

# **BEREC Report on Transparency and Comparability of International Roaming Tariffs**

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## I. EXECUTIVE SUMMARY AND MAIN FINDINGS

This report is focused on two aspects that are key issues for consumers when selecting tariffs for international roaming services: first, *transparency*, meaning the availability of clear information about prices and conditions for each tariff, as well as simple procedures for customers to switch between tariffs; and, second, the comparability of tariffs. By *comparability* BEREC means the ability for customers to compare different type of tariffs offered by operators and to select the one best suited to their needs and pattern of consumption.

In order to investigate these issues, BEREC launched a questionnaire to NRAs and mobile services providers. In the questionnaire for NRAs, BEREC focused on information about complaints received by NRAs on transparency issues as well as on any information about tariff comparison tools that may be offered by different organizations such as consumer associations; recommendations available for customers on how to select the most adequate tariff and any tools and hints for customers to estimate data traffic that may be facilitated by NRAs and any third party (i.e. consumer) associations. The questionnaire for providers was directed at providing the range of tariff structures offered by them, information for customers on the use of the tariffs, how to switch between tariffs as well as information and tools for comparing tariffs and estimate consumption.

Transparency is a key issue in taking informed decisions and consumers should be able to access prices and conditions for each tariff in an easy and understandable way. Also, switching between tariffs should be done in a quick and convenient way.

When requested information about customer complaints related to transparency issues, just half of the NRAs received transparency complaints and when received, there were very few of them per NRA. So, in general, it can be said that transparency is not an issue of concern with regard to complaints received from NRAs. The few complaints received are mainly focused on the need for greater clarity on the application of the cut-off limit, the services included in the bundles and the lack of information about the application by default of specific tariffs (already addressed in the BEREC compliance report<sup>1</sup>).

Most providers report having adequate information on the conditions and prices for each tariff in their websites and also report informing customers about tariffs by sending out SMS or USSD (Unstructured Supplementary Service Data) messages. BEREC identified only a minority of providers which do not inform their customers on how services are charged when the conditions for specific tariffs, such as when tariffs are limited in time and/or where volumes are no longer valid and/or customers are not notified when bundle traffic is exhausted (i.e. when from that moment different charges will apply). This is clearly an area where improvements can be made to avoid bill-shock issues and facilitate a positive customer experience when using roaming services. In any case, this information should be

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<sup>1</sup> [BEREC International Roaming Compliance Report \(Regulation \(EU\) No 531/512 of the European Parliament and of the Council of 13 June 2012 on roaming\)](http://berec.europa.eu/eng/document_register/subject_matter/berec/reports/1482-berec-international-roaming-compliance-report-regulation-eu-no-531512-of-the-european-parliament-and-of-the-council-of-13-june-2012-on-roaming) (Chapter 7). Document available at <[http://berec.europa.eu/eng/document\\_register/subject\\_matter/berec/reports/1482-berec-international-roaming-compliance-report-regulation-eu-no-531512-of-the-european-parliament-and-of-the-council-of-13-june-2012-on-roaming](http://berec.europa.eu/eng/document_register/subject_matter/berec/reports/1482-berec-international-roaming-compliance-report-regulation-eu-no-531512-of-the-european-parliament-and-of-the-council-of-13-june-2012-on-roaming)>

available for customers, at least on the website and in the contract, as it may otherwise involve the customer paying additional charges without having been informed in advance.

Regarding issues related to the switching from one tariff to another, most providers facilitate information on switching between tariffs on their website and through call centers.

Information about consumption and charges for the past use may help consumers to take informed decisions on which tariff to select. In general, providers supply this kind of information in the bill. Some providers also provide e-bills and detailed information on their website and/or in specific applications.

Providing data on real-time consumption is more challenging for roaming services, as it typically is based on the collaboration between the home network and the visited network, and the home network does not always have information available on real-time consumption of all services. This is reflected in the responses BEREC received, where some providers point out these limitations. For those services where real-time information can directly be supplied (as it is the case for data services in most situations), the information is generally provided by the customer calling the customer center. Other methods are also offered by a minority of providers, such as showing service records in the customer area of their websites or using short codes to deliver the information upon request to the customer. Applications for smartphones and tablets are not commonly supplied, although some providers supply specific applications to their customers for this purpose, and there are applications available in the market for users of smartphones and tablets to check real-time consumption. In general, there is room for improvements in this area, especially regarding the availability of applications for obtaining not only real time consumption, but also charges for data services.

With regard to the comparability of tariffs, the responses received show that there is a large variety of different types of tariffs, ranging from linear tariffs (such as the Eurotariff), to daily/weekly or monthly bundles of different services and specific tariffs where domestic prices are combined with different kinds of additional fees. In general, it is not a surprise that most of them are restricted to the EEA area, but there are few cases where the tariff is valid only in the geographic area where the provider has a footprint either within the EEA area or where the footprint of the group covers also the rest of the world.

BEREC welcomes this diversity of tariffs as it increases the customers' ability to adapt and select the most suitable tariff based on their pattern of consumption even though the number of different available tariffs for a European customer varies by countries. However, making choices from such a large range of different types of offer makes it more challenging and difficult for customers to make informed and optimal choices. In summary, the more different options consumers have, the more difficult will be the task to compare them and make informed decisions. BEREC will continue to assess the evolution of the current diversity of tariffs.

Regarding the availability of tables and/or tools for comparing different tariffs, BEREC detected that consumers in general do not have simple access to any information summarizing the features of each set of roaming tariffs offered by operators. Due to the high burden of updating information about changing tariffs and the focus of public interest on domestic tariffs, this information on international roaming tariffs is not provided in a comprehensive way by consumer associations, thus limiting the information only to certain

recommendations and the analysis of only certain alternative tariffs. In general, there is also a lack of availability of simple tables comparing all tariffs offered by the provider. Currently, international roaming is contracted with the same provider that supplies domestic services, and it may help customers to make informed decisions and compare different tariffs if providers supply tables on their website and in their retail outlets. In this sense, to increase transparency and comparability of tariffs, BEREC encourages operators to publish and keep up-to-date comprehensive information on all active offers in one place.

BEREC has noticed a steady trend of alternative roaming tariffs with average prices higher than the regulated caps of the standard roaming services (linear tariff scheme) in its benchmark reports on the monitoring of the roaming tariffs. The findings in this transparency and comparability report substantiates the conclusion that this effect is at least partly caused by the difficulties for consumers to compare available tariff structures and to select the most adequate tariff for their personal usage patterns.

Customers must be able to select the most suitable tariff based on their own estimated pattern of consumption. In this regard, BEREC also explored the availability of tools and information for customers to estimate their traffic based on the use of internet services such as e-mail sending/checking, web pages browsing, video streaming, etc. For most customers it is far from clear how to estimate the amount of traffic consumed when using internet services, and this is one of the potential issues that may result in bill-shocks as well as in customers underestimating or overestimating traffic when they contract bundles, leading to non-optimal buying decisions. Availability of transparent, historic and real-time usage of data is also key for making optimal buying decisions.

In general, apart from some isolated cases, NRAs and consumer organizations do not provide tools to help customers to estimate data traffic, but some of them supply information and hints on how to estimate traffic consumption. In the case of providers, a minority of them provide such tools on their websites, allowing customers to report estimated use of different internet services for a certain period, and providing as a result an estimation of the data traffic that will be used. BEREC considers this a good practice and encourages all stakeholders to provide these tools (where possible using iconic graphical interfaces) to customers. This can help customers to take more informed decisions between different types of bundles and tariffs and to contract tariffs that best fit their needs.

BEREC will repeat this exercise each year to assess the evolution and advances in increasing the transparency and comparability of tariffs.

## **II. INTRODUCTION AND OBJECTIVES OF THE DOCUMENT**

The market for electronic communications has been providing a steadily increasing number of offers. Accordingly, users may find it more difficult to compare the various offers as well as to compare the performance parameters of different services. Specific tools to measure consumption could help to create certainty about the offers used in order to allow users to assess and compare what they pay for and what they use. For service providers these tools may help them to differentiate more clearly their offers. Especially in the case of data

services, considering the increased use of smartphones and tablets, the availability of applications for the most common operating systems would enable customers to take informed decisions based on their patterns of consumption.

The selection of an alternative tariff should be done taking full account of the possibility to use the Eurotariff and of the conditions for the alternative tariff chosen. Such an awareness, together with policies and instruments which allow customers to estimate their consumption and compare international roaming tariffs, will lead to better informed consumer decisions.

In this context, and in accordance with Article 19(4), each year BEREC will publish information on the transparency and the comparability of different tariffs offered by operators to their customers.

In line with the provisions set out in the Roaming Regulation, the Report has the following objectives:

*1. To investigate specific problems which prevent or impede customers from taking informed decisions.* As part of this objective, the Report aims to assess whether offers are transparent, and to investigate transparency issues concerning charges which may be applied and other billing issues.

