international trade or investment. The EU's Roaming Regulation is a legislative instrument focusing on the creation of the EU internal market. Its scope covers intra-EU traffic, when a customer of one EU network operator roams on a network of another EU operator's network. The EU, a World Trade Organisation Member on its own right, is an economic integration within the meaning of Article V GATS and the EU and its Member States thereby benefit from a waiver under that Article. As the EU Roaming Regulation applies to the EU internal market only, there is no discrimination or Most-Favoured-Nation issue if (wholesale and retail) roaming rates for operators within EU differ from those outside the EU.

D. Follow up

When will the policy be reviewed?

The EC is required to report every 2 years as from June 2018. The Roaming Regulation mandates NRAs to monitor and supervise compliance with this Regulation, and BEREC to collect data from NRAs on retail and wholesale charges development (notified to the EC twice a year) and to report on the evolution of wholesale prices.

1. Policy background

International roaming services ensure that a travelling wireless device (typically a mobile phone) is kept connected to a foreign visited network without breaking the connection when crossing a border. The provision of retail roaming services rely on the functioning of a wholesale roaming market, where visited network operators offer access and capacity to visiting home operators.

Since 2006 the Commission has taken action to address the high roaming charges paid by consumers for using their mobile phones when travelling abroad in another EU Member State. Regulatory measures adopted by co-legislators in 2007, 2009 and 2012 have introduced binding maximum caps for retail and wholesale roaming prices. The ultimate objective was to ensure that market forces would achieve an internal market for mobile communication services in which no differentiation between national and roaming tariffs would exist; accordingly the Commission was required to verify whether this objective was achieved through these measures².

During these years wholesale and retail roaming prices have decreased in the EU. However roaming and national tariffs remained differentiated.

In particular, as analysed in the accompanying Review Staff Working Document (SWD) on the wholesale roaming market in the EU ('accompanying Review SWD' hereinafter), at both retail and wholesale levels the evolution of prices for roaming services has been closely aligned to the dynamics of the various price caps set by the EU Roaming Regulations since 2007, although differences exist on the extent and timing of prices' decreases in particular at wholesale level between voice and SMS on the one hand and data on the other³.

While an increasing number of operators have started to offer some domestic tariff plans which include roaming services in the domestic bundle, also in view of the forthcoming "roam-like-at-home" regime (see below), most of these tariff plans do not cover all EU Member States, or concern only voice and SMS, or data only, and/or include roaming services in the domestic bundle as an add-on package (i.e. for a fixed periodic - daily, weekly or monthly – charge which represents a fixed roaming surcharge over the domestic price).

Several market failures analysed in the accompanying Review SWD affect the roaming retail market. These include the absence of substitutes at retail level fully satisfying the mobility needs of users, the lack of tariff transparency and of sufficient incentives for intermittent roaming users to look for alternatives to the roaming services bundled with the domestic tariff and the resulting inelastic demand for roaming services for a significant proportion of the customer base⁴. These market failures prevent the same competitive dynamics characterising the retail domestic services to extend also to the provision of retail roaming services.

Even if some technological developments analysed in the accompanying Review SWD could increase competitive pressure at retail level, yet these are unlikely to be massively available in

² See in particular Article 19(2) of the original wording of Regulation (EU) n. 531/2012, which called upon the Commission to make appropriate proposals if differences between roaming and national tariffs did not approached to zero.

³ See Section 3.2.1 and 3.2.2. of the accompanying Review SWD on the wholesale roaming market in the EU..

⁴ See Section 4.2. of the accompanying Review SWD on the wholesale roaming market in the EU.

the medium term⁵ and above all, they do not address the competitive issues affecting the wholesale roaming markets and in particular the risk of high prices for some of the wholesale inputs still needed for the provision of the retail service. Indeed high prices for the input acquired at wholesale level, well above the underlying costs, also hinder convergence of domestic and roaming retail prices, since the home operator faces costs for providing roaming retail services which differ significantly from its own domestic costs, which are taken into account in defining domestic prices.

Taking into account the importance for the effective establishment and functioning of a telecom single market of achieving the objective of no differentiation between national and roaming tariffs, the policy makers considered necessary to ensure such an objective directly.

In particular in 2015, the European Parliament and the Council completed the process of adoption of Regulation 2015/2120⁶, which entered into force on 29 November 2015 and, *inter alia*, amended Regulation 531/2012⁷. In the rest of the document, the Roaming III Regulation as amended by Regulation 531/2012 is called the Roaming Regulation.

The co-legislators in particular agreed to directly mandate the abolition of retail roaming surcharges in the EU from 15 June 2017, subject to fair usage of roaming services and a sustainability clause. This new regulatory regime for retail roaming services in the EU is designated as the "roam-like-at-home" (RLAH) regime in the remainder of the report. The entry into force of RLAH is subject to the adoption of appropriate legislative measures regarding the wholesale roaming markets, following a review carried out by the Commission. In the meantime a transition regime applies, where retail roaming surcharges to domestic conditions are applicable (s.c. RLAH+) in line with the applicable maximum roaming wholesale price caps laid down in the Roaming III Regulation and which were not addressed by the co-legislators in 2015⁸.

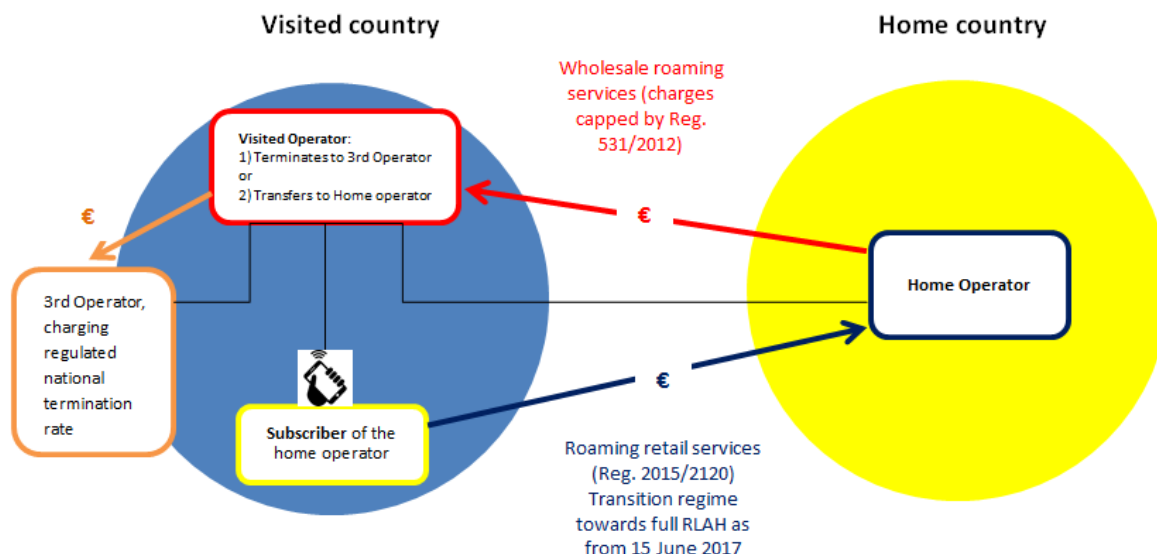
Figure 1 - Scheme of current regulatory treatment of retail and wholesale roaming services within the EU

⁵ Such as, for instance, eSims or Voice over LTE (VoLTE) analysed in section 4.6. of the accompanying Review SWD.

⁶ http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2015.310.01.0001.01.ENG&toc=OJ:L:2015:310:TOC

⁷ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012R0531>

⁸ I.e. up to 0,05€ per minute of calls made, up to 0,02€ per SMS sent, 0,05€ per MB of data, the weighted average of maximum mobile termination rates per minute of call received) in addition to the domestic tariff conditions, provided that the overall amount does not exceed 0,19€ per minute of call received, 0,06€ per SMS and 0,20€ per MB.



Indeed the retail and wholesale roaming markets are closely interrelated, in particular in the event of regulation at retail level, since the price at which the wholesale input is available to the home operator is key to ensure that regulated operators can fulfil their retail price obligations.

Accordingly, since the correct working of wholesale roaming market is a precondition for the achievement of a full RLAH regime but was not specifically addressed in 2015, the Commission has therefore been entrusted with the specific task to review the wholesale roaming markets, as a precondition for the entry into force of RLAH. This review was carried out with a view to analyse the degree of competition in national roaming markets, any observable risk of distortion of competition and investment incentives in domestic and visited markets in order to assess the measures necessary to enable the achievement of the objective established by the co-legislators, i.e. the abolition of retail roaming surcharges by 15 June 2017; it also took into account the need to ensure that the visited network operators are able to recover all costs of providing regulated wholesale roaming costs and the need to prevent permanent roaming or anomalous or abusive use of wholesale roaming (Article 19 of the Roaming Regulation).

The Commission has therefore conducted a comprehensive review of national wholesale roaming markets in the EU in view of these specific objectives laid down in the Roaming Regulation, since other aspects of the overall roaming regulatory regime set out in Roaming III, and in particular those concerning the regulation of retail roaming services have been already addressed by the policy choices made by the co-legislators in the context of the adoption of Regulation 2015/2120⁹. The methodology and findings of the review are detailed in the accompanying Review SWD. Based on these findings, this Impact Assessment takes stock of the problems affecting the functioning of the wholesale roaming markets identified in the accompanying Review SWD and their impact on the provision of regulated retail roaming

⁹ Concerning in particular the establishment of the RLAH regime, the corresponding necessary transparency measures and the principles governing the safeguards for consumers and operators for the provision of sustainable RLAH.

services across the Union, and analyses the options for addressing them in view of the policy objectives indicated by the co-legislators, i.e. to enable European citizens to access mobile services at domestic prices when periodically travelling abroad in the EU, without distorting visited and home markets.

2. Problem definition

2.1. What is the problem

With the establishment of the obligation to charge retail roaming services at domestic prices (no more retail roaming surcharges), Regulation EU 2015/2120 has defined the substance of the new RLAH retail regulatory regime for regulated roaming services.

However, while retail pricing of roaming and domestic services would be aligned by regulation, the provision of retail roaming services does not use the same wholesale inputs as retail domestic services, in view of the fact that the provision of retail roaming service requires, by definition, the use of a different (visited) network. These wholesale roaming inputs are therefore to be bought in the market by the visiting operator. Wholesale roaming inputs include a number of costs specific to roaming (i.e. not incurred in providing domestic services), such as roaming operation and management costs, roaming financial and data clearing costs, roaming negotiation and contract management costs¹⁰. In order to ensure that the retail roaming services can be provided at domestic retail prices, therefore, it is necessary that wholesale roaming inputs are available at a price that makes generally possible for the visiting (home) operators the provision of RLAH, eventually subject to fair use and without prejudice to the possibility to ask for a sustainability derogation in exceptional circumstances, while at the same time ensuring that the visited operators can recover the costs of provision of these services.

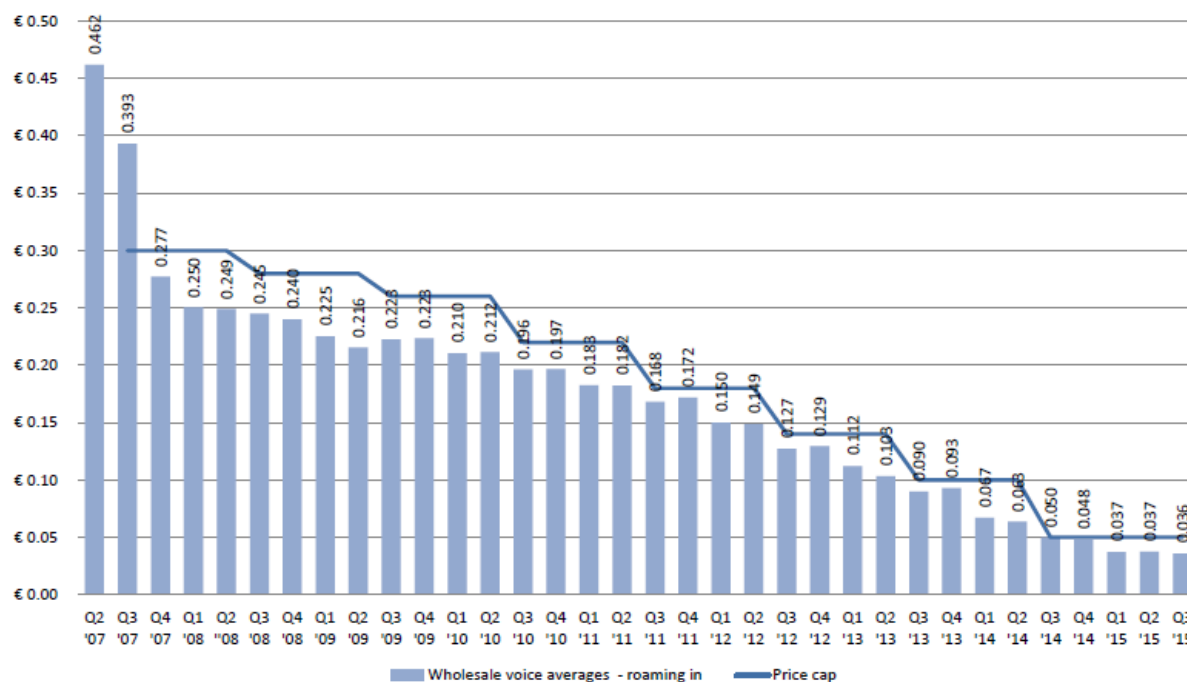
A perfect functioning of national wholesale roaming markets, which would bring prices in line with the costs of visited networks, would clearly facilitate the sustainability of RLAH. However, the accompanying Review SWD shows that wholesale roaming markets do not always function correctly and that the future retail RLAH obligation is by itself unlikely to lead to well-functioning wholesale roaming markets. The main findings of the Review report are set out below.

National wholesale roaming markets exhibit a number of market failures

First of all it is widely admitted by stakeholders in the public consultation that any competitive dynamics that may be observed on the wholesale roaming markets in the EU are essentially linked to existing EU caps which provide a starting point for price negotiations in bilateral roaming agreements. This is also confirmed by the dynamics of wholesale prices in relation with the caps, in particular for voice and SMS.

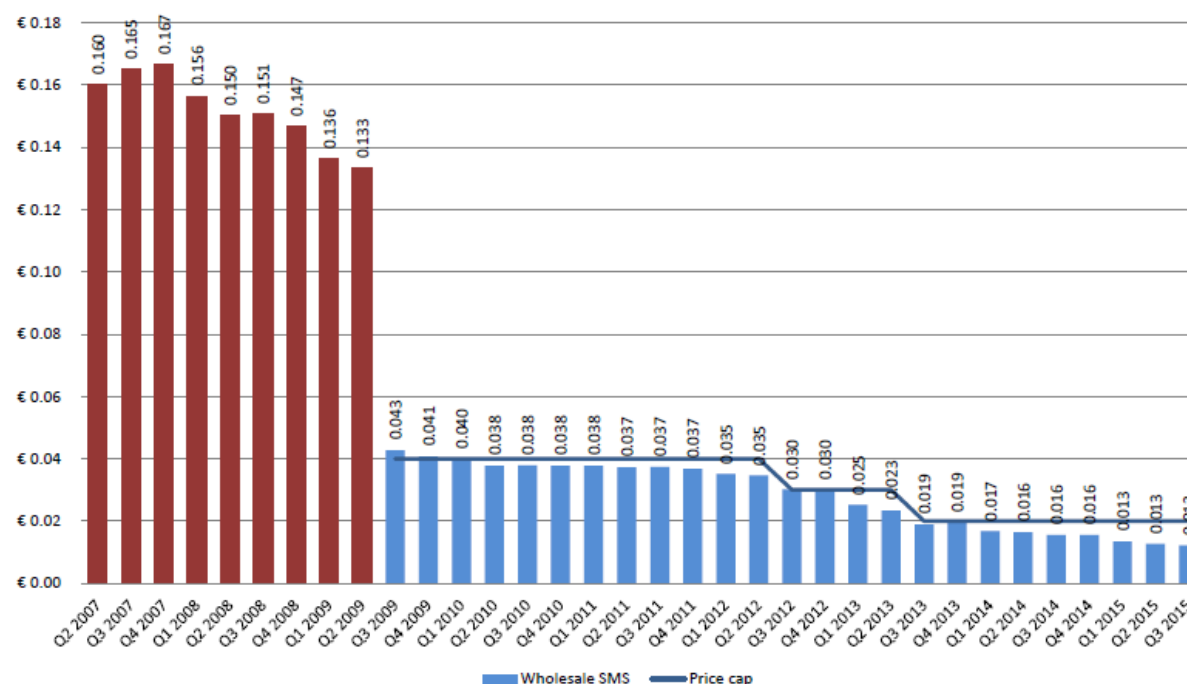
Figure 2 - EEA average price per minute for wholesale non-group roaming voice calls

¹⁰ See the accompanying Review SWD on wholesale roaming markets in the EU, section 5.



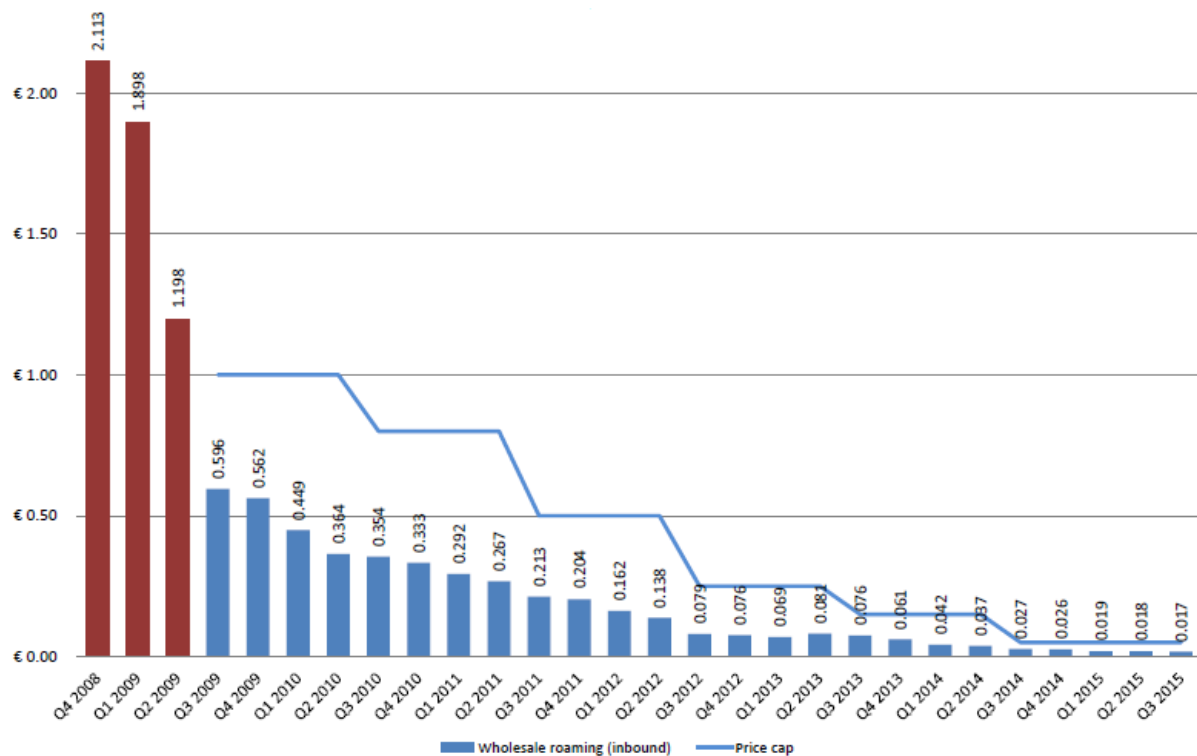
Source: International roaming BEREC Benchmark Data Report April – September 2015, BoR(16)28, February 2016

Figure 3 - Average wholesale price per intra-EEA roaming SMS: charges to non-group companies



Source: International roaming BEREC Benchmark Data Report April – September 2015, BoR(16)28, February 2016

Figure 4 - Average wholesale data price per MB (prepaid+postpaid), EEA average



Source: *International roaming BEREC Benchmark Data Report April – September 2015*, BoR(16)28, February 2016

Absent regulation in the EU, wholesale roaming prices would be higher than they are, as evidenced by unregulated wholesale roaming prices inside the EU before any regulation.. The main market failures identified in the accompanying Review SWD, persisting despite some competitive dynamics emerging thanks to steering traffic techniques (i.e. the possibility for the home operator to steer most of the traffic originated by its subscribers to a single visited network offering the best quality and pricing wholesale conditions) are the following:

- Oligopolistic character of national wholesale markets: only MNOs offer roaming services in visited markets (3 to 4 depending on the Member State) and among those, often not all of them can provide a full range of services (such as full geographic or services coverage) needed to provide services to all roamers (see also section 6.2.1 of the accompanying Review SWD).
- Bilateral nature of roaming agreements: the main negotiation driver in roaming agreements is the amount of inbound and outbound traffic that can be balanced between each pair of operators, more than the final price agreed for the unbalanced part. This means that operators with no or little inbound traffic to balance off (MVNOs, MNOs with large outbound balance) are unable or seriously impaired to negotiate better conditions than those in the cap. (see also section 6.2.4 of the accompanying Review SWD)
- Imperfect wholesale roaming substitutes: these did not develop beyond very niche markets, in view of their inconveniences at retail level (need to change number; need to acquire a new subscription in the local/visited market, see also section 6.2.2. of the accompanying Review SWD)
- Exclusion of MVNOs from wholesale roaming markets: this reduces competition among visited networks as well as the possibility for MVNOs to negotiate

autonomously from the host MNOs better deals for their outbound roaming traffic. (see also section 6.2.5. of the accompanying Review SWD)

The impact of these market failures on the functioning of wholesale markets results in observed prices substantially above estimated costs, as analysed in the accompanying Review SWD¹¹. That analysis in particular shows that the gap between prices and estimated underlying costs is likely to be larger for data than for voice. The report also shows that a number of market players, in particular smaller operators not part of a group and with smaller traffic volumes and MVNOs, do not generally benefit from lower wholesale roaming prices than the caps (see section 6 of the accompanying Review SWD).

The anticipated impact of the future RLAH obligation on competition dynamics in national wholesale roaming markets is uncertain

The Wholesale Report also concludes that it is not possible to anticipate with certainty a positive impact of the future RLAH obligation on competition on national wholesale roaming markets. The public consultation shows that, if 70% of the mobile operators expect an effect of the retail RLAH obligation on competition dynamics in the wholesale roaming markets, they are split as to whether the retail RLAH obligation will increase or decrease competition on the wholesale roaming market¹².

Overall, the mandatory imposition of RLAH is supposed to produce an increase of wholesale roaming traffic¹³. On the one hand, this expansion of wholesale markets could bring per-unit production costs down, thanks to economies of scale. This could be accordingly reflected in lower wholesale prices, depending on the level of competition between visited operators to attract to their networks the increased demand by home operators. On the other hand, the overall demand will increase, and this may inflate overall costs borne by the home operators, taking also into account that they have more limited freedom in the wholesale roaming negotiations in view of the reduced capacity to influence demand for retail roaming services of its subscribers through pricing. The obligation upon the home operator to provide RLAH to its customers could therefore exacerbate and aggravate the structural differences and imbalances in the relative negotiation positions between net senders and net receivers in bilateral roaming negotiations.

In light of the analysis carried out in section 7 of the accompanying Review SWD, therefore, the risk that the negotiation position of the net senders of roaming traffic, including the weaker market players on wholesale roaming markets, would in fact deteriorate under RLAH cannot be excluded in the absence of countervailing measures.

In assessing whether and to what extent RLAH regime could be delivered in accordance with the objective of the co-legislator, therefore, it can be first of all concluded that the current functioning of the wholesale roaming markets has not by itself supported a competitive dynamic leading to a convergence of wholesale prices generally available in the markets towards underlying costs. Accordingly, with a generalisation of a RLAH regime (in particular in the event of mandatory abolition of retail roaming surcharges), the current functioning of wholesale roaming markets would not enable in general the sustainability of operators'

¹¹ See in particular Section 5.9 of the accompanying Review SWD on the estimation of costs for the provision of wholesale roaming services and section 6.5 on the analysis of observed prices.

¹² See Annex 2.

¹³ See the estimates of traffic increases between 2014 and 2017 provided for in Annex 4.

domestic charging models, in particular for those operators with weaker bargaining powers in wholesale markets.

Figure 5: Parts of the problem, drivers and consequences table

<i>Drivers</i>	<i>Problem</i>	<i>Consequences</i>
<ul style="list-style-type: none"> - Retail and wholesale roaming markets are strictly interlinked, since in order to provide retail roaming it is necessary to acquire wholesale access inputs in the visited country. - National wholesale roaming markets exhibit a number of market failures which result in wholesale roaming prices being supra-competitive compared to underlying costs. - The impact of the retail RLAH obligation on competition dynamics in national wholesale roaming markets is uncertain and unlikely to change wholesale roaming market conditions so as to ensure that they would work competitively to satisfy increased demand, in particular from operators with low or no inbound traffic to exchange. 	<p>The current functioning of national wholesale roaming markets would not enable a competitive dynamic enabling the abolition of retail roaming surcharges by 15 June 2017 while in general ensuring the sustainability of operators' domestic charging models, in particular for those operators with weaker bargaining powers in wholesale markets.</p>	<ul style="list-style-type: none"> - Customers of the derogating operators will not enjoy the benefits of RLAH and continue to pay a roaming surcharge in addition to the domestic price. - In effect RLAH will not happen throughout the EU from 15 June 2017. - If RLAH is implemented while wholesale roaming costs are inconsistent with current domestic retail prices, domestic prices may rise.

2.2. Who is affected

Wholesale roaming markets represent a fraction of overall domestic traffic, which actually vary across operators, as analysed in the accompanying Review SWD. In most instances, wholesale roaming revenues represent between 1 and 2% and in any case are below 4% of overall domestic retail revenues (see in particular Section 6.4.).

