QUALITY OF SERVICE MONITORING REPORT- SECOND QUARTER 2024

Department of Engineering & Infrastructure

June 2024

1. Background

One of the responsibilities of the Authority as provided for in the National Communications Authority Act 2022 is to ensure fair competition and protect the consumer against poor network quality of service.

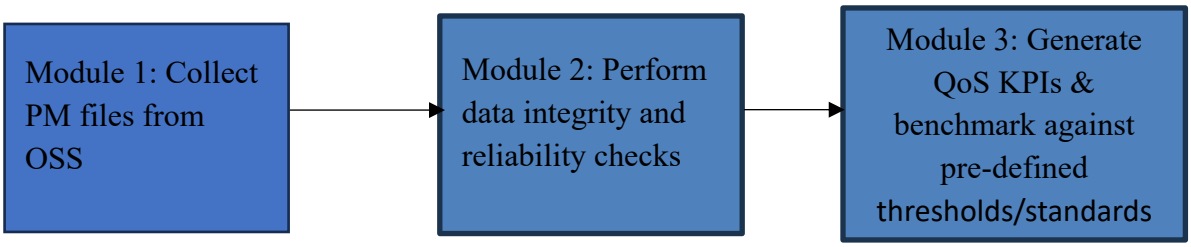
Pursuant to the provisions of Section 15 of the Quality of Service (QoS) Regulations 2020, and the QoS obligations outlined in the relevant sections of the cellular mobile licenses for Operators, the Authority is to measure and audit the compliance of licensees with predefined Key Performance Indicators (KPIs) on an equal basis.

The measurement of 2G KPIs is carried out on three (3) Mobile Network Operators (MNOs), namely Orange, Africell, and Qcell. Raw files are collected daily from the Base Station Controllers (BSCs) of these operators and dumped into servers hosted by SALCAN. This data is analyzed to understand technical parameters that translate into the end-user's perception of the quality of service.

The second quarter of 2024 report provides obligatory monitoring and enforcement of 2G Voice service of quality, evaluated using KPIs of radio network parameters including Cell Availability**,** Stand-alone Dedicated Control Channel (SDCCH), Call Drop Rate, and SDCCH Congestion, Traffic Channel (TCH) call drop rate and TCH Congestion, and Call setup Success Rate.

1.1 Methodology for Networks Performance Measurement

This report is based on the analysis of network performance data collected from the operators' Performance Management (PM) files using the Authority's Network Monitoring System (NMS) for the months of April, and June 2024. The NMS is designed to interface passively with the operator's Operations Support System (OSS) platform via a Virtual Private Network (VPN) connection. The functions of the NMS and its modular architecture are captured in the block diagram below:



2. Definition of Key Performance Indicators (KPIs) Measured

Call Setup Success Rate (CSSR): Call Setup Success Rate (CSSR) measures successfully initiated calls by the mobile station. It is a critical KPI for evaluating network performance, as a low CSSR indicates potential difficulties for subscribers in making successful calls. CSSR is measured using performance monitoring systems and Test station, which analyze PM files from operators' network. The threshold for call setup success rate is set at **≥ 95%.**

Traffic Channel (TCH) Drop Call Rate: Traffic channels (TCH) consist of a combination of voice and data signals (time slot assignments) within a communication channel. The TCH call drop rate refers to the ratio of call drops to successful TCH seizures after the Base Station Controller (BSC) successfully assigns TCHs to mobile stations. It is measured using performance monitoring systems and test stations by analyzing PM files from operators' networks. The threshold for TCH drop call rate is set at **≤ 2%.**

TCH Congestion Rate: TCH congestion rate is the proportion of the number of TCH assignment failures to the number of TCH seizure requests. If the TCH congestion rate is high, the network service quality deteriorates. It is measured using performance monitoring systems and Test Stations by analyzing PM files of Operator's networks. The threshold for TCH congestion rate is set at **≤ 1.5%**

SDCCH Congestion: SDCCH Congestion: This KPI reflects the network's ability to handle signaling traffic such as call setup, SMS, location updates, and authentication procedures. High congestion can lead to call setup failures and degraded user experience. It is measured using performance monitoring systems and test station by analyzing PM files from Operator's networks. The threshold for SDCCH Congestion rate is set at **≤ 1.5%.**

3. Quality of Service Monitoring Results

The table below provides an average summary of monthly performance measurements for the four (4) GERAN KPIs each compared with their respective thresholds. The figures indicate pre-defined threshold of a particular KPI.

