



NATIONAL COMMUNICATIONS AUTHORITY

Quality of Service (QoS) Monitoring of Cellular Mobile Data Services- NORTHERN REGION

[August 2016]

**QUALITY OF SERVICE (QoS) MONITORING OF CELLULAR MOBILE DATA SERVICES IN NORTHERN
REGION, AUGUST 2016**

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Background

In pursuance of obligations of the 3G Cellular Mobile Licence of Telecommunication Operators, the consumer perspective of the quality of data 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 data service in the Northern Region between 6th August and 1st September 2016 for all Operators except Espresso due to technical challenges.

What we measure

As per the 3G Cellular Mobile licence obligations, the QoS indicators and their respective threshold for compliance under assessment considering the user's perspective are as below;

- **Data Access Success Rate (DASR)**
- **Data Drop Rate (DDR)**
- **Data Throughput**

Findings

The results for the district capitals within Northern Region tested during the period are as below:

a. Data Access Success Rate

Data Access Success Rate is the probability of success in connecting to the public server.

Data Access Success Rate should be equal or better than *ninety-five per cent (95%)*

For analysis and calculations,

$$\text{Packet Service Success Rate [\%]} = \frac{\text{Number of successful PDP Context Activations}}{\text{Total number of PDP Context Activation requests}} \times 100\%$$

The results for the district capitals tested during the period are as below:

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Table 1. Data Access Success Rate, August 2016

Month	Town	MTN	Vodafone	Tigo	Airtel	Glo
August	Bimbilla	100%	100%	No 3G Coverage	100%	No 3G Coverage
August	Bole	100%	100%	100%	100%	
August	Buipe	100%	100%	No 3G Coverage	100%	
August	Bunkpurugu	100%	100%	100%	100%	
August	Chereponi	100%	100%	100%	100%	
August	Daboya	No 3G Coverage	No 3G Coverage	No 3G Coverage	No 3G Coverage	
August	Damongo	100%	100%	100%	100%	
August	Gambaga	100%	98.33%	98.33%	100%	
August	Gushiegu	100%	100%	100%	100%	
August	Karaga	95.65%	100%	No 3G Coverage	100%	
August	Kumbungu	100%	100%	100%	No 3G Coverage	
August	Saboba	100%	100%	100%	100%	100%
August	Sagnarigu	100%	100%	100%	100%	100%
August	Salaga	100%	No 3G Coverage	100%	100%	No 3G Coverage
August	Sang	No 3G Coverage	No 3G Coverage	No 3G Coverage	No 3G Coverage	
August	Savelugu	100%	100%	100%	100%	
August	Sawla	100%	100%	100%	97.73%	
August	Tamale	100%	99%	100%	100%	97.59%
August	Tatale	100%	No 3G Coverage	No 3G Coverage	No 3G Coverage	No 3G Coverage
August	Tolon	100%	100%	100%	100%	
August	Walewale	100%	100%	100%	100%	
August	Yagaba	No 3G Coverage	No 3G Coverage	No 3G Coverage	No 3G Coverage	
August	Yendi	100%	100%	100%	100%	
August	Zabzugu	100%	100%	100%	100%	

REMARKS:

- ❖ All Operators complied with the Data Access Success Rate obligation in all the available District Capitals tested.

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b. Data Drop Rate

Data Drop Rate is the probability to drop in connection to a public server without end user's intervention.

Data Drop Rate should be equal or less than *one per cent (1%)*.

$$\text{Data Drop Rate [\%]} = \frac{\text{Number of aborted PDP context activations}}{\text{Total number of PDP Context Activation requests}} \times 100\%$$

Table 2. Data Drop Rate, August 2016

Month	Town	MTN	Vodafone	Tigo	Airtel	Glo
August	Bimbilla	0%	0%	No 3G Coverage	0%	No 3G Coverage
August	Bole	0%	0%	0%	0%	
August	Buipe	0%	0%	No 3G Coverage	0%	
August	Bunkpurugu	0%	0%	0%	0%	
August	Chereponi	0%	0%	0%	0%	
August	Daboya	No 3G Coverage	No 3G Coverage	No 3G Coverage	No 3G Coverage	
August	Damongo	0%	0%	0%	0%	
August	Gambaga	0%	0%	0%	0%	
August	Gushiegu	0%	0%	0%	0%	
August	Karaga	0%	0%	No 3G Coverage	0%	
August	Kumbungu	0%	0%	0%	No 3G Coverage	
August	Saboba	0%	0%	0%	0%	0%
August	Sagnarigu	0%	0%	0%	0%	
August	Salaga	0%	No 3G Coverage	0%	0%	No 3G Coverage
August	Sang	No 3G Coverage	No 3G Coverage	No 3G Coverage	No 3G Coverage	
August	Savelugu	0%	0%	0%	0%	
August	Sawla	0%	0%	0%	0%	
August	Tamale	0%	0%	0%	0%	0%
August	Tatale	0%	No 3G Coverage	No 3G Coverage	No 3G Coverage	No 3G Coverage
August	Tolon	0%	0%	0%	0%	
August	Walewale	0%	0%	0%	0%	
August	Yagaba	No 3G Coverage	No 3G Coverage	No 3G Coverage	No 3G Coverage	

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Month	Town	MTN	Vodafone	Tigo	Airtel	Glo
August	Yendi	0%	0%	0%	0%	
August	Zabzugu	0%	0%	0%	0%	

REMARKS:

- ❖ All Operators complied with the licence threshold of less than one percent (1%) in the available District Capitals tested.

c. Data Throughput

Data Throughput is the rate of data transfer.

As per the 3G licence obligations, the minimum data transfer rate for 90% of data connections should be *256kbps or better*

Table 3. Data Throughput, August 2016

Month	Town	MTN	Vodafone	Tigo	Airtel	Glo
August	Bimbilla	282.43	6829.76	No 3G Coverage	726.05	No 3G Coverage
August	Bole	5519.31	6914.32	3048.69	5490.22	
August	Buipe	10173.4	5987.54	No 3G Coverage	7326.62	
August	Bunkpurugu	10508.64	2967.28	3426.63	6136.30	
August	Chereponi	7723.00	3020.63	3326.66	2206.33	
August	Daboya	No 3G Coverage	No 3G Coverage	No 3G Coverage	No 3G Coverage	
August	Damongo	7684.87	6956.62	3096.87	4387.11	
August	Gambaga	4365.46	2771.32	1768.14	5283.92	
August	Gushiegu	2078.05	8398.44	2911.07	2720.37	
August	Karaga	389.56	8410.68	No 3G Coverage	1334.23	
August	Kumbungu	5977.82	6456.82	3046.61	No 3G Coverage	
August	Saboba	3951.36	1238.23	3084.01	2863.50	
August	Sagnarigu	3239.78	4041.99	6703.54	219.47	
August	Salaga	681.64	No 3G Coverage	2873.71	5231.33	No 3G Coverage
August	Sang	No 3G Coverage	No 3G Coverage	No 3G Coverage	No 3G Coverage	

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Month	Town	MTN	Vodafone	Tigo	Airtel	Glo
August	Savelugu	2563.77	8153.50	3279.36	551.37	
August	Sawla	4609.73	1508.75	2938.94	2930.37	
August	Tamale	2449.27	4672.07	4586.33	1111.98	637.75
August	Tatale	1933.11	No 3G Coverage	No 3G Coverage	No 3G Coverage	No 3G Coverage
August	Tolon	10280.33	5533.57	3393.97	9601.61	
August	Walewale	3322.94	4290.89	2520.3	5508.63	
August	Yagaba	No 3G Coverage	No 3G Coverage	No 3G Coverage	No 3G Coverage	
August	Yendi	2605.59	7966.37	3279.44	3757.30	
August	Zabzugu	7095.06	1369.61	3511.36	3338.16	

REMARKS:

- ❖ All Operators except Airtel were compliant with the licence threshold of Data Throughput in all the available District Capitals tested.
- ❖ Airtel failed the Data Throughput licence threshold at Sagnarigu.

REMEDIES

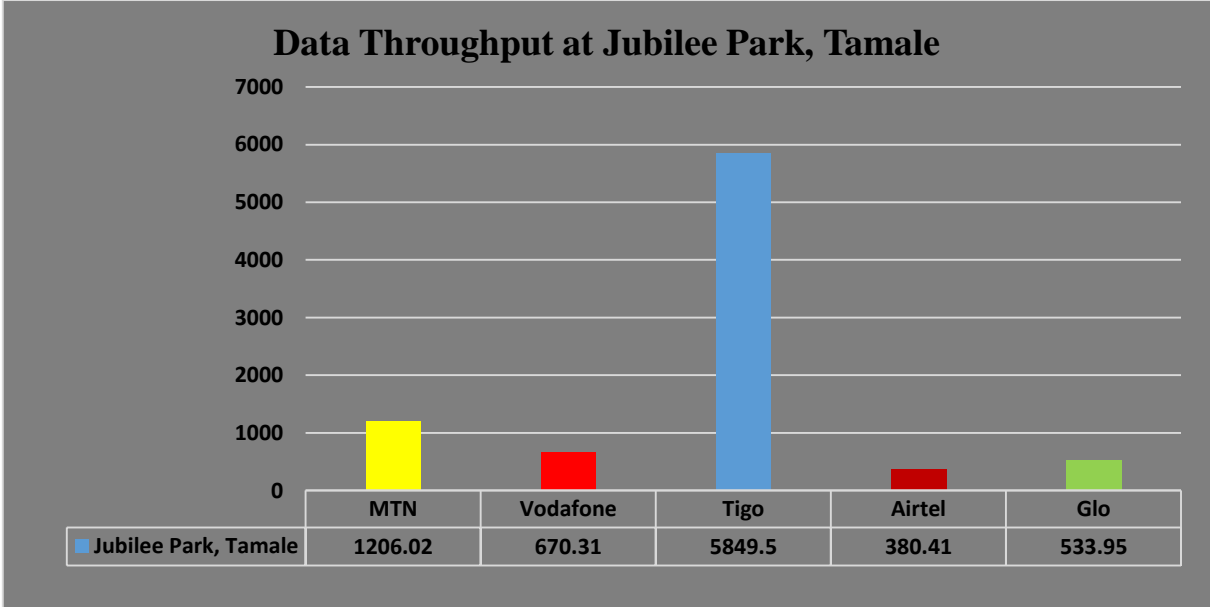
- ❖ The NCA has notified Operators of publication of these findings and directed all Operators to improve any obligation in default by December, 2016.
- ❖ Sanctions will be applied to Operators on obligations in default after December, 2016.

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APPENDIX 1

The Graphs below show the Throughput levels attained by Operators in each location where monitoring was performed.

