Bottom Up Modelling of Wholesale Call Termination costs of a notional MNO in Italy

Data Request

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1 INTRODUCTION AND PURPOSE OF THIS DATA REQUEST

1.1 Europe Economics is currently assisting AGCOM in producing a Bottom Up LRAIC model in order to be able to analyse wholesale call termination costs of a notional MNO in Italy, in accordance with the new EC recommendations.[1]

1.2 In order to facilitate this work, Europe Economics would very much appreciate the assistance of the mobile network operators in providing us with certain data.

1.3 The purpose of this data request is to describe the data requirements as we currently understand them. You are requested by AGCOM to provide responses to this data request by **16th July 2009. Given the tight timeframe for the whole project, responses received later than this deadline will not be considered.** We will then analyse those responses and this will then enable us to prepare as necessary a second data request to be used for clarification purposes. We expect to be in a position to issue the clarification data request around the end of July.

1.4 We have attached to this data request an Excel spreadsheet "Data Request Tables" containing various tables we would like completed in addition to the textual questions contained within this document. Each worksheet within that spreadsheet is specifically referred to at the appropriate place within this data request. Certain areas within the worksheets contain rows to allow you to provide two or three examples of certain items. If you feel that additional examples would aid our understanding, then please do provide them.

1.5 In each section we have included a request for any additional information you believe is relevant. Please note however that, in order that we are not overwhelmed by huge amounts of extra information, such information should be concise and ideally in English. We will prioritise consideration to information which is clear and concise.

1.6 All information provided by you in response to this data request will be shared with Agcom.

1.7

[1] http://209.85.129.132/search?q=cache:FgWfpnYWF74J:ec.europa.eu/information_society/policy/ecomm/doc/implementation_enforcement/article_7/recom_term_rates_en.pdf+COMMISSION+RECOMMENDATION+of+7.5.2009+on+the+Regulatory+Treatment+of+Fixed+and+Mobile+Termination+Rates+in+the+EU&cd=1&hl=en&ct=clnk&gl=uk

2 DEMAND

2.1 For subscriber demand, we propose to identify separately residential and business customers and to subdivide each into:

- Post-pay customers
- Pre-pay customers

2.2 For voice subscriptions, we require the number of 2G only handsets to be separately identified from those capable of both 2G and 3G use.

2.3 We propose to address three basic types of usage demand – voice telephony, messaging (both textual sms and multimedia), and data (essentially broadband/Internet usage).

For voice telephony, we subdivide this into:

- Fully on-net calls (Mobile to mobile, without leaving the network)
- Call origination (On-net to off-net calls, these could be Mobile to Another Mobile, or Mobile to fixed/international/VAS)
- Wholesale call termination (Off-net to on-net calls, from wherever the call originates)

With regard to call origination we propose to assume near-end handover (that is, the call leaves the MNO at the earliest opportunity) for calls to other mobile networks. With regard to fully on-net calls, call origination to non-mobile networks, and wholesale call termination assumptions will need to be made on the average call routes taken by such calls once they have been passed over to the MNO. However, for all calls, and indeed other network services, the Excel sheet requests call routing information.

For messaging (covering SMS, MMS and other associated media services) we will similarly also subdivide it:

- Fully on-net messages
- Message origination (On-net to off-net messages)
- Wholesale message termination (Off-net to on-net messages)

For data usage we will subdivide it into:

- GPRS data usage
- HSDPA data usage

We would like actual data for at least years 2007 and 2008 (though preferably for years 2004, 2005, and 2006 as well) together with forecast data (either expressed as percentage increase/decrease or as actual numbers) for years 2009 through to 2013.

In the event that a network is providing MVNO services, then the traffic attributable to these providers should be included but segregated from own-network traffic where possible. Likewise, traffic attributable to the provision of national roaming services should be included but again segregated where possible.

Question – Excel table

2.4 Please fill in the table shown in worksheet "Demand" in the enclosed spreadsheet file.

2.5 Please be careful with the units of measurement. If you find that you really need to change the units specified then do so clearly.

2.6 Given that different products such as voice, messaging and data services use the network, we would like to have your views on the conversion factors that can be used to produce equivalent usage metrics.

2.7 Please fill in the table shown in worksheet "Routing Factors" in the enclosed spreadsheet file.

Question – Other

2.8 Please provide us with any additional information and/or data which you think is relevant to assess both historic and future levels of demand.