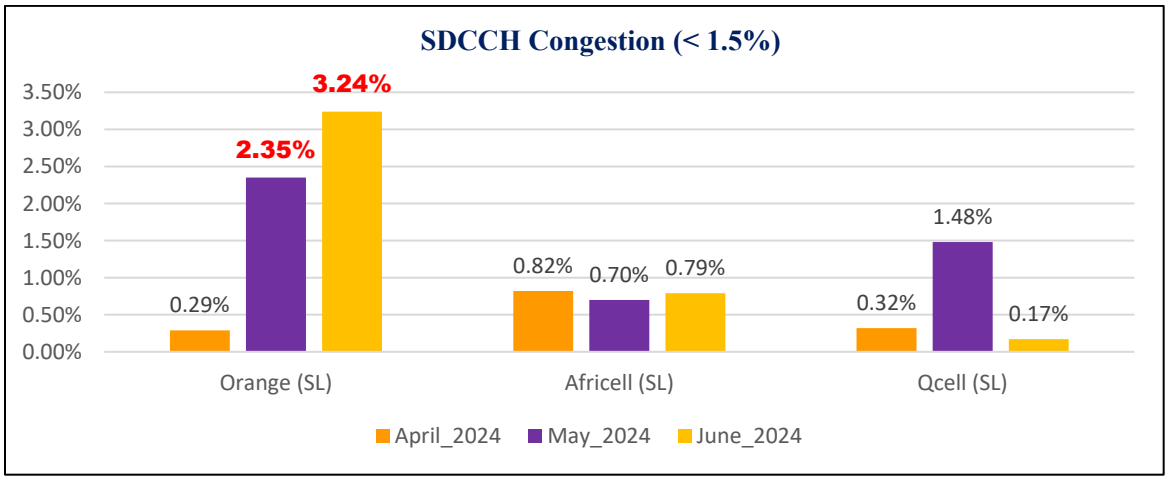
Operator	2G KPI	SDCCH Congestion (%)	TCH Congestion (%)	Call Drop Rate (%)	Call Setup Success Rate (%)
	Threshold	< 1.5%	< 1.5%	< 2%	> 95 %
Orange (SL)	April 2024	0.29%	0.27%	0.41%	98.68%
	May 2024	2.35%	0.73%	0.52%	95.99%
	June 2024	3.24%	1.07%	0.54%	94.60%
Africell (SL)	April 2024	0.82%	0.02%	0.15%	98.60%
	May 2024	0.70%	0.02%	0.14%	98.71%
	June 2024	0.79%	0.03%	0.15%	98.37%
Qcell (SL)	April 2024	0.32%	0.01%	0.12%	99.60%
	May 2024	1.48%	0.03%	0.14%	98.42%
	June 2024	0.17%	0.01%	0.13%	96.95%

4. KPI Analysis for GERAN(2G)

A detailed analysis of the four (4) KPIs for the three (3) mobile network operators is provided hereafter.

