# Data request for fixed operators – PART II – Quantitative questions

*25 September 2017*

To be used in conjunction with the accompanying Excel workbook

**Ref: [2010987-365]**

# Contents

# 1 Introduction

## 1.1 Purpose of this document

This document describes the quantitative data requested from the fixed operators in Portugal in the context of the update of the BULRIC model for fixed termination, previously developed and updated by Analysys Mason on behalf of ANACOM. The previous model was published in 2014 with data up to 2012.

The data collected during this phase will be used to populate, calibrate and reconcile the model to take into account national specificities and real-life constraints where appropriate, in keeping with ANACOM's modelling principles.

## 1.2 Process and timeline

The data requested should be provided in the timeframe indicated by ANACOM. Relevant data can be sent continuously during this period – this means that the operator does not have to wait until all data is available.

All data, information and queries on the data request must be addressed to Analysys Mason at the following addresses:

Figure 1: Analysys Mason's contacts

|  | Contact 1 | Contact 2 |
|---|---|---|
| Name | Gilles Monniaux | Pedro Braz Caria |
| Email | gilles.monniaux@analysysmason.com | pedro.braz.caria@analysysmason.com |
| phone | +44 7795 262 731 | +34 670 637 653 |

|  | Contact 3 |
|---|---|
| Name | Joan Obradors |
| Email | joan.obradors@analysysmason.com |
| phone | +34 610 734 386 |

ANACOM would expect to circulate responses to clarifications to the other operators, where this would improve the accuracy of data collection. Industry parties should therefore indicate if a query regarding the data request contains confidential information which should be removed from a circulated response.

### 1.3    Historical, current and forecast data

If possible, please provide data that relates to the calendar year 2017 (even if 2017 data is an estimate), indicating if year average rather than year-end data is provided. Please indicate the currency of any cost information provided (EUR or other). If possible, please provide cost data in nominal terms (i.e. money of that day) rather than transformed into any particular year real terms (e.g. 2017 real). Where data is requested 'over time' or 'in each year', please provide data for 2012–2017, unless specified otherwise.

If forecasts for parameters or costs are readily available, please provide these for any forecast years that are available, noting the source of the forecast (e.g. budget, long-range plan).

Please bear in mind that this process is an update of the already existing model. Hence, it is important to carefully highlight any change or modification on both existing and forecast data that took place from 2013 up to date.

### 1.4    Granularity of information

We recognise that historical data is unlikely to be available to the same level of detail as recent data – in this case, please provide historical totals, or aggregate figures. Please indicate if any particular data points are estimates as opposed to known parameters, and explain briefly the basis on which the estimate was derived.

### 1.5    Treatment of confidential information

Data provided will be of importance for the set-up of the model, to ensure that our bottom-up calculations are generating reasonable asset volumes and costs. However, there may be certain data-points that could be used in the actual model itself *as inputs*. We recognise that the model must take into account confidentiality considerations in this respect.

The objective of the model is to be transparent and shareable for all industry parties. We expect that some data (more likely to be for calibration) will not be released in public models. However certain data-points, which could be beneficial to the model, could be processed to remove commercial sensitivities, through the following approaches:

- aggregating the data across either groups of areas or the whole of the country
- using averaged input values (taking into account values from multiple operators).

In order to further ensure the confidential treatment of the data received a Non-Disclosure Agreement (hereafter "NDA") has been signed by Analysys Mason Limited.

### 1.6    Auditability

Operators should keep records of intermediate working used to provide the data, and a record of officers responsible for each block of data, in order to allow follow-up and validation by ANACOM.

## 1.7   Structure of this document

The remainder of this document is structured as follows:

- Section 2 sets out questions related to coverage and demand
- Section 3 sets out questions related to network data
- Section 4 sets out questions related to cost data.

Each section contains questions requesting both qualitative and quantitative information.

Qualitative questions are typically open questions. They deal with points that may be country-specific or operator-specific, or technical matters on which a better understanding is sought. Please provide quantitative data in the provided Microsoft Excel format whenever possible.

# 2 Coverage and demand data

## 2.1 Coverage data

We need to gain an updated understanding of the assets currently in the network and their modern equivalents where possible.

Q01 Can you give an update of the extent of your network footprint, in terms of the regions served, or in terms of regions not served since 2013? Please distinguish between technologies deployed, if possible. For example, can you provide a (digital) map showing those areas in which your deployments are present?

