



# Assessment of the cost of providing mobile telecom services in the EU/EEA countries

## EXECUTIVE SUMMARY

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*Contact: CNECT B3 Secretariat*

*E-mail: [cnect-b3@ec.europa.eu](mailto:cnect-b3@ec.europa.eu)*

*European Commission  
B-1049 Brussels*

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## Abstract

Axon Consulting assesses in this study the costs of mobile telecommunication networks in each of the 30 EU/EEA countries<sup>1</sup>. The assessment is based on Axon's Bottom-up Long-Run Incremental Cost (BULRIC) model, developed thanks to the collaboration from National Regulatory Authorities and telecom operators across EU/EEA.

This initiative was commissioned to Axon Consulting by the European Commission (EC) in the context of the following regulations:

- ▶ The Regulation (EU) 2022/612<sup>2</sup> (the Wholesale Roaming Regulation - WRR) which defined, in the context of the Roaming Like at Home (RLaH) policy, the wholesale roaming caps until 2032 and mandated the Commission to assess, in years 2025 and 2029, the need to amend them.
- ▶ The Directive (EU) 2018/1972<sup>3</sup> (the European Electronic Communications Code - EECC) from December 2018, required the Commission to establish a single maximum voice termination rate that applies Union-wide and review it every five years.

The results of our assessment will be one of the main inputs the European Commission will use to fulfil its obligations for the revision and potential update of the wholesale roaming caps as well as the mobile termination Euro-rate for all the EU/EEA Member States.

All the public materials produced under this cost study are available in the Commission's website.

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<sup>1</sup> The 30 states that are members of the EU (European Union) and/or EEA (European Economic Area) are: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

<sup>2</sup> Regulation (EU) 2022/612 of the European Parliament and of the Council of 6 April 2022 on roaming on public mobile communications networks within the Union, available [here](#).

<sup>3</sup> Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code, available [here](#).

## Executive Summary

This executive summary provides an overview of the context, methodological framework and outputs of the study performed by the EC/Axon team to quantify the costs of providing mobile roaming (including voice, data and SMS) and voice termination services in the 30 EU/EEA countries. This executive summary is structured as follows:

- ▶ Context
- ▶ Methodological framework
- ▶ Scenarios modelled
- ▶ Final results

### 1. Context

The cost study kicked-off on 22 May 2023. On 21 June 2023, the Commission and Axon hosted the Workshop 1 to present the main principles to be adopted in the update of the Bottom-Up cost model, previously developed by the EC/Axon team during the project SMART 2017/0091<sup>4</sup>, to the industry (including National Regulatory Agencies – NRAs – as well as Mobile (Virtual) Network Operators – M(V)NOs –). Stakeholders were given the possibility to comment on the Workshop 1 materials so that their feedback could be taken into consideration in the methodological update of the model. Detailed answers to stakeholders' feedback were provided in the "*Overview of comments to Workshop 1*" document circulated on 2 August 2023.

On the same 2 August 2023, a data gathering process was launched with the industry to collect from the NRAs and operators the relevant information required to populate and update the model for each Member State. A Data Request Form was circulated to the NRAs, together with a Data Request Manual providing detailed descriptions of the data gathering process and instructions on how to fill in the Form. The data collection process was closed on 22 September 2023, although additional pieces of

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<sup>4</sup> The complete list of public materials developed as part of such project is available in the following link: <https://digital-strategy.ec.europa.eu/en/library/finalisation-mobile-cost-model-roaming-and-delegated-act-single-eu-wide-mobile-voice-call>

information provided after this deadline were also taken into account when populating the model.

Based on the data provided, the Commission and Axon worked on the implementation of a first draft version of the model. This first draft, together with its associated documentation<sup>5</sup>, was submitted to consultation on 8 January 2024. Stakeholders were given seven weeks (until 23 February 2024) to provide their views on the 6 questions that were raised in the consultation document. This consultation process served to i) identify areas of improvement in the model, ii) gather new/corrected inputs from several stakeholders and, as a result, to iii) achieve more accurate and representative results.

