

QUALITY OF SERVICE (QoS) MONITORING OF CELLULAR MOBILE VOICE SERVICES

In pursuance of Annexures 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 all regions from January to April 2013.

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

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,

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

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

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;

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

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;

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

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

Table 1 Signalling Congestion Rate Cellular Mobile Voice Service

Month	City/Town	MTN	Vodafone	Tigo	Airtel	Glo
January	Tamale	0	0.3	0	0	0.31
January	Wa	0	0	0	0.34	0
January	Jirapa	0	0	1.18	N/A	N/A
January	Nandom	0	0	0	0	N/A
January	Bolgatanga	0	0	1.59	0	0
January	Navrongo	0	1.03	0	0	0
January	Bawku	0	0	0	0	N/A
January	Aflao	0	0	0	0	3.42
January	Keta	0	0	0	0	0
January	Anloga	0	0	0	0	8.96
January	Ho	4.23	0	0	0	0
January	Kpando	0	0	0	0	14.04
January	Jasikan	0	0	0	0	N/A
January	Hohoe	0	0	0	0	0.72
January	Asamankese	0	0	0	0.34	0.68
January	Akim Oda	0	0	0	0	0
January	Koforidua	0	0	0.21	0	0
January	Akosombo	0	0	0	0	N/A
February	Kumasi	0.07	0	0.27	0.07	0.43
February	Konongo	0	0	0	0	0
February	Mampong	0	5.81	0	0	5.26
February	Obuasi	0	0	0	0	0
March	Sunyani	0	0	0	0	0.19
March	Berekum	0	0	0	0	0
March	Dormah	0	0	0	0	0
March	Techiman	0	0	0	0	0
March	Wenchi	0	0	0	0	0
March	Kasoa	0	0	0	0	1.35
March	Swedru	0	0	0	0	0
March	Winneba	0	0	0	0	0
March	Cape Coast	0	0	0	0	1.43
March	Elmina	0	0	0	0	1.19
March	Takoradi	0.12	0	0.13	0	0.44
March	Tarkwa	0.68	0	0	0	0
April	Accra	0.12	0.09	0.22	0.00	0.77
April	Tema	0.00	0.00	0.00	0.00	0.60
April	Tamale	0	0.3	0	0	N/A
April	Yendi	0	0	0	0	N/A
April	WA	0	0	0	0	N/A
April	Jirapa	0	0	0	N/A	N/A
April	Nandom	0	0	0	0	N/A
April	Bolgatanga	0	0	0	0	N/A
April	Navrongo	0	0	0	0	N/A
April	Bawku	0	0	0	0	N/A

REMARK:

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

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Table 2. Call Setup Time of Cellular Mobile Voice Service, 2013

Month	City/Town	MTN	Vodafone	Tigo	Airtel	Expresso
January	Tamale	10.92	7.9	7.04	6.91	13.44
January	Wa	7.8	7.17	12.09	7.75	12.42
January	Jirapa	8.84	4.44	12.1	N/A	N/A
January	Nandom	8.84	4.14	7.55	7.05	N/A
January	Bolgatanga	4.6	5.69	6.66	8.14	10.42
January	Navrongo	4.6	5.22	6.48	7.41	N/A
January	Bawku	8.54	6.67	7.01	7.92	11.23
January	Aflao	10.42	7.15	8.26	7.28	N/A
January	Keta	10.88	8.94	9.25	9.05	11.24
January	Anloga	11.5	8.82	8.87	9.43	14.08
January	Ho	14.05	9.18	8.51	8.84	13.71
January	Kpando	13.58	8.81	8.43	8.99	9.73
January	Jasikan	10.52	8.58	8.34	8.66	9.51
January	Hohoe	10.56	9.75	8.01	9.14	10.41
January	Asamankese	9.03	8.64	7.94	9.07	12.6
January	Akim Oda	9.95	9.09	8.21	8.45	9.94
January	Koforidua	10.8	9.1	8.49	9.81	10.49
January	Akosombo	7.2	7.2	7.75	8.99	10.63
February	Kumasi	14.96	9.72	10.54	10.27	15.58
February	Konongo	10.89	8.54	8.23	9.65	10.97
February	Mampong	10.88	10.17	7.88	9.38	N/A
February	Obuasi	12.16	8.37	6.86	12.14	9.92
March	Kasoa	17.7	7.82	11.16	8.18	14.25
March	Swedru	7.71	6.83	6.95	8.07	12.57
March	Winneba	7.53	7.47	7.06	7.3	11.01
March	Cape Coast	9.5	7.21	9.5	7.39	14.12
March	Elmina	7.54	7.64	7.32	9.11	15.42
March	Takoradi	9.73	7.62	12.39	9.7	13.24
March	Tarkwa	9.99	6.68	10.72	7.37	13.87
March	Sunyani	12	9.99	9.98	9.48	10.74
March	Berekum	10.37	8.24	8.49	9.42	10.5
March	Dormaa	10.78	10.38	8.91	9.86	16.59
March	Techiman	9.65	6.38	8.14	9.31	15.93
March	Wenchi	N/A	8.66	7.73	9.29	15.45
April	Accra	12.79	8.93	13.00	8.80	15.66
April	Tema	14.02	9.29	9.83	8.23	15.34
April	Tamale	10.45	11.53	8.59	8.86	12.34
April	Yendi	10.88	15.72	8.12	9.33	9.57
April	Wa	10.8	8.46	8.28	9.59	14.55
April	Jirapa	10.36	7.86	7.96	N/A	N/A
April	Nandom	9.86	7.29	8.13	8.65	N/A
April	Bolgatanga	12.1	8.82	9.87	9.59	12.09
April	Navrongo	9.92	8.09	10.13	9.19	14.89
April	Bawku	10.28	9.82	9.94	9.91	N/A