3 RADIO ACCESS NETWORK

3.1 In this section we are concerned about the amount of spectrum available to you (historically, current, and agreed future) and also about your deployment of base stations.

Question – Coverage

3.2 The new EC recommendation makes specific mention of the intention that costs associated with providing "coverage" (the ability to make/receive the first call anywhere in the coverage area) should not be allocated to wholesale call termination. For this reason, the model needs to be able to specify the equipment and network infrastructure associated with providing this coverage.

3.3 Could you please provide us with an assessment made by your own engineers as to what type of network you would require to fulfil the coverage obligation alone.

3.4 Please provide the above analysis separately for a 2G (presumably 900 MHz) network and for a 3G (based on currently available frequency bands) network.

Question – Traffic Related Costs

3.5 Could you please provide us with a few worked examples of how your engineers typically cope with increasing demand in a given area? For example, what is the minimum usable configuration for a BTS/NodeB and how (and in what steps) can that be expanded to cope with increased traffic levels? This would also need to cover at what stage the engineers would decide to "split" the site (e.g. into a number of micro sites) and how this would tend to be done in practice.

Question – Excel table

3.6 Please fill in the tables shown in worksheet(s) "Radio Access and Core Network" in the enclosed spreadsheet file for 2G and/or 3G as appropriate.

3.7 Please separate out those sites shared with other MNOs or fixed operators from those tht are standalone.

3.8 Please also fill in the table in worksheet "Site List and Sharing".

Question – Other

3.9 Please provide us with any additional information and/or data which you think is relevant to this section.

4 BACKHAUL AND CORE NETWORK

4.1 In this section we are concerned about the deployment of base station controllers, backhaul between the base stations and their controllers, the core transmission network, centralised equipment, and equipment used for interconnection with other licensed operators.

Question – Base Station Controllers (BSC, RNC[2])

4.2 Please provide us with the basic configuration rules that your engineers adopt in relation to BSCs and/or RNCs. We are particularly interested in how the configuration of a BSC/RNC is adapted as the number of connected BTS/NodeB increases and/or the aggregate traffic level increases.

4.3 Also, please provide us with maximum configuration details (for example, the maximum number of connected TRX and/or BTS/NodeB and the maximum amount of traffic the BSC/RNC is capable of carrying). For "maximum" we would be interested in both the theoretical maximum (as specified by the manufacturers) and also the practical maximum (as used as design rules by your own engineers).

4.4 Please provide us with details on the port sizes used (and/or available as options if not currently used) for communication between:

(a) The BSC/RNC and BTS/NodeB (eg 2 Mbps, 10 Mbps etc); and

(b) The BSC/RNC and MSC (eg 2 Mbps, 10 Mbps etc).

4.5 Please provide us with details of the transcoding that occurs between the BSC/RNC and the core network. We assume that, in the case of a TDM-based core network, a voice channel will occupy 64 kbps, but would like confirmation of this. Where the core network is packet based (whether ATM or IP) we would like clarification of the effective bit rates and how these are derived (for example, the packet rate, voice payload size in Bytes, the size of the various headers, whether bit-rate efficiency steps such as Voice Activity Detection are used etc)

Question – Base Station Backhaul

4.6 From the responses to our initial email regarding an overview of the MNO networks in Italy, we are aware that a number of different solutions are used by the operators to facilitate backhaul connections from the BTS/NodeB sites to the BSC/RNC sites. For example, these include single point-to-point links, "tree and branch" point-to-point links (where a number of BTS are groomed into a single link etc), and SDH rings.

[2] Radio Network Controller

4.7 Please provide us with the general design guidelines used by your engineers when selecting which of the various backhaul options to use. Please incorporate within your response how and when your engineers determine that an upgrade to the backhaul is necessary – in particular when a decision would be taken to change the backhaul delivery mechanism itself (for example in moving from a microwave solution to a leased line solution).

Question – Mobile Switching Centres (incorporating Visitor Location Registers) and Media Gateways

4.8 Please provide us with the basic configuration/sizing rules that your engineers adopt in relation to Mobile Switching Centres (MSCs), including Mobile Switching Centre Servers (MSC Servers, or MSS), Gateway Mobile Switching Centres (GMSCs or MSC/GWs), Media Gateways (MGWs). We are particularly interested in how the configuration of MSCs/VLRs and/or MGWs is adapted as the number of connected TRX and/or BSC/RNC increases and/or the aggregate traffic level increases.