The feedback and data received were accounted for in a new version of the model (second draft version) which addressed the main areas of improvement identified in the first consultation round. This second draft model, together with its associated documentation, was submitted to a second consultation round on 17 April 2024. Stakeholders had 5 weeks to comment on the consultation materials (until 22 May 2024). The outcomes of this second consultation round proved that most of the main concerns identified in the first round had already been dealt with and only a few areas of discussion remained.

The main suggestions received, as well as the new pieces of information provided, were implemented in a new and final version of the cost model. The detailed outcomes of the consultation rounds as well as the final results produced by the model were presented to the stakeholders in the Workshop 2 on 4 July 2024.

Overall, the process counted with a relevant participation from the European industry (both NRAs and operators), having received feedback from 51 stakeholders.

## **2. Methodological framework**

The methodological framework adopted in this cost study is consistent with the approach adopted in the SMART 2015/0006 and SMART 2017/0091 cost studies as well as with the Commission Recommendation on the regulatory treatment of fixed

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<sup>5</sup> Including: methodological approach document, user manual of the model, descriptive manual of the model and consultation document.

and mobile termination rates<sup>6</sup> from 2009 and the Directive (EU) 2018/1972<sup>7</sup> (the European Electronic Communications Code - EECC) from December 2018.

The table below provides a summary of the key methodological approaches adopted in the development of the cost model:

Methodological aspect	Approach Adopted
<b>Cost standard</b>	<ul style="list-style-type: none"> <li>▶ Pure LRIC (termination) and LRIC+ (rest of the services).</li> </ul>
<b>Cost categories considered</b>	<ul style="list-style-type: none"> <li>▶ Network CapEx.</li> <li>▶ Network OpEx.</li> <li>▶ General and administration costs (G&amp;A).</li> <li>▶ Wholesale specific costs</li> </ul>
<b>Modelled operator</b>	<ul style="list-style-type: none"> <li>▶ Hypothetical Efficient operator, with a market share equal to 1/#MNOs (subject to a minimum of 20%).</li> </ul>
<b>Depreciation methodology</b>	<ul style="list-style-type: none"> <li>▶ Economic depreciation.</li> <li>▶ Two economic depreciation scenarios are included based on (i) demand or (ii) revenues as the relevant production factors.</li> </ul>
<b>Modelled period</b>	<ul style="list-style-type: none"> <li>▶ 2022-2032</li> </ul>
<b>Volume forecasts</b>	<ul style="list-style-type: none"> <li>▶ Projections are based on an assessment of historical traffic patterns and data provided by the stakeholders.</li> <li>▶ A total of three scenarios are included to assess alternative volume forecasts (conservative, base case and aggressive).</li> </ul>

<sup>6</sup> Commission Recommendation of 7 May 2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU, available [here](#).

<sup>7</sup> Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code, available [here](#).



Methodological aspect	Approach Adopted
<b>Allocation of joint and common costs</b>	<p>Two cost allocation modules are available in the model:</p> <ul style="list-style-type: none"> <li>▶ <i>Network module</i>: Joint and common costs are allocated to services based on their network usage, by using a routing factors matrix.</li> <li>▶ <i>Regulatory policy module</i>: The allocations performed in the network module are adjusted to take into account regulatory policy decisions (e.g. re-allocation of the joint and common costs initially allocated to the voice/SMS termination service to voice/SMS origination). Please refer to the descriptive manual for further indications on how this is implemented.</li> </ul>
<b>Treatment of seasonality</b>	<ul style="list-style-type: none"> <li>▶ The impact of seasonality on all domestic and roaming services was assessed (when data was provided) based on the monthly evolution of traffic.</li> <li>▶ Three alternative seasonality scenarios are included in the model depending on the minimum threshold required between monthly fluctuations and the yearly average to consider that seasonality exists.</li> </ul>

**Exhibit 1: Key methodological approaches adopted in the cost model [Source: Axon]**

In addition to the above key methodological approaches, the EC/Axon team has introduced the following methodological updates in the cost model, with respect to the previous version from the project SMART 2017/0091:

- ▶ **5G technology.** The 5G technology has been incorporated within the model, together with the new available spectrum bands and the possibility of deploying small-cell sites.
- ▶ **M2M services.** The model includes a new functionality to recognize that traffic patterns of M2M services are different from traditional services provided to end-customers, and hence, providing differentiated results for both service types.