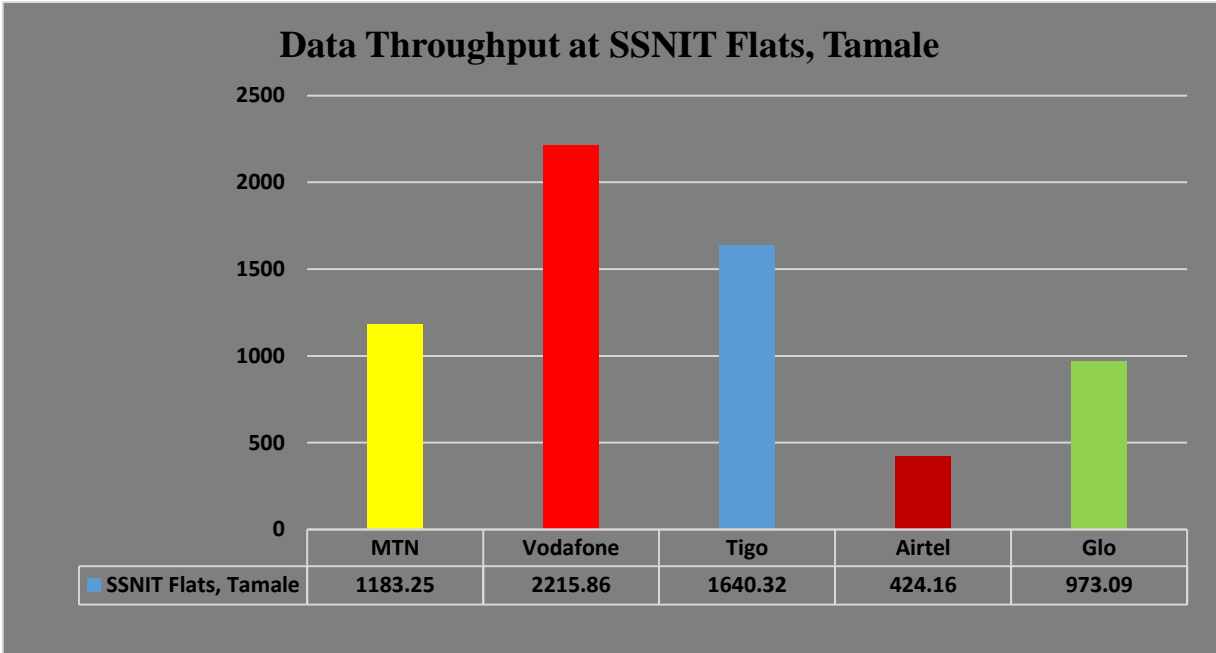
Figure 1. Data Throughput September 2016, Jubilee Park, Tamale



REMARKS:

- ❖ All Operators exceeded the Data Throughput threshold of 256kbps

Figure 2. Data Throughput September 2016, SSNIT Flats, Tamale

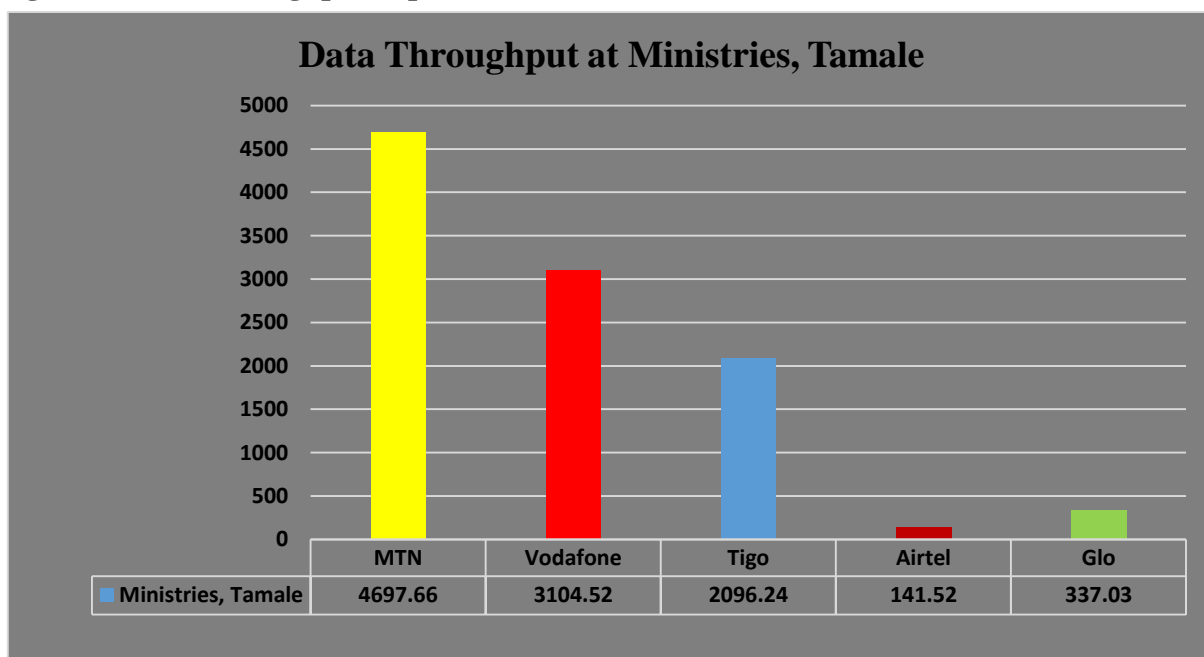


REMARKS:

- ❖ All Operators exceeded the Data Throughput threshold of 256kbps

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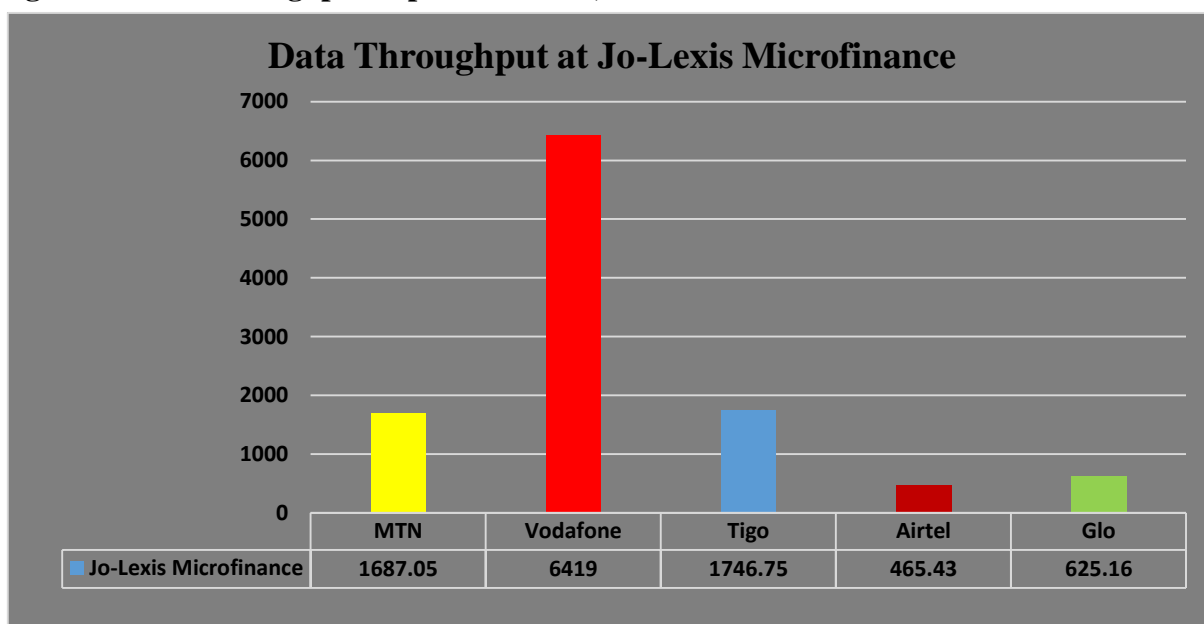
Figure 3. Data Throughput September 2016, Ministries, Tamale



REMARKS:

- ❖ All Operators except Airtel exceeded the Data Throughput threshold of 256kbps.
- ❖ Airtel failed the Data Throughput licence condition at Ministries.

Figure 4. Data Throughput September 2016, Jo-Lexis Microfinance

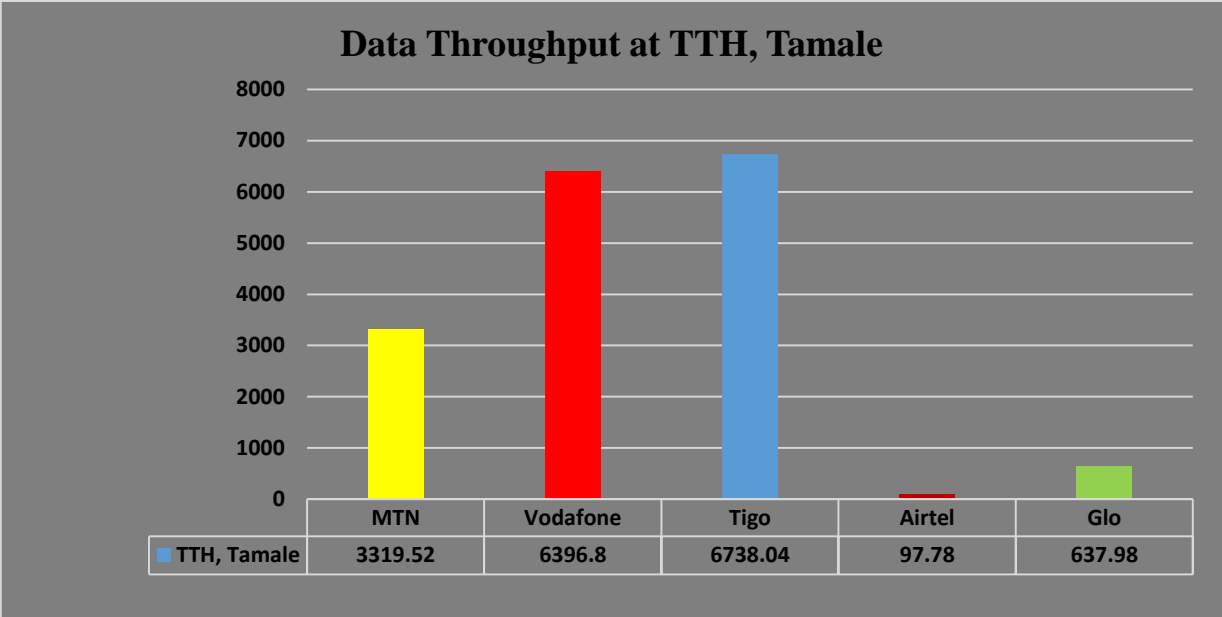


REMARKS:

- ❖ All Operators exceeded the Data Throughput threshold of 256kbps

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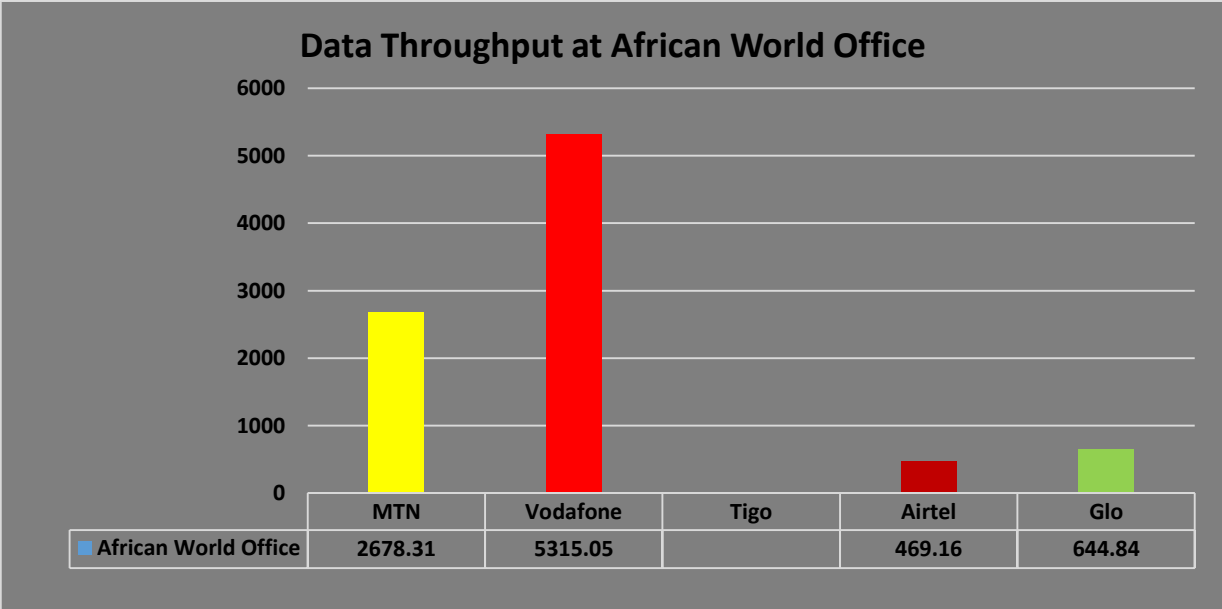
Figure 5. Data Throughput September 2016, TTH, Tamale



REMARKS:

- ❖ All Operators except Airtel exceeded the Data Throughput threshold of 256kbps.
- ❖ Airtel failed the Data Throughput licence condition at TTH.

Figure 6. Data Throughput September 2016, African World Office

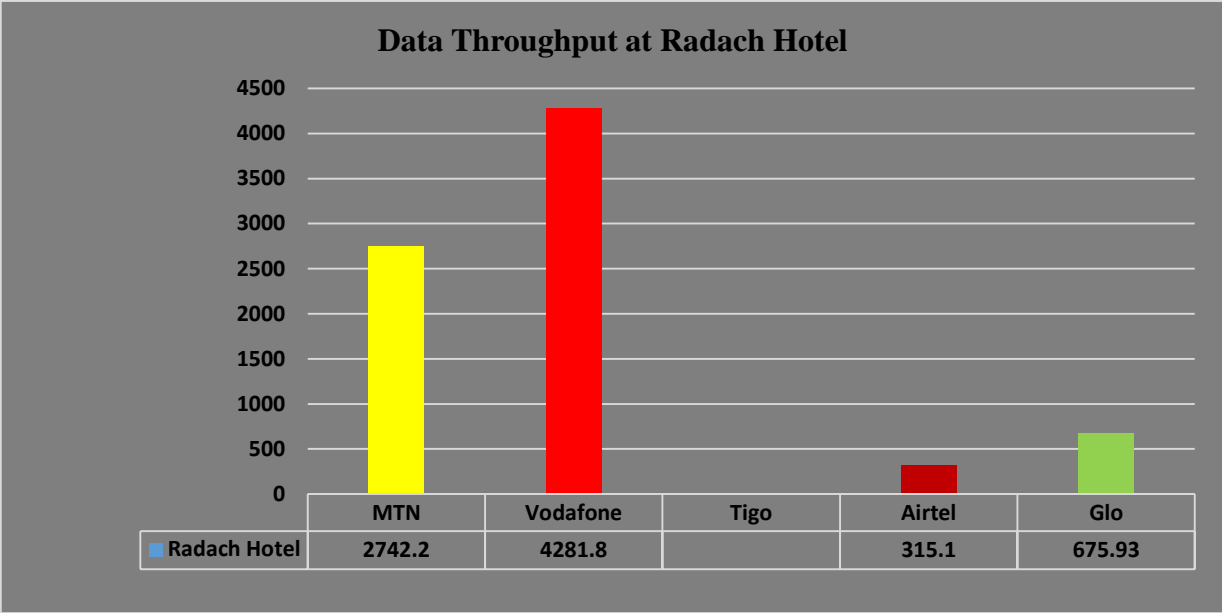


REMARKS:

- ❖ MTN, Vodafone, Airtel and Glo exceeded the Data Throughput threshold of 256kbps.
- ❖ Tigo had no 3G Service at the time of the test.

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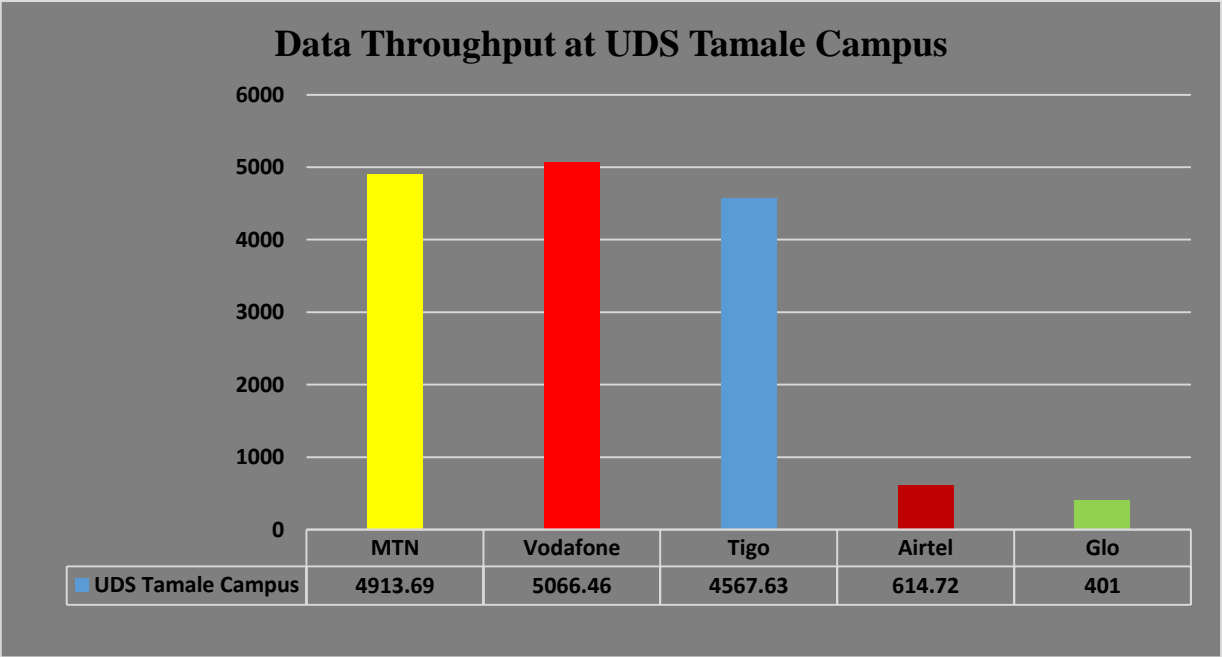
Figure 7. Data Throughput September 2016, Radach Hotel



REMARKS:

- ❖ MTN, Vodafone, Airtel and Glo exceeded the Data Throughput threshold of 256kbps.
- ❖ Tigo had no 3G Service at the time of the test.

Figure 8. Data Throughput September 2016, UDS Tamale Campus

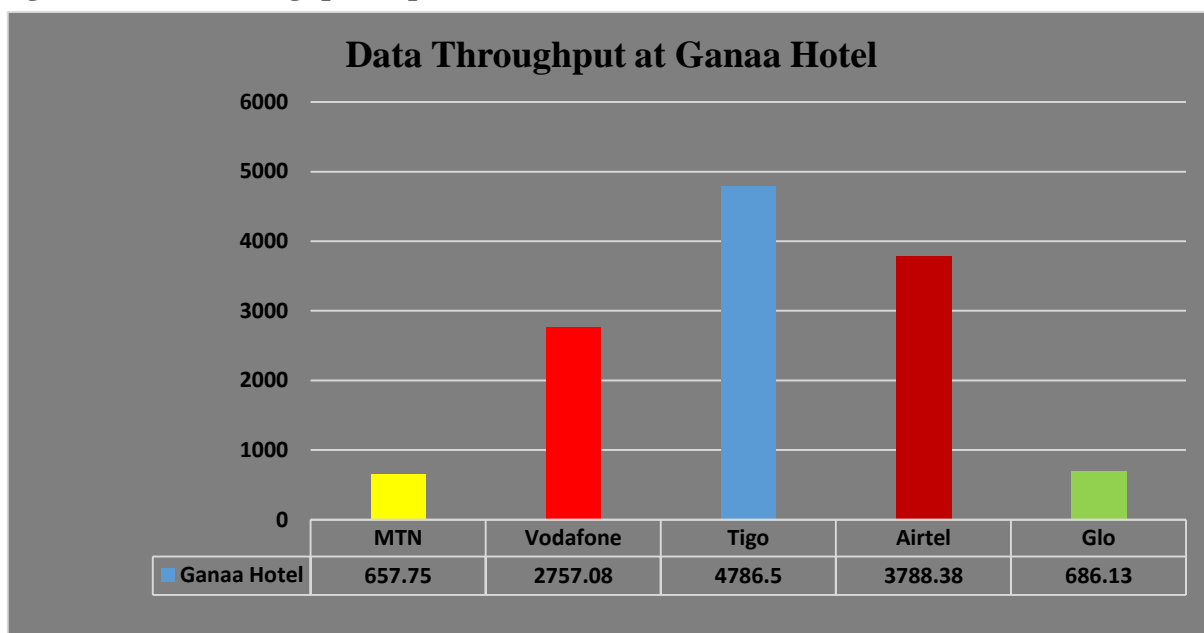


REMARKS:

- ❖ All Operators exceeded the Data Throughput threshold of 256kbps

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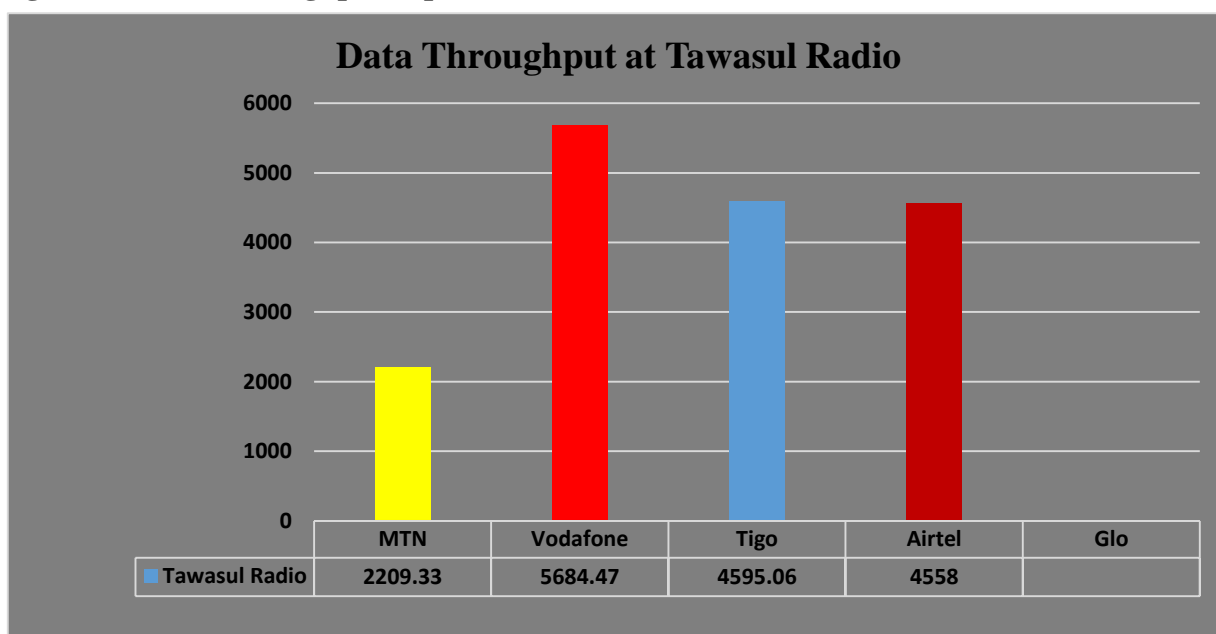
Figure 9. Data Throughput September 2016, Ganaa Hotel



