TANZANIA COMMUNICATION REGULATORY AUTHORITY

QUALITY OF SERVICE RESULT FOR MOBILE COMMUNICATION SERVICES IN TANZANIA FOR THE PERIOD OF APRIL TO JUNE, 2023

1. Introduction

In fulfilment of the requirements of the Electronic and Postal Communications (Quality of Service) Regulations, 2018 the Tanzania Communications Regulatory Authority carried out measurements on Quality of Service (QoS) for Voice and Data (Internet) services from the end users' viewpoint.

Quality of Service (QoS) measurements were carried out for six Mobile Service Providers namely Airtel Tanzania Plc (trading as Airtel), Viettel Tanzania Plc (trading as Halotel), MIC Tanzania Plc (trading as Tigo and Zantel), Tanzania Telecommunications Corporation (trading as TTCL) and Vodacom Tanzania PLC (trading as Vodacom) in **Kahama, Songwe, Mbeya, Kigoma, Katavi, Tabora, and Rukwa** Measurements were conducted from April to June, 2023 for services offered on 2G, 3G and 4G technologies through mobile devices in auto mode configuration.

QoS measurements were conducted considering the QoS parameters and measurements methods as specified in the schedules to the Electronic and Postal Communications (Quality of Service) Regulations 2018.

2. Quality of Service Results

The following is the summary on quality of service results for Mobile Network Operators in Tanzania for the period of April to June, 2023.

a) Network Availability

Network Availability is a measure of how well the mobile network is available when consumers want to use mobile network services. The threshold for compliance is greater than 99%.

Vodacom and Airtel passed the target in all seven (7) measured service areas, MIC-Tigo failed to reach target only in Kahama, MIC-Zantel failed to reach target only in kahama, Halotel failed to reach target only in Rukwa while TTCL failed to reach target only in Kigoma as shown in Figure 1.

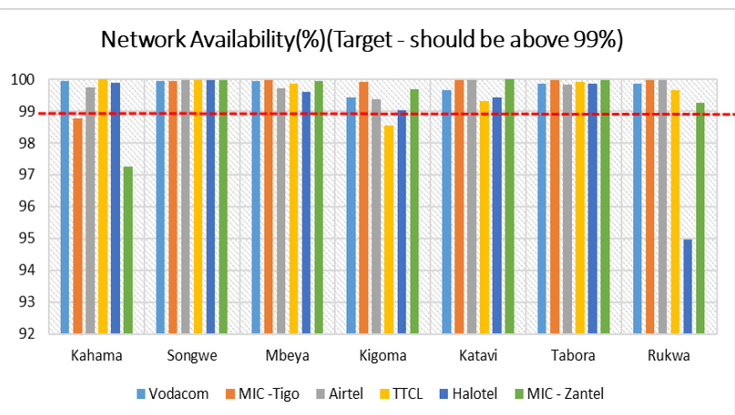

Figure 1: Comparative results on the Network Availability

b) Call Connection Failure Rate

Call Connection Failure Rate is a measure of percentage of calls failed to connect after dialing due to technical reasons. The threshold for compliance is less than 2%.

Vodacom failed to reach target only in Rukwa, MIC-Tigo failed to reach target only in kahama while MIC-Zantel failed to reach target in Kahama, Kigoma and Tabora. Halotel failed to reach target in Mbeya, Songwe and Katavi, Airtel failed to reach target in four (4) service areas while TTCL failed to reach target in five (5) service areas as shown in Figure 2.