*2. Comparability of tariffs.* Under this objective, the report aims to assess how easy it is for customers to compare different roaming tariffs, especially to compare the Eurotariff with other alternative tariffs, and to identify whether customers are able to take informed decision when selecting the most suitable tariff based on their needs. The report also includes an overview of the different structure of roaming tariffs offered by the mobile operators.

### **III. INFORMATION COLLECTED BY BEREC**

In order to investigate whether consumers face transparent conditions and are able to compare different tariffs, BEREC prepared two questionnaires addressing the operators and the NRAs respectively.

With regard to assessing transparent market conditions, the questions focused on the availability of roaming tariffs and the conditions applied (price limitations in terms of volumes or geographical area, or any other restrictions as well as any linkages to domestic tariffs etc.). Operators were also asked whether they provide transparent information about the start and end of a specific period for a given, time-limited, tariff. BEREC also asked whether operators inform their customers about any possible tariffs/charges when a bundle is exhausted or where the valid time period for the tariff elapses, as well as whether bills were itemized. NRAs were requested to provide any information on customer complaints concerning any alleged lack of transparency.

With regard to assessing the comparability of tariffs, BEREC's attention was focused on the availability of tools, applications and any information facilitating the selection of the most adequate tariff to suit the customers' pattern of consumption.

A total of 27 National Regulatory Authorities (NRAs) sent their responses to BEREC.

BEREC received a total of 141 responses from mobile providers operating in EEA countries. Of these 141 responses, 101 corresponded to MNOs and 40 correspond to full MVNOs or resellers.

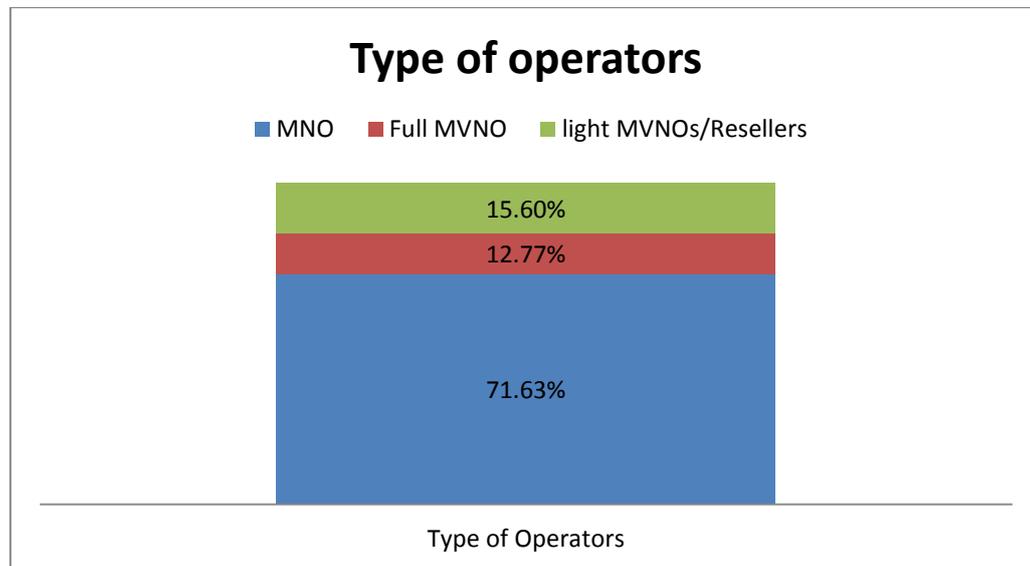


Figure 1: Type of mobile providers responding to the BEREC questionnaire

## IV. Transparency of roaming services

### 1.1. Transparency complaints received by NRAs

Around 50% of the responding NRAs received complaints on transparency issues since 1<sup>st</sup> July 2012. In general, complaints received per NRA were just a few, and in some cases only one or two per year. Customers mainly complained about being put on specific alternative roaming tariffs by default or about being misinformed about which services are included in bundled offers. In some cases, customers reported that operators do not send a notification-SMS and do not apply a cut-off limit for alternative tariffs. Eight NRAs had received complaints about the lack of clarity or accessibility of information on international roaming tariffs. Some customers complained about the limited information on roaming tariffs on the services providers' websites or about operators failing to notify their customers about the absence of the default cut-off limit in a given tariff and how to re-activate it.

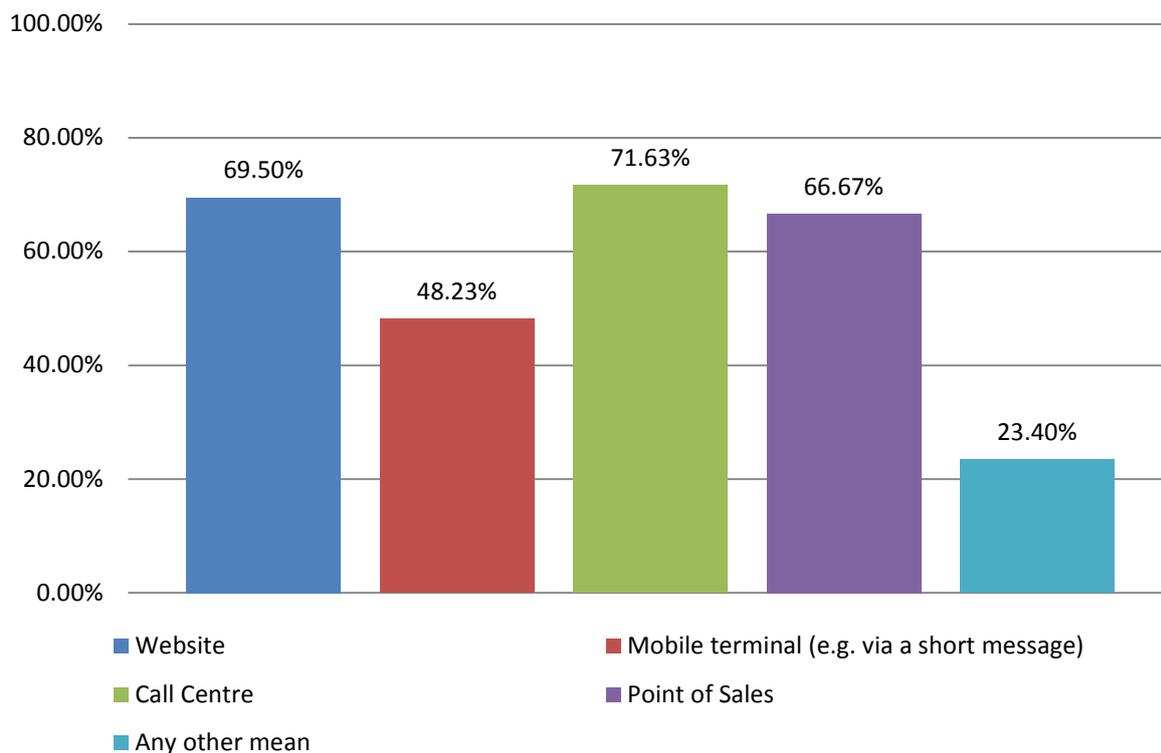
### 1.2. Information on switching between alternative tariffs

According to the number of responses to questions on this topic, the large majority of providers offering alternative tariffs do not apply any activation charge when their customers switch between any of their tariffs (85% of the respondents).

Providers mainly inform customers about alternative tariffs by sending them a notification-SMS or USSD (Unstructured Supplementary Service Data). A large majority also specify that the tariffs are available on their websites. Some also send newsletters or have developed smartphone applications for data consumption. Customers can also contact the customer care service. Nevertheless, BEREC notes that, in case of tariffs limited in time, about 30% of the providers do not inform their customers about charges applied for roaming services when their alternative tariff period ends.

When customers have contracted a bundle with roaming services that includes a limited number of minutes, SMS and/or limited amount of data services, the majority, (around 80% of respondents), inform them via SMS, the website etc. about the charges applied for out-of-bundle consumption. On the other hand, BEREC notes that some operators do not inform their customers about these prices and specific aspects of the selected bundle. This can be damaging for customers as they could end up paying additional charges without having been informed of them in advance. Moreover, about 20% of the respondents do not notify their customers when they reach the limits included in the bundle.

Most providers point out that they provide switching information on their websites, via call centers or points of sale. Some also give this information in their brochures, by sending out emails or via applications.



