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BRIEFING NOTE ON ISSUES RAISED BY OPERATORS IN THEIR SUBMISSIONS OF 30 NOVEMBER 2017

Date of issue: 13 February 2018

1. Purpose:

1.1. The purpose of this note is to provide further information in response to licensees' submissions, following ICASA's briefing note of 24 November 2017.

2. The specific areas to be clarified:

2.1. Project timelines

2.1.1. Timeline and data collection?

In the briefing note of 24 November 2017 ICASA indicated it would provide additional documentation on data request definitions by 15 January 2018.

ICASA has widened the scope of this activity and now the intention is to provide BU 'shell' models in the next batch of information, along with updated data request templates. These models will illustrate how the input data is planned to be processed to calculate the unit costs of termination. They will be populated with placeholder data which, while purely illustrative, are intended to be in the general order of magnitude of expected real data. It is hoped that these models will assist the operators in formulating their responses and further questions. They will also help to clear up questions expressed in the operators' submissions (for example, by providing worked examples as to the utilisation adjustment for the tilted annuity, network busy hour, scorched node, support and business activity costs, completeness of network design).

At least one operator welcomed the prospect of further information of this type.

However, progress has been slower than had been hoped, and we now plan to circulate the 'shell' models and the update data request documents on 16 February 2018.

Notwithstanding this, the operators should continue data gathering activities in the meantime.

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

2.2.1. 'Large' / 'small' operator models, and their spectrum holdings

At least one operator expressed opinions regarding whether there should be 'large' / 'small' operator models.

We propose to include the following spectrum portfolios in the bottom-up mobile model:

Portfolio	900MHz (FDD)	1800MHz (FDD)	2100MHz (FDD)	2300MHz (TDD)
With sub-1GHz	2×11MHz	2×12MHz	2×15MHz	
Without sub-1GHz		2×12MHz	2×15MHz	1×60MHz

We believe these to be representative of the currently usable mobile spectrum holdings of the majority of individual mobile operators in South Africa. (Please see below for a discussion of national roaming).

We propose to develop 'large' and 'small' operator models, and to produce results for the following combinations of spectrum portfolio and operator scale:

Portfolio	Large operator	Small operator
With sub-1GHz	✓	✓
Without sub-1GHz	×	✓

In each case we propose to use the bottom-up model to determine the efficient split of the relevant spectrum between technologies (2G, 3G and 4G / LTE / LTE-A) based on the forecast demand for capacity of each type for each hypothetical operator (based on the relevant user device mix and traffic demand forecasts).

2.2.2. Definition of geotypes

At least one operator said they would proceed on the basis of their own geotypes. At least one operator provided a proposal for geotypes based on publicly available geographical units, the CSIR's mesozones[1]

We have proposed the use of four geotypes within the bottom-up mobile model:

- Dense urban
- Urban
- Suburban
- Rural

We have also proposed that these be defined in the same way as was proposed for the 2014 model: by reference to factors such as building density and building height; more generally to the nature of the local clutter (and to some extent the speed of movement of users within the area). So, for example we would expect:

- **dense urban** areas to be characterised by streets lined with tall buildings (i.e., urban canyons)
- **urban** areas to consist largely of streets lined with buildings, but where the buildings are relatively low rise, e.g., generally no more than three stories high
- **suburban** areas to consist largely of streets having more dispersed, low-rise buildings, where other forms of clutter, such as trees, may start to be relevant to radio propagation
- **rural** areas having relatively widely dispersed, generally low-rise buildings, where the predominant impediment to radio propagation is vegetation and terrain, rather than buildings.

This approach allows us to include in the bottom-up model two important features of real-world mobile networks:

- Differences in the radio propagation environment that affect the number of radio access network sites (base stations) required to provide coverage of a given area
- Differences in the likely density of demand, and hence the radio access network capacity required per unit area (sq. km).