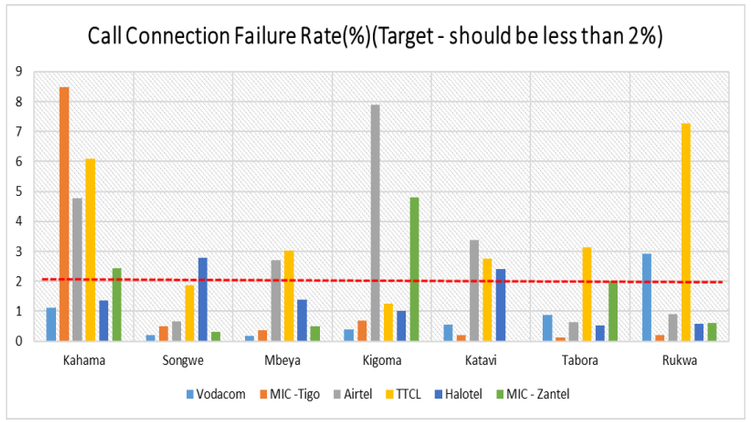

Figure 2: Comparative results on the Call Connection Failure Rate

c) Call Drop Rate

Call Drop Rate is a measure of percentage of calls which were cut off due to technical reasons before the speaking parties finish their conversation and before one of them hang up (dropped calls). The threshold for compliance is less than 2%.

Vodacom, MIC-Tigo TTCL, Halotel and MIC-Zantel passed target in all seven (7) measured service areas, while Airtel failed to reach target in Tabora and Mbeya as shown in Figure 3.

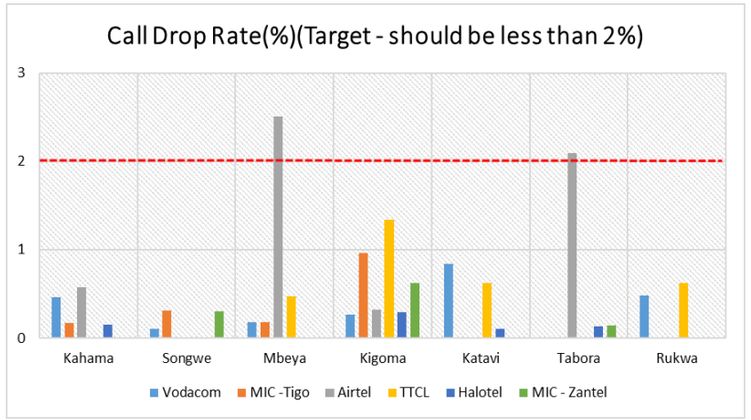

Figure 3: Comparative results on the Call Drop Rate

d) 2G Service Coverage

2G Service Coverage is a measure of how well service areas are covered by a particular mobile network operator signal for consumers to get mobile network service. In areas with no coverage or very poor coverage, consumers cannot get mobile network services. Threshold for compliance for 2G technologies is -85 dBm.

MIC –Tigo, Airtel, Vodacom, Halotel and MIC -Zantel passed target in all seven (7) measured service areas while TTCL failed to reach target only in Mbeya as shown in Figure 4.

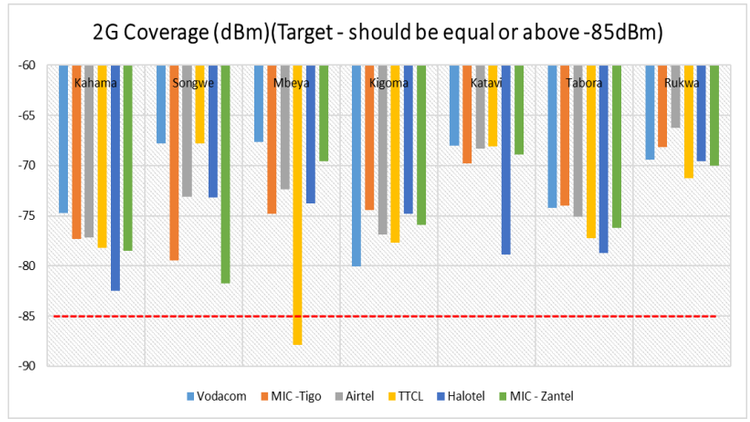

Figure 4: Comparative results on 2G Coverage

e) 3G Service Coverage

3G Service Coverage is a measure of how well service areas are covered by a particular mobile network operator signal for consumers to get mobile network service. In areas with no coverage or very poor coverage, consumers cannot get mobile network services. Threshold for compliance for 3G technologies is -85 dBm.