4.9 Also, please provide us with maximum configuration details (for example, the maximum number of connected BSC/RNC and the maximum amount of traffic the MSC is capable of switching). For "maximum" we would be interested in both the theoretical maximum (as specified by the manufacturers) and also the practical maximum (as used as design rules by your own engineers)

4.10 Please provide us with details on the port sizes used (and/or available as options if not currently used) for communication between one MSC and other MSCs (eg 2 Mbps, 10 Mbps, 34 Mbps, 100 Mbps, STM1 etc).

4.11 Please provide us with a list of MSC/MSS/GMSC/MGW sites within your network (providing a separate list as appropriate for 2G and 3G). For each site, please provide us with the following information:

(a) Site location (e.g. Rome, Naples etc – if there are multiple sites in one town then refer to them as Rome A, Rome B, Rome C or another suitable identification system).

(b) Number of connected BSC/RNC.

(c) Number of transmission ports used to connect to the BSC/RNC by capacity (for example, 8 * 2 Mbps, 3 * 8 Mbps etc).

(d) Number of transmission ports used to connect to other MSCs, by capacity.

(e) Peak traffic (in Erlangs or appropriate equivalent(s)) carried by that MSC.

4.12 In addition, please provide us with a schematic detailing how all of the MSC/MSS/GMSC/MGW are interconnected. (Should you prefer to provide this information in the form of a table of connection links, then this would be acceptable)

Question – Voice Interconnection (PoI)

4.13 Please provide us with a list of voice interconnection points within your network (providing a separate list as appropriate for 2G and 3G). In addition, for each site, please provide us with the following information (where a site contains both 2G and 3G interconnect, please provide separate information as appropriate):

(a) The location of that site (e.g. Rome, Naples etc).

(b) Number of transmission ports used to connect to the other licensed operators by capacity (for example, 8 * 2 Mbps, 3 * 8 Mbps etc).

(c) Peak traffic (in Erlangs or appropriate equivalent(s)) carried over that interconnection point or MGW.

4.14 Please provide us with details of any other equipment you believe is required in order to technically provide a wholesale call termination service, again including the basic configuration/sizing rules that your engineers adopt.

Question – Other Core Voice Telephony Service Specific Equipment

4.15 For the following additional equipment types, please provide us with the general design/configuration/sizing guidelines used by your engineers. We are particularly interested in how the quantity and/or configuration/sizing varies with subscriber and/or traffic levels on the network. The information should also be clear where separate devices (or sets of devices) are used/needed for 2G and 3G or where a single (set) is utilised for both 2G and 3G.

4.16 We believe the following list contains all of the relevant equipment types, but please also include any additional items that you believe we have omitted and, in your opinion, have costs that will vary with voice traffic levels:

(a) Home Location Register (HLR).

(b) Authentication Centre (AuC).

(c) Flexible Numbering Register (FNR).

(d) Equipment Identity Register (EIR).

(e) Signalling Transfer Points and Signalling Control Points (STP and SCP).

(f) Voice Mail Platform.

(g) Test Equipment.

(h) Equipment at the Points of Interconnect.

(i) IN Platform etc.

Question – Core (Inter-MSC/MSS) Transmission Network (infrastructure and equipment)

4.17 Please provide us with details of the methods used to connect the various MSC/MSS locations and the basic configuration rules used by your engineers in selecting which method is most appropriate for each link and how the selection choice will vary with the amount of traffic carried. We would envisage that the answer to this question will cover both the physical route provision (point-to-point microwave, leased line, dark fibre, own fibre/trench) and logical route provision (ATM equipment, SDH equipment, IP equipment etc).

Question – Excel table

4.18 Please fill in the table shown in worksheet "Network" in the enclosed spreadsheet file.

4.19 Please split out the interconnection links between origination links and termination links.

Question – Call Routes

4.20 For call origination (on-net to off-net calls) we intend to assume that the originating MNO adopts near-end handover.

4.21 Please provide average routing information separately for calls received for termination from each of the other MNOs and also for calls received from fixed operators (since they are likely to have different quantities and locations of PoI). Alternatively, please provide a list of route possibilities, together with relative probabilities – again separately for each of the other MNOs and also for calls received from fixed operators.