[1] See: https://gap.csir.co.za/gap/

By way of illustration, we believe the following would not be unreasonable estimates of the proportion of the total land area and population of South Africa currently falling within each of these geotypes:

Geotype	Area (%)	Population (%)
Dense urban	0.05%	9%
Urban	0.20%	17%
Suburban	2.00%	40%
Rural	97.75%	34%[2]

An alternative approach would be to define geotypes by reference to population density at some level of geographic granularity – for example the CSIR's mesozones. However, whilst this is not an unreasonable approach for areas where the majority of buildings are residential, such as suburban and rural areas, it is less suitable to classifying areas where a substantial proportion of buildings are commercial (e.g., shops and offices). It is in particular a poor way of differentiating between urban and dense urban areas, where the difference is more to do with building type than it is to do with population density.

In practice, the exact definition of these geotypes is in any case not critical to our results, provided that a self-consistent set of inputs are used in the bottom-up model[3]. It is for this reason that we have invited each of the mobile operators to provide us with their preferred definition for each of the geotypes, and most importantly to then provide us with all the necessary inputs for the bottom-up model consistent with those definitions (for example, coverage cell sizes in terms of radius and area, by site type and frequency band). We propose to review the information provided by the various mobile operators and derive what we believe to be a reasonable and self-consistent set of input values for each of the hypothetical network operators that we are modelling – one large and one small. We do not foresee any particular problem in doing this.

An alternative approach would be to define more or less precisely which areas of the country fall within each geotype, and to then ask each mobile operator to calculate their existing coverage and other vital statistics by reference to these areas. At face value this would have the advantage of ensuring a degree of consistency and comparability between the data provided by each of the mobile operators. In practice, however, we are sceptical of the benefits of this approach:

- It would require each of the mobile operators to undertake a potentially complex exercise to calculate their coverage and other vital statistics in a way which probably

[2] We note that the United Nations Population Division estimates the urban population of South Africa to be 65% of total population.
[3] Noting that the bottom-up mobile model is not concerned with the details of the definition of each geotype, it only requires certain statistical information about the characteristics of each.

does not match with their existing analyses – this is likely to be time consuming, costly and prone to error

- Even given a consistent definition of the geotypes, it is unlikely that each of the mobile operators would calculate their coverage and other vital statistics in exactly the same way – hence in practice the results are still unlikely to be comparable
- In any case, we are not asking for this information in order to be able to do a comparison between the different mobile operators – we are merely seeking the information necessary to define appropriate input values for two hypothetical operators, one large and one small.

For all of these reasons, we continue to prefer the approach that we have proposed – namely to ask each of the mobile operators to provide us with their definition of each of the geotypes, and to then provide us with the information we need to build a bottom-up mobile model by reference to that definition of geotypes.

Similar considerations apply as regards the definition of coverage. Again, predicting whether a location is within or outside network coverage is a complex question, both in theory and in practice. This is not helped by the fact that, even in reality, a location may be within coverage some of the time, and outside coverage at other times, depending upon a range of factors such as the time of year, the weather, the technology used, and the level of demand for services from other customers in the same area.

Again, we have, therefore, deliberately chosen not to specify the radio signal characteristics that define whether a location is within or outside coverage of a network. We have simply asked each of the mobile operators to provide us with a consistent set of data describing the coverage and technical characteristics of their own network. We propose to use this information to derive, what we believe to be, a reasonable and self-consistent set of input values for each of the two hypothetical network operators that we are modelling – one large and one small[4]. We do not foresee any particular problem in doing this.

