



Excellence in Business



Cost of Providing Roaming Wholesale Services – CNECT/2022/OP/0065

Consultation document

Axon Partners Group

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1 Introduction

The European Commission (hereinafter "EC") commissioned Axon Partners Group Consulting S.L.U. (hereinafter "Axon Consulting" or "Axon") for the realization of the study "*Cost of Providing Roaming Wholesale Services – CNECT/2022/OP/0065*" ('the Project').

As described during the Workshop 1, held on 21 June 2023, the EC deemed relevant to develop a new cost study to understand the costs of providing mobile services in EU/EEA countries. This initiative was necessitated by the new roaming regulation ('the Regulation')¹, which requires comprehensive review reports in the years 2025 and 2029. As part of this cost study, the Axon/EC team has updated the Bottom-Up cost model previously elaborated by the EC/Axon during the project SMART 2017/0091², which calculates the costs of providing mobile services in the EU/EEA countries. The updated model aligns with the current market conditions and adheres to the regulatory framework established by the Regulation, ensuring that the EC's approach is both current and compliant for the forthcoming review periods.

The EC/Axon team has decided to involve stakeholders in this first (out of two) public consultation processes³ to provide transparency and gather feedback to improve the outcomes of the cost study.

The objective of this document is to introduce stakeholders to the consultation process. This document includes an overview of the consultation process, namely, a description of the: (i) files submitted for consultation; (ii) roles of each party to the consultation (NRAs and operators); (iii) procedure to submit comments; (iv) treatment of confidential information; and (v) questions for consultation.

The EC/Axon team invites stakeholders participating in this consultation round to follow the indications presented in the remainder of this document.

¹ 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.

² 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>

³ See further indications on the different phases of the Project in the presentation of Workshop 1 held on 21 June 2023 and shared with NRAs and operators.

2 The consultation process

The main objectives of this consultation are to:

- ▶ Provide full transparency to the industry with regards to the methodology, inputs and outcomes of the cost model developed to calculate the costs of providing mobile telecommunications services in the EU/EEA countries.
- ▶ Gather feedback from stakeholders on the methodology, inputs and outputs of the model.
- ▶ Maximise the accuracy and representativeness of the results for each of the countries included in the cost study.

This consultation is the first of the two consultations that the EC/Axon team will organise with the industry over the lifespan of this study. The two consultation processes will be similar, and stakeholders will be able to provide comments on the methodology, inputs and outputs of the model.

The following sub-sections provide further indications on:

- ▶ Description of files submitted to consultation
- ▶ Roles of each party
- ▶ Procedure to submit comments
- ▶ Confidentiality of the information

2.1 Description of files submitted to consultation

As part of the consultation round, the EC has shared the following documents with NRAs:

- ▶ **Main Consultation Document** (this document): provides an introduction to the consultation and gives general indications on the consultation process.
- ▶ **Annex 1 – Draft Cost Model (including a CONFIDENTIAL and NON-CONFIDENTIAL version to share externally)**: Cost model for mobile networks in Microsoft Excel format. This document includes the calculations, inputs and outputs of the model updated by the EC/Axon team and has been shared with each NRA via its dedicated country folder in the CIRCABC platform created by the EC for this project, named “**1st Public consultation 8 Jan - 23 Feb**”. For confidentiality reasons, access to the country folder in CIRCABC is allowed only to colleagues from their respective NRAs who have been approved by their NRA at the start of the project and can only

access data for their own country (see section 2.4 for further indications on the treatment of confidentiality).

NRAs should note that two versions of the cost model have been shared with them.

- Annex 1- Draft cost model – Internal version: Microsoft Excel file 'Mobile Cost Model **CONFIDENTIAL** – *Country Name*'.

This is the CONFIDENTIAL version of the cost model. This version of the cost model should be for internal (i.e. NRA) use only and should not be shared with M(V)NOs. This version includes the same input and output data as considered by the EC/Axon team in their internal version of the models for each NRA. This version will provide NRAs with a clear picture on the actual costs produced by the model for their own country, without any adjustments due to the anonymization of confidential data.