REMARKS:

- ❖ All Operators exceeded the Data Throughput threshold of 256kbps

Figure 10. Data Throughput September 2016, Tawasul Radio

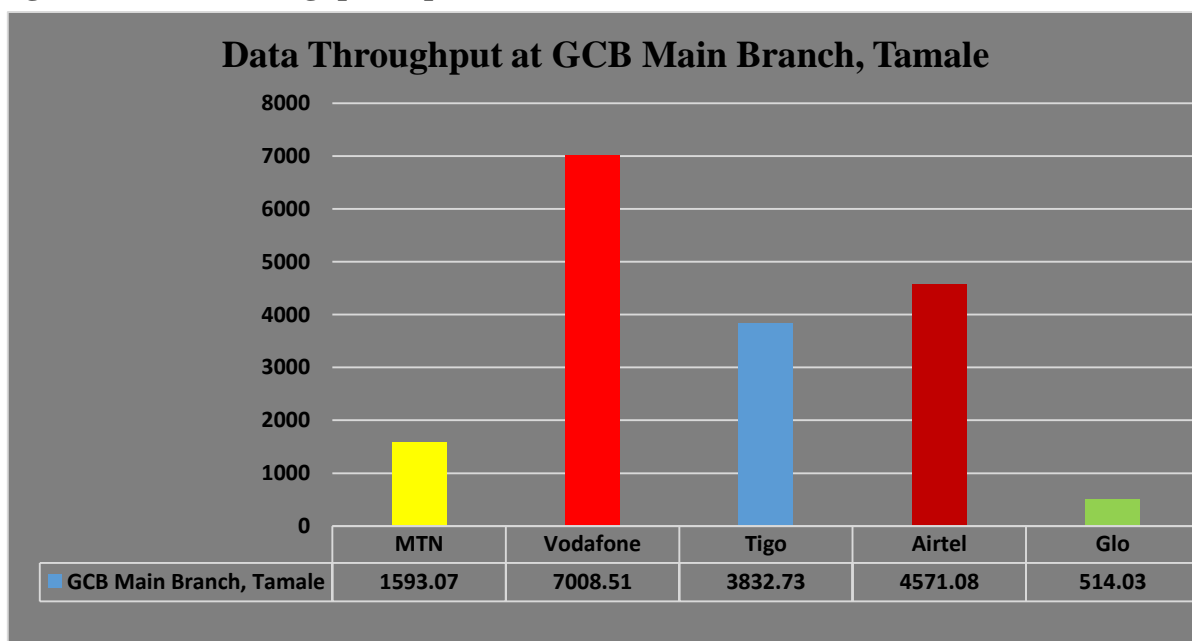


REMARKS:

- ❖ MTN, Vodafone, Tigo and Airtel exceeded the Data Throughput threshold of 256kbps.
- ❖ Glo had no 3G Service at the time of the test.

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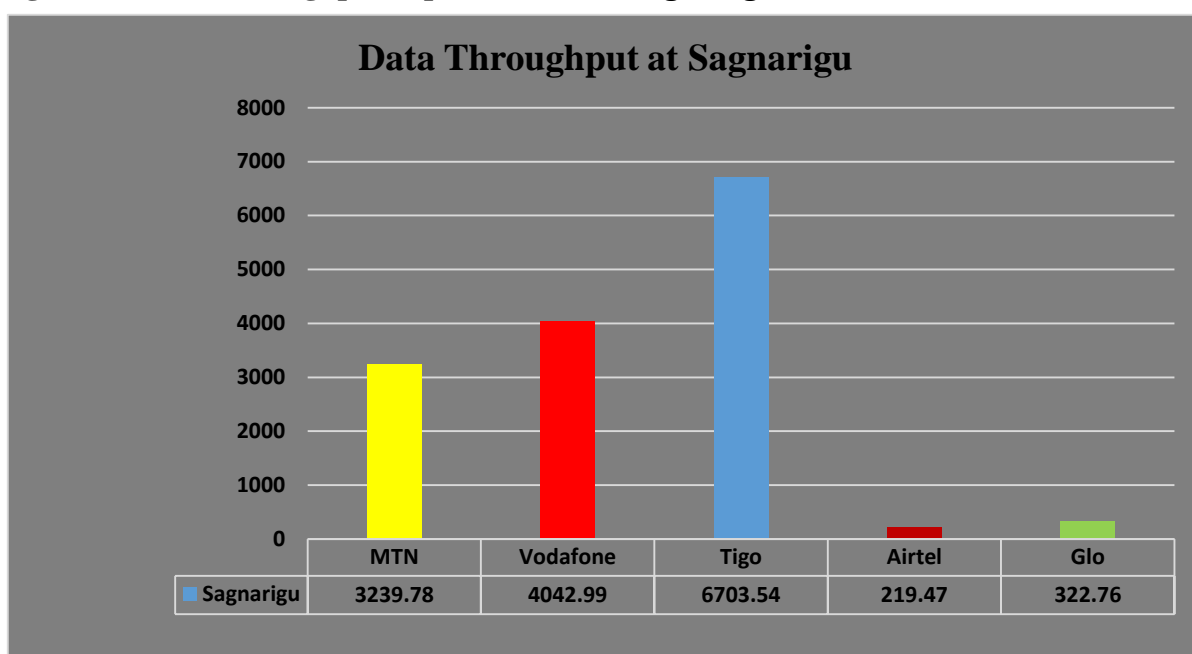
Figure 11. Data Throughput September 2016, GCB Main Branch, Tamale



REMARKS:

- ❖ All Operators exceeded the Data Throughput threshold of 256kbps

Figure 12. Data Throughput September 2016, Sagnarigu

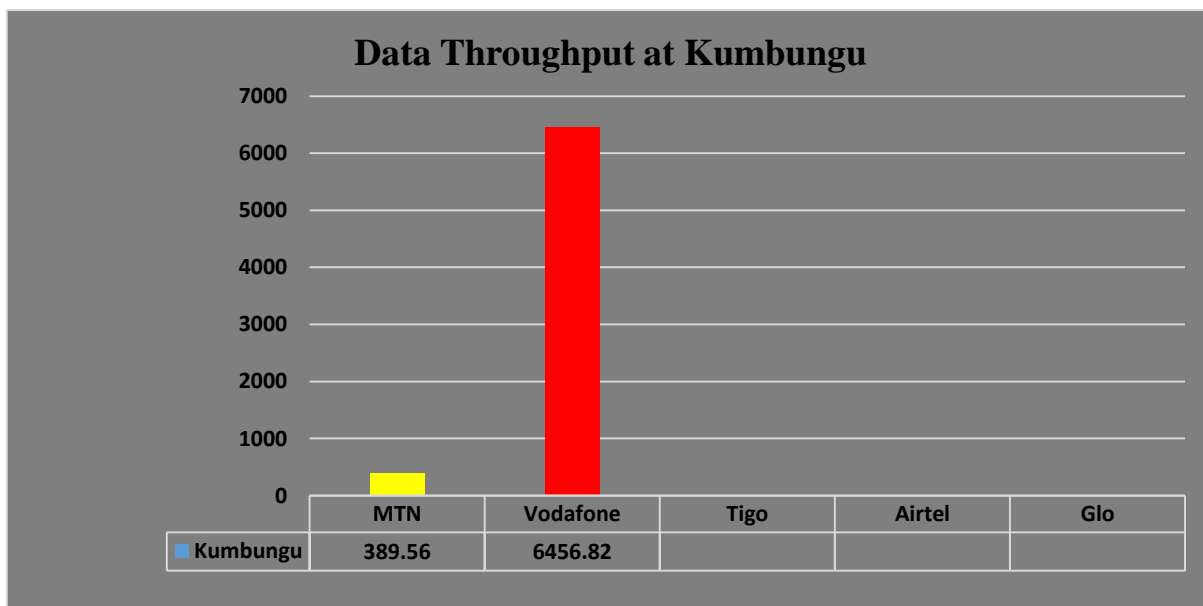


REMARKS:

- ❖ All Operators except Airtel exceeded the Data Throughput threshold of 256kbps
- ❖ Airtel failed the Data Throughput licence condition at Sagnarigu.

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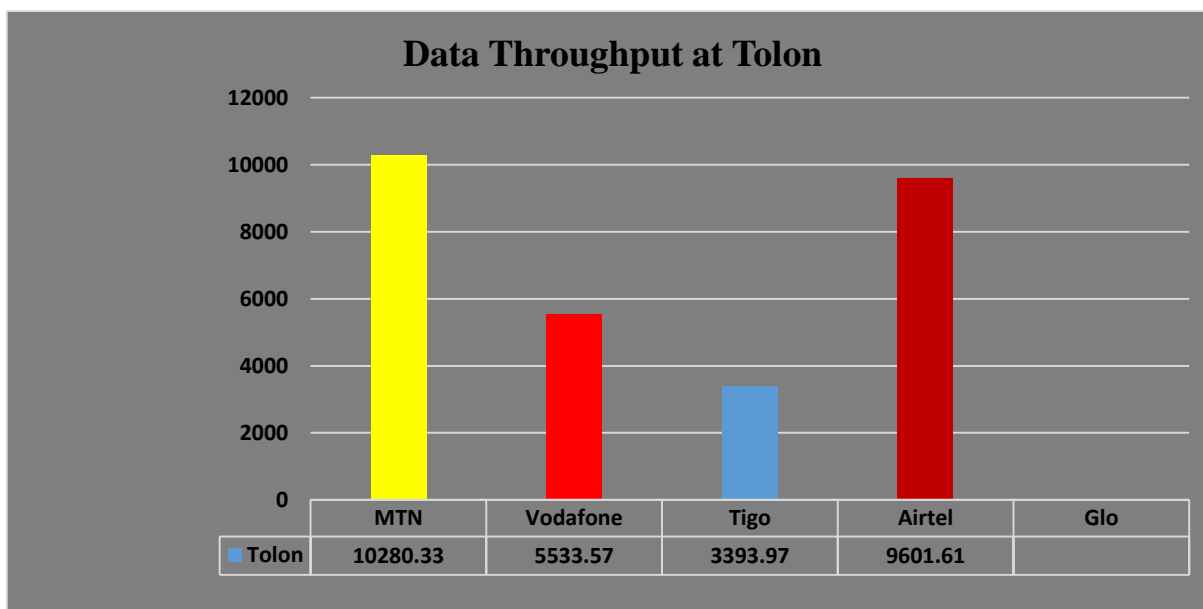
Figure 13. Data Throughput September 2016, Kumbungu



REMARKS:

- ❖ Only MTN and Vodafone had 3G Service at the time of the test.
- ❖ MTN and Vodafone exceeded the Data Throughput threshold of 256kbps.