## 2.2 Demand data

In order to update the dimension of a fixed network appropriately in the BULRIC model, Analysys Mason will need to have an understanding of the current demands being made on fixed networks in Portugal. This is with respect to two aspects:

- service (line / traffic) volumes
- network loading parameters.

Analysys Mason would like to have an updated understanding of the usage of your network. This will assist the derivation of appropriate forecasts for usage and take-up in the period required by the BULRIC model. We shall utilise ANACOM's latest market information wherever possible. Please provide information for as many years as are available in the period 2012–2017.

*Subscriptions and volumes*

Please provide the following data regarding access lines at a national level.

Q02 Active end-user access lines, including PSTN, ISDN, FWA fibre and cable:

      a. retail end-user lines
      b. wholesale line rental lines
      c. wholesale unbundled lines
      d. data-only lines, excluding leased line tails
      e. leased-line tails
      f. TV services, both linear/IPTV and VoD
      g. OTT services.

Q03 If available, please supply forecasts of active lines (by type) for the period 2018–2020.

Q04 Please provide the following data:

*Figure 2.1: Voice services currently provided in Portugal [Source: Analysys Mason]*

| Services | Unit |
|---|---|
| Local on-net calls (retail) | Calls and minutes |
| National on-net calls (retail) | Calls and minutes |
| Non-geographic on-net calls (retail) | Calls and minutes |
| Outgoing calls to mobile (retail) | Calls and minutes |
| Outgoing calls to other fixed operators (retail) | Calls and minutes |
| Outgoing calls to international numbers (retail) | Calls and minutes |
| Incoming calls to non-geographic numbers | Calls and minutes |
| Local incoming calls (wholesale) | Calls and minutes |
| Simple tandem incoming calls (wholesale) | Calls and minutes |
| Double tandem incoming calls (wholesale) | Calls and minutes |
| International incoming calls (wholesale) | Calls and minutes |
| Local outgoing calls (wholesale) | Calls and minutes |
| Simple tandem outgoing calls (wholesale) | Calls and minutes |
| Double tandem outgoing calls (wholesale) | Calls and minutes |
| Local outgoing calls to non-geographic numbers (wholesale) | Calls and minutes |
| Simple tandem outgoing calls to non-geographic numbers (wholesale) | Calls and minutes |
| Double tandem outgoing calls to non-geographic numbers (wholesale) | Calls and minutes |
| Local transit calls (wholesale) | Calls and minutes |
| Simple transit calls (wholesale) | Calls and minutes |
| Double transit calls (wholesale) | Calls and minutes |
| National to International or International to National transit calls (wholesale) | Calls and minutes |
| International transit calls (wholesale) | Calls and minutes |
| Local on-net calls (retail) | Calls and minutes |
| National on-net calls (retail) | Calls and minutes |
| Non-geographic on-net calls (retail) | Calls and minutes |
| Outgoing calls to mobile (retail) | Calls and minutes |
| Outgoing calls to other fixed operators (retail) | Calls and minutes |
|  |  |
|  |  |

Q05 VoIP volumes, in minutes and number of calls, which are converted to circuit-switched minutes in your network (split by incoming from other carriers, outgoing to other carriers, and on-net traffic). Please explain at what point in the network VoIP traffic is converted to circuit-switched traffic. Please confirm if this VoIP traffic is a subset or is additional to that identified in Figure 2.1.

Q06 VoIP volumes, in minutes and number of calls, which are carried through your network as IP (split by incoming from other carriers, outgoing to other carriers, and on-net traffic). Please explain at what point in the network VoIP traffic is interconnected to other carriers. Please confirm if this VoIP traffic is a subset or is additional to that identified in Figure 2.1.

Q07 Total data connections, split by:

    a. retail vs. resale/wholesale

    b. technology and access medium: xDSL, fibre, cable (eventually split between DOCSIS3.0 accesses and legacy accesses), etc.

    c. point-to-point links between business sites vs. Internet service lines (for leased lines).

Q08 Peak end-user data traffic in Mbit/s. If possible, please provide destination splits for throughput (or volume) to the following end points:

    a. other carriers (due to bitstream wholesale arrangement)

    b. other carriers (due to retail generated traffic)

    c. on-net (due to bitstream wholesale arrangement)

    d. on-net (due to retail generated traffic).