**Figure 2: Where providers supply information concerning switching between tariffs**

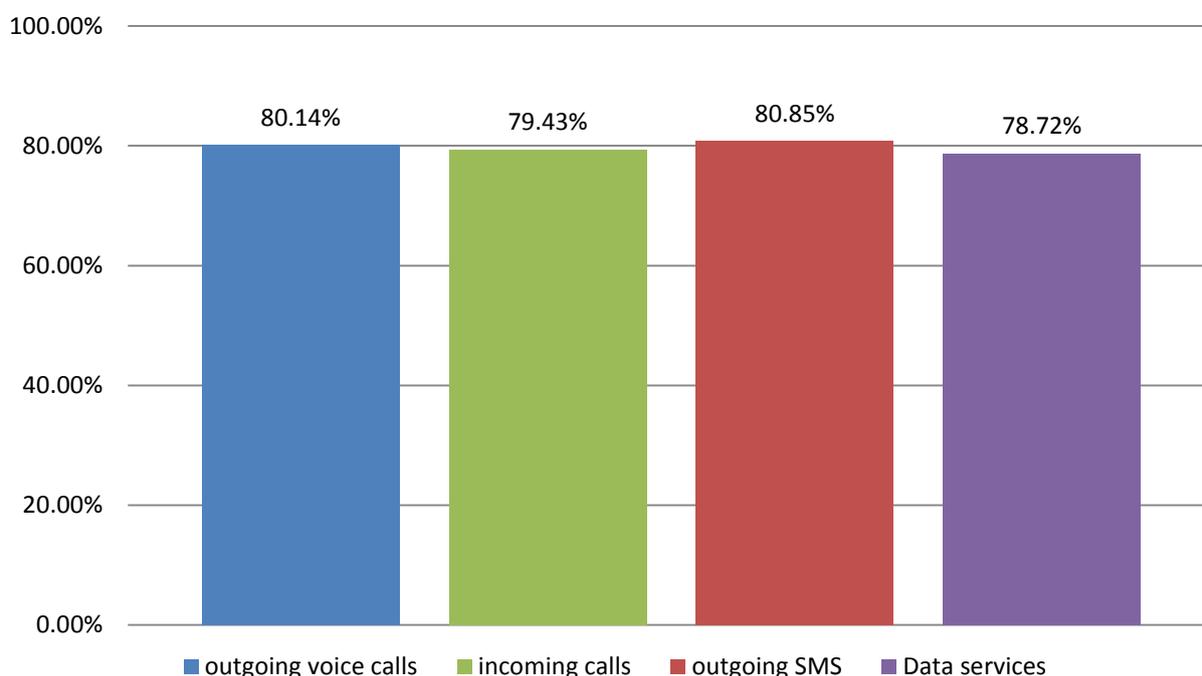
### 1.3. Information on volumes consumption and charges

This section analyses the provision of separate itemized information relevant to the roaming services, charges and volumes in the monthly bills as well as real time billing information. The wide adoption of such a practice ensures transparency among the European providers with regard to roaming charges as it makes clear how much the subscriber pays and what they get in return.

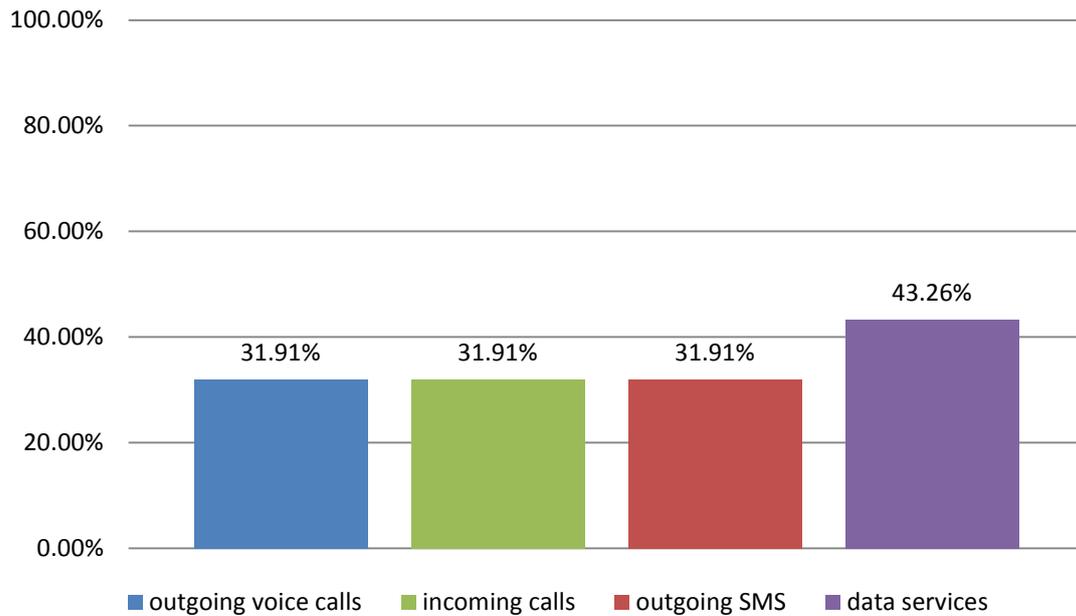
BEREC asked operators whether consumers were provided with service records containing volumes and charges as well as real time billing information. The information collected on charges and volumes was then separated into outgoing voice calls, incoming voice calls, outgoing SMS and data services.

Customers generally have a good knowledge about the roaming charges and the volumes of the regulated roaming services they consume, as about 80% of the operators deliver the necessary service records to their customers in the monthly bills, However, BEREC notes that a minority of the providers only supply information about charges but not about volumes.

In addition, only 31% provide the itemized charges and volumes in real time for calls and SMS. 43 % of the operators provide real time information concerning charges for the data services.

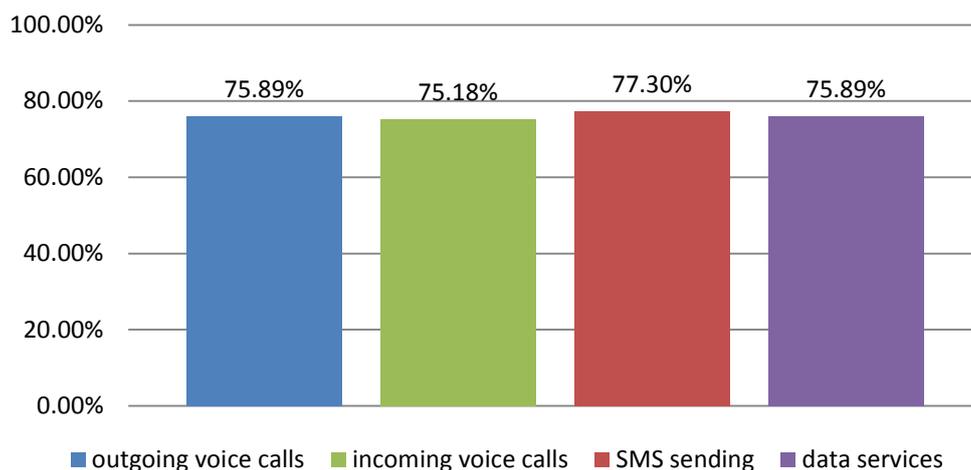


**Figure 3: Information for customers about charges for intra-EU roaming (monthly information)**

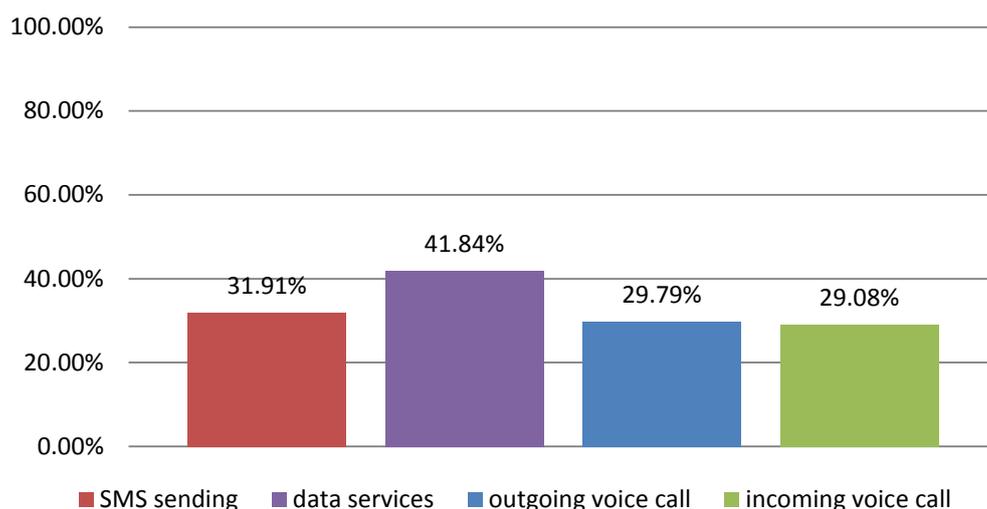


**Figure 4: Information for customers about charges for intra-EU roaming (real time information)**

BEREC notes that there is a variety of ways of providing prices or volumes for the three services to the customer. Some operators only deliver information on volumes, others only on the prices. In certain cases operators provide price and traffic information on all three services, but in other cases the records are restricted to one or two services only. Overall there is no significant difference between providing real time information on prices and volumes regarding the type of service considered.



