



NATIONAL COMMUNICATIONS AUTHORITY

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

[September 2016]

**QUALITY OF SERVICE (QoS) MONITORING OF CELLULAR MOBILE DATA SERVICES IN ASHANTI
REGION, SEPTEMBER 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 Ashanti Region between 5th September and 22nd September 2016 for all Operators except Expresso 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 Ashanti 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, September 2016

Month	Town	MTN	Vodafone	Tigo	Airtel	Glo
September	Agogo	100%	100%	No 3G Coverage	100%	100%
September	Agona	100%	100%	100%	100%	100%
September	Akumadan	100%	100%	100%	100%	No 3G Coverage
September	Asiwa	100%	100%	No 3G Coverage	100%	
September	Asokore Mampong	100%	100%	100%	100%	100%
September	Bekwai	100%	100%	100%	100%	100%
September	Drobonso	No 3G Coverage	No 3G Coverage	No 3G Coverage	No 3G Coverage	No 3G Coverage
September	Effiduase	100%	100%	100%	100%	100%
September	Ejisu	100%	100%	100%	100%	100%
September	Ejura	100%	100%	100%	100%	No 3G Coverage
September	Foase	100%	100%	No 3G Coverage	100%	
September	Fomena	100%	100%	100%	100%	
September	Jacubu	100%	100%	100%	100%	
September	Juaso	100%	100%	100%	100%	100%
September	Kodie	100%	100%	100%	100%	100%
September	Konongo	100%	100%	100%	100%	100%
September	Kumasi	100%	100%	100%	99.2%	99.17%
September	Kumawu	100%	100%	100%	100%	No 3G Coverage
September	Kuntanase	100%	100%	100%	100%	100%
September	Mampong	100%	100%	No 3G Coverage	100%	100%
September	Mamponteng	100%	100%	100%	100%	100%
September	Mankranso	100%	100%	100%	100%	No 3G Coverage
September	Manso Nkwanta	100%	100%	No 3G Coverage	100%	
September	New Edubiase	100%	100%	100%	100%	100%
September	Nkawie	100%	100%	100%	100%	No 3G Coverage
September	Nsuta	100%	100%	100%	100%	
September	Nyinahin	100%	100%	100%	100%	100%
September	Obuasi	95.65%	100%	100%	100%	73.68%
September	Offinso	100%	100%	100%	90.91%	100%
September	Tepa	100%	100%	100%	100%	No 3G Coverage

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REMARKS:

- ❖ All Operators except Airtel and Glo complied with the Data Access Success Rate obligation in all the available District Capitals tested.
- ❖ Airtel failed Data Access Success Rate at Offinso.
- ❖ Glo failed Data Access Success Rate at Obuasi.

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, September 2016

Month	Town	MTN	Vodafone	Tigo	Airtel	Glo
September	Agogo	0%	0%	No 3G Coverage	0%	0%
September	Agona	0%	0%	0%	0%	0%
September	Akumadan	0%	0%	0%	0%	No 3G Coverage
September	Asiwa	0%	0%	No 3G Coverage	0%	
September	Asokore Mampong	0%	0%	0%	0%	0%
September	Bekwai	0%	0%	0%	0%	0%
September	Drobonso	No 3G Coverage	No 3G Coverage	No 3G Coverage	No 3G Coverage	No 3G Coverage
September	Effiduase	0%	0%	0%	0%	0%
September	Ejisu	0%	0%	0%	0%	0%
September	Ejura	0%	0%	0%	0%	No 3G Coverage
September	Foase	0%	0%	No 3G Coverage	0%	
September	Fomena	0%	0%	0%	0%	
September	Jacobu	0%	0%	0%	0%	0%
September	Juaso	0%	0%	0%	0%	0%
September	Kodie	0%	0%	0%	0%	0%

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Month	Town	MTN	Vodafone	Tigo	Airtel	Glo
September	Konongo	0%	0%	0%	0%	0%
September	Kumasi	0%	0%	0%	0%	0%
September	Kumawu	0%	0%	0%	0%	No 3G Coverage
September	Kuntanase	0%	0%	0%	0%	0%
September	Mampong	0%	0%	No 3G Coverage	0%	0%
September	Mamponteng	0%	0%	0%	0%	0%
September	Mankranso	0%	0%	0%	0%	No 3G Coverage
September	Manso Nkwanta	0%	0%	No 3G Coverage	0%	
September	New Edubiase	0%	0%	0%	0%	0%
September	Nkawie	0%	0%	0%	0%	No 3G Coverage
September	Nsuta	0%	0%	0%	0%	
September	Nyinahin	0%	0%	0%	0%	
September	Obuasi	0%	0%	0%	0%	0%
September	Offinso	0%	0%	0%	0%	0%
September	Tepa	0%	0%	0%	0%	No 3G Coverage

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, September 2016

Month	Town	MTN	Vodafone	Tigo	Airtel	Glo
September	Agogo	3761.01	2637.02	No 3G Coverage	356.09	628.71
September	Agona	4083.55	4899.10	1099.14	996.20	712.28
September	Akumadan	3703.28	4383.16	2562.12	3502.53	No 3G Coverage
September	Asiwa	2883.26	3200.28	No 3G Coverage	8406.10	
September	Asokore Mampong	2848.23	4192.36	2796.98	6294.79	574.20

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Month	Town	MTN	Vodafone	Tigo	Airtel	Glo
September	Bekwai	2771.14	3139.74	6305.81	787.15	653.92
September	Drobonso	No 3G Coverage	No 3G Coverage	No 3G Coverage	No 3G Coverage	No 3G Coverage
September	Effiduase	1605.31	3067.95	2521.23	775.44	312.29
September	Ejisu	3318.73	2628.06	2799.89	1024.96	412.79
September	Ejura	1021.36	5241.76	2674.39	2538.79	No 3G Coverage
September	Foase	6443.92	6200.06	No 3G Coverage	1429.89	
September	Fomena	3441.70	4142.71	3380.40	699.12	
September	Jacobu	3160.08	2110.52	2161.37	800.26	
September	Juaso	2533.50	4176.95	2831.12	825.51	662.35
September	Kodie	2322.81	3668.29	2915.21	3834.75	388.21
September	Konongo	3745.90	4234.01	7593.92	816.84	483.82
September	Kumasi	2483.79	3800.51	3187.07	2952.14	573.10
September	Kumawu	1857.32	3865.30	4234.65	615.28	No 3G Coverage
September	Kuntanase	5885.28	3368.18	3279.73	530.01	558.06
September	Mampong	1427.79	3320.54	No 3G Coverage	5198.27	537.79
September	Mampongten	724.23	4950.13	5820	3127.11	674.57
September	Mankranso	4552.09	5353.08	1799.15	2336.23	No 3G Coverage
September	Manso Nkwanta	2711.09	4226.47	No 3G Coverage	2154.12	
September	New Edubiase	1011.98	4482.76	2951.11	7850.03	722.01
September	Nkawie	476.68	4020.21	1774.82	2017.53	No 3G Coverage
September	Nsuta	2731.35	5050.30	1771.16	12668.42	
September	Nyinahin	364.81	2603.75	708.68	1774.09	
September	Obuasi	807.32	3802.15	3417.82	2927.17	2198.86
September	Offinso	1427.42	3974.76	2155.79	709.32	1231.12
September	Tepa	2952.59	4710.63	3147.67	1329.17	No 3G Coverage

REMARKS:

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

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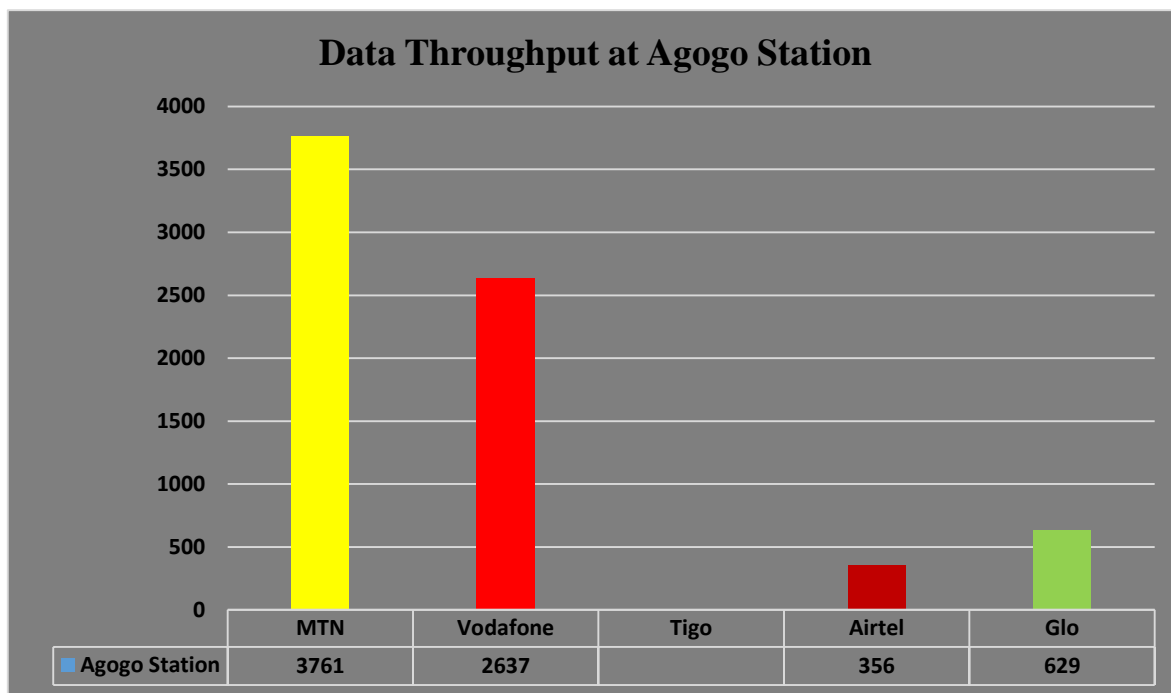
REMEDIES

- ❖ The NCA has notified Operators of publication of these findings and directed all Operators to improve any obligation in default by January, 2017.
- ❖ Sanctions will be applied to Operators on District Capitals that persist in default after January, 2017.

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, Agogo Station

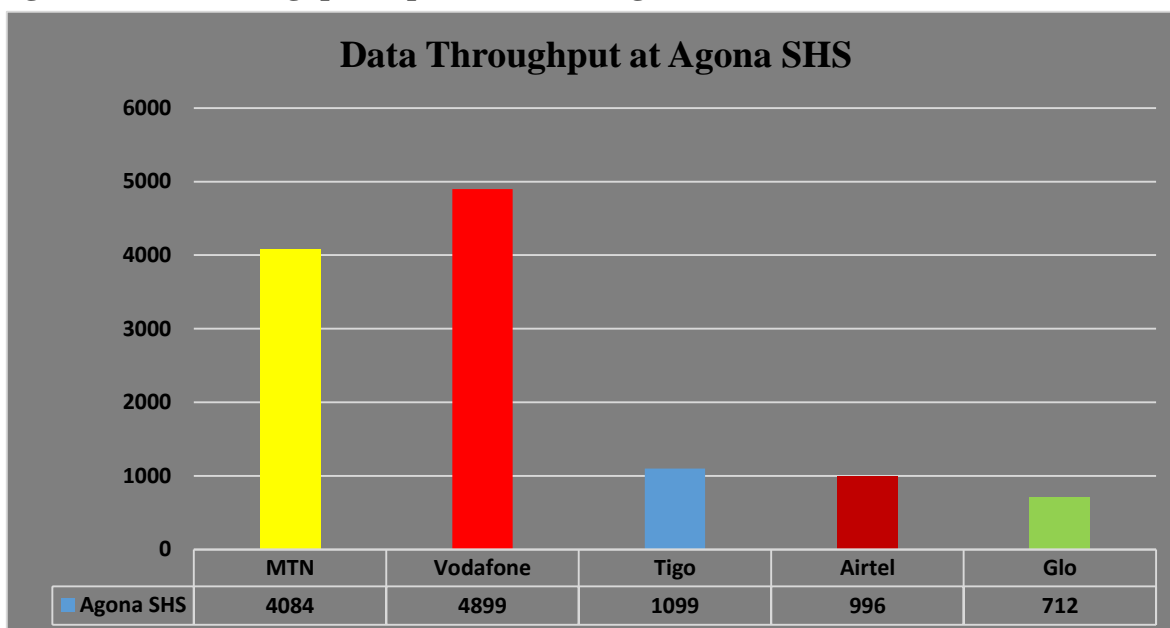


REMARKS:

- ❖ 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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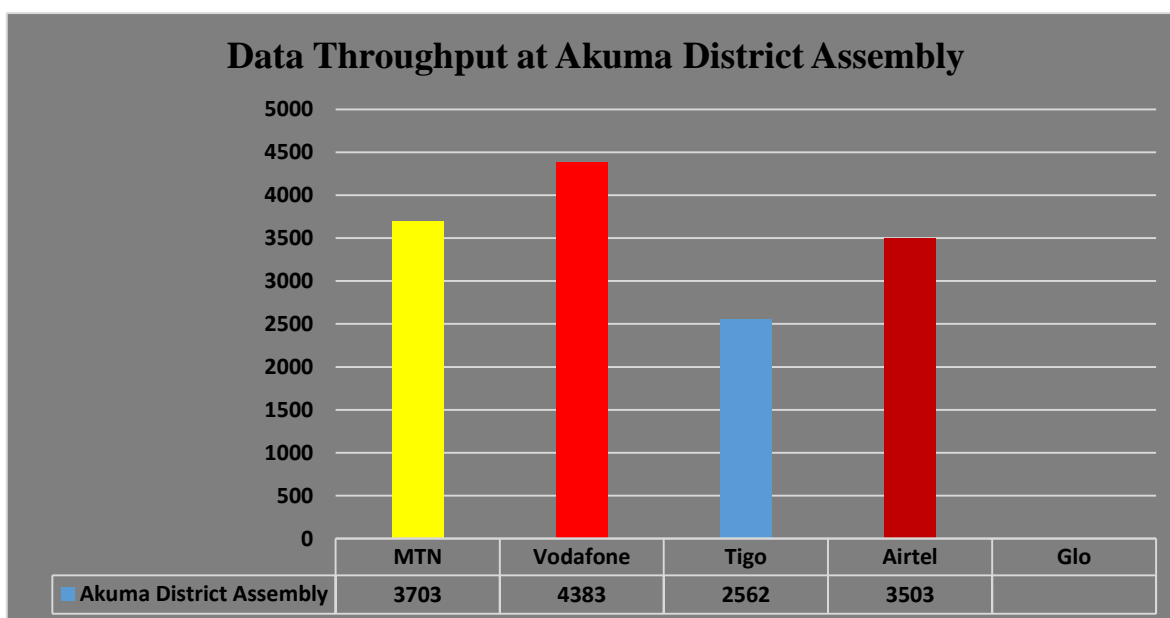
Figure 2. Data Throughput September 2016, Agona SHS



REMARKS:

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

Figure 3. Data Throughput September 2016, Akuma District Assembly

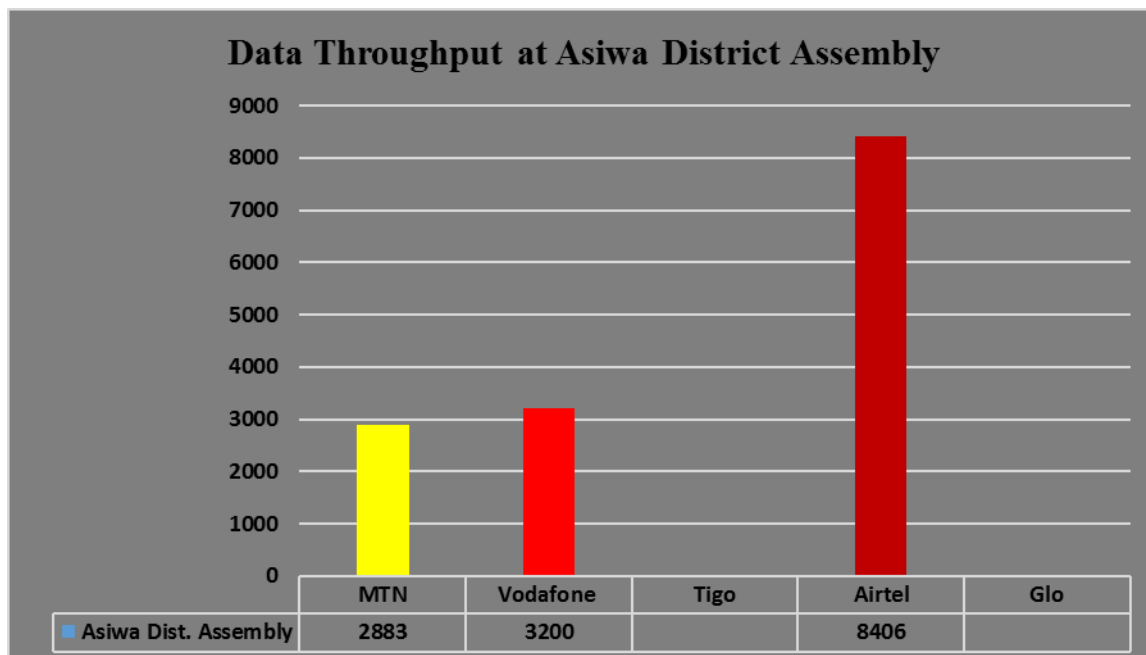


REMARKS:

- ❖ 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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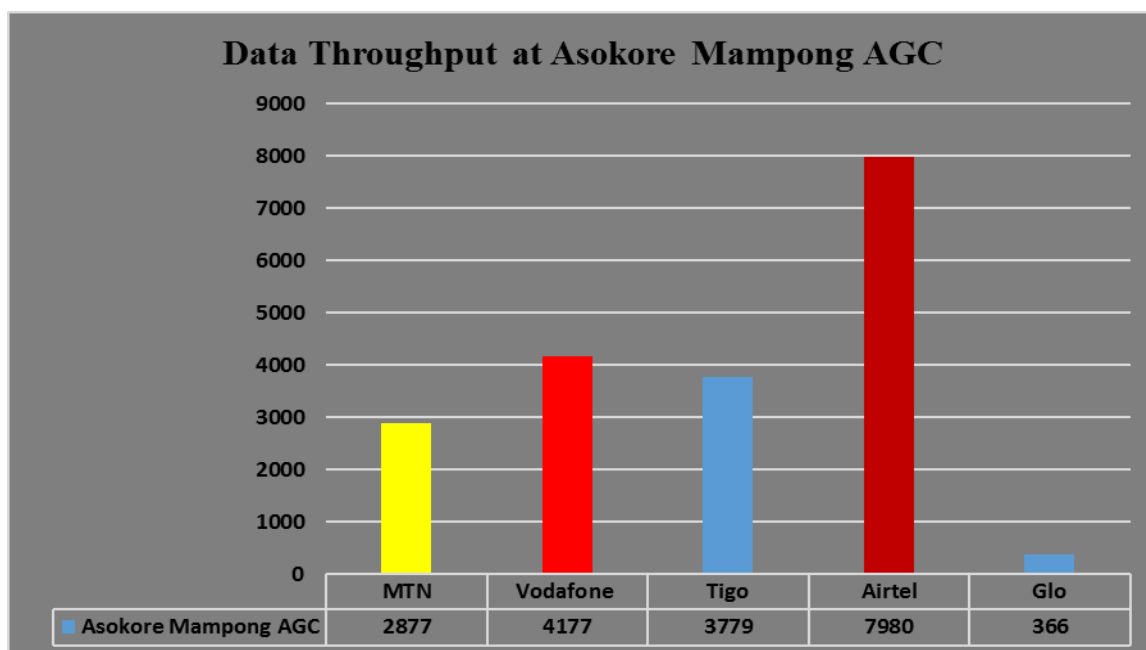
Figure 4. Data Throughput September 2016, Asiya District Assembly



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 5. Data Throughput September 2016, Asokore Mampong AGC

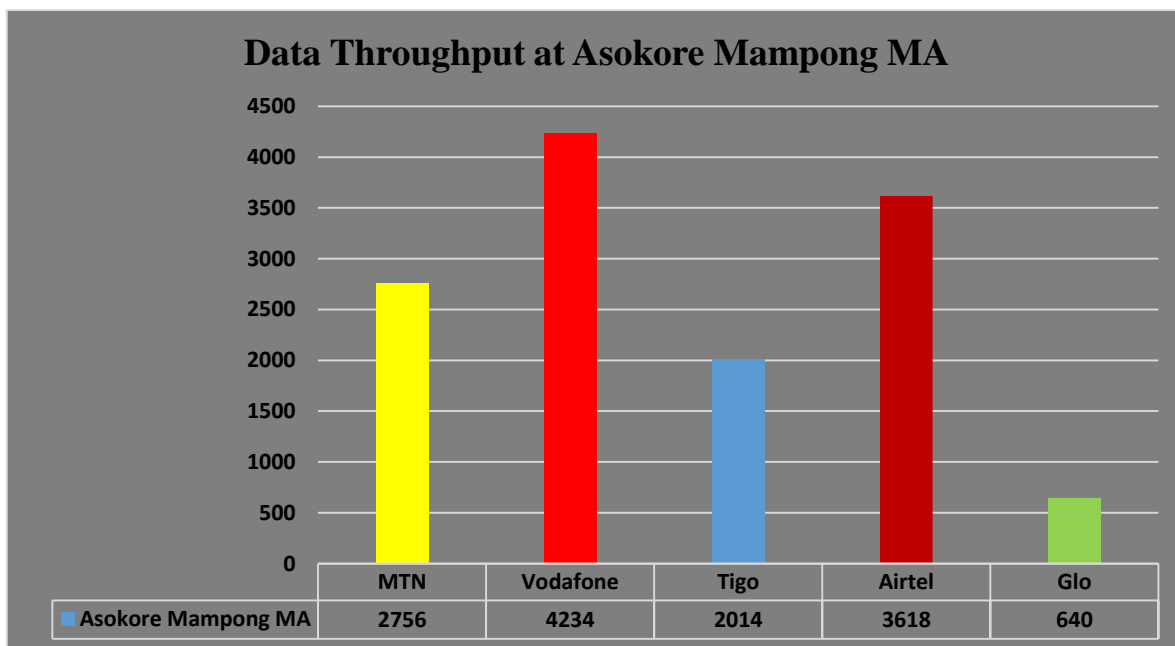


REMARKS:

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

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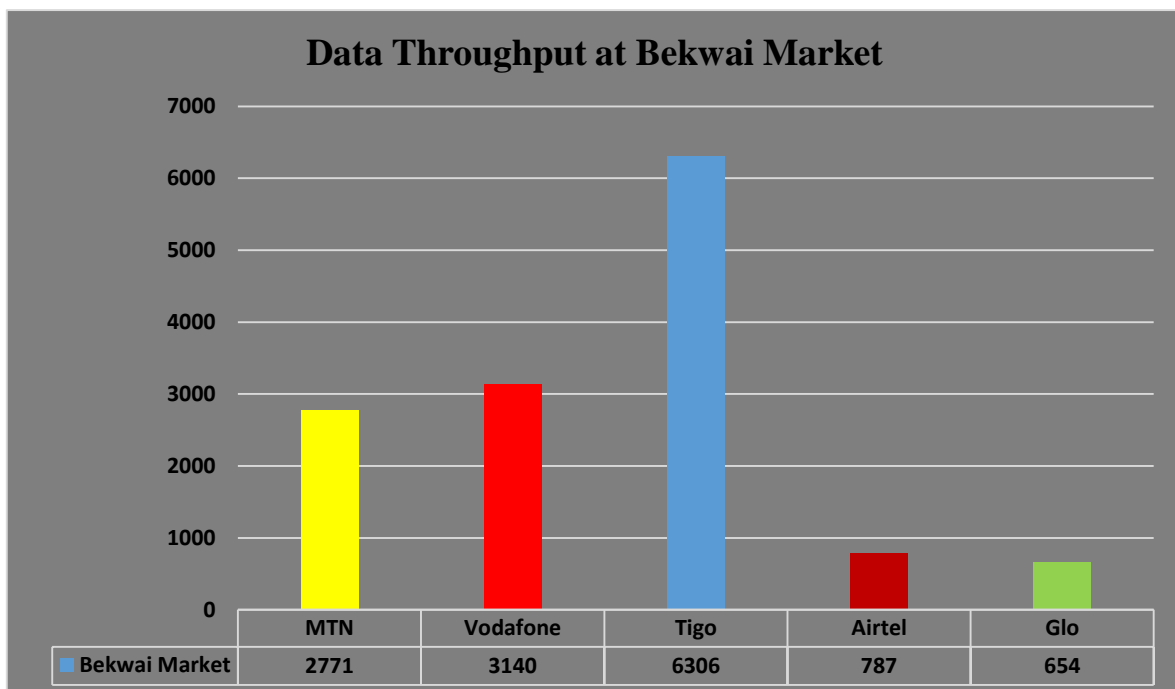
Figure 6. Data Throughput September 2016, Asokore Mampong MA



REMARKS:

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

Figure 7. Data Throughput September 2016, Bekwai Market

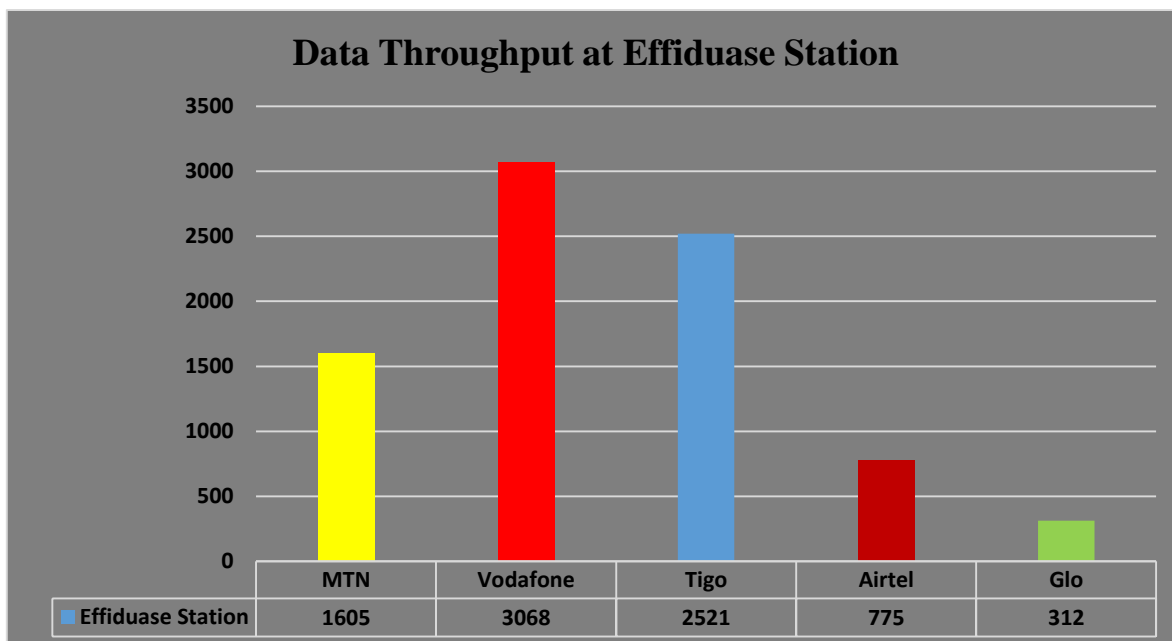


REMARKS:

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

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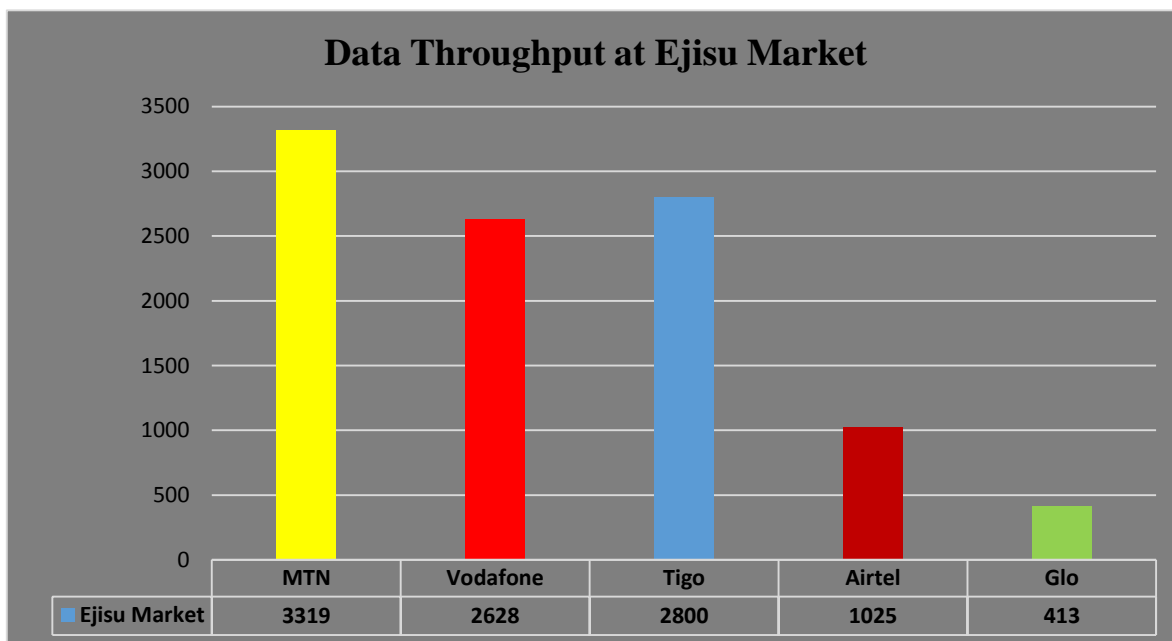
Figure 8. Data Throughput September 2016, Effiduase Station



REMARKS:

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

Figure 9. Data Throughput September 2016, Ejisu Market

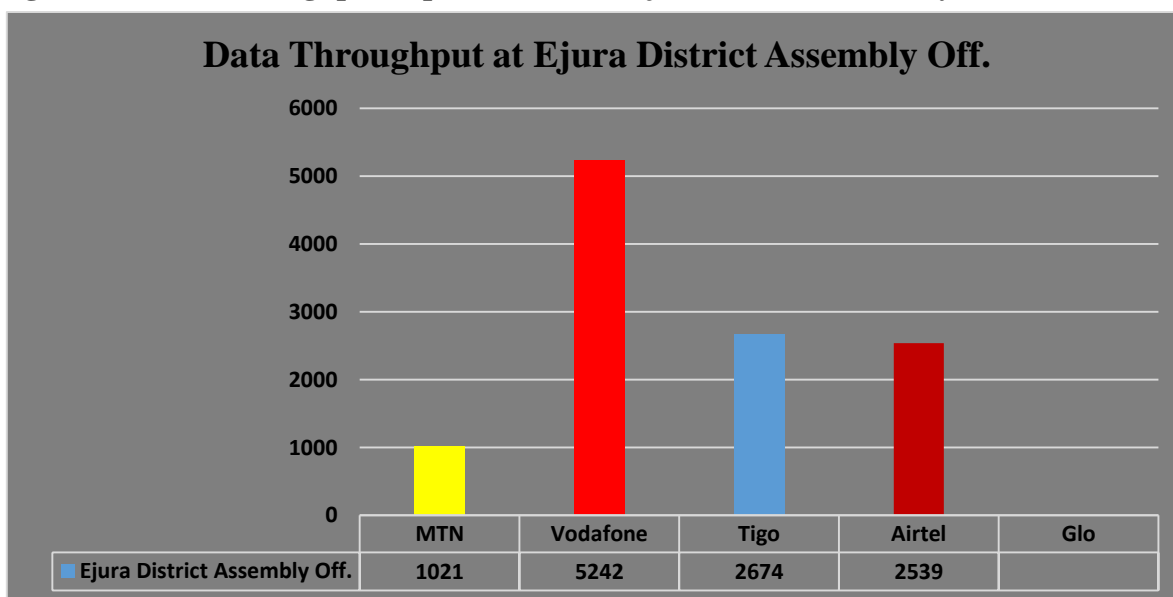


REMARKS:

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

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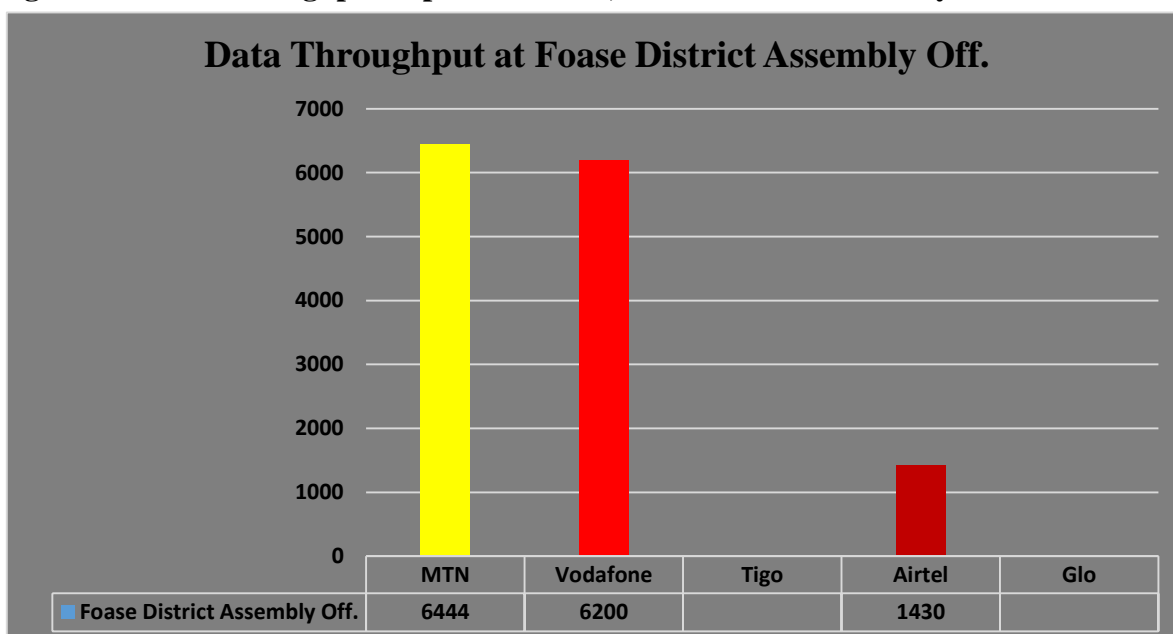
Figure 10. Data Throughput September 2016, Ejura District Assembly Office.



REMARKS:

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

Figure 11. Data Throughput September 2016, Foase District Assembly

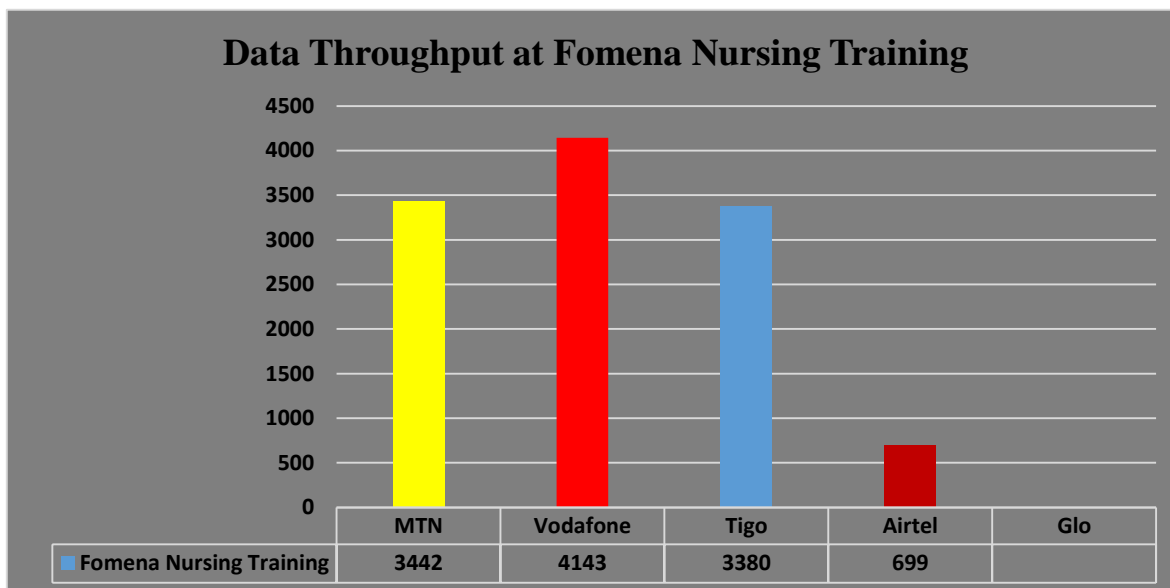


REMARKS:

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

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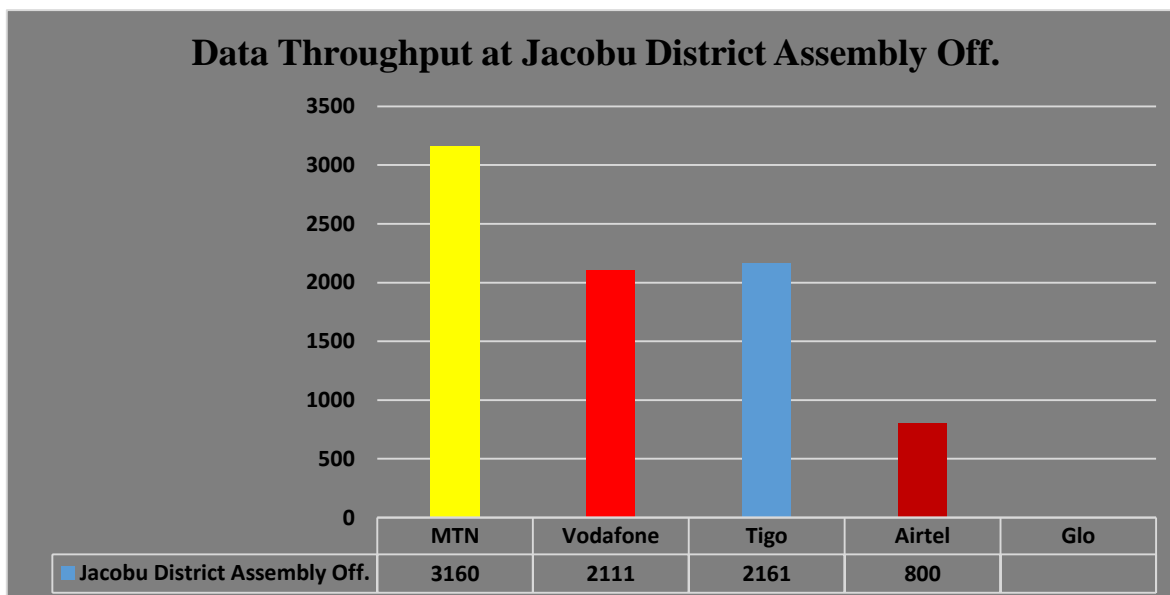
Figure 12. Data Throughput September 2016, Fomena Nursing Training



REMARKS:

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

Figure 13. Data Throughput September 2016, Jacobu District Assembly Off

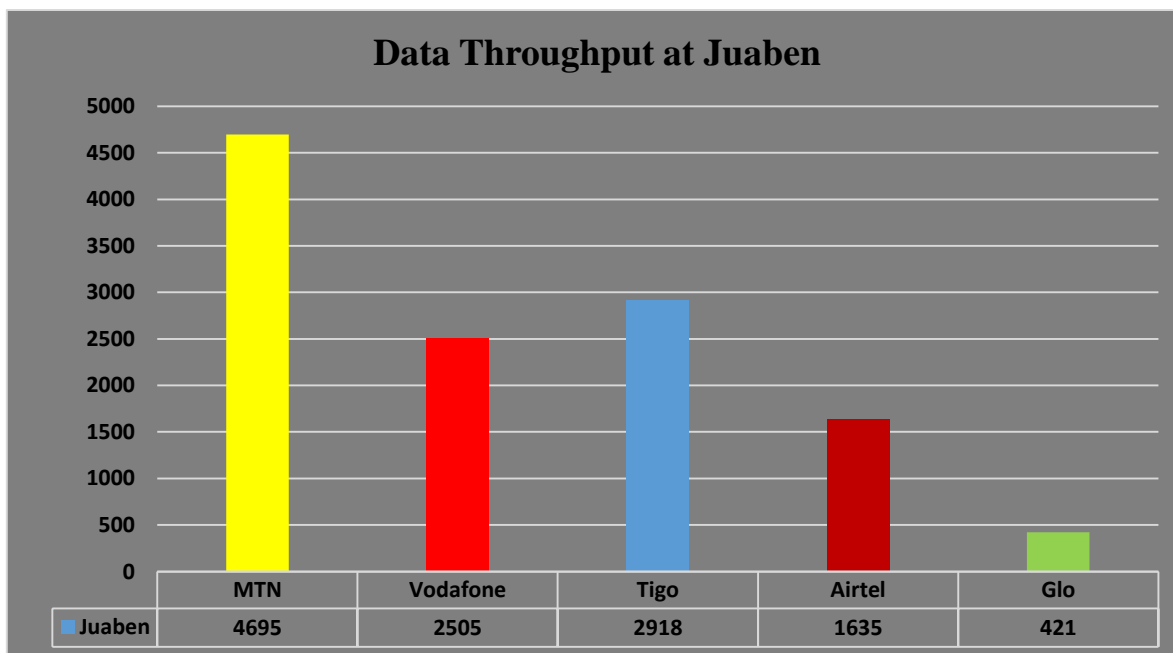


REMARKS:

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

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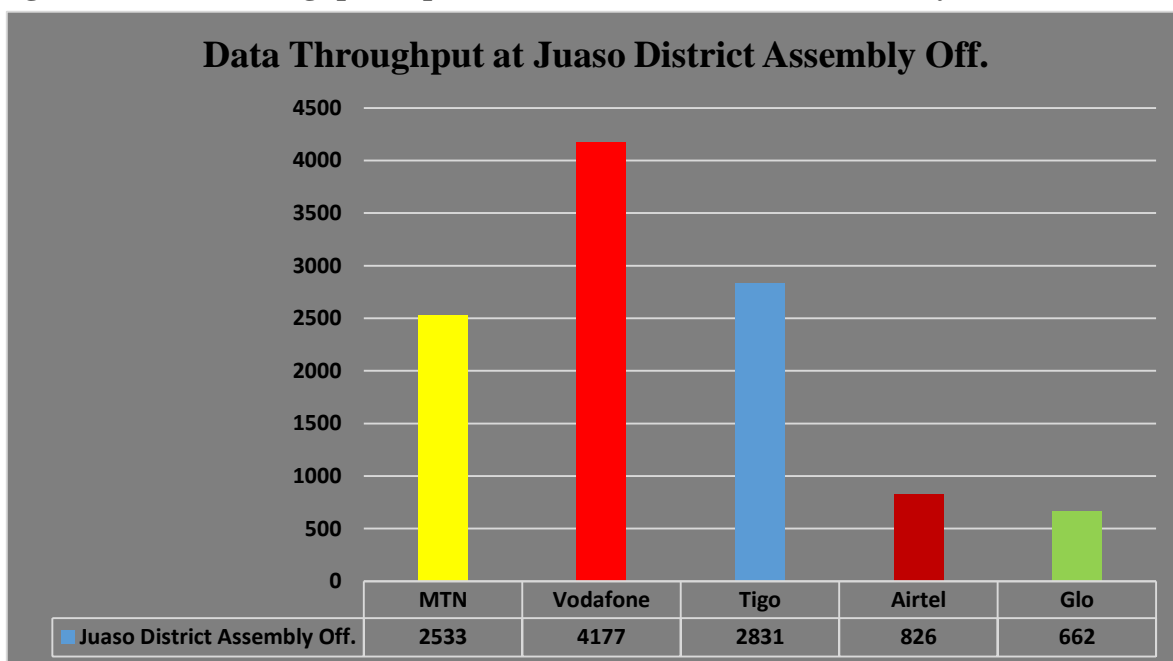
Figure 14. Data Throughput September 2016, Juaben



REMARKS:

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

Figure 15. Data Throughput September 2016, Juaso District Assembly Office.

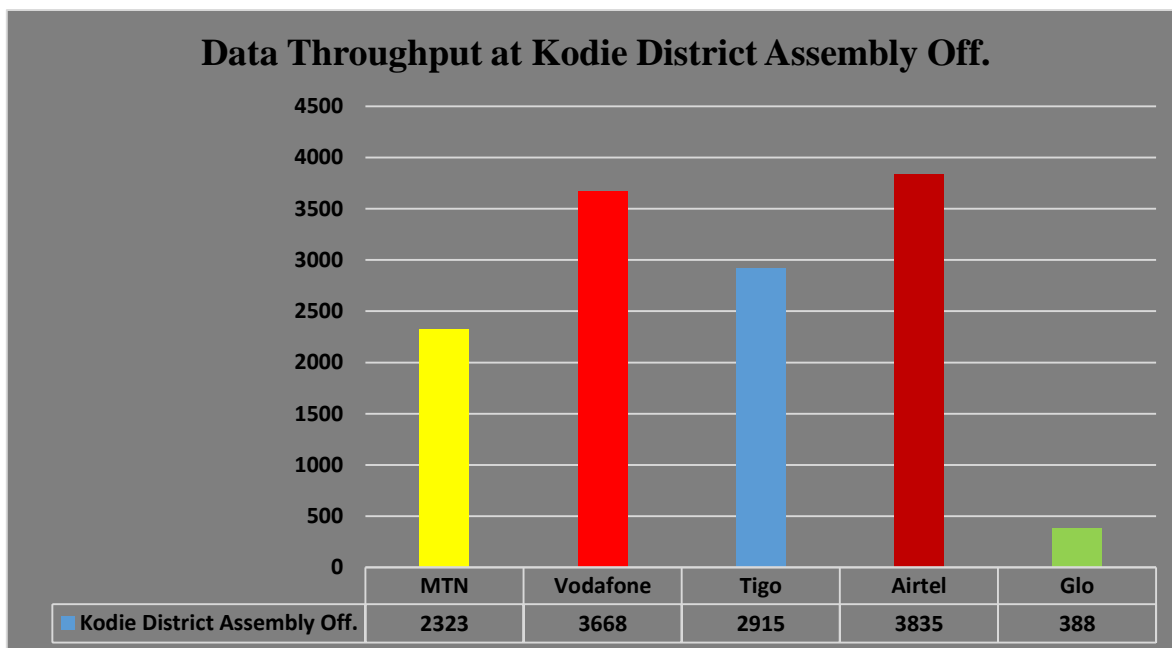


REMARKS:

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

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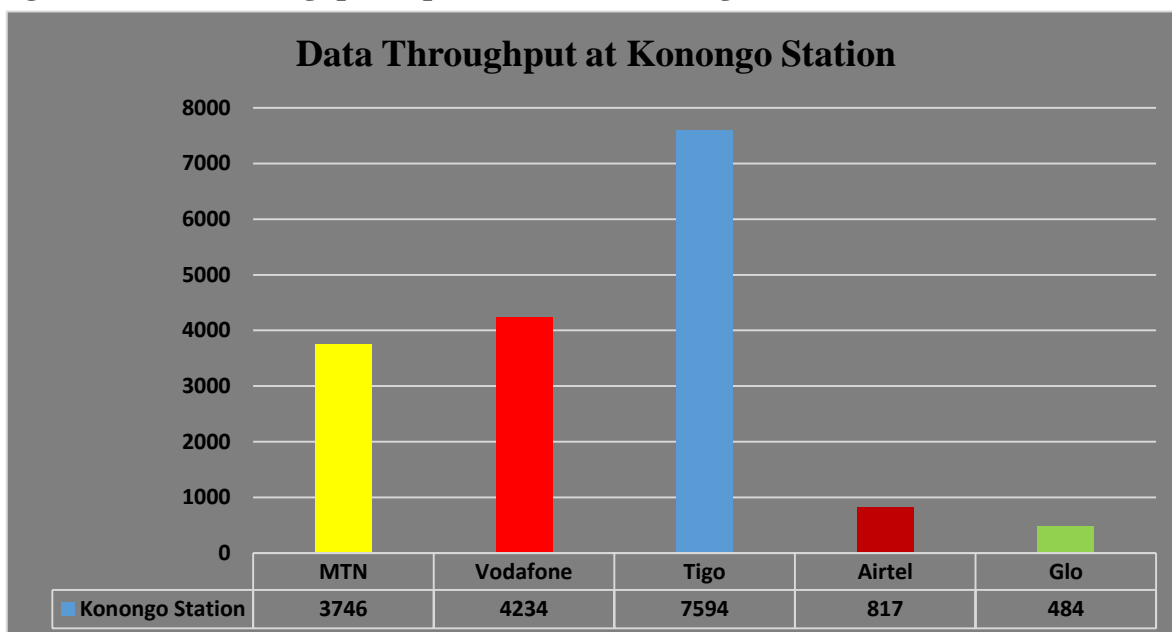
Figure 16. Data Throughput September 2016, Kodie District Assembly Office.



REMARKS:

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

Figure 17. Data Throughput September 2016, Konongo Station

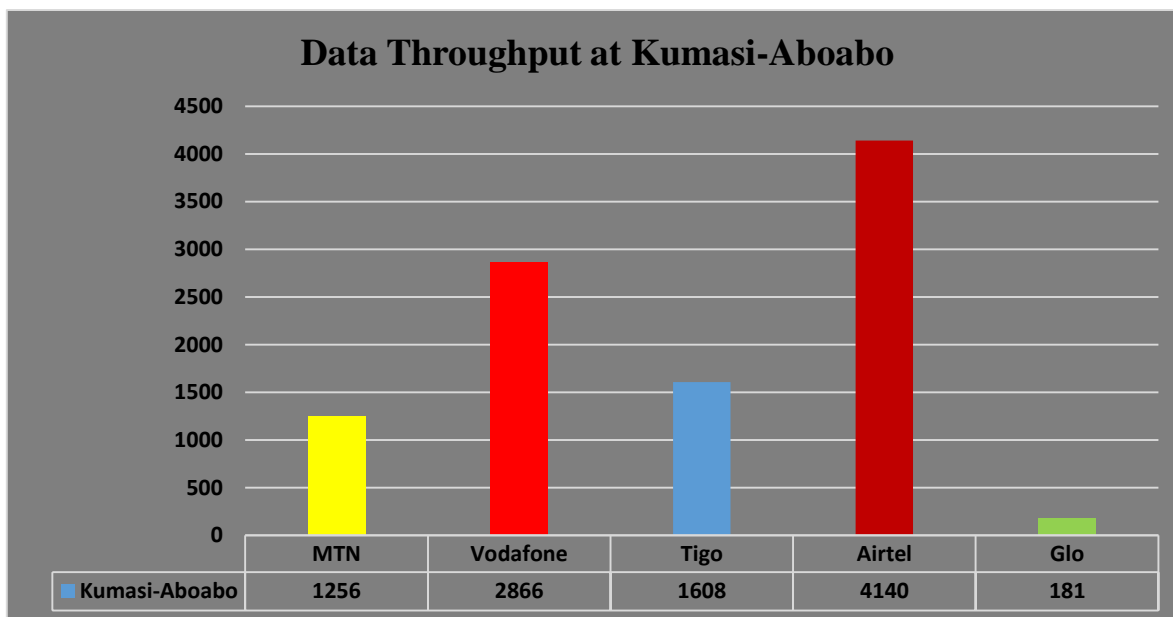


REMARKS:

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

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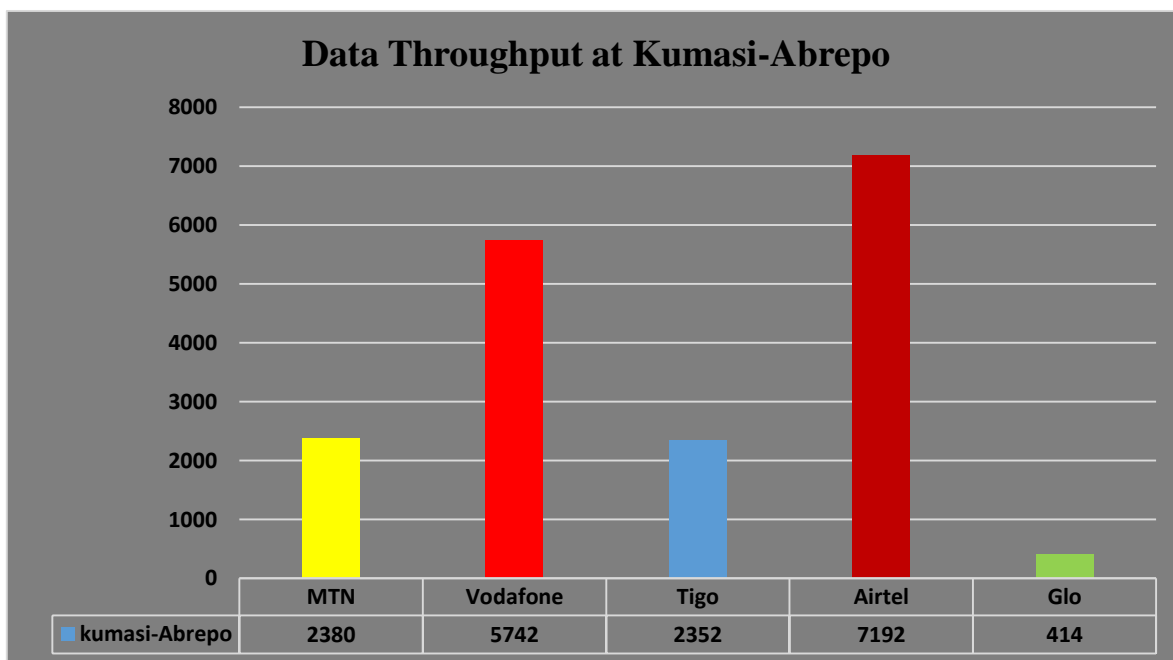
Figure 18. Data Throughput September 2016, Kumasi-Aboabo



REMARKS:

- ❖ All Operators except Glo exceeded the Data Throughput threshold of 256kbps.
- ❖ Glo failed the Data Throughput licence condition at Kumasi-Aboabo.