Vodacom, MIC-Tigo TTCL, Halotel, TTCL and MIC-Zantel Halotel passed target in all seven (7) measured service areas as shown in Figure 5.

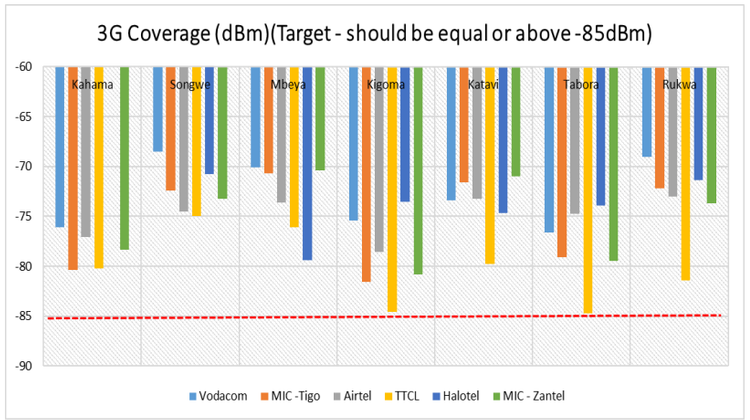

Figure 5: Comparative results on 3G Coverage

f) 4G Service Coverage

4G Service Coverage is a measure of how well service areas are covered by a particular mobile network operator signal for consumers to get mobile network service. In areas with no coverage or very poor coverage, consumers cannot get mobile network services. Threshold for compliance for 4G technology is -95 dBm.

Vodacom, MIC-Tigo, MIC-Zantel, Halotel and Airtel passed target in all seven (7) measured service areas, while TTCL failed to reach target only in Katavi as shown in Figure 6.

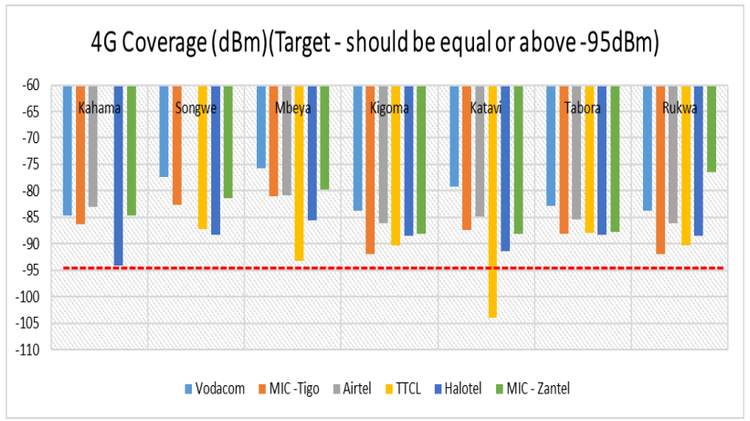

Figure 6: Comparative results on 4G Coverage

g) **Call Success Rate**

Call Success Rate is a measure of the percentage of calls completed successful after dialing such that was neither blocked nor dropped. The threshold for compliance is equal or greater than 95%.

Vodacom and Halotel passed target in all seven (7) measured service areas, MIC-Tigo failed to reach target only in Kahama while MIC-Zantel failed to reach target only in Kigoma. TTCL failed to reach target in Kahama and Rukwa. Airtel failed to reach target in Kahama, Mbeya and Kigoma as shown in Figure 7.