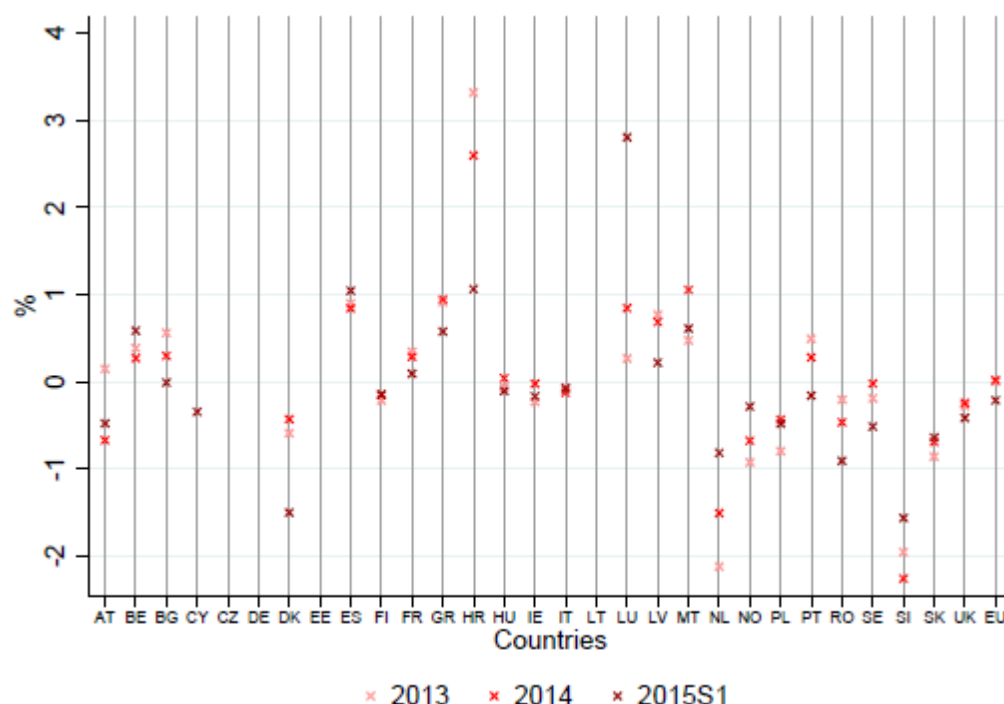
On the other hand, the distribution of roaming traffic across Member States diverges quite significantly, since roaming traffic flows are highly influenced by the patterns of tourism and travelling in the EU as well as, increasingly, by consumption patterns¹⁴. There has been a traditional distinction between countries with a high ratio of inbound traffic compared to outbound traffic (i.e. more users coming in the country using roaming services than users leaving the country), and those with a larger amount of residents leaving the country for tourism, usually along a South-North divide¹⁵. This results in significant divergences of the

¹⁴ For instance, in some countries traffic unbalance, in particular for data is also driven by consumption of outbound roamers adding to inbound touristic flows (for instance in view of general low usage of data) or, on the contrary, by very high consumption of inbound roamers (for instance by business users accounting for a substantial amount of inbounders, such as in Belgium and Luxembourg).

¹⁵ See in particular Section 6.4.1. of the accompanying Review SWD, with an analysis of traffic flows. It should be noted that references to Northern and Southern countries are intended schematically, there are notable

total wholesale roaming balance (revenues minus payments) as a percentage of retail domestic revenues, as shown in the graph below.

Figure 6 - Total intra-EEA wholesale roaming balance (revenues minus payments) as a % of total retail domestic revenues (y-axis), all services included, per country



Data: operators' replies to the autumn 2015 data collection
JRC's calculations

In assessing the sustainability of RLAH under current market conditions, it should be noted that the size of these traffic imbalances, in particular those deriving from general touristic and travelling flows, may actually increase, in view of the generalised expected increase in roaming consumption¹⁶. Under current market conditions and in view of the functioning of wholesale markets illustrated above, operators that would be more affected by that imbalance would be operators with less bargaining power in wholesale roaming negotiations (e.g. smaller operators not part of a group, MVNOs, which cannot negotiate significant discount compared to the wholesale caps in view of their limited size) and/or with large net outflows of roaming customers and/or roaming traffic (e.g. operators operating in Northern countries and with high domestic consumption patterns).

With regard to operators in many Northern countries with high imbalance in roaming traffic this is due both to the travelling patterns towards the South of the EU and, in some cases, to their intensive and growing use of mobile data. Altogether, the exposure of operators in Northern countries to wholesale roaming charges is high and will increase considerably under the RLAH regime as their subscribers will, subject to fair use, be able to replicate their sizeable domestic data consumption while roaming.

variations between countries in both regions due to travel patterns, smartphone penetration, price sensitivity, domestic touristic flows, size, etc. As an example, both Italy and France, although among the most touristic countries in the EU, have rather balanced traffic.

¹⁶ See the estimates of traffic increases between 2014 and 2017 provided for in Annex 4.

In contrast, operators with large net inflows of roaming customers and/or capacity to negotiate better rates, in particular a number of incumbents and operators with large footprint, benefit from high wholesale roaming caps (in terms either of direct wholesale revenues, or of competitive advantage relative to domestic rivals) and this could be accentuated with the abolition of roaming surcharges, in view of the increase in demand due to the mandatory RLAH obligation.

In conclusion, the imposition of RLAH is expected to affect the demand for wholesale roaming services. In view of the current traffic flows and market conditions, on the one hand this could accentuate the impact of current imbalances between Northern/smaller (net out-bounders) and Southern/bigger (net in-bounders) operators, leading to the risk of unsustainable provision of RLAH under current domestic prices for the former and additional revenues triggered by the RLAH regulatory obligation for the latter. .

2.3. What would happen if nothing is done?

The abolition of retail roaming surcharges from 15 June 2017 mandated in the Roaming Regulation is conditioned to the adoption and applicability at that date of measures at wholesale level necessary to enable this abolition (Article 6a). Therefore, if no measure were proposed and given the foregoing evidence that the current wholesale market legislative regime is not a sufficient basis for the introduction of RLAH, the obligation laid down in Article 6a of the Roaming Regulation to abolish retail roaming surcharges from 15 June 2017 would not be applicable at that date. The transitional period put in place in the Roaming Regulation from 30 April 2016, which allows operators to apply to their customers roaming in the EU retail roaming surcharges in addition to the domestic price, would continue beyond 15 June 2017. EU would fail to deliver in June 2017 the end of retail roaming surcharges in the EU that it has mandated and announced publicly in 2015.

3. Why should the European Union act?

As described in the background section, EU regulatory intervention on wholesale and retail roaming markets pursuant to Article 114 TFEU (former Article 95 TEC), has been necessary for the last 10 years in order improve the conditions for the functioning of the internal market for roaming services within the Union¹⁷, taking also into account that NRAs acknowledged that they were unable to autonomously tackle alone this problem due to the cross-border nature of the international roaming market¹⁸.

This regulatory intervention includes the RLAH obligation introduced by the Roaming Regulation, which considered in particular this retail obligation as a necessary element to ensure the establishment and functioning of a single telecom market across the Union. While necessary, in view of the interrelationships between retail and wholesale roaming markets explained above, this retail regulation is not sufficient alone to ensure the correct functioning of the single telecom market and the roaming market in particular. Therefore, measures on regulation of wholesale roaming markets pursuant to Article 114 TFEU are therefore also needed to ensure the correct functioning of the wholesale roaming market across the Union and, ultimately, to enable the provision of RLAH in a sustainable way.

¹⁷ The use of the legal basis was also confirmed by the European Court of Justice in Case C-58/08: Judgment of the Court (Grand Chamber) of 8 June 2010, paragraph 48.

¹⁸ See December 2005 ERG letter to the Directorate general of the Commission's DG Information Society.

In particular, with regard to wholesale roaming markets, individual Member States have insufficient incentive to regulate in a way that takes into account the possible effect of its regulation on the other Member States and on the implementation of RLAH. Therefore a common approach at the European level is preferable as this would better take into account the general interest of all European Member States. A European approach would also avoid that individual Member States take divergent approaches for dealing with the problem of high wholesale prices, which would create obstacles to the Internal Market since European roaming services providers would be treated differently depending on whether they are wholesale roaming providers (as visited operators) or buyers of wholesale roaming services (as home operators), in spite of common roaming retail regulation at European level as laid down in Regulation (EU) No 2015/2120.

Moreover, in accordance with the principle of subsidiarity, while on the one hand national measures on roaming markets alone would not be able to ensure the objective of RLAH, a common approach at EU level on the contrary could establish the necessary regulatory conditions ensuring that national wholesale markets work in accordance with the European objective of abolition of roaming surcharges in a sustainable way throughout the EU. This will also take into account the interdependence between a common approach on regulation of retail and wholesale markets to ensure the smooth functioning of Union roaming markets, as highlighted by the Court of Justice¹⁹.

Finally, the principle of proportionality of EU action requires that measures implemented through Union law provisions are appropriate for attaining the legitimate objectives pursued by the legislation and do not go beyond what is necessary to achieve these objectives. Within the broad discretion granted to the legislator in achieving this objective, the Court clarified in particular with regard to roaming regulation that the legislator shall base its choice on objective criteria; moreover, even if substantial negative economic consequences for some operators could derive from the measures adopted, for the measures to be compatible with EU law these consequences need to be justified for the achievement of the objective²⁰. With specific regard to these aspects, the wholesale regulatory options assessed in this Impact Assessment take into account two elements in accordance with Regulation 2015/2120, i.e. the need to ensure that visited operators are able to recover all costs, including joint and common costs, of providing regulated wholesale roaming services and the need to prevent permanent roaming or anomalous or abusive use of wholesale roaming access.²¹ These specific requirements indeed ensure that wholesale roaming regulation, in accordance with the proportionality principle, does not go beyond what is necessary to ensure the general policy objective, by creating negative economic consequences which are not justified for the achievement of the objective, such as requiring efficient operators to provide services below their costs or imposing access regulation without visited operators having the effective means to limit this to roaming services. On the other hand, as highlighted by the Court, compliance with the proportionality principle does not exclude that in specific cases negative economic consequences could occur for some operators, such as with regard to reduction of supra-competitive profits stemming from wholesale roaming activities or losses due to inefficient

¹⁹ In case 58/08 the Court of Justice considered that wholesale regulation of roaming market is compliant with the subsidiarity principle in view of the fact that "the interdependence of retail and wholesale charges for roaming services is considerable, so that any measure seeking to reduce retail charges alone without affecting the level of costs for the wholesale supply of Community-wide roaming services would have been liable to disrupt the smooth functioning of the Community-wide roaming market", paragraph 77.

²⁰ Case C-58/08, paragraph 53.

²¹ The latter requirement is in principle addressed through Article 3(6) of the Roaming Regulation.

management of network costs, since in these cases these negative consequences are indeed justified by regulatory measures necessary to achieve the objective.

4. Policy objectives

The general policy objective, set out in the Roaming Regulation by the co-legislators in 2015, is to enable European citizens to access mobile services at domestic prices when periodically travelling abroad in the EU. This is an important element of the Digital Single Market strategy set out by the Commission on 6 May 2015 (COM(2015)192)²².

Taking into account the interdependence between retail and wholesale roaming regulation and in line with the problem definition according to which the current functioning of wholesale markets would not ensure the achievement of that policy objective, the present initiative should ensure that national wholesale roaming markets function in such a way that, from 15 June 2017, that general policy objective can be met throughout the EU and without distorting domestic *visited* and *home* markets. The two specific objectives of this initiative therefore are to ensure that the functioning of wholesale markets with a view to enable RLAH a) do not distort domestic visited markets and b) do not distort domestic home markets, by making the provision of RLAH structurally unsustainable.

With regard to the first specific objective, the Roaming Regulation explicitly requires the Commission to take into account the impact of wholesale regulation on the *visited* networks, including in particular in terms of cost recovery, in order to preserve incentives to invest in visited networks and avoid distortion of domestic competition in the visited markets due to regulatory arbitrage of operators using roaming access remedies to compete in domestic visited markets..

In order to take into account this specific objective, each of the regulatory options takes into account different estimations to assess the costs of provision of wholesale roaming services, including joint and common costs, by an efficient operator. Moreover, while bearing in mind that the visited operators are empowered to act against permanent roaming under Article 3(6) of the Roaming Regulation and will have relevant incentives to do so, the risk of permanent roaming is also analysed in order to determine whether there is a need for additional regulatory options, taking also into account the level of domestic retail prices.

At the same time, the other specific objective of the proposal requires to verify that any appropriate regulatory measures to be imposed on national wholesale roaming markets enable a sustainable abolition of retail roaming surcharges for all, or virtually all, operators in the EU in order to avoid distortions on the *home* markets.

Indeed, while other regulatory measures than wholesale measures may also have an impact on the way RLAH is provided in the Union (in particular by means of application of fair use policies by operators or sustainability derogations in specific circumstances in accordance with the other implementing measures to be adopted by the Commission pursuant to Regulation 2015/2120), the correct functioning of wholesale roaming markets is the main element to ensure that wholesale roaming inputs are available to the vast majority of market

²² <https://ec.europa.eu/digital-agenda/en/news/digital-single-market-strategy-europe-com2015-192-final>; see in particular section 3.1 " Making the telecoms rules fit for purpose"

players at conditions enabling the provision of RLAH²³. This was also raised in the public consultation, where several respondents stressed that any restriction in the provision of RLAH allowed under fair use or via sustainability derogations is likely to be a competitive factor in the domestic market and should therefore be limited as much as possible.

The analysis of regulatory options *vis à vis* this specific objective, therefore, will be based on the assessment of the impact of different wholesale regulatory measures on the costs of the visiting operators providing RLAH and on its overall business case.

As a matter of fact, the two specific objectives are interrelated and need to be taken into account together, since the highest level of sustainability can be achieved with the lowest level of wholesale prices, but any regulation of the latter should ensure cost recovery. Therefore the options considered in the impact assessed are meant, on the one hand, to minimise number of cases where the provision of RLAH is not sustainable for the home operators provided that, on the other hand, cost recovery for the visited operators is ensured.

Figure 7: General and specific objectives

General Objective	Specific Objectives
Enable European citizens to access mobile services at domestic prices when periodically travelling abroad in the EU	<ul style="list-style-type: none"> • ensure cost recovery at wholesale level, preserving incentives to invest in visited networks and avoiding distortion of domestic competition in the <i>visited</i> markets • enable a sustainable abolition of retail roaming surcharges for all, or virtually all, operators in the EU, avoiding distortions on the <i>home</i> markets

5. Policy options

The different options to achieve the objective are the following:

Option 1 (baseline scenario): no action at EU level.

Option 2: set EU-wide wholesale roaming caps after 15 June 2017 at the level of the Roaming Regulation currently in force.

Option 3: set EU-wide wholesale roaming caps after 15 June 2017 at a lower level than in the Roaming Regulation currently in force, but compatible with the recovery of (i.e. above) costs of providing wholesale roaming services, including a relevant share of joint and common costs, in all Member States.

Option 4: set country-specific wholesale roaming caps after 15 June 2017 at a cost-oriented level based on costs estimated by NRAs using a common cost model.

²³ This is due to the fact that these other measures concern rather the harmonisation of measures adopted by home operators aiming at preventing abusive or anomalous behaviour of end-users (the minimum fair use safeguards) or of national powers to grant derogations from RLAH in order to take into account exceptional market circumstances (the sustainability derogations).

Additional measure in Options 2, 3, 4: allow mobile operators to opt out from the cap regulation if both the visited and visiting operators agree to the terms of an unregulated contract, e.g. capacity-based pricing or any other contractual form.

All options are to be imposed on providers of mobile electronic communications services (hereinafter "operators").

5.1. Option 1: no action at Union level (baseline scenario)

The Commission does not make any legislative proposal. By conditioning the applicability on 15 June 2017 of the abolition of retail roaming surcharges (RLAH regime) to the applicability, on that date, of a legislative act adopted following the Commission's wholesale roaming review, Article 6a of the Roaming Regulation provides that, under Option 1, the abolition of retail roaming surcharges (RLAH) does not take effect on 15 June 2017. Pursuant to Article 10(2) litera (a) of the Regulation, the transitional regime defined in Article 6f (designated as the RLAH+ regime, which includes the possibility for operators to continue applying a retail roaming surcharge) continues to apply until that legislative act becomes applicable.

5.2. Option 2: set EU-wide wholesale roaming caps at the level currently in force

This option implies setting, after 15 June 2017, the same wholesale roaming caps set in Articles 7, 9, and 12 of the Roaming Regulation and valid until 30 June 2022 for calls made, SMS messages and data respectively. Their respective values are 0.05 € per minute, 0.02 € per SMS, and 0.05 € per MB. This is done by adopting a new legislative act setting out the wholesale roaming caps at the same level

5.3. Option 3: set EU-wide wholesale roaming caps at a lower level

This option implies setting EU-wide wholesale roaming caps at lower levels than the levels set in Articles 7, 9, and 12 of the Roaming Regulation and valid until 30 June 2022 for calls made, SMS messages and data respectively. In line with Article 19 of the Roaming Regulation, the new levels of the caps would allow the recovery of costs of providing wholesale roaming services in all Member States, including a relevant share of joint and common costs. Under this option, the Commission estimates the costs for a hypothetical efficient operator in the higher-costs Member States, using a variety of evidence sources such as the generic cost model developed by TERA for the Commission for the wholesale roaming review, assumptions underlying regulated termination rates for voice, evidence from domestic and roaming wholesale markets and from domestic retail prices. The EU-wide caps are set above those costs.

5.4. Option 4: set country-specific wholesale roaming caps

Under this option, NRAs are requested to estimate the costs of providing wholesale roaming voice, SMS messages and data services for a hypothetical operator in their respective countries using the generic cost model developed by TERA for the Commission for the wholesale roaming review. The national cost estimates produced are used to set, at national level, cost-oriented country-specific wholesale roaming caps with an appropriate return on investment.

The national cost estimates of each NRA are peer-reviewed by the Commission. If, in a given Member State, the Commission finds the cost estimates of the NRA inconsistent with the methodology set out by the Commission, the Commission may oppose the caps proposed by the NRA and impose alternative caps based on the cost estimates found for countries of a similar cost level according to the cost model.

5.5. Additional measure to Options 2 to 4

This measure can be proposed next to any of the three options setting wholesale roaming price caps. The measure consists in giving the possibility to "opt out" of the regulated caps regime if both parties to the roaming agreement agree to the terms of a specific contract. This can be for example a capacity-based roaming contract based on bandwidth or a flat-rate based on the expected number of visiting subscribers. This option gives more negotiating flexibility and at the same time enables operators to explore specific agreements which are currently disincentivised by the possibility for one of the contracting party to have recourse to the legal wholesale caps *ex post* in contrast with initial contractual commitments: under this additional measure, neither party would be entitled to revert to the cap once the agreement outside the cap has been contractually established.

5.6. Discarded options

Lifting (removing) wholesale roaming caps:

The option of not imposing any wholesale roaming cap in the EU after 15 June 2017 has been actually proposed by a very limited number of operators, in particular with big footprint and large inbound roaming traffic, on the basis that the current wholesale market would be sufficiently competitive to ensure that wholesale roaming prices are sufficiently low²⁴. In contrast the vast majority of stakeholders are not calling for lifting any wholesale roaming price regulation under the future retail RLAH obligation. These are of the view that price caps are necessary, as operators tend to use wholesale price caps as the starting point for their bilateral negotiations on wholesale roaming prices. Removing wholesale roaming price cap regulation could affect the competitive dynamics observed in these markets and result in higher wholesale roaming prices. In its Report on the review of the wholesale roaming market, BEREC is not considering the option of lifting any wholesale roaming regulation at all.

Taking into account the results of the public consultation, this option has been discarded as it raises significant doubts as to the possibility that it enables RLAH on a significant scale for the following reasons: 1) significant market failures affect the wholesale roaming markets, as highlighted in the accompanying Review SWD, and therefore there is no guarantee that without regulation wholesale roaming prices driven by market forces alone will be lower or even will not increase compared to existing price levels, in particular for specific categories of operators which have limited footprint, smaller volume traded and significant outbound roaming traffic 2) as shown in the accompanying Review SWD and in Option 2 below, even current wholesale roaming regulation is not sufficient to enable sustainable RLAH in 2017, 3) the impact of the future retail RLAH obligation on competition dynamics in the wholesale

²⁴ In the public consultation, only 4 (including two from the same group) out of 40 operators are of the view that the most appropriate regulatory measure to enable RLAH would be to lift any wholesale roaming regulation altogether, on the ground that there is enough competition in national wholesale roaming markets as shown by actual prices below the cap.

roaming markets is unlikely to improve the wholesale roaming market conditions so as to eliminate the unsustainability issues (on the contrary, the risk cannot be excluded that the future retail RLAH obligation may deteriorate the bargaining power of the weaker operator in bilateral roaming negotiations), 4) wholesale roaming caps also protect home networks when customers lose coverage from their preferred networks and roam on a network that does not have discounted rates, Therefore regulation of wholesale roaming markets will be necessary under RLAH.

Set new, lower EU-wide wholesale roaming caps allowing additional seasonality mark-up:

This option would be similar to Option 3, but the costs estimated for a hypothetical efficient operator in the higher-costs Member States would not include any possible impact of the seasonal character of roaming on the costs of providing wholesale roaming services going beyond the seasonal character of the domestic market and the overall trend in demand for the retail services in question. If an NRA demonstrates a measurable effect of seasonality contributing to increase those costs, it would be allowed to add a mark-up on those EU caps to enable the operators of the country to strictly recover those additional costs.

The impact of roaming seasonality has been carefully analysed in the external study²⁵ to assess the costs of providing wholesale roaming services using the best available data to quantify it. It is discussed in detail in section 5 of the accompanying Review SWD. In particular, for data services, network needs to support domestic users already tend to exceed the summer seasonal peak before the seasonal peak recurs the following year due to massive ongoing demand growth. For voice services, there are significant extra costs for seasonal peaks for some countries, but these are spread over all users (domestic and roamers) due to significant seasonal in-country displacement to touristic areas and to the compensating effect of roamers on capacity usage in metropolitan areas during the summer holiday season.

While being not negligible for voice services in some countries, seasonality effects remain small relative to overall caps in Option 3, in particular because countries where seasonality effects are assessed as the highest (Croatia, Greece, Bulgaria) are not among the higher cost countries for wholesale roaming services (Malta, Cyprus, Luxembourg). The seasonality effects measured in the higher cost countries are smaller²⁶. Therefore an option excluding seasonality effects from Option 3's caps only allows a small reduction of EU caps and adds little value. In particular, seasonality effects alone do not jeopardise the sustainability of RLAH in the EU as shown in Option 3 below.

In addition, like Option 4, this option implies important implementation challenges, complexities and costs compared to Option 3. By opening a new derogation procedure at wholesale level which may have consequences on the sustainability derogation procedure foreseen in the Roaming Regulation at retail level, this option would create an uncertain and unstable RLAH setting for at least several months. This option would therefore involve implementation complexities and additional administrative burden without adding value in reaching the policy objectives compared to Option 3.

Create a spot market:

²⁵ See Annex 1.

²⁶ In other words, larger seasonality effects add up on top of smaller costs while smaller seasonality effects add up on top of higher costs, thereby reducing the net effect of seasonality on the overall highest costs in the EU.

A spot market would impose a mandatory obligation to trade roaming traffic anonymously through trading platforms. This would allow separating the offer to supply a given number of roaming units (minutes, SMS, MB) in a given visited country from the offer to purchase a given number of units of roaming traffic, removing the bilateral nature of roaming exchanges. Total volumes of demand and supply are broken down in standard size "bonds" in order to allow for easy and neutral trading. This option requires all wholesale inbound roaming traffic to be purchased by means of open trading (e.g. via an electronic platform). In this way, suppliers will compete to attract as much inbound traffic as possible in their visited networks, regardless of the amount of outbound traffic to be negotiated for, mimicking a perfectly competitive market.

Creating a spot market would involve a significant structural change to the functioning of wholesale roaming markets. The whole structure of the market would be shaken up since all competitively and commercially grown alliances would be broken down. Such a complete overhaul of the system needs a significant time to be implemented and to fully and effectively replace the current system of bilateral agreements elaborated by operators over the last 20 years. It cannot be considered in practice as an option enabling RLAH by June 2017.

In addition the outcome and real benefits of such a drastic change of the roaming structure is uncertain. As concluded in the impact assessment accompanying the Commission proposal for the Roaming III Regulation²⁷, it is not expected that this change would be beneficial to the European industry since it would be uncertain if the advantageous offers by multi-country alliances would still be possible once all of the national partners of these alliances would need to pass via the spot market. The spot market would also definitely make it much more difficult for operators to provide pan-European mobile offers since the underlying wholesale conditions would become too variable. Also, roaming traffic cannot be easily treated as a commodity in view of the qualitative aspects involved such as coverage or speed.

Finally, no respondent to the public consultation identified the lack of an efficient trading platform as a source of concern for the functioning of roaming markets nor suggested this regulatory option.

6. Impacts of the different policy options

The aim of this section is to assess to what extent each option considered reaches the policy objective set in the Roaming Regulation of enabling the abolition of retail roaming surcharges from 15 June 2017 in the EU (*RLAH objective*), while meeting the explicit requirement set out in Article 19 of the Roaming Regulation to ensure that the visited network operators are able to *recover all costs* of providing regulated wholesale roaming services, including joint and common costs. In addition, as also required in Article 19 of the Roaming Regulation, account is taken of the need to *prevent permanent roaming* or anomalous or abusive use of wholesale roaming access for purposes other than the provision of regulated roaming service (i.e. the risk of arbitrage distorting domestic competition in the visited country), while bearing in mind the means already available to visited operators under Article 3(6) of the Roaming Regulation.

²⁷ Impact assessment of policy options in relation to the Commission's review of the functioning of regulation (EC) No 544/2009 of the European Parliament and of the Council of 18 June 2009 on roaming on public mobile telephone networks within the Community, COM(2011)407final, SEC(2011)870final

The wholesale cost recovery and permanent roaming criteria correspond to the first specific objective of the proposal indicated in section 4. The RLAH criterion corresponds to the second policy objective indicated in section 4. These three criteria are set out in Article 19 of the Roaming Regulation and must be simultaneously met by the option to be proposed by the Commission.

In addition, options are qualitatively assessed against their administrative burden, implementation challenges by public authorities and timeliness, as well as against their contribution to achieving the digital single market.

The criteria against which each option is assessed are summarized in the table below. The RLAH objective of sustainability is assessed on the basis of data available at country level and operator level²⁸. The methodology for the RLAH sustainability assessment based on operators' data is explained in Annex 4²⁹. The two tests are complementary analyses that should be considered jointly. They are based on the best country-level and operator-level data available to the Commission for the purpose of assessing the impact of different options on the sustainability of domestic charging models under the RLAH regime. However, the tests should not be understood as an accurate prediction of the actual number of requests for sustainability derogations that may be filed by operators pursuant to Article 6c of the Roaming Regulation.

²⁸ From the autumn 2015 data collection conducted for the purpose of the wholesale roaming review.

²⁹ The methodology for the RLAH assessment based on country level data is straightforward and explained together with the presentation of the results of this assessment.

Figure 8: Criteria to assess the impact of each option

Criteria	Key Issues
RLAH objective	<u>Assessed with country level data</u> : How does the average net wholesale roaming costs of providing RLAH incurred by operators of a country (given the average number of days abroad in the EEA of that country's citizens and the average domestic mobile services consumption in that country) compare with the country's average retail revenue per user (ARRPU)?
	<u>Assessed with operator level data</u> : For how many operators would RLAH not be sustainable given their individual domestic revenues, inbound roaming traffic, outbound roaming traffic pattern in the EEA, and their subscribers' domestic consumption?
Cost recovery at wholesale level	Can the costs of providing regulated wholesale roaming services, including joint and common costs, be recovered by the visited operators?
Permanent roaming	Are the possible risks of unwanted permanent roaming or anomalous or abusive use of wholesale roaming access appropriately addressed?
Implementation costs	On public authorities: regulatory steps to be completed, monitoring, supervision and enforcement, future updates and review of the Regulation; on mobile operators: costs implied by changing operations according to the option's rules
Digital Single market and Digital Economy	Completion of the Digital Single Market (DSM) and users' benefits from the digital economy

Consumer welfare (or more generally user welfare) is stemming from the RLAH obligation already contingently imposed by the Roaming Regulation. As such, it is not referred to in Article 19 of the Roaming Regulation as a criterion to be taken into account by the Commission in assessing measures necessary to enable RLAH. However, as the different options considered enable RLAH from June 2017 to a varying degree, the proportion of consumers which can actually reap the benefits of RLAH from that date differs across options. The relative size of consumer welfare is therefore used as an additional criterion to compare, in section 7, the different options against the baseline scenario (no EU action) where very few consumers, if any, would benefit from RLAH. .