Please provide also the average nominal download and upload speed per connection type (e.g. xDSL, cable, fibre, leased lines) as well as the relative contention ratios.

Q09 Transmission services going through the core, in number of circuits and total Mbit/s requirements, split by:

    a. data backhaul (e.g. for xDSL used by unbundlers to backhaul traffic from exchanges to their core network)

    b. leased-line services provisioned for retail customers

    c. leased-line services provisioned for other operators

    d. leased-line services provisioned for internal use

    e. other transmission services, including ATM, FR, Ethernet PTP (L2), IP-VPN (L3) VPN, connections to cable networks and mobile networks, etc.

Q10 If available, please supply any forecasts of voice minutes and data traffic over the period 2018–2020.

*Network loading data*

Loading parameters can be specific to a country or between individual networks, and Analysys Mason believes that it is important for you to provide updated indications of what values are appropriate for the Portuguese market by providing the following data:

Q11 Hour-by-hour percentage distribution of network busy-hour Erlangs (BHE) for an average weekday

Q12 Proportion of total annual traffic which occurs during weekdays compared to weekends.

Q13 What is your average number of call attempts per successful call?

Q14 What is the average capacity per broadband connection that is provisioned for backhaul purposes? In the case of cable networks, please distinguish the backhaul capacity provisioned for the multiplexers used within each layer of the hierarchy.

Q15 TV services (linear TV and VoD) and OTT (Over-the-Top) services:

    a.   Please provide the number of channels broadcast using IPTV or cable technologies, broken down by the resolution of the channels:

        i.   SD (standard definition)
       ii.   HD (high definition).

    b.   What is the percentage of OTT and VoD concurrent subscribers over the total number of OTT and VoD subscribers?

# 3 Network data

The LRIC model of fixed core networks currently dimensions a modern forward-looking fixed core network applicable to Portugal. As part of the update, Analysys Mason intends to determine any recent network developments that may be relevant. The table below indicates the assets that are currently of greatest importance in the LRIC model's network design.

*Figure 3.1: List of assets in the LRIC model [Source: Analysys Mason]*

| Asset name | Asset type (for traffic routeing) |
|---|---|
| Access nodes: Site acquisition, preparation and maintenance | Access |
| Access: DSLAM rack/processor | Access |
| Access: DSLAM core-facing ports - 1GE ports | Access |
| Access: DSLAM core-facing ports - 10GE ports | Access |
| Access: OLT rack/processor | Access |
| Access: OLT core-facing ports - 1GE ports | Access |
| Access: OLT core-facing ports - 10GE ports | Access |
| Aggregation L1: Site acquisition, preparation and maintenance | Access |
| Aggregation L1: Switch - chassis | L1 Aggregation switching |
| Aggregation L1: Switch - 1GE ports card 48 port | L1 Aggregation switching |
| Aggregation L1: Switch - 10GE ports card 12 port | L1 Aggregation switching |
| Aggregation L2: Site acquisition, preparation and maintenance | Access SBC |
| Aggregation L2: Switch - chassis | Access SBC |
| Aggregation L2: Switch - 1GE ports card 48 port | Access SBC |
| Aggregation L2: Switch - 10GE ports card 12 port | Access SBC |
| Aggregation L2: Edge router - chassis | L1 Aggregation switching |
| Aggregation L2: Edge router - 1GE ports card 20 port | L1 Aggregation switching |
| Aggregation L2: Edge router - 10GE ports card 2 port | L1 Aggregation switching |
| Aggregation L2: SBC - chassis | Access SBC |
| Aggregation L2: SBC - 1GE ports card 2 port | L1 Aggregation switching |
| Core: Site acquisition, preparation and maintenance | |
| Core: core router - chassis | |
| Core: core router - 10GE ports card 4 port | |
| Core: SBC (Interconnection) - chassis | |
| Core: SBC (Interconnection) - 1GE ports card 2 port | |
| Core: Interconnect trunk gateways | |
| Core: Interconnect trunk gateway E1 ports | |
| Core: Core switch - chassis | |
| Core: Core switch - 1GE ports card 48 port | |
| Core: Core switch - 10GE ports card 12 port | |
| Core: Call server/soft-switch | |
| Core: DNS | |
| Core: RADIUS | |
| Core: BRAS | |
| Core: HSS | |
| Access transmission - fibre cables (km) | Access |
| Access transmission - buried duct (km) | Access |
| Access transmission - aerial duct (km) | Access |
| Access transmission - submarine fibre cables (km) | Access |
| Access transmission - leased dark fibre | Access |

