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**Abridged report on the monitoring of quality of service of the  
cellular mobile operators serving Eastern Cape Province –  
conducted by ICASA in financial year 2018/2019 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 the Eastern Cape Province during the period 12 December 2018 to 23 January 2019. The report is based on the extended report on the monitoring titled "2018/19 Quarter 4: Voice Quality of Service Report – Eastern Cape Province".

Section 2 describes what the quality of a network is about and how measurements are conducted. Section 3 details why ICASA conducts QoS monitoring, while Section 4 focuses on the measurements that were conducted in the Eastern Cape Province. Section 5 gives the key results for the four operators (ECNS/ECS licensees) Cell C, MTN, Telkom 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, call drop ratio, call setup time and speech quality 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 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 conducts 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 key performance indicators (KPIs) measured are: Accessibility, Retainability Response time and Speech Quality. In definition: *accessibility* refers to the ability to set up a call: *retainability* refers to ability of the network to retain the call, i.e. not drop it: *response time* refer to the time it takes for the user to connect to the nearest serving or base station and *speech quality* refers to the user's ability to hear the audio voice clearly.

To be more specific:

- Accessibility is measured through Call Setup Success Ratio (CSSR);
- Retainability is measured through Drop Call Ratio (DCR);
- Response time is measured through Call Setup Time; and
- Speech Quality is measured through the Mean Opinion Score.

The targets of the above, are stipulated in the End-user Service charter of 2016.

### **4. Monitoring that was done in Eastern Cape Province**

The Authority conducted QoS measurements in the Eastern Cape Province on the networks of the cellular mobile operators; Cell C, MTN, Telkom and Vodacom. The measurements were carried out between 12 December 2018 to 23 January 2019 and covered a total distance of over 3100 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 East London, Mdantsane, Dimbaza, Lady Frere and Dutywa.

Focus 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 finding 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, Cell C, MTN and Telkom did not meet the overall Drop Call Ratio target of less than 3%, thus failed the Retainability target. Vodacom is the only operator that met the overall Drop Call Ratio target of less than 3% as per the Authority's target

In terms of overall accessibility (Call Setup Success Ratio), all operators achieved less than 98% CSSR values, thus failed to meet the Accessibility target.

In terms of response time (Call Setup Time), all operators met the target as prescribed by the End-User and Subscribers Service Charter Regulation of 2016.

In terms of speech quality (Mean Opinion Score), only Vodacom and MTN met the target.

The detailed report was shared with the affected mobile operators in order for them to share their plans and remedial action to address issue of poor performance. The improvement plans and remedial actions are provided below.

### **5.1. Vodacom**

Vodacom provided feedback and network improvement plans that are in place for the areas that were identified to be negatively affecting customer experience by the Authority's QoS monitoring report and shared the following plans and remedial actions:

Dimbaza route – New sites are planned with the 2019/2020 budget.

Dutywa route – A further site hardening combined with new battery rollout is in progress, there are new sites planned and will be implemented in 2020. Transmission capacity and outage to be addressed.

East London route – There are plans for site hardening and to integrate new sites. Capacity enhancements has been completed as well as transmission stability improvement with self-provisioned transmission and better site availability with new battery rollout is in progress. LTE upgrades were completed in January 2019.

Lady Frere route – There is a site hardening combined with new battery rollout in progress as well as capacity upgrade. Transmission capacity and outage will be addressed with Telkom. Self-provisioning is planned to facilitate LTE rollout in the area.

Mdantsane route – There is a site hardening and new sites have been integrated in January and February. LTE rollout and further U900 upgrade have been implemented in January 2019, optimisation is in progress.

Furthermore, Vodacom is experiencing theft of feeders, cables and site wiring, batteries, generators, fuel and vandalism is a huge problem. However, there are a number of initiatives being undertaken by Vodacom to reduce the impact.