### 3. Scenarios modelled

The determination of mobile services' costs in a Bottom-Up model heavily relies on the inputs considered. At the same time, as the two consultation rounds have shown, in some cases, there may be debate on what are the most suitable inputs that shall be taken into consideration. In order to address such situations, the model includes the following scenarios for the six elements described below:

Scenario	Alternatives	Description
<b>Annualisation criteria</b>	Economic depreciation based on ARPU	▶ Revenues act as the modulation factor in economic depreciation
	Economic depreciation based on demand	▶ Demand acts as the modulation factor in economic depreciation
<b>Roaming increment</b>	Specific roaming increment	▶ Roaming traffic is grouped in a single increment
	Joint roaming and domestic increment	▶ Roaming and domestic traffic are assessed within the same increment
<b>Allocation of wholesale specific costs</b>	Allocation based on GB	▶ Wholesale specific costs allocated to services based on equivalent GB
	Allocation based on drivers	▶ Wholesale specific costs allocated to services based on equivalent GB/TAPs
<b>Threshold to identify seasonal patterns</b>	10%	▶ Areas are considered as seasonal when the traffic in the peak month (net of structural growth) is above the traffic in the average month by 10%
	30%	▶ ...The threshold is set at 30%
	50%	▶ ...The threshold is set at 50%
<b>Demand</b>	Conservative	▶ Domestic data traffic forecast based on the historic growth rate with a 30% YoY reduction in the annual growth rate
	Base-case	▶ ...Considering a 20% YoY reduction in the annual growth rate
	Aggressive	▶ ...Considering a 10% YoY reduction in the annual growth rate
<b>Allocation of common costs</b>	Common costs allocated based on traffic	▶ It allocates the common costs of data services between traditional services to end-customers and M2M services by taking into account their split of traffic (volumes of GB)
	Common costs allocated based on customers	▶ It allocates the common costs of data services between traditional services to end-customers and M2M services by taking into account their split of customers

**Exhibit 2: Description of the modelled scenarios [Source: Axon]**

The results produced under each combination of scenarios are going to be taken into consideration by the Commission in its decision-making process as long as they duly reflect the national characteristics of each Member State (i.e. they reconcile with the operational and financial realities of the MNOs operating in the Member State).

## 4. Final results

As outlined in the previous section, the model produces results under multiple combinations of scenarios. A 'Summary of results' file has been published in the Commission's website that shows the results produced for mobile roaming (including data, voice and SMS) and voice termination services in each Member State from 2022 until 2032 under 72 different combinations of scenarios.

