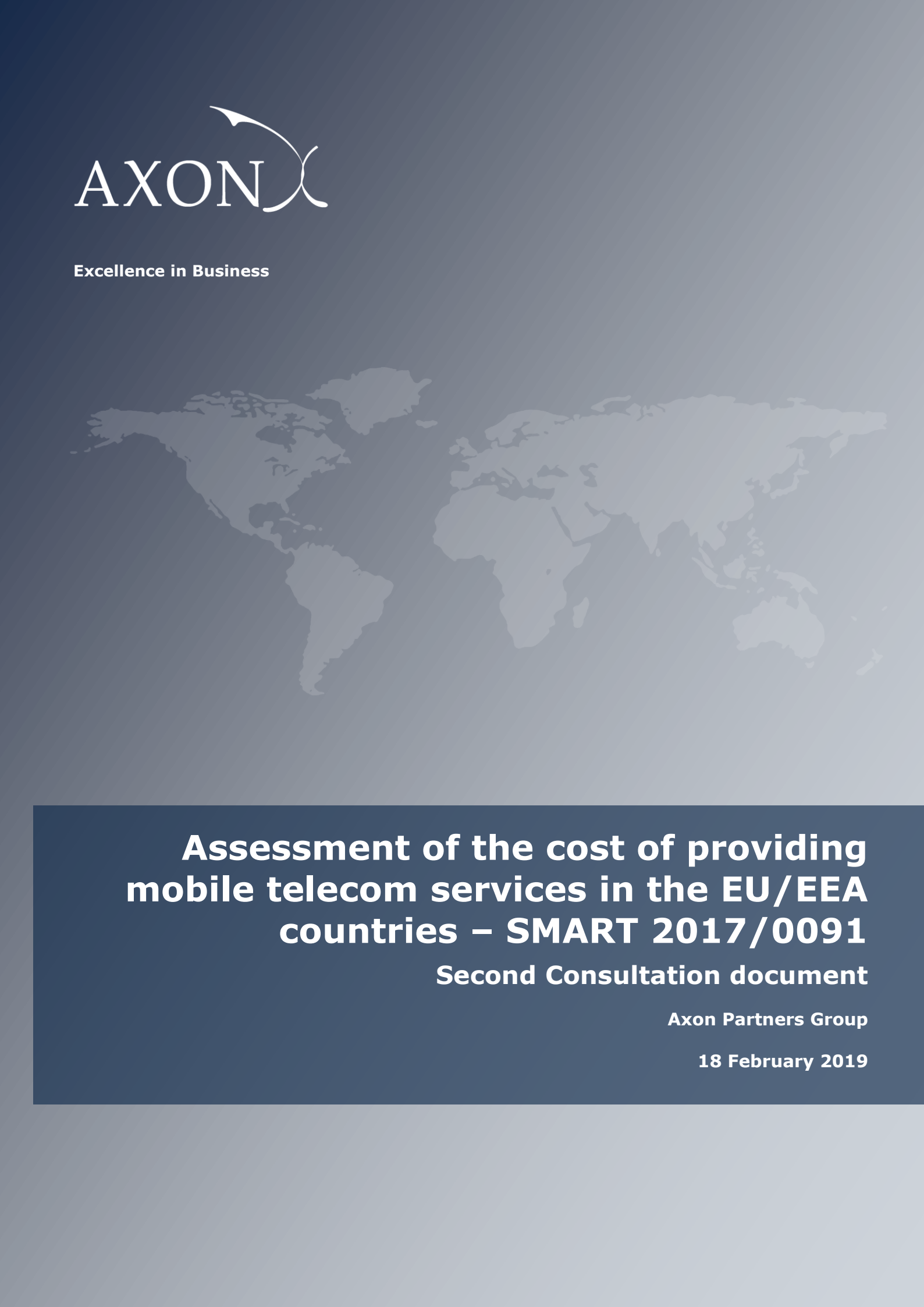

Assessment of the cost of providing mobile telecom services in the EU/EEA countries – SMART 2017/0091

Second Consultation document

Axon Partners Group

18 February 2019

Contents

1 Introduction

The European Commission (hereinafter "EC") commissioned Axon Partners Group Consulting S.L.U. (hereinafter "Axon Consulting" or "Axon") for the "*Assessment of the cost of providing wholesale roaming services in the EU/EEA countries – SMART 2017/0091"* ('the Project').