Figure 14. Data Throughput September 2016, Tolon

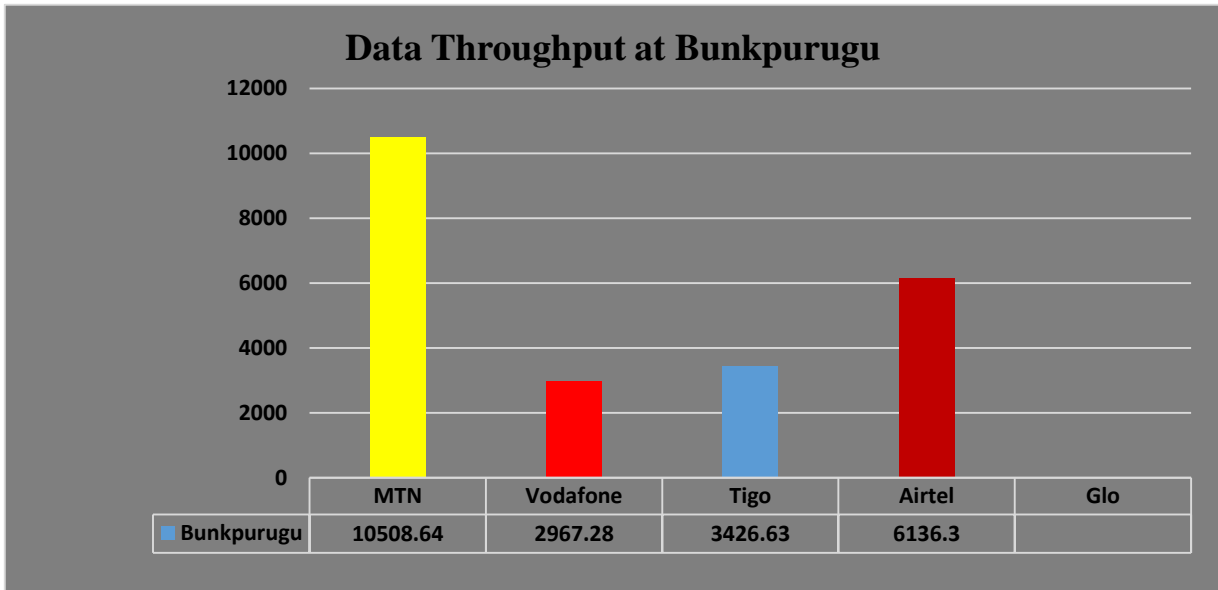


REMARKS:

- ❖ MTN, Vodafone, Tigo and Airtel exceeded the Data Throughput threshold of 256kbps.
- ❖ Glo had no 3G Service at the time of the test.

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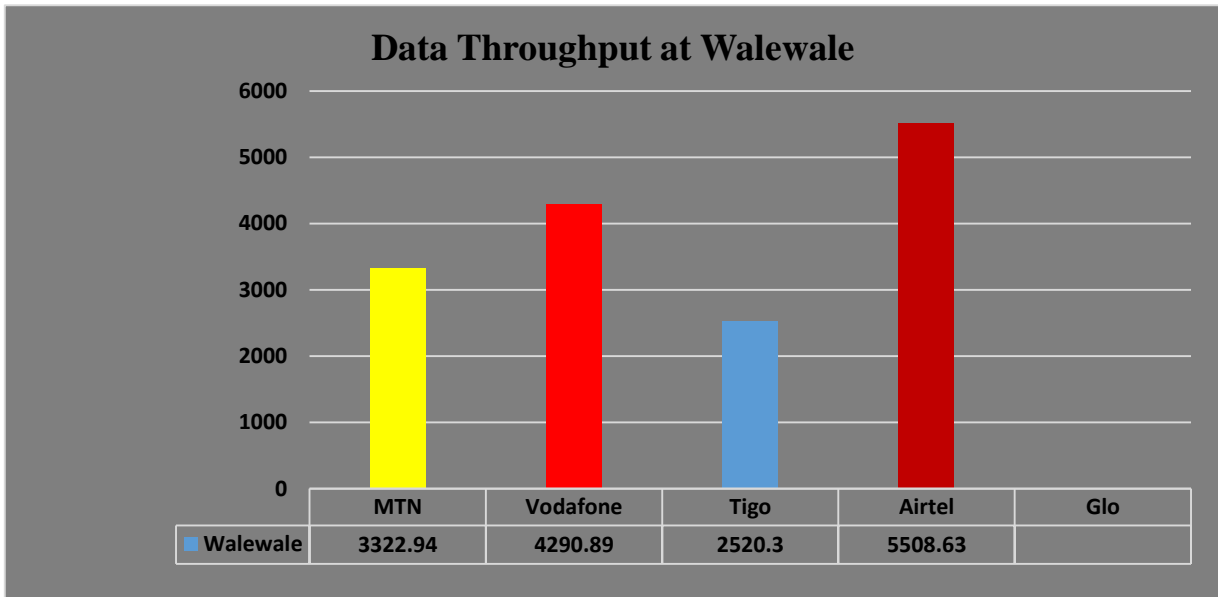
Figure 15. Data Throughput September 2016, Bunkpurugu



REMARKS:

- ❖ MTN, Vodafone, Tigo and Airtel exceeded the Data Throughput threshold of 256kbps.
- ❖ Glo had no 3G Service at the time of the test.

Figure 16. Data Throughput September 2016, Walewale

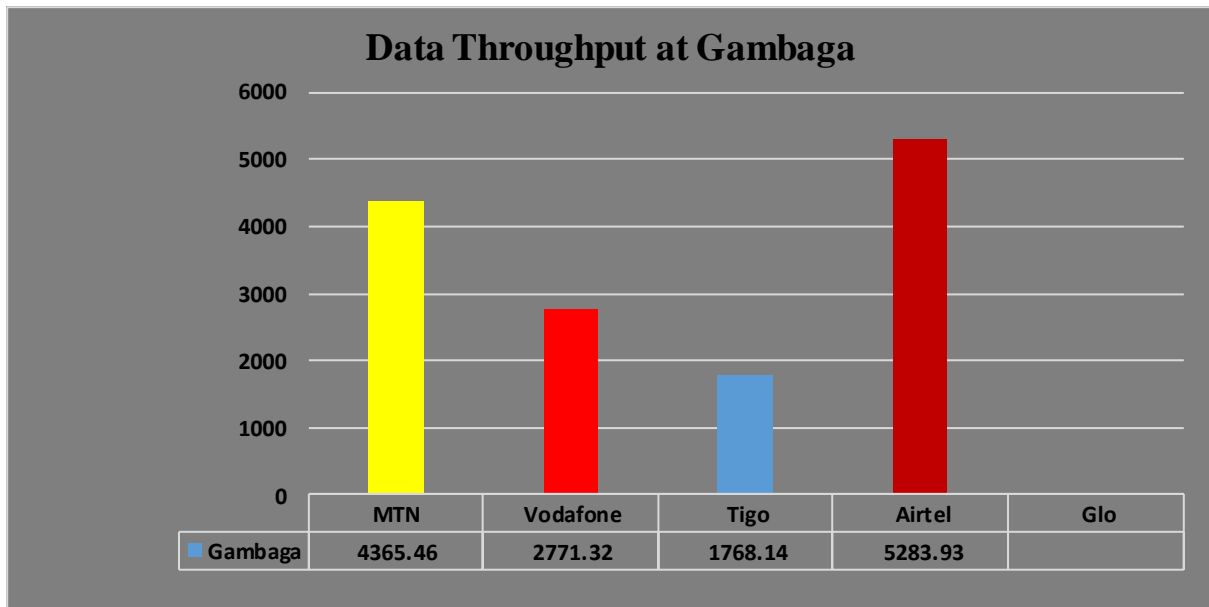


REMARKS:

- ❖ MTN, Vodafone, Tigo and Airtel exceeded the Data Throughput threshold of 256kbps.
- ❖ Glo had no 3G Service at the time of the test.

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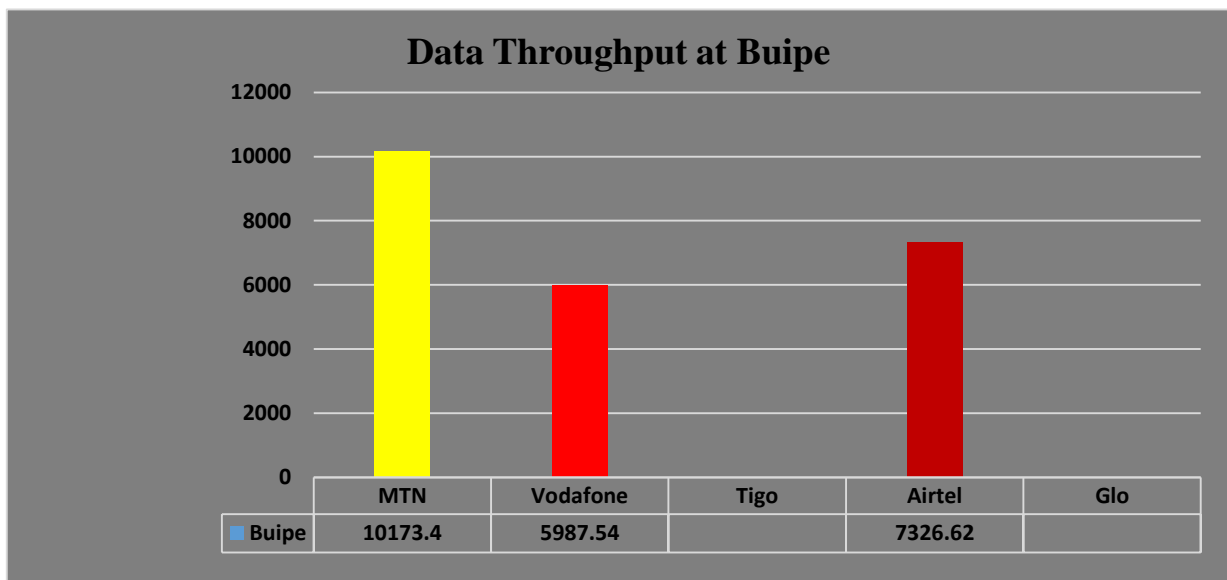
Figure 17. Data Throughput September 2016, Gambaga



REMARKS:

- ❖ MTN, Vodafone, Tigo and Airtel exceeded the Data Throughput threshold of 256kbps.
- ❖ Glo had no 3G Service at the time of the test.

