



QUALITY OF SERVICE FINDINGS FOR MOBILE VOICE TELEPHONY AND DATA SERVICES IN UGANDA

1. BACKGROUND

Uganda Communications Commission (the Commission) was established by the Uganda Communications Act 2013 to champion the development of a modern communications sector which includes telecommunications, broadcasting, radio communications, postal communications, data communication and infrastructure.

The functions of the Commission include promoting and safeguarding the interests of consumers and operators as regards the quality of communications services and equipment. In fulfilment of this, the Commission sets standards for operators on among others, the quality of communication services to be provided in Uganda.

In the period from 8th – 23rd December 2021, the Commission conducted benchmark measurements of mobile voice telephony and data services in Uganda to assess the Quality of Service (QoS) received by user/consumers of these services. The operators whose services were considered under this exercise were Airtel Uganda Limited (Airtel), MTN Uganda Limited (MTN), Smile Communications Uganda Limited (Smile), Tangerine Limited TA Lycamobile and Uganda Telecom Limited (UTL).

The measurements were carried out from the end user perspective in 3 towns (Kampala, Mukono and Entebbe).

The summary of the findings of this exercise are hereby presented.

2. INTERPRETATION

The following information is provided to facilitate the consideration of the findings.

- A. Quality of Service (QoS) is defined as the totality of characteristics of a telecommunications service that bear on its ability to satisfy stated and implied needs of the user of the service. QoS covers the entire communication path from end-to-end between user-to-user or user-to-content interfaces.
- B. Call Attempt means an attempt to achieve a connection to one or more devices attached to a telecommunications network which commences when the destination address information required for setting up the call is sent by the user.
- C. Blocked call means a call attempt that fails to achieve a connection to the destination party and therefore not receiving an alerting or ring tone, busy tone, answer signal or announcement.
- D. Dropped call means a call terminated by the network before it is ended by either party participating in the call.
- E. A successful call means a call that;
 - Rings and is terminated with a 'no answer' message from the network or voice mail services or an announcement that the subscriber is not available.
 - Is responded to by the network with:
 - a busy signal indicating the called party is on another call,

- a network announcement that a wrong (invalid or non-existent) number has been dialled, or
 - rings, is answered and terminated by either call party.
- F. Data means the form in which information moves around the internet or in which information is processed or stored by a communication device.
- G. Data Throughput means how much data (number of data packets) that gets transferred from one point on the network to another in a given amount of time. It is measured in bits per second (bps).
- H. The Commission standard for QoS is as indicated below

| SN | Parameter | Definition | Target |
|----|-------------------------|---|--------|
| 1. | Blocked Call Rate (BCR) | Maximum proportion of successful call attempts on the network that should be blocked | ≤2% |
| 2. | Dropped Call Rate (DCR) | Maximum proportion of successful call attempts on the network that should be dropped | ≤2% |
| 3. | Call Setup Success Rate | Proportion of call attempts with an indication of call connection (alerting, busy tone or announcement) within 12 seconds from the instant the user initiates a request | ≥95% |

3. SUMMARY OF THE FINDINGS

The findings are presented as follows:

Figure 1 through figure 3 show a summary of the QoS results for the mobile voice services.

Figure 4 presents the average download throughput measured for data services.

Figure 7 presents the Major causes of the failures that were observed during the exercise.

Major causes of inadequate or degraded voice performance

- The following were the top contributors to the performance degradation observed:
- i. **Limited coverage:** Areas where there is no signal or the signal strength/level is too low for a phone to connect to the mobile network.
 - ii. **Degraded signal quality:** Degradation in the quality of the network signal due to interference to the radio signal majorly originating from another radio in the same network using the same frequency or due to other radio systems in the area.

Figure 1: Comparative results on the Call Setup Success Rate.

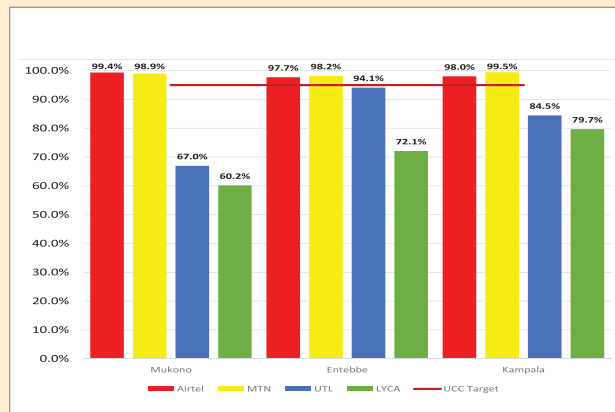


Figure 2: Comparative results on the Blocked Call Rate.