In summary, we are not asking for information from each of the mobile operators, in order to be able to do a comparison between them. We do not, therefore, require the information provided to be consistent across the mobile operators for this purpose. Similarly, whilst the two hypothetical operators that we are modelling (large and small) need to be reflective of the characteristics of actual operators in South Africa today (and over the next few years), they are not intended to be representations of any particular operator, or even of an 'average' operator (of the given scale). Hence again, we do not believe that we need information from

[4] Noting that the bottom-up model is not concerned with the details of radio signal propagation and quality, it is merely interested in the geographic coverage (and capacity) provided by a radio access network site of each type using each frequency band in each geotype.

the individual operators that is strongly consistent across the operators, in order for us to be able to derive suitable inputs for the two hypothetical operators that are reflective of the characteristics of actual operators of the relevant scale.

Operators will, of course, be able to review the inputs we use for each of the hypothetical mobile operator and, if they believe them to be significantly out of line with reality as regards either their own characteristics or those of other relevant mobile operators in South Africa, they will of course be able to challenge those inputs. We will not, however, be providing operators with a detailed explanation of how we have decided upon the value of each hypothetical operator input by reference to the information provided by the operators. Given both the commercial sensitivity of the information provided and the fact that we are modelling hypothetical rather than actual operators, we believe that the input values used should be assessed by reference to their reasonableness alone, rather than by reference to the specific information provided by the individual mobile operators.

2.2.3. National roaming (as a cost)

At least one operator had comments on this topic.

We propose to assume that the hypothetical small mobile operator makes use of national roaming to extend its coverage beyond that of its own network. For this operator, we propose to calculate the average cost of mobile call termination as a blend of its own network call termination cost – as calculated by the bottom-up mobile network model – and the wholesale price that it pays for call termination when its retail customers are roaming. In doing so we assume that operators are rational in their 'buy vs build' decisions – in other words that they will only choose to 'buy' if this will cost them less than if they were to 'build'.

To be consistent with this approach, the coverage inputs to the bottom-up model of the hypothetical small operator will need to reflect the typical own-network coverage of a 'small' operator that is making use of national roaming to extend its coverage, and the demand inputs and routing factors will need to reflect the traffic carried on the hypothetical small operator's own network (i.e., originating or terminating on devices within the operator's own network coverage) and exclude traffic that is carried on another operator's network (i.e., that originates or terminates on devices outside the operator's own network coverage)[5]. Conversely, to accurately capture any economies of scale that operators might enjoy as a result of carrying roaming traffic on behalf of other operators (both national and international), we have already proposed that the total demand inputs to the bottom-up mobile model should reflect the total traffic carried on the hypothetical networks in South Africa (large and small),

[5] More accurately, such traffic will only be included in the bottom-up model to the extent that it requires capacity in the operator's own network – for example HLR capacity.

including traffic carried on-behalf of wholesale customers (such as traffic originating and terminating with in-bound national and international roamers).

To the extent that any (larger) mobile operator might make use of ‘national roaming’ to provide additional capacity in certain areas of the country, we propose to model this (if at all) in the same way we model national roaming for coverage: in other words we will calculate an average cost of mobile call termination based on a blend of own-network costs (for those calls carried entirely on the operator’s own network, and to the extent that any ‘national roaming’ calls make use of parts of the operator’s own network), together with any relevant wholesale call termination charges (applicable to national roaming calls). However, it seems likely to us that any such use of national roaming to provide additional capacity will largely, if not exclusively, be for the purpose of increasing data capacity, and not to provide additional voice capacity. We are, therefore, minded to recommend that the cost of voice call termination in this situation be calculated on the basis that all voice calls will terminate on the operator’s own network alone, and hence exclude any wholesale call termination cost. We are, however, open to considering evidence or argumentation to the contrary.

We can envisage two possible alternatives to the blended cost approach that we have proposed (in the context of national roaming being used for either coverage or capacity enhancement):

- An approach in which we only include the cost of terminating calls on the operator’s own network, when that network is limited in coverage and/or capacity (i.e., purely the network cost as calculated by the bottom-up model, as described)
- An approach in which we use the bottom-up model to estimate how much it would cost the operator to build a network with full coverage and sufficient capacity to meet all of its demand (notwithstanding that it might be cheaper for an operator to buy some of this coverage and/or capacity from another operator).