REMARK:

- ❖ Airtel was the only network that was compliant with Call Setup time of less than ten(10) seconds in all cities and towns tested in March and April.

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Table 3 Call Congestion Rate Cellular Mobile Voice Service, 2013

Month	City/Town	MTN	Vodafone	Tigo	Airtel	Expresso	Glo
January	Tamale	0	0	0.16	0	1.12	0
January	Wa	0.31	0	0	0	9.94	0
January	Jirapa	0	0	0	N/A	N/A	N/A
January	Nandom	0	0	0	0	N/A	N/A
January	Bolgatanga	0	0	21.03	4.46	0	0
January	Navrongo	0	0	1.15	0	0	N/A
January	Bawku	1.03	0	0	0	N/A	0
January	Aflao	0	0	0	0	0	N/A
January	Keta	4.82	0	0	1.33	0	0
January	Anloga	6.06	0	0	0	0	0
January	Ho	0.7	0	0	0	0	0
January	Kpando	0	0	0	0	0	0
January	Jasikan	0	0	0	0	N/A	0
January	Hohoe	0	0	0	0	0	0
January	Asamankese	0	0	0	0	1.43	0
January	Akim Oda	0	0	0	0	11.54	0
January	Koforidua	0.9	0	0	0	1.27	0
January	Akosombo	0	0	0	0	1.05	N/A
February	Kumasi	1.72	0	0	0.70	0	0
February	Konongo	0	0	0	0	18.31	0
February	Mampong	0	0	0	0.98	N/A	0
February	Obuasi	0.5	0	0	0.00	12.07	0
March	Kasoa	5.26	0	0	0	0	0
March	Swedru	0	0	0	0	1.87	0
March	Winneba	0	0	0	0	1.45	0
March	Cape Coast	0.67	0	0	0	0	0
March	Elmina	0	0	0	0	3.23	0
March	Takoradi	2.94	0	0	0.41	1.65	0
March	Tarkwa	2.7	0	0	0	4.62	0
March	Sunyani	0.71	0	2.29	0.23	10.69	0
March	Berekum	0.96	0	0	0	0	17.9
March	Dormaa	1.03	0	0.99	0	0	7.5
March	Techiman	1.9	0	0.44	0	0	14
March	Wenchi	N/A	0	0	0	0	3.5
April	Accra	2.62	0	1.13	0.3	2.04	0
April	Tema	0.4	0	0	0	0	0
April	Tamale	2.6	0	1.2	2.24	2.4	N/A
April	Yendi	0	0	0	17.95	N/A	0
April	Wa	0	0	1.2	0.32	2.4	N/A
April	Jirapa	0	0	0	N/A	N/A	N/A
April	Nandom	0	0	0	N/A	N/A	N/A
April	Bolgatanga	1.73	0	11.73	9.59	2.3	N/A
April	Navrongo	0	0	42.98	0	4.4	N/A
April	Bawku	0	0	2.41	0	N/A	N/A

REMARK:

- ❖ Vodafone was the only network that remained within the call congestion threshold of less than one percent (1%) in all localities that were tested in March and April.