| | |
|---|---|
| Access transmission - Ethernet leased lines | Access |
| Access transmission - OADMs | Access |
| Access transmission - Agg TERMs | Access |
| Access transmission - 1GE Transponders | Access |
| Access transmission - 10GE Transponders | Access |
| Access transmission - DWDM amplifiers | Access |
| Access transmission - STM-4 | Access |
| Access transmission - STM-16 | Access |
| Access transmission - STM-64 | Access |
| Access transmission - SDH regenerators | Access |
| Aggregation L1 transmission - fibre cables (km) | Access |
| Aggregation L1 transmission - buried duct (km) | Access |
| Aggregation L1 transmission - aerial duct (km) | Access |
| Aggregation L1 transmission - submarine fibre cables (km) | Access |
| Aggregation L1 transmission - leased dark fibre | Access |
| Aggregation L1 transmission - Ethernet leased lines | Access |
| Aggregation L1 transmission - OADMs | Access |
| Aggregation L1 transmission - Agg TERMs | Access |
| Aggregation L1 transmission - 1GE Transponders | Access |
| Aggregation L1 transmission - 10GE Transponders | Access |
| Aggregation L1 transmission - DWDM amplifiers | Access |
| Aggregation L2 transmission - fibre cables (km) | L1 Aggregation switching |
| Aggregation L2 transmission - buried duct (km) | L1 Aggregation switching |
| Aggregation L2 transmission - aerial duct (km) | L1 Aggregation switching |
| Aggregation L2 transmission - submarine fibre cables (km) | L1 Aggregation switching |
| Aggregation L2 transmission - leased dark fibre | L1 Aggregation switching |
| Aggregation L2 transmission - Ethernet leased lines | L1 Aggregation switching |
| Aggregation L2 transmission - OADMs | L1 Aggregation switching |
| Aggregation L2 transmission - Agg TERMs | L1 Aggregation switching |
| Aggregation L2 transmission - 1GE Transponders | L1 Aggregation switching |
| Aggregation L2 transmission - 10GE Transponders | L1 Aggregation switching |
| Aggregation L2 transmission - DWDM amplifiers | L1 Aggregation switching |
| Core transmission - fibre cables (km) | |
| Core transmission - buried duct (km) | |
| Core transmission - aerial duct (km) | |
| Core transmission - submarine fibre cables (km) | |
| Core transmission - leased dark fibre | |
| Core transmission - Ethernet leased lines | |
| Core transmission - OADMs/TERMs | |
| Core transmission - 10GE Transponders | |
| Core transmission - DWDM signal amplifier | |
| Core: VMS | |
| Core: IN platform | |
| Core: Wholesale billing system | |
| Core: Clock and synchronisation equipment | |
| Core: Network management system | |
| Linear TV platform | |
| VoD platform | |
| Interconnection team | Interconnection establishment |

The following network design information is requested. It falls into four categories:

- asset information
- network dimensioning rules
- upcoming deployments
- equipment lifetimes.

## 3.1 Asset information

Q16 For the core assets shown above in Figure 3.1, please state the number of those active in your network for each of the years 2013-2017.

## 3.2 Network dimensioning rules

This section is covered by questions Q01 to Q08 in the qualitative fixed data request that has been separately sent by ANACOM. Operators should ensure that any response in this data request is consistent with the information provided in response to the qualitative fixed data request.

## 3.3 Upcoming deployments

This section is covered by question Q09 in the qualitative fixed data request that has been separately sent by ANACOM. Operators should ensure that any response in this data request is consistent with the information provided in response to the qualitative fixed data request.

## 3.4 Equipment lifetimes

Q17 Can you identify the lifetimes associated with each of the assets identified in Figure 3.1? Please provide the average physical lifetimes. Where reasonable estimates of physical lifetimes are not available, accounting lifetimes may be of use as a proxy for the model.