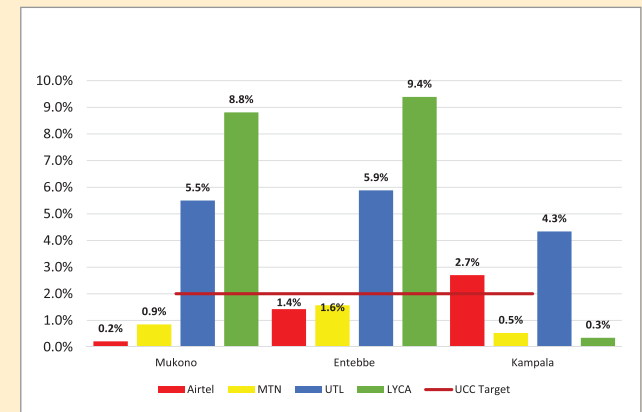


Figure 3: Comparative results on the Dropped Call Rate.

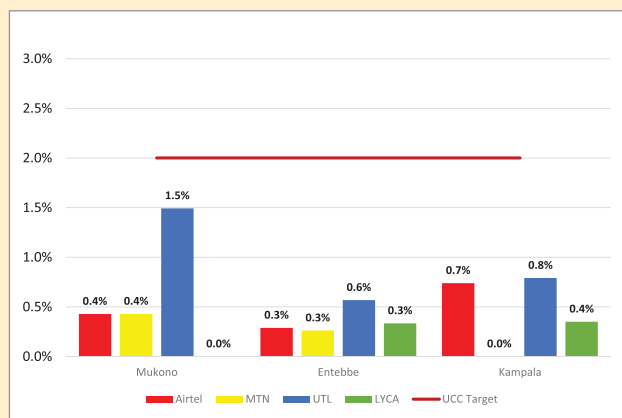
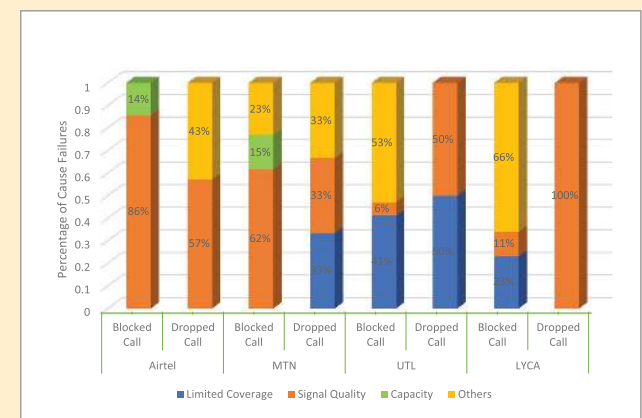


Figure 4: Average HTTP Download Throughput measured on the different operator's networks.



Figure 5: Proportion of causes of degradation in performance observed.



4. CONCLUSION

It is noted that coverage remains a significant factor with a number of blackspots (geographical areas with poor or no communication coverage). The causes of these blackspots include:

- a) geographical terrain – valleys and sides of hills,
- b) placement of the tower/mast relative to the location – the radio or phone signal reduces with distance away from the tower,

- c) physical obstructions (e.g. buildings and trees),
- d) dense and metallic building material impacting signal penetration and in turn indoor coverage.

There has also been a significant deterioration in QoS due to illegally installed signal boosters which cause interference instead to the cellular networks. Always contact your operator to assist with proper installation of signal enhancements equipment or apparatus.

The Commission in its effort to ensure improvement in QoS has;

1. Engaged the operators for remedial plans to address the observed causes of deterioration in service
2. The licensed operators have been obliged to ensure their network extends at least 90% of the geographical licensed area.
3. The Commission is clamping down and confiscating illegal GSM repeaters. The Commission remains committed to ensuring the availability of quality and modern communication services to foster the realisation of the transformation of Uganda into a modern and prosperous country.

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