Figure 19. Data Throughput September 2016, Kumasi-Abrepo

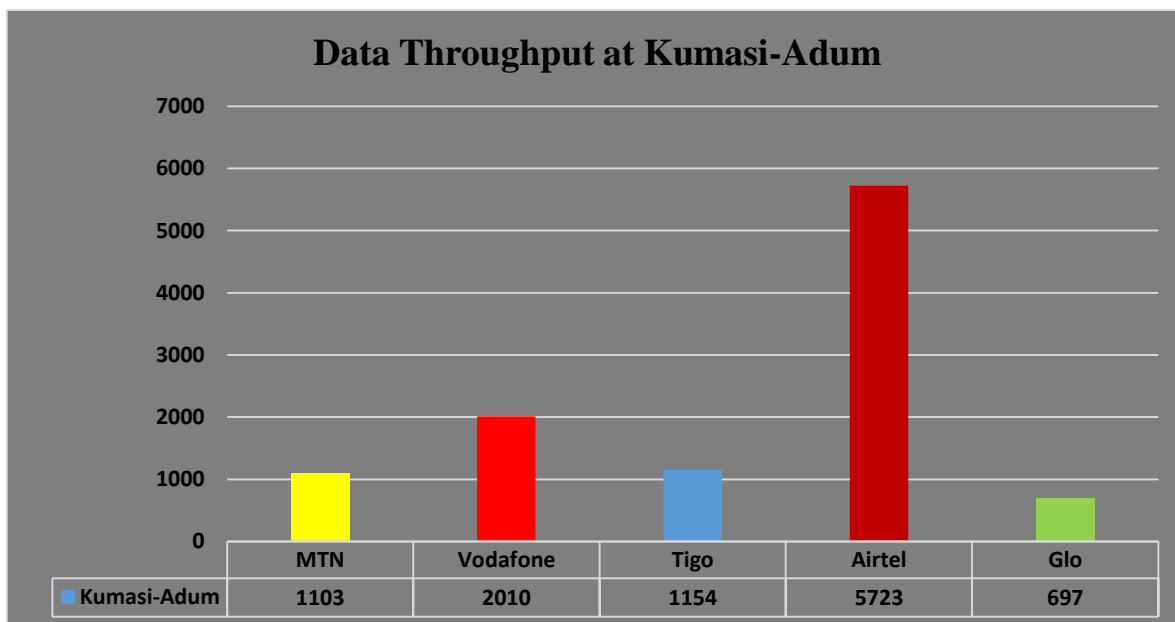


REMARKS:

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

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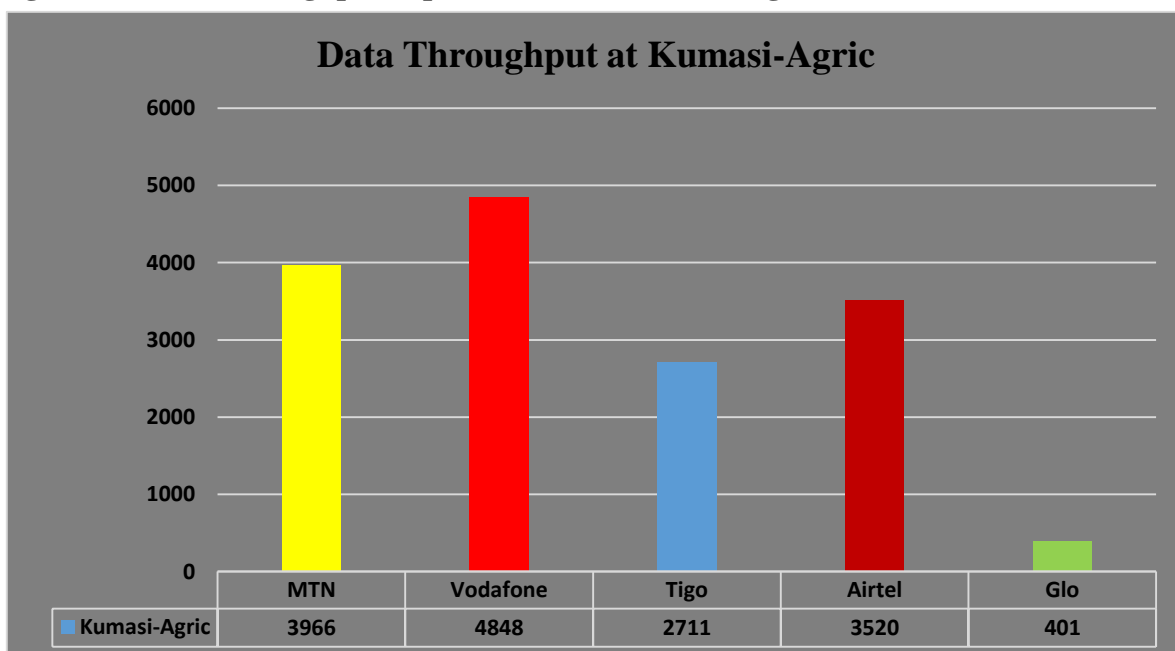
Figure 20. Data Throughput September 2016, Kumasi-Adum



REMARKS:

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

Figure 21. Data Throughput September 2016, Kumasi-Agric

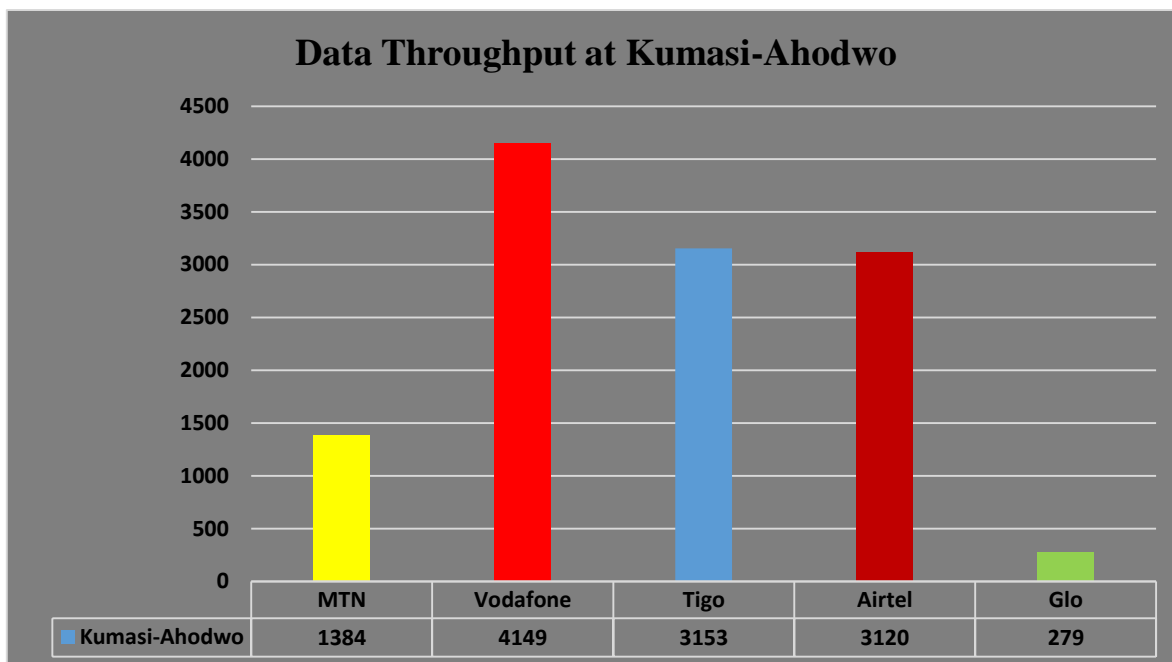


REMARKS:

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

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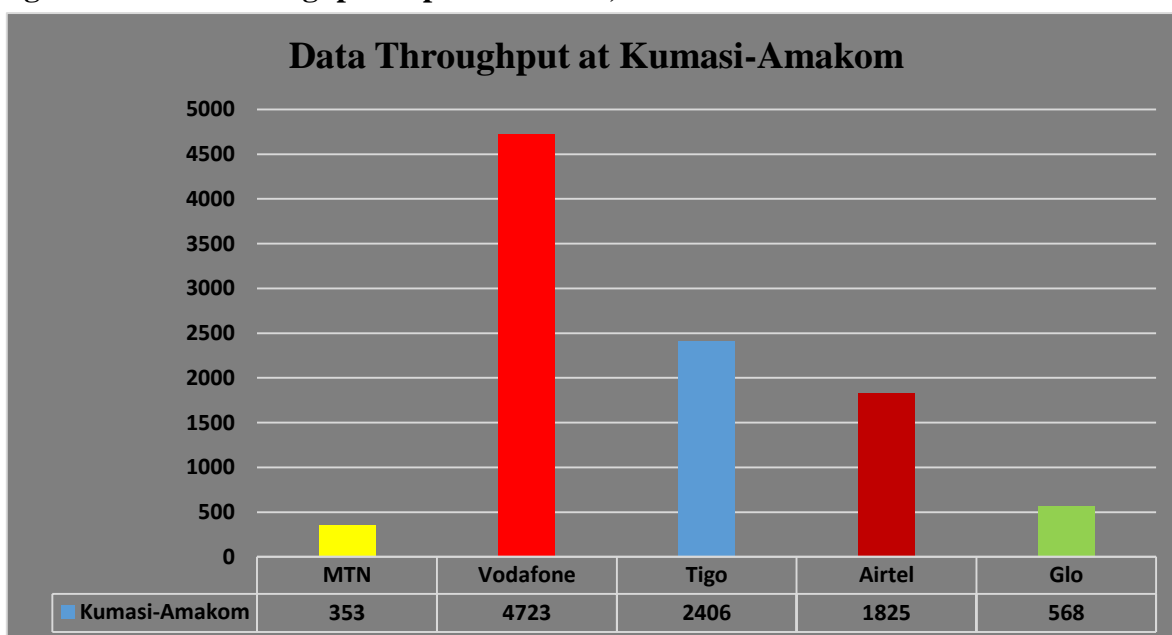
Figure 22. Data Throughput September 2016, Kumasi-Ahodwo



REMARKS:

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

Figure 23. Data Throughput September 2016, Kumasi-Amakom

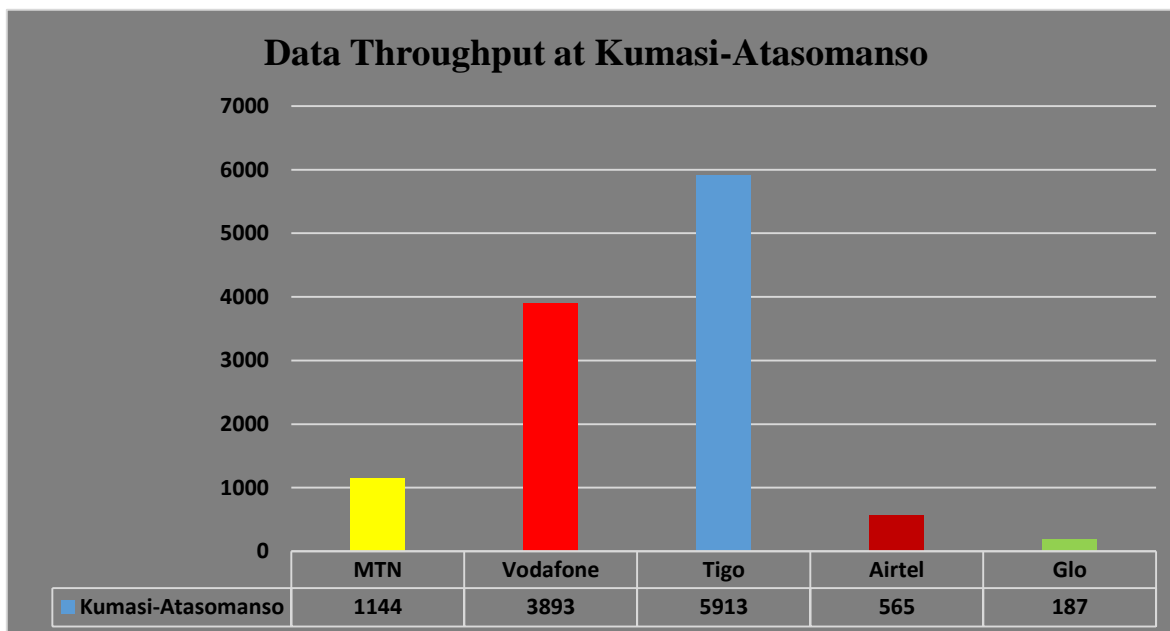


REMARKS:

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

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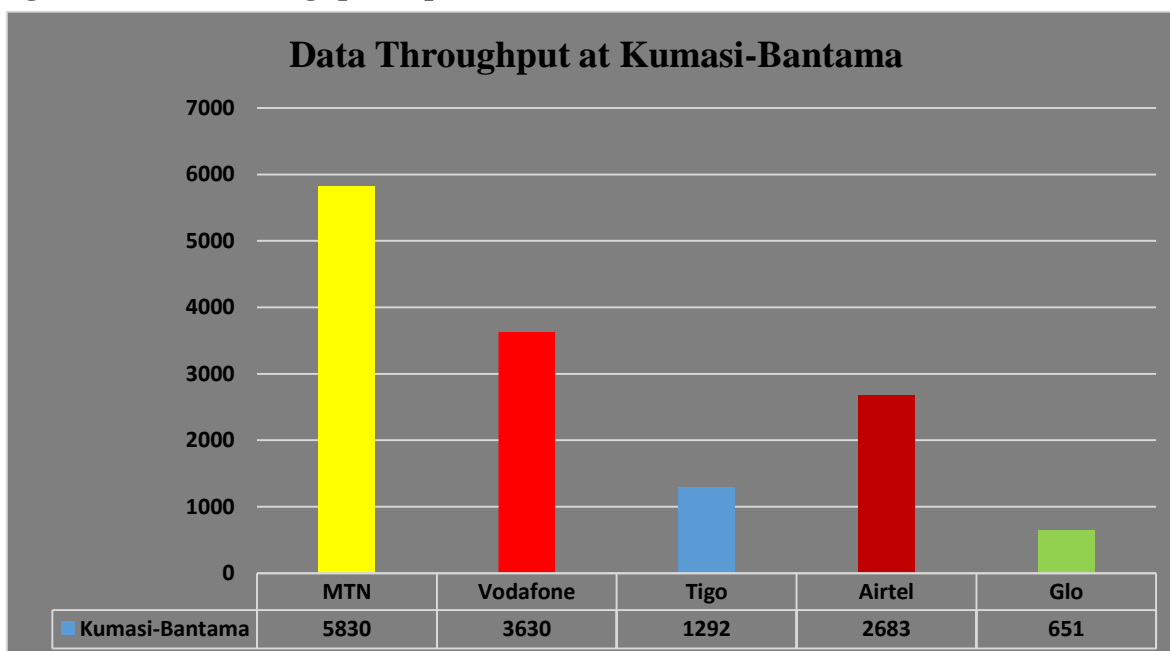
Figure 24. Data Throughput September 2016, Kumasi-Atasomanso



REMARKS:

- ❖ All Operators except Glo exceeded the Data Throughput threshold of 256kbps.
- ❖ Glo failed the Data Throughput licence condition at Kumasi-Atasomanso.

Figure 25. Data Throughput September 2016, Kumasi-Bantama

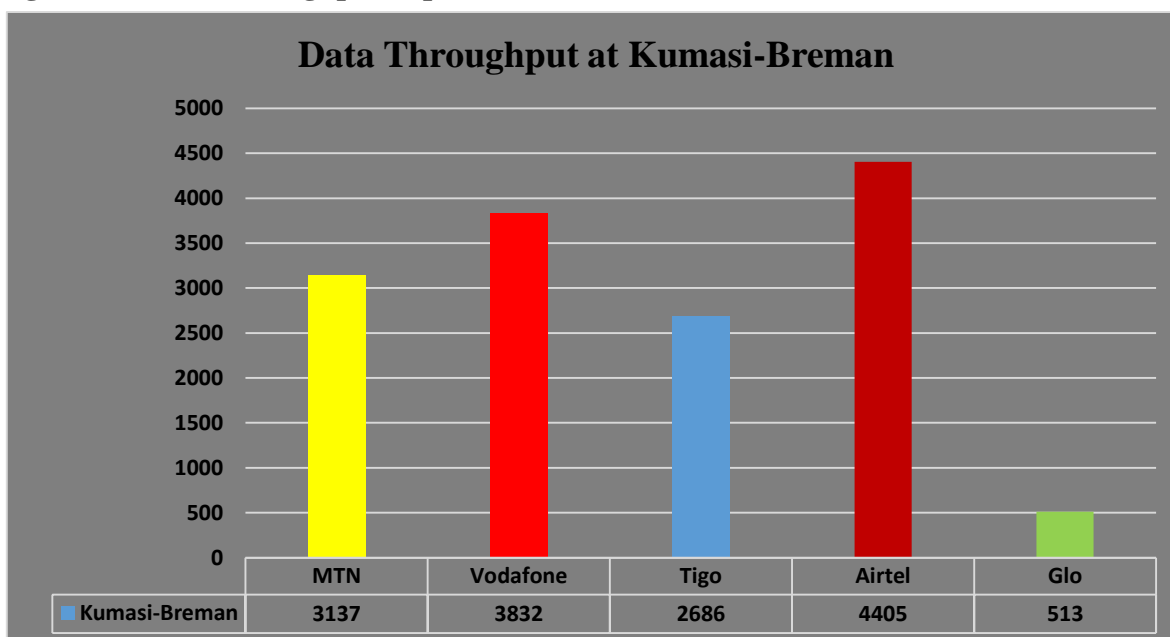


REMARKS:

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

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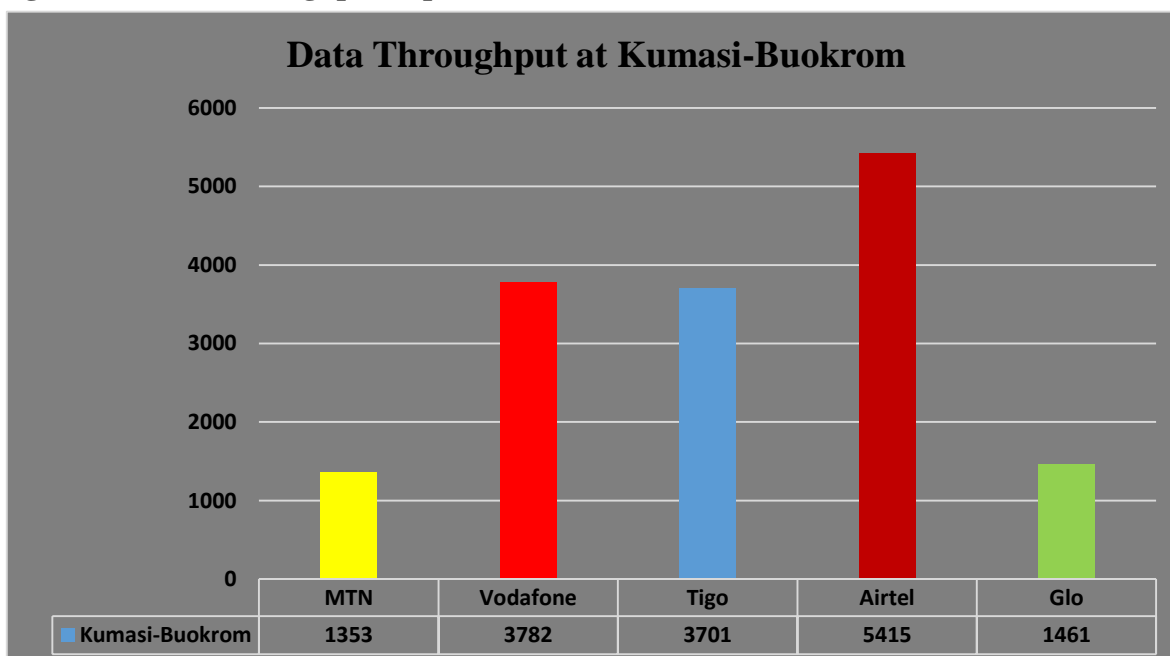
Figure 26. Data Throughput September 2016, Kumasi-Breman



REMARKS:

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

Figure 27. Data Throughput September 2016, Kumasi-Buokrom

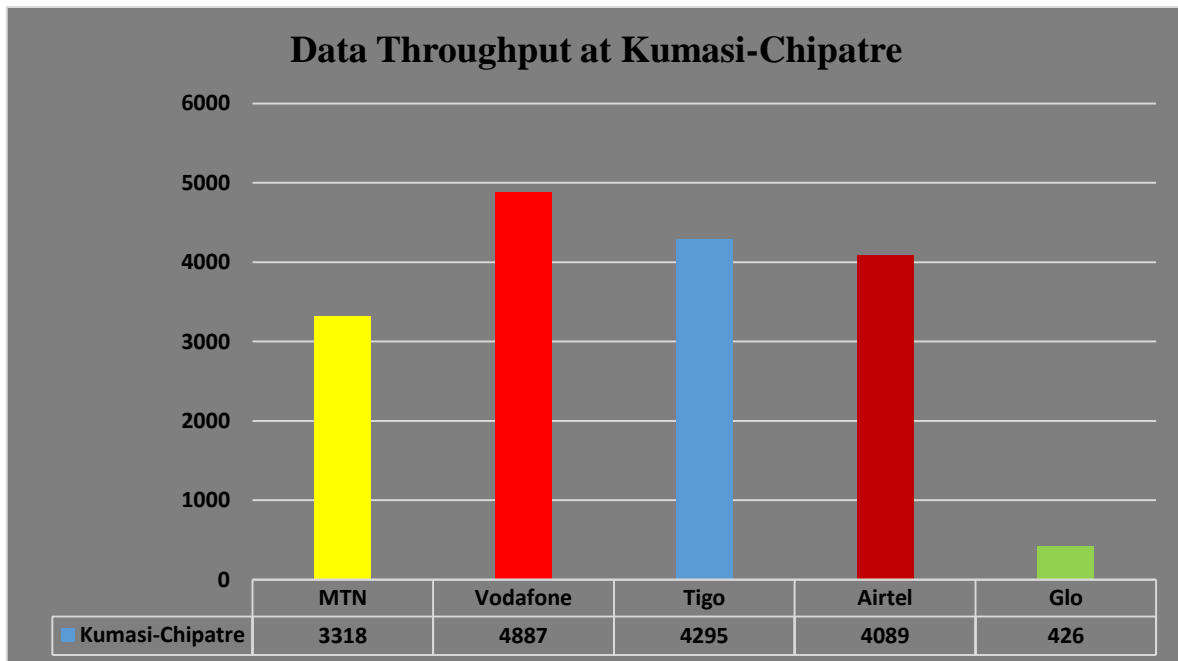


REMARKS:

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

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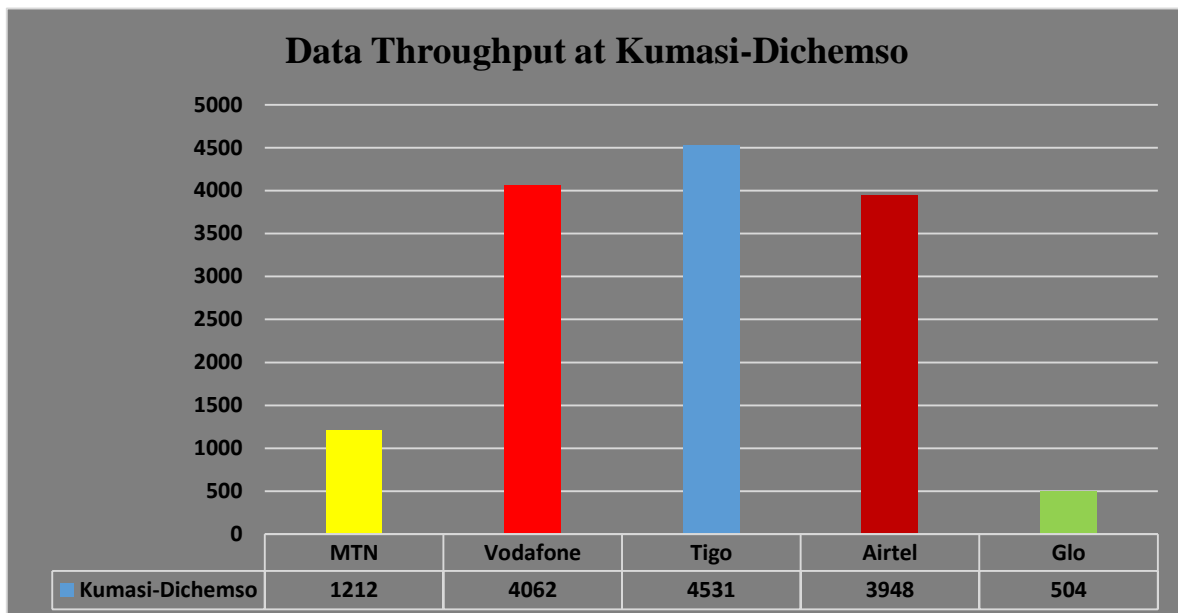
Figure 28. Data Throughput September 2016, Kumasi-Chipatre



REMARKS:

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

Figure 29. Data Throughput September 2016, Kumasi-Dichemso

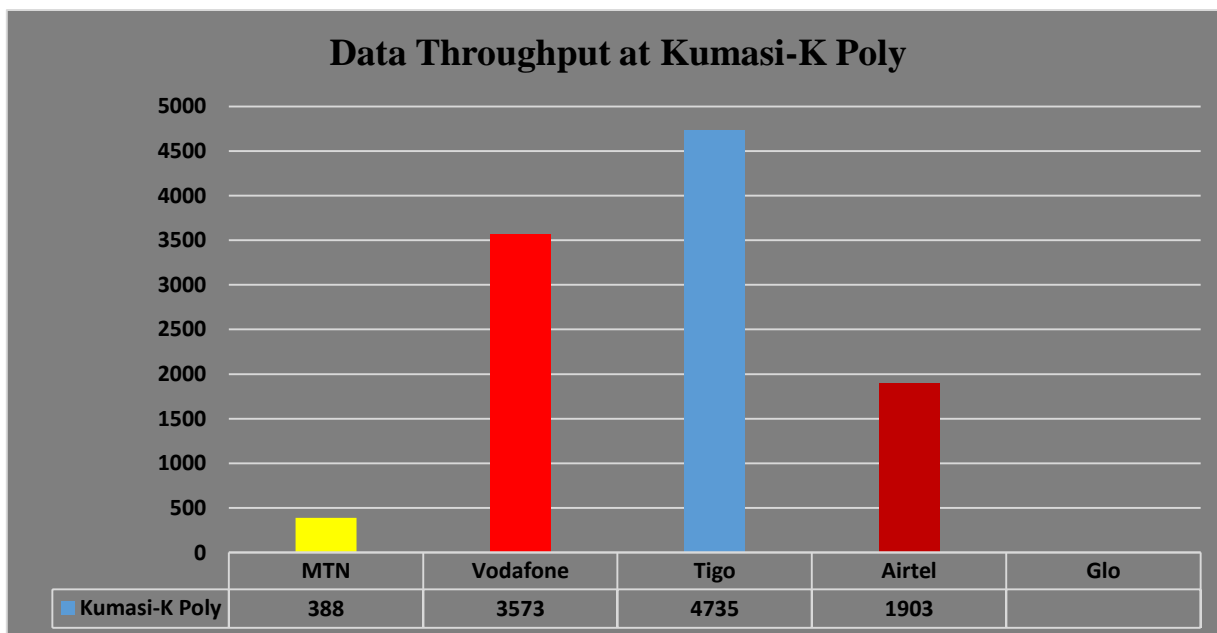


REMARKS:

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

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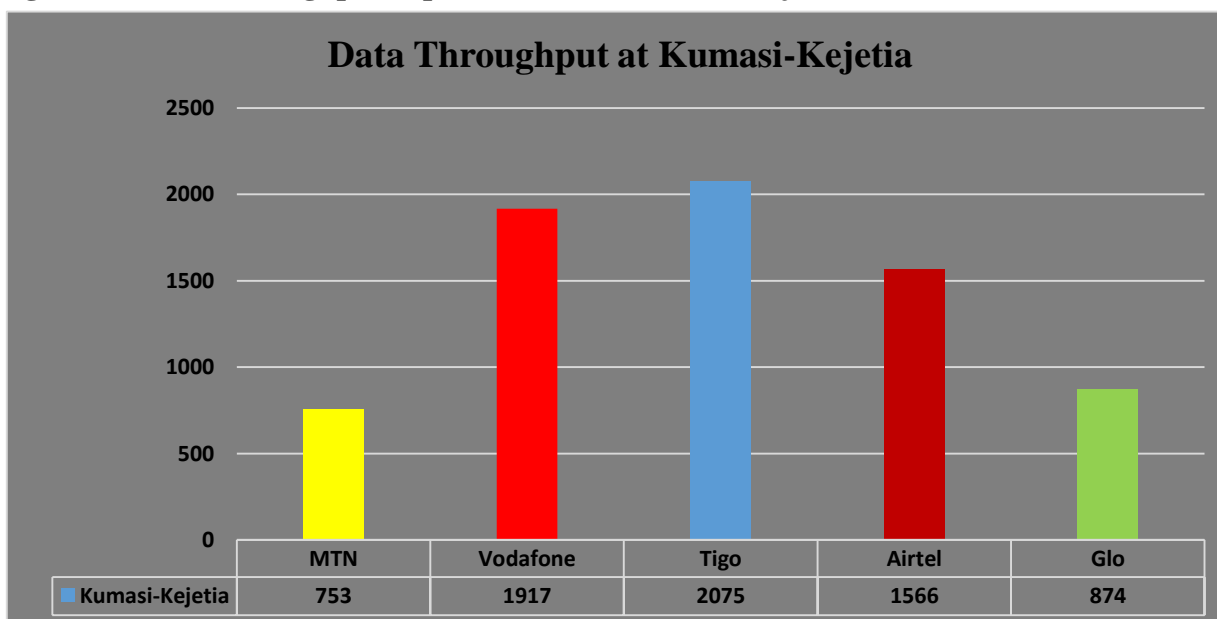
Figure 30. Data Throughput September 2016, Kumasi-K Poly



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 31. Data Throughput September 2016, Kumasi-Kejetia

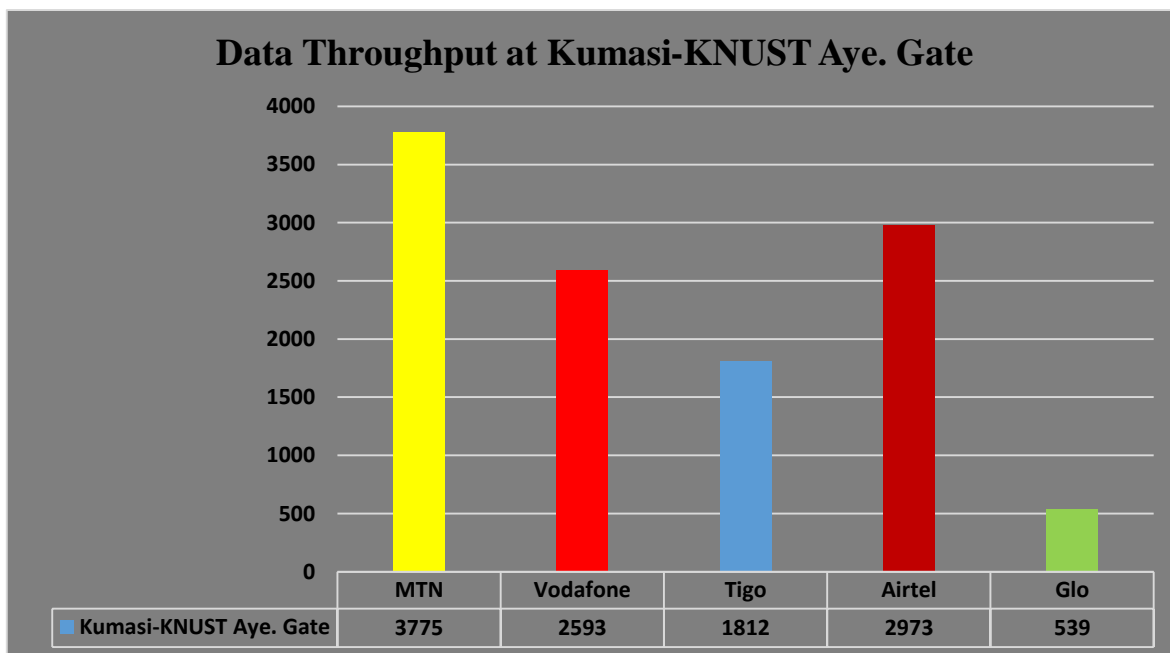


REMARKS:

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

QUALITY OF SERVICE (QoS) MONITORING OF CELLULAR MOBILE DATA SERVICES IN ASHANTI REGION, SEPTEMBER 2016

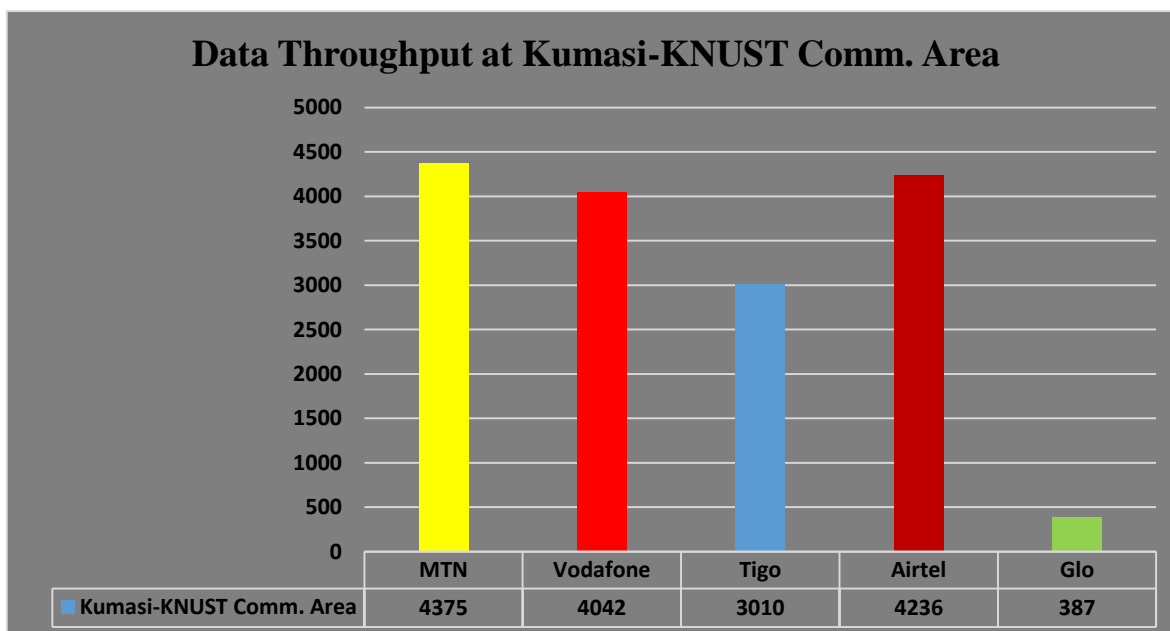
Figure 32. Data Throughput September 2016, Kumasi-KNUST Ayeduase Gate



REMARKS:

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

Figure 33. Data Throughput September 2016, Kumasi-KNUST Comm. Area.

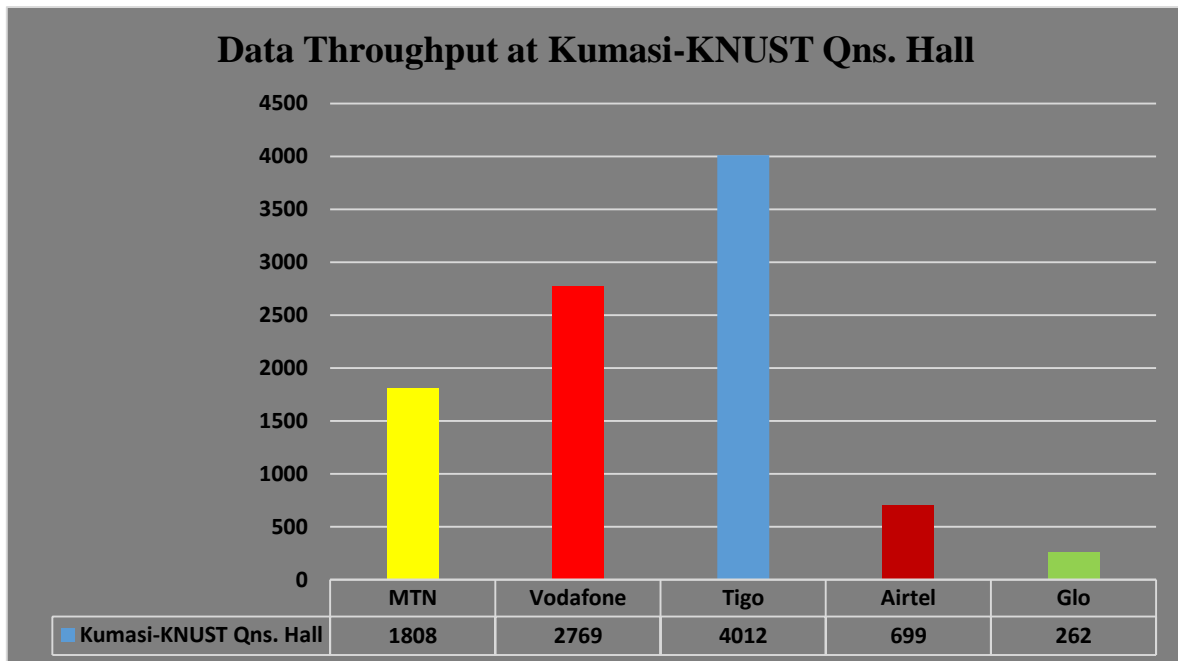


REMARKS:

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

QUALITY OF SERVICE (QoS) MONITORING OF CELLULAR MOBILE DATA SERVICES IN ASHANTI REGION, SEPTEMBER 2016

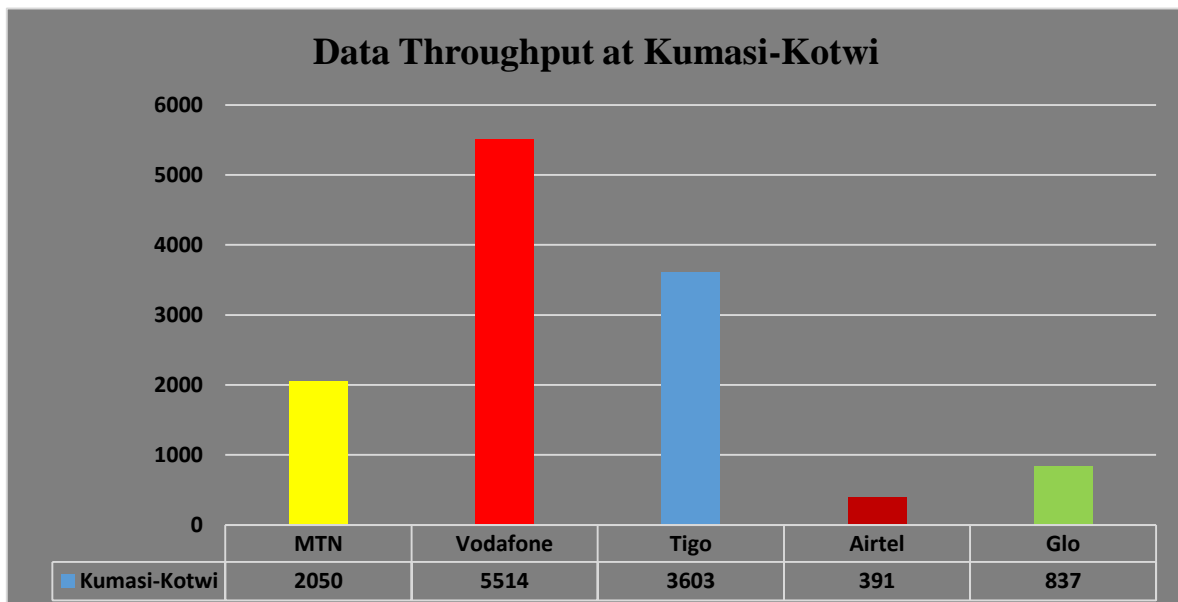
Figure 34. Data Throughput September 2016, Kumasi-KNUST Queens Hall