4.22 Where applicable, please provide the above routing information separately for calls that traverse your 2G network and those that traverse your 3G network.

Question - NGN

4.23 The EC recommendation states that the *core* part of the network "could be assumed to be NGN-based". Our initial view is that the core part in this respect will relate to the network that connects the various MSCs and/or MSSs, whereas the access part includes traffic flows between the BTS/NodeB and the MSC/MSS. Optionally, the connections from the BTS/NodeB to the BSC/RNC and then to the MSC/MSS could also be IP-based (perhaps making use of the Precision Time Protocol, IEEE 1588v2).

4.24 Please provide us with details on your plans to adopt NGN within your mobile networks, and/or the extent to which NGN has already been rolled out.

4.25 Regardless of your actual plans to adopt NGN, please provide us with details on what specific changes you would envisage being necessary in order to migrate to NGN and

what the cost impact of such changes would be. Examples of this might include, but not be limited to:

(a) Replacement of MSCs in the 2G network for equivalent MSSs.

(b) Replacement of ATM interface cards with Ethernet ones.

(c) Deployment of sychnronised timing throughout the network via Precision Time Protocol (PTP)-based equipment.

(d) TDM to IP interface conversion equipment, such as TDMoIP-based equipment.

(e) Cell site gateway equipment.

Question – Other

4.26 Please provide us with any additional information and/or data which you think is relevant to this section.

5 EQUIPMENT

5.1 Following our review of the documents provided by the operators in response to Agcom's earlier request for details on your network structure, we have identified specific types of equipment and facilities we will consider for inclusion within the Bottom Up model. (Note that just because items are listed in this section/worksheet does not imply that they will automatically be included in the model).

5.2 We have included items in one of a number of broad areas:

(a) Network equipment you would purchase.

(b) Network facilities you would rent or lease.

(c) Costs associated with site acquisition, preparation and civils/build costs. These costs should be split between those sites that are shared with other operators and sites that house only your own equipment.

(d) Management, operational and support systems.

(e) Power supply and air-conditioning equipment you would purchase.

5.3 For each item we now seek your input on a number of aspects, particularly:

(a) Type, manufacturer, model/range.

(b) Configuration details.

(c) Current purchase price/cost.

(d) Expected lifetime.

(e) Expected annual price trend.

(f) Space and power requirements.

(g) Installation and commissioning costs.

(h) Operations and maintenance costs (in terms of necessary staffing).

Question – Excel table

5.4 Please fill in the table shown in worksheet "Equipment" in the enclosed spreadsheet file. Please pay particular attention in identifying and detailing equipment costs that will vary with traffic levels as such items are much more likely to be included within the Wholesale Call Termination increment.

Question – Other

5.5 Please provide us with any additional information and/or data which you think is relevant to this section. In particular, if you feel that the items we have included are not sufficient and/or any of the information we have asked would result in significant necessary costs/expenses being excluded then please do expand the items and/or information categories accordingly.

6 BUSINESS STRUCTURE AND OPERATIONAL EXPENSES

6.1 In this section we are aiming to understand the totality of additional costs and expenses necessary for you to provide the services listed in the Demand section. We intend to structure the model to identify separately:

(a) Network assets and facilities (covered previously).

(b) Operations and maintenance costs and expenses related.

(c) Network support systems (covered previously).

(d) Operations and maintenance costs and expenses related.

(e) Wholesale service provision costs and expenses (including necessary support systems).

(f) Corporate, business support costs and expenses (including necessary support systems).

Question – Staffing

6.2 Please provide us with details on your total number of staff, broken down by network staff, wholesale staff, retail staff, central/corporate staff. For each staff area, please provide a further breakdown of staff numbers by major function. For example, for network staff you might provide staff numbers associated with each major network asset category (BTS/NodeB, BSC/RNC, MSC, etc). This information would relate uniquely to the "telecoms" business activities of your company (for companies with activities outside of telecoms).

6.3 Please split out those staff in the legal, regulatory and interconnection (wholesale) departments that are concerned solely with termination services and the regulation thereof.

Question – Staff related equipment

6.4 Please also provide us with information on specific items of equipment that each function requires in order to carry out its work. This might, for example, include expensive items of test equipment or office equipment.