Finally, any potential environmental impact stemming from the RLAH obligation already imposed by the Roaming Regulation (e.g. additional network capacity building) falls outside of the impact assessment of this initiative. There is no specific environmental impact in any of the options considered for this initiative.

6.1. Option 1: Baseline scenario - no action at Union level

RLAH objective

In Option 1, the RLAH objective is missed. RLAH is not applicable from 15 June 2017. The RLAH+ regime of the transitional period starting on 30 April 2016 continues to be in force instead. Consumers continue paying a roaming surcharge of up to 5€/min, 2€/SMS and

5€/MB in addition to the domestic price, instead of paying no roaming surcharge for a fair usage of roaming services.³⁰

Table 1 below provides an estimation of the missed consumer welfare under that baseline scenario compared to any option that enables RLAH from 15 June 2017. The missed consumer welfare is the amount of RLAH volume that they would have consumed at domestic prices (i.e. with no retail roaming surcharge) if RLAH were applicable from that date. This volume can be valued in euros at the level of the retail roaming surcharge applicable under the RLAH+ regime that would apply under Option 1.

The amount of RLAH consumption considered in Table 1 is based on the assumption that, if RLAH were applicable, roaming customers would consume mobile services abroad in the EEA like at home (RLAH assumption). The method and data used to obtain the volumes in Table 1 are provided in Annex 4.

This estimated total RLAH roaming consumption by country can be expected to take place at RLAH prices (i.e. domestic prices). It can be conservatively valued at the level of the wholesale roaming caps of the preferred option in this impact assessment (4€/min, 1€/SMS and 0.85€/MB, see section 6.3 below), as shown in the last column of Table 1.³¹ The total value for the EEA is 1.408 bn€. Most of this value is linked to the RLAH data consumption (1.012 bn€) while RLAH voice and SMS consumption is valued at 314 and 51 mln€ respectively.

³⁰ It is not excluded that some operators, on a voluntary basis, would choose to provide EU-wide RLAH (with no per diem nor any fixed periodic charge) to their customers under the RLAH+ regime. This however has remained marginal so far. As this is uncertain and cannot be quantified, the assumption is made in the rest of this section that no consumer would benefit from RLAH under the RLAH+ regime.

³¹ These rates correspond to the main production costs for RLAH, and thus function as a proxy for consumer valuation of additional roaming services at RLAH prices, which they would not consume at current retail roaming prices.

Table 1: RLAH consumption in 2017 valued at wholesale roaming cap of the preferred option (4€/min, 1€/SMS and 0.85€/MB)

	Number of RLAH minutes (million)	Number of RLAH SMS (million)	Number of RLAH MB (million)	Value (in million €) at the preferred option's caps (4 €/min, 1 €/SMS, 0.85 €/MB)
Austria	287	58	7,878	79.0
Belgium	326	501	2,032	35.3
Bulgaria	6	0	34	0.5
Croatia	15	5	145	1.9
Cyprus	40	21	714	7.9
Czech Republic	128	51	706	11.6
Denmark	103	67	3,067	30.9
Estonia	21	3	736	7.1
Finland	129	27	9,825	88.9
France	1,312	1,711	10,667	160.3
Germany	1,223	238	17,928	203.7
Greece	11	2	31	0.7
Hungary	48	4	382	5.2
Iceland				
Ireland	165	104	3,075	33.8
Italy	425	117	4,858	59.5
Latvia	30	11	636	6.7
Liechtenstein				
Lithuania	39	33	390	5.2
Luxembourg	51	40	1,243	13.0
Malta				
Netherlands	521	81	5,090	64.9
Norway				
Poland	281	170	3,385	41.7
Portugal	14	13	126	1.8
Romania	24	7	45	1.4
Slovakia	74	17	386	6.4
Slovenia	49	28	367	5.4
Spain	59	2	561	7.1
Sweden	409	194	19,835	186.9
UK	2,076	1,608	28,443	340.9
EEA***	7,864	5,113	122,586	1,407.7
Cap under the preferred option (€)	0.04	0.01	0.0085	
Total value (million €)	315	51	1,042	1,407.7

If users miss the above amount of roaming consumption at domestic prices, operators on their side do not face any sustainability issue as regards the provision of retail roaming services to their roaming customers, as operators can charge their roaming customers up to the regulated wholesale roaming caps, which allows them to cover the wholesale roaming payments to the wholesale roaming providers. Operators do not face any cost recovery issue as regards the provision of wholesale roaming services to visiting operators' customers as current wholesale roaming caps have been set above the costs of providing these services.

Under this option, the transitional RLAH+ regime can be expected to be stable and last over time for the following reasons.

As shown in the accompanying Review SWD³², there have been some important developments on the retail roaming markets recently, with domestic offers proposing more and more affordable roaming prices to the customers. A number of new RLAH-like retail roaming offers have appeared on the market. However, most of them are not RLAH offers in

³² See section 4 of the accompanying Review SWD.

the sense of the Roaming Regulation: they do not cover the full of the EU and they are usually available for an add-on (a fixed periodic charge, often a per diem) which constitutes an upfront roaming surcharge to be paid in addition to the price of the domestic bundle mobile services. In addition, even where RLAH is offered in accordance with the meaning of the Roaming Regulation, these developments are unequal across Member States, operators and tariff plans.

During the transitional period, these roaming per diem offers can be expected to flourish further while being compliant with the retail roaming surcharge of that period (i.e. the price of the per diem divided by the roaming volume it gives access to is below the cap retail roaming surcharge). These per diem/up-front charges may still represent a less than optimal charging mechanism for the user, since, in case the user does not fully consume the roaming volume bought, the effective unit retail roaming surcharges resulting from this actual consumption may be higher than the cap. However, the per unit charging model of retail roaming consumption must always be available to the user, whereby the retail roaming surcharge is paid for each unit consumed in addition to the domestic price, should the user prefer this charging model over the per diem offer.

With the retail roaming surcharge, be it in the form of a per diem or a per unit surcharge, home operators fully and undisputedly recover the costs of providing retail roaming services, while roaming customers pay relatively modest retail roaming prices in addition to the domestic price. As a consequence, in the absence of EU regulatory action resulting from this review of the wholesale market, the transitional RLAH+ regime can be expected to be relatively stable and last over time under the baseline scenario.

In the most competitive national retail roaming markets in the EEA where demand is very elastic, some more aggressive retail roaming tariff plans offering RLAH all over the EU or over a subset of EU countries may become more numerous. Also in these cases, however, the possibility for some home operators in a given country to provide these offers may be limited in view of different negotiating power to secure lower wholesale roaming prices necessary to sustain RLAH offers in a mass market.

As also shown in the accompanying Review SWD³³, there has been some significant technological developments of relevance to roaming, especially the diffusion of smartphones, OTT services, and the proliferation of Wi-Fi hotspots. However, there has been no perfect substitute to roaming services so far. The most serious potential technological substitute to roaming services is the embedded SIM card provisionable over-the-air (eSIM cards) which allows switching operator without changing physically the SIM card. However, the technology is still in a very early stage of market take-up and the standardisation work that happened over the last years shows that this technology will start to be used in the B2B market for M2M communications. It is not clear yet if and when the technology will be used in the consumer market and in which devices (e.g. smartphones or other connected objects) and what the switching process will be in practice. Thus, their current and short-term market pressure remains limited.

Altogether, under the baseline scenario, we do not expect that the market will by itself bring full RLAH over the entire EU to all customers in all EU Member States in the medium to long term, which is the policy objective decided by the co-legislator in the Roaming Regulation.

³³ See section 4 of the accompanying Review SWD.

Cost recovery at wholesale level

Under this option, cost recovery at wholesale level is ensured as it is today.

Permanent roaming

As noted by operators in reply to the public consultation, current wholesale roaming caps act as an effective safeguard against unwanted permanent roaming. Raising wholesale roaming prices to the current cap level is a powerful deterrent against abusive use of wholesale roaming access, and would likely make intervention by visited operators under Article 3(6) of the Roaming regulation unnecessary.

Implementation costs

There are no additional implementation costs to be borne by public authorities nor by mobile operators compared to the transitional period already imposed by the Roaming Regulation.

Digital Single Market

Consumers still pay higher prices when roaming in the EU than domestically, which is a sign of fragmentation of the mobile market in the EU, which is not in line with the DSM objective.

6.2. Option 2: set EU-wide wholesale roaming caps at the level currently in force

RLAH objective assessed with country-level data

In Option 2, RLAH is applicable from 15 June 2017 with wholesale roaming prices capped at current level, i.e. 5€/min, 2€/SMS and 5€/MB.

The effective, net, wholesale cost of providing retail roaming services is generated only by the outbound roaming traffic in excess to the inbound roaming traffic. For balanced traffic, wholesale revenues generated by incoming roamers effectively balance wholesale payments for domestic customers who periodically travel outside the operator's domestic network³⁴.

Table 2 shows the average net annual wholesale cost of the outbound unbalanced part of RLAH³⁵ at current wholesale roaming caps level for retail roaming providers, per country (in euros in column (a) and as % of Annual Retail Revenue Per User, ARRP³⁶, in the last column). For countries (or services within the country) with net inbound roaming traffic, the net wholesale cost of RLAH is set at zero in Table 2. The amount of roaming consumption considered in the simulation is based on the assumption that roamers would consume abroad in the EEA like at home (RLAH assumption). The roaming consumption is therefore obtained by multiplying, for each country, the average daily domestic consumption of voice, SMS and data in the country by the average number of days abroad in the EEA of citizens of the

³⁴ Article 6d(3) litera (a) of the Roaming Regulation refers to the effective wholesale roaming charges for unbalanced traffic.

³⁵ Based on the inbound/outbound ratio in BEREC Report on the wholesale roaming market, BoR(16)33, February 2016

³⁶ In the absence of a reliable time series of ARRP over the last years to forecast ARRP in 2017, ARRP is assumed to be the same in 2017 as in 2014.

country³⁷. The average daily domestic consumption itself is a forecast for 2017 based on 2014 consumption³⁸ and growth forecast used in the cost model study³⁹. Table 2 does not separate out the RLAH retail revenues, which, within the overall ARRPU, serve to cover the net wholesale cost of roaming services.

Table 2: Average net annual wholesale cost of unbalanced outbound RLAH at current EU wholesale roaming caps, as % of ARRPU, per country

	ARRPU 2017 (€) ^{(1)*}	Days abroad EEA ⁽²⁾	Domestic daily min 2017 ^{(1)**}	Domestic daily sms 2017 ^{(1)**}	Domestic daily MB 2017 ^{(1)**}	outbound unbalanced share of roaming traffic voice ^{(1)***}	outbound unbalanced share of roaming traffic SMS ^{(1)***}	outbound unbalanced share of roaming traffic data ^{(1)***}	net wholesale cost of RLAH at current EU caps (5/2/5 €c) (a)	(a) as % of ARRPU
Austria	174	11.2	4.9	1.0	133.8	0.160	0.000	0.430	32.7	18.8
Belgium	198	10.9	3.6	5.6	22.7	0.000	0.000	0.000	0.0	0.0
Bulgaria	60	0.9	4.3	0.3	25.5	0.000	0.000	0.000	0.0	0.0
Croatia	145	5.4	5.3	1.9	51.0	0.000	0.090	0.000	0.0	0.0
Cyprus	277	12.1	9.1	4.8	161.2	0.000	0.000	0.000	0.0	0.0
Czech Republic	108	5.1	4.6	1.8	25.2	0.015	0.515	0.355	2.4	2.2
Denmark	199	12.6	4.6	3.0	136.5	0.255	0.545	0.000	1.1	0.6
Estonia	89	6.4	4.9	0.7	173.2				0.0	0.0
Finland	160	11	4.7	1.0	360.9	0.255	0.450	0.100	20.6	12.9
France	214	4	6.3	8.2	51.2	0.000	0.090	0.000	0.1	0.0
Germany	186	8.9	3.1	0.6	45.9				0.0	0.0
Greece	137	0.8	6.3	1.0	18.0	0.000	0.000	0.000	0.0	0.0
Hungary	104	2.5	3.8	0.3	30.3	0.025	0.000	0.000	0.0	0.0
Iceland	0	5.7	0.0	0.0	0.0				0.0	
Ireland	286	10.9	6.3	4.0	117.9	0.590	0.585	0.670	45.6	16.0
Italy	140	2.2	5.0	1.4	57.6	0.035	0.000	0.000	0.0	0.0
Latvia	44	5	4.4	1.6	91.9	0.060	0.450	0.000	0.1	0.3
Liechtenstein	526								0.0	
Lithuania	44	5.1	5.4	4.6	54.3	0.095	0.460	0.000	0.3	0.8
Luxembourg	280	27.1	3.5	2.8	86.8	0.000	0.000	0.000	0.0	0.0
Malta	162		3.5	2.4	44.6				0.0	
Netherlands	253	15	3.7	0.6	36.0	0.520	0.340	0.715	20.8	8.2
Norway	305	12.6	6.0	2.7	94.6	0.455	0.450	0.575	36.3	11.9
Poland	72	3	4.2	2.6	51.1	0.380	0.600	0.000	0.3	0.5
Portugal	139	1.5	4.3	4.2	39.3	0.000	0.000	0.000	0.0	0.0
Romania	59	1.4	8.0	2.3	15.1	0.440	0.675	0.385	0.7	1.2
Slovakia	156	5.9	4.9	1.1	25.4	0.515	0.560	0.600	5.3	3.4
Slovenia	164	6.9	5.2	3.0	39.1	0.000	0.415	0.675	9.3	5.6
Spain	187	1.8	4.4	0.1	42.2	0.000	0.000	0.000	0.0	0.0
Sweden	228	12.1	5.5	2.6	266.2	0.000	0.460	0.000	0.3	0.1
UK	258	7.6	4.8	3.7	65.7	0.245	0.370	0.435	11.5	4.5
EEA ****	172	5.7	4.7	2.5	0.0	0.000	0.000	0.000	0.0	0.0

Data: (1) BEREC Report on the wholesale roaming market, BoR(16)33, February 2016, based on operators' replies to the autumn 2015 data collection

(2) BEREC Analysis of the impacts of "Roam Like At Home". BoR(14)209, December 2014

Values in blue italics are imputed.

*ARRPU 2017 is assumed to be the same as in 2014

** forecasted change in consumption between 2014 and 2017: +16% for voice, +328% for data, -40% for SMS

*** 1 - inbound/outbound (average over 2013 and 2014) if inbound/outbound < 1, 0 otherwise; Austria: 2014 only

**** weighted average

Under current caps, five Member States and Norway stand out with a net wholesale RLAH cost above 5% of ARRPU, and in some cases very significantly above 5%. The level of outbound imbalance established by BEREC on the basis of 2013 and 2014 operators' data

³⁷ We consider, for each country, that the average travelling time abroad in the EEA and daily consumption are within fair use of roaming services.

³⁸ BEREC Report on the wholesale roaming market, BoR(16)33, February 2016, based on operators' replies to the autumn 2015 data collection

³⁹ % change between 2014 and 2017: +6% for voice and +3% for SMS for all countries; for data, the % change is country-specific (+300% on average).

collected in autumn 2015 has a determining impact in this simulation. By using the cap level, Table 2 provides an estimate of the cost of RLAH in the absence of any discount rate from the cap. With discounted rates, the effective cost of RLAH under Option 2 is likely to be lower than presented in this table. However, the situation is more difficult in almost all EEA countries for MVNOs and more generally for operators with a very large excess of outbound over inbound roaming traffic because these operators do not benefit from hosting roaming traffic in return. While, as stated above, this simulation does not attribute any RLAH revenues from overall ARRPU to correspond to the consumption which generates the assumed wholesale cost at capped rates, and is thus likely to somewhat overstate the problem of RLAH sustainability, it is clear that there are likely to be significant problems where operators in a country can be predicted to spend in excess of 10%, or even of 15%, of their ARRPU on wholesale costs for customers' roaming (which is assumed to follow domestic usage patterns) for less than two weeks a year on average.⁴⁰

Keeping EU wholesale roaming caps unchanged would therefore not meet the objective of the present initiative to ensure that national wholesale roaming markets function in such a way that, from 15 June 2017, retail roaming surcharges may be sustainably abolished for all or virtually all operators in the EU without generating distortions on the home markets.

RLAH objective assessed with operator-level data

In addition to the country-level sustainability assessment, the Commission has also analysed the sustainability of each of our options at an operator level. For this exercise, the Commission used data gathered from EU mobile operators in the autumn 2015 data collection conducted with BEREC (see Annex 1). Out of the sample of 127 operators that replied to our information request, only 64 provided sufficient information allowing to undertake the sustainability assessment. In this section we describe the results of our analysis, further details on our approach can be found in Annex 4⁴¹.

In summary, the sustainability assessment by operator compares the retail roaming margin (i.e. the revenues from retail roaming services after the introduction of RLAH in 2017 minus the costs of providing these services) against the domestic retail margin (i.e. the revenues from domestic retail services minus the costs of providing these services). We define sustainability as:

$$\text{Sustainability} = \frac{\text{retail roaming margin}}{\text{domestic retail margin}} \times 100\%$$

In order to assess the sustainability of each operator we run three scenarios for each of the three wholesale price cap options that we have considered. In this section we present only the results under our Base case scenario (i.e. the scenario to which we attach the highest probability). Further details on the assumptions underlying this Base case scenario (as well as the results and assumptions used for the other scenarios) can be found in Annex 4, which explains in more detail the operator-level sustainability analysis. In Table 3 below we present the sustainability results for the wholesale price caps under Option 2 (i.e. setting EU-wide wholesale roaming caps at the level currently in force) under our Base case scenario.

⁴⁰ See e.g. the cases of Austria, Finland, Ireland, and Norway.

⁴¹ This analysis is without prejudice to the methodology that will be developed for dealing with sustainability derogation applications by individual operators pursuant to Article 6c of the Roaming Regulation, which will be subject to an impact assessment accompanying the Commission implementing act on this topic to be adopted by 15 December 2016.

Table 3, Table 7 and Table 8 below present, for each of the wholesale price cap options considered (Options 2, 3 and 4), the percentage of operators in the sample that have:

- Positive sustainability (i.e. RLAH does not result in a negative retail roaming margin)
- Negative retail roaming margin and the percentage of operators in the sample that have a negative margin:
 - Below 1% of domestic retail margin
 - Between 1-3%
 - Between 3-5%
 - Greater than 5%

In Table 3 below we present the sustainability results for the wholesale price caps under Option 2 (i.e. setting EU-wide wholesale roaming caps at the level currently in force) under our Base case scenario.

Table 3: Sustainability results for Option 2 under the Base case scenario modelled

	Sustainability %				
	Positive sustainability	<1%	1-3%	3-5%	>5%
Option 2 – current caps	66%	6%	5%	5%	19%

Note: the row adds up to more than 100% due to rounding.

In Table 3 below we present the sustainability results for the wholesale price caps under Option 2 (i.e. setting EU-wide wholesale roaming caps at the level currently in force) under our Base case scenario.

Table 3 above shows that Option 2 results in a low percentage of operators with a positive sustainability (66% under our Base case scenario) and almost 20% of operators have a negative sustainability above 5% (i.e. a negative retail roaming margin higher than 5% of the domestic retail margin). This result is driven by the fact that Option 2 includes wholesale roaming price caps that are significantly above the retail prices in most EU countries, thereby resulting in a negative retail roaming margin for mobile operators that are net senders of roaming traffic (i.e. have higher outbound than inbound roaming traffic).

Cost recovery at wholesale level

Under this option, cost recovery at wholesale level is ensured as it is today.

Permanent roaming

As noted by operators in reply to the public consultation, current wholesale roaming caps act as an effective safeguard against unwanted permanent roaming. Raising wholesale roaming prices to the current cap level is a powerful deterrent against abusive use of wholesale roaming access, and would likely make intervention by visited operators under Article 3(6) of the Roaming Regulation unnecessary.

Implementation costs

Option 2 does not involve any additional implementation costs for public authorities nor for mobile operators compared to the current situation. Under this option, NRAs continue monitoring and supervising compliance with the current wholesale roaming caps, which has been good over the years according to the biannual BEREC's Benchmark Reports.

Digital Single Market

Because RLAH is not sustainable for operators based in several Member States, RLAH derogations pursuant to Article 6c of the Roaming Regulation may be obtained by a significant number of operators, and probably by all operators in some Member States. Mobile subscribers in these Member States would not benefit from RLAH. The EU would be divided between countries where some operators offer RLAH and countries where no operator offers RLAH. Depending on the specific competitive conditions in domestic markets, in some Member States where RLAH poses a sustainability problem, operators may prefer raising domestic prices over derogating from RLAH. Altogether, this option leads to distortions on the domestic markets and fragmentation of the EU between RLAH enabled and non-enabled Member States and operators.

6.3. Option 3: set lower EU-wide wholesale roaming caps

Wholesale price caps considered in Option 3

In section 5 of the accompanying Review SWD, we have presented cost estimates for wholesale roaming services based on an analysis of different sources of information, namely:

- we have sense-checked the TERA Consultants' cost model;
- an alternative approach to estimate the total costs of wholesale roaming voice services based on national mobile termination rates; and
- retail unit prices in MS from a Commission study on retail prices in the EEA.

In Table 4 below we present the cost estimates for wholesale roaming services in each of the 29 countries (28 MS and Norway) considered in TERA Consultants' cost model (this table corresponds with Table 10 in the accompanying Review SWD).

Table 4: Wholesale roaming services' cost estimates in each of the 29 countries considered in TERA Consultants' cost model

	Voice (€/min)	SMS (€/SMS)	Data (€/MB)
AT	2.60	1.00	0.30
BE	1.85	1.00	0.41
BG	2.74	1.00	0.53
CY	1.63	1.00	0.35
CZ	1.86	1.00	0.42
DE	1.70	1.00	0.31
DK	1.86	1.00	0.29
EE	1.82	1.00	0.34
EL	1.94	1.00	0.35
ES	2.81	1.00	0.41
FI	1.65	1.00	0.28
FR	2.79	1.00	0.39
HR	2.31	1.00	0.36
HU	2.39	1.00	0.39
IE	1.24	1.00	0.31
IT	1.75	1.00	0.31
LT	1.62	1.00	0.43
LU	2.63	1.00	0.44
LV	2.81	1.00	0.52
MT	4.20	1.00	0.67

NL	2.57	1.00	0.37
PL	1.72	1.00	0.32
PT	1.78	1.00	0.36
RO	1.79	1.00	0.59
SE	3.22	1.00	0.29
SI	2.52	1.00	0.57
SK	1.63	1.00	0.55
UK	2.65	1.00	0.36
NO	1.96	1.00	0.38

As we describe in the accompanying Review SWD's section 5, these cost estimates include:

- the total wholesale roaming costs in MS estimated by TERA (including network costs, roaming-specific costs and the impact of seasonality on roaming costs), as discussed in section 5.4 of the accompanying Review SWD;
- an allocation for the termination rate that the visited network operator needs to pay the terminating network operator for terminating a call on its network, as discussed in section 5.5 of the accompanying Review SWD; and
- an allocation for the transit costs that the visited network operator needs to pay for routing a call to the terminating network operator or to send data traffic back to the home network, as discussed in section 5.6 of the accompanying Review SWD.

In order to assess the appropriate wholesale price caps for roaming services under Option 3, we have had regard to the twin objectives of minimising unsustainability of RLAH at retail level (which will tend to support setting lower wholesale roaming price caps), while at the same time ensuring that the caps recover costs (including joint and common costs) at the wholesale level. In relation to the cost recovery objective, we have also compared TERA's cost estimates above against the effective average wholesale roaming prices for unbalanced traffic currently effective in EEA countries.⁴² We consider that the relevant benchmark for wholesale costs is indeed the price for unbalanced traffic, given that prices for balanced traffic are merely a bilateral transfer between operators with no net cost for any of the parties and the weighted balanced-unbalanced price will also not be appropriate for the same reason, as it takes into account the price for balanced traffic.

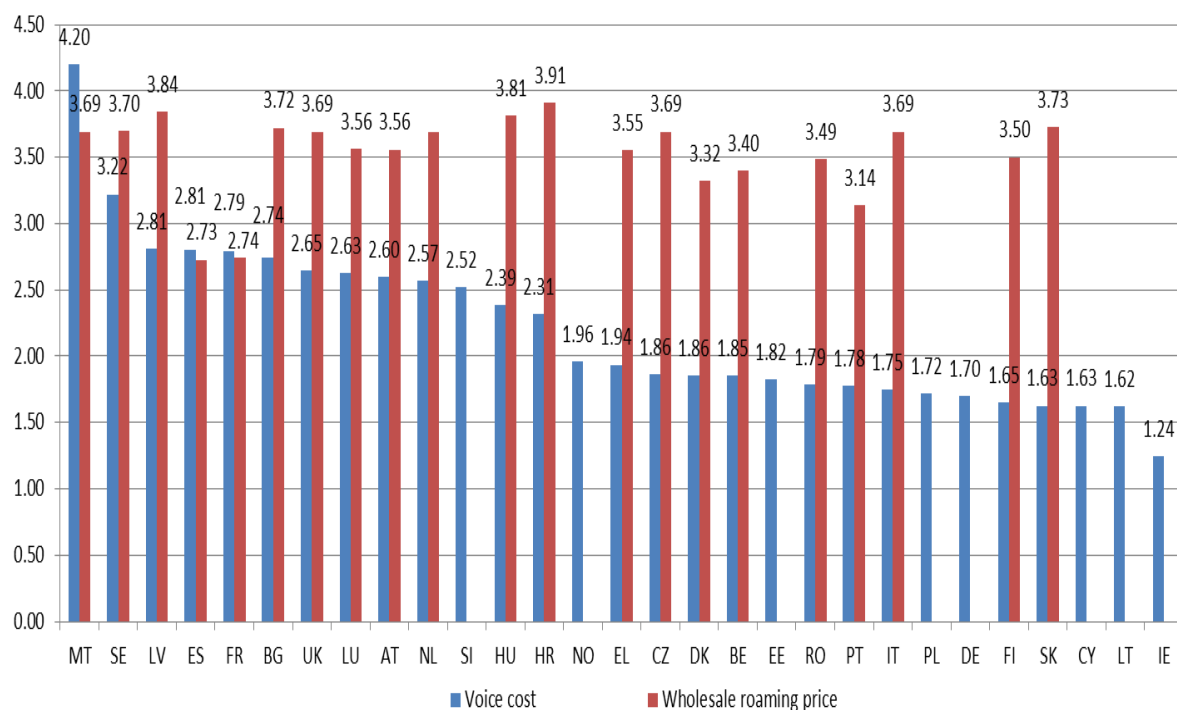
It is already apparent from Table 4 above that there are significant asymmetries in the estimated costs of provision of individual wholesale roaming services within individual countries, in particular for voice and data, i.e. the countries with the highest estimated costs for provision of voice are not necessarily the same for data, and vice versa, as well as very considerable variation from country to country, with the highest-cost countries having estimated costs which are significantly in excess of the lowest or even of the median. In considering the role of safeguard wholesale caps in achieving the twin objectives of ensuring that wholesale providers recover all their relevant costs, while maintaining RLAH sustainability derogations as an exceptional case, it is appropriate to take into account the portfolio of services provided by each wholesale provider, and the predictable volumes of each. Just as retail roaming operators are likely to have to assess the sustainability of their domestic charging model under RLAH by reference to the overall costs and revenues of retail

⁴² We obtained the data on effective wholesale roaming prices from operators' replies to the autumn information request.

roaming services (and this is the approach in the country-level and operator-level simulations in this impact assessment), wholesale cost recovery should be considered in terms of aggregate costs of provision of the foreseen volumes. Safeguard wholesale caps fixed solely by reference to the highest estimated cost of each individual service would therefore risk creating an imbalance as between the retail-level and wholesale-level objectives of this review, going beyond what is necessary to ensure that each visited network is able to cover all wholesale costs. At the same time, too much weight should not be placed on the concept of aggregate cost recovery – the caps chosen should leave some margin for error in this respect, and it is also considered important that the safeguard caps for individual services should be broadly aligned (i.e. of a comparable order of magnitude) with the cost levels in the highest-cost countries for the respective services.

