



Independent Communications Authority of South Africa

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BRIEFING NOTE ON ISSUES RAISED DURING THE 2017 WHOLESALE VOICE CALL TERMINATION COST MODELLING WORKSHOP HELD ON 13 NOVEMBER 2017 AND ONE-ON-ONE MEETING WITH LICENSEES FROM 15-16 NOVEMBER 2017

Date of issue: 24 November 2017

1. Purpose:

- 1.1. The Independent Communications Authority of South Africa (“ICASA”) thanks all those who participated in the workshop with industry held on 13 November 2017 at ICASA Sandton offices and the subsequent one-on-one meetings with licensees held from 15-16 November 2017.
- 1.2. The purpose of this briefing note is to provide clarity in respect of the questions raised by licensees during the aforementioned industry workshop and one-on-one meetings.

2. The specific areas to be clarified:

2.1. Project timelines

2.1.1. Timeline and data collection?

We asked operators how much of the data requests they would provide for the end of January 2018. Several operators indicated that this would be a challenge. In view of those comments, we propose the following timetable:

Date	Top-Down	Bottom-Up
30/11/2017	Operators provide comments on materials circulated to date	As per TD

Date	Top-Down	Bottom-Up
15/01/2018		ICASA provide additional documentation on data request definitions
28/02/2018	Operators provide completed models	Operators provide completed data requests
13/04/2018	ICASA to provide draft models with comments	ICASA to provide draft models with documentation
15/05/2018	Operators provide comments on draft models	Operators provide comments on draft models

2.1.2. We would like to have another opportunity to comment on the Draft Final model.

At the Draft Final stage we will be discussing the determination. We expect the great majority of model changes to be implemented between the Draft and Draft Final stages.

2.1.3. We would like to receive an empty BU shell model before we provide the data.

During the one-on-one meetings with the operators it became clear that the reason for this request is to better understand the data request. There is no time to introduce an extra stage circulating a model spreadsheet for comments (that will happen at the Draft model stage). Instead, we will provide additional definitions and methodological notes as an upgrade to the existing data request documentation, as per the timetable above. Additionally, our consultants will be available to answer further questions of clarification.

2.1.4. Is there space in the timeline for having meetings with the operators to answer questions regarding data, e.g., with the engineering team?

Yes, via ICASA.

2.2. Rate setting

2.2.1. The materials are silent on the key issue of asymmetry. Can ICASA clarify?

ICASA will publish a briefing note on guiding principles on asymmetry for comment.

2.2.2. How is ICASA going to pick the “correct” rate for its determination, out of all the rates that will be produced.

ICASA may adopt a similar approach to that used in 2014 in setting the new termination rates.

2.2.3. Specific role for TD and BU models? How will they be used for the regulatory process?

Cost / minute outputs will not be exactly the same for BU and TD models. The outputs will be taken into consideration, along with other factors, that will result in the final numbers. ICASA may follow the same methodology as in 2014 – TD model results used for Year 1, and BU model results for Years 2 and 3.

2.2.4. Are we going to look at various retail products or voice only?

The only service for which we will be calculating a cost is wholesale voice call termination. The BU models will not include retailing costs at all. However, they will include demand for network capacity from all types of services, including voice, data and SMS, in order to estimate the cost of voice call termination in conjunction with those other services. TD models will detail retailing costs only to the extent necessary to demonstrate reconciliation with financial statements.

2.2.5. Access line deficit

We will not be calculating access costs or any “access deficit” in the BU fixed model. Costs will only focus on traffic-sensitive costs. In the TD model, access costs are only included to the extent necessary to demonstrate reconciliation with financial statements.¹

2.3. **Top-down models**

2.3.1. Will the “Current year” be aligned to the operator’s financial year?

Yes. The TD models are based on audited accounts. We need to have the latest two published financial years (or audited financial statements in case of unlisted companies) and relevant data (Trial balances, FAR, etc.), in order to calculate the average for the year for balance sheet (capital employed) items. So, December 2016 and December 2015 for Cell C and MTN; April 2016 and February 2017 for Liquid Telecom; and March 2017 and March 2016 for Vodacom

¹ The Excel workbook circulated before the workshop contains placeholder values which appear to allocate access costs to calls. These placeholders were purely to provide the formulas with input values, and do not have any other significance. There is no intention to allocate access costs to calls.

and Telkom. Three months' difference has been regarded as an acceptable time difference in other accounting settings.² The disadvantages of exact comparability are outweighed by the advantages of reconciliation to annual accounts on the companies' normal reporting cycle. Only one model Excel workbook is required per operator: December 2016 for Cell C and MTN, March 2017 for Vodacom and Telkom, and February 2017 for Liquid Telecom.