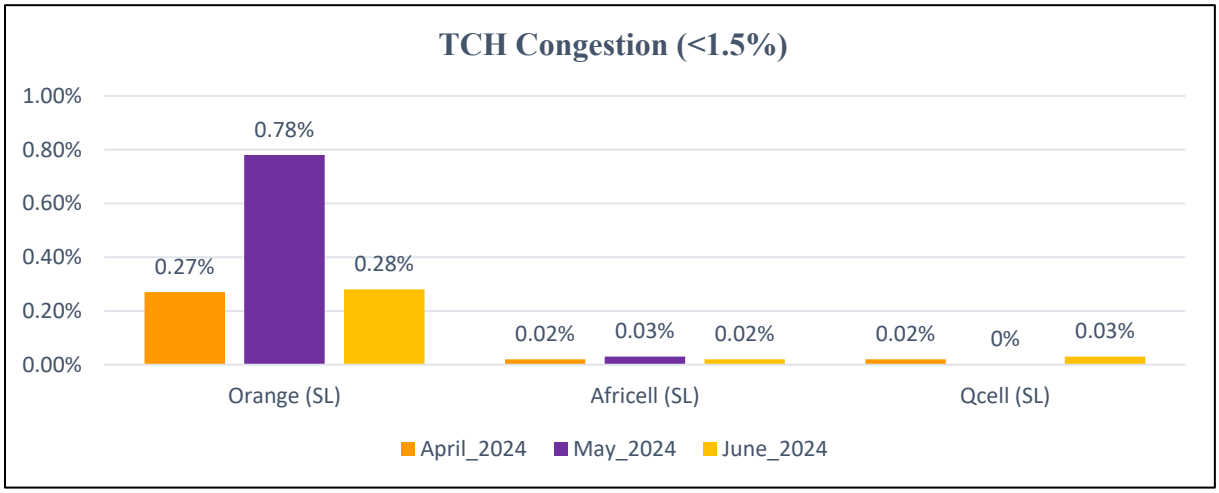
4.1 SDCCH Congestion Rate

The bar chart below illustrates the analysis of SDCCH Congestion (< 1.5%) for the second quarter of 2024, specifically covering the months of April, May, and June of 2024. Africell and Qcell met the pre-defined threshold in the three months. In contrast, Orange failed to meet the threshold in both May and June 2024.



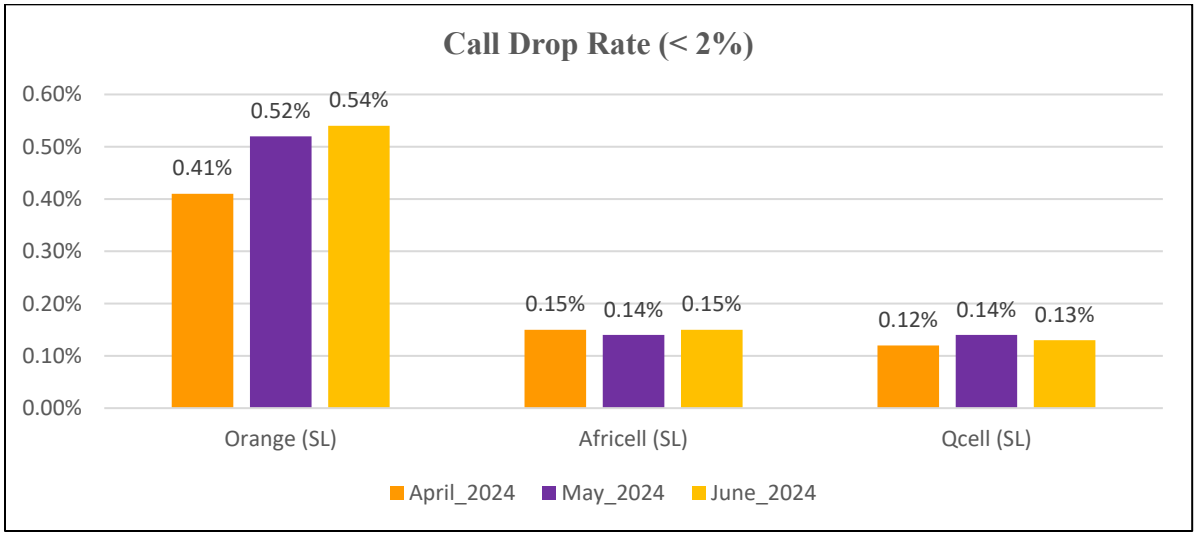
4.2 TCH Drop Call Rate

The bar chart below illustrates the analysis of the TCH Drop Call Rate (<1.5%) for the second quarter of 2024. All three Mobile Network Operators (MNOs) viz: Orange, Africell and QCELL met the pre-defined threshold for this KPI.



4.3 Call Drop Rate (< 2%)

The bar chart below illustrates the analysis of the Call Drop Rate (<2%) for the second quarter of 2024. During this period, all three Mobile Network Operators (MNOs) Orange, Africell, and QCELL achieved the pre-defined KPI threshold of <2%.



4.4 Call Setup Success Rate

The bar chart below illustrates the analysis of the Call Setup Success Rate (> 95) for the second quarter of 2024. All Mobile Network Operators (MNOs) achieved the pre-defined threshold for this KPI.