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Abridged report on the monitoring of the quality of service of the cellular mobile operators serving Northern Cape Province – conducted by ICASA in 2017/2018 Quarter 4

1. Introduction

This report is produced for the benefit of consumers that may not have the time to read the full report and would like to (a) have a better understanding of the monitoring of quality of service (QoS) of cellular land mobile network operators and, (b) to understand the results of the Authority's monitoring exercise in Northern Cape Province during the period 22 January 2018 to 05 February 2018. The report is based on the extended report on the monitoring titled "Quality of Service Report: Northern Cape Province 2017/18 Quarter 4".

Section 2 describes what the quality of a network is about and how the measurements are conducted. Section 3 details why ICASA conducts QoS monitoring, while Section 4 focuses on the measurements that were conducted in Northern Cape Province. Section 5 gives the key results for the four operators (ECNS licensees) Cell C, MTN, Telkom Mobile and Vodacom. Section 6 gives the conclusion.

2. What is network quality of service and how are measurements done?

Quality of Service (QoS) measurement refers to the exercise of measuring the performance of services that are delivered over mobile networks. It provides an indication of what a customer experiences when using his/her cellphone on the cellular mobile network.

Only voice services are topical for this report. However, the Authority is in the process of establishing a capability to also monitor the quality of data services.

A drive-test method is used to measure the QoS. Drive-testing is a method of measuring the coverage, capacity and performance levels of a mobile network. Vehicles used are equipped with mobile radio equipment similar to a cellphone. The equipment can automatically make cellphone calls while driving. It makes calls in much the same way as a user would, but in a controlled and predetermined way. Measurements include a broad range of parameters of mobile cellular services.

Drive-tests are usually done on public roads. However, in villages, where public roads often do not exist, the vehicles may stop for a set of measurements and then advance to another point.

During a monitoring campaign for a particular province (which may take several weeks) the measurements are confined to a specific geographic region or regions. Specific regions are used for testing because it is not possible to survey an area as large as a province within the time and resources available. Fundamentally the measurements therefore represent a sampling of the network's performance.

When conducting measurements, calls would be initiated and maintained for a length of time. While doing so, it would be determined how easily a call is set up – whether the call is set up when first dialling, or whether there needs to be multiple attempts. Calls are of a standard length of time and during this period the system would also record whether a call is dropped. For voice calls, call set-up success ratio and call drop ratio are key elements in establishing quality of service (more on these aspects in section 3).

The whole process of making the calls is well controlled and parameters are automatically registered. Together with the measured values of the network parameters, the geographic position of every measurement is registered by means of a built-in GPS device. All the information is recorded in files, called logfiles, for post-measurement processing.

Technical standards apply for the measurements and there is also a subscriber service charter that guides the Authority.

3. Why is ICASA conducting QoS measurements?

The Authority does these quality-of-service measurements to ensure that the operators (service providers) maintain a reasonable level of quality of service delivered to their customers.

The two key performance indicators (KPIs) measured are fundamentally the accessibility of the network for calls and the ability of the network to retain the call, i.e. not drop it. The generic name for the ability to set up a call is *accessibility*. For the ability to not drop calls the generic name is *retainability*. In technical terms one measures the accessibility by a parameter called Call Setup Success Ratio (CSSR) and the retainability by a parameter called Drop Call Ratio (DCR).

More specifically, the Call Setup Success Ratio (CSSR) is the fraction of the attempts to make calls that result in a connection to the dialled number, whilst the Drop Call Ratio (DCR) is the fraction of the calls which, due to the network, were cut off before the speaking parties had finished their conversation. Satisfactory performance applies when at least 98% of calls are set up on the first attempt in dialling and if not more than 3% of calls are dropped.

4. Monitoring that was done in Northern Cape Province

The Authority conducted QoS measurements in Northern Cape Province on the networks of the cellular mobile operators Cell C, MTN, Telkom and Vodacom. The measurements were carried out between 22 January 2018 and 05 February 2018 and covered a total distance of over 2500 km.

The measurements were conducted in areas and in circumstances where the mobile service is likely to be frequently and widely accessed. These areas include

major towns, townships, farm areas, other rural areas, major road arteries, areas of major economic activity nodes and areas that generated previous complaints. The sampled areas include Kuruman, Upington, Springbok, Kamiesberg and Calvinia.