We do not currently believe that either of these two alternative approaches would be more appropriate than the blended cost approach that we have proposed for the purpose of setting regulated mobile voice call termination rates. We believe that the first alternative approach is likely to lead to under-recovery of efficiently incurred costs by the relevant operator, and that the second alternative approach is likely to lead to over-recovery (on the assumption in both cases that the relevant operator’s use of national roaming reflects a rational cost-minimising buy-vs-build decision by them). We are, however, open to considering evidence or argumentation to the contrary.

2.2.4. Re-farming

At least one operator asked in what format it should provide its re-farming forecasts.

Operators should provide their re-farming forecast on the 'RAN Equipment' sheet in the data request distributed with this document. The relevant table is located at rows 38-47.

2.2.5. Once-off/upfront cost of spectrum

At least one operator mentioned this, and asked whether the once-off cost should be entered in the model using the 'current' cost.

This information should be entered on the 'RAN Equipment' sheet in the data request distributed with this document. The relevant table is located at rows 27-36.

Operators are welcome to provide this data on a current cost basis. We would request them to provide the underlying working to justify departures from historic costs.

2.2.6. Sources for demand forecasts

At least one operator suggested that significantly more credence be given to operators' own forecasts than those of industry commentators.

While ICASA cannot predict the likely discrepancies between such forecasts, it actively welcomes, and will take into account, the operators' forecasts.

2.3. **Top-down models**

2.3.1. Use of operators' existing top-down model

At least one operator asked if it could use its own existing top-down model.

Since the cost allocation methodology depends on data availability and systems in place, which may differ among the operators, the methodology is principle- and not rule-based. The 'shell model' was created to assist the operators applying the methodology. Therefore, if an operator has already a relevant costing model in place which produces the required unit costs (termination per minute) then an audit of that model can be done, under the following conditions:

1. The operators will provide full access to the costing tool and its data, by installing the software on laptops or desktops accessible by Mazars.
2. The operator or its consultants will provide one day of training on the costing tool software to the consultants (Mazars).

3. The operator will provide a relevant manual to present the flows of data, inputs and outputs of each allocation process within the software.
4. Two models will be delivered. One for HCA and one with CCA TA accompanied with relevant documentation.

2.3.2. Revenue as an allocation driver

At least one operator expressed concern that revenues might be used to allocate costs.

In the TD shell model there is no link between revenues and network costs. In other words, revenues are not used as an allocation factor for network costs.

2.3.3. Breakdown of interconnect cost of sales

At least one operator expressed concern that interconnect costs might be used to allocate costs, and should in any case be presented in aggregate.

In the TD shell model, Interconnection cost is presented within “productive activities” as a separate element, which is allocated directly with the usage of actual data. Consequently, it is not used for the allocation of network costs. The separation between fixed, mobile and other is necessary as it will assist the execution of sanity checks, during the audit process.

2.3.4. Breakdown of service provision cost between content and international roaming

At least one operator suggested combining these in a category of ‘other cost of sales’.

Service provision cost is presented within “productive activities” as a separate element, which is allocated directly with the usage of actual data. Consequently, it is not used for the allocation of network costs. The separation between content and international roaming is necessary as it will assist the execution of sanity checks, during the audit process.

2.3.5. Combining retail activities in a category named “Retail Commercial Activities”

At least one operator suggested, for similar reasons, combining Marketing, Sales and Distribution, ‘after sales’, billing and bad debt as well as other retail-specific commercial activities in a category named ‘retail commercial activities’.

The shell model includes different commercial activities (e.g., sales and distribution, billing and bad debt, etc.), in order to give the opportunity to the operators to use different allocation factors for each activity, if necessary. However, we can agree to aggregate all commercial activities as long as this method does not lead the operator to use a more complex methodology for allocating costs to final products.