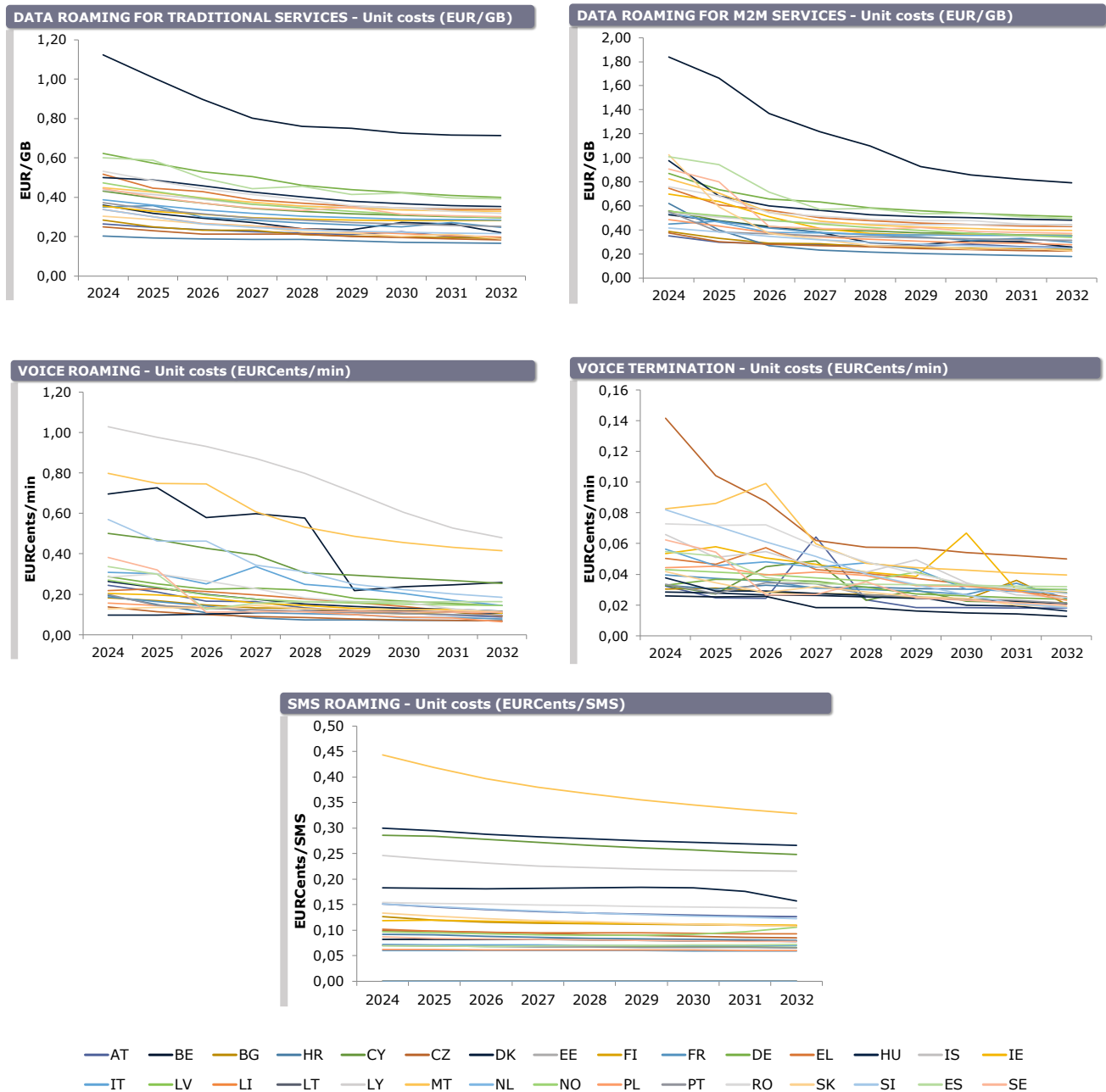
The results produced by the model include network, G&A and wholesale specific costs only. This means that, in the decision-making process, on top of the unit costs produced by the model, the Commission is going to take into consideration:

- ▶ Transit costs for the mobile data roaming service.
- ▶ Transit costs and the applicable EEA average termination rate for the mobile voice roaming service.

As an illustrative summary of the results, the exhibits below show the costs produced by the model under a sample combination of scenarios. Be reminded that these results do not include transit or voice termination charges.

This illustrative combination of scenarios takes into consideration the following configurations: Annualisation criteria (Economic depreciation based on demand), Roaming increment (Specific roaming increment), Allocation of wholesale specific costs (Allocation based on drivers), Threshold to identify seasonal patterns (50%), Demand (Conservative) and Allocation of common costs (Common costs allocated based on traffic).

This illustrative combination of scenarios considers stakeholders' preferred option for each of the 6 scenarios defined. Therefore, it does not necessarily reflect the EC's preferences.



**Exhibit 3: Illustrative results for the five key services [Source: Axon]**

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