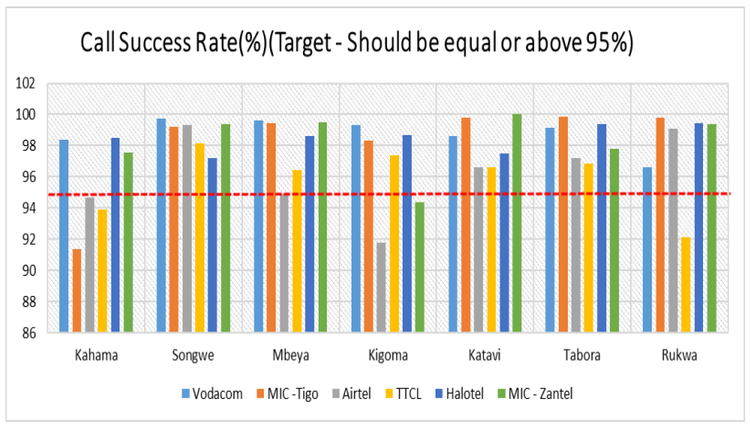

Figure 7: Comparative results on Call Success Rate

h) **Handover Success Rate**

Handover Success Rate is a measure of how well voice calls are transferred from one communication tower to another without dropping while user is moving. The threshold for compliance is equal or greater than 98%.

MIC-Tigo, Vodacom, Airtel, Halotel and MIC-Zantel passed target in all seven (7) measured service areas, while TTCL failed to reach target only in Rukwa as shown in Figure 8.

i) **Voice Quality (MOS)**

Voice Quality (MOS) is a measure of the perception of the audio quality of the conversation during a call. The MOS Score scale ranges from 1 to 5 with 1 being poor and 5 being excellent audio quality. Threshold for compliance is an average of all Voice Quality (MOS) measurements samples being greater than 3.5.

Vodacom, MIC-Tigo, TTCL, Airtel, Halotel and MIC-Zantel passed target in eighteen (18) measured service areas as shown in Figure 9.

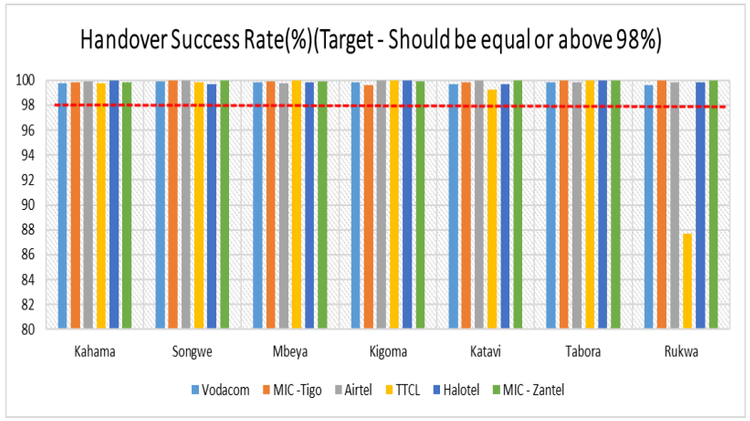

Figure 8: Comparative results on Handover Success Rate

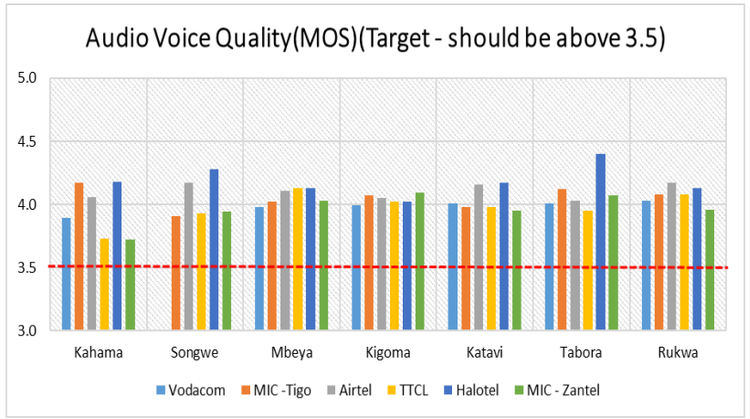

Figure 9: Comparative results on Voice Quality

j) **Download Mean Data Rate**

Download Mean Data rate is a measure of the rate of data transfer on a network. It measures how fast data is transferred from a file transfer protocol (ftp) server to a mobile device. The threshold for compliance is average being greater or equal to 4000 kbps.