- Annex 1- Draft cost model – Anonymised version: Microsoft Excel file 'Mobile Cost Model **NON-CONFIDENTIAL** – *Country Name*'.

This is the NON-CONFIDENTIAL version of the cost model. In this version of the cost model, confidential information has been anonymised to allow NRAs to circulate it to relevant M(V)NOs. The procedure used to anonymise confidential information is described in section 2.4 below.

- ▶ **Annex 2 – User manual:** This document is an introduction to the cost model, describing the worksheets it contains and providing guidance on how to run it.
 - Annex 2 – User manual of the model: PDF file '20240108 – Axon – User Manual'.
- ▶ **Annex 3 – Descriptive manual:** This technical document provides transparency on the way the model works and describes the main algorithms implemented.
 - Annex 3 – Descriptive manual: PDF file '20240108 – Axon – Descriptive Manual'.
- ▶ **Annex 4 – Methodological approach document:** This detailed document describes the methodology adopted to update the model, the specific steps followed in the definition of the inputs used and the main outputs obtained.
 - Annex 4 – Methodological approach document: PDF file '20240108 – Axon – Methodological approach document'.
- ▶ **Annex 5 – Template for the provision of comments:** This Excel file is to be used by stakeholders to provide their comments to the questions raised by the EC/Axon team.
 - Annex 5 – Template for the provision of comments: Excel file '20240108 – Template for providing comments to the EC's cost model'.

2.2 Roles of each party

The following subsections (i) describe the roles of the main parties from which the EC/Axon team are seeking responses to this consultation: NRAs and operators; and (ii) provide indications and suggestions on how to organise their work during the consultation process.

2.2.1 NRAs' role

Equivalently to the approach followed in previous processes within this study (such as during Workshop 1 and the data gathering), NRAs are expected to act as the interface between the EC/Axon team and national operators. They are also expected to be operators' point of contact with the EC. This allows the EC/Axon team to take into account NRAs' history and knowledge in regulating telecoms markets nationally and ensures that NRAs are in the "driver's seat" during the entire process, avoiding as well that national operators may bypass NRAs' previous national regulatory provisions.

In particular, NRAs are expected to conduct the following tasks:

- ▶ **Share with their national operators the general consultation files uploaded to the folder "General" (and, within this, into sub-folder "1st Public Consultation Materials") in CIRCABC.** This includes the following files:
 1. Main Consultation Document (this document)
 2. Annex 2 – User manual of the model: PDF file '20240108 - Axon - User Manual'
 3. Annex 3 – Descriptive manual: PDF file '20240108 – Axon – Descriptive Manual'
 4. Annex 4 – Methodological approach document: PDF file '20240108 - Axon - Methodological approach document'
 5. Annex 5 – Template for the provision of comments: Excel file '20240108 - Template for providing comments to the EC's cost model'
- ▶ **Share with their national operators the NON-CONFIDENTIAL version of the cost model that can be found in each country folder in CIRCABC in sub-folder "1st Public consultation 8 Jan - 23 Feb".** The name of the relevant file should be:
Annex 1- Draft cost model - Anonymised version: Microsoft Excel file 'Mobile Cost Model - NON-CONFIDENTIAL – Country Name'
- ▶ **Define internal deadlines and procedures with the operators to allow to consolidate feedback from operators in the template provided.** Equivalently to the previous processes, the EC/Axon team understands that each country has its own regulations, habits and/or processes in place regarding timing and submission of

feedback by operators. Therefore, NRAs are expected to set the internal deadlines they deem appropriate to receive feedback from the operators, in order to allow NRAs time to (i) integrate all feedback from operators in the template provided by the EC/Axon team and (ii) submit it to the EC/Axon team no later than the deadline established in section 2.3.

- ▶ **Analyse the consultation files and provide comments to these in the template provided for this particular purpose.** Please remember to include supporting evidence and any information considered necessary to support your arguments.
- ▶ **Upload the filled-in template (including the NRA and national operators' feedback to the consultation) in the NRA's country folder (sub-folder "1st Public consultation 8 Jan - 23 Feb") in the CIRCABC space before the established deadline** (see section 2.3).