Question – Excel table

6.5 Please fill in the table shown in worksheet "Opex Items" in the enclosed spreadsheet file.

6.6 In relation to the "network support and maintenance" contracts with equipment vendors the Excel table assumes that outsourcing has not taken place and the annual charges are split between right of use, support and maintenance. If the annual charges in relation to network equipment are specified differently in your contracts then please change the

categories as necessary. Likewise, if you have outsourced portions of the network support and maintenance to equipment vendors, please provide details of the contract (for example, the number of network personnel taken over by the outsourcing company, the job titles of those personnel, the resultant reduction in payroll and accommodation costs etc).

Question – WACC

6.7 In what proportion is your debt inflation linked?

Question – Other

6.8 Please provide us with any additional information and/or data which you think is relevant to this section. In particular, if you feel that the items we have included are not sufficient and/or any of the information we have asked would result in significant necessary costs/expenses being excluded then please do expand the items and/or information categories accordingly.

7 RESPONSES TO QUESTIONS AND COMMENTS

7.1 In this section we provide responses to the various questions and comments raised by the operators.

Demand

7.2 Should the entries for HSDPA Datacard also include R99 (UMTS) traffic?

7.3 Yes

7.4 Can you please better clarify if the requested data are Yearly total or average? In case the request is to have average data, can you please indicate the average period (month, day)?

7.5 Actual yearly totals should be provided

7.6 What is the reference time period for Peak?

7.7 The peak period(s) should be the peak period(s) on your network <u>in traffic load terms</u> rather than from the pricing perspective.

Radio and Core Network 2G

7.8 Can you please clarify the definition of Urban/Suburban/Rural? In general, we think that it would be necessary using a much finer geographic breakdown. The reason is that the pure incremental costs of terminating traffic will occur mostly in dense urban areas where incremental capacity will be required for the additional traffic. If we consider only one category for "Urban" covering the whole of a city, this will average across cells with spare capacity and those without spare capacity, so we will under-estimate the true incremental cost.

7.9 We have asked for the usage of three categories as a minimum. If you are able to provide a greater level of detail using additional categories, such as "Dense Urban" then this would be welcomed.

7.10 Can you please clarify definitions of "Air interface blocking probability", "Network blocking probability" and "Sector re-use number"?

7.11 "Air interface blocking probability": The air interface represents the connection between the base station and the customer's handset. Thus the "air interface blocking probability" is the blocking probability used by the engineers when "sizing" the radio access network, with respect to the air interface, in relation to the amount of offered traffic (number of customers trying to make calls over that particular cell etc). The traffic carrying capacity of each cell is dependent on the

"assumed" blocking probability (using Erlang B). A typical value for the air interface blocking probability might be 2% since the air interface is generally the scarcest resource of the overall network

7.12 "Network blocking probability": The network blocking probability, in a similar manner, is the blocking probability used by the engineers when "sizing" the network beyond the air interface. A typical value for the general network blocking probability might be around 0.1%, although different values might be used by the engineers in different parts of the network, for example at interfaces connected to other operators.

7.13 "Sector re-use number": This would allow a calculation to be performed on the average spectral capacity of each sector. However, having reflected on this, we are now of the opinion that the other information we have requested would be sufficient. Thus in this revised version of the Data Request we have removed the question.

7.14 What do you mean by maximum cell radii?

7.15 "Maximum cell radii" refers to the maximum geographic coverage radius in km that could be achievable from a single cell. We appreciate that your engineers might have different views on this depending on where the cell is deployed – with a cell in an open field in a rural area having much greater coverage than a cell on a roof top in a city.

7.16 Where should we include MGW?

7.17 MGWs (Media Gateways) should be included in the worksheets "Network – Other" (sections 5.3/5.4) and "Equipment" (section 6.6).

Backhaul and Core Network

7.18 What do you mean when you refer to links?

7.19 We use the term "links" to refer to point-to-point circuits. These could be provisioned by Microwave or leased lines etc.

7.20 Question 4.19: How should we split the interconnection links into termination and origination?

7.21 We had assumed that you would order and configure links at the POI separately for origination traffic and termination traffic. If you are not required to use separate links for origination and termination at your POIs please indicate that this is the case. However, in such a case please split the link costs based on amount of originating traffic and amount of terminating traffic.