As described during Workshop 1 held on 10 April 2018 at the EC's headquarters, the EC deemed relevant to develop a new cost study to understand the costs of providing mobile services in EU/EEA countries. With such objective in mind, the EC/Axon team developed a Bottom-Up Long Run Incremental Cost (hereinafter 'BULRIC') model that calculates the costs of providing mobile services in the EU/EEA countries.

The first draft cost model developed by Axon was subject to a first consultation round of comments from stakeholders that ran from 29 October 2018 until 23 November 2019. The EC/Axon team is now inviting stakeholders to a second and final consultation process to gather stakeholders' views on the treatment given by the EC/Axon team to the feedback provided in the first consultation and to gather feedback on the methodology, inputs and outputs of this second draft model.

The outcomes of this model are expected to inform the EC's decision on both (i) the need to review the wholesale roaming price caps[1] and (ii) set a single maximum mobile termination Euro Rate across the EU[2]. **Stakeholders should not, in any case, expect any regulatory decision to be adopted solely based on the information produced by the cost model subject to this consultation**.

The objective of this document is to introduce stakeholders to the second 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 second consultation round to follow the indications presented in the remainder of this document.

[1] In the context of the RLAH regulation.

[2] As included in the European Electronic Communications Code (EECC). Link: https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:32018L1972.

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.
- Give stakeholders the opportunity to assess how the feedback they provided in the 1st consultation round has been taken into consideration in the updated version of the model.
- 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.

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 – Second Draft Cost Model (including a CONFIDENTIAL and NON-CONFIDENTIAL version to share externally):** Updated version of the cost model for mobile networks in Microsoft Excel format, including the treatment of the feedback provided by stakeholders in the first consultation round[3]. This document includes the calculations, inputs and outputs of the model developed by the EC/Axon team.

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

[3] Please note that the model includes a new 'CHANGE LOG' worksheet describing the main changes that have been implemented in the second draft model.

- Annex 1- Second draft cost model - Internal version: Microsoft Excel file '20190218 - Axon - Mobile Cost Model v36.5 **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 anonymisation of confidential data.

- Annex 1- Second draft cost model - Anonymised version: Microsoft Excel file '20190218 - Axon - Mobile Cost Model v36.5 **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[4].
  - Annex 2 – User manual of the model: PDF file '20190218 - Axon - User Manual'.
- **Annex 3 – Descriptive manual:** This technical document provides transparency on the way the model works and describes the main algorithms implemented[4].
  - Annex 3 – Descriptive manual: PDF file '20190218 - Axon - Descriptive Manual'.
- **Annex 4 – Methodological approach document:** This detailed document describes the methodology adopted to develop the model, the specific steps followed in the definition of the inputs used and the main outputs obtained[4]. This document includes all the consultation questions.
  - Annex 4 – Methodological approach document: PDF file '20190218 - 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 in Annex 4.
  - Annex 5 – Template for the provision of comments: Excel file '20190218 - Template for providing comments to the EC's cost model'.

[4] Please note that a mark-up version has been also shared to ease the identification of changes in comparison with the documents shared during the first consultation process.