2.2.2 Operators' role

Operators are the owners of the information and have the first-hand experience with the networks modelled. Therefore, their contribution is crucial to maximise the accuracy of the study. In particular, operators are expected to conduct the following tasks:

- ▶ **Analyse the consultation files and fill in the template with the feedback on the consultation materials.** Please remember to include supporting evidence and any information considered necessary to support your arguments.
- ▶ **Deliver the filled-in template to the NRA (on the date agreed) and following its indications in terms of timings and processes.**

2.3 Procedure to submit comments

The EC/Axon team invites comments on the materials that are part of this consultation from all stakeholders. The following rules should be respected by NRAs when submitting their comments:

- ▶ Stakeholders should focus their comments on the specific questions raised by the EC/Axon team in the Template for providing comments.
- ▶ Comments should be as precise and brief as possible, while making sure they are properly justified with supporting information and evidence.
- ▶ Any questions from operators should be addressed to their national regulatory authority (not to the EC or Axon).
- ▶ The EC/Axon team will endeavour to provide answers to critical questions received from NRAs via email before 31 January. Due to the vast number of stakeholders

involved, NRAs are expected to issue questions to the EC/Axon team only if critical to successfully carry out the review of the consultation materials.

- ▶ Each NRA will only be able to provide one filled-in template with comments. The document submitted will have to integrate the comments generated by the NRA itself and the comments collected by the NRA from its national operators.
- ▶ NRAs will have to review the comments submitted by their national operators and filter out repeated comments (e.g. comments with the same objective/meaning). In these cases, please indicate how many operators provided the same comment.
- ▶ Comments will have to be uploaded to the CIRCABC space⁴ and, more specifically, to the subfolder “**1st Public consultation 8 Jan - 23 Feb**” within your country’s main folder. For any issues regarding access to the CIRCABC platform, please get in touch with Lovre Dodig (lovre.dodig@ec.europa.eu) and Tarja Tuovila (tarja.tuovila@ec.europa.eu).
- ▶ **All comments will have to be submitted by NRAs to the EC/Axon team by 23 February.**

The EC/Axon reserves the possibility to dismiss the comments that do not comply with the indications provided above and/or that have been provided outside the template for the provision of comments.

2.4 Confidentiality of the information

The information included in the anonymised draft cost model shared with each NRA has been adjusted to account for potential confidentiality issues according to the indications provided by the NRAs in the data collection process, in particular:

- ▶ **Confidentiality Level 0 – Public Level:** This confidentiality level was associated with information available in the public domain that could be directly shared with or used in other NRAs’ models to fill any potential gaps. Consequently, the inputs that had been provided under this confidentiality level have not been adjusted in the anonymised model.
- ▶ **Confidentiality Level 1 – National Level:** This confidentiality level was associated with information that could not be disclosed to NRAs from other countries (unless it was anonymised or averaged with data from other NRAs). It could, however, be disclosed to national stakeholders in the consultation process. Therefore, the inputs

⁴ [Click to access to the CIRCABC space.](#)

that had been provided under this confidentiality level have not been adjusted in the anonymised model (as they can be shared nationally). We can also confirm that inputs with this confidentiality categorisation in one country have not been used to populate the model of another country.

- ▶ **Confidentiality Level 2 – Operator Level:** This confidentiality level was associated with information that could not be disclosed to any party involved in the process besides the NRA that provided it (unless it was anonymised or averaged with data from other operators/countries). The inputs classified under this confidentiality level have not been included as such in the anonymised model but have been adjusted (i.e. those values are not the true values).