Site List and Sharing

7.22 Can you please clarify if the complete site list of radio sites have to include the actual site On Air at the end of reference period, or also the planned site for the forecast reference period?

7.23 To the extent you are able, please include both but indicate which ones are planned sites.

7.24 The radio sites can be divided in sites equipped with macro BTS/NodeB and in sites equipped with micro-BTS, micro-NodeB, 2G/3G repeaters and other radio equipments. The questionnaire should be integrated considering both kind of sites

7.25 Please feel free to adapt your response accordingly, modifying the particular Excel sheet as necessary.

Equipment

7.26 What do you mean by POI?

7.27 POI stands for Point of Interconnection

7.28 In the Excel file, section 6:10 "POI Transmission Links (links only include termination - see columns M-R)": It is not clear what is required in the paragraph and what should be included in column G?

7.29 What we are interested in here are the unit costs (and associated information) for your Point of Interconnection transmission links. Thus if you lease a circuit between two sites that is used purely for transmission between your PoI and the PoI of another operator, then it is the unit cost (and associated information) for that link that we are looking for.

7.30 What do you expect in alternative configurations? What do you mean by configuration details?

7.31 The purpose of this section of the data request is to help us to understand the way in which your engineers decide how to "size" each item of equipment. Central to the new EU Recommendation is the concept of non-traffic versus traffic related costs, and how the traffic related costs vary with capacity deployed. For each type

of equipment we therefore need to establish the minimum possible, workable configuration and also, clearly, the cost of that configuration. We totally accept that in most likelihood, the minimum configuration would never (or at least very rarely) be deployed. However, the cost of that minimum configuration will help us to determine the cost of carrying the first minute of traffic – which the EU has referred to as the cost of "coverage" and thus is not included within the LRIC for wholesale call termination.

7.32 **For example, you might decide that the minimum configuration for a base station backhaul is a 2Mbps microwave link. However, you might also consider, especially in urban deployments, that the minimum configuration would be an adsl link (after all, it only has to carry a single minute of traffic). With regard to a base station, we would again be looking to understand the minimum possible configuration (and cost) in order for that base station to be able to handle a single minute of traffic.**

7.33 **The purpose of the alternative configurations is to allow us to understand how the configuration will grow with demand, and equally how the cost will increase with demand. In this respect it is again important to reflect on the new EU recommendation, which states that other sources of demand (on net traffic, sms, etc) *must* be applied *before* wholesale call termination. Thus the shape of the cost curve (how the cost of each item of equipment or facility varies with demand) will be very important. Quite simply, the more linear (that is, resembling a straight line) that the cost curve is, the more cost will get allocated to wholesale voice termination according to the EU recommendation.**

7.34 **We would leave it up to each operator to determine what alternative configurations will help best to illustrate how the cost of each type of equipment will vary with demand – after all, your engineers will know the equipment (and facility) options available much better than us consultants.**

7.35 Minimum requirement for equipment will vary across years. How is this taken into account?

7.36 **It is not the minimum requirement that we are interested in, but the minimum possible configuration (for the reasons explained above). We fully accept that the deployed requirement will vary from year to year in order to be able to meet customer demand. The model will be developed in order to vary the deployed assets according to the growth in demand, taking into account the information you provide us concerning configuration/expansion options.**

7.37 What do you intend by Lifetime?

7.38 **For lifetime, we wish to know the standard accounting lifetime (for depreciation purposes) that you use for each asset type. If you are of the opinion that the economic lifetime is significantly different to this (on average) then please do indicate this, but in addition to informing us of the standard accounting lifetimes.**

7.39 Question 4.6): We believe that the indication of Mbps related to each backhauling solution (for example PMP, or Microwave) will not be exhaustive and will change during the examined timeframe, because it is not possible to indicate all equipments by their throughput capacity along the years. We'll try to suggest an alternative solution as soon as possible in order to indicate all equipments.

7.40 Noted. Please provide us with the most appropriate alternative solution that you are able to.

7.41 Should the costs provided be for single (unit) costs or the aggregate amount for each equipment type?

7.42 It is the unit cost information that we need. Presenting us with aggregate cost information would not allow us to assess how the costs varied with traffic levels and thus we would not be in a position to identify LRIC costs for wholesale call termination. It is very important that the operators identify the various cost components of each equipment/facility type and provide us with unit cost information for each one.