We compare the average wholesale prices for unbalanced traffic against TERA's estimated costs for voice in Figure 9 below.

Figure 9: Total voice origination cost and average wholesale roaming voice price (unbalanced traffic)⁴³ in MS (€/min)



The evidence on estimates of total wholesale roaming voice origination costs and wholesale roaming voice prices for unbalanced traffic in Figure 9 shows that:

- cost estimates are below the current wholesale roaming prices for voice in all MS with the only exception of Malta, for which TERA's cost estimate is 4.20€/min compared to a wholesale roaming price of 3.69€/min (which is presumably not loss-making), Spain (2.81€/min against a market price of 2.73€/min) and France (2.79€/min against 2.74€/min);

⁴³ Based on the autumn 2015 data collection.

- the maximum average wholesale roaming price for voice in all MS is currently 3.91€/min (the price in Croatia), compared to TERA's estimated maximum wholesale cost of 4.20€/min (in Malta).

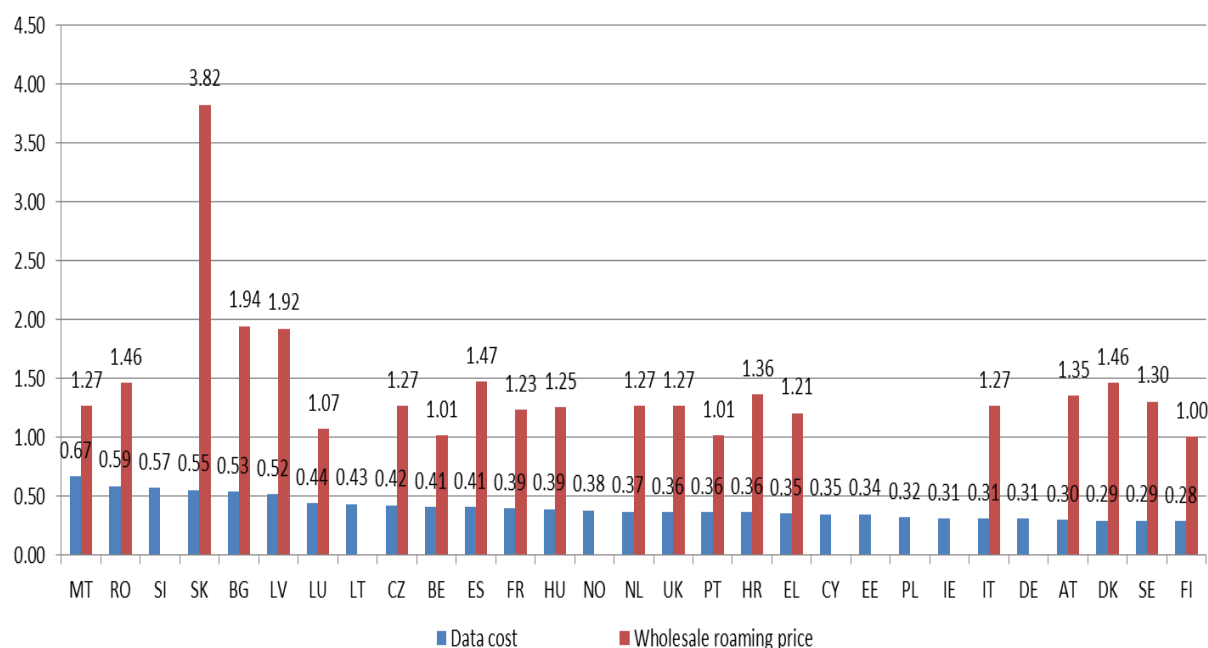
Based on the evidence above, we conclude that it would be appropriate to consider a **maximum wholesale roaming cap for voice of 4€/min** in all MS, as this acts as a safeguard cap, leaving some margin for negotiations in several instances while ensuring cost recovery according to several estimates. While this maximum lies somewhat below TERA's estimated maximum cost for wholesale roaming voice services (€4.20c/min in Malta)), it is nonetheless above the maximum cost estimated using an alternative approach based on current LRIC mobile termination rates (€3.81c/min), as explained in Section 5 of the accompanying Review SWD. It is also noteworthy that current average wholesale prices for unbalanced traffic in the highest cost country (Malta) are reported to lie appreciably below this envisaged cap level. Moreover, this cap level is appreciably above the second highest cost estimate of TERA (3.22€/min in Sweden) and slightly above the maximum average wholesale roaming voice price for unbalanced traffic currently effective in all MS (€3.91c/min). In this regard, we actually considered in the accompanying Review SWD that the assumptions made on the applicable termination rates in 2017 are likely to be relatively conservative. In addition, divergences across the Union in this respect are foreseen to decrease, in particular through the prospect of measures taken in accordance with the Regulatory Framework aiming at ensuring consistency of regulatory approaches⁴⁴. In the meantime, taking into account the specific regulatory framework applicable to roaming (where the visited network can levy a maximum charge for wholesale roaming services that also includes other regulated inputs provided by third operators such as termination services), where the competent national regulatory authorities are requested to address any dispute that could arise on the level of rates levied by third operators to inputs necessary for the provision of wholesale roaming services (or on the rates for other inputs required by a visited operator), such authorities should be obliged to seek the assistance of BEREC in resolving the dispute. This procedure will be potentially relevant at least as long as significant divergences remain in the regulatory treatment across Member States, leading to a hypothetical – but in our view improbable - risk that a significant imbalance between the price of the regulated input and that recovered through the wholesale roaming charge could result in a given visited operator being unable to recover its aggregate wholesale roaming costs⁴⁵.

In Figure 10 below we compare the cost estimates for data services based on TERA's cost model against effective average wholesale roaming prices for unbalanced traffic in the 29 countries considered.

⁴⁴ In addition to ongoing market review notifications and pending litigation, the Commission has launched a public consultation on review of the Termination Rates Recommendation in which it has raised the question of additional harmonisation procedures pursuant to Article 19 of the Framework Directive or as part of the Framework Review. Any follow-up measures will be subject to separate impact assessment, but for the purposes of the present impact assessment the Commission may be assumed to have the firm intention to pursue greater regulatory convergence in this field in a timely and consequential manner.

⁴⁵ As illustrated in para 5.5 of the accompanying Review SWD, the termination rate (TR) is one element in the estimation of costs, which may vary according to different traffic mix and variations of termination rates across Member States.

Figure 10: Total data costs and average wholesale roaming data prices (unbalanced traffic) ⁴⁶ in MS (€/MB)



The evidence on TERA's estimates of total wholesale roaming data costs and average wholesale roaming data prices for unbalanced traffic in Figure 10 shows that the cost estimates are well below the current average wholesale roaming prices for data in all MS. The highest estimated cost is in MT, at 0.67€/MB, while estimated costs in the great majority of Member States, as well as Norway, lie below 0.4€/MB. In order to assess an appropriate wholesale price cap for data roaming services, we have also taken into consideration other factors, in particular:

- the sensitivity analysis conducted by TERA Consultants on its estimated data roaming costs (described in more detail in TERA's report⁴⁷). This sensitivity analysis shows that the unit data roaming costs could be slightly above the level estimated under their baseline scenario by about 0.1€/MB under certain assumptions regarding, for example, the cost allocation rule (Erlang vs Mbps);
- domestic wholesale prices for data provided by MVNOs to the Commission show that domestic wholesale prices for data present significant variations between MS but are usually below 0.8€/MB (as described in more detail in the accompanying Review SWD, section 6.5.4).

In light of the above, we conclude that it would be appropriate to consider a **maximum wholesale roaming cap for data of 0.85€/MB** in all MS. Such a level would reflect the role of the legislative maximum as a safeguard cap, would give sufficient assurances of cost recovery for all visited operators for the provision of wholesale roaming data services, would leave significant room for further commercial negotiation with most visited networks, including in many of the countries with the greatest positive balance of incoming over

⁴⁶ Based on the autumn 2015 data collection.

⁴⁷ European Commission, *Assessment of the cost of providing wholesale roaming services in the EEA*, Final report, study conducted by TERA Consultants, to be published

outgoing roaming traffic (Spain, Greece, Cyprus, etc.), and would at the same time represent a very significant reduction by reference not only to the current wholesale cap but also the currently observed wholesale market prices. As will be seen below, such a safeguard level – even if applied without any commercial discounts – gives assurances of sustainability for visiting operators which are not significantly different from those under a cap system more precisely tailored to the cost estimates for individual countries.

In the accompanying Review SWD we noted that Malta is the only country for which the unit cost for wholesale roaming voice services estimated using the TERA cost model (i.e. 4.2c€/min) is above our proposed wholesale roaming price cap for voice under Option 3 (i.e. 4c€/min). In Table 5 below we show that any potential loss on voice from a wholesale roaming price cap of 4c€/min would in any event be recovered through the margin on data services, where the 0.85 c€/min wholesale price cap is well above the cost estimated using the TERA cost model for wholesale roaming data services in this country (i.e. 0.67c€/MB).

Table 5: Wholesale roaming cost recovery in Malta

		Malta
Total inbound roaming volume (2017 forecast) ¹	voice (min)	26,412,594
	data (MB)	221,908,441
Inbound wholesale roaming balance ²	voice (EUR)	-52,825
	data (EUR)	399,435

¹ From TERA Consultants study

² The balance is equal to: inbound roaming volume*(EU cap - estimated country unit cost)

In the case of SMS, we explain in section 5.8 of the accompanying Review SWD that we consider it appropriate to use a **maximum wholesale roaming cap of 1€/SMS** based on the evidence from current wholesale roaming SMS prices for unbalanced traffic.

We therefore conclude that the wholesale price caps that should be considered under Option 3 are as follows:

- voice: **4€/min**;
- SMS: **1€/min**;
- data: **0.85€/MB**.

Below we assess RLAH's sustainability for operators against these caps.

RLAH objective assessed with country-level data

In Option 3, RLAH is applicable from 15 June 2017 with wholesale roaming prices capped at 4 €/min, 1 €/SMS and 0.85 €/MB.

The effective, net, wholesale cost of providing retail roaming services is generated only by the outbound roaming traffic in excess to the inbound roaming traffic. For balanced traffic,

wholesale revenues generated by incoming roamers effectively balance wholesale payments for domestic customers who periodically travel outside the operator's domestic network⁴⁸.

⁴⁸ Article 6d(3) litera (a) of the Roaming Regulation refers to the effective wholesale roaming charges for unbalanced traffic.

Table 6 shows the average net annual wholesale cost of the outbound unbalanced part of RLAH⁴⁹ at Option 3's EU wholesale roaming caps level for retail roaming providers, per country (in euros in column (a) and as % of Annual Retail Revenue Per User, ARRPU⁵⁰, in the last column). For countries (or services within the country) with net inbound roaming traffic, the net wholesale cost of RLAH is set at zero in Table 6. The amount of roaming consumption considered in the simulation is based on the assumption that roamers would consume abroad in the EEA like at home (RLAH assumption). The roaming consumption is therefore obtained by multiplying, for each country, the average daily domestic consumption of voice, SMS and data in the country by the average number of days abroad in the EEA of citizens of the country⁵¹. The average daily domestic consumption itself is a forecast for 2017 based on 2014 consumption⁵² and growth forecast used in the cost model study⁵³. Table 6 does not separate out the RLAH retail revenues, which, within the overall ARRPU, serve to cover the net wholesale cost of roaming services.

⁴⁹ Based on the inbound/outbound ratio in BEREC Report on the wholesale roaming market, BoR(16)33, February 2016

⁵⁰ In the absence of a reliable time series of ARRPU over the last years to forecast ARRPU in 2017, ARRPU is assumed to be the same as in 2017 as in 2014.

⁵¹ For the purposes of this simulation, we assume, for each country, that the average travelling time abroad in the EEA and daily consumption are within fair use of roaming services.

⁵² BEREC Report on the wholesale roaming market, BoR(16)33, February 2016, based on operators' replies to the autumn 2015 data collection

⁵³ % change between 2014 and 2017: +6% for voice and +3% for SMS for all countries; for data, the % change is country-specific (+300% on average).

Table 6: Average net annual wholesale cost of outbound unbalanced RLAH at Option 3's wholesale roaming caps as % of ARRPU, per country

	ARRPU 2017 (€) ^{(1)*}	Days abroad EEA ⁽²⁾	Domestic daily min 2017 ^{(1)**}	Domestic daily sms 2017 ^{(1)**}	Domestic daily MB 2017 ^{(1)**}	outbound unbalanced share of roaming traffic voice ^{(1)***}	outbound unbalanced share of roaming traffic SMS ^{(1)***}	outbound unbalanced share of roaming traffic data ^{(1)***}	net wholesale cost of RLAH at Option 3's EU caps (4/1/0.85 €c) (a)	(a) as % of ARRPU
Austria	174	11.2	4.9	1.0	133.8	0.160	0.000	0.430	5.8	3.3
Belgium	198	10.9	3.6	5.6	22.7	0.000	0.000	0.000	0.0	0.0
Bulgaria	60	0.9	4.3	0.3	25.5	0.000	0.000	0.000	0.0	0.0
Croatia	145	5.4	5.3	1.9	51.0	0.000	0.090	0.000	0.0	0.0
Cyprus	277	12.1	9.1	4.8	161.2	0.000	0.000	0.000	0.0	0.0
Czech Republic	108	5.1	4.6	1.8	25.2	0.015	0.515	0.355	0.4	0.4
Denmark	199	12.6	4.6	3.0	136.5	0.255	0.545	0.000	0.8	0.4
Estonia	89	6.4	4.9	0.7	173.2				0.0	0.0
Finland	160	11	4.7	1.0	360.9	0.255	0.450	0.100	4.0	2.5
France	214	4	6.3	8.2	51.2	0.000	0.090	0.000	0.0	0.0
Germany	186	8.9	3.1	0.6	45.9				0.0	0.0
Greece	137	0.8	6.3	1.0	18.0	0.000	0.000	0.000	0.0	0.0
Hungary	104	2.5	3.8	0.3	30.3	0.025	0.000	0.000	0.0	0.0
Iceland	0	5.7	0.0	0.0	0.0				0.0	
Ireland	286	10.9	6.3	4.0	117.9	0.590	0.585	0.670	9.2	3.2
Italy	140	2.2	5.0	1.4	57.6	0.035	0.000	0.000	0.0	0.0
Latvia	44	5	4.4	1.6	91.9	0.060	0.450	0.000	0.1	0.2
Liechtenstein	526								0.0	
Lithuania	44	5.1	5.4	4.6	54.3	0.095	0.460	0.000	0.2	0.5
Luxembourg	280	27.1	3.5	2.8	86.8	0.000	0.000	0.000	0.0	0.0
Malta	162		3.5	2.4	44.6				0.0	
Netherlands	253	15	3.7	0.6	36.0	0.520	0.340	0.715	4.5	1.8
Norway	305	12.6	6.0	2.7	94.6	0.455	0.450	0.575	7.4	2.4
Poland	72	3	4.2	2.6	51.1	0.380	0.600	0.000	0.2	0.3
Portugal	139	1.5	4.3	4.2	39.3	0.000	0.000	0.000	0.0	0.0
Romania	59	1.4	8.0	2.3	15.1	0.440	0.675	0.385	0.3	0.5
Slovakia	156	5.9	4.9	1.1	25.4	0.515	0.560	0.600	1.4	0.9
Slovenia	164	6.9	5.2	3.0	39.1	0.000	0.415	0.675	1.6	1.0
Spain	187	1.8	4.4	0.1	42.2	0.000	0.000	0.000	0.0	0.0
Sweden	228	12.1	5.5	2.6	266.2	0.000	0.460	0.000	0.1	0.1
UK	258	7.6	4.8	3.7	65.7	0.245	0.370	0.435	2.3	0.9
EEA ****	172	5.7	4.7	2.5	0.0	0.000	0.000	0.000	0.0	0.0

Data: (1) BEREC Report on the wholesale roaming market, BoR(16)33, February 2016, based on operators' replies to the autumn 2015 data collection

(2) BEREC Analysis of the impacts of "Roam Like At Home", BoR(14)209, December 2014

Values in blue italics are imputed.

*ARRPU 2017 is assumed to be the same as in 2014

** forecasted change in consumption between 2014 and 2017: +16% for voice, +328% for data, -40% for SMS

*** 1 - inbound/outbound (average over 2013 and 2014) if inbound/outbound < 1, 0 otherwise; Austria: 2014 only

**** weighted average

The level of outbound imbalance established by BEREC on the basis of 2013 and 2014 operators' data collected in autumn 2015 has a determining impact in this simulation. By using the cap level, Table 6 provides an estimate of the cost of RLAH in the absence of any discount rate from the cap. With discounted rates, the effective cost of RLAH under Option 3 will likely be lower than presented in this table. Moreover, it should be noted that RLAH retail revenues corresponding to roaming consumption in line with domestic consumption patterns would still need to be taken into account before drawing conclusions. For example, for countries whose residents spend 10-11 days abroad per year on average, such RLAH retail revenues would be expected to correspond to around 3% of mobile ARRPU. Under Option 3's wholesale roaming caps, no country stands out with a net wholesale RLAH cost above 5% of ARRPU.⁵⁴ The situation may be more difficult for MVNOs and more generally for operators

⁵⁴ There is an ARRPU ratio slightly higher than might be covered from RLAH revenues for the number of projected travel days from Austria and Ireland, whereas the ratios for Finland, Norway and the Netherlands (all with wholesale projected costs at capped levels >1%) appear broadly consistent with their residents' respective travel patterns and the corresponding RLAH retail revenues. The inbound/outbound ratio of Austria in 2013 for data services available in the BEREC Report on the wholesale roaming review (BoR(16)33) is 0.3, significantly lower than the 2014 value of 0.57 and among the lowest across all countries and services. As this might be a data

with a very large excess of outbound over inbound roaming traffic⁵⁵ because these operators do not benefit from hosting roaming traffic in return.

Setting EU wholesale roaming caps at 4 €/min, 1 €/SMS and 0.85 €/MB would therefore meet the objective of the present initiative to ensure that national wholesale roaming markets function in such a way that, from 15 June 2017, retail roaming surcharges may be sustainably abolished for all or virtually all operators in the EU in order to avoid distortions on the home markets.

RLAH objective assessed with operator-level data

In line with our assessment of Option 2 above, we have also conducted analysis on the sustainability of Option 3 at the operator level (as indicated above when describing our assessment in Option 2, we only present here the final results, additional details on our approach can be found in Annex 4).

Table 7: Sustainability results for Option 3 under the Base case scenario modelled

	Sustainability %				
	Positive sustainability	<1%	1-3%	3-5%	>5%
Option 3 – Single EU-wide cap	88%	5%	2%	5%	2%

Note: the row adds up to more than 100% due to rounding.

Table 7 above shows that Option 3 results in higher percentage of operators with a positive sustainability (88%), compared to Option 2 (66%). This result is driven by the fact that in Option 3 the wholesale price caps are sufficiently low to ensure that they are below the retail prices in the great majority of EU countries, thereby minimising the potential for a negative retail roaming margin for mobile operators that are net senders of roaming traffic (i.e. have higher outbound than inbound roaming traffic).

Cost recovery at wholesale level

As shown above, the wholesale roaming caps set under this option are largely dictated by the costs of providing wholesale roaming services in the higher-cost countries for the respective component services. Each cap is above the estimated costs in virtually all EEA countries, is close to such levels in all countries, and is in any event set at a level to allow all visited operators to recover their overall costs of provision of the three component wholesale roaming services. This level also leaves economic space for most visited operators to engage in wholesale competition below the caps⁵⁶. We expect a fair potential for competitive negotiation for most operators, as evidenced under the current regime. Even if RLAH obligations may give visiting operators less margin for manoeuvre⁵⁷, there remain a number of parameters in which they can make their traffic volumes more attractive to host operators

anomaly, the 2013 inbound/outbound data ratio for Austria was not considered. If it were, the annual net RLAH wholesale cost would represent 4.4% of annual ARRP in Austria.

⁵⁵ In particular in Finland, Sweden, Denmark, Norway, Estonia, Latvia, Lithuania, Luxembourg, Cyprus, Austria and Ireland.

⁵⁶ In specific cases of significant imbalances of termination rates paid to the terminating operator compared to the wholesale price charged, disputes in this regard can also benefit from BEREC guidance in this regard.

⁵⁷ See the accompanying Review SWD, section 7

⁵⁷ BEREC Report on the wholesale roaming market, BoR(16)33, February 2016 (section 3.5)

in return for lower prices where the latter can still recover costs and make a margin on bigger volumes.

For countries whose estimated costs are closer to the EU voice cap set in this option, the margin allowed by this option's data cap in these countries is more than adequate to ensure aggregate cost recovery on wholesale provision in these countries. Reciprocally, for countries whose estimated costs are closer to the EU data cap set in this option, the margin allowed by Option 3's voice cap in these countries achieves a similar effect. Altogether, this option ensures aggregate cost recovery at wholesale level for all countries.

Setting EU-wide caps at an average cost level across EEA countries or at the level of the lower-cost country is not considered as this would not ensure cost recovery by efficient operators in all EEA countries.

Permanent roaming

As noted by operators in reply to the public consultation, ensuring that the costs of providing wholesale roaming services are recovered mitigates the risk of unwanted permanent roaming. In addition, the Roaming Regulation provides that the obligation of providing wholesale roaming access upon reasonable access (Article 3) may be lifted by the visited operator should the wholesale roaming access seeker use this access for other purposes than providing retail roaming services to its roaming customers while periodically travelling.

Implementation costs

Option 3 does not involve any additional implementation costs for public authorities compared to the current situation since the new EU caps are simply set at a lower level than they are today. Under this option, NRAs monitor and supervise compliance with the new EU wholesale roaming caps as they have done with current EU wholesale roaming caps. Implementation costs for mobile operators should be limited to the adjustment of the billing system for wholesale roaming services with the new values of the EU caps.

Digital Single Market

Under Option 3, the above simulations show that the potential non-sustainability of RLAH remains exceptional, i.e. in cases of operators based in a few countries, with outbound-only roaming traffic and paying at the cap level. This outcome is without prejudice to what the detailed sustainability applications will be, in accordance with the methodology to be set out in the forthcoming Commission implementing act, and without prejudice to how many of them will actually be filed by operators and accepted by NRA if this option is chosen.

Option 3 therefore achieves widely sustainable RLAH in the EU contributing to the DSM specific goal of making borders meaningless for the use of mobile services within the EU. It does so by imposing single EU-wide caps, thereby not artificially fragmenting the wholesale roaming market (in which commercial negotiation can still find the appropriate price level in cases where wholesale providers' costs are below the safeguard caps).

6.4. Option 4: set country-specific wholesale roaming caps

Wholesale price caps considered in Option 4

In section 5 of the accompanying Review SWD, we have presented cost estimates for wholesale roaming services based on an analysis of different sources of information, namely:

- the TERA Consultants' cost model;
- an alternative approach to estimate the costs of wholesale roaming voice services based on national mobile termination rates; and
- retail unit prices in MS from a Commission study on retail prices in the EEA.

In Table 4 above (section 6.3) we present final cost estimates for wholesale roaming services in each of the 29 countries (28 MS and Norway) considered in TERA Consultants' cost model.

As we describe in the accompanying Review SWD's section 5, these cost estimates include:

- the total wholesale roaming costs estimated by TERA (including network costs, roaming-specific costs and the impact of seasonality on roaming costs), as discussed in section 5.4 of the accompanying Review SWD;
- an allocation for the termination rate that the visited network operator needs to pay the terminating network operator for terminating a call on its network, as discussed in section 5.5 of the accompanying Review SWD; and
- an allocation for the transit costs that the visited network operator needs to pay for routing a call to the terminating network operator or to send data traffic back to the home network, as discussed in section 5.6 of the accompanying Review SWD.

Under Option 4 we consider wholesale price caps based on the cost estimates presented in Table 4 above (section 6.3).

RLAH objective assessed with country-level data

The effective, net, wholesale cost of providing retail roaming services is generated only by the outbound roaming traffic in excess to the inbound roaming traffic. For balanced traffic, wholesale revenues generated by incoming roamers effectively balance wholesale payments for domestic customers who periodically travel outside the operator's domestic network⁵⁸.

Based on operators' data from the autumn 2015 data collection, BEREC has calculated, for each EEA country, the distribution of outbound roaming traffic across all destination countries in the EEA⁵⁹. However, the (reciprocal) distribution of inbound roaming traffic received by a given EEA country from the different EEA countries is not available. Therefore, the bilateral balance of roaming traffic between each pair of EEA countries is not available. As a consequence, it is not possible to compute, for each country, the average net annual wholesale cost of the outbound unbalanced part of RLAH⁶⁰ at the level of Option 4's country-specific wholesale roaming caps for retail roaming providers. As the cost-oriented country-specific caps are all below the level of the EU caps of Option 3, this cost is necessarily smaller, so that the RLAH exposure of retail roaming providers is smaller than the exposure shown in Table 6 for Option 3. Based on a simulation of the average RLAH exposure at country level therefore, Option 4 can only raise less RLAH sustainability concerns than Option 3.

RLAH objective assessed with operator-level data

⁵⁸ Article 6d(3) litera (a) of the Roaming Regulation refers to the effective wholesale roaming charges for unbalanced traffic.