REMARKS:

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

Figure 35. Data Throughput September 2016, Kumasi-Kotwi

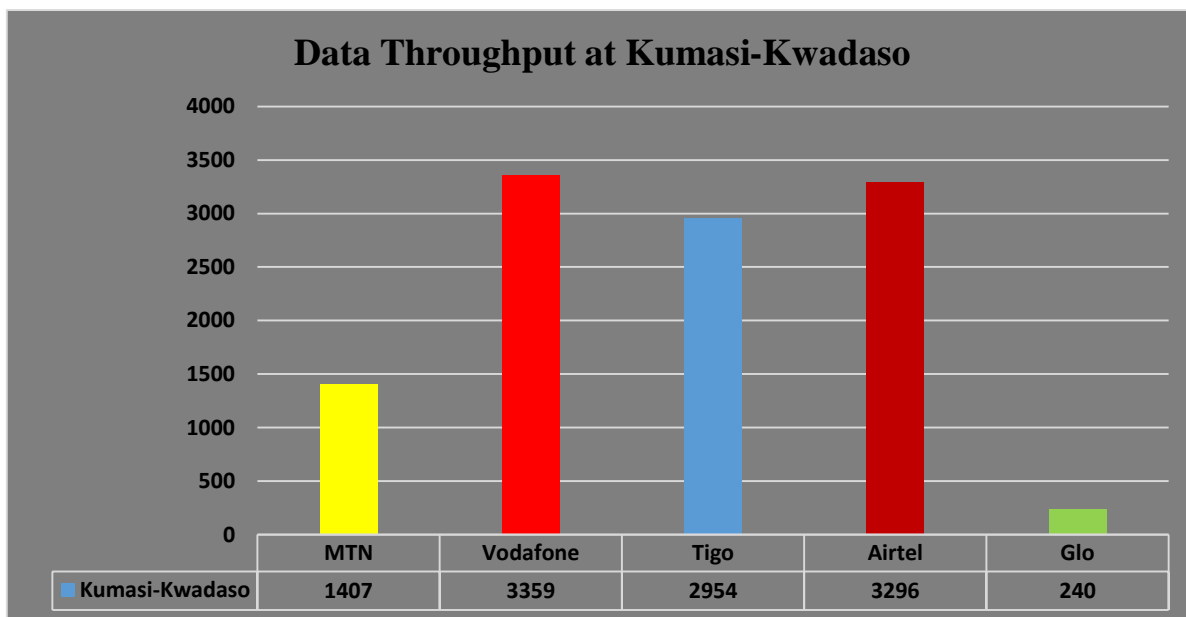


REMARKS:

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

QUALITY OF SERVICE (QoS) MONITORING OF CELLULAR MOBILE DATA SERVICES IN ASHANTI REGION, SEPTEMBER 2016

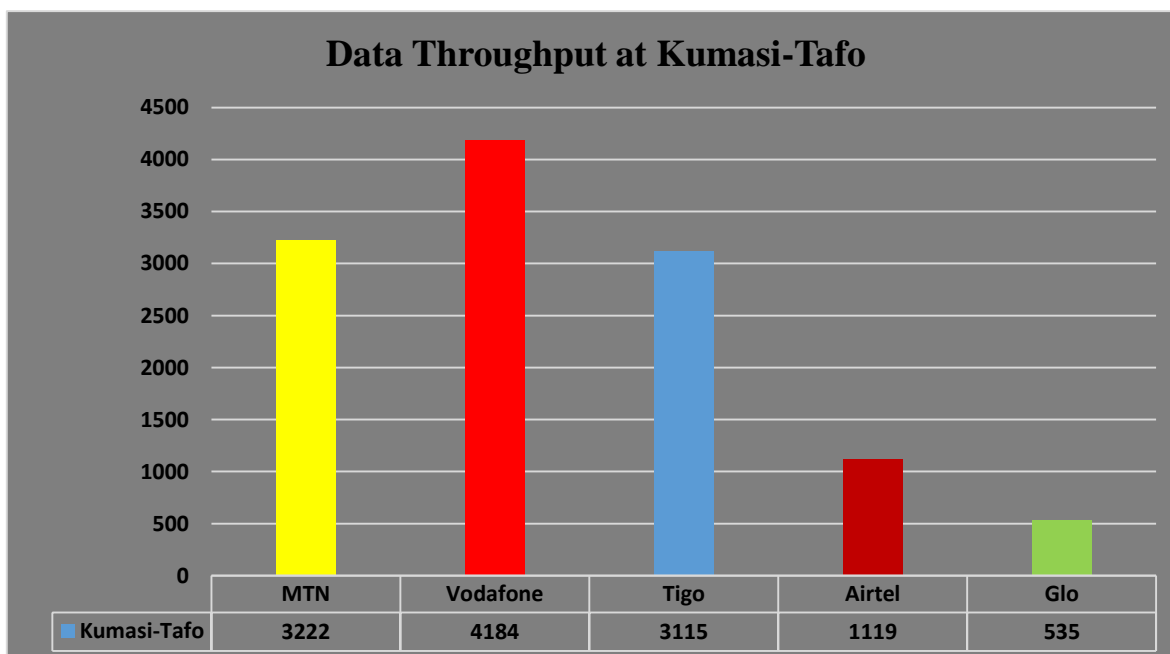
Figure 36. Data Throughput September 2016, Kumasi-Kwadaso



REMARKS:

- ❖ All Operators except Glo exceeded the Data Throughput threshold of 256kbps.
- ❖ Glo failed the Data Throughput licence condition at Kumasi-Kwadaso.

Figure 37. Data Throughput September 2016, Kumasi-Tafo

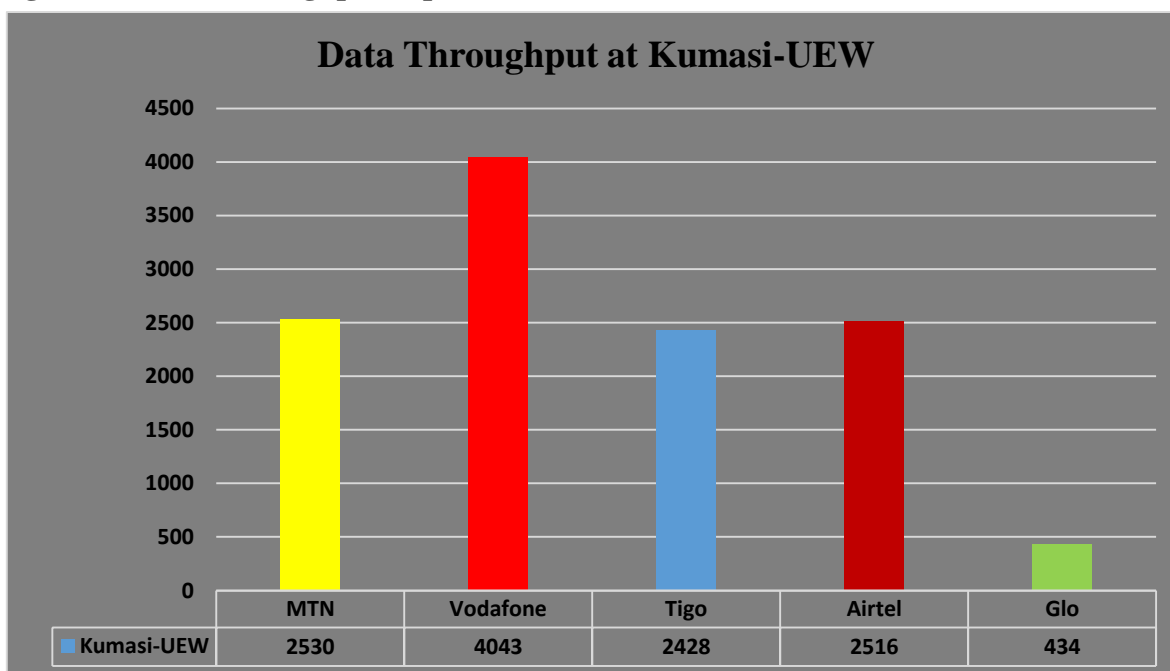


REMARKS:

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

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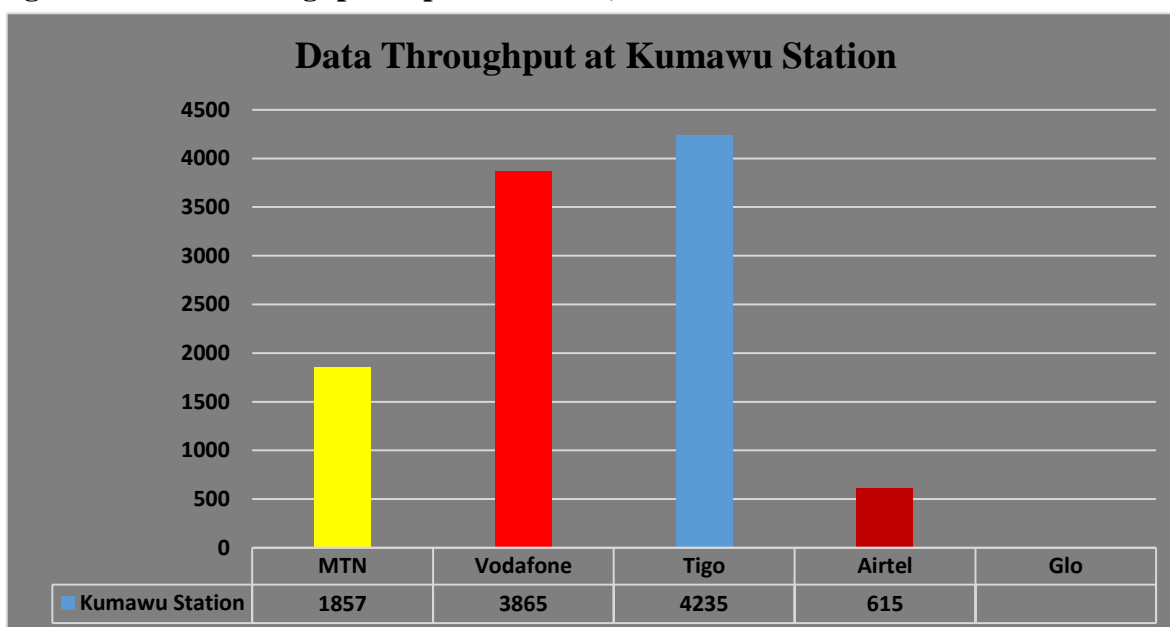
Figure 38. Data Throughput September 2016, Kumasi-UEW



REMARKS:

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

Figure 39. Data Throughput September 2016, Kumawu Station

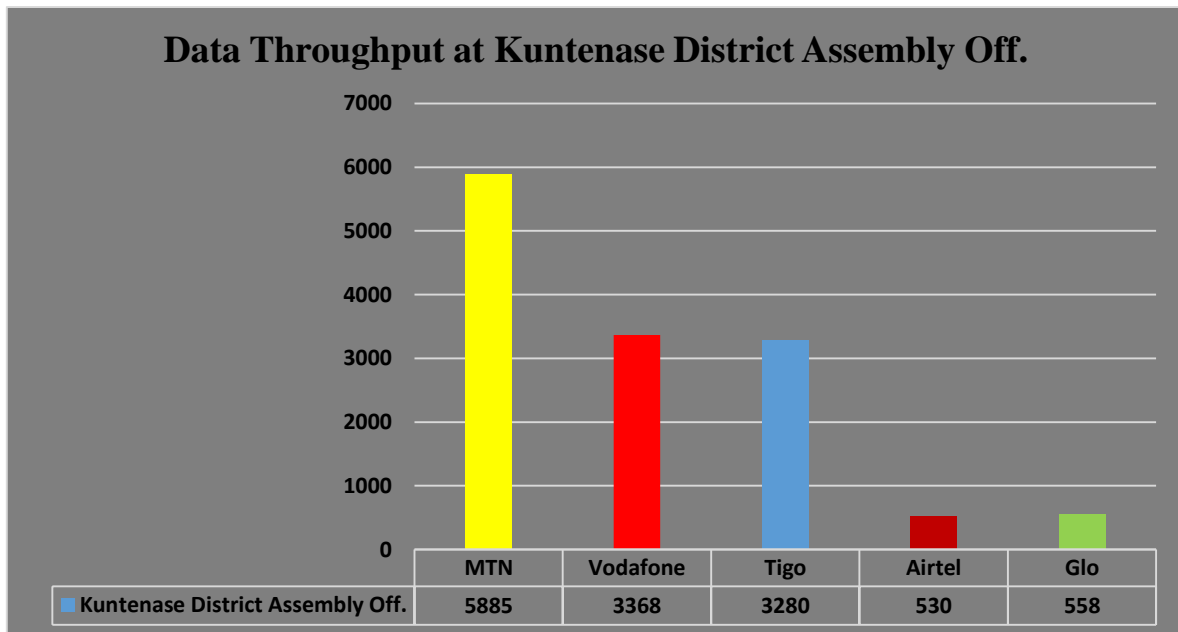


REMARKS:

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

QUALITY OF SERVICE (QoS) MONITORING OF CELLULAR MOBILE DATA SERVICES IN ASHANTI REGION, SEPTEMBER 2016