- **Annex 6 – Summary presentation**: This presentation includes the outcomes of the 1st consultation round and an overview of the 2nd draft model.
    - Annex 6 – Summary presentation: PDF file '20190218 - Axon - Outcomes of the 1st consultation round and overview of 2nd draft model'

The EC has set up a dedicated space for this project on its CIRCABC platform named "Wholesale roaming cost study_2019". Only selected delegates from NRAs can access this platform. The materials for this consultation have been shared in the following folders in the aforementioned space:

- The general (non-confidential) documents accompanying the cost model, namely, the (i) Main Consultation Document; (ii) Annex 2 – User Manual; (iii) Annex 3 – Descriptive Manual; (iv) Annex 4 – Methodological approach document; (v) Annex 5 – Template for the provision of comments; and (vi) Annex 6 – Summary presentation can be found in the folder named "General" in sub-folder "Consultation 2 – 18 Feb-15 Mar".
- The documents relating to the national cost model, namely, "Annex 1 – Second Draft Cost Model (including a CONFIDENTIAL and NON-CONFIDENTIAL version to share externally)", can be found in the NRA's country folder, in sub-folder "4. Replies to 2nd Consult_18Feb – 15Mar 2019". For confidentiality reasons, only two colleagues from each NRA have been granted access to the country folder in CIRCABC containing the data relating to its own country (see section 2.4 for further indications on the treatment of confidentiality).

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 the first consultation round, 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 "Consultation 2-18 Feb-15 Mar") in CIRCABC.** This includes the following files:

  1. Main Consultation Document (this document)
  2. Annex 2 – User manual of the model: PDF file '20190218 - Axon - User Manual'[5]
  3. Annex 3 – Descriptive manual: PDF file '20190218 - Axon - Descriptive Manual'[5]
  4. Annex 4 – Methodological approach document: PDF file '20190218 - Axon - Methodological approach document'[5]
  5. Annex 5 – Template for the provision of comments: Excel file '20190218 - Template for providing comments to the EC's cost model'
  6. Annex 6 – Summary presentation: PDF file '20190218 - Axon - Outcomes of the 1st consultation round and overview of 2nd draft 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 "4. Replies to 2nd Consult_18Feb – 15Mar 2019".** The name of the relevant file should be:

  Annex 1- Draft cost model - Anonymised version: Microsoft Excel file '20190218 - Axon - Mobile Cost Model v36.5 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 of 15 March.

- **Analyse the consultation files and provide comments to these in the template provided together with the consultation materials in the folder "General".** 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 "4.**

[5] Please note that a mark-up version has also been shared to ease the identification of changes in comparison with the documents shared during the first consultation process.

Replies to 2nd Consult_18Feb-15Mar 2019") in the CIRCABC space before the deadline of 23 November (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 before 1 March from NRAs via email. 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.
- While all comments received will be assessed and studied by the EC/Axon team, the new comments and answers section to be produced after the 2nd consultation round will focus only on comments that are i) significant for the results of the model and ii) have been thoroughly justified. In addition, copy/paste comments from members of the same operator group will be treated as a single response.

- Comments will have to be uploaded to the CIRCABC space[6] and, more specifically, to the subfolder "4. Replies to 2nd Consult_18Feb – 15Mar 2019" within your country's main folder. For any issues regarding access to the CIRCABC platform, please get in touch with JARVI-KOUKONEN Anne (CNECT): Anne.Jarvi-Koukonen@ec.europa.eu and TUOVILA Tarja (CNECT): Tarja.Tuovila@ec.europa.eu.
- **All comments will have to be submitted by NRAs to the EC/Axon team by 15 March.**

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 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

[6] Click to access to the CIRCABC space.

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 ±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 ±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 ±10%). When this anonymisation has resulted in a percentage of data traffic in the downlink above 95%, we have used a number below 95% to keep its reasonability.
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 ±10%). When this anonymisation 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.

Worksheet	Input	Data treatment
1F INP UNITARY COSTS	All unit costs except access and spectrum unit costs	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 and access 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 ±30%).
1G INP COST ADJ FACTORS	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 and 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 ±30%).
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 2015 (2015 = 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 and traffic percentages in the busy month.	Confidential information has been anonymised by multiplying the actual data by a random factor between 0.7 and 1.3 (i.e. variations of ±30%)
2C INP CELL RADIUS	Cell radii	Confidential information has been anonymised by multiplying the actual data by a random factor between 0.7 and 1.3 (i.e. variations of ±30%).
2D INP DIST POP GEOT	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.