⁵⁹ BEREC Report on the wholesale roaming market, BoR(16)33, February 2016: Table 6 in Annex 1

⁶⁰ Based on the inbound/outbound ratio in BEREC Report on the wholesale roaming market, BoR(16)33, February 2016

In line with our assessment of Option 2 and 3 above, we have also conducted analysis on the sustainability of Option 4 at the operator level (as indicated above when describing our assessment in Option 2 and 3, we only present here the final results, additional details on our approach can be found in Annex 4). Again, we present our results for the Base case scenario modelled in Table 8 below.

Table 8: Sustainability results for Option 4 under the Base case scenario modelled

	Sustainability %				
	Positive sustainability	<1%	1-3%	3-5%	>5%
Option 4 – Country-specific caps	88%	5%	3%	3%	2%

Note: The row adds up to more than 100% due to rounding

Table 8 above shows that Option 4 results in the same percentage of operators with a positive sustainability than Option 3 (88%), albeit higher than Option 2 (66%). Therefore, according to our analysis it can be concluded that setting country-specific wholesale price caps does not seem to improve the sustainability of RLAH at operator level.

Cost recovery at wholesale level

The wholesale roaming caps set under this option are at the estimated costs of providing wholesale roaming services in each EEA country. This should in principle allow visited operators in each country to recover their costs. However, there could be risks of insufficient cost recovery for some visited operators if the cost model misses some specificities or in case of path-dependent/historical additional costs for some operators.

There is a risk that visited operators not recovering their costs increase their domestic prices (waterbed effect in the visited country).

Country-specific caps may not adequately reward efficiency and innovation, as operators who manage to keep costs low would be hit twice: they would face large out-payments to higher-cost operators, and they would be forced by lower caps to impose low charges to the higher-costs operators in return.

It may be argued that the economic rationale for cost-orientated regulation on the wholesale roaming market may be contested, as there is no monopoly nor dominance or significant market power situation and that cost-oriented regulation would therefore be disproportionate. Cost-orientation could in any case lower incentives to invest to provide wholesale roaming services. These risks cannot be entirely evacuated in an approach such as that of option 3, where the necessary balance between wholesale cost recovery and the attainment of a maximal level of RLAH, with only exceptional derogations on grounds of unsustainability of domestic charging models, leads towards setting caps close to the cost recovery level for the highest cost operators / countries. However, this is not a reason to generalise these potential disadvantages to all Member States, as option 4 could do, to an extent not necessary to reach the primary objectives of this wholesale review.

Finally, although, the inclusion of wholesale roaming specific costs within the wholesale roaming caps ensures in principle higher levels of the wholesale roaming caps than market-driven domestic wholesale prices, cost-oriented regulation of wholesale roaming access may

entail some risks of de facto price-regulating and distorting the visited country's domestic markets which are deemed competitive by the Commission and NRAs.

Permanent roaming

The lower the caps, the higher the risk of non-cost recovery and the risk of unwanted permanent roaming. By removing the economic safeguard of an above-costs cap, this cost-orientation option entails the highest risk of unwanted permanent roaming and arbitrage. In particular, new actors may enter national markets and use the cheap roaming access to compete on the national markets, thereby distorting national competitive dynamics on the basis of a regulatory intervention solely designed to reconcile RLAH with domestic pricing in other markets with other costs.

In order to mitigate the unwanted permanent roaming risk, the Roaming Regulation provides a safeguard, namely that the obligation of providing wholesale roaming access upon reasonable request (Article 3) may be lifted by the visited operator should the wholesale roaming access seeker use this access for other purposes than providing retail roaming services to its roaming customers while periodically travelling. There is no certainty as to whether this safeguard may act as effectively as the economic (cap) safeguard.

Implementation costs

This option involves many implementation challenges and complexities.

First of all, this option puts a considerable administrative burden on NRAs. NRAs would have to run the common cost model with their own model inputs and set caps accordingly.

The national caps set by NRAs with reference to cost estimates they obtain using the common cost model developed by the Commission would have to be notified to the Commission after the entry into force of the new Regulation. The national caps set by NRAs would therefore have to be applicable from 15 June 2017, while being reviewed by the Commission⁶¹. In case the Commission's assessment leads to a different outcome from that of the NRA, the NRA would have to change the national cap, so as to comply with the Commission's assessment. This would lead to legal uncertainty, litigations and compensation requests.

The uncertainty about the final level of country-specific caps during at least several months after June 2017 would create a very unstable context for operators to implement RLAH offers. The decision of some operators to apply or not for sustainability exemption may depend on the final level of the caps in certain countries. The uncertainty on the wholesale side inevitably leads to uncertainty on the retail side.

The common cost model to be applied by NRAs, with its necessary built-in flexibility, may lead to variations resulting from policy choices rather than from objective factual elements. Results may not be comparable. Data quality, consistency and updates may differ across NRAs. There are also risks that arbitrary or necessarily subjective adjustments may be made to the NRA's model inputs, involving risks that the model produces unreliable results.

⁶¹ Review of cost estimates by the Commission would be needed in order to ensure consistency of cost estimates and check compliance of national measures with the common cost model, in order to avoid divergences which could result in unbalanced national price caps, with corresponding distortions in roaming revenues flows. This would be needed, taking into account that on the other hand retail regulation (RLAH) would be binding and uniform across Europe. See also the analysis of the limited incentive of individual NRAs, when acting on their own, to solve roaming problems rooted in wholesale roaming rates – see section 3 above.

Country-specific caps would then require a cumbersome and frequent update from NRAs and the Commission to remain relevant in the light of market evolution in every EU Member State.

Finally, this option also puts a considerable burden on the Commission as it would have to review and assess the cost estimates obtained by NRAs and the national caps set by them, and then to repeat this exercise periodically. As shown above, the gain in terms of RLAH sustainability from Option 4 relative to Option 3 is not demonstrated or even slightly negative, while the overall additional resources it would entail at national and EU level is considerably higher relative to Option 3.

By fragmenting the rules at wholesale level, this option also implies more substantial implementation costs for mobile operators than in the other options, in particular costs related to the billing system adjustment and to increased complexities in wholesale roaming negotiations and contract management.

Digital Single Market

By ensuring that RLAH is sustainable for a maximum of operators in the EU, Option 4 in principle fulfils the DSM specific goal of making borders meaningless for the use of mobile services within the EU.

However, Option 4 is perceived by many stakeholders as fragmenting the wholesale roaming market with country-specific caps instead of the EU-wide caps, valid in all Member States, used to regulate the market so far. Country-specific regulation is contrary to the objective of a digital single market, and as such represents a step backwards. It is more complex and less transparent than EU-wide caps.

In addition, Option 4 may also lead to some fragmentation of the retail roaming market. Operators consider that country-specific wholesale roaming caps would lead to differentiation of retail roaming offers as the latter would depend on the country visited by the roaming customer; this would be a very complex, fragmented and unfriendly outcome for the consumer.

6.5. Additional Measures: Enable operators to freely agree wholesale roaming terms which are not unit-based

This option may be proposed in addition to the chosen cap-based option among Options 2 to 4, in what would constitute a special type of regulatory menu offered to the operators⁶². This section presents the expected effects of including this option in the Commission's proposal

This option gives parties the possibility to negotiate a de-regulated alternative to wholesale roaming caps where both visiting and visited operators freely agree to waive the application of maximum unit-based wholesale caps, hence concluding alternative pricing agreements (e.g. capacity-based pricing). This option guarantees that, once a contractual agreement outside the regulated price-cap reference has been voluntarily and freely agreed by both parties, neither party would be entitled to revert to the unit-based cap during the contractual period. Thus, it eliminates potential obstacles to alternative pricing negotiations due to opportunistic *ex post* application of mandatory unit-based caps, disregarding initial contractual arrangements.

⁶² Laffont J.J and Tirole, J. (2001). Competition in Telecommunications. MIT Press. Chapter 2.

Taking into account the new RLAH context, this measure, in line with the Better Regulation guidelines, seeks to promote a market-led solution as far as possible, which could help phase out wholesale price regulation in the future.

Indeed, in the wholesale roaming market, there is a strong level of uncertainty regarding actual volume consumption, especially for data. The RLAH policy, which gives security to the consumer, and links usage to domestic tariffs that are generally not unit-based and potentially unlimited, could translate into higher volume consumption, which increases even further the level of uncertainty.

Moreover, the cost structure of domestic offers (mostly fixed capex expenses) often differs from the roaming cost structure (mostly variable opex expenditure), as also highlighted in the public consultation. The RLAH policy could also increase this divergence between domestic and roaming cost structure.

For these reasons there may be cases where alternative agreements, waiving the application of a unit based cap, can be potentially attractive to both parties. If the cap remains referential, the implicit unit prices resulting from contracts that ground price upon probable (and not unit-based or actual) amount of customer consumption may be above the cap level. In exchange, the visited operator would be taking greater volume-related risks, which could potentially bring implicit final unit prices down. Moreover, in practice operators' concern is more related to meeting overall revenue targets rather than lowering costs, a dynamic that is at the root of the bilateral exchanges we have observed in the market. Thus, the possibility of stable income in a RLAH context can also make this option attractive and economically efficient.

In particular, capacity-based contracts, which could in principle incorporate this economic dynamic, have other features and built-in incentives that bring a positive impact to the wholesale market⁶³:

- Capacity-based contracts, under which visiting operators buy a percentage of an MNO's mobile network capacity, allow the visited operator to have a better estimation of the visiting operator's estimated initial needs, thus optimizing its network investment strategies.
- Moreover, capacity-based contracts provide stable revenue commitments to the visited network, which can incentivise both visited and visiting networks to include risk variables in their contracts.
- Capacity-based contracts are better suited to dealing with peak-loads – for example capacity can be priced on a monthly basis to deal with vacation periods or subject to variable QoS agreed by the parties.
- The better the management efficiency and technology of the visited operator, the more it would be willing to take risks related to unpredicted inbound traffic. While rewarding efficiency, the predictable economies of scale of the RLAH regime could be better distributed.

⁶³ See in this regards also the elements assessed by BEREC in its Report on the wholesale roaming market, BoR (16) 33, page 27 and 35.

- The visiting network has not only an incentive to grow and utilise the full initial capacity, but also to go beyond it and contract an additional, presumably cheaper bandwidth unit. This gives an incentive to the visiting operator to extend the availability of RLAH traffic in its tariff models or to build re-selling business models, if contractually possible.
- Capacity-based models are in principle better situated to deal with different type of network speeds and help Voice-over-LTE (VoLTE) models extend to roaming.

Since this option will be fully optional for the parties, it does not impinge on the effectiveness of any other main regulatory option.

7. Comparison of options

7.1. Stakeholders' views on the most appropriate regulatory approach

Almost all operators responding to the public consultation⁶⁴ agree that price caps set at EU level valid for all Member States is the most appropriate approach to continue regulating wholesale roaming markets in the RLAH context⁶⁵.

Operators are however divided as to what the level of these caps should be to enable sustainable RLAH. Only 28% of responding operators (certain historic incumbents and operators with a large footprint, and generally operators with large inbound roaming traffic) are of the view that, under current regulation, the functioning of the wholesale roaming markets would deliver RLAH in 2017; in contrast, 53% (smaller operators, MVNOs, and operators with large outbound roaming traffic) are of the view that they would not deliver RLAH in 2017. The proportion of operators which do not know (18%) is noticeable, while only one operator thinks it depends on the Member State.

As a consequence of different perceptions of the functioning of the wholesale roaming market, operators are divided along the same sender/receiver line as to what the most appropriate regulatory wholesale level measure can be to enable sustainable RLAH in 2017: 28% of responding operators favour keeping current caps unchanged or lifting any wholesale regulation, against 58% who think that wholesale roaming price caps should be lowered.

In the small sample of NRAs and governments who responded to the public consultation (9 out of 9 Member States in total), those in countries with large inflows of roamers defend the status quo (no change in the wholesale roaming price caps), while those in countries sending large outflows of roamers call for lower caps.

Individual consumers and their associations are cautious in expressing views on wholesale roaming markets since they do not face these markets directly. 56% of the individual consumers do not indicate the regulatory measure they see as most appropriate. 63% of those of them expressing a view on this, and all consumer associations expressing a view on this (6 out of 7), defend the view that caps must be lowered. 69% of consumers expressing a view

⁶⁴ For a detailed analysis of the results of the public consultation, see Annex 2.

⁶⁵ Only 4 (including 2 respondents from the same company) out of the 40 mobile operators responding to the consultation argue that lifting wholesale regulation would be the best approach.

favour an EU-wide cap over country-specific caps. 3 out of 7 consumers' associations consider that caps should remain EU-wide and 4 consumers' associations do not reply.

Finally, some stakeholders suggest additional regulatory measures next to the cap measure which are also considered in BEREC Report on the wholesale roaming market⁶⁶. There is in particular a widespread and strong call from operators for further harmonisation of MTRs, in addition to the roaming regulation, as MTRs are an important input for roaming services. In order to enable the visited operator to prevent permanent roaming, some operators suggest to allow the visited operator to apply a wholesale surcharge (higher than the cap) for those roamers who are roaming more than periodically (i.e. a fair use policy at wholesale level). Finally, MVNOs suggest specific measures to enable them to benefit from discounted wholesale roaming prices, such as obliging the MNOs to pass discounts they obtain for wholesale roaming services on to their hosted MVNOs, or obliging MNOs to include RLAH in their wholesale domestic offer to MVNOs.

Stakeholders' views expressed in response to the public consultation on the different regulatory options are consistent with BEREC's analysis of operators' views in response to the autumn 2015 data collection⁶⁷.

Based on this data collection, BEREC reports some operators' views about capacity-based wholesale roaming charges. Some operators think that wholesale tariffs on a per-unit basis are becoming problematic and obsolete because the majority of domestic retail mobile packages today are “flat” offers including large or even “unlimited” volumes of minutes, SMS and MBs. In spite of that, up to now, only few, if any, operators were willing to negotiate flat wholesale deals. These MNOs believe that the dynamics of the retail market will allow for the introduction of pure capacity models in the long term as data traffic increases, including the introduction of VoLTE. This may require introducing quality-of-services criteria linked to data wholesale services.

While capacity-based agreements may be appealing, a number of operators oppose changing the current regulation based on the current wholesale roaming unit rate structure into one *exclusively* based on capacity. According to them, there is uncertainty regarding traffic flows in a RLAH environment and fixed fees for roaming services would mean that the financial risk is 100% on home operators. They consider that this model would potentially exclude small operators with very low demand on volumes.

7.2. Commission's assessment of the best option

Option 1 (baseline scenario: no EU action) meets the objective of cost recovery at wholesale level (as no EU action would leave wholesale roaming caps at their current level), but does not deliver the policy objective set in the Roaming Regulation to enable RLAH in the EU from 15 June 2017. Under this option, the RLAH+ transitional regime, whereby operators may apply a roaming surcharge to roaming customers in the EU in addition to the domestic price, continues to apply and is not expected to lead to the RLAH regime in the medium to long-term. Under this option, the EU would fail to deliver on its promise to EU citizens, set out in EU legislation and widely communicated to the public over the last year, to abolish retail roaming surcharges from 15 June 2017. The consumer welfare gain to be provided by RLAH would be entirely missed. This option can therefore not be retained.

⁶⁶ BEREC Report on the wholesale roaming market, BoR(16)33, 29 February 2016 (section 3).

⁶⁷ BEREC Report on the wholesale roaming market, BoR(16)33, February 2016 (section 3.5)

Under Option 2, setting the wholesale roaming caps after 15 June 2017 at the level of the Roaming Regulation currently in force would fulfill the condition set in the Roaming Regulation to make the retail RLAH obligation applicable from that date. It would also meet the wholesale level cost recovery objective. Because a number of operators would provide RLAH under the new rules, the RLAH consumer welfare gain would not be entirely missed as in Option 1. As such, Option 2 is preferable to Option 1. However, as shown in the analysis of Option 2 (section 6.2), a sizeable share of operators (at least 20% in our sample and/or in at least six countries) would not be able to sustain their domestic charging model under RLAH with the current level of wholesale roaming caps. Option 2 therefore presents significant risks of distortion of competition and domestic prices increases in the home markets where RLAH sustainability is not ensured. As a result, the RLAH consumer welfare gain would be missed for a high proportion of consumers.

Option 3 (setting EU cap at a lower level than currently) also meets the objective of cost recovery at wholesale level. The EU cap level under this option (4€/min, 1 €/SMS and 0.85 €/MB) is above the costs of providing wholesale roaming services by visited operators in all EU countries, as evidenced by already observed wholesale roaming prices in the market, domestic wholesale prices, and estimates provided by a cost model⁶⁸. For countries whose estimated costs are closer to the EU voice cap set in this option, the margin allowed by this option's data cap in these countries is more than adequate to ensure aggregate cost recovery on wholesale provision in these countries. This cap level therefore ensures the recovery of costs of providing wholesale roaming services by visited operators, leaves space for competition below the cap, keeps investment incentives in the visited markets, and may act as a safeguard against unwanted permanent roaming and the potentially resulting national market distortions.

On the retail side, the cap level under Option 3 makes RLAH sustainable in the EU. The country level tables (Table 2 and Table 6 in section 6) indeed show that Option 3 substantially improves the sustainability of RLAH across EEA countries compared to Option 2, leaving no country with an average annual net wholesale cost of RLAH above 5% of ARRPU, and only two - Ireland and Austria - where such wholesale costs exceed (to a limited extent) the proportion of retail revenue corresponding to the annual average number of days travelled abroad in the EEA by residents of the country in question. Option 3 results in a significantly higher percentage of operators with a positive sustainability (91%), compared to Option 2 (70%) (see Table 9 below which summarizes the sustainability results obtained at operator level under Options 2, 3 and 4). Option 3's wholesale price caps are sufficiently low to ensure that they are below the retail prices in the great majority of EU countries, thereby minimising the potential for a negative retail roaming margin for mobile operators that are net senders of roaming traffic (i.e. have higher outbound than inbound roaming traffic).

As only a very limited number of operators (if any) may be expected to be entitled to derogate from RLAH, Option 3 would allow to benefit from the RLAH consumer welfare gain, in contrast to Option 1. Compared to the cap level of Option 2, the lower cap level of Option 3 reduces considerably the proportion of consumers who would not benefit from RLAH, limits the possibly asymmetric impact of RLAH on operators in home markets, and reduces the risks of market distortions and increase in retail prices in home markets.

As to Option 4 (cost-oriented country-specific caps), it presents important risks as regards the cost recovery of wholesale roaming services, as well as the risk of de facto regulating national

⁶⁸ See accompanying Review SWD on the wholesale roaming markets in the EU, section 5

wholesale markets. It also implies considerable implementation challenges, complexities and costs that none of the other options implies.

Under Option 4, the proportion of consumers that would have sustainable RLAH is higher than in Options 1 and 2, but similar to Option 3, since Option 4 does not improve substantially the sustainability of RLAH in the EU compared to Option 3 (see Table 9). It may even worsen the situation in some particular instances where the reduction in wholesale roaming revenues due to the lower country cap (than Option 3's EU cap) in a given country is larger than the reduction in wholesale roaming payments due to lower country caps (than Option 3's EU caps) in the other countries. This makes this cost-orientation option unnecessary and disproportionate to achieve the overall RLAH policy objective.

Table 9: Sustainability results for each regulatory option under each of the three scenarios modelled

	Sustainability %				
	Positive sustainability	<1%	1-3%	3-5%	>5%
Option 2 – Current caps	66%	6%	5%	5%	19%
Option 3 – Single EU wide cap	88%	5%	2%	5%	2%
Option 4 – Country-specific caps	88%	5%	3%	3%	2%

Notes: each row adds up to more than 100% due to rounding.

A summary of the comparison of the different options is shown in Table 10.

The Commission therefore considers that Option 3 best fulfils the policy objectives. Annex 3 summarizes who is affected by the proposal and how.

In addition, the Commission proposes giving flexibility to operators to agree wholesale terms which are not unit-based in order to promote market-led solutions as far as possible. In particular, we anticipate a possible interest from operators for unregulated capacity-based contracts. Such contracts may bring a number of benefits to both parties of a bilateral roaming agreement, in particular since the logic of RLAH means that roaming becomes included in domestic bundles which are not charged on a unit basis. At the same time, no operator could be forced to agree on such contract, in which case the regulated cap (Option 3) would apply. This addresses the concerns of some operators opposed to abandoning the unit cap based regulation model for a regulation exclusively based on a capacity model. Finally, should such alternatives to the regulated cap-based solution (Option 3) not be taken up by the market at all, this would have no negative impact on the outcome of the regulated solution itself.

Table 10: Comparison of options: effectiveness, efficiency, stakeholder views and coherence

Option	Effectiveness (- negative; 0 neutral; +positive)	versus objectives	Stakeholders' (- negative; 0 neutral; +positive)	views	Coherence (- negative; 0 neutral; +positive)
Option 1 - Base line; no EU action	<p>(-) RLAH is not applicable from 15 June 2017 in the EU.</p> <p>Consumers and business users continue to pay retail roaming surcharges when roaming abroad in the EU.</p> <p>(+) Recovery of costs of providing wholesale roaming services is ensured, preserving incentives to invest in visited networks and avoiding distortion of domestic competition in the <i>visited</i> markets.</p> <p>In particular, the existing wholesale roaming caps act as an effective safeguard against unwanted permanent roaming; additional safeguard in the Roaming Regulation lifts roaming access obligation in case of unwanted permanent roaming.</p>		<p>(+) Operators would potentially support the prolongation of the RLAH+ regime beyond 15 June 2017 as this allows them to still continue to apply retail roaming surcharges to cover their costs.</p>		<p>(-) In contradiction with the Roaming Regulation's requirement to enable RLAH from 15 June 2017 in the EU.</p> <p>(+) Consistent with the Roaming Regulation's requirement of wholesale cost recovery and keeping safeguards against unwanted permanent roaming</p>

<p>Option 2 - Set EU-wide wholesale roaming caps at the current level</p>	<p>(-) RLAH is not sustainable from 15 June 2017 for at least 20% of the operators in our sample and/or in at least six countries.</p> <p>Distortions on the <i>home</i> markets appear in certain countries:</p> <ul style="list-style-type: none"> - Operators proving non-sustainability of RLAH are authorised by NRAs to continue applying a retail roaming surcharge if they apply; - Alternatively, operators facing RLAH sustainability challenges, instead of asking for an RLAH exemption, may choose to raise domestic prices to the extent allowed by domestic competition in a given Member State. <p>(+) Recovery of costs of providing wholesale roaming services is ensured, preserving incentives to invest in visited networks and avoiding distortion of domestic competition in the <i>visited</i> markets.</p> <p>In particular the existing wholesale roaming caps act as an effective safeguard against unwanted permanent roaming; additional safeguard in the Roaming Regulation lifts roaming access obligation in case of unwanted permanent roaming.</p>	<p>(+) Certain incumbents/operators with large footprint, Southern operators, in general operators which are net receivers of roaming traffic, strongly support keeping the wholesale roaming caps unchanged; it allows them a good margin, in particular with smaller operators and MVNOs.</p> <p>(-) Small operators, Northern operators, MVNOs, in general operators which are net senders of roaming traffic strongly oppose maintaining caps at their current level as this would create considerable sustainability problems to them, margin squeeze and possible market exit.</p>	<p>(-) As it does not enable sustainable RLAH in the EU and may create distortions on domestic markets as domestic prices may rise, it is in contradiction with the Roaming Regulation's requirement to enable RLAH from 15 June 2017 in the EU.</p> <p>(+) Consistent with the Roaming Regulation's requirement of wholesale cost recovery and keeping safeguards against unwanted permanent roaming</p>
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Option 3 – Set lower EU-wide wholesale roaming caps	<p>(+) RLAH is sustainable from 15 June 2017 for operators in the EU.</p> <p>The number of operators that may be entitled to be authorised by NRAs to continue applying a retail roaming surcharge is very small, if any: RLAH-exemption remains exceptional, avoiding distortions on the <i>home</i> markets.</p> <p>(+) Recovery of costs of providing wholesale roaming services is ensured, preserving incentives to invest in visited networks and avoiding distortion of domestic competition in the <i>visited</i> markets.</p> <p>In particular, the new wholesale roaming caps may act as an effective safeguard against unwanted permanent roaming; additional safeguard in the Roaming Regulation lifts roaming access obligation in case of unwanted permanent roaming.</p>	<p>(+) Small operators, Northern operators, MVNOs, in general operators which are net senders of roaming traffic strongly support a sharp reduction of EU caps in order to reduce their wholesale roaming payments as their subscribers will consume high RLAH roaming volumes without retail surcharges for that service in the EU, with a view to making RLAH a sustainable service for these operators.</p> <p>(-) Certain incumbents and operators with large footprint, Southern operators, in general operators which are net receivers of roaming traffic, strongly oppose any reduction of wholesale roaming caps as, according to them, the wholesale roaming market is already well-functioning and delivering prices that already enable RLAH offers to exist on the market.</p>	<p>(+) Consistent with the Roaming Regulation's requirement to enable RLAH from 15 June 2017 in the EU.</p> <p>Consistent with the Roaming Regulation's requirement of wholesale cost recovery and keeping safeguards against unwanted permanent roaming</p> <p>Consistent with the harmonised EU wide regulation of wholesale roaming market in place so far.</p>
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Option 4 – Set country-specific wholesale roaming caps	<p>(+) RLAH is sustainable from 15 June 2017 for operators in the EU.</p> <p>The number of operators entitled to be authorised by NRAs to continue applying a retail roaming surcharge is very small, if any: RLAH-exemption remains exceptional, avoiding distortions on the <i>home</i> markets.</p> <p>(+/-) Recovery of costs of providing wholesale roaming services may not be ensured in all cases.</p> <p>The cost-orientation of the caps increases the risk of arbitrage and abusive use of the wholesale roaming access to a domestic network, and hence the risk of distortion of domestic competition in the <i>visited</i> markets.</p>	<p>(-) No operator is supporting this regulatory option.</p> <p>All operators favour EU-wide caps to avoid fragmenting the wholesale roaming market, complexifying and distorting bilateral roaming relationships.</p> <p>Operators however do not agree on the level of the EU-caps (see Options 2 and 3).</p>	<p>(+) Consistent with the Roaming Regulation's requirement to enable RLAH from 15 June 2017 in the EU.</p> <p>(+/-) At risk with the Roaming Regulation's requirement of wholesale cost recovery and keeping safeguards against unwanted permanent roaming</p> <p>(-) Not consistent with the single market regulatory approach of the Commission and the harmonised EU wide regulation of wholesale roaming market in place so far.</p> <p>Not consistent with Better Regulation principles of simplicity, transparency and minimising administrative burden.</p>
Additional Measure: Enable operators to freely agree wholesale roaming terms (capacity-based contracts)	<p>(+) This option further optimizes the economics of RLAH, facilitating the sustainability of different tariffs plans, and providing additional avenues to deal with seasonality issues.</p> <p>This option is strictly voluntary and available next to the regulated solution. It is expected to be taken up by both parties to a bilateral roaming agreement only if judged beneficial by both of them.</p>	<p>(+) Operators with different characteristics/sizes have stressed the benefits of capacity-based contracts.</p> <p>Some operators are clearly opposed to changing the regulation based on the current wholesale roaming unit rate structure into a regulation based on capacity only. However, they would not in principle be opposed to enabling capacity-based contracts on a voluntary and flexible basis.</p>	<p>(+) Fully consistent with both the Roaming Regulation and the Better Regulation principles.</p>

Finally, as noted in section 6.1, the most serious potential technological substitute to roaming services is eSIM card which allows switching operator without changing physically the SIM card. This would potentially facilitate the choice of a local operator to provide services, instead of the user's home operator, when arriving in another country. By doing so, the user would choose paying local tariffs for mobile services.