# 4 Cost data

## 4.1 Bottom-up equipment unit costs

For the bottom-up model we request cost information on a per unit basis (i.e. per unit of network equipment). Unit costs may cover all direct and indirect costs associated with the deployment and operation of each network element, including:

- Direct costs:
    – switching site acquisition
    – electronics or equipment
    – physical works (cabinets, housing, racking, ducts)
    – ancillary services (power supply, rectifiers, air conditioning units, security alarms)
    – purchase or rental of land and buildings
    – construction costs, including capitalised or non-capitalised labour costs
    –– operating costs (such as rental, power).

- Indirect costs:
    – staffing costs (network planners, network engineers, network maintenance staff, network operations staff)
    – maintenance costs (including ongoing hardware replacement costs)
    – other indirect costs such as tools, vehicles, intangible costs (such as other capitalised costs, licence fees, deposits, warranties or guarantees).

We would expect that it will be possible to source direct costs from vendor price lists. Indirect unit costs may be available from budgetary models, or alternatively can be supplied in aggregate in the following section as top-down data. We recognise the availability of such detailed data may depend upon the existence of an activity-based costing (ABC) approach – please outline any assumptions used when generating cost numbers. Alternatively, estimates from other cost accounting systems can be used.

For each of the assets identified in Figure 3.1 that you own, please provide the following cost data in a table. If data at this granularity is not available, then please provide data at as granular a level as is available. Please provide data for as many years in the period 2012–2017 as are available:

Q18 Direct unit capital costs

   a. identify where these costs vary significantly (e.g. by geography / terrain).
   b. provide the cost trend over time.

Q19 Deployment costs:

      a.   identify any costs that are capitalised

      b.   identify where these costs vary significantly (e.g. by geography / terrain)

      c.   provide the cost trend over time.

Q20 Direct operating and maintenance costs:

      a.   identify where these costs vary significantly (e.g. by geography / terrain)

      b.   provide the cost trend over time.

Q21 Vendor support costs:

      a.   identify if these costs are capitalised

      b.   provide the cost trend over time.

Q22 Indirect network-related capital costs for these assets (e.g. tools, vehicles etc.) and cost trend over time.

Q23 Indirect network-related operational costs for these assets (e.g. tools, vehicles etc.) and cost trend over time.

Q24 Costs for any other significant activities.

Q25 Scrap value of any major assets, at risk of obsolescence or retirement.

Q26 Decommissioning costs of any major assets, at risk of obsolescence or retirement.

Q27 Can you describe the methodology of any operational cost items that are capitalised in the above question (e.g. capitalisation of labour costs)?

Q28 Can you provide information on your network-related business overheads?

Q29 Can you identify your intangible costs (e.g. licence fees, deposits, warranties or guarantees)?

Q30 Amount of working capital in each year (year average or year-end).

Where data is provided for individual network elements (e.g. street cabinets, local switches, media gateways etc.) please supply:

Q31 Capacity of the network element associated with the bottom-up cost (particularly where different capacity elements have been available, such as street cabinets).

Q32 Magnitude of any price discounts applied to the list prices.

Q33 Any annual price deflators built into the price list.

## 4.2 Top-down expenditure data

The following top-down investment and operating expenditure data is requested in order to establish that the BULRIC models are generating appropriate levels of costs.

Top-down data from management accounts is usually presented in some form of cost categorisation. The exact categorisation of costs varies from company to company. In the following table we provide the model cost categorisation, although we would welcome suggestions for an alternative categorisation if it is easier to provide data in such a form.

For the appropriate categorisation below please separate, where possible, costs related to next-generation network (NGN) deployments. Please provide:

Q34 Operating expenditures for as many of the years 2012–2017 as are available.

Q35 Gross book value (GBV) for the calendar year 2017.

Q36 Net book value (GBV) for the calendar year 2017.

Q37 Gross replacement costs (GRC) for the calendar year 2017.

*Figure 4.1: Categories for network related to the core [Source: Analysys Mason]*

| Category of costs | Category of costs |
|---|---|
| Site acquisition, preparation and maintenance | Trench and fibre cables |
| DSLAM-OLT | VMS |
| Access switches | IN and VAS |
| Aggregation switches | Network Management Centre |
| Core switches | Wholesale billing system |
| Access transmission | TV Platforms |
| Aggregation transmission | Other service platforms |
| Core transmission | Interconnection |
| Access SBC | Overheads |
| Edge router | |
| SBC Interconnection | |
| Core router | |