Worksheet	Input	Data treatment
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 ±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.
	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 ±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 ±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 ±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:

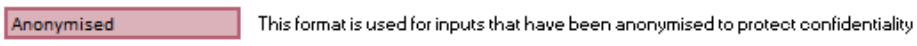

Exhibit 2.1: Colour code employed for anonymised inputs [Source: Axon Consulting]

3 Questions for consultation

This section includes a summary of the questions included in this Consultation round. Please refer to "Annex 4 – Methodological approach document" (for a more detailed explanation of all the questions included below) and "Annex 5 – Template for the provision of comments" (for a more detailed explanation on the feedback expected by stakeholders).

#	Question
1	In your opinion, what scenario should be adopted to forecast the traffic split per technology? Please describe your preferred approach in detail and provide supporting information and references.
2	In your opinion, what option should be used in defining the increments considered in the model? Please, describe your preferred approach in detail together with its rationale, as well as provide supporting information and references.
3	Do you agree that cell radii values in EU/EEA countries should be broadly consistent? If not, please describe in detail the factors that you believe could explain the large discrepancies observed in the figures collected from the different Member States.
4	In your opinion, what cell radii scenario should be adopted? Please justify your preferred approach in detail and provide supporting information and references for the preferred cell radii levels as well as the reconciliation in number of sites with real MNOs.
5	Do you consider appropriate to maintain as our base case scenario a 50% threshold to identify municipalities as seasonal (as described above), in line with the approach adopted in the first consultation? If you don't, please justify your position and provide supporting information and references.
6	In your opinion, what domestic data demand forecast scenario do you expect to better represent the traffic evolution in your country? Please, describe your preferred approach in detail and provide supporting information and references.
7	Do you agree with the validation, treatment and definition of the unit cost inputs defined for access sites and Single RAN equipment? Otherwise please describe your rationale in detail and provide supporting information and references.
8	Do you agree with the validation, treatment and definition of the traffic distribution per technology inputs defined for the "Country specific projections" scenario? Otherwise please describe your rationale in detail and provide supporting information and references.

#	Question
9	Do you agree with the validation, treatment and definition of the cell radii inputs under both scenarios defined? If you don't, please justify your position and provide supporting information and references.
10	Do you agree with the validation, treatment and definition of the useful lives for spectrum elements? If you don't, please justify your position and provide supporting information and references.
11	Do you agree that parameters and scenarios that lead to a mis-reconciliation of the number of assets and/or cost base are not representative and should not be taken into account? If you don't, please justify your position and provide supporting information and references.
12	Do you agree with the approach adopted to assess the reconciliation of the number of sites? If you don't, please justify your position and provide supporting information and references.
13	Do you agree that the number of access sites calculated for the reference operator is reasonable for the operations in your country? If you don't, please justify your position and provide supporting information and references.
14	Do you agree with the approach adopted to assess the reconciliation of the cost base? If you don't, please justify your position and provide supporting information and references.
15	Do you consider that the annual cost base produced for the reference operator is reasonable for the operations in your country? If you don't, please justify your position and provide supporting information and references.
16	Do you consider that the unit costs obtained for the roaming-in data service (within the EU/EEA) are reasonable for an operator with the scale of the reference operator in your country? If you don't, please justify your position and provide supporting information and references.
17	Do you consider that the unit costs obtained for the voice termination service are reasonable for an operator with the scale of the reference operator in your country? If you don't, please justify your position and provide supporting information and references.
18	Do you consider that the unit costs obtained for the roaming-in voice service (within the EU/EEA) are reasonable for an operator with the scale of the reference operator in your country? If you don't, please justify your position and provide supporting information and references.

#	Question
19	Do you agree with the EC's preliminary estimates of voice and mobile data transit charges, namely 0.4-0.6 EUR cents/min and 0.1-0.2 EUR/GB, respectively? 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]

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