Under the RLAH regime, choosing a local operator, even if facilitated by a new technology, loses some of its advantages compared to the current regulatory regime where roaming services are substantially more expensive than domestic services. When traveling in the EU under the RLAH regime, many customers may rather not see the need of making such a switch while they would continue paying from their domestic bundle if they do nothing at all when arriving in another Member State. Customers do not know the local operators, nor their respective prices, while they know their own domestic price and the volume available on their domestic subscription. This is precisely the political choice made by the co-legislator in 2015 by imposing RLAH: to allow customers ignoring they are changing Member State from the point of view of mobile services.

Those customers who, under the future RLAH regime, still want to try and find good local offers while traveling in other Member States will be able to make the switch of operators with the new eSIM technology if the latter is implemented in smartphones in the future, or with any other local break-out technique made available by operators.

7.3. Commission's assessment of additional measures suggested by stakeholders

Termination rates (TRs) regulation

TRs are part of the wholesale payments to be made by the visiting operators to the visited operators to cover the termination of outgoing calls made by its roaming customers when hosted on the visited network. The visiting operator also pays a mobile termination rate (MTR) to the visited network for terminating the call made to the roaming customer while the latter is hosted on the visited network. Therefore, termination rates, in particular MTRs, are an important element of the wholesale costs incurred by the visiting operator for providing retail roaming services.

The public consultation showed a widespread and strong call from operators for further harmonizing MTRs as a pre-requisite for sustainable voice RLAH. Operators at the same time recognize that this should be a parallel process, as the Roaming Regulation is not the appropriate legislative instrument to regulate TRs. This is also the view expressed by BEREC in its Report on wholesale roaming market⁶⁹.

The Commission will take the appropriate measures to harmonise the regulatory approach to MTRs in the EU⁷⁰. Therefore the option of setting the wholesale roaming voice cap on the

⁶⁹ "The Roaming Regulation is not the appropriate legislative instrument to amend the current system which would require an amendment of the current regulatory approach on termination rates" in BEREC Report on the wholesale roaming market, BoR(16)33, February 2016 (section 3.5.3, p 33)

⁷⁰ On 15 March 2016 the Commission launched a public consultation on the termination rates recommendation, available at <https://ec.europa.eu/digital-single-market/en/news/public-consultation-termination-rates-recommendation>. In the meantime, should any dispute between the visited and terminating operators arise on significant imbalances due to divergences in the termination rates applied, option 3 would empower BEREC to provide guidance for the resolution of the dispute.

basis of the origination service only (i.e. excluding the MTR from the cap and allowing the MTR to be charged by the visited operator to the visiting operator on top of the cap) is not considered. This has never been the case in past roaming regulations and would be technically complex to implement as it would involve IT development in order to charge a wholesale roaming price on a call by call basis according to the MTR of the destination country. In view of the forthcoming harmonisation of regulatory approaches to MTRs in the EU, the option of setting a cap on MTRs for roaming incoming calls only is not considered either. It would need IT development to split traffic between international and roaming. None of these two options would fully solve the issue to RLAH raised by non-harmonised MTRs in the EU.

Fair use policy at wholesale level

In the public consultation there is a consensus among stakeholders about the possible market distortions that permanent roaming could cause on the domestic market of the visited network. However, it is also widely admitted that the risks of permanent roaming are to a large extent mitigated as long as the recovery of wholesale roaming costs is ensured, which is the case with the option chosen consisting of a cap above costs. In addition, the Roaming Regulation already includes one of the additional safeguards suggested by some stakeholders to enable the visited operator to prevent permanent roaming on its network, namely the possibility to refuse roaming access to an operator if this access is used for other purposes than providing roaming services for periodic travels. Finally, in the public consultation stakeholders are not calling for measures to prevent hypothetically anticipated circumvention mechanisms, many of them being of the view that they would not be proportionate.

We therefore do not propose to include additional regulatory measures to prevent permanent roaming in addition to setting the caps above costs and the existing measure of the Roaming Regulation. Permanent roaming will be a point of attention of the monitoring and evaluation of the regulation (see section 8). If it becomes an issue, appropriate regulatory measures will be considered.

MVNOs-specific measures

Since 2007, domestic wholesale access to mobile networks is not among the relevant markets subject to ex ante regulation recommended by the Commission. The introduction of roaming-specific regulatory measures (e.g. obliging the MNOs to pass discounts they obtain for wholesale roaming services on to their hosted MVNOs, or obliging MNOs to include RLAH in their wholesale domestic offer to MVNOs) would involve the risk of distorting the domestic markets and the current relationships and commercial practices between MNOs and MVNOs, including the risk of increasing domestic wholesale price conditions. As also noted by BEREC, such measures would be difficult to verify by regulators⁷¹. We assess the level of the caps as generally enabling sustainable RLAH for market players paying wholesale roaming services at the level of the caps, with possible sustainability problems for MVNOs⁷² being confined to a limited number of Member States.

⁷¹ BEREC Report on the wholesale roaming market, BoR(16)33, February 2016 (section 3.5.3, p 36)

⁷² As reported in Section 6.2. , under *current* wholesale roaming caps (5 €/min, 2 €/SMS, 5 €/MB) MVNOs may encounter margin squeeze problems with RLAH and some exceptional sustainability problems cannot be excluded with the lower caps proposed in this impact assessment (4 €/min, 1 €/SMS, 0.85 €/MB).

8. Monitoring and evaluation

This section presents the monitoring and evaluation mechanism and indicators proposed to assess the progress achieved with this initiative *vis à vis* its intended general objective, i.e. to ensure that national wholesale roaming markets function in such a way that, from 15 June 2017, the general policy objective of RLAH can be met in a sustainable manner throughout the EU, while ensuring at the same time the more specific objectives, i.e. recovery of all costs of providing regulated wholesale roaming services and the need to prevent distortion in the visited country due to permanent roaming. The monitoring and evaluation strategy analysed in the following paragraphs, therefore, concerns the regulation of wholesale markets, which are the object of this initiative.

At the same time, it should also be considered that monitoring and evaluation obligations and tools are provided for in the existing Roaming Regulation, including both retail and wholesale regulation underpinning the RLAH obligation. In line with the better regulation principle, therefore, any evaluation strategy for the wholesale market, therefore, need to take also into account the existing rules provided for in this context⁷³.

With regard to *timing* of the evaluation, the Commission is currently required to submit a report every two years, starting from the date of the report on wholesale market accompanying this Impact Assessment, i.e. as from June 2018. Taking into account that the entry into force of the RLAH obligation will be triggered as from June 2017 and depending on the approval of the wholesale review by European Parliament and Council by that date, this first reporting exercise would provide only a very partial overview of the entry into force of the new retail and wholesale regulatory regimes, since it would not be able to take into account data covering an entire year of application of the new regime. Moreover, in the event of delays in the adoption of the legislative proposal, since the reporting obligation is linked to the proposal of the Commission but not on the entry into force of RLAH, the report would be able to take into account a correspondingly more limited period of application of any retail and wholesale regulation. In order to address this inconsistency, therefore, it is proposed to link the reporting obligation to the entry into force of RLAH. In order to have more complete data series can be gathered on the functioning of the wholesale markets and its impact on domestic and visited markets as well as on the sustainability of RLAH.

With regard to the *content* of the monitoring and evaluation exercise, Article 19(3) refers to some aspects which are directly relevant for the assessment of effects of the wholesale regulation considered in the context of this initiative, in particular sub point b) ("the degree of competition in both the retail and wholesale roaming markets, in particular the competitive situation of small, independent or newly started operators, including the competition effects of commercial agreements and the degree of interconnection between operators"). Within this

⁷³ In particular, Article 19(3) of Regulation 531/2012, as amended by Regulation 2015/2120, provides that the Commission shall adopt a report to the Council and the European Parliament every two years after the report accompanying the wholesale review, assessing the availability and quality of services, in particular in light of technological developments, the degree of competition in both retail and wholesale roaming markets, in particular the competitive situation of small independent and newly started operators, the impact of implementation of structural measures provided for in Article 3 and 4. In order to assess the competitive developments, BEREC is entrusted with the task to collect the relevant data and to report on the evolution of pricing and consumption patterns and of wholesale rates. In this regard, BEREC annually publishes a Benchmark Roaming Report with the data gathered by NRA under the coordination of BEREC.

existing reporting obligation, therefore, the following indicators are proposed in order to assess the specific measures included in this initiative:

1. Number of sustainability requests filed by operators and accepted by NRAs pursuant to Article 6c of Roaming Regulation and impact on domestic and roaming markets: this will provide an indication of the operators that effectively demonstrated that provision of RLAH was exceptionally deemed unsustainable, including whether specific types of operators (small, independent, new entrants) are particularly affected.
2. Total inbound and outbound roaming traffic volumes per quarter: this indicator allows identifying the impact of RLAH on the demand of the different wholesale services by visiting countries as well as impacts on costs for visited operators.
3. Average wholesale prices and volumes for unbalanced and balanced traffic traded on the basis of volume-based contracts: this indicator gives an indication of variable wholesale costs sustained by visiting operators in providing RLAH and the variable revenues for the visited countries, as well as to monitor the competitive dynamics of the wholesale markets in comparison with the cap. [In particular, if the average shows prices substantially below the caps and a limited standard deviation, it could be considered that market dynamics within the cap are able to provide for regulated roaming wholesale services which may help to ensure the provision of sustainable RLAH for different kinds of operators while still ensuring the recovery of costs by the visited countries.
4. Number and main features of capacity-based wholesale contracts: the number and main categories of capacity-based contracts (such as the alternative metric variables agreed between parties, size of the market in terms of contractual value) will allow to identify the capacity of fully unregulated and negotiated contractual solutions to cope with some of the uncertainties of RLAH, as well as to define the fixed wholesale roaming costs for those visiting operators that adopted these tools.
5. Effectiveness of appropriate contractual wholesale remedies to prevent operators effectively using wholesale roaming access conditions for the purpose of large-scale permanent roaming in a domestic market: domestic market distortions due to operator's abusive use of wholesale conditions for other purposes than the periodic travel of their customers need to be monitored, in particular by gathering information on wholesale contractual measures adopted in this regard and their effective application. In case these abuses cannot be prevented by visited operators, appropriate regulatory measures will need to be taken.

Moreover, it is necessary to monitor how emerging technological trends such as eSims and VoLTE (see accompanying Review SWD) might impact these and other aspects of roaming markets.

With specific regards to the *tools* for monitoring and evaluation, Article 19(4) of the Roaming Regulation entrusts BEREC to collect data from NRAs on the developments of wholesale charges, to be notified by the Commission twice a year. Moreover, BEREC regularly reports on the evolution of wholesale charges and pricing. In this regard, information sub 1 to 3 above are already regularly collected and published in the context of the regular BEREC Roaming Benchmark Reports and this will remain the main source for the data collection. In addition,

with regard to indicators sub 4 and sub 5 above, this could be added in the data gathering exercise for publication in aggregate terms, in order to ensure confidentiality of commercial negotiations and taking into account that NRAs are empowered to require operators to provide any information relevant for the implementation of the Roaming Regulation pursuant to Article 16(4).

ANNEX 1: Procedural information concerning the process to prepare the impact assessment report and the related initiative

The process described in the accompanying Review SWD was designed and set up to serve the purposes of both the wholesale roaming review and the preparation of the impact assessment. This process is described below.

1. Information and data gathering on roaming markets

The first phase of the process consisted in gathering quantitative and qualitative information about wholesale and retail markets in the EU. On 28 July 2015, the Commission sent a request for input to the Body of European Regulators in Electronic Communications (BEREC) to specify the data and information necessary to conduct the review of national wholesale roaming markets in accordance with the Regulation requirements⁷⁴.

Following that request, BEREC, in collaboration with the Commission, sent two questionnaires to, respectively, mobile (virtual) network operators M(V)NOs and national regulatory authorities (NRAs) on 11 September 2015. These questionnaires aimed at collecting detailed data, facts and figures about the degree of competition in national wholesale markets, the level of wholesale roaming costs incurred by a visited operator, including relevant joint and common costs, any observable risks of distortions of competition and investment incentives in home and visited market, and the competition developments in the retail roaming markets⁷⁵. The questionnaire to operators also gathered their views about appropriate options for regulating wholesale roaming markets to enable the abolition of retail roaming surcharges. The questionnaire to NRAs also aimed at gathering information on the cost models and input data used by NRAs to estimate mobile network costs. Replies from operators and NRAs to these questionnaires were received in the course of September and October 2015. Some operators provided updated replies in November-December 2015 and early January 2016.

Through this information gathering exercise, the Commission received quantitative and qualitative information from 135 operators and from the 28 EU NRAs plus the Norwegian NRA. This information gathering exercise is referred to as the '*autumn 2015 data collection*' in this Impact Assessment and in the accompanying Review SWD.

In the course of December 2015 and January 2016, the Commission complemented this data collection exercise with additional requests on the characteristics and inputs of NRAs' mobile termination rates cost models, for the purpose of developing the cost model for the provision of wholesale roaming services.

In addition to these formal information requests, the Commission has maintained informal meetings with NRAs and stakeholders since the start of the review in July 2015. The Commission's approach has been to consult openly with NRAs and BEREC on the analysis contained in this report and the conclusions of its legislative proposal.

⁷⁴ The Commission's request for input to BEREC of 28 July 2015 also covers the inputs needed for the implementing acts mandated to the Commission by the Regulation on the weighted average of maximum MTRs across the EU, fair use policy, and sustainability mechanism.

⁷⁵ In addition, the questionnaire to operators included questions on fair use policies applied so far in unlimited domestic offers and roam-like-at-home-type of offers already marketed (usually for a fixed add-on price).

2. Analysis of the data on roaming markets and development of a sustainability assessment model

The analysis of the qualitative and quantitative data received on wholesale and retail roaming markets in the autumn 2015 data collection was conducted by DG CNECT and the Competence Centre on Microeconomic Evaluation (CC-ME) of Joint Research Centre (JRC)⁷⁶ from November 2015 to February 2016.

For the purposes of the impact assessment, DG CNECT and JRC carried out an assessment of the sustainability of RLAH under the different options considered at wholesale level for individual operators that submitted the necessary data in the autumn 2015 data collection. The methodology used for this sustainability assessment is detailed in Annex 4. It relies on the same domestic and roaming traffic forecast and on the same principle of services allocation as in the cost model developed in the external study (below).

3. External study to estimate the costs of providing wholesale roaming services

In order to assess the level of costs incurred by visited network operators to provide wholesale roaming services, the Commission commissioned an external study to TERA Consultants⁷⁷. The study was conducted from October 2015 to March 2016. Building upon cost models used by NRAs for mobile networks, the contractor has developed a cost model to estimate the costs of providing wholesale roaming services by a generic European mobile network operator. The development of the cost model was made in close collaboration with the BEREC International Roaming Expert Working Group and NRAs. Anonymised data on wholesale roaming specific costs collected from operators in the data collection process described in section 1 above were used in the study to develop the cost model.

In addition, in the context of the study, the Commission invited NRAs, operators and trade associations, as well as other interested stakeholders, to a workshop organised together with TERA Consultants on 28 January 2016 in Brussels to present the interim results and to obtain feedback on the cost model for wholesale roaming services being developed in the study. The feedback from stakeholders has been incorporated into the final version of the cost model developed by TERA Consultants.

Finally, a reality check exercise was conducted in March 2016. During two weeks, NRAs were invited to run and test the cost model on their input data. 20 NRAs provided comments and further information, in particular input data, where they deemed relevant to improve the model. The model and the country input data used were then revised by the contractor to take into account the feedback received from NRAs.

4. Public consultation (see Annex 2)

On 26 November 2015 the Commission launched a wide-ranging 12-week public consultation to gather views on the functioning of, and level of competition on, the wholesale roaming markets in the EU, on the need to regulate them in view of the abolition of retail roaming surcharges by 15 June 2017, on possible options for doing so, and on the possible risks

⁷⁶ The Joint Research Centre (JRC) is the European Commission's in-house science service employing scientists to carry out research in order to provide independent, evidence-based scientific advice and support to EU policy. For further information, please visit the JRC's website at: <https://ec.europa.eu/jrc/>.

⁷⁷ Study SMART 2015/006 "Assessment of the cost of providing wholesale roaming services in the EU", TERA Consultants

associated with permanent roaming and the ways to address them⁷⁸. The public consultation was closed on 18 February 2016. The Commission received 92 responses to the consultation⁷⁹.

5. Commission's inter-service group

In order to support the preparation and drafting of the accompanying Review SWD and of this impact assessment report, a Commission inter-service group was established. The following Commission services were invited to participate: Secretariat General, Legal Service, Competition, Internal Market, Industry, Entrepreneurship and SMEs, Justice and Consumers. The group met on a regular basis throughout the wholesale roaming review process.

⁷⁸ In addition, the public consultation included two sets of questions on fair use policy and the sustainability mechanism foreseen in the Roaming Regulation, in view of implementing powers conferred to the Commission by the Roaming Regulation on these two topics.

⁷⁹ In addition, three respondents sent their replies by e-mail and two respondents sent separate position papers. BEREC published the BEREC Report on the wholesale roaming market (BoR(16)33) on 29 February 2016.

ANNEX 2: Stakeholder consultation

1. Consultation on the cost model to estimate the costs of providing wholesale roaming services in the EEA

The Commission commissioned an external study to develop a cost model in order to estimate the costs of providing wholesale roaming services in the EEA (see section 5 of the accompanying Review SWD). The development of the cost model by the contractor and the Commission was done in close cooperation with National regulatory Authorities (NRAs) via the International Roaming Expert Working Group (IR EWG) of BEREC. Several rounds of oral and written exchanges were organised on the methodology to be used to build the cost model. NRAs were requested to provide detailed information on the cost models they have developed over the years to estimate the costs of termination in accordance with the 2009 Commission Recommendation⁸⁰, so that Member States' specificities can be accommodated as much as possible in the cost model developed for the purpose of assessing the wholesale roaming costs.

In addition, NRAs, operators and trade associations, as well as other interested stakeholders, were invited by the Commission to a workshop organised together with the contractor on 28 January 2016 in Brussels. The objective of the workshop was to present the interim results of the study and to obtain feedback on the cost model. NRAs and stakeholders provided comments on the methodology and the preliminary results during the workshop and in written after the workshop. The comments were taken into account by the contractor in further developing the cost model.

Finally, a reality check exercise was conducted in March 2016. During two weeks, NRAs were invited to run and test the cost model on their input data. 20 NRAs provided comments and further information, in particular input data, where they deemed relevant to improve the model. The model and the country input data used were then revised by the contractor to take into account the feedback received from NRAs.

⁸⁰ Commission Recommendation of 7 May 2009 on the Regulatory Treatment of Fixed and Mobile Termination rates in the EU (2009/396/EC), OJ L 124/67 of 20.5.2009

2. Public consultation on the initiative

A. Methodology of the public consultation and of this report

The Commission ran a consultation on the review of national wholesale roaming markets from 29 November 2015 to 18 February 2016 for 12 weeks. The purpose was to gather views on the functioning of roaming markets in the EU, and the current regulation of national wholesale roaming markets in the EU against the Roaming Regulation's obligation to abolish retail roaming surcharges by 15 June 2017⁸¹. Contributions will be taken into account in the Commission's review of the EU wholesale roaming market and in the Regulation at wholesale level that it will propose to enable the abolition of retail roaming surcharges in the EU as of 15 June 2017 ('Roam-Like-At-Home regime': RLAH). The replies of contributors who agreed to publication are available on [DG CONNECT's website](#). This report analyses the replies to the public consultation.

All online contributions were analysed for the purposes of this report⁸². The consultation targeted mobile operators, national regulators, public authorities, civil society organisations, businesses and citizens.

The analysis was conducted by type of respondents and centres on the two main themes of the consultation:

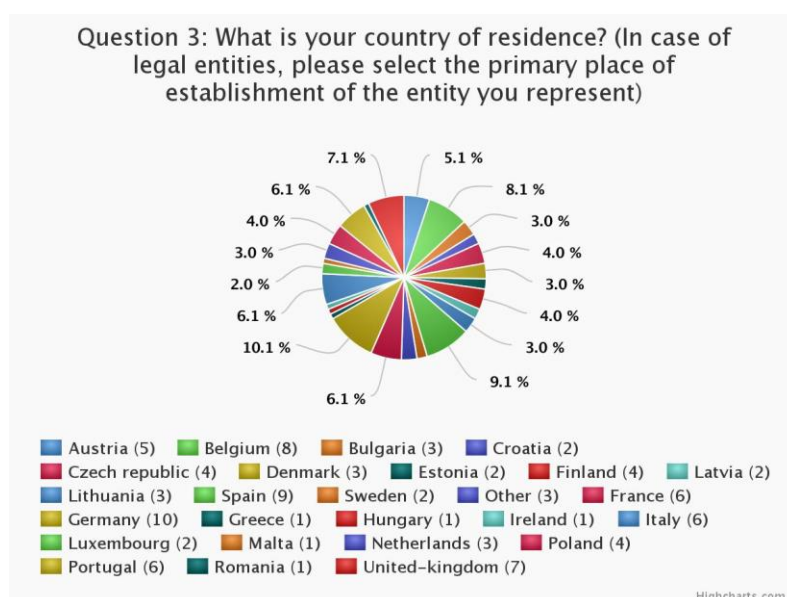
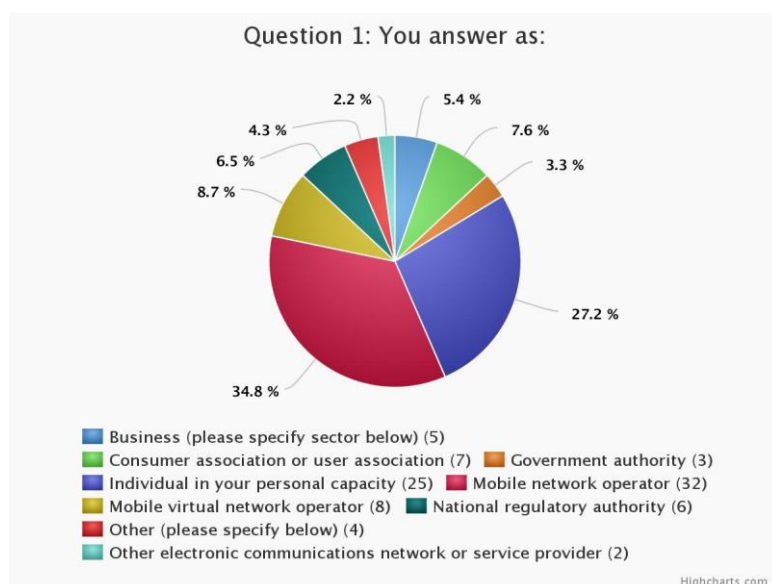
- the functioning of the wholesale roaming market
- the most appropriate regulatory measures to enable RLAH in the EU from 15 June 2017

B. Respondents' profile

A total of 92 replies came through the online questionnaire; 3 by e-mail; 2 respondents sent position papers. The response rate is comparable to the Commission's last public consultation on roaming in 2011 (90 replies). Respondents came from 25 EU Member States and Norway.

⁸¹ Regulation EU 531/2012 of 13 June 2012 on roaming on public mobile communications networks within the Union, as amended by Regulation 2015/2120 of 25 November 2015

⁸² The three contributions received by e-mail and the two positions papers received fed into the qualitative analysis but are not included in the statistics. In addition, the Body of European Regulators for Electronic Communications (BEREC) published its [analysis of the wholesale roaming market](#) on 29 February 2016. While this analysis has served as an input to the wholesale roaming review conducted by the Commission, it is not reflected as such in the present Synopsis report, which focuses on the analysis of the replies to the online questionnaire.



Among the 32 mobile network operators (MNOs) that replied to the public consultation, the 9 group operators⁸³ which operate mobile networks in at least 3 EU countries responded as a group i.e. 1 reply per group. Only one affiliate of one of these nine group operators contributed separately in addition to the group. Therefore, 22 independent MNOs (operating in one or two Member States) replied to the public consultation. Since the 9 group operators represent in total 64 operators in the 28 Member States plus Norway, the responses to the public consultation cover a total of 86 MNOs, plus 8 MVNOs, thus covering most of the telecom sector in the EU plus Norway (the total number of MNOs and MVNOs is approximately 140; those having not responded are among the smaller operators).

⁸³ Deutsche Telecom, Hutchinson Europe, Orange, Tele2, Telefonica, Telekom Austria, Telenor, TeliaSonera, Vodafone.

Citizens and consumers' associations only partially responded to the questions. 6 national regulators and 3 government authorities replied to the questions.⁸⁴

C. Functioning of the wholesale roaming market

Operators have differing perceptions of the effective functioning of wholesale roaming markets:

- **Certain historic incumbents and operators with a large footprint, and generally operators with large inbound roaming traffic, argue that some competitive dynamics take place as shown by wholesale market prices being often below the current regulatory caps.**
- **Other operators, in particular smaller ones, Mobile Virtual Network Operators (MVNOs) and operators with large outbound roaming traffic, argue that prices available to them on the wholesale market are at or close to the current caps and substantially above costs.**

Views on the effect of Roam-Like-At-Home (RLAH) on competition in the wholesale roaming markets are also split between these two groups of operators, the former arguing that RLAH will increase competition, the latter - the opposite.

C.1. Mobile operators

Current functioning of the wholesale roaming market

The responses show that mobile operators are split on the functioning of national wholesale roaming markets currently:

- 50% of MNOs replied that they function well for voice, SMS and data
- another 6% of MNOs state that they function well for voice and SMS only
- 75% of MNOs are able to negotiate prices well below the cap for voice
- 62.5% for SMS and 97% for data
- MVNOs claim that they never get prices well below the caps

Only 10% of MNOs and MVNOs combined do not steer traffic over one or more networks in the visited country. MVNOs in particular say they have no incentive to steer traffic since they get a unique price from visited networks.

61% of the operators that steer traffic steer all traffic; 39% steer only a fraction. Most of those which steer only a fraction specify that they steer a very large part of their traffic (typically 95%), claiming that there is always residual traffic that cannot be steered (for coverage, capacity reasons).