**Figure 5: Information for customers about consumption for intra-EU roaming (monthly information)**



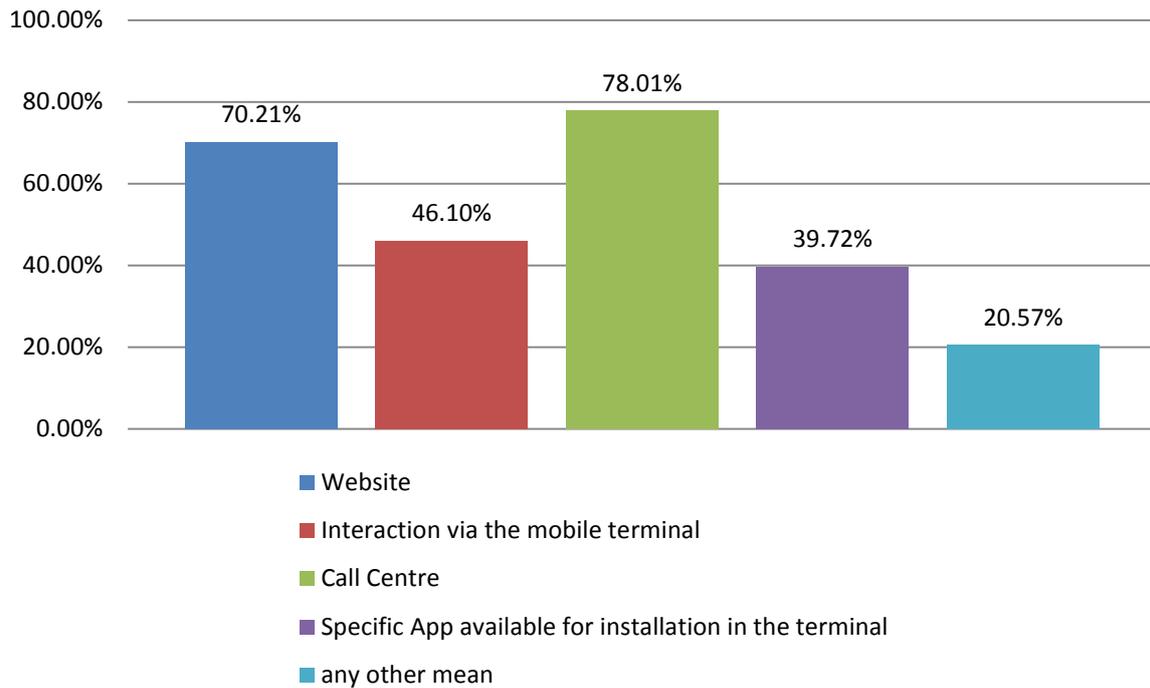
**Figure 6: Information for customers about consumption for intra-EU roaming (real time information)**

#### 1.4. Methods of providing information about consumption

This section addresses the methods used by providers to inform their customers on historical and real time consumption of international roaming services. The questionnaire provides some examples such as providers' websites, interaction with the mobile terminal of the customer, call centers, applications or any other means specified by the provider.

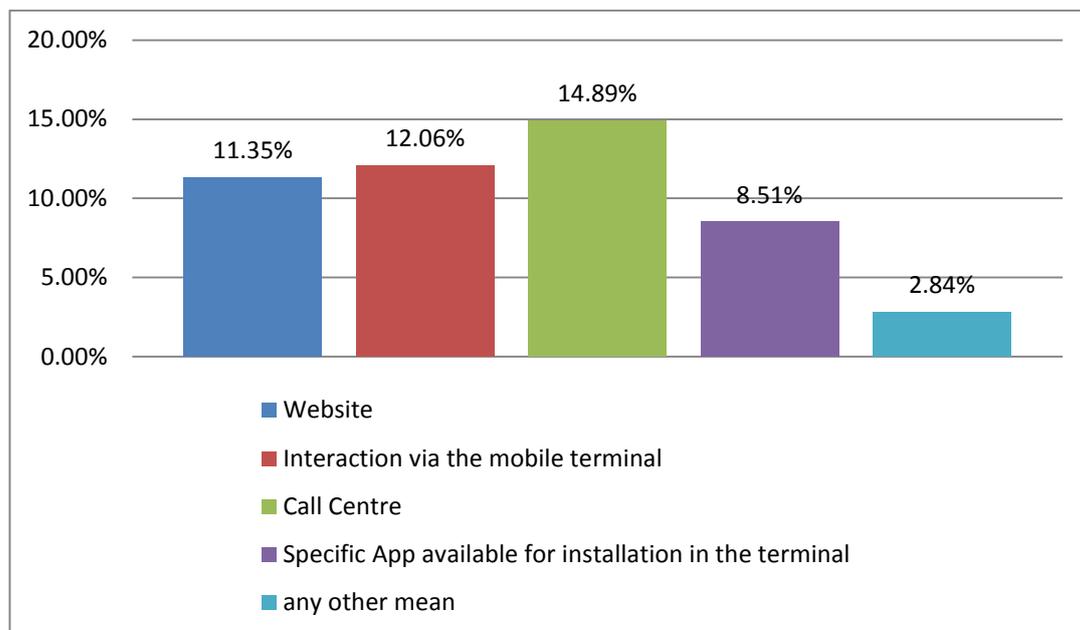
First, BEREC notes that providers are using different methods to provide historical information on consumption and charges, ranging from customer area in the website, calls to the customer center, interaction via the terminal using short codes, to specific applications for smartphones and tablets. Many of the operators enable customers using different methods to access this information.

As shown in next figures, similar methods are also used to provide real time consumption.



**Figure 7: How providers inform about the charges and/or volumes consumption (historical)**

For clarity, “real time” information does not include information provided in “near” real time as providing information with a certain time lag cannot be defined as instantaneous delivery. Some providers state that delivering information by a certain date is “near” real time without specifying the period between request for information and its delivery, and they do not consider this time lag to be real time.



**Figure 8: How providers inform about the charges and/or volumes consumption (real time information)**

In cases where historical and real time information is delivered to the customer, this is mostly done via a customer area on the providers' website and call center agents. 58 % of the providers supply historical service records to their customers and just 11 % of the providers supply real time information via the customer area on the website or via the customer calling the customer center. Providers also supply the service records on the customers' handset by sending out SMS. Some providers notify their customer via email as soon as the agreed usage limit is reached.

There are some methods which require some action by the customer such as dialing a short code or sending a keyword to a short code and upon doing so they will receive an SMS giving their call credit and data usage balance. One provider indicates that customers are able to get real time information about their consumption by visiting their shops.

Specially designed applications available on smartphones or tablets do not seem very popular compared to call centers, websites and sending out SMS. Nevertheless, applications for accessing historical and real time information are offered by some providers and BEREC expects that in the short or medium term more applications for tablets and smartphones will be available for customers.

BEREC concludes that customers are mostly quite well informed and do not face major problems with regard to the transparency of roaming tariffs. Customers are also supplied with the necessary information about switching, which is also free of charge. BEREC discovered that a relevant minority of operators do not supply information about charges which are not included in bundles, and considers this issue needs to be addressed. Although consumers in general are provided with detailed information about itemized charges and consumption for all roaming services in their monthly bills, there is room for improving access to real time information, especially by offering applications for smartphones and tablets. In addition to such tools existing, in order for customers to fully make use of them, they must know of their existence and BEREC would therefore encourage operators to ensure that dedicated roaming web-pages highlight such tools.

## **V. COMPARABILITY OF INTERNATIONAL ROAMING TARIFFS**

### **1.5. Diversity of tariff structures**

Comparability problems can arise because of many different reasons, either because there is a lack of information, as described in the previous chapter, or due to other factors such as an increasing number of different tariffs, the increasing complexity of tariff structures, as well as bundling of different services. This could lead to non-optimal decisions when customers wish to choose the most suitable roaming tariff. This section gives an overview of the different roaming tariffs that are offered by European operators.

The easiest tariffs to understand are obviously linear tariffs, as their pricing, such as per used minute/SMS or MB is comprehensive and easy to compare with other linear tariffs. But in many cases (especially in the case of frequent travelers) prices per minute or SMS or MB

are higher for customers with a linear tariff subscription than for others. Alternative linear roaming tariffs are offered by more than half of the providers replying to the questionnaire. Most of these tariffs are not restricted to a specific time period, but are applied as long as the customer does not switch to any other roaming tariff.

	Tariff exist	Bundle restricted to one day	Bundle restricted to more than one day and up to a week	Bundle restricted to more than one week and up to a month
Linear tariff Voice	82	1	1	9
Linear tariff SMS	79	1	1	4
Linear tariff Data	71	1	2	6

**Table 1: Availability of linear tariffs**

In general, linear tariffs are not included in or associated with any specific domestic tariff, so they are available for all customers and for all domestic tariffs. Around 22 % of the providers replied that their linear tariffs were restricted to a limited number of countries, most of them to EEA countries. Six to eight providers (depending on the roaming service) offer linear tariffs that can only be used when roaming on specific networks and only one provider replied that its linear tariff is restricted to the usage of the group footprint.