Vodacom, MIC-Tigo and Halotel passed target in all seven (7) measured service areas, MIC-Zantel o failed to reach target only in Kahama, while Airtel and TTCL failed to reach target in Kahama and Katavi as shown in Figure 10.

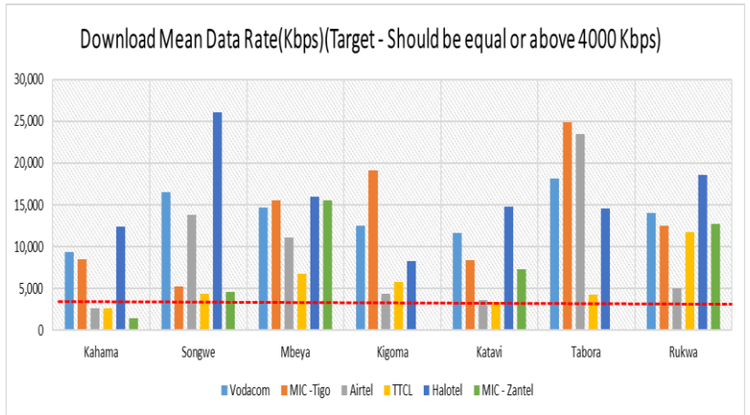

Figure 10: Comparative results on Download Mean Data Rate

k) **Ping Round Trip Time**

Ping Round Trip Time is a measure of duration taken for user equipment to sends a request to when it receives a response from a server. The threshold for compliance is average being less than 400 ms.

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Vodacom, MIC-Tigo, MIC- Zantel and Halotel passed target in all seven (7) measured service areas, Airtel failed to reach target only in Katavi while TTCL failed to reach target in five (5) service areas as shown in Figure 11.

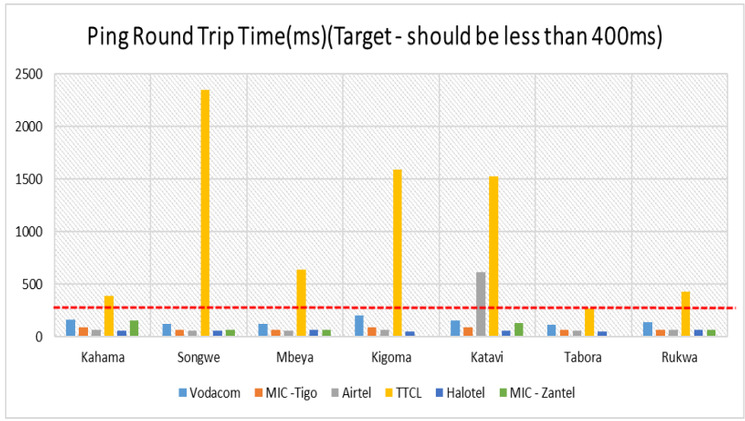

Figure 11: Comparative results on Ping Round Trip Time

l) **Attach Failure Ratio**

Attach Failure Ratio is a percentage of failures when a mobile phone fail to connect to network when powered ON or flight mode turned OFF. The threshold for compliance is less than 2%.

MIC-Tigo and Halotel passed target in all seven (7) measured service areas, MIC-Zantel failed to reach target only in Kahama, Airtel failed to reach target in Kigoma and Kahama, TTCL failed to reach target in six (6) service areas while Vodacom failed to meet target in five (5) service areas as shown in Figure 12.

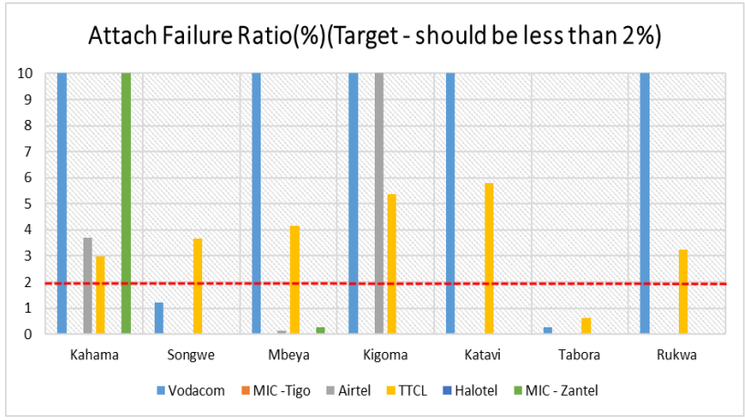

Figure 12: Comparative results on Attach Failure Ratio

m) **Attach setup time**

Attach setup time is a measure of time taken mobile phone to connect to network when powered ON or flight mode turned OFF. The threshold for compliance is less than 5 seconds.

