



NATIONAL COMMUNICATIONS AUTHORITY

Quality of Service (QoS) Monitoring of Cellular Mobile Voice Services

[September 2014]

[Communications for Development]

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Background

In pursuance of Annexure D1 and D2 of the Cellular Mobile Licence of Telecommunication Operators, the user perspective of the quality of voice services are tested to ensure the compliance of Operators to the obligations on service quality to the user.

The report is based on findings on quality of service in Ashanti, Greater Accra, Eastern and Volta regions from April to September 2014. Espresso network was not available in all test locations at the time of testing except the Ashanti Region.

What we measure

As per the Cellular Mobile licence obligations, the QoS indicators and their respective threshold for compliance under assessment considering the user's perspective are;

- **Stand-alone Dedicated Control Channel (SDCCH) Congestion Rate**
- **Call Setup Time (CST)**
- **Call Congestion Rate**
- **Call Drop Rate (CDR)**

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Findings

The results for the cities and towns tested this month are as below:

a) Stand-alone Dedicated Control Channel (SDCCH) Congestion Rate

SDCCH Congestion Rate should be equal or less than one per cent (1%).

SDCCH Congestion is defined as the probability of failure of accessing a stand-alone dedicated control channel during call set up.

For analysis and calculations,

$$\text{SDCCH Congestion}[\%] = \frac{\text{Number of connect fails due to Immediate Assignment Failures}}{\text{MOC call attempts}} \times 100\%$$

The results for the cities and towns tested this year are as below:

Month	City/Town	MTN	Vodafone	Tigo	Airtel	Glo
APRIL	KUMASI	0	0	0	0	0
APRIL	OBUASI	0	0	0	0	0
APRIL	MAMPONG	0	0	0	0	0
APRIL	KONONGO	0	0	0	0	0
MAY	GREATER ACCRA	0	0	0	0	0
JUNE	TEMA	0	0	0	0	0
JULY	SUNYANI	0	0	0	0	0
JULY	BEREKUM	0	0	0	0	0
AUGUST	TECHIMAN	0	0	0	0	0
AUGUST	DORMAH AHENKRO	0	0	0	0	0
AUGUST	WENCHI	0	0	0	0	0
AUGUST	AFLAO	0	0	0	0	0
AUGUST	KETA	0	0	0	0	0
AUGUST	ANLOGA	0	0	0	0	0
AUGUST	HO	0	0	0	0	0
AUGUST	KPANDO	0	0	0	0	0
AUGUST	HOHOE	0	0	0	0	0
AUGUST	JASIKAN	0	0	0	0	0
AUGUST	KOFORIDUA	0	0	0	0	0
AUGUST	ASAMANKESI	0	0	0	0	0
SEPTEMBER	ODA	0	0	0	0	0
SEPTEMBER	AKOSOMBO	0	0	0	0	0

Table 1 Signalling Congestion Rate Cellular Mobile Voice Service, 2014

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REMARK:

- ❖ All Operators were in compliance in tested cities and towns with the signalling congestion threshold of less than 1 percent (1%).

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b) Call Setup Time (CST)

CST should be less than ten seconds (<10secs) in 95% of cases.

Call Setup Time is the period of time elapsing from the sending of a complete destination address (target telephone number) to the setting up of a call to the receiving terminal;

$$\text{Call set - up time [s]} = t_{\text{alerting - signal}} - t_{\text{address - sending}}$$

$t_{\text{alerting - signal}}$ – Moment when an alerting signal is sent to the called terminal

$t_{\text{address - sending}}$ – Moment user presses the SEND button on the calling terminal

Table 2. Call Setup Time of Cellular Mobile Voice Service, 2014

Month	City/Town	MTN	Vodafone	Tigo	Airtel	Expresso	Glo
APRIL	KUMASI	6.25	13.62	8.48	6.06	14.75	7.05
APRIL	OBUASI	6.05	5.32	14.27	6.79	n/a	5.62
APRIL	MAMPONG	4.98	13.78	6.73	7.39	17.70	7.31
APRIL	KONONGO	5.51	7.62	10.69	9.81	n/a	19.62
MAY	GREATER ACCRA	8.45	13.64	12.52	9.21	8.9	8.94
JUNE	TEMA	7.12	7.39	12.81	8.03	7.7	8.24
JULY	SUNYANI	7.9	8.9	12.8	6.7	n/a	13.9
JULY	BEREKUM	6.9	9.00	10.6	7.9	n/a	12
AUGUST	TECHIMAN	8.9	6.481	14.481	6.8	n/a	14.48
AUGUST	DORMAH AHENKRO	7.8	9.042	13.042	5.9	n/a	13.04
AUGUST	WENCHI	5.9	13.825	13.825	9.7	n/a	13.83
AUGUST	AFLAO	6.03	5.11	6.45	5.79	n/a	5.36
AUGUST	KETA	4.21	5.6	7.80	7.04	n/a	7.95
AUGUST	ANLOGA	10.2	13.91	7.45	7.4	n/a	7.49
AUGUST	HO	9.5	13.95	9.98	6.68	n/a	7.38
AUGUST	KPANDO	5.1	11.70	6.78	5.29	n/a	22.4
AUGUST	HOHOE	5.21	11.63	6.65	7.14	n/a	6.9
AUGUST	JASIKAN	6.24	13.20	11.12	5.56	n/a	n/a
AUGUST	KOFORIDUA	6.00	5.72	8.92	7.29	n/a	6.24
AUGUST	ASAMANKESE	4.6	4.72	13.73	6.36	n/a	4.07
SEPTEMBER	ODA	6.5	5.8	7.06	6.28	n/a	4.3
SEPTEMBER	AKOSOMBO	4.3	5.52	7.20	7.43	n/a	19.48