Figure 18. Data Throughput September 2016, Buipe

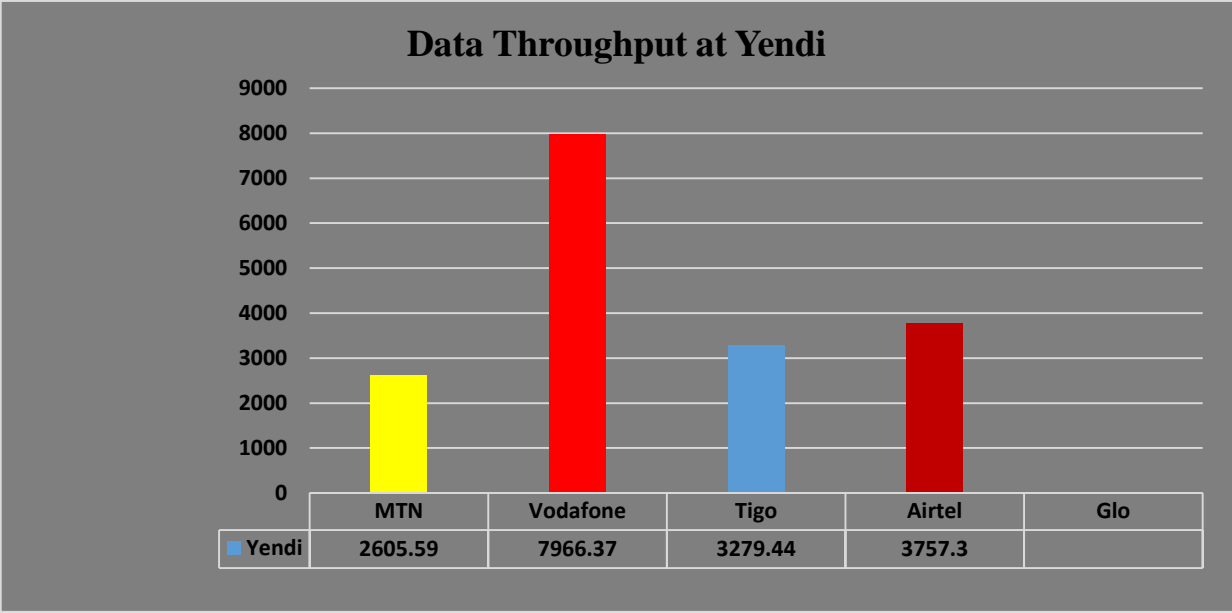


REMARKS:

- ❖ MTN, Vodafone and Airtel exceeded the Data Throughput threshold of 256kbps.
- ❖ Tigo and Glo had no 3G Service at the time of the test.

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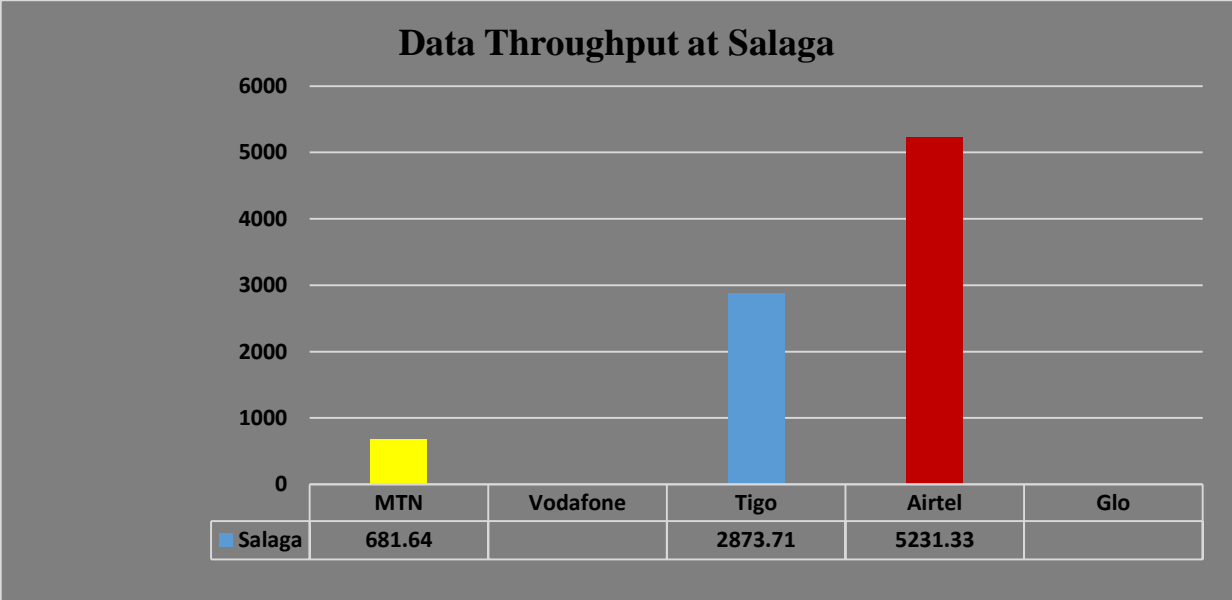
Figure 19. Data Throughput September 2016, Yendi



REMARKS:

- ❖ MTN, Vodafone, Tigo and Airtel exceeded the Data Throughput threshold of 256kbps.
- ❖ Glo had no 3G Service at the time of the test.

Figure 20. Data Throughput September 2016, Salaga

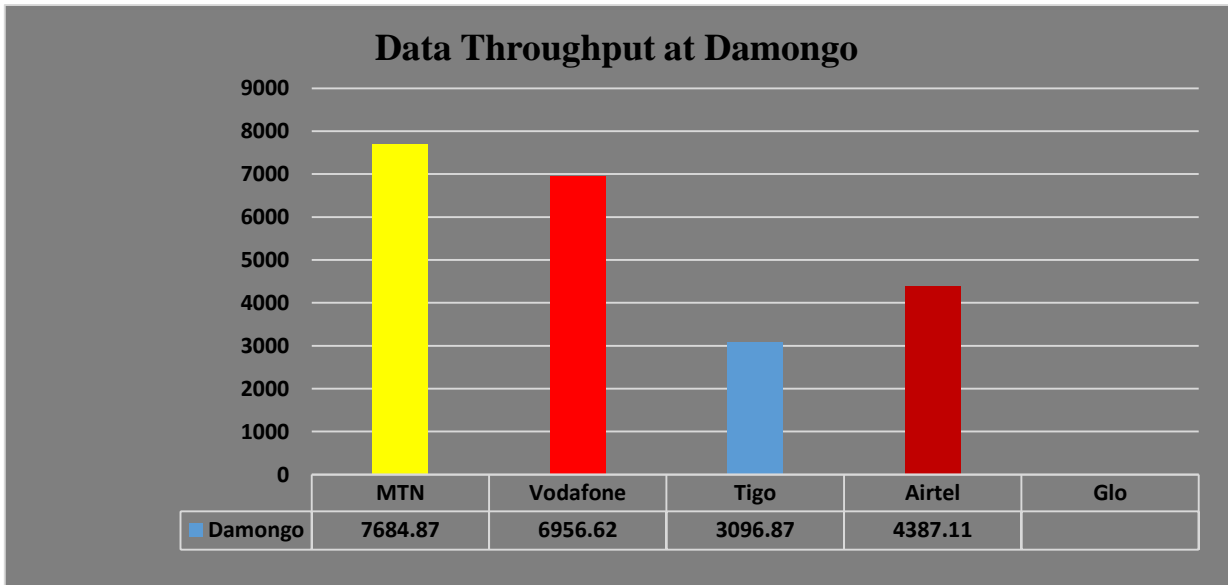


REMARKS:

- ❖ MTN, Tigo and Airtel exceeded the Data Throughput threshold of 256kbps.
- ❖ Vodafone and Glo had no 3G Service at the time of the test.

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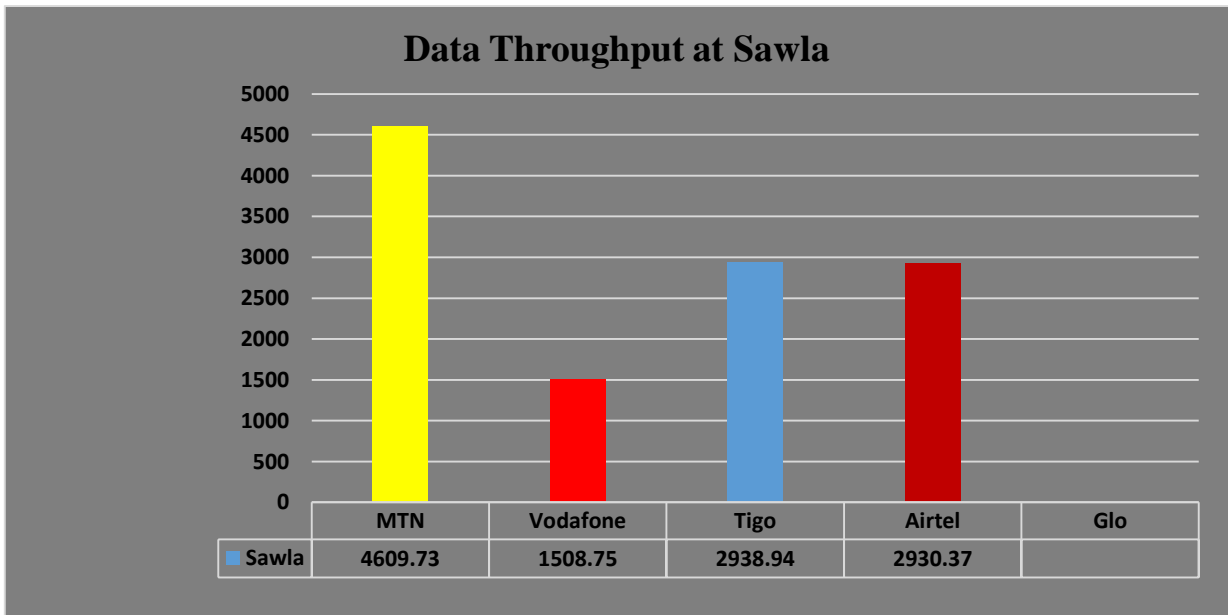
Figure 21. Data Throughput September 2016, Damongo



REMARKS:

- ❖ MTN, Vodafone, Tigo and Airtel exceeded the Data Throughput threshold of 256kbps.
- ❖ Glo had no 3G Service at the time of the test.