	International roaming is included in specific domestic tariff/s	International roaming is offered associated to any domestic tariff	Roaming tariff is restricted to a limited number of countries	Tariff is restricted to the use of the group footprint	Tariff is restricted to the use of certain networks of any other operator
Linear tariff Voice	11	16	32	1	7
Linear tariff SMS	10	16	27	1	6
Linear tariff Data	7	17	25	1	8

**Table 2: Characteristics of linear tariffs**

As mentioned above, complexity for customers increases with the number of different bundle tariffs, which means that a certain amount of units of one or more services (minutes, SMS, MB) are included in a fixed fee for a specified period (day, week, month). An overview of the availability of roaming bundle tariffs is shown in Table 3. 30 % of the providers offer tariffs which include a package of minutes, 12 % of the providers offer packages of SMS and 64% of the providers offer packages of data traffic measured in Megabytes.

Bundles with more than one service included are also offered by a significant number of providers. 18 % of the providers offer bundles with minutes and SMS, 12 % of the providers offer bundles with minutes and MB and 19 % of the providers offer tariffs that include all three services (voice, SMS, data). Only six providers supply bundles with SMS and data services.

Most of the bundle tariffs include a restricted usage of more than one week but less than one month. For bundles of MB there is also a significant number of providers (31 %) that restrict these tariffs for a period of between one day and a week.

	Tariff exist	Bundle restricted to one day	Bundle restricted to more than one day and up to a week	Bundle restricted to more than one week and up to a month
Bundle minutes	43	3	5	32
Bundle of SMS	18	1	2	14
Bundle Mb	90	54	34	51
Bundle voice + SMS	26	2	5	18
Bundle voice + Data	17	1	1	8
Bundle SMS + Data	6	0	0	4
Bundle voice + SMS+ Data	28	9	4	14

**Table 3: Availability of bundles**

About one third of the providers offering bundles replied that roaming services are included in their domestic tariff/bundle. More than one third of the providers offering roaming services note that those bundles are associated with a domestic tariff.

About half of the providers restrict their bundle tariffs to a limited number of countries, which are in most cases the EEA countries. Only a few of the bundle tariffs are restricted to the use of the group footprint or to certain networks of other operators.

	International roaming is included in specific domestic tariff/s	International roaming is offered associated to any domestic tariff	Roaming tariff is restricted to a limited number of countries	Tariff is restricted to the use of the group footprint	Tariff is restricted to the use of certain networks of any other operator
Bundle minutes	12	16	35	3	9
Bundle of SMS	7	5	17	1	4
Bundle Mb	18	25	70	8	14
Bundle voice + SMS	5	12	23	4	6
Bundle voice + Data	9	7	13	1	2
Bundle SMS + Data	0	4	6	1	3
Bundle voice + SMS+ Data	9	9	23	3	4

**Table 4: Characteristics of bundles**

The questionnaire also asked whether providers offer tariffs where domestic rates are applied for roaming services (“roam like at home” tariffs) or tariffs where customers could use their domestic bundle when being abroad without paying an additional fee or paying e.g. a daily connection fee. Only a few providers offer tariffs where customers can use their domestic bundle when roaming, but most of these tariffs are restricted to the use of the footprint of the group, or some are restricted to EEA countries. A minority offer roam like at home tariffs which include a connection fee, i.e. paying a few Euros per day allows customers to use their domestic bundle while roaming in EEA countries, or on specific networks defined by the provider.

To sum up, comparing prices for roaming services is complicated by the wide range of possible usage patterns (frequent traveler versus occasional traveler) and the detailed variations in price levels and price structures (e.g. tariffs for a restricted time period, for a restricted number of countries/ networks etc.). It is quite easy to compare different linear tariffs and find out the best price, but comparing linear tariffs with daily or monthly bundles is complex. In order to find out the best deal customers would need to study their roaming consumption pattern, i.e. to analyze their travel behavior (how often they travel, which countries they visit, or on which networks they roam) as well as their roaming consumption pattern (number of calls made and received, number of SMS and data services used), which is unfortunately quite difficult to anticipate, especially for data services.

Nevertheless, given the alternative tariffs on offer including paying an extra daily charge to use one’s domestic allowance when roaming, BEREC invites operators and consumer associations to consider providing practical examples of roaming usage (including voice, SMS and data) which might illustrate when it might be advantageous to take up an alternative roaming offer from an existing provider in a similar way to illustrations which may currently be provided in the context of choosing a domestic package best suited to the consumer’s usage.

#### **1.6. Availability of up to date information on existing tariffs**

In the case of roaming services, customer’ choice is highly limited. It is not usually convenient for customers (particularly for light and moderate users) to compare international roaming tariffs and choose the right package from different providers. Roaming services are sold as additional services in a bundle, which usually includes domestic mobile access. In the retail market, the focus of competition is on domestic services, due to customer preferences and the fact that the bulk of them spend far more on domestic services. All these different factors significantly influence customer choice and the costs of services, and thus can make any comparison difficult. In any case, availability of information comparing different tariffs at least for each provider, is a first step to empower customers to take informed decisions on which roaming tariff to contract.

#### **Tables on providers’ websites comparing tariffs available for customers**

BEREC asked whether providers supply any table or tool on their websites, which enable customers to compare the prices and terms and conditions of the tariffs available for intra-EU international roaming.

Around 41% of the providers reported doing so. However, only 28% of the providers supplied a link. A closer look at the links showed that just 10% of the providers actually allow customers to compare tariffs at one glance, and 90% of the providers do not provide easy methods that allow a comprehensive comparison of tariffs.

### **Tables and assessment from consumer associations and other organizations**

BEREC asked NRAs if consumer associations or any other organization provide tables or any other information that allow comparing tariffs for international roaming offered by different operators, as well as access for customers to publicly available reports comparing international roaming tariffs.

Approximately 17% of the responding NRAs are aware of such comparison tables. These NRAs kindly provided links from consumer associations. Unfortunately it proved that the information supplied do not cover all possible tariff plans of all the providers. The focus is mainly on comparing potentially interesting alternative tariff packages for customers or showing options for tariff plans that are offered by the different providers per country (hence not including all of them). Where reports are provided, those reports only offer a snapshot taken at a certain moment in time. BEREC believes that providing such a comprehensive tool would consume too many resources for those organizations as they would have to closely monitor a variety of tariff plans in real time in order to keep the information updated. Additionally, for most consumers, international roaming is of interest only at certain times of the year (usually during holiday periods) compared to domestic services where real time comparison tools are of interest throughout the year and are readily available.

### **Tables with tariffs on NRAs websites**

BEREC also wanted to know whether NRAs provide up-to-date information on their websites. Around 40 % of the responding NRAs actually provide such information and supplied a link. As was seen for operators in the previous section, it turned out that getting a comprehensive overview of all different tariff plans is also quite difficult for NRAs. NRAs supplied general information about roaming regulation and the caps applied, and in some cases supplied links to the websites of providers where customers could find international roaming tariffs.

53 % of the responding NRAs publish general recommendations for customers which may help them to select the most suitable international roaming tariff. A closer look at the links showed that 15% of those NRAs only published links to the websites of providers. The remaining 35% reported general information, caps for international roaming tariffs and some advice on how to cope with data roaming usage (bill-shock and/or advice to switch off roaming).

BEREC observes that, as it happens with consumers associations it is not easy for NRAs to provide a comprehensive comparison tool. In the case of NRAs, this is partly due to legal obstacles (in fact one NRA reports that its legal constraints would prevent it from providing such comparison tables), but also because this is not considered as being the responsibility of a NRA but rather as the task of the market players. Some operators already provide such tools (however comparability for roaming seems to be lacking there as well, as can be seen

in section 2.2). Additionally, as happens also with consumer associations, the burden of resources implied of having up-to-date information on existing roaming tariffs is high and may inhibit initiatives in this area.

### **1.7. Hints for customers to estimate data traffic**

One of the key issues to be considered when assessing the comparability of tariffs is the ability for customers to forecast data traffic based on the intensity of their use of different internet services when travelling abroad. As we have seen in previous sections, many of the tariffs are based on bundles of voice minutes and/or SMS and/or data traffic to be used in a certain time period. So any comparison with a view to making an informed decision should as a first step include a forecast of the likely consumption of roaming services in order to select the most suitable tariff plan.

Although forecasting consumption of voice and SMS is not straightforward, the relation between price paid and service obtained by customers can be directly related to consumption in terms of minutes and SMS sent. A given number of minutes or SMS has a clear meaning for customers in terms of usage.

The situation is very different for data services. Even for proficient data users, it is quite difficult to translate the mere use of different data services into the amount of traffic which the service generates in terms of MB and thus to estimate the potential amount of MB for a certain period. Contrary to voice or SMS, each different final data service may involve different traffic consumption. Even if consumers manage to forecast the number of emails they expect to receive in a certain period, in the end the amount of traffic may deviate from the forecast number depending on whether e.g. the emails contain annexes.

The ability to make a good estimate of data traffic is relevant not only for international roaming, but also for selecting the most adequate tariff for domestic services. As charges for domestic services are typically calculated on a monthly basis, customers can use records of past traffic consumption for months with similar patterns of data usage as a basis for assessing the future consumption of traffic.