Vodacom, MIC-Tigo, TTCL, Airtel, Halotel and MIC-Zantel passed target in all seven (7) measured service areas as shown in Figure 13.

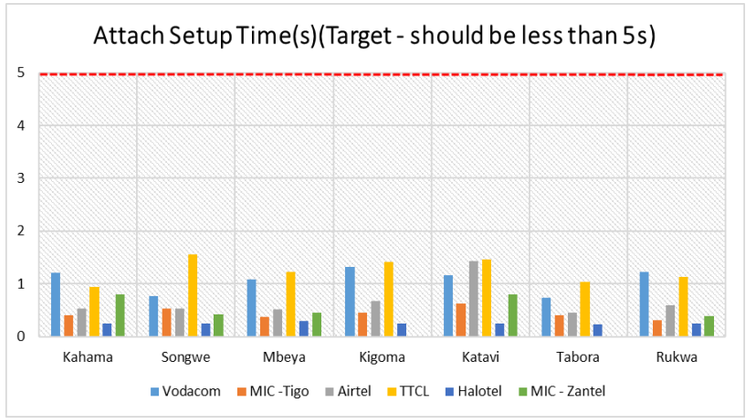

Figure 13: Comparative results on Attach setup time

n) **Call setup time**

Call setup time is a measure of time taken for a call to connect after dialling. The threshold for compliance is less than 10 seconds.

Vodacom, MIC-Tigo, Airtel and Halotel passed target in all seven (7) measured service areas, MIC-Zantel TTCL failed to reach target in Kigoma and Tabora while TTCL failed to reach target in Kahama, Songwe and Rukwa as shown in Figure *14.*

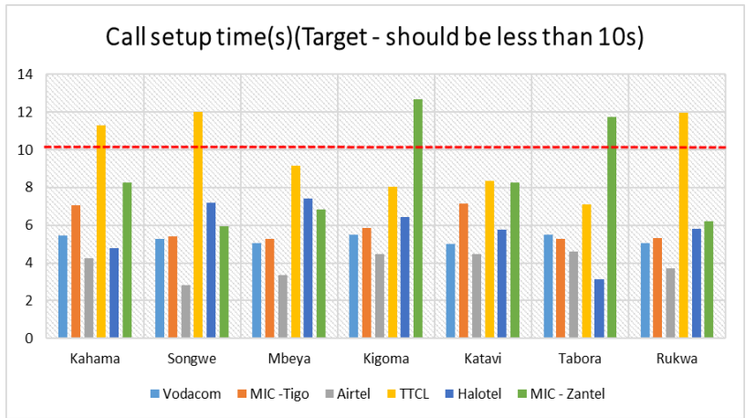

Figure 14: Comparative results on Call setup time

3. Conclusion

This quality of service result reveals that for **period of April to June, 2023** the leading brand was **MIC-Tigo which failed three (3)** parameters, followed by **Halotel which failed four (4)** parameters, followed by **Vodacom which failed six (6)** parameters, followed by **MIC-Zantel which failed nine (9)** parameters, followed by **Airtel which failed fourteen (14)** parameters and last one was **TTCL which failed twenty-seven (27)** parameters.

TCRA already met with mobile network operators to discuss observed issues and heard their responses. TCRA is closely following up on implementation of provided improvement plan to ensure consumers are satisfied by good quality of service. TCRA is also continuous monitoring quality of service for other areas quarterly in making sure all areas have good quality of service.

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