The table below indicates how confidential data has been anonymised in each of the model’s input worksheets:

Worksheet	Input	Data treatment
1A MARKET SHARE	Market Share	This input is obtained from the number of MNOs per country, which is publicly available, and therefore, has not been anonymised in any country.
1B INP DEMAND	Demand	When actual demand information was reported as confidential, it has been adjusted by multiplying the actual data by a random factor between 0.7 and 1.3 (i.e. variations $\pm 30\%$).
		Regarding demand trends, in most cases an EEA average was considered to maximise consistency across NRAs’ models and, therefore, there was no need to anonymise the inputs considered. Nevertheless, when NRAs’ data was used and it was reported as confidential, trends have been anonymised with a random factor between ± 10 percentage points.
1C INP NW STATISTICS	Voice network statistics	Confidential information has been anonymised by multiplying the actual data by a random factor between 0.7 and 1.3 (i.e. variations of $\pm 30\%$).
	Data network statistics	Confidential information for the percentage of data traffic in the downlink has been anonymised by multiplying it by a random factor between 0.9 and 1.1 (i.e. variations of $\pm 10\%$). When this anonymization has resulted in a percentage of data traffic in the downlink above 95%, we have used a number below 95% to keep its reasonability.

Worksheet	Input	Data treatment
1D INP COVERAGE	Population coverage	Confidential information for the percentage of population covered has been anonymised by multiplying it by a random factor between 0.9 and 1.1 (i.e. variations of $\pm 10\%$). When this anonymization has resulted in a percentage of population covered above 100%, we have used a number below 100% to keep its reasonability.
1E INP SPECTRUM	Spectrum bandwidth	This input is defined specifically for the reference operator and therefore, is a result of a data treatment exercise performed by Axon using input data from all EEA operators as well as publicly available references. Consequently, this input is not subject to confidentiality issues and has not been anonymised.
1F INP UNITARY COSTS	All unit costs except those listed below	These inputs have been obtained as an EEA average (including always more than one reference). Therefore, they are not subject to confidentiality issues and have not been anonymised.
	Spectrum Unit cost	Confidential information has been anonymised by multiplying the actual data by a random factor between 0.7 and 1.3 (i.e. variations of $\pm 30\%$).
	Specific costs at country level (sites and Single RAN equipment costs when available)	Confidential information has been anonymised by multiplying the actual data by a random factor between 0.7 and 1.3 (i.e. variations of $\pm 30\%$).
1G INP COUNTRY ECO PAR	Cost adjustment factors	This information has been extracted from public sources and is not subject to confidentiality issues. Therefore, it has not been anonymised.
1H INP COST OVERHEADS	G&A expenses percentage over GBV	This input has been obtained as an EEA average (including more than one country) and is not subject to confidentiality issues. Therefore, it has not been anonymised.
1I INP TECHNOLOGY DIS	Technological disaggregation of traffic	When technological disaggregation has not been calculated as an EEA average and it was reported as confidential, it has been adjusted by multiplying the actual data by a random factor between 0.7 and 1.3 (i.e. variations of $\pm 30\%$).
	Disaggregation per type of data service (traditional vs M2M)	This information has been extracted from a public source and is not subject to confidentiality issues. Therefore, it has not been anonymised.

Worksheet	Input	Data treatment
1J INP ARPU	ARPU	This input has been obtained as an EEA average (including more than one country) and its trend has been referenced to the year 2022 (2022 = 10). Therefore, it is not subject to confidentiality issues and has not been anonymised.
2A INP NW	Network parameters	Network parameters are either based on publicly available data or on EEA averages (including more than one country). Therefore, they are not subject to confidentiality issues and have not been anonymised.
2B INP GEO	Geographical parameters except those listed below.	These parameters have been extracted from public sources (and processed through Axon's own analyses) and are not subject to confidentiality issues. Therefore, they have not been anonymised.
	Percentage of rooftop sites	Confidential information has been anonymised by multiplying the actual data by a random factor between 0.7 and 1.3 (i.e. variations of $\pm 30\%$)
	Traffic in busiest month (Defined only when seasonality is considered)	Confidential information has been anonymised by multiplying the actual data by a random factor between 0.9 and 1.1 (i.e. variations of $\pm 10\%$)
2C INP CELL RADIUS	Cell radii	This input has been obtained as an EEA average (including more than one country) and is not subject to confidentiality issues. Therefore, it has not been anonymised.
2D INP DIST POP RURAL	Distribution of population in rural geotypes	This data comes from an analysis carried out by Axon based on publicly available data. Therefore, it is not subject to confidentiality issues and has not been anonymised.
2E INP BUSY HOUR	Busy hour	Confidential information has been anonymised by multiplying the actual data by a random factor between 0.9 and 1.1 (i.e. variations of $\pm 10\%$).
2F INP BACKBONE & CORE	Core & Backbone Networks	This input is defined specifically for the reference operator and therefore, is a result of a data treatment exercise performed by Axon based on information provided by EEA operators. Consequently, this input is not subject to confidentiality issues and has not been anonymised.
2G INP RESOURCES LIFE	Useful life of all elements except spectrum licenses	These inputs have been obtained as an EEA average (including always more than one reference). Therefore, they are not subject to confidentiality issues and have not been anonymised.