This method may be challenging for estimating international roaming traffic as it is not consumed on a regular basis and usually the travel periods differ (many tariffs are based on daily consumption). It may also be difficult to get hold of historical data from previous journeys. Nevertheless, BEREC considers that customers should be able to forecast international roaming traffic and compare international roaming tariffs in order to select the most suitable tariffs. Therefore any hints provided by NRAs, consumer associations, operators and other organizations would help consumers to estimate their roaming traffic, over a given time period allowing them to select the best tariff corresponding to their likely usage.

As already indicated in the previous section, the availability of information and/or applications that allow customers to estimate their data roaming traffic is not widespread. Around 17% of the responding NRAs reported having published information or applications to help customers to forecast data traffic consumption. Around 13% of the responding NRAs reported that organizations such as consumer associations provide such information or tools.

Those NRAs and consumer associations that publish any kind of information usually provide general hints on the use of data roaming services and tariffs of providers. A few of them also provide quantitative guides on how to estimate data traffic consumption based on the intensity of internet services usage. The tool provided by the Norwegian Regulator NPT can be considered as a good example. As can be seen in figure 8, the tool allows consumers to interact with a simple panel providing qualitative information on the intensity of use for several types of services per month. Additionally the tool provides an assessment of the number of Mb to be consumed. However, it must be noted that the tool is mainly focused on estimating monthly consumption of domestic data services, and roaming services are typically used on a daily or weekly basis.

**Mobilt bredbånd**

Standardverdiene viser typiske forbruksmønstre. Juster verdiene under slik at de passer til ditt forbruk og klikk beregn.

**Tilkoblingsform**

USB-modem  Mobiltelefon/PC

**Ditt antatte forbruk**

	Lavt	Middels	Høyt	MB
<input checked="" type="checkbox"/> E-post	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	40
<input checked="" type="checkbox"/> Nettsurfing	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	1000
<input checked="" type="checkbox"/> Musikk	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	520
<input checked="" type="checkbox"/> Video	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	650
<input checked="" type="checkbox"/> Spill	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	400

Total datamengde: 2610

Bruk fordelt på:

Dagtid: 50 prosent Kveld/helg: 50 prosent

**Klikk og beregn**

**Tilbakestill**

Figure 9: Tool for data traffic estimation provided by NPT<sup>2</sup>

Some providers (33%) reported that they provide information or tools for forecasting data consumption as well. Several models have been identified:

- 1) Providers describe how to estimate data traffic for each type of service, such as the amount of MB an email has or video streaming or mp3 download takes etc.

<sup>2</sup> [http://www.telepriser.no/portal/page/portal/telepriser/forsiden/mobilt\\_bredband?calcType=MOBINET&type=get\\_calc\\_1ml&antRader=20&kategori1=USB-modem&kategori2=Mobiltelefon/PC&antMegaByte=2610&andelDag=50&andelKveldHelg=50&fordeltPaEnhet=1.0&epost=true&nett=true&video=true&musikk=true&spill=true&epostr=medium&nettr=medium&videor=medium&musikkr=medium&spillr=medium&forbruk=medium](http://www.telepriser.no/portal/page/portal/telepriser/forsiden/mobilt_bredband?calcType=MOBINET&type=get_calc_1ml&antRader=20&kategori1=USB-modem&kategori2=Mobiltelefon/PC&antMegaByte=2610&andelDag=50&andelKveldHelg=50&fordeltPaEnhet=1.0&epost=true&nett=true&video=true&musikk=true&spill=true&epostr=medium&nettr=medium&videor=medium&musikkr=medium&spillr=medium&forbruk=medium)

Activiteit	Gemiddeld verbruik*	Käyttökohde	Määrä
E-mail	0,05 MB per E-mail	Sähköposti ilman liitettä	1-20 kt
Versturen/ontvangen E-mail	0,5 MB per E-mail	Kotisivu internetissä	300 kt–3 Mt
Versturen/ontvangen E-mail met bijlagen	0,5 MB per E-mail	A4 dokumentti tekstillä	50–300 kt
Radio/muziek streamen	60 MB per uur	Korkealaatuinen kuva	1–2 Mt
Webpagina's bekijken (surfen)	15-20 MB uur	Musiikkikappale (mp3)	2-3 Mt
Foto uploaden	1 MB per foto	Videoleike	1-10 Mt
Muziek downloaden	3,9 MB per liedje		
Whatsapp/pingen/chatten	0,01 MB per bericht		
Bellen via internet (Skype/Viber)	50-72 MB per uur		
Social media controleren op applicatie (Facebook/Twitter)	0,2 MB per bezoek		
Video streamen (YouTube)	120-150 MB per uur		
Uploaden/downloaden van een foto	2 MB per foto		
App downloaden	5 MB per app		
*Verbruik per applicatie kan variëren afhankelijk van het type handset/device.		Huom. 1 Mt = 1024 kt ja 1 Gt = 1024 Mt.	

### Príklady

Príklady, indikujúce približnú veľkosť objemu prenesených dát

e-mail (bez prílohy)	10 - 100 kB
obrázok (nízke rozlíšenie)	10 - 100 kB
obrázok (vysoké rozlíšenie)	100kB - 2 MB
načítanie web stránky	100 -300 kB
stiahnutie pesničky	1 - 4 MB
video-TV 5min	5 - 10 MB

**Figure 10: Some examples of information supplied by providers on traffic consumption for different types of Internet Services<sup>3</sup>**

- 2) Providers describe how different internet services such as e-mail, web browsing, video streaming, use of social networks etc. can be combined for each roaming tariff. In this case, the starting point is the tariff to be contracted and consumers are informed about the typical use combinations in terms of traffic. The following figure shows a typical case of this model.

<sup>3</sup>Screenshots obtained from the following links provided by providers: <http://www.t-mobile.nl/mobiel-abonnement/buitenland/internet-in-het-buitenland>, [http://www5.sonera.fi/ohjeet/Netin\\_k%C3%A4ytt%C3%B6\\_ulkomailla](http://www5.sonera.fi/ohjeet/Netin_k%C3%A4ytt%C3%B6_ulkomailla), <http://www.telekom.sk/osobne/telefonovanie/mobilne-sluzby-a-tarif/roaming/datovy-roaming/internet-v-zahranici/priklady>

## Forfaits Roaming Europe

TRAVEL EUROPE 5 5 MB 2,53 € par mois <sup>1</sup>	TRAVEL EUROPE 10 10 MB 4,83 € par mois <sup>1</sup>	TRAVEL EUROPE 30 30 MB 13,80 € par mois <sup>1</sup>	TRAVEL EUROPE 60 60 MB 26,22 € par mois <sup>1</sup>	TRAVEL EUROPE 150 150 MB 62,10 € par mois <sup>1</sup>
Envoyez ou recevez jusqu'à 500 emails ou surfez pendant 30 min, ou téléchargez jusqu'à 5 photos <sup>2</sup>	Envoyez ou recevez jusqu'à 1000 emails ou surfez pendant 1h00, ou téléchargez jusqu'à 10 photos <sup>2</sup>	Envoyez ou recevez jusqu'à 3000 emails ou surfez pendant 3h00, ou téléchargez jusqu'à 30 photos <sup>2</sup>	Envoyez ou recevez des emails 6000 emails ou surfez pendant 6h00, ou téléchargez jusqu'à 60 photos <sup>2</sup>	Envoyez ou recevez des emails 15.000 emails ou surfez pendant 15h00, ou téléchargez jusqu'à 150 photos <sup>2</sup>
Prix pour le MB hors forfait en roaming: 0,5175 €				
Rythme de facturation 10 KB		Rythme de facturation: 5 KB		Rythme de facturation: 1 KB

Figure 11: Example of information provided by operators on intensity of use of Internet Services for each roaming tariff<sup>4</sup>

Providers also supply tools where customers can interact by using sliding bars or boxes to select the number of e-mails, period of web browsing etc., and the application supplies an estimate of the number of MB which will be used based on this data. Many of the tools are oriented to providing estimates for monthly consumption, but some of them allow for daily or weekly forecasts and are focused on international roaming.

The screenshot shows a mobile application interface for selecting roaming options and estimating data usage. At the top, there are five icons representing different user categories: 'Nebudu potřebovat' (No need), 'Dovolená' (Vacation), 'Služební cesta' (Business trip), 'Student', and 'Vlastní' (Own). Below these, there are five rows of selection options for different services: 'Počet emailů bez přílohy' (Number of emails without attachments), 'Webové stránky a zpravodajství' (Web pages and news), 'Videa na m.youtube.com' (Videos on m.youtube.com), 'Sociální sítě' (Social networks), and 'Vyhledávání na mapách' (Map searches). Each row has five buttons with values 0, 1, 5, 10, and 50. A dropdown menu for 'Jaký máte datový tarif?' (Which data tariff do you have?) is set to '-- Vyberte --'. At the bottom, it shows 'Odhadovaná spotřeba dat je 6.9 MB/den' (Estimated data consumption is 6.9 MB/day).