## **5.2. MTN**

MTN provided feedback and network improvement plans that are in place for the areas that were identified to be negatively affecting customer experience by the Authority's QoS monitoring and shared the following plans and remedial actions:

- Dimbaza route – A new site planned to improve coverage in the area. The source of interference to be identified and a change of tilts on several serving cells to improve coverage.
- Dutywa route – A new site planned to improve coverage in the area and restore the site that was out.
- East London route – A new site planned to improve coverage in the area. The source of interference to be identified and path imbalance issues to be resolved.
- Lady Frere route – A new site planned to improve coverage in the area and diversity issues will be resolved.

- Mdantsane route – A new site planned to improve coverage in the area and planned adjustment of tilts on several serving cells to create dominance and resolve overshooting cells.

Furthermore, MTN plans to increase site count to resolve poor coverage and clear the uplink interference issues. However, MTN will optimise the existing sites to improve coverage in the meantime.

### **5.3. Cell C**

Cell C attributes poor performance to tests currently underway to update system parameters in order to accommodate national roaming arrangement with the new roaming partner MTN . Cell C utters that the test period coincides with their major network optimising project which took place during the period of November 2018 to January 2019. However, Cell C’s plans and remedies to improve the low performance areas include the following:

- Dimbaza route – There was a transmission issue that affected performance and was resolved on 24<sup>th</sup> and 27<sup>th</sup> January 2019, the area has since improved.
- Dutywa route – The test device roamed on Vodacom quite significantly and there was no seamless handover. Further optimisation is needed.
- East London route – There was a transmission issue that affected performance and was resolved on 24<sup>th</sup> and 27<sup>th</sup> January 2019, the area has since improved. This area forms part of the last batch of Cell C to MTN neighbour optimisation that was implemented in early December 2018.
- Lady Frere route – This area forms part of the last batch of Cell C to MTN neighbour optimisation that was implemented in early December 2018. Cell C to engage with the roaming partner.
- Mdantsane route – Cell C to engage with the roaming partner on issues experienced while roaming. Optimisation is needed to improve data performance and transmission upgrade plan will be implemented within the first half of 2019.

### **5.4. Telkom**

Telkom views the test results as very significant and uses them as additional input to further improve the quality of the mobile network. Most call failures on the

Telkom network were due to inadequate network coverage. This is being addressed by building additional sites in the tested areas to provide a more contiguous network coverage. Telkom's deployment plan within these areas are set out below:

- Dimbaza route – 2 sites are planned to be built.
- Dutywa route – 1 site is planned to be built.
- East London route – there are currently 73 sites On-Air and an additional 16 sites are planned to be built.
- Lady Frere route – Telkom did not plan any sites for Lady Frere for the current financial year. Deployment of sites in this area will be considered during the new financial year.
- Mdantsane route – there are currently 16 sites on-Air and an additional 2 sites are planned to be built.

In addition to building additional sites, other initiative to improve network and service quality is underway including LTE Carrier Aggregation, reframing of 2100 MHz spectrum for LTE, UMTS R99 parameter optimization, 256QAM modulation, etc.

Furthermore, Telkom has recently signed a new national roaming agreement with Vodacom, which is being implemented. Advantages of the new roaming agreement includes roaming on 4G/LTE and seamless call handover between networks. This will significantly improve Telkom's overall network voice and data quality, especially in areas where it has limited or no network coverage.

## **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. 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.

All operators scored less than 98% CSSR values, thus failed to meet the Accessibility target. At an area level, Vodacom, Cell C and Telkom met the target in East London and Mdantsane whilst MTN only met the target in Lady Frere.

All operators except Vodacom, failed to meet the overall Drop Call Ratio target of less than 3%, thus failed to meet the Accessibility target.

Dimbaza and Dutywa were the areas where all operators experienced poor performance with none of them meeting the target of both the CSSR and DCR.

MTN and Vodacom were the only operators that met the target for Speech Quality in the overall results. All operators achieved Call Setup Time target according to the End-User and Subscribers Service Charter Regulation of 2016

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