2.3.2. Will HCA or CCA be used?

Our current plan is HCA, as per 2014. Operators are welcome to propose an alternative asset valuation methodology.

2.3.3. Slide 7 in the industry workshop presentation.³ What does the asterisk next to 'tilted annuity' mean?

Accounting depreciation will be used, not tilted annuity.

2.3.4. Regarding the flowcharts provided in the industry workshop presentation slides (around Slide 20), should we assume that these are guidelines?

Yes, these are only guidelines to allow operators to see how to make the splits, but it will be also guided by the systems the operators have.

2.3.5. Allocation of retail revenue by products. Can we look at consolidated revenue as sufficient for splitting working capital into wholesale / retail? There is no need to break down the revenue by call type (fixed / mobile)?

Currently, the model is split into: 1) voice and 2) other services. We agree that the only service of direct interest is the voice termination rate. Therefore, we are interested in the operators' ideas regarding which services to merge, in order to split revenues only at a higher level (lower granularity), while still preserving the model's traceability.

² See, for example, IFRS 10: B92, IFRS 10:B93: "The parent and subsidiaries are required to have the same reporting dates, or consolidation based on additional financial information prepared by subsidiary, unless impracticable. Where impracticable, the most recent financial statements of the subsidiary are used, adjusted for the effects of significant transactions or events between the reporting dates of the subsidiary and consolidated financial statements. The difference between the date of the parent and subsidiaries are required to have the same reporting dates, or consolidation based on additional financial information prepared by subsidiary, unless impracticable. Where impracticable, the most recent financial statements of the subsidiary are used, adjusted for the effects of significant transactions or events between the reporting dates of the subsidiary and consolidated financial statements. The difference between the date of the subsidiary's financial statements and that of the consolidated financial statements shall be no more than three months".

³ All references are to the documents circulated prior to the 13 November 2017 industry workshop.

- 2.3.6. What's the expectation with respect to the audit trail – TD data request template; Columns G + H? How do we complete this?

Do calculations in the background / side model, and provide this as well.

- 2.3.7. What does "SFP" mean?

Statement of Financial Position or a Balance Sheet

- 2.3.8. Sheet 'B1 Network data'. What is meant by core network 'transport' and 'signalling' at Row 76?

Transport refers to the transfer of user data through the core network, whereas signalling refers to the systems that control and support the transfer of user data. Signalling tasks include circuit-switched call setup, GPRS connection setup, and other supplementary services. In the TD model we have suggested that the routing factors for transport and signalling be equal, meaning that the respective cost of these activities are allocated in the same way.

- 2.3.9. Is it appropriate to include EPMU? A lot of costs which go in here (e.g., HR) are not necessarily easy to apportion.

Equi-proportionate mark up (EPMU) allocates overhead costs to the products in proportion to the products' share of total costs. This is common practice in FAC models internationally and we consider it to be appropriate here, however alternative suggestions are welcome in the November 2017 submissions, ideally accompanied by an electronic version of proposed revisions to the Excel Workbook.

- 2.3.10. Where would national roaming feature on the B1? Network Data tab?

As a service, it does not have its own column; it should be captured under "Other". Operators should provide a volume analysis of significant call types in this column for information purposes. We are making the simplifying assumption that all calls in the "other" column use the same routing factors. If this is not the case and there is a need to use different routing factors, then we may have to add new products. We will do this, if necessary, after receipt of operators comments.