<sup>4</sup>Screenshot obtained from the following link provided by the provider: <http://www.post.lu/fr/particuliers/mobile/les-forfaits-internet-mobile#panel3>

Izberite napravo in vnesite podatke o svoji običajni uporabi interneta: Mobitel Računalnik

<p><b>Poslana in prejeta e-sporočila</b> Koliko e-sporočil pošljete v določenem obdobju? <b>0 KB</b></p> <p>0 5 25 50 100 250 na dan ▼</p>	<p><b>Predvajanje pretočnih videoposnetkov</b> Koliko minut prenašate video posnetke v določenem obdobju? <b>0 KB</b></p> <p>0 5 15 30 60 120 na dan ▼</p>
<p><b>Poslana in prejeta e-sporočila s pripunko</b> Koliko e-sporočil s pripunko pošljete v določenem obdobju? <b>0 KB</b></p> <p>0 5 25 50 100 250 na dan ▼</p>	<p><b>Objave na družabnih omrežjih</b> Koliko slik objavite v določenem obdobju? <b>0 KB</b></p> <p>0 5 25 50 100 250 na dan ▼</p>
<p><b>Število obiskanih spletnih strani</b> Koliko spletnih strani obiščete v določenem obdobju? <b>0 KB</b></p> <p>0 5 25 50 100 250 na dan ▼</p>	<p><b>Prenesene igre/aplikacije</b> Koliko aplikacij prenesete v določenem obdobju? <b>0 KB</b></p> <p>0 5 25 50 100 250 na dan ▼</p>
<p><b>Poslušanje spletnega radia</b> Koliko minut poslušate spletni radio v določenem obdobju? <b>0 KB</b></p> <p>0 5 15 30 60 120 na dan ▼</p>	

[Ponastavi nastavitve](#)

Vaša mesečna poraba znaša:

**0 KB**

100 MB 2 GB 15 GB 30 GB 40 GB

**Priporočamo vam storitev:**

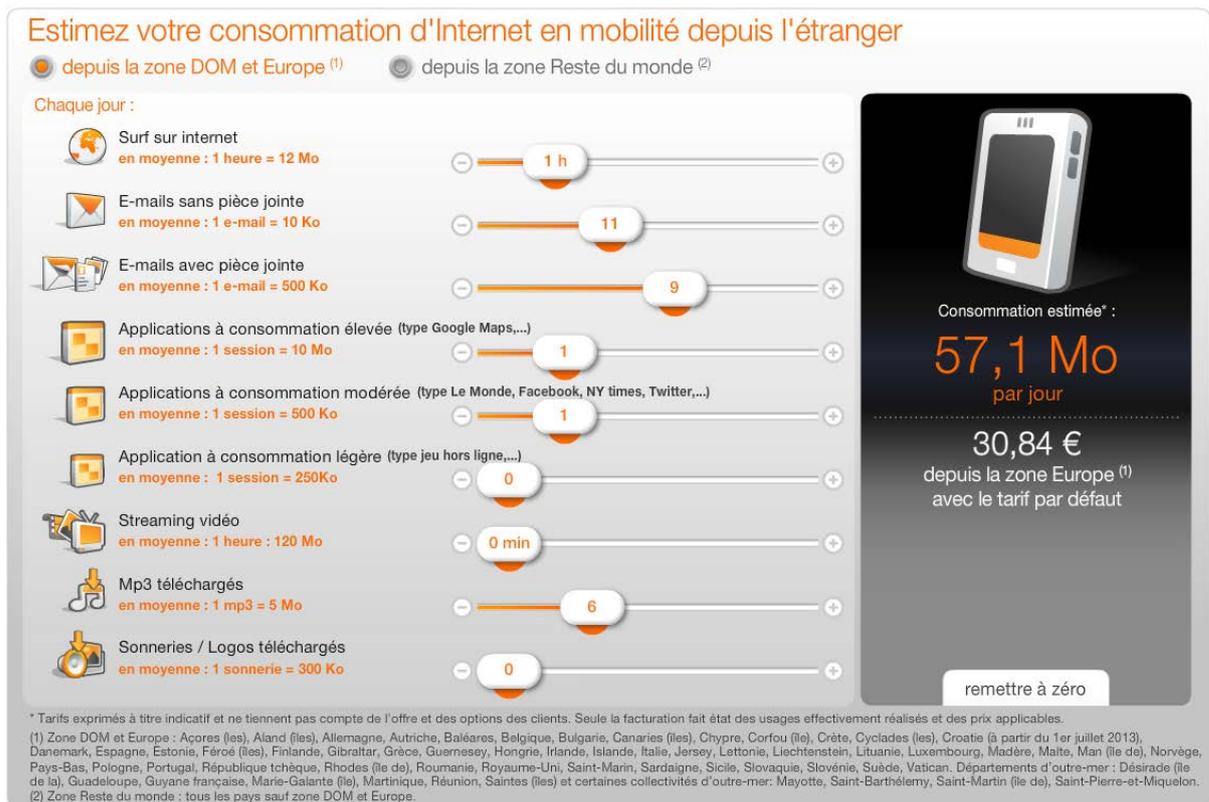
Internet  
**Mini**

[Preveri ponudbo](#)

Figure 12: Some examples on tools provided by providers in their website to allow for traffic estimation based on Internet Services use<sup>5</sup>

In general, these tools do not provide the final price for customers, which in the end will depend on the specific tariff selected. However, it would be useful for customers to know at least what would be the price under the Eurotariff, which can be considered a good reference for comparison as it is the default tariff for most customers. Orange France supplies the price under the default tariff together with the estimate of data traffic, as shown in the next figure.

<sup>5</sup>Screenshots obtained from the following links provided by providers: <http://www.mobitel.si/storitve/info/kalkulator.aspx>, <http://www.vodafone.cz/roamingova-kalkulacka/>



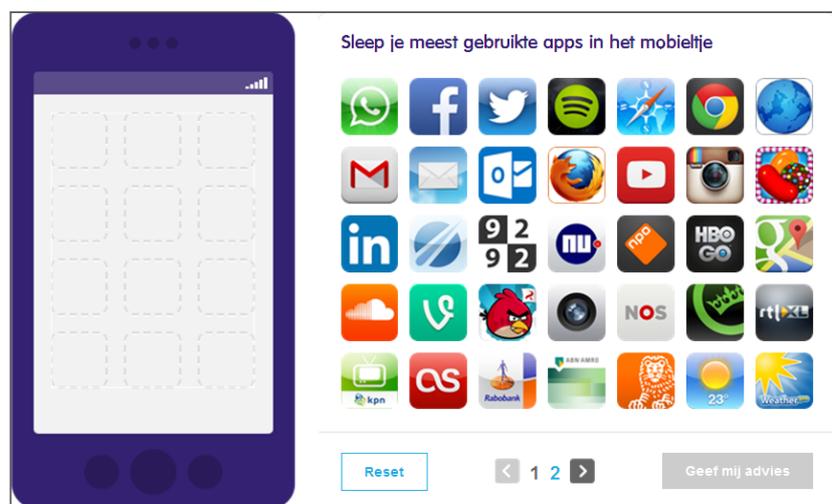
**Figure 13: Example on tool provided by providers supplying both, traffic estimation and price for the default tariff<sup>6</sup>**

- 3) Finally, operators also provide the tools described in the previous paragraph, recommending additionally the most adequate tariff for the specific traffic pattern supplied by the customer. In this case, the tool not only provides traffic estimates, but also gives a recommendation to the customer on the optimum tariff to use for the forecast data consumption. The following figure provides an interesting example of this model (although it is not applied to roaming, but instead is applied for monthly contracts), where the graphical interface is based on the typical icons used in smart phones for each type of services, thus facilitating consumer interaction.

<sup>6</sup>Screenshot obtained from the following link provided by the operator:  
[http://www.uc-orange.com/usages/estimation\\_data\\_mobile/estimation\\_roaming.html](http://www.uc-orange.com/usages/estimation_data_mobile/estimation_roaming.html)

## HOEVEEL DATA HEB JIJ NODIG?

Op basis van de apps die jij gebruikt kun je goed bepalen welke internetbundel het beste bij jouw mobiele gedrag past. Sleep de apps die je het meest gebruikt in het mobieltje en bekijk je persoonlijke advies voor een abonnement met toestel.



**Figure 14: Example of tool based on icons and oriented to provide advice on the tariff to be selected by the customer<sup>7</sup>**

In conclusion, the analysis has shown that customers in general do not have straightforward and simple to use information and tools to estimate their consumption of data traffic (MB) at their disposal when roaming. Although some of the providers supply convenient tools and clear information, this is not the case in general.

The lack of information and tools for customers aimed at estimating data traffic consumption may be one of the reasons why many customers contract specific alternative tariffs that at the end of the day imply higher costs than the Eurotariff. Of course, other factors should be taken into consideration when analyzing why some customers contract disadvantageous tariffs. In any case, tools and hints and other information allowing consumers to estimate data traffic increases transparency and efficiency in the market as consumers can make more informed decisions.