REMARK:

- ❖ All Operators except MTN and Airtel failed to meet the parameter threshold in certain locations.
- ❖ Expresso was not available in all locations at the time of testing.

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c) Call Congestion Rate

Traffic Channel Congestion should be equal or less than one per cent (1%).

Call Congestion Rate is the probability of failure of accessing a traffic channel during call setup;

$$\text{Call Congestion [\%]} = \frac{\text{Number of Connect failed calls}}{\text{Total number of call attempts}} \times 100\%$$

Table 3 Call Congestion Rate Cellular Mobile Voice Service, 2014

Month	City/Town	MTN	Vodafone	Tigo	Airtel	Expresso	Glo
APRIL	KUMASI	0.00	0.00	0.11	0.10	6.71	2.10
APRIL	OBUSI	0.00	0.00	16.33	0.00	n/a	0.00
APRIL	MAMPONG	0.00	0.00	0.00	0.00	7.24	0.00
APRIL	KONONGO	0.00	0.00	0.00	0.00	0.00	0.00
MAY	GREATER ACCRA	0.00	1.65	0.11	0.00	1.2	2.34
JUNE	TEMA	0.00	4.33	0.19	0.00	0.59	3.42
JULY	SUNYANI	0.28	0.26	0.51	0.00	0.51	n/a
JULY	BEREKUM	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	TECHIMAN	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	DORMAH AHENKRO	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	WENCHI	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	AFLAO	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	KETA	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	ANLOGA	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	HO	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	KPANDO	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	HOHOE	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	JASIKAN	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	KOFORIDUA	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	ASAMANKESE	0.00	0.00	0.00	0.00	n/a	0.00
SEPTEMBER	ODA	0.00	0.00	0.00	0.00	n/a	0.00
SEPTEMBER	AKOSOMBO	0.00	0.00	0.00	0.00	n/a	0.00

REMARK:

- ❖ MTN and Airtel remained compliant with the licence threshold of less than one percent (1%) Congestion in all the tested locations.
- ❖ Vodafone and Glo exceeded the licence threshold of one percent (1%) in Accra and Tema.

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- ❖ Tigo recorded higher TCH congestion in violation of their licence threshold in Obuase. However they obtained compliance in all other tested Cities and Towns.
- ❖ Expresso measured very high TCH congestion in the Ashanti Region. They were not present in other testing locations.

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d) Call Drop Rate (CDR)

Call drop rate should be equal or less than three per cent (3%).

Voice Call Drop Rate is the probability of a call terminating without any of the users' will;

$$\text{Drop Rate [\%]} = \frac{\text{Number of calls terminated unwillingly}}{\text{Total number of call attempts}} \times 100\%$$

Table 4 Call Drop Rate Cellular Mobile Voice Service, 2014

Month	City/Town	MTN	Vodafone	Tigo	Airtel	Expresso	Glo
APRIL	KUMASI	0.00	0.00	0.00	0.00	0.91	0.00
APRIL	OBUASI	0.00	0.00	0.00	0.00	n/a	0.00
APRIL	MAMPONG	0.00	0.00	0.00	0.00	0.00	0.00
APRIL	KONONGO	0.00	0.00	0.00	0.00	0.00	0.00
MAY	GREATER ACCRA	0.00	0.00	0.00	0.06	0.00	0.00
JUNE	TEMA	0.00	0.00	0.00	0.18	0.00	0.00
JULY	SUNYANI	0.00	0.00	0.00	0.00	0.00	n/a
JULY	BEREKUM	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	TECHIMAN	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	DORMAH AHENKRO	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	WENCHI	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	AFLAO	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	KETA	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	ANLOGA	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	HO	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	KPANDO	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	HOHOE	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	JASIKAN	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	KOFORIDUA	0.00	0.00	0.00	0.00	n/a	0.00
AUGUST	ASAMANKESE	0.00	0.00	0.00	0.00	n/a	0.00
SEPTEMBER	ODA	0.00	0.00	0.00	0.00	n/a	0.00
SEPTEMBER	AKOSOMBO	0.00	0.00	0.00	0.00	n/a	0.00

REMARK:

- ❖ All operators except Expresso were in compliance with the Call Drop Rate licence threshold of less than three percent (3%) in all localities tested in February.
- ❖ Expresso was not present in all test locations except the for Ashanti region.

REMEDIES

- ❖ The NCA has notified operators of publications of these findings and postponed sanctions to defaulters pending operator's performance in the next monitoring.