7.43 If we provide unit costs in worksheet "Equipment" that are not asked about in worksheet "Network – Other" do you want to know the quantities of such items in worksheet "Network – Other"?

7.44 Yes, please, if you find inconsistencies between the information asked in the various worksheets (for example, we ask about the unit cost of certain equipment in one sheet but not about the quantity and/or configuration in another worksheet) then we would appreciate it if you can also include the corresponding information in the other worksheet(s). Feel free to expand/adapt the worksheets as necessary in order to achieve this.

Opex Items - Accommodation

7.45 Can you please specify what do you mean by technical and office space? What kind of office has to be included?

7.46 Generally, "technical space" relates to the housing of any equipment or network elements excepting BTS which has its own rental cost category. "Office space" relates to space occupied by personnel but not, for example, the IT server rooms. In either case, the buildings might be rented or owned.

7.47 BTS rental is generally not directly associated to the physical space occupied.

7.48 Accepted. We are looking for your total BTS rental costs. Generally, in other countries the costs vary based on location type; thus, for example, rural locations

are less expensive than urban ones and urban locations are less expensive than dense urban ones.

7.49 Can you please specify what do you mean by “price trend”?

7.50 This refers to the annual price change, if any, for a piece of equipment or charges. If for example spectrum fees were subjected to an annual increase of 2.5% p.a. then the price trend is +2.5%. Please take care to inform us of whether the price trend information supplied is in nominal (before effects of general inflation) or real (after effects of general inflation) terms.

7.51 What do you mean by “service charge”?

7.52 In some cases the rental contract may specify that utility charges will be separately billed or that management charges shall be applied. If you pay a bundled rental charge which includes all other charges enter a zero in the service charge boxes; if your charges are unbundled then report each charge separately.

7.53 What do you mean by “bought in services”?

7.54 The term “bought in services” is a catch-all phrase to relate to any services that you purchase from other companies that could have costs relevant to wholesale call termination and/or are traffic related (that is, the cost of obtaining those services will vary with the amount of traffic the network carries – even if only indirectly). One example of such services might be if you outsource the operation and/or maintenance of your BTS/NodeB equipment.

Routing Factors

7.55 What network element fits the "BTS to SIM" definition?

7.56 The list of network elements that appear in your routing factor table should be the same as those listed in your network lists. <u>The list provided was indicative only.</u>

7.57 VMP: what is the definition/explanation for the Acronym?

7.58 Voicemail Platform.

7.59 SOG: what is the definition/explanation for the Acronym?

7.60 Service Order Gateway.

7.61 GPRS what is the meaning of this system, while SGSN and GGSN are already present?

7.62 As mentioned previously, the list of network elements that appear in your routing factor table should be the same as those listed in your network lists. <u>The list provided was indicative only.</u>

7.63 What is the definition of Routing Factor for Billing System?

7.64 This refers to the interconnection or wholesale billing system. On reflection, we take your point that it should probably not be included in the main routing factor table, so please remove it when compiling the list of network elements you believe are most appropriate.

7.65 In cells F4, L4 and T4 does "SW" refer to Software?

7.66 Yes, in this context SW does refer to Software. Depending on the pricing structure of the equipment vendor, the cost of the software might well vary with levels of traffic and so could, at least to some extent, be allocated to wholesale call termination.

7.67 You ask us to indicate the routing factors for IN and GPRS. What exactly are you looking for here because IN and GPRS are entire portions of the network? How does this request relate to the one for routing factors for nodes SCP (item IN) and SGSN (the network in GPRS / PS UMPS)?

7.68 As mentioned previously, the list of network elements that appear in your routing factor table should be the same as those listed in your network lists. <u>The list provided was indicative only.</u>

7.69 Could you clarify what you mean by the elements POI to MNO/Fixed/International Origination and also by MNO/Fixed/International Termination to POI?

7.70 These elements would refer to the links from, for example, the Point of Interconnection to another Mobile Network Operator (MNO) etc. However, as stated in the previous answer, you need to adapt the routing factor table to reflect your own network structure.

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7.71 With regard to debt, what do you mean by "linked to inflation"?

7.72 Linked to inflation means "index linked". Thus, you might have some debt where the interest rate payable is agreed to be a certain rate above the rate of inflation. For example, if the agreement was 3% over inflation and the rate of inflation in a specific year was 2%, then the company would pay 5% interest for that year.