BEREC identified some good examples such as tools using graphical interfaces which provide different scenarios. Those could be used as a reference for further enhancement of existing tools. Such tools, which forecast data consumption, are in general easy to implement and may help a number of customers to assess alternative roaming tariffs (such as bundled offers) compared to the Eurotariff. Although providers' websites are an adequate place for customers to access this type of tools, BEREC encourages consumer associations also to provide such tools so customers can gain confidence in estimating their data usage. NRAs may also want to provide such possibilities. Using graphical icons such as the ones shown by KPN may help customers to use such tools in an easy and convenient way. Additionally, something considered as advisable would be not only to provide data traffic estimations in MB, but also the maximum price that customers would have to pay under the Eurotariff. This could help them to better compare the Eurotariff with alternative tariffs.

<sup>7</sup>Screenshot obtained from the following link provided by the operator: [www.hi.nl/mbadvies](http://www.hi.nl/mbadvies)

## Annex 1: QUESTIONNAIRE SENT TO NRAs

<b>1.- Identification</b>	
Name of the NRA:	<input type="text"/>
Country:	<input type="text"/>
Contact person for doubts in the questionnaire:	<input type="text"/>
e-mail contact person:	<input type="text"/>

<b>2.- Questions on transparency</b>			
<b>2.1.- Complaints on transparency (received from July 2012)</b>			
	<table border="1"> <tr> <td>Yes</td> <td>No</td> </tr> </table>	Yes	No
Yes	No		
Have you received complaints from customers on transparency issues?	<input type="text"/>		
If yes, please describe the issues most cited by customers as transparency issues			
<input type="text"/>			
	<table border="1"> <tr> <td>Yes</td> <td>No</td> </tr> </table>	Yes	No
Yes	No		
Are you aware of any problems or issues relating to a) the clarity or b) the accessibility of information on International Roaming tariffs provided by any of your operators?	<input type="text"/>		
If response to previous question is "yes", please provide details below:			
<input type="text"/>			

3.- Information available to customers in the NRA website facilitating comparison of tariffs made public from July 2012		
	Yes	No
Is there updated information in your website comparing tariffs for international roaming from different operators?		
If yes, provide the link		
	Yes	No
Have you produced any publicly available report on comparison of international roaming tariffs?		
If yes, provide the link		
	Yes	No
Do you publish any set of general recommendations for customers in order to help them to select the most adequate international roaming tariff?		
If yes, provide the link		
	Yes	No
Is there any application provided by the NRA available for customers to decide on which type of tariff to select based on estimation of consumption for international roaming?		
If yes, provide the link		
	Yes	No
Do the NRA provide any application or information for customers to estimate data services consumption based on the estimated use of Internet Services as web browsing, e-mails, and specific applications as Google Maps or Whatsapp?		
If yes, provide the link		

<b>4.- Information available to customers provided by consumer associations or other organizations facilitating comparison of tariffs (made public from July 2012)</b>		
	Yes	No
Do customer associations or any other organization provide tables or any other information comparing tariffs for international roaming from different operators?	<input type="checkbox"/>	<input type="checkbox"/>
If yes, provide the link/s		
<input type="text"/>		
	Yes	No
Have customer associations or any other organization produced any publicly available report on comparison of international roaming tariffs?	<input type="checkbox"/>	<input type="checkbox"/>
If yes, provide the link		
<input type="text"/>		
	Yes	No
Have consumer associations or any other organization publish any set of recommendations for customers in order to help them to select the most adequate international roaming tariff?	<input type="checkbox"/>	<input type="checkbox"/>
If yes, provide the link		
<input type="text"/>		
	Yes	No
any other organization available for customers to decide on which type of tariff to select based on estimation of consumption for international roaming?	<input type="checkbox"/>	<input type="checkbox"/>
If yes, provide the link		
<input type="text"/>		
	Yes	No
Do customer associations or any other organization provide any application or information for customers to estimate data services consumption based on the estimated use of Internet Services as web browsing, e-mails, and specific applications as Google Maps or Whatsapp?	<input type="checkbox"/>	<input type="checkbox"/>
If yes, provide the link		
<input type="text"/>		

<b>5.- Any other input that can be considered useful by the NRA</b>
Please, include here any additional information that you consider that can be useful for the BEREC report on transparency and comparability of tariffs
<input type="text"/>

## Annex 2: QUESTIONNAIRE SENT TO OPERATORS

	1.- Identification		
	Name of the provider		
	Country		
	Type of provider (mark with a cross in the corresponding cell)		
		<input type="checkbox"/>	MNO
		<input type="checkbox"/>	Full MVNO
		<input type="checkbox"/>	Light MVNO/Reseller

**2.- Structure of alternative tariffs for international roaming (intra-EU)**

**2.1.- Structure of alternative tariffs**

Please, respond yes/no in the corresponding cells.

If there are several tariffs qualifying for any row, you can mark as yes several columns for that row if different tariffs have different time limits or conditions

	Existing tariff? (yes/no)	Time limit to use the bundle restricted to one day?	Time limit to use the bundle restricted to more than one day and up to a week? (Yes/No)	Time limit to use the bundle restricted to more than one week and up to a month? (Yes/No)	Is the international roaming tariff included in specific domestic tariff/s? (Yes/No) (see note (1))	Is the international roaming tariff offered associated to any domestic tariff? Yes/No (see note (2))	Is this tariff restricted to a limited number countries (if yes, specify "EEA", "Non EEA countries" or "others"?)	Is this tariff restricted to the use of the group footprint? (Yes/No)	Is the tariff restricted to the use of certain networks of any other operator? (Yes/No)
Linear tariff Voice per minute									
Linear tariff SMS per unit									
Linear tariff Data Services per Mb									
Bundle of a number of voice minutes									
Bundle of a number of SMS									
Bundle of data services (a quantity of Mb)									
Bundled voice + SMS									
Bundled voice + Data Services									
Bundled SMS + Data Services									
Bundled Voice + SMS+ Data Services									
Application of domestic rates									
Connection fee + Domestic Rates									
Connection fee + other Rates									

Note (1): This column refers to domestic tariffs (typically bundles) that are including a certain number of minutes, SMS and/or Mb for international roaming in the EU/EEA

Note (2): This column refers to international roaming alternative tariffs that can only be contracted when selecting certain domestic tariffs, but are separate tariffs from the domestic ones

In case that other tariffs exists, please, describe in the box below

<b>3.2 Alternative tariffs</b>				
		Yes	No	
Are there any activation charges applied when switching between any of the tariffs?				
Do you inform customers actively about the start and end of the tariff period for tariffs limited in time?				
Also for tariffs limited in time, do you inform customers, about the tariffs/charges they have to pay for roaming services, when their alternative tariff period ends?				
Regarding bundles, do you inform customers using an alternative tariff (via SMS, website, etc.) about the charges applied for out of bundle consumption?				
Do you inform customers actively when they reach the limits included in the bundle ?				
Please, describe how do you inform customers about the issues addressed in the previous questions				
<b>3.3 Switching between tariffs</b>				
Where do you provide information concerning switching between tariffs ?				
	Yes	No		
Website				
Mobile terminal (e.g. via a short message)				
Call Centre				
Point of Sales				
Any other mean (please specify)				
If "Any other mean" has been marked as "Yes", please describe				
<b>3.4. Information for customers about charges and consumption for intra-EU roaming</b>				
	Monthly information (bill)		Real Time Information	
	Charges	Volumes	Charges	Volumes
Does the bill include separate itemized information on International Roaming intra-EEA outgoing voice calls?				
Does the bill include separate itemized information on International Roaming intra-EEA incoming calls?				
Does the bill include separate itemized information on International Roaming intra-EEA SMS sending?				
Does the bill include separate itemized information on International Roaming intra-EEA data services?				
In case you are providing information for charges and/or volumes consumption, please, identify how this information is provided to customers				
	historical		real time	
	Yes	No		
Website				
Interaction via the mobile terminal (e.g. via a short message)				
Call Centre				
Specific App available for installation in the terminal				
Any other mean (please specify)				
If "Any other mean" has been marked as "Yes", please describe				

<b>4.- Information and tools to compare tariffs for intra-EEA International Roaming</b>		
<b>4.1.- Tables comparing all international roaming intra-EU tariffs</b>		
	Yes	No
Is there available any table for customers comparing conditions and prices for all tariffs available for intra-EU international roaming in your website?		
If yes, please, supply the link		
<b>4.2.- Tools for selecting the most adequate international roaming tariff based on estimation of consumptions</b>		
	Yes	No
Do you provide customers with any application to help in the selection of the most adequate tariff for his/her pattern of consumption?		
If yes, please, supply the link		
<b>4.3.- Information for customers on estimating data traffic consumption</b>		
	Yes	No
Do you provide customers with information on how to estimate data services consumption based on the estimated use of Internet Services as web browsing, e-mails, and specific applications as Google Maps or Whatsapp?		
If yes, please, supply the link		
Where the information about the billshock measures for alternative tariffs is available		

<b>5.- Any other input that can be considered useful by the provider</b>		
Please, include here any additional information that you consider that can be useful for the BEREC report on transparency and comparability of tariffs		