Worksheet	Input	Data treatment
	Useful life of spectrum licenses	Confidential information has been anonymised by multiplying the actual data by a random factor between 0.7 and 1.3 (i.e. variations of $\pm 30\%$).
2H INP WACC	WACC	Confidential information has been anonymised by multiplying the actual data by a random factor between 0.7 and 1.3 (i.e. variations of $\pm 30\%$).
2I INP ERLANG	Erlang tables	The Erlang tables are publicly available and not subject to confidentiality issues. Therefore, they have not been anonymised.
2J INP SERVICE SPEC COSTS	Cost regressions	These inputs have been obtained as an EEA average (including always more than one reference). Therefore, they are not subject to confidentiality issues and have not been anonymised.
	Traffic related information	Confidential information has been anonymised by multiplying the actual data by a random factor between 0.7 and 1.3 (i.e. variations of $\pm 30\%$).

Table 2.1: Summary table of confidential information treatment [Source: Axon Consulting]

When an input has been anonymised and, therefore, does not represent the real value considered internally by the EC/Axon, it has been formatted as follows:

Anonymised This format is used for inputs that have been anonymised to protect confidentiality

Exhibit 2.1: Colour code employed for anonymised inputs [Source: Axon Consulting]

3 Questions for consultation

This section includes a summary of the questions included in this Consultation round. Please refer to “Annex 5 – Template for the provision of comments” (for a more detailed explanation on the feedback expected by stakeholders).

#	Question
1	Question 1: In your opinion, what domestic data demand forecast scenario (Base Case, Aggressive and Conservative) do you expect to better represent the traffic evolution in your country (please refer to sections 2.5 and 3.1.2. of the Methodological approach document for further details on these scenarios)? Please describe your preferred approach in detail and provide supporting information and references.
2	Question 2: Do you agree with the validation, treatment and definition of the model’s inputs (please refer to sections 3 - demand, market share, coverage, spectrum, unitary costs, etc. - of the Methodological approach document for further details)? Otherwise please describe in the spaces below your rationale in detail and provide supporting information and references.
3	Question 3: Do you agree with the modelling implementation adopted by Axon/EC team for the incorporation of the 5G technology within the model (please refer to section 4.1 of the Methodological approach document for further details)? Otherwise please describe your proposed approach in detail and provide supporting information and references.
4	Question 4: Do you agree with the modelling implementation adopted by Axon/EC team for the separation of the M2M services within the model (please refer to section 4.2 of the Methodological approach document for further details)? Otherwise please describe your proposed approach in detail and provide supporting information and references.
5	Question 5: Do you consider that the outputs produced by the model are reasonable for an operator with the scale of the reference operator in your country (please refer to section 5 of the Methodological approach document for further details)? Otherwise please describe in the spaces below your rationale in detail and provide supporting information and references.
6	Question 6: Do you agree with the EC’s preliminary estimates of voice and mobile data transit charges, namely 0.3-0.5 EURcent/min and 0.07-0.1 EUR/GB, respectively (please refer to section 7 of the Methodological approach document for further details)? Otherwise, please indicate your estimate(s) for transit charges and provide evidence supporting your estimate(s).

Table 3.1: Summary of public consultation questions [Source: Axon Consulting]