2.3.11. What is meant by 'conversion factor'?

These are often used in models of this type to provide an equivalence between e.g., voice and data. The example provided was the ratio of the data-carrying capacity of a 5MHz carrier (expressed in MB) and its voice-carrying capacity (expressed in minutes). Operators are welcome to propose conversion factors to be used. Please provide a detailed explanatory note if you do so.

2.3.12. Specifically, we cannot identify soft handover on 3G in the TD Network sheet.

The numbers suggested in the templates are intended as the overall averages to be employed. If, in the context of the formulae and of the overall size and scope of the template, it is felt that these numbers require adjustment, suggestions are welcome.

2.3.13. Slide 26 in the industry workshop presentation. Conversion factors are missing for 4G and HSPA?

Operators, please review the Excel workbook formulas and let us know whether these factors are required, and if so suggest calculation bases.

2.3.14. What is the purpose of sheet C.1?

To separate voice ('calls') from other services.

2.3.15. Sheet C.3.1 – Is there a formula error in cell X8? The minutes need to be split between 2G / 3G / 4G – apportioned across the technologies. Sheet C.3.2 – feeds from the C.3.1. sheet (therefore, currently also erroneous).

Column X gives the cost of each element per total network minutes. We acknowledge that this metric is not intuitive for the 2G/3G/4G access elements, as only a fraction of the total network minutes pass through these elements. However, this approach simplifies the calculation both in Sheet C.3.2.1 and in the subsequent sheets, and has been adopted for that reason. This issue in any case does not affect the operators' work on reviewing the rest of the model.

2.3.16. Sheet C.6 This is a high level of granularity. Propose that costs not necessary for call termination are consolidated.

It will be OK to reduce the level of granularity associated with retail revenues and commercial costs, while maintaining enough detail to allow the costs to be allocated in the manner suggested.

2.3.17. TD Model (FNO) – Can consultant generate additional model flow slides and share that with the operators?

Yes, additional documentation will be provided to replace the existing slides in the workshop presentation relating to the FNO TD model. It is worth noting that slides 30-33 (“Top-down approach: fixed operators”) of the Workshop Presentation will be superseded by the new documentation, so should be disregarded.

2.3.18. In the industry workshop, it was indicated that operators need to populate their own versions of the TD model. What will then happen to the TD models submitted?

Please refer to the timetable above.

2.3.19. Revenue is not necessarily a good indicator of operational costs. The billing cost is not representative of splitting of revenues.

We do not think there is excessive use of revenues to allocate cost; please provide examples in the November 2017 submission.

2.3.20. Can we propose a different asset allocation, based on a mapping exercise we will undertake between our costing system and the TD shell model supplied by the consultants?

Yes, as long as the TD models maintain their current approximate scope and scale.

2.3.21. Is the Weighted Average Cost of Capital in the TD model templates the number proposed?

Yes. In commenting on it, the operators should not necessarily be restricted by calculation structure in the spreadsheet.

2.4. Bottom-up data requests (aspects common to mobile and fixed)

2.4.1. What sources will be used to develop demand/network forecasts for the BU model for 2017-2020?

We have asked each operator for their forecast of coverage and demand to 2020. We also intend to look at other relevant forecasts of demand, and welcome any suggestions operators have in this regard. We will then synthesise these to develop a base-line forecast of coverage and demand for use in the BU model. The BU model itself will then forecast the size of network needed to meet the forecast coverage and demand of an operator of a given scale. We will look at the sensitivity of our final estimates of the cost of voice call termination to changes in these forecasts.

2.4.2. Can consultants be more prescriptive with the definition of geotypes and signal strength, to have more consistency in data provided by the operators?

Yes, operators can proceed on the basis of the 2014 definitions of geotypes. That exercise was based on 234 municipalities and the 2011 population census. The thresholds for population density were: rural: up to 10 pop/km²; suburban: 10 to 100 pop/km²; urban: 100 to 1,000 pop/km²; dense urban: above 1,000 pop/km². Comments are invited as to the suitability of this segmentation for the 2017/18 exercise.

2.4.3. Will ICASA consult on modelling principles? Will operators have an opportunity to comment on model methodology notes?