There is a Sender/Receiver divide among MNOs i.e. incumbent/operators with large footprint vs smaller operators, operators with large inbound vs large outbound roaming traffic, in the appreciation of the functioning of national wholesale roaming markets. Operators sending out more roaming traffic and/or with smaller roaming volumes to offer do not find the wholesale roaming market to be functioning properly (smaller operators, MVNOs, large outbound

⁸⁴ The Body of European Regulators for Electronic Communications (BEREC) published its [analysis of the wholesale roaming market](#) on 29 February 2016. While this analysis has served as an input to the wholesale roaming review conducted by the Commission, it is not reflected as such in the present Synopsis report which focuses on the analysis of the replies to the online questionnaire.

operators). Operators receiving more roaming traffic and/or with large roaming volumes to offer (incumbents/operators with large footprint, large inbound operators) find it properly functioning. All MVNOs find the market not properly functioning.

Operators that consider the national wholesale roaming markets to be functioning well argue that:

- Regulated wholesale caps serve as a reference from which operators commercially negotiate the prices
- Actual negotiated prices are below regulated caps and have decreased continuously in between two successive cap changes
- The visiting operator can choose between several operators in the visited country and steer traffic to its chosen partner(s) only
- Continuous and expected growth of retail roaming volumes increases the competition among visited operators in a country in order to obtain those volumes (and the related revenues) on their own networks
- Because they only have roaming-out wholesale volumes to buy and cannot offer roaming-in wholesale traffic in return, full MVNOs are in a good negotiation position, as visited operators compete with each other to offer their best prices to get this net traffic on their network and the corresponding additional revenue
- There are already true RLAH offers on the market showing that the wholesale roaming markets already enable RLAH

In contrast, operators that consider the national wholesale roaming markets as not well-functioning argue that:

- Prices obtained by some market players (MVNOs, smaller operators not part of a group) are at or close to cap level;
- Prices are much higher than the costs
- Prices are much higher than domestic wholesale MVNO access prices, which are unregulated; this shows that MNOs do not compete for MVNO roaming traffic, while they do compete for MVNO *domestic* traffic
- Prices are much higher than domestic retail prices
- Even if there are several operators to choose from in each national market, the visiting operator is dependent on certain operators (for coverage, capacity), which in practice limits the bargaining power of the visiting operator and hence competition on the visited market
- There are structural differences in negotiation positions of different market players:
 - Operators in travel surplus countries attract inbound roamers anyway and do not need to decrease prices. They seek to maximise their inbound roaming revenues. In these countries all network operators have a common interest to keep wholesale rates high
 - Discount rates from the cap depend on roaming volumes so that smaller operators and MVNOs which send less traffic than bigger MNOs, benefit from no or very limited discount rates
 - For coverage and quality of service reasons, the visiting operator may have to negotiate roaming agreements with several operators in visited countries. That situation reduces the visiting operator's roaming volume commitments to each visited network, and as a consequence the ability to negotiate discount rates. For the same reasons of coverage and quality of service, there is always a residual part of the

- roaming traffic that the visiting operator cannot steer to the visited network(s) with which it has a wholesale roaming discounted rates
 - Large groups with significant footprints in several countries can take advantage of the imbalance in European roaming: they have stronger negotiation power against smaller groups or individual operators
- MVNOs are unilateral buyers as they cannot host any inbound roaming, hence they do not have any traffic to trade;
- As shown by the much higher international non-EU wholesale roaming prices, the market needs caps to deliver lower prices, which implies that it does not function well structurally.

Although voice and SMS prices are closer to the cap than data prices, voice and SMS wholesale roaming markets are judged well-functioning by slightly more operators than the data wholesale roaming market. These operators hold the view that voice and SMS prices are approaching a (cost) floor. They consider that although data prices are usually well below the cap (a sign of competition dynamics), there is still plenty of room for a further decrease while remaining above costs. That is cited as a sign that competition is insufficient on that market.

For most operators, the functioning of the market does not depend on the EU country. To most operators what matters are the relative positions and bargaining power of the two operators in roaming negotiations, rather than the visited country itself. Yet, many operators argue that the relative bargaining power of two operators heavily depends on geographical features that structurally make some countries large inbound countries and others - large outbound countries.

Anticipated impact of the retail RLAH obligation on the functioning of the wholesale roaming market

70% of mobile operators (including MVNOs) anticipate an effect of retail RLAH obligation on the functioning of the wholesale roaming market. They have different and opposite views as to what this effect will be.

Operators note that RLAH will objectively change two aspects of the bilateral roaming negotiations between two mobile operators: 1) it will increase wholesale roaming traffic due to increased retail roaming demand; 2) it will limit the freedom in the wholesale roaming negotiations i.e. namely a certain capacity of the home (visiting) operator to influence the volume of traffic it will send to the visited operator via its retail roaming offers. Since RLAH will (save in exceptional cases) be an obligation of the home operator, the latter will have fewer means to restrict or boost the retail roaming demand created by its customers on the visited operator's network. The impact on wholesale roaming prices of these new features is ambivalent, and may vary according to the relative situations of the negotiating operators.

- RLAH will increase competition on the wholesale roaming markets

On the one hand, the RLAH-triggered increase in roaming traffic at wholesale level is likely to reduce wholesale roaming unit costs due to economies of scale. In a given national market, wholesale roaming providers potentially compete to obtain the increased inbound roaming traffic generated by RLAH from a visiting operator. That competition may drive wholesale roaming prices down as unit costs in general decrease.

- RLAH will decrease competition on the wholesale roaming markets

On the other hand, even if there are several operators to choose from in each national market, the visiting operator depends on certain operators in the visited country e.g. for coverage, capacity. Also, there are relatively high switching costs for wholesale roaming services, which may limit competition on the visited market in practice. If the visiting operator is small and under RLAH only brings small volumes relative to those brought by larger operators, it might find even less competition in the provision of wholesale roaming services.

Some operators express concerns that the visited operator may attempt to recover part of the lost revenues on their retail roaming side (as home operators) through wholesale roaming prices. Therefore the willingness of visited operators to give discounts may decline. This implies that RLAH could exert some upward pressure on the wholesale roaming prices currently observed in the market.

In addition, the degree of retail-level freedom the home operator loses implies that for the visited operator, the RLAH inbound roaming traffic the home operator sends will take place whatever the wholesale roaming price the visited operator imposes. Under RLAH, the home operator may keep a margin to influence the roaming traffic volumes it sends to the visited operator, but it will lose the bargaining power linked to the current possibility not to provide RLAH at all.

- RLAH will have no effect on competition on the wholesale roaming markets

Some MVNOs considered the hypothesis that RLAH would not affect competition dynamics in wholesale roaming markets and that current wholesale roaming prices obtained by the different market players could be maintained under RLAH. They argue that RLAH would mechanically increase the impact of the wholesale roaming prices discrimination between market players i.e. large groups vs smaller operators and MVNOs, as the negative impact of paying higher wholesale roaming prices will not be mitigated by retail roaming surcharges/margins, and RLAH will increase roaming volumes.

Increased roaming volumes under RLAH would contribute to reduce unit costs of wholesale roaming services. Assuming wholesale roaming prices remain unchanged, the wholesale roaming margins of the wholesale roaming provider would increase.

Only 28% of MNOs and MVNOs combined (34% of MNOs and 0% of MVNOs) hold the view that under current regulation, the functioning of the wholesale roaming markets would deliver RLAH; 53% are of the opposite view. 18% of operators do not know; one operator thinks it depends on the Member State.

30% of MNOs and MVNOs combined (38% of MNOs and 0% of MVNOs) think that without any wholesale roaming regulation the functioning of the wholesale roaming markets would deliver RLAH; 48% think the opposite.

C.2 Other respondents

NRAs and governments express views similar to those of the operators of their countries. Large inbound roaming countries see national wholesale roaming markets as well-functioning, while large outbound roaming countries are of the opposite view.

Consumers and their associations are cautious in expressing views on wholesale roaming markets since they do not face these markets directly. Up to 72% of consumers and 4 out of 7

consumers' associations do not express views about some of the wholesale review questions. When they do, their perspective is similar to that of smaller operators and MVNOs, as they tend to see national wholesale roaming markets as not well-functioning.

D. Most appropriate regulatory measure at wholesale level to enable RLAH in 2017

A large majority of respondents are of the view that EU-wide wholesale roaming caps valid in all Member States are the most appropriate regulatory approach to enable RLAH in 2017.

However, because of different perceptions of how the wholesale roaming market functions, operators are divided as to what would be the most appropriate level of the EU caps to enable sustainable RLAH. Certain incumbents and operators with a large footprint, and generally operators with large inbound roaming traffic, defend the view that RLAH is sustainable under current wholesale roaming price caps. Others, in particular smaller ones, MVNOs and operators with large outbound roaming traffic, argue that wholesale roaming price caps must be significantly lowered in order to enable sustainable RLAH.

There is a widespread call from operators for further harmonisation of Mobile Termination Rates, in addition to the Roaming Regulation, in order to enable RLAH for voice.

D.1 Mobile operators

- 73% of all responding MNOs and MVNOs combined prefer EU-wide caps i.e. valid for all Member States
- 58% of all responding MNOs and MVNOs combined advocate reducing wholesale roaming caps (all MVNOs advocate so)
- 25% of all MNOs and MVNOs combined advocate keeping the caps unchanged or lifting any wholesale regulation (no MVNO holds that view)

Operators in favour of reducing the caps are mainly net senders of roaming traffic concerned about the retail sustainability of RLAH i.e. smaller operators, MVNOs and operators with large outbound roaming traffic. They argue the following:

- with current caps, the effective wholesale roaming prices are too high for RLAH to be sustainable; with current caps and resulting prices, some operators would have to raise some of their domestic tariffs or cut roaming from some domestic tariff plans; some smaller MNOs and MVNOs would be squeezed (retail prices below wholesale roaming prices) and could exit the retail roaming market;
- operators in the least expensive domestic markets and operators with unlimited domestic offers, including for data, underline they face challenges in introducing RLAH if the caps are not lowered
- as the current wholesale roaming caps and effective prices are well above costs, there is ample room to decrease the caps without affecting cost recovery at wholesale level and creating a risk of arbitrage
- lower wholesale roaming caps are a lower starting point for negotiations, and allow operators with less bargaining power to obtain lower prices than currently possible; lower caps lead to lower prices and enable RLAH for more operators

- some existing RLAH offers are only possible because it is a *commercial choice* of the visiting operator to offer it to customers. The related roaming volume commitments of the visiting operator to the visited operator are an argument used in wholesale roaming negotiations to drive the wholesale roaming prices down. Under an RLAH obligation, that bargaining power of the visiting operator will disappear, and the visited operator may again increase prices. If the caps are not reduced, some of the existing RLAH offers would no longer be sustainable.

On the contrary, operators defending the view that current caps should be kept at the same level are mainly net receivers of roaming traffic intent on preserving wholesale roaming revenues to invest in their networks i.e. incumbents, operators with a large footprint, operators with large inbound roaming traffic. They argue the following:

- the wholesale roaming market functions well: prices are market-driven and below regulated caps, there are incentives to compete for inbound roaming traffic to earn incremental revenue; there is no need for intervention
- EU-wide RLAH offers already exist on the market under current caps; current caps are not an obstacle to RLAH
- RLAH sustainability issues encountered in certain Member States have structural causes in those Member States (very low domestic prices/production costs, very large (unlimited) domestic data consumption, frequent travel abroad), which cannot be eliminated even if wholesale roaming prices were to reach the cost level
- the caps act as a safeguard against unwanted permanent roaming (by raising the price in case of unwanted permanent roaming); if caps are lower, there is a risk of arbitrage and permanent roaming, whereby cheap roaming access to a country's networks could be used by foreign networks or OTTs to enter the domestic market of that country and unfairly compete with the operators of that country, without incurring the costs of investing in and operating a network in that country
- if caps are lower, there is no more room to compete or negotiate prices
- if caps are lower, there is a risk of de facto regulating wholesale national mobile access markets
- if caps are lower, the visited operator has no incentive to invest and offer quality of service to roamers

Operators on both sides believe the caps should be EU-wide and valid in all Member States:

- EU unit price cap model is established and well-functioning
- Simple and transparent
- All operators should be subject to the same price caps

In addition, operators note that cost-oriented country-specific caps raise issues:

- country-specific regulation is contrary to the objective of a single telecom market; it would be a step back and would further fragment the European market
- country-specific caps would penalise efficiency and innovation: those who manage to keep costs low would: 1) face large out-payments to those who do not, and 2) would be forced to apply low charges to them in return
- country-specific caps would distort/complicate wholesale relationships/competition
- cost-orientation bears a risk of regulating/distorting the visited country's market

- cost-orientation is disproportionate and economically unjustified because there is no monopoly, dominance or significant market power; on the contrary, competition is happening on the market
- cost-orientation weakens incentives for investment, and entails the risk of no cost recovery in practice by real operators
- country-specific caps would lead to differentiation of retail roaming prices as they would depend on the country visited by the roaming customer - a complex and unfriendly outcome for the consumer
- cost-oriented country-specific caps would have no added value as they would not solve the structural RLAH-sustainability issues of operators in a few Member States
- cost-oriented country-specific caps would be complex and time-consuming to implement; it would require a cumbersome annual update to remain relevant in the light of market evolution in every Member State
- the lengthy and inefficient process of MTR modelling/regulation by NRAs should be avoided for roaming;
- cost models that NRAs apply will lead to variations resulting from policy choices rather than from objective factors. Results would not be comparable. Data quality, consistency and updates would differ across NRAs. There is risk that arbitrary adjustments will be made to the model inputs to make the models look robust; such arbitrary adjustments always risk producing unreliable results.

13% of operators see some benefits in country-specific caps:

- it allows to take into account the specific country situation as costs of networks vary across countries, and depend on factors outside operators' control and on historic choices
- one should be able to prove that costs variation across Member States are small to be able to define EU caps without distortions
- it would allow to take into account distortion of competition in both visited and visiting countries

Operators suggest the following regulatory measures in addition to a cap measure:

- There is widespread call from operators for further harmonisation of Mobile Termination Rates, in addition to the Roaming Regulation, as a pre-requisite for voice RLAH.
- One operator calls for flexibility in pricing models, other than per-unit basis. The wholesale regulation should be a safety net for commercially negotiated tariff structures, allowing sufficient flexibility to experiment with pricing models other than the per-unit base. Roam-like-at-home should allow flexibility to combine fixed and variable wholesale tariff arrangements to cope with differences in mobile retail markets.
- In that regard, another operator suggests incentivizing a capacity-based, price-unregulated approach.
- One operator suggests different safeguards to avoid that negative retail effects are compensated by wholesale prices e.g. prohibit net purchase cost increase compared to the latest voluntarily negotiated tariff levels.
- A few operators suggest adding regulatory measures applicable to suppliers other than the visited operator, who provide other inputs necessary for the provision of roaming services, like international carriers, clearing houses, signalling and GRX providers.
- According to an MVNO, the regulation should clarify that any MVNO reselling the roaming services of its host MNO should have access to such service at a wholesale

regulated price, and any MVNO negotiating an access directly with a European visited MNO should have a right to access to such network at regulated wholesale price.

Stakeholders' views expressed in response to the public consultation on the different regulatory options are consistent with BEREC's analysis of operators' views in response to the autumn 2015 data collection⁸⁵.

Seasonality impact on wholesale roaming costs

Mobile operators are divided on the question whether or not seasonality affects the costs of providing wholesale roaming services. 50% of MNOs and MVNOs combined are of the view that seasonality has an impact; 40% argue it has no impact; 10% do not pronounce themselves.

The division line is again between Sender/Receiver: certain incumbents and operators with a large footprint, and generally operators receiving more roaming traffic than they send particularly in Southern, touristic countries defend the view that seasonality has an (important) impact on costs. In contrast, smaller operators and operators sending more roaming traffic than they receive particularly in Northern countries contest any seasonality impact on costs. All MVNOs contest the existence of a seasonality impact on costs.

Risk of permanent roaming

Virtually all MNOs and MVNOs identify risks of permanent roaming for the visited market as a whole if wholesale roaming caps are very low: the lower the caps, the higher the risks of permanent roaming. The risk is that in Member States with high domestic prices, SIM cards from low-cost countries (e.g. Baltic States) could be used to substitute the more expensive domestic offers. Virtual operators and other (non-EU) operators or Over-The-Top (OTTs) players could start providing (pan-EU) permanent services in Member States via the cheap roaming access, without incurring network costs: they would compete with national offers without having to bear the costs of the national operators building and operating the networks.

53% see the need for additional measures to prevent unwanted permanent roaming. Some operators believe those risks are already mitigated or will not be too high since future caps are supposed to cover the costs, and do not need additional regulatory measures (38%). MVNOs see the potential risk but consider it is already mitigated. Operators wish to have the possibility to refuse roaming access to an operator seeking roaming access for reasons other than to serve its customers' needs for roaming services while periodically travelling in the EU⁸⁶. Some operators suggest in addition allowing the visited operator to apply a wholesale surcharge (higher than the cap) for roamers who roam more often than periodically (i.e. a fair use policy at wholesale level). Most operators do not call for additional regulatory measures to prevent the risks of possible circumvention mechanisms to permanently roam at this stage. Regulatory action would be needed only if such (or other) circumventions are effectively observed in the market.

Many MNOs and MVNOs consider permanent roaming to be necessary for M2M and that any anti-permanent roaming regulatory measure should not apply to M2M, or that M2M should be excluded from the roaming regulation altogether since the traffic patterns and the use of M2M are completely different from personal communications.

⁸⁵ BEREC Report on the wholesale roaming market, BoR(16)33, February 2016 (section 3.5)

⁸⁶ This is allowed by Article 3(6) of the Roaming Regulation.

D.2 Other respondents

In the small sample of NRAs and governments who responded (9 out of 9 Member States in total), countries with large inflows of roamers defend the status quo (no change in the wholesale roaming price caps), while those sending large outflows of roamers call for lower caps.

Individual consumers and their associations are cautious in expressing views on wholesale roaming markets since they do not face these markets directly. 56% of the individual consumers do not indicate the regulatory measure they see as most appropriate. Among those expressing a view on this, 63% take the view that caps must be lowered, and 69% favour an EU-wide cap over country-specific caps; 6 out of 7 consumers' associations consider that caps must be lowered (1 does not respond), and 3 out of 7 consumers' associations consider that caps should remain EU-wide (4 do not reply).

ANNEX 3: Who is affected by the initiative and how

Who is affected	How
Member States	Like under the current Roaming Regulation, National regulatory Authorities (NRAs) will have to monitor and supervise compliance with the new wholesale roaming caps set out in this initiative. In addition they could be involved in solving specific disputes concerning the level of termination rates applied by terminating network operators to roaming traffic.
Mobile Network Operators (MNOs)	<p><u>As visited networks:</u></p> <ul style="list-style-type: none"> - MNOs, when providing wholesale roaming services (as visited network operators), will have to apply to the roaming access seeker (the home operator) wholesale roaming charges that are at or below the cap level set out in this initiative, unless both parties agree to a de-regulated alternative to wholesale roaming caps for a predefined period of time. The cap level proposed ensures that the visited MNO will be able to recover the costs of providing wholesale roaming services, including joint and common costs. - As a result of the lower wholesale roaming caps proposed, the unit margin earned by the visited MNO on the provision of wholesale roaming services will be reduced. This will contribute to reduce wholesale roaming revenues for the visited MNO. However, in the RLAH context (roaming at domestic price with no more surcharge) the volume of roaming traffic generated by roaming customers on the visited network is expected to grow substantially, in particular for data services (+28% for voice, +5% for SMS, +919% for data compared to 2014, see Annex 4). This is a more than ten-fold increase in data roaming volume. This will contribute to increase wholesale roaming revenues for the visited MNO. The expected increase in roaming traffic is larger than the reduction in the cap level for voice (-20%) and data (six-fold decrease).⁸⁷ Overall, increased RLAH-driven volumes are expected to more than counter-balance the compressing effect on revenues of a reduction in caps. - MNOs receiving more roaming traffic than they receive (net receivers of roaming traffic, operating predominantly as visited operators) will therefore be able to recover the costs of providing wholesale roaming services, including joint and common costs, and benefit from the higher volumes of roaming traffic generated under RLAH. <p><u>As home (visiting) networks:</u></p>

⁸⁷ In addition, the resulting reduction in effective wholesale roaming prices compared to current effective prices will be much smaller than the reduction in the cap level (the average price for wholesale data roaming is 1.7 €/MB, and 1.3 €/MB for unbalanced traffic). With a ten-fold increase in wholesale roaming data volumes, the reduction in effective wholesale roaming unit margin resulting from the new cap on data can be expected to be more than counter-balanced by the increased volumes, generating an overall increase in wholesale roaming profits.

	<ul style="list-style-type: none"> - When providing retail roaming services (as home network operators), MNOs will benefit from the lower wholesale roaming caps proposed under the preferred option which will reduce the unit cost of providing retail roaming services. This reduction in unit cost will allow the home operator to provide for the larger volumes of roaming traffic generated by their roaming customers in the RLAH context (roaming at domestic price with no more surcharge), without changing its domestic charging model. The 20% reduction in the cap for voice will to a large extent offset the 28% increase in roaming voice volume that can be expected under RLAH in 2017 compared to 2014 (see Annex 4). For data, the six-fold reduction in the cap will substantially compensate for the ten-fold increase in roaming data consumption under RLAH in 2017 compared to 2014. It is also worth noting that this forecasted RLAH consumption in 2017 is made under the hypothesis that it all remains within the scope of any fair use policy that may be applied in accordance with the forthcoming Commission implementing act. - Smaller MNOs with more limited traffic volumes and hence more limited bargaining power in wholesale roaming negotiations, as well as MNOs sending more roaming traffic than they receive (net senders of roaming traffic), will particularly benefit from the lower level of the caps proposed. - The ability of retail roaming providers (i.e. MNOs as home operators) to provide RLAH with the proposed level of wholesale roaming caps, without changing their domestic charging model, has been tested on the basis of country-level data and operators' data (section 6.3): <ul style="list-style-type: none"> a) The simulations of the average annual wholesale cost of providing retail roaming services for the amount of forecasted roaming consumption under RLAH in 2017 provided in Annex 4 (the unbalanced part of it) show that, with the level of caps proposed, this cost does not exceed 3% of annual ARRPUs in each country and Norway⁸⁸ (see Table 6). This corresponds to RLAH retail revenues for countries whose residents spend 10-11 days abroad per year on average. b) The sustainability test run with operators' data shows that 91% of the operators in our sample have a positive sustainability and only 5% would have a negative retail roaming margin greater than 5% of their domestic margin (see Table 7). - Therefore the simulations show that, with the proposed caps, all or virtually all operators should be able to provide RLAH without changing their domestic charging model. - As the cap level proposed will also for most countries allow space for price competition, MNOs with significant traffic volumes or multi-country footprints will be able to negotiate (or internalise) lower rates than the caps and to derive economic advantages from scale.
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⁸⁸ Except in Austria and Ireland where the simulation result is a % of ARRPUs slightly higher than 3%

Mobile Virtual Network Operators	MVNOs do not provide wholesale roaming services and as such are not imposed any new obligations by this initiative. However, they will benefit from the lower wholesale roaming caps proposed under the preferred option when providing retail roaming services to their subscribers (see considerations above concerning home network operators).
Consumers and Users	Consumers and (business) users of mobile services are not directly affected by the initiative as it concerns only the wholesale side of the roaming market. They are however indirectly affected since a failure to adopt any legislative act at the wholesale level would have the result that the RLAH obligation is not applicable from 15 June 2017. In that case, consumers and (business) users would continue to pay roaming surcharges in addition to the domestic price. By enabling RLAH in 2017 in the EU, consumers and (business) users will benefit from the abolition of roaming surcharges and pay the same amount as at home for mobile services while traveling in the EU
Small and Medium Sized Enterprises (SMEs)	<p><u>Online businesses and start-ups</u>: like consumers, online business and start-ups are not directly affected by the initiative as it concerns only the wholesale side of the roaming market. However they are indirectly affected since the proposal enables the abolition of retail roaming surcharges from June 2017 which would otherwise not happen. This will have a significant positive impact on these enterprises: the usage of their services while roaming in the EU will grow, which means more opportunities for them to provide services to consumers when they travel in the EU. The initiative will promote cross-border use of connected devices/services/mobile apps, favouring innovation.</p> <p><u>SMEs</u>: like consumers and online business and start-ups, SMEs are not directly affected by the initiative as it concerns only the wholesale side of the roaming market. However they are indirectly affected since the proposal enables the abolition of retail roaming surcharges from June 2017 which would otherwise not happen. This will have a significant positive impact for SMEs since the bills for mobile services will be substantially reduced for their employees periodically travelling in the EU for business purposes⁸⁹.</p>

⁸⁹ Subject to fair use of roaming services. Detailed rules on the application of fair use policy will be set out in an implementing act to be adopted by the Commission by 15 December 2016.

ANNEX 4: Analytical models used in preparing the impact assessment.

1. Forecasted roaming consumption under RLAH in 2017

The forecasted amount of RLAH consumption in 2017 is based on the assumption that, if RLAH is applicable in 2017, roaming customers will consume mobile services abroad in the EEA like at home (RLAH assumption).

1) The average RLAH roaming consumption of a user in 2017 is therefore obtained by multiplying, for each country, the average daily domestic consumption for voice, SMS and data in the country by the average number of days abroad in the EEA of citizens of the country⁹⁰.

2) The average daily domestic consumption itself is a forecast for 2017 based on 2014 domestic consumption data⁹¹ and growth forecast between 2014 and 2017 used in the cost model study⁹².

3) The total RLAH roaming consumption by subscribers of a country is obtained by multiplying the average RLAH roaming consumption of a user by the number of subscribers which roam abroad in the EEA from that country⁹³.

Table 11: Forecasted roaming consumption under RLAH in 2017

⁹⁰ We consider, for each country, that the average travelling time abroad in the EEA and daily consumption are within fair use of roaming services. The precise parameters for fair use policy have still to be laid down in a binding implementing act which will itself be subject to impact assessment.

⁹¹ BEREC Report on the wholesale roaming market, BoR(16)33, February 2016, based on operators' replies to the autumn 2015 data collection

⁹² % change between 2014 and 2017: +6% for voice and +3% for SMS for all countries; for data, the % change is country-specific (+300% on average).

⁹³ Digital Agenda for Europe Scoreboard.