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Table 4 Call Drop Rate Cellular Mobile Voice Service, 2013

Month	City/Town	MTN	Vodafone	Tigo	Airtel	Expresso	Glo
January	Tamale	0	0.89	0	0.43	0	0.31
January	Wa	0	0	1.34	0	3.11	0
January	Jirapa	0	0	0	N/A	N/A	N/A
January	Nandom	0	0	0	0	N/A	N/A
January	Bolgatanga	0	0	0.4	0	0	0
January	Navrongo	0	0	1.15	0	0	N/A
January	Bawku	0	0	0	0	N/A	0
January	Aflao	0	0	0	0	N/A	0.85
January	Keta	0	0	0	0	0	6.38
January	Anloga	0	0	0	0	0	4.48
January	Ho	0	0	0	0	0	0
January	Kpando	0	0	0	0	0	1.75
January	Jasikan	0	0	0	0	N/A	0
January	Hohoe	0	0	0	0	0	0
January	Asamankese	0	0	0	0	0	0
January	Akim Oda	0	0	0	0	0	0
January	Koforidua	0.22	0.21	0.21	0.22	0	0
January	Akosombo	0	0	0	0	0	N/A
February	Kumasi	0.34	0.36	0.27	0.14	1.79	0
February	Konongo	0	0	1.25	0	0.00	0
February	Mampong	0	0	0	0	N/A	0
February	Obuasi	0.49	0	0	0	0.00	0.5
March	Kasoa	0	0	0.65	1.34	0.65	0.68
March	Swedru	0.91	0	0	1.75	0	0
March	Winneba	0	0	0	1.02	0	0
March	Cape Coast	0	0	0	0.52	0	0.24
March	Elmina	0	0	0	2.47	0	0
March	Takoradi	0	0.12	0	0.55	0	0.44
March	Tarkwa	0.68	0	0	1.48	1.54	1.63
March	Sunyani	0.23	0	0.91	0	0	0.19
March	Berekum	0	0	0	0	0	0
March	Dormaa	0	0	0	0	0.96	0
March	Techiman	0	0	0	0	0.34	0
March	Wenchi	1.21	0	0	0	0	0
April	Accra	0.45	0.22	0.34	0.64	0	0.16
April	Tema	0	0	0.46	0.23	0	0
April	Tamale	0.3	0.3	1.16	0	0	N/A
April	Yendi	0	0	0	0	0	N/A
April	WA	0	0.2	0	0.64	0	N/A
April	Jirapa	0	0	0	N/A	N/A	N/A
April	Nandom	0	0	0	0	N/A	N/A
April	Bolgatanga	0	0	0	0	0	N/A
April	Navrongo	0	0	0	0	0	N/A
April	Bawku	0	0	0	0	N/A	N/A

REMARK:

- ❖ All operators were in compliance with the Call Drop licence threshold of less than three percent (3%) in all localities tested in April.

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REMEDIES

The NCA has notified Operators of publication of these findings and sanctioned operators concerning measurement performed in March and April are as follows:

- ❖ MTN has been sanctioned GhC350,000.00 for defaulting Call congestion and Call Setup Time obligations in the Greater Accra, Upper East, Upper West and Northern Regions.
- ❖ Tigo has been sanctioned GhC250,000.00 for defaulting Call Setup Time obligation in Western as well as Greater Accra Region and Call Congestion obligation in Upper East , Upper West and Northern Regions.
- ❖ Espresso has been sanctioned GhC200, 000.00 for defaulting Call Congestion obligations in Western, Upper West, Upper East and Northern regions.
- ❖ Glo has been sanctioned GhC100,000.00 for defaulting Call Setup Time and Call Completion obligations in Brong Ahafo Region.
- ❖ Airtel has been sanctioned GhC 50,000.00 for defaulting Call Congestion obligation the Northern region.
- ❖ Vodafone has been sanctioned GhC 50,000.00 for defaulting Call Setup Time obligation in Northern region.