We will provide additional definitions and methodological notes as an upgrade to the existing data request documentation. Notwithstanding, operators should continue data gathering activities in the meantime.

2.4.4. What market shares are you proposing?

After reviewing operators' submissions on the market, as well as the situation regarding resources (such as spectrum) and reviewing the prospects for future operator entry and/or consolidation, we will provide some options. For example, for the single hypothetical South African mobile operator proposed at the industry workshop, shares of 1/3, 1/4 and 1/5 would be candidates.

Without prejudice to ICASA's position on asymmetry, operators are welcome propose the appropriate volume market shares for the "small" and "large" fixed and mobile operator in terms of the percentage (e.g., 20%, 33%, ...) and measure (total minutes, incoming minutes, ...).

2.4.5. What will be the market share metric – revenue, subscribers, MoU (minutes of use)?

ICASA has, to date, used Terminating Minutes as the market share measure in its assessments of asymmetry. In the absence of asymmetry, it is worth noting that for a hypothetical operator, the market share would be the same whether measured in minutes or subscribers. However, we would not use revenue as a market share input.

2.4.6. Please explain how the utilisation adjustment for the tilted annuity will work. With what information will the adjustment be derived?

The first step in the calculation of a utilisation adjusted tilted annuity is to calculate the cost per unit capacity for each network element (i.e. the capacity cost), rather than the cost per unit of actual output. We do so by excluding from the capacity cost all costs of unused capacity. Note that when calculating capacity cost, we recognise that a certain amount of headroom needs to be included within the dimensioning of any individual network element to allow for statistical fluctuations in traffic and other necessary factors. The capacity cost is, therefore, calculated relative to the usable capacity of each network element (reflected in its maximum design utilisation) and not its theoretical maximum capacity.

To calculate a long-run utilisation adjusted tilted annuity, it is then necessary to scale up the capacity cost by a factor to reflect the common cost of the unused capacity of the network element over the long run (achieved by dividing the capacity cost by the long-run average utilisation of the usable capacity expressed as a percentage). We propose to estimate the long-run average utilisation of each network element by looking at the utilisation of that network element forecast by the BU model in the years being modelled, to consider the magnitude of the number of individual units installed (for example, if only a handful of units are installed, or hundreds), and the degree to which the capacity of each network element can be more-or-less continuously changed to meet demand. We do not envisage using a model to estimate this long-run average utilisation, but rather to look at a range of factors that enable us to come up with a reasonable estimate of that average utilisation, noting that in practice the real long-run average utilisation will depend upon future developments about which there is in some cases considerable uncertainty.

2.4.7. How would an utilisation-adjusted Opex be implemented in the BU model?

We propose to adjust Opex the same way as Capex. In the case of Opex, the starting point is the expenditure incurred in each year, whereas in the case of Capex the starting point is an annualised version of the capital expenditure (i.e., the tilted annuity).

2.4.8. Methodology, Bottom-Up: “LRIC, LRAIC, LRAIC+, (not ‘Pure’ LRIC)”. Are you planning to implement all those methods?

Yes.

2.4.9. Will there be consultation / opportunity to comment on cost standards? Currently, there are three approaches mentioned.

By ‘LRIC’, we mean the cost over the long-run of the network capacity required to provide a single service (in this case, voice call termination). Our calculation of ‘LRIC’ should give a similar result to European regulators’ models based on the European Commission’s so-called “pure LRIC” method (but we will be using the “capacity cost” method instead).

By ‘LRAIC’ we mean LRIC calculated over a large increment (all the traffic services provided by the operator). The main difference between ‘LRIC’ and ‘LRAIC’ is that ‘LRAIC’ includes the costs of spare capacity arising out of factors such as the need to provide coverage in rural areas.

By ‘LRAIC+’ we mean LRAIC plus a mark-up for other common costs including corporate overheads such as accounting and finance, HR, corporate IT, office buildings, office equipment. By this definition, the 2014 models calculated termination costs using LRAIC+.

During the 2014 termination rate proceeding the term ‘LRIC+’ was used. ICASA’s consultants are of the view that LRIC+ and LRAIC+ may be used interchangeably in the setting of BU cost modelling by ICASA.