Figure 22. Data Throughput September 2016, Sawla

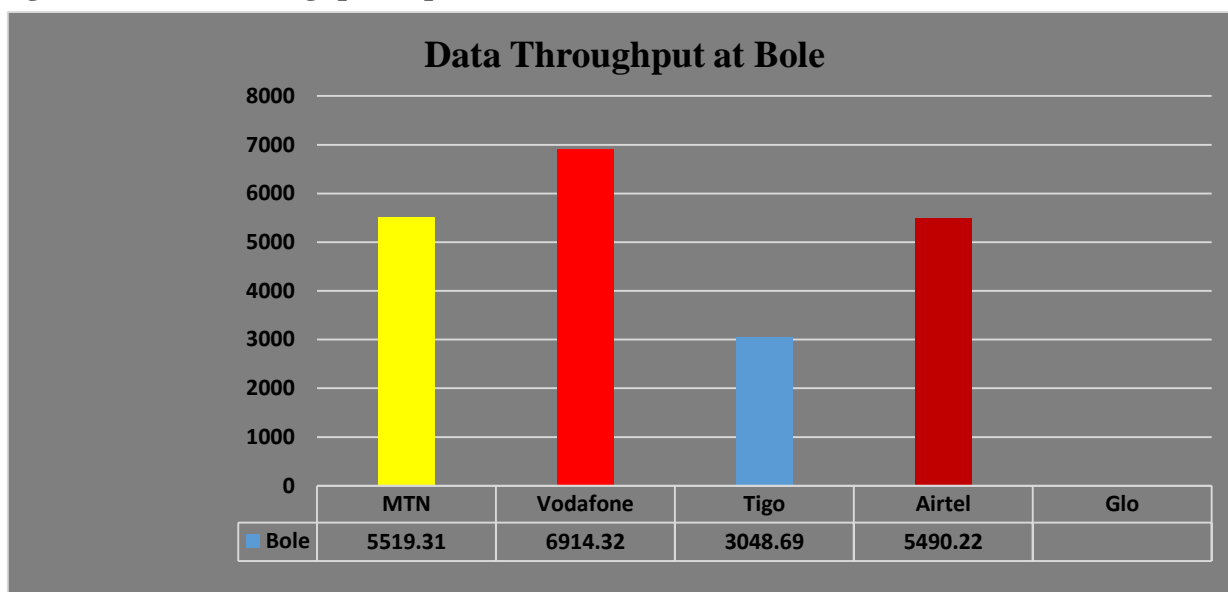


REMARKS:

- ❖ MTN, Vodafone, Tigo and Airtel exceeded the Data Throughput threshold of 256kbps.
- ❖ Glo had no 3G Service at the time of the test.

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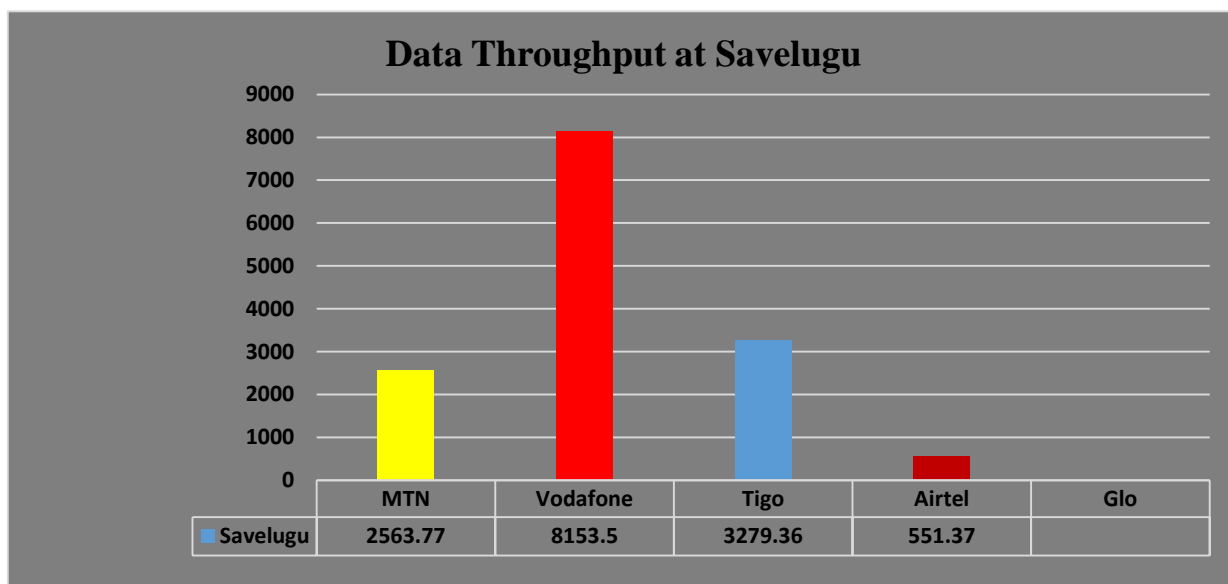
Figure 23. Data Throughput September 2016, Bole



REMARKS:

- ❖ MTN, Vodafone, Tigo and Airtel exceeded the Data Throughput threshold of 256kbps.
- ❖ Glo had no 3G Service at the time of the test.

Figure 24. Data Throughput September 2016, Savelugu

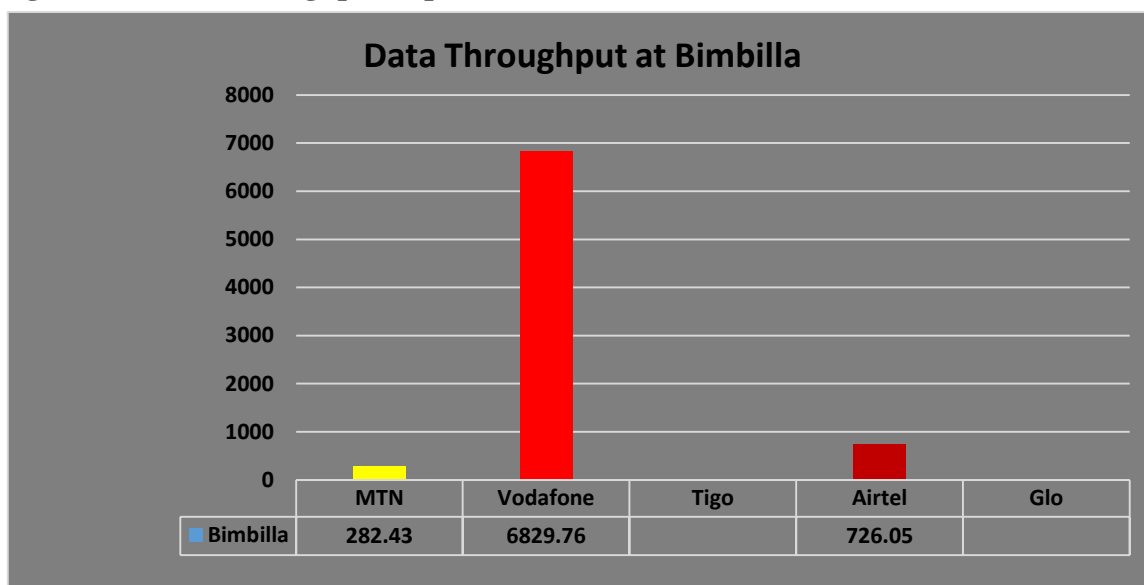


REMARKS:

- ❖ MTN, Vodafone, Tigo and Airtel exceeded the Data Throughput threshold of 256kbps.
- ❖ Glo had no 3G Service at the time of the test.

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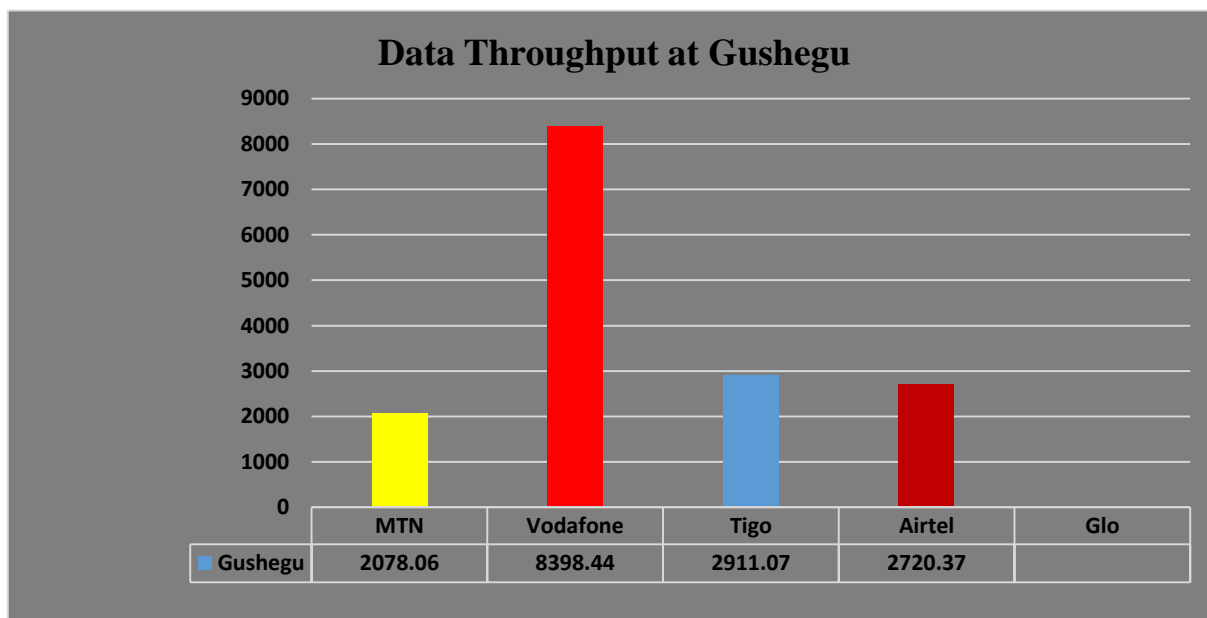
Figure 25. Data Throughput September 2016, Bimbilla



REMARKS:

- ❖ MTN, Vodafone and Airtel exceeded the Data Throughput threshold of 256kbps.
- ❖ Tigo and Glo had no 3G Service at the time of the test.

Figure 26. Data Throughput September 2016, Gushegu

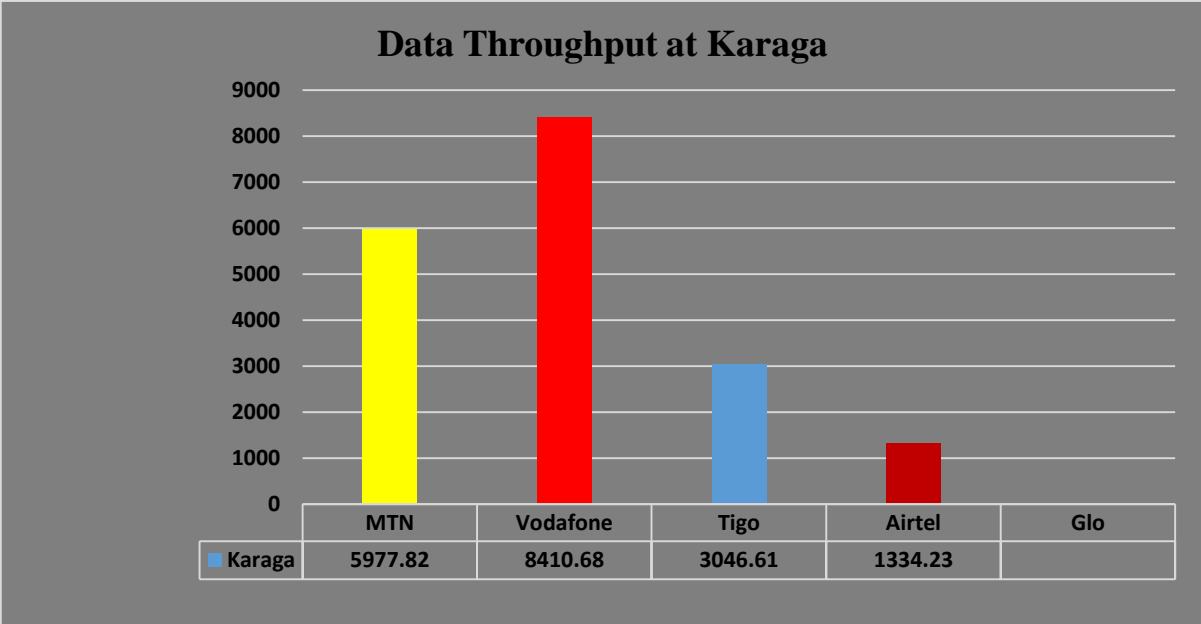


REMARKS:

- ❖ MTN, Vodafone, Tigo and Airtel exceeded the Data Throughput threshold of 256kbps.
- ❖ Glo had no 3G Service at the time of the test.