	Days abroad EEA ⁽²⁾	Domestic daily min 2017 ^{(1)**}	Domestic daily sms 2017 ^{(1)**}	Domestic daily MB 2017 ^{(1)**}	Number of subscribers (2014) ⁽³⁾	% of roamers (2nd semester 2014, BEREC) ⁽⁴⁾	Number of RLAH minutes	Number of RLAH SMS	Number of RLAH MB
Austria	11.2	4.9	1.0	133.8	13,049,318	40.3%	286,508,273	57,668,478	7,878,398,302
Belgium	10.9	3.6	5.6	22.7	13,709,766	59.9%	326,374,350	501,379,033	2,031,555,703
Bulgaria	0.9	4.3	0.3	25.5	11,551,605	12.9%	5,826,270	362,328	34,236,480
Croatia	5.4	5.3	1.9	51.0	4,658,355	11.3%	15,128,170	5,476,476	145,069,246
Cyprus	12.1	9.1	4.8	161.2	1,127,298	32.5%	40,162,354	21,381,888	713,910,296
Czech Republic	5.1	4.6	1.8	25.2	13,812,803	39.8%	127,743,739	51,167,411	706,003,563
Denmark	12.6	4.6	3.0	136.5	8,208,270	21.7%	103,053,313	66,757,806	3,066,970,286
Estonia	6.4	4.9	0.7	173.2	2,109,218	31.5%	20,682,744	2,871,055	736,383,749
Finland	11	4.7	1.0	360.9	9,367,000	26.4%	128,668,119	26,660,077	9,824,582,058
France	4	6.3	8.2	51.2	76,137,251	68.5%	1,311,722,935	1,711,201,571	10,666,961,539
Germany	8.9	3.1	0.6	45.9	110,294,129	39.8%	1,222,929,000	237,663,560	17,927,831,485
Greece	0.8	6.3	1.0	18.0	13,101,993	16.7%	10,923,980	1,769,135	31,445,946
Hungary	2.5	3.8	0.3	30.3	11,297,048	44.7%	47,866,700	4,267,154	382,337,026
Iceland	5.7	0.0	0.0	0.0					
Ireland	10.9	6.3	4.0	117.9	5,759,563	41.6%	164,992,603	103,945,682	3,074,753,290
Italy	2.2	5.0	1.4	57.6	96,263,889	39.8%	425,079,752	116,793,220	4,858,437,543
Latvia	5	4.4	1.6	91.9	4,396,868	31.5%	30,315,355	11,221,857	636,177,584
Liechtenstein									
Lithuania	5.1	5.4	4.6	54.3	4,474,544	31.5%	38,960,296	32,761,424	389,998,780
Luxembourg	27.1	3.5	2.8	86.8	779,400	67.8%	50,787,602	40,157,530	1,243,032,664
Malta		3.5	2.4	44.6	563,335	32.5%			
Netherlands	15	3.7	0.6	36.0	20,554,684	45.9%	520,778,798	81,157,322	5,089,875,798
Norway	12.6	6.0	2.7	94.6		52.3%			
Poland	3	4.2	2.6	51.1	52,190,755	42.3%	280,948,262	170,063,640	3,385,391,797
Portugal	1.5	4.3	4.2	39.3	16,421,251	13.0%	13,889,552	13,280,508	125,779,587
Romania	1.4	8.0	2.3	15.1	22,275,031	9.6%	23,751,979	6,752,592	45,182,969
Slovakia	5.9	4.9	1.1	25.4	6,460,762	39.8%	73,872,045	16,919,884	386,304,999
Slovenia	6.9	5.2	3.0	39.1	2,322,310	58.6%	49,244,000	27,886,269	366,994,865
Spain	1.8	4.4	0.1	42.2	55,697,955	13.3%	58,720,862	1,797,132	561,124,033
Sweden	12.1	5.5	2.6	266.2	19,204,200	32.1%	409,207,574	193,779,870	19,834,985,988
UK	7.6	4.8	3.7	65.7	85,112,017	66.9%	2,076,086,858	1,608,016,414	28,442,635,956
EEA***	5.7	4.7	2.5	0.0	680,900,618	39.8%	7,864,225,483	5,113,159,317	122,586,361,531

Data: (1) BEREC Report on the wholesale roaming market, BoR(16)33, February 2016, based on operators' replies to the autumn 2015 data collection

(2) BEREC Analysis of the impacts of "Roam Like At Home", BoR(14)209, December 2014

(3) European Commission, Digital Agenda Scoreboard, February 2016

(4) BEREC analysis (unpublished), based on operators' replies to the autumn 2015 data collection

** forecasted change in consumption between 2014 and 2017 (from TERA Consultants' study):

+6% for voice and +3% for SMS for all countries; for data, the % change is country-specific (+300% on average)

*** weighted average

Values in italics have been imputed

This forecasted amount of RLAH consumption in 2017 in the EEA represents the following increase compared to actual 2014 roaming consumption⁹⁴:

Table 12: % change in roaming consumption between 2014 and 2017 under RLAH , total EEA

	2014	2017 RLAH	% increase
voice (million minutes)	6,129	7,864	28%
SMS (million SMS)	4,853	5,113	5%
Data (million MB)	12,027	122,586	919%

⁹⁴ International roaming BEREC Benchmark Data Report April – September 2015, BoR(16)28, February 2016

2. Sustainability test based on operators' data

Introduction

In some specific and exceptional circumstances, the provision of RLAH may affect the sustainability of an operator's domestic charging model, for example, if its domestic prices are below the prices they have to pay to the visited network operators hosting their roaming customers when travelling abroad in the EU and the operator's overall revenues are low relative to its effective roaming costs.

The Regulation foresees that, in order to avoid the domestic charging model of roaming providers being rendered unsustainable by such cost recovery problems, generating a risk of an appreciable effect on the evolution of domestic prices or so-called "waterbed effect", roaming providers, upon authorisation by the national regulatory authority, should, in such circumstances, be able to apply a surcharge to regulated retail roaming services only to the extent necessary to recover all relevant costs of providing such services.

Pursuant to the Regulation, the methodology for assessing the sustainability of the abolition of retail roaming surcharges shall be based on an analysis of:

- i. the overall actual and projected costs of providing regulated retail roaming services by reference to the effective wholesale roaming charges for unbalanced traffic and a reasonable share of the joint and common costs necessary to provide regulated roaming services;
- ii. the overall actual and projected revenues from the provision of regulated retail roaming services;
- iii. the consumption of such services and of domestic services; and
- iv. the level of domestic competition, prices and revenues, and any observable risks that domestic prices would be appreciably affected by RLAH pricing.

In this Annex we describe the analysis we have undertaken to assess the sustainability for mobile operators of the wholesale price caps we propose under Options 2, 3 and 4 of our impact assessment. Our assessment follows the approach described in the Regulation and was conducted by the Competence Centre on Microeconomic Evaluation (CC-ME) of the Joint Research Centre (JRC)⁹⁵ under the guidance of DG CNECT's services.

Data used to assess sustainability

Our assessment of sustainability by operator uses the information we gathered from operators in the autumn information request. We received responses to our information request from 127 operators, however, due to missing data in the replies from operators (e.g. missing volumes data) we could only use the replies from 64 operators out of the total sample of 127 operators.⁹⁶

⁹⁵ The Joint Research Centre (JRC) is the European Commission's in-house science service employing scientists to carry out research in order to provide independent, evidence-based scientific advice and support to EU policy. For further information, please visit the JRC's website at: <https://ec.europa.eu/jrc/>. The CC-ME is a newly established centre of the JRC with the aim of providing scientific support to policy DGs in the field of Counterfactual Impact Evaluation.

⁹⁶ It should be noted that for some of these 64 operators that we included in our sample we had to use imputation strategies to fill in certain gaps in the data provided. This allowed us to increase the sample of operators that we

JRC performed an evaluation of the representativeness of the sample of 64 operators that were used for the sustainability analysis. The set of MS present in this analysis is the same as the one for the overall representativeness. In order to see which operators dropped from the sample in terms of their position in terms of size, the number of subscribers was used as a proxy for size. The fraction of operators present in the sample of 64 was on average equal to 43%. When restricting attention to the largest 50% of operators, this fraction equalled 50%. This means that the sample of 64 operators used for the sustainability study slightly over-represents large operators. Due to the small absolute number of operators, this difference does not appear to be large.

In Table 13 we present the number of operators that we have been able to use in each of the 29 MS that replied to our information request. We also describe the number of operators that are net receivers and senders of data roaming traffic in each country (i.e. operators with higher inbound than outbound data roaming traffic and vice-versa, respectively).

Table 13: Sample of operators used in the assessment of sustainability by operator

Country	Total number of operators	Outbound traffic lower than inbound traffic (positive balance)	Outbound traffic higher than inbound traffic (negative balance)
AT	3	1	2
BE	3	3	0
BG	3	3	0
CY	2	2	0
CZ	1	0	1
DE	0	0	0
DK	3	1	2
EE	0	0	0
GR	2	2	0
ES	3	3	0
FI	2	1	1
FR	5	4	1
HR	2	2	0
HU	2	2	0
IE	3	2	1
IT	3	3	0
LT	0	0	0
LU	3	2	1
LV	1	1	0
MT	2	2	0
NL	3	0	3
PL	1	0	1
PT	3	3	0
RO	3	1	2
SE	3	2	1
SI	3	0	3

include in our analysis. We describe in detail the imputation strategies that were used for these data gaps in this Annex.

SK	3	0	3
UK	1	1	0
NO	1	0	1
Total	64	41	23
%	100%	64%	36%

As can be seen in Table 13 above, 64% of the operators considered in our analysis are net receivers of wholesale data roaming traffic (compared to only 36% being net senders).⁹⁷ In order to evaluate the sample of operators in our assessment we analysed the traffic pattern of other operators that replied to our autumn information request (and included inbound and outbound roaming traffic) but that could not be taken into account in our sustainability assessment due to other missing information. Unfortunately, there were only 6 additional operators that met these criteria. Thus, we could not conduct this test of representativeness on the sample of operators that we used for the sustainability assessment. In light of the above, we consider that the results of the operator-level sustainability should be assessed together with the results of the sustainability at country level that we have presented in the impact assessment.

Sustainability estimation by operator

The sustainability estimation is based on a comparison of the "roaming margin" and "domestic margin" by operator. We define each of these as follows:

roaming margin = revenues from the provision of retail roaming services – costs of providing retail roaming services

domestic margin = revenues from the provision of domestic services x assumed retail margin

For the purposes of estimating sustainability we only consider those operators that we estimate would have a negative roaming margin. The sustainability estimation is therefore the result of comparing both margins, as follows:

$$sustainability = \frac{roaming\ margin}{domestic\ margin} \times 100$$

In other words, the sustainability estimation reflects the magnitude of the negative retail roaming margin when compared against the domestic margin of each operator considered.

Below we explain how we have derived each of the variables considered in our assessment of sustainability.

(a) Revenues from the provision of retail roaming services

The revenues from the provision of retail roaming services are derived using the formula below:

$$Revenues\ from\ the\ provision\ of\ retail\ roaming\ services = \sum_{k=1}^n (RetServPrice\ k) \times (OutRoamTraff\ k)$$

Where: k = (1=voice, 2=sms, 3=data).

⁹⁷ In the case of voice, the sample of operators we use for the sustainability analysis includes 75% of net receivers (against 25% of net senders) and in the case of SMS 87% of net receivers (13% net senders).

In other words, we derive the revenues from the provision of retail roaming services multiplying the forecast outbound roaming volumes for each service in 2017 by the assumed retail domestic price for each service:

- $RetServPrice_k$ = the operator's domestic retail price for service k in 2017; and
- $OutRoamTraff_k$ = the total outbound roaming volume as home operator for intra EEA outbound roaming traffic per service k in 2017

In order to derive the domestic retail price for each service in 2017 we assume that retail prices in 2017 will remain at the same level of 2014. We first estimated domestic retail prices in 2014 using the information provided by operators in their response to the autumn information request by dividing total revenues per service by total service volumes. However, this resulted in relatively high retail prices for most operators. For this reason, we did not consider this approach appropriate and instead opted for using country domestic retail prices from a price study recently conducted for DG CNECT.⁹⁸ We underline that, by taking this approach, the results of the sustainability assessment are likely to be more conservative than if we used the retail prices derived using operators' own data (i.e. all other things being equal, using the high retail price estimates derived from operators' data is likely to attenuate the effect that wholesale roaming prices may have on retail roaming margins of operators with a negative roaming traffic imbalance under RLAH conditions).

The study we used to derive retail prices includes the prices of 5 mobile baskets in 28 MS (i.e. all countries considered in our analysis with the exception of Norway). In the case of Norway we used the prices derived using the data provided by the operators in that country. The 5 mobile baskets considered are shown in Table 14 below.

Table 14: Allowances included in the baskets included in the price study conducted for DG Connect

	Handset use		
	Voice calls	SMS	Data
Basket 1	51 min	100	100 MB
Basket 2	191 min	140	500 MB
Basket 3	576 min	225	1 GB
Basket 4	1809 min	350	2 GB
Basket 5	191 min	140	2 GB

The baskets used in the study are consistent with the OECD methodology for mobile telecommunications price baskets.⁹⁹ In order to derive domestic retail prices we subtracted from the VAT-inclusive prices in the study the VAT in every MS considered in the analysis. The VAT rates considered are shown in Table 15 below.

Table 15: Country VAT rates used to derive domestic retail prices excluding VAT

Country	VAT rate
AT	20%

⁹⁸ European Commission, *Mobile Broadband prices*, conducted by Van Dijk Management Consultants finalised in February 2016 (prices from February 2015), to be published

⁹⁹ Namely OECD (2012), "Methodology for Constructing Wireless Broadband Price Baskets", OECD Digital Economy Papers, No. 205, OECD Publishing. <http://dx.doi.org/10.1787/5k92wd5kw0nw-en> and OECD (2009), "Revision of the methodology for construction telecommunications price basket" (DSTI/ICCP/CISP(2009)14/FINAL).

BE	21%
BG	20%
CY	19%
CZ	21%
DE	19%
DK	25%
EE	20%
EL	23%
ES	21%
FI	24%
FR	20%
HR	25%
HU	27%
IE	23%
IT	22%
LT	21%
LU	17%
LV	21%
MT	18%
NL	21%
PL	23%
PT	23%
RO	24%
SE	25%
SI	22%
SK	20%
UK	20%
NO	25%

Source:

http://ec.europa.eu/taxation_customs/resources/documents/taxation/vat/how_vat_works/rates/vat_rates_en.pdf
(page 16)

In order to allocate the revenues from the baskets considered in the study to each service, we use the wholesale roaming prices effective in 28 MS and Norway that we gathered during the autumn information request to derive relative prices between services (voice, SMS and data). We allocate the basket revenues to each service ensuring that the relative retail prices derived are the same as for the observed wholesale roaming prices.¹⁰⁰

We present in Table 16 below the retail prices for each of the 28 MS and Norway.

Table 16: Country retail prices derived using the DG CNECT study

	Voice (€/min)	SMS (€/SMS)	Data (€/MB)
AT	3.84	1.18	1.31

¹⁰⁰ This simulation uses Scenario 2 to determine unit prices through retail revenue distribution across bundled services for all operators, but is without prejudice to the methodology that will be developed for dealing with sustainability derogation applications by individual operators pursuant to Article 6c of the Roaming Regulation.

BE	3.87	1.19	1.32
BG	8.74	2.70	2.99
CY	5.77	1.78	1.98
CZ	7.43	2.29	2.54
DE	4.41	1.36	1.51
DK	3.09	0.95	1.06
EE	3.83	1.18	1.31
EL	6.21	1.92	2.13
ES	5.86	1.81	2.01
FI	3.91	1.21	1.34
FR	3.75	1.16	1.29
HR	5.24	1.62	1.79
HU	8.61	2.66	2.95
IE	4.69	1.45	1.61
IT	4.04	1.25	1.38
LT	1.77	0.55	0.61
LU	4.80	1.48	1.64
LV	4.33	1.34	1.48
MT	8.54	2.64	2.93
NL	5.60	1.73	1.92
PL	3.72	1.15	1.27
PT	7.16	2.21	2.45
RO	3.88	1.20	1.33
SE	3.80	1.17	1.30
SI	4.69	1.45	1.61
SK	5.40	1.67	1.85
UK	2.91	0.90	1.00
NO	3.80	1.17	1.30

We used the above retail prices and multiplied by our forecast outbound roaming volumes in 2017 to derive the roaming revenues in 2017 (under RLAH conditions). We derived the forecast outbound roaming volumes using the 2014 outbound roaming volumes from operators' data and projecting these to 2017. In order to forecast the volume growth between 2014 and 2017 we used data on the number of days abroad by EU nationals and the volumes of domestic use per user.¹⁰¹ In Table 17 we present the percentage change in outbound roaming volumes between 2014 and 2017 assumed in our sustainability assessment.

¹⁰¹ Some operators in our sample did not provide outbound roaming volumes in 2014. For these, we used the sum of the volumes provided for the first semester of 2015 (actual) and second semester of 2015 (expected). We derived an annual growth rate (g_k) between 2014-2017 consistent with the TERA Consultants' assumptions (calculated as $(1 + g)^{1/3} - 1$), where g is the percentage change in volumes between 2014-2017 in TERA Consultants' cost model. For one Dutch operator we used the average ratio between wholesale roaming and domestic retail traffic of other Dutch operators to derive missing wholesale roaming volumes. In addition, missing data for outbound roaming volumes by destination country have been imputed using the total roaming volume for the operator and assuming a distribution of volume by country that is identical to the median distribution of other operators in the same country. This imputation is done after the imputation previously described.

Table 17: Assumed percentage change in outbound roaming volumes between 2014-2017

% change in voice volumes	28%
% change in SMS volumes	5%
% change in data volumes	920%

In our view, our traffic forecast assumptions are likely to be in the higher range of traffic forecast assumptions and thereby challenging for our sustainability analysis, as we assume a significant increase in roaming services' traffic, particularly for data. This will tend to increase the potential for unsustainability of RLAH for net senders of roaming traffic if such traffic is loss-making for them at the unit level. We believe this is likely to increase the robustness of our sustainability analysis, i.e. to increase its reliability as a gauge of the worst-case scenario in terms of RLAH sustainability.

(b) Costs of providing retail roaming services

The costs of providing retail roaming services are derived using the formula below:

$$\text{Costs of retail roaming services} = \text{retail roaming costs} + \text{wholesale roaming payments for unbalanced traffic}$$

We derived retail roaming costs using regression analysis on the data on retail roaming costs provided by operators in response to our autumn information request.¹⁰² In particular, we derived the relationship between retail roaming costs and the operators' retail roaming voice volumes in 2014. We then used this relationship to derive retail roaming costs in 2017 (using our forecast retail roaming voice volumes for that year).

We derive wholesale roaming payments for unbalanced traffic in 2017 using the formula below:

$$\begin{aligned} & \text{Wholesale roaming payments} \\ &= \\ & \text{Intra} - \text{EEA wholesale roaming payments} - \text{Intra} - \text{EEA wholesale roaming revenues} \\ &= \\ & \sum_{k=1}^3 \sum_{i=1}^n (\text{OutRoamTraffCount } i, k) \times (\text{WholePriceCap } i, k) - (\text{InbRoamTraff } k) \times (\text{WholePriceCap } k) \end{aligned}$$

Where: i = intra-EEA countries; k = service (1= voice, 2 = sms, 3 = data).

In relation to the variables used to derive wholesale roaming payments, we estimate these as follows:

- $\text{InbRoamTraff}_{i,k}$ = This is the same variable we use to derive wholesale roaming costs.
- WholePriceCap_k = Wholesale roaming price cap for service k in the country of the visited operator
- $\text{OutRoamTraffCount}_{i,k}$ = The wholesale service k volume as home operator for intra EEA outbound roaming traffic to country i in 2017
- $\text{WholePriceCap}_{i,k}$ = The wholesale roaming price cap for service k in country i

¹⁰² We note that we adjust retail roaming cost data provided by operators in response to our autumn information request to reflect roaming costs relating to intra-EEA traffic only. We assume 65% of the retail roaming cost provided by operators relates to intra-EEA roaming, consistent with the assumption made in TERA Consultants' cost model for wholesale roaming costs. This is based on the share of roaming traffic to EEA vs non-EEA countries.

The wholesale price caps in 2017 considered for inbound traffic ($WholePriceCap_k$) and outbound roaming traffic ($WholePriceCap_{i,k}$) are the wholesale price caps in each of the options considered in our impact assessment, described in section 5 above.

For the outbound roaming traffic per country ($OutRoamTrafficCount_{i,k}$) we use data gathered from operators in our autumn information request on their traffic disaggregated by destination country.¹⁰³ Similarly to the inbound roaming traffic, we take the 2014 volumes and project these to 2017 using the same assumptions described in Table 17 above.¹⁰⁴

We note that in the formula that we have considered for wholesale roaming payments for unbalanced traffic the result can only be either of (i) zero or (ii) positive. In other words, we exclude the possibility that a net receiver of wholesale roaming traffic will have a negative wholesale roaming payment balance (i.e. revenues at the wholesale level from the provision of wholesale roaming services).

In addition our analysis does not consider the costs and revenues from mobile calls terminated while roaming, as we did not gather data on mobile calls terminated while roaming at an operator level in our autumn information request. However, we note that most calls originated by roaming customers are terminated on the subscriber's home country operators. Thus, we consider that revenues from calls terminated while roaming are likely to increase the revenues of operators that are net senders (rather than net receivers of inbound roaming traffic), thereby improving the overall sustainability of RLAH.

(c) Retail roaming margin

We estimate the retail roaming margin as the difference between the revenues from the provision of retail roaming services (a) above and the costs of providing retail roaming services (b) above (in other words: (b) – (a) above). We note that a positive retail roaming margin means that sustainability is not an issue, as the operator makes a positive margin on retail services.

(d) Domestic margin:

We derive the domestic margin in 2017 using the formula below:

$$Domestic\ margin = \sum_{k=1}^n [(RetServPrice_k) \times (DomRetTraffic_k)] \times (DomRetMargin\%)$$

Where: k = (1=voice, 2=sms, 3=data).

In relation to the variables used to derive the domestic margin, we estimate these as follows:

- $RetServPrice_k$ = the operator's domestic retail price for service k in 2017 (this is the same variable we use to derive revenues from the provision of retail roaming services above);
- $DomRetTraffic_k$ = the operator's domestic retail traffic for service k in 2017; and
- $DomRetMargin\%$ = the operator's assumed domestic retail margin in 2017 in percentage.

¹⁰³Some of the operators in our sample did not provide total outbound roaming traffic disaggregated by destination country. For these we used the total outbound roaming traffic of the operator and assumed a distribution of volume by country identical to the median distribution of other operators in the same country.

¹⁰⁴Note that we assume the same percentage change between 2014-2017 for inbound and outbound roaming traffic.

We derive the domestic retail traffic in 2017 ($DomRetTraff_k$) using the operator's domestic retail traffic for service k in 2014 and projecting these volumes to derive the forecast volumes in 2017 using the same assumption used in TERA Consultants' cost model.¹⁰⁵ We present the expected change in domestic retail traffic between 2014-2017 in Table 18 below.

Table 18: Assumed percentage change in domestic retail traffic between 2014-2017

% change in voice volumes	6%
% change in SMS volumes	3%
% change in data volumes	265%

Finally, for the purposes of deriving the domestic retail margin, we assume a different domestic retail margin ($DomRetMargin\%$) for each of the scenarios modelled (as described below).

(e) **Sustainability**

Finally, we estimate sustainability for each operator as follows:

$$Sustainability = \frac{\text{retail roaming margin}}{\text{domestic retail margin}} \times 100\%$$

Where each of the retail roaming margin and the domestic retail margin are calculated as explained above.

Results and sensitivity analysis

In order to assess sustainability by operator we have run a sensitivity analysis on our Base case scenario results estimating the operator sustainability under two additional scenarios for each of the three wholesale price caps that we have considered in our impact assessment. Each of the scenarios considered takes into account the assumptions described in Table 19 below.

Table 19: Assumptions considered in each of the three sustainability scenarios

	Scenario 1 – Low sustainability	Scenario 2 – High sustainability	Scenario 3 – Base case scenario
Domestic retail margin	10%	50%	30%
Retail prices	DG CNECT study – 20%	DG CNECT study	DG CNECT study
Volumes	Outbound traffic + 20%; Domestic retail traffic – 20%	Outbound traffic - 20%; Domestic retail traffic + 20%	Volumes derived using the approach described in the previous section

In other words:

¹⁰⁵ For some operators that did not provide retail domestic revenues and traffic, we derived these variables using a regression approach. Namely, the relevant variable is regressed against the number of total subscriptions and country dummies: $\log(y) = \beta \cdot X$, where $X = [\text{constant } \log(\text{total subscribers}) \text{ country_dummies}]$ and β is a vector of coefficients. Then the predicted value of y is used whenever y is missing and total subscribers has valid data.

- **Scenario 1-Low sustainability scenario:** the scenario that is likely to produce the lowest sustainability, as it assumes a low 10% domestic retail margin; reduces the estimated domestic retail prices by 20% and increases the outbound roaming traffic forecast by 20% while reducing the forecast domestic retail volumes by 20%;
- **Scenario 2-High sustainability scenario:** the scenario that is likely to produce the highest sustainability, as it assumes a high 50% domestic retail margin and reduces the forecast outbound roaming traffic by 20% while increasing the forecast domestic retail volumes by 20%;
- **Scenario 3- Base case scenario:** the scenario to which we attach the highest probability given its underlying assumptions of a 30% domestic retail margin; the retail prices derived using the DG CNECT study and the volume forecast derived using BEREC data;

We have presented the results of our sustainability analysis under the Base case scenario (Scenario 3 in Table 19 above) in the main body of our impact assessment. In Table 20 below, for each of the wholesale price cap options considered (Options 2, 3 and 4) we present the percentage of operators in the sample that have:

- Positive sustainability (i.e. RLAH does not result in a negative retail roaming margin)
- Negative margin on retail roaming services and the percentage of operators in the sample that have a negative margin:
 - Below 1% of the domestic retail margin
 - Between 1-3%
 - Between 3-5%
 - Greater than 5%

We present the results in terms of the percentage of operators under each of the three scenarios modelled using the format [x%-y%] (z%) in Table 20, where:

- x% is the percentage of operators under Scenario 1 (Low sustainability);
- y% is the percentage of operators under Scenario 2 (High sustainability); and
- z% is the percentage of operators under Scenario 3 (Base case scenario).

Table 20: Sustainability results for each wholesale price cap option under each of the three scenarios modelled

	Sustainability %				
	Positive sustainability	<1%	1-3%	3-5%	>5%
Option 2	[58%-72%] (66%)	[2%-6%] (6%)	[3%-11%] (5%)	[3%-5%] (5%)	[34%-6%] (19%)
Option 3	[81%-91%] (88%)	[5%-3%] (5%)	[5%-5%] (2%)	[2%-2%] (5%)	[8%-0%] (2%)
Option 4	[86%-91%] (88%)	[3%-5%] (5%)	[3%-3%] (3%)	[0%-2%] (3%)	[8%-0%] (2%)

As can be seen in Table 20 above, the results under the scenarios with Low sustainability (Scenario 1) and High sustainability (Scenario 2) are in line with the results under our Base case scenario (Scenario 3). In a nutshell, Option 3 (single EU-wide cap) and Option 4 (country-specific caps) present similar results, albeit the positive sustainability under the Low sustainability scenario for Option 4 (86% of operators in the sample) is slightly higher than for Option 3 (single EU-wide caps) under the same scenario (81%). Similarly, the proportion of operators with a negative sustainability between 1-5% and higher than 5% is also different for each of the two options, albeit only slightly. Option 2 clearly has the lowest positive sustainability and highest negative sustainability.

In light of the above, we consider that the sensitivity analysis conducted on our sustainability assessment does not change our conclusions presented in the main body of our impact assessment.