ICASA’s current preferred standard is LRAIC+. Operators are welcome to propose alternative cost standard to be used. Please provide a detailed explanatory note if you do so.

2.4.10. “Actual and forecast demand – all service” – Is it network or commercial? Also, which “busy hour” is used? Busy hour could be understated by swings and roundabouts of different network elements.

This should be based on ‘user’ traffic (see additional detail below). The ‘busy hour’ should be the average network busy hour. Individual site BH statistics should not be used as these occur at different times.

2.4.11. What coverage (population, geographic) will be used?

The BU Mobile model will use geographic coverage to determine the minimum number of base station sites required to provide coverage. The associated population coverage will then affect the total demand for services, which will determine the network capacity required.

2.4.12. It will not be feasible for us to upgrade to modern equivalent technology (e.g., fibre from microwave) over a 3 to 5-year horizon (particularly in less dense / rural areas).

If you wish to provide the consultants with additional information about your planned future upgrades you are welcome to do so. The BU models are however of hypothetical efficient operators and not actual operators. Whilst even a hypothetical efficient operator would not actually upgrade their entire network to new technology each year, they would revalue their existing asset base each year to reflect the cost of building the same network using the latest efficient technology. The appropriate cost benchmark for a hypothetical efficient operator is therefore the cost of building and operating a network using the latest efficient technology.

2.4.13. Population forecasts. Should the operators standardise?

The operators should each provide their own forecast. It would be helpful if they could also document the source / rationale for the forecast.

2.4.14. Coverage and demand. How do we account for an on-net call which originates in one geotype (or technology) and terminates on another?

The BU Fixed model data request asks you to quantify for each geotype the total of originating and terminating traffic within that geotype (i.e. to count each on-net call minute twice – once as originating traffic and once as terminating traffic). When completing the BU Mobile model data request please do the same i.e. please count each on-net voice minute and on-net SMS/MMS message twice, once on the basis of the technology and geotype on which it originates, and once on the basis of the technology and geotype on which it terminates.

2.4.15. Existing total costs (all worksheets). Our fixed asset register does not provide sufficient granularity for any of these tables.

If you can provide this data, or an approach to it which is more in line with your systems' capabilities, that will assist us to design the model, and calibrate it, in a way best suited to local conditions. Groups of assets could be sufficient. The data does not have to be more granular (specific asset items). We are not prescriptive as to how the operator needs to get that data. We only want to be able to reconcile it with the financials.

2.4.16. We do not see all the design parameters we would expect for a telecommunications network.

This is not a detailed network design, but instead a high-level model. We do not know which parameters in particular are being missed. We can revisit this after you have seen the model with working formulae.

2.4.17. In the case of a BU model for a fixed operator with wireline and wireless elements, please note that such operators will have a core network common to both access means.

Noted. We will model this situation in the BU fixed model. Note we will not model the sharing of elements between fixed and mobile operators. In the event we produce 'small' and 'large' mobile operator models, both 'small' and 'large' operators will be of standalone hypothetical efficient mobile operators.

2.4.18. What steps will be taken in the BU model to ensure that it reflects South African conditions? In particular, what calibration / reconciliation will be undertaken?

We have asked for quite a lot of detailed data about each individual operator's network and costs, as well as new / replacement costs, as part of our data request. We will use this data to help ensure that the model is appropriately reflective of South African conditions. To the extent that it is practical and sensible to do so, we will also cross-check the BU model against the TD model(s).

2.4.19. The "Coverage and demand" worksheet of the mobile data request asks for "total volume of traffic carried over the year". We understand this is not taken to be network traffic, but rather "billed traffic". However, we are still not clear if this should include 'non-billed' retail traffic, e.g., voice from subscribers on unlimited packages, voicemail retrievals / deposits? Can it please be clarified what should be included?