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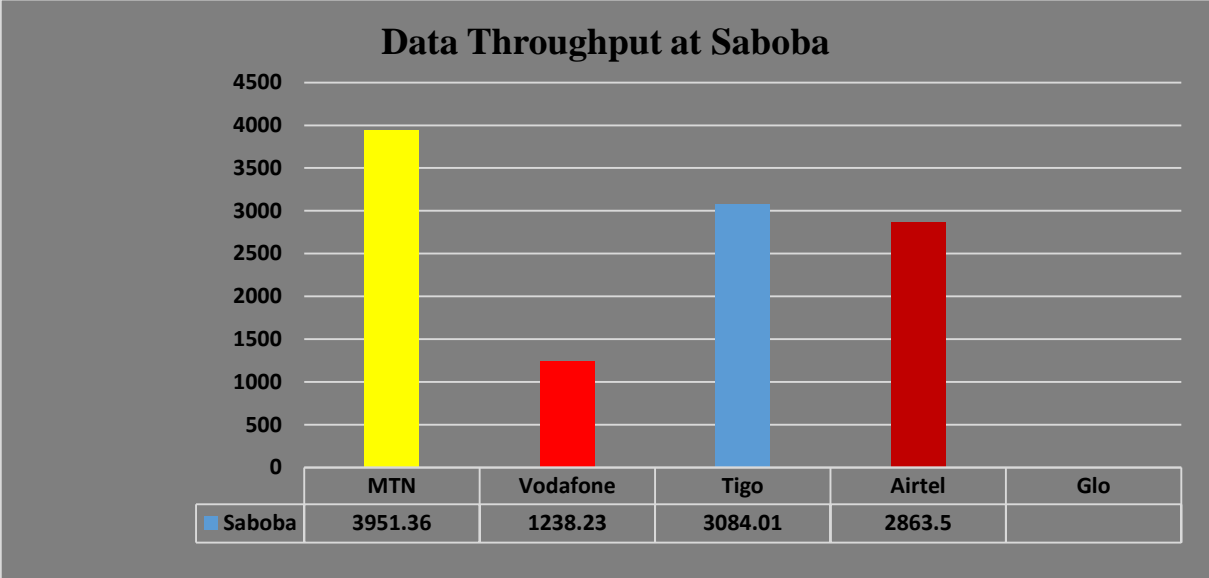
Figure 27. Data Throughput September 2016, Karaga



REMARKS:

- ❖ MTN, Vodafone, Tigo and Airtel exceeded the Data Throughput threshold of 256kbps.
- ❖ Glo had no 3G Service at the time of the test.

Figure 28. Data Throughput September 2016, Saboba

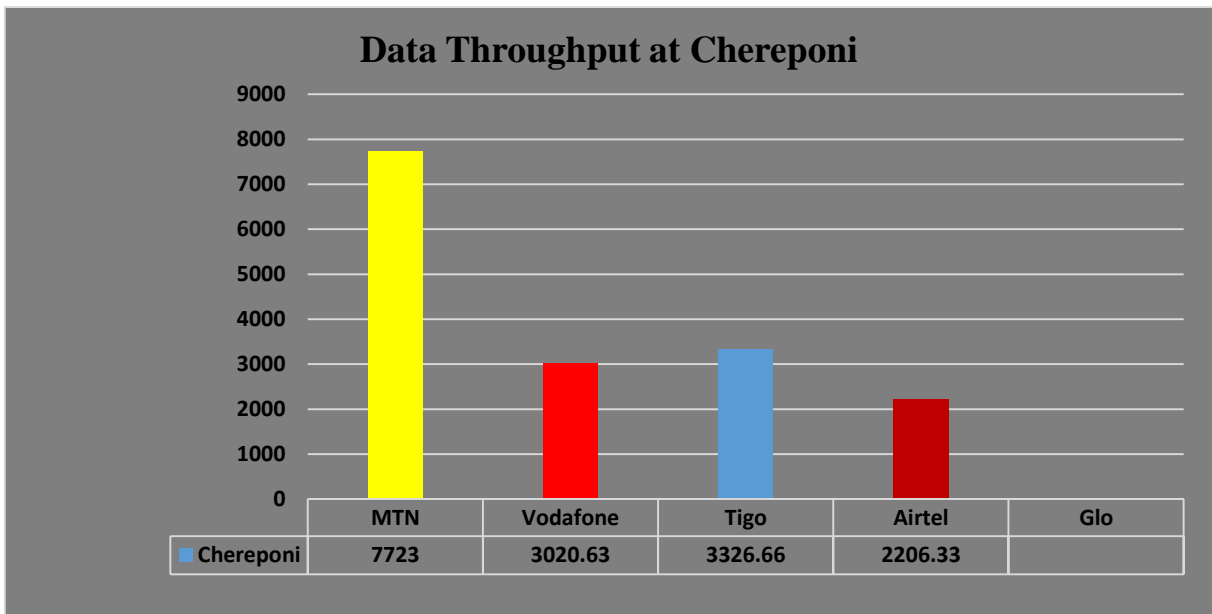


REMARKS:

- ❖ MTN, Vodafone, Tigo and Airtel exceeded the Data Throughput threshold of 256kbps.
- ❖ Glo had no 3G Service at the time of the test.

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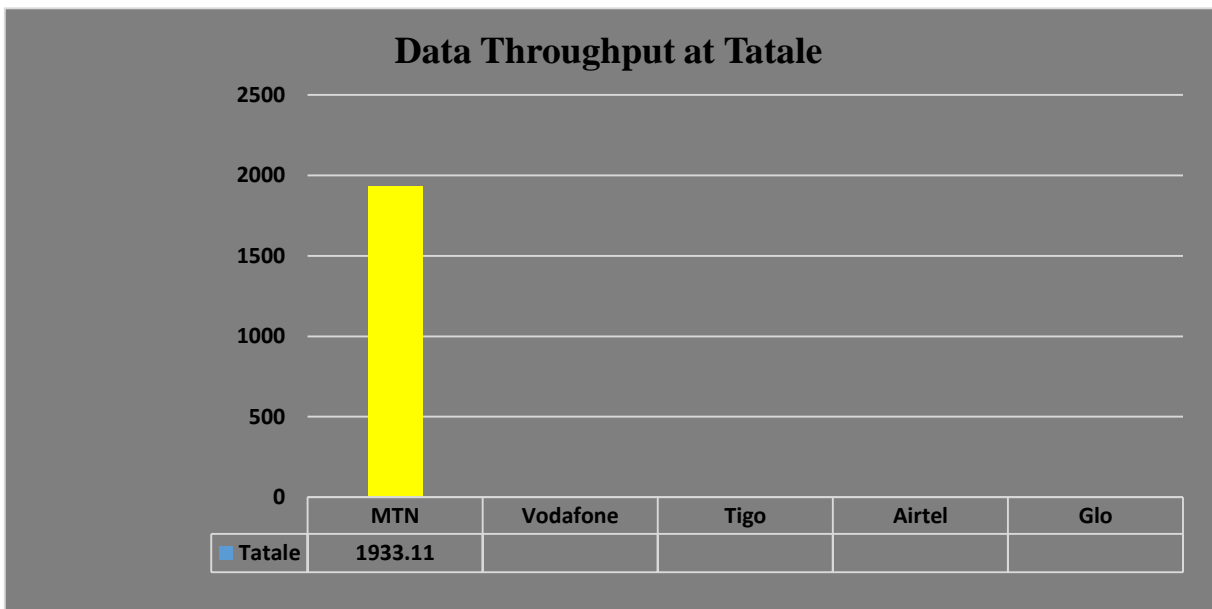
Figure 29. Data Throughput September 2016, Chereponi



REMARKS:

- ❖ MTN, Vodafone, Tigo and Airtel exceeded the Data Throughput threshold of 256kbps.
- ❖ Glo had no 3G Service at the time of the test.

Figure 30. Data Throughput September 2016, Tatale

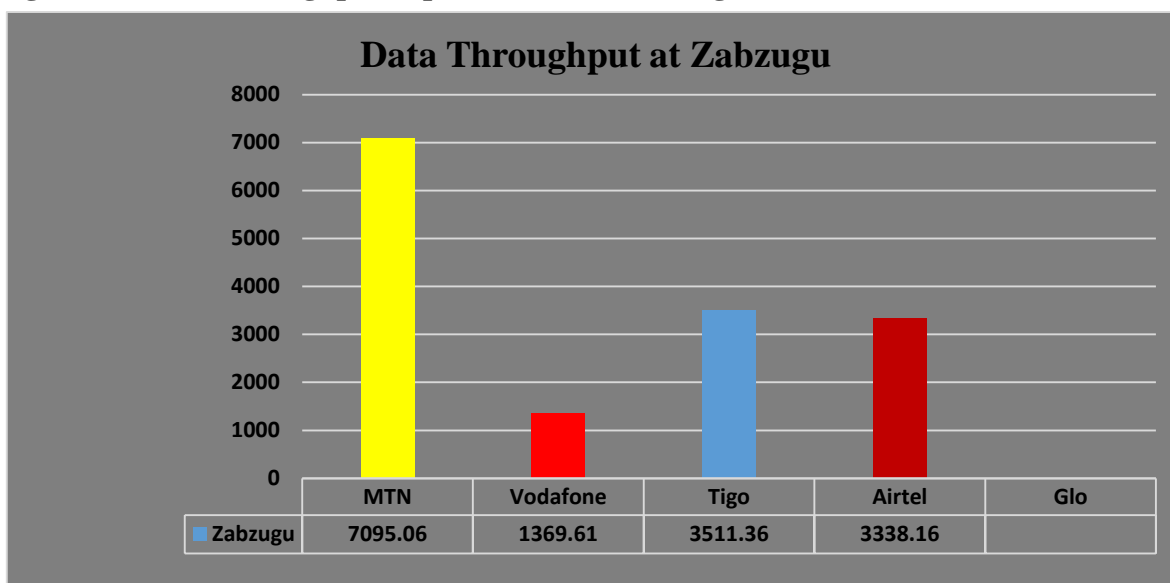


REMARKS:

- ❖ All Operators except MTN had no 3G Service at the time of the test.

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Figure 31. Data Throughput September 2016, Zabzugu



REMARKS:

- ❖ MTN, Vodafone, Tigo and Airtel exceeded the Data Throughput threshold of 256kbps.
- ❖ Glo had no 3G Service at the time of the test.