2.3.6. WACC

At least one operator had comments on the WACC calculation contained within the TD shell models. For example, it was noted that regulatory costing models typically break the cost of debt into its components: risk-free rate and debt risk premium.

We should clarify that WACC can be different between the TD and the BU models. The parameters, used in the draft shell TD model are merely placeholders used as an example and not actual data that should be used "as is" from all operators. WACC in the TD model will be different among the operators to reflect each operator's specific capital structure.

For example:

- Cost of debt: this is the effective rate a company pays on its current debt. To calculate its cost of debt, a company needs to determine the total amount of interest it is paying on each of its debts for the year. Then, it divides this number by the total of all of its debt. The quotient is its cost of debt and should be placed in cell E13 in sheet 'A.2 WACC' and is in line with the Capital Asset Pricing Model (CAPM). This value should be calculated as follows: Interest expense for 2016 / Average Interest-Bearing Debt during 2016.
- Risk-free rate: The average monthly value of 2016 for the 10-year Government bond yield can be used with reference to relevant sources.
- Beta calculation: Damodaran's Global beta Telecom (wireless) for mobile operators and Telecom Services (for fixed or integrated operators) indexes for 2016 (1/17) can be used. The relevant link is: http://www.stern.nyu.edu/~adamodar/pc/archives/betaGlobal16.xls
- Tax rate: The nominal tax rate for 2016 should be used.

2.3.7. Aggregated form of reporting

At least one operator suggested an aggregated form of reporting for the sheet 'C.4 attribution to commercial' and for the sheet 'C.6 Final Accounts' or reducing the level of granularity.

As a principle, an aggregated form of reporting can be followed. However, this should not negatively affect the transparency of the allocations in place and the reconciliation with the financial statements or other external reports can be documented.

2.3.8. Description of consistency checks

At least one operator requested a description of the consistency checks to be done by Mazars on the TD models.

The methodology distributed to the operators provides the ways of cost allocation that can be used for each different cost pool. Consistency checks refers to the procedures that will be followed, on a materiality basis, to ensure the following:

1. Expenses allocated to a cost pool are relevant with this cost pool.
2. Relative allocation of cost pools to activities and network elements is reasonable, in line with the methodology and can be justified by the operator with relevant documentation.

Since the cost allocation methodology depends on data availability and systems in place which may differ among the operators, the methodology is principle- and not rule-based. Consequently, consistency checks refers to procedures tailored for each operator in a different way, in order to get assurance on items 1 and 2, above.

2.3.9. Tilted annuity depreciation

At least one operator requested that Tilted Annuity Depreciation (GRC-TA) be used in the top-down (TD) models, rather than straight line depreciation using the Historic Cost Accounting (HCA) convention.

The operators should deliver two top-down models which share the same allocation principles. The first top down model should be based on HCA in order to provide information on the historic performance of the operator, reconciled with relevant financial statements and the second model should be based on the GRC-TA concept. The GRC-TA concept - including efficiency adjustments - will be included in the BU LRIC model.

2.3.10. EPMU allocation

At least one operator requested that an alternative allocation method can be used for general overheads.

The methodology distributed to the operators provides general principles that can be followed, depending on data availability and systems in place. Therefore, any deviations from the methodology should supported with relevant documentation and will be assessed during the review.

2.3.11. Conversion factors

At least one operator comment on conversion factors presented in slide 25.

Slide number 25 was an illustrative example on conversion factors. Consequently, if the operator has adequate data to support different conversion factors then these can be used in cells B50:C58 in the sheet ‘B1. Network data’.

2.3.12. Formulas in the Sheet C.3.1. Calc. unit cost p. macro

At least one operator commented on the formulas within sheet Calc. unit cost p. macro.

It is our understanding that the formulas are correct. Operators comment on different traffic distribution by technology (2G/3G/4G) should be considered by the operator when applying relevant routing factors in the sheet “B1. Network data”, cells D10:X16.