Please include within the “total volume of traffic carried over the year” all traffic that is carried on your network that an end user would recognise as “user” traffic, irrespective of whether or not someone actually has to pay for it. Examples of traffic that should NOT be included include time spent listening to ring tone before a voice call is answered and voice call attempts that are not successful. Please DO include successful voice calls to voicemail – both to leave voicemail and to retrieve voicemail. Please do NOT include any non-user traffic, e.g., signalling traffic. Please include all user traffic irrespective of the commercial relationship that you have with the end user, e.g., irrespective of whether the end user concerned is a retail customer, an inbound international roaming customer, an inbound national roaming customer or a wholesale MVNO customer. Please only include traffic that is carried on your network, and please report it on the basis of how it is carried on your network (e.g., if one of your retail customers is roaming internationally and makes a call to an end user connected to your network, please report this as an incoming voice call and not an on-net call).

2.4.20. BU data requests. Should the cost trends be nominal or real?

Nominal. Operators are also requested to provide their assumptions on inflation, to help put the nominal cost trends into context.

2.4.21. BU data requests. Do the average ages need to be the same for the TD and BU models?

Not necessarily, although one would expect them to be.

2.4.22. Will the Weighted Average Cost of Capital in the TD model also be used for the BU models?

There should be no difference in WACC between the TD and the BU model. However, since the BU model will reflect hypothetical efficient operators (not specific operators in SA), the WACC will be different between the TD (operator-specific models) and the BU models. The operators are requested to comment on the WACC by the end of November 2017.

2.4.23. Which model(s) do the operators populate – mobile only, fixed only or mobile and fixed?

We expect operators to populate the TD models and BU data requests in line with the table below:

Operator	TD mobile	TD fixed	BU mobile	BU fixed
Cell C	Yes	No	Yes	No
Liquid Telecom	No	Yes	No	Yes
MTN	Yes	No	Yes	No
Telkom	Yes	Yes	Yes	Yes
Vodacom	Yes	No	Yes	No

2.5. Bottom-up data request (mobile)

2.5.1. How will the BU models account for the differences in scale that exist in the South African mobile market?

The BU model will calculate the costs of building and operating a hypothetical mobile network given a required geographic coverage for that network and the volume of customers and traffic it is required to serve, using simplified (but still realistic) engineering rules to dimension the network. The model will not be based on the network of any individual mobile operator in South Africa, although we will take existing network sizes into account. Therefore, we will be able to use the model to calculate the costs of building and operating mobile networks in South Africa of various different scales (geographic coverages and user demands).

2.5.2. Define tower sites; what is the difference between “Large tower - rented space”, “Cell tower - self build”, “Cell tower - rented space” and so forth?

Operators have normally both types of towers listed. If there is an obvious height to use to differentiate a “Large tower” from a “Cell tower” in South Africa, then we would be happy to adopt that. If there is not an obviously correct height for this, then we suggest each operator decide on how to split its site base, and ask them to tell us how they have done this.

2.5.3. “Existing RAN total costs (actual)” – Is the purpose of this table to enable a health check of historical values?

That is the main purpose. The main input to incremental costs is the following table, “New / replacement RAN unit costs”.

2.5.4. The data request mentions Single RAN on some sheets but not on others. Is it complete?

We have requested information about current and potential future use of Single RAN in the RAN Equipment layer as we believe this is the area where it is most likely to have been deployed, and to be efficient to do so. If an operator has already deployed Single RAN functionality in other layers of the network – for example the BSC/RNC layer – or believes that a hypothetical efficient operator would do so, please extend the data request s/sheet appropriately and provide the relevant information (including disaggregated unit cost data that allows the total cost of such single RAN equipment to be calculated based on the required capacity for each RAN technology –see for example the new/replacement RAN units costs table).

2.5.5. The data request requests Opex, and licence, split by frequency band. Can you help us understand how to implement this split?

The 'annual licence fee' unit cost category is intended to reflect annual licence fees payable to equipment vendors and the like. The 'annual Opex (excluding licence fees)' unit cost category is intending to encompass all other operating costs. The data request asks operators to estimate how these costs are driven by a range of potential cost drivers, including the frequencies in use (or deployed), the technologies in use (or deployed), and the capacity of each technology in use (or deployed), and also to distinguish between those costs that vary with the number of sectors on a site (per sector costs) and those that do not (per site costs). Operators are asked to estimate these units costs on the basis of their expert knowledge, where possible supported by analyses of their existing operating costs and agreements with vendors, reaching out to their technology suppliers where necessary.

2.5.6. 'Base' is used at various points in the BU Mobile data request, for example RAN Equipment Row 110. Does this include air conditioners, batteries, etc?

Yes, it mops up the cost elements which cannot be expressed under the classified headings which follow it.

2.5.7. Population coverage. We already report our coverage to ICASA. That could be a more practical basis than a propagation model.

Agreed. Can operators please re-forward those reports at their earliest convenience to the consultants (via ICASA).

2.5.8. Coverage and Demand, voice call characteristics (busy hour, etc.). From the look of this table, we think it is likely to underestimate equipment volumes if the busy hour is defined as a national average.

Please provide further details on this in written submissions.

2.5.9. Coverage and Demand, other service characteristics (busy hour, etc.). Do you require these services in their own busy hour or in the voice busy hour?

The average network busy hour.

2.5.10. Can we have a statement from ICASA as to how national roaming (as a cost) will be treated in the models.

To the extent that the operators carry traffic on their network on behalf of other operators (whether national roaming, international roaming, or MVNO wholesale traffic), we would want them to include that traffic within the traffic statistics reported to us in response to our data request (i.e., in the “Coverage and Demand” worksheet). It is certainly our intention that the traffic demand forecast used in the BU model includes roaming (and other wholesale) traffic carried on the modelled network. The estimated cost of voice call termination will, therefore, reflect the costs of carrying roaming (and other wholesale) traffic on the modelled network.

The one element of the BU model where we might need to look more specifically at the costs of providing national and international roaming services (as well as other wholesale services) is in the modelling of Wholesaling costs – the costs of billing and managing wholesale customers. More specifically we may need to identify the magnitude of the Wholesaling costs related to voice call termination separately from the Wholesaling costs related to other wholesale services. Operators’ suggestions are welcome in this regard.

It could be argued that the MTR of a recent entrant operator should include the cost to the operator of their customers roaming on another operator’s network (or indeed any efficiently incurred ‘leased rather than bought’ cost incurred during the start-up phase). In that case, the cost will not be included in the BU model itself. If it turns out that there will be an asymmetric rate for more recent entrants, and if the national roaming payments flows and contract conditions justify it, then ICASA can add on a supplement to the MTR in a side model.

2.5.11. How will network sharing and spectrum sharing / spectrum re-farming be captured in the BU/TD models?

We have in our data request asked the operators to provide us with information about the extent to which they already share network infrastructure, and the extent to which they expect to do so in future. We have also asked them to provide information on the costs of building and operating both exclusive and shared infrastructure.

If it is decided that the hypothetical efficient mobile operator that we are modelling would go further than this, and share active network assets or spectrum, we will adjust the model accordingly to reflect any difference in costs, as well as the additional spectrum capacity available.

Similarly, we have asked the operators to forecast their re-farming of existing spectrum to 2020. To the extent that it is reasonable to take future releases of spectrum into account we will also do so, adjusting the spectrum available to the hypothetical efficient operator as appropriate, and having the model make use of this additional spectrum efficiently.

2.5.12. Will the BU models take into consideration the 'natural' scarcity of spectrum in South Africa, which translates into higher cost of network deployment? If not, the results of modelling could be distorted for a hypothetical efficient operator. For example, with re-farming of spectrum, some operators have spent higher capex on network deployment / densification than had they enjoyed access to more appropriate spectrum.

We will develop a spectrum deficiency scenario for the hypothetical operator and will submit it to the MNOs for comment. Without prejudice to ICASA's position on asymmetry, the operators' views are welcome (in the November 2017 submission) on the following question: What would be suitable hypothetical spectrum holdings for a 'small' and a 'large' hypothetical operator?

2.5.13. Please explain the choice of spectrum bands indicated in the documents (e.g., why is 2600MHz spectrum not listed, whilst 2300MHz spectrum is listed)?

The models will include 2600MHz and 3500 MHz spectrum bands. Current spectrum assignments are as per the table below:

Name of operator	800MHz	900MHz	1800MHz	2100MHz	2300MHz	2600MHz	3500MHz
Cell C		22	24	30			
MTN		22	24	30			
Vodacom		22	24	30			
Rain (formerly known as WBS)			24			15	
Liquid Telecom (formerly known as Neotel)	10		24				56
Telkom			24	30	60		28

ICASA's consultants will use the existing spectrum holdings as per the table above, plus operators' data request responses on refarming, to propose hypothetical spectrum configurations for two types of mobile operator: 'Established' (large) and 'Entrant' (small), and two types of fixed operator: 'Established' (large) and 'Entrant' (small).

2.5.14. Mobile BU data request. RAN sites. Row 57. What is meant by "Capacity" vs. "Coverage"?

Capacity is generally associated with densification. Coverage is to increase sq. km. (covered) reported internally / externally.

2.5.15. Mobile BU data request. Key design parameters. Is 4G missing?

It could be added if there is significant voice traffic carried on 4G in the modelled period (to 2020). We will make suggestions on this after hearing back from the operators at end November 2017.

2.6. **Bottom-up data request (fixed)**

2.6.1. We appreciate that cellular radio is a cost of termination, and point-to-point microwave (being non-traffic sensitive) is not. But what about point-to-multipoint microwave? We believe this latter is generally deployed in South Africa in a manner which makes it non-traffic sensitive.

To the extent that its deployment is non-traffic sensitive (e.g., provisioned in effect as 'always on' capacity with high availability), we agree.

2.6.2. The data request does not contain Wireless Local Loop technology.

A Wireless Local Loop supplement will be provided along with the enhanced data request documentation.

2.7. **Populating bottom-up models with operator specific data**

2.7.1. Populating BU models with operator data.

We are not producing a BU model of each operator; only a BU model of a hypothetical efficient fixed operator and a hypothetical efficient mobile operator. If the operators want to populate the BU models we provide with their own data, then they are welcome to do that, and we will be happy to review the results. We appreciate that the operators feel that a model populated with their own data might enable them to understand better the workings of the model, and the effects of the data they are providing. Recognising this, we propose that instead of providing an empty 'shell' BU model, we provide (in April 2018) the first version of our model for consultation populated with the efficient operator data.

2.7.2. How will data be normalised – coverage, geotypes, etc.? Standard definitions need to be applied.

If operators are concerned about how we might (mis-)interpret the data they provide, we suggest they provide us with as much context as possible for the data that they provide, plus any necessary supporting information to help us correctly interpret it. For our part, we will include in the final model documentation information on how the BU models make use of each input, and hence our interpretation of each model input data item.

The consultants propose to prepare a separate confidential Excel workbook that documents how they have derived the inputs to the two BU models (fixed and mobile) from the data provided by the operators and other sources (e.g., international benchmarks).

- 2.7.3. There is a concern about protecting confidential data in the BU fixed operator models, as Telkom and Liquid Telecom could be easily identified, especially if there were 'large' and 'small' runs of the model. Any data in such BU models could be deemed to be effectively actual data.

It is worth noting that all historic fixed line ex-incumbents face this issue in similar processes in other countries. We will try to ensure that the model does not contain much useful data for any potential Telkom competitors by disguising sensitive inputs. Ultimately, the model will be that of a hypothetical fixed operator, which can be expected to be rather different from the real Telkom.

2.8. Other issues

- 2.8.1. Will the 2014 models be considered or will the consultants produce new model(s)?

We intend to produce new models as the 2014 models are considered to be cumbersome, etc. If the operators would like the consultants to rather update the 2014 models, they need to indicate so ASAP.

- 2.8.2. There is only one operator with copper local loops, therefore, maybe we could be less technical?

Agreed, we have been over-using the phrase 'copper loops' in the oral presentation; it is too loose a term. We meant 'wireline network' in general. In our written materials we will try to refer to generic terms for infrastructure, e.g., only refer to access concentrators (which could be an OLT, MSAN, or any other device).

- 2.8.3. Which model(s) will the operators receive from ICASA?

Each operator will receive its own TD model(s) but not the TD model(s) of any other operator. Operators will receive the mobile and fixed BU models.