Focusing on the above regions was aimed at collecting sampled data that well represent the experience of the general public in an important and representative part of the province.

5. Key results

This section provides a summary and key findings of all measurements. The results give a snapshot of the mobile network performance and customer experience at these locations during the measurement period.

The results indicate that the quality of service and operators' network performance vary significantly on a per-location basis.

In terms of overall retainability (Drop Call Ratio) results, all operators failed to meet the 3% DCR target. There was no statistically significant difference in results between all operators.

In terms of overall accessibility (Call Setup Success Ratio), all operators failed to meet the 98% target. MTN's results show statistically significance difference in relation to other operators results. There is no statistically significance difference between Vodacom and Cell C results. Telkom results show statistically significance difference to other operators results.

A draft of the QoS monitoring report was shared with all the operators for comments and a network improvement plan. The summarised remedial actions are listed as follows:

5.1. Vodacom

Vodacom acknowledge that it is proving to be costly and difficult to provide adequate coverage in this area because of the sparse population, terrain and general lack of infrastructure; and shared the following remedial actions:

- Kuruman route – Plans for U900 layer addition to improve 3G coverage. New sites rollout and site sectorisation to be completed by June 2018.
- Upington route – Planned RF optimisation and U900 layer addition to improve coverage by March 2018.

Vodacom further noted the following:

- High percentage of these failures occurred outside of the Vodacom advertised coverage.
- For the areas that are outside of coverage, Vodacom is waiting for budget to be allocated under Rural coverage and exploring other alternative solutions. These solutions will take a minimum of 6 months to be implemented.

5.2. MTN

MTN did not provide a response within a time specified.

5.3. Cell C

Cell C highlighted the lack of its own network coverage in some of the areas tested. In order to provide Cell C subscriber with good quality of service, Cell C relies on its national roaming arrangement with Vodacom in addition to its own network coverage.

Cell C's plans and remedies to improve the low performance areas include the following:

- Cell C has project plans for the future to have site roll-out, capacity and transmission routes improved and optimised in the low performing areas.
- Cell C is further testing seamless handover with its roaming partner Vodacom.
- Kuruman route – three sites are planned for 2018 and additional site in 2020.
- Upington route – six sites are planned for 2018 and 2 additional sites in 2020. Two sites upgrade in Kakamas and Keimoes planned for 2018/19.
- Kamiesberg – New site planned in Garies.
- Calvinia – Cell C relies on Vodacom roaming outside the towns.
- Springbok – two new sites planned in built-up areas.

5.4. Telkom

Telkom gave the following response to the Authority's draft report:

- ICASA's drive tests give a snapshot of network performance on the specific day and time and is not a true representation of the overall network performance. Nevertheless, Telkom views the test results as very significant and use them as additional input to further improve the quality of the mobile network.
- Out of all areas tested, Telkom has deployed a mobile network only in Upington. In all other tested areas, Telkom depends on its roaming partner for coverage.
- Telkom has planned six (6) sites in Upington and five (5) in Kuruman. These sites are awaiting integration, which will take approximately nine (9) months to deploy.
- In Calvinia, Kamiesberg and Springbok, Telkom has currently no sites planned and will depends on MTN to provide service to customers.

Telkom will continue to optimize the network to resolve quality related issues on both UMTS and GSM and continue to engage with its roaming partner regarding service improvements in the affected area.

6. Conclusion

The monitoring method provides a snapshot of an operator's network performance, from the users' point of view, on the selected routes and the particular time of day. Although this is not necessarily a true representation of the mobile service providers overall network performance, enough understanding has been gained to assess that it could be difficult for a user to initiate a call in some of the tested areas. It also means that if the user succeeds in initiating a call and the call is established, then there is a likelihood that the call will be dropped before the user completes his/her conversation. However, the degree to which the operators' results are below the standard is not very large. Although users may be frustrated sometimes by not being able to make a call, or to have a call dropped, users will still be able to get a reasonable service from any of the operators.

On the positive side, the operators have taken note of the results obtained by the Authority. The operators have undertaken to further investigate and future network infrastructure investment to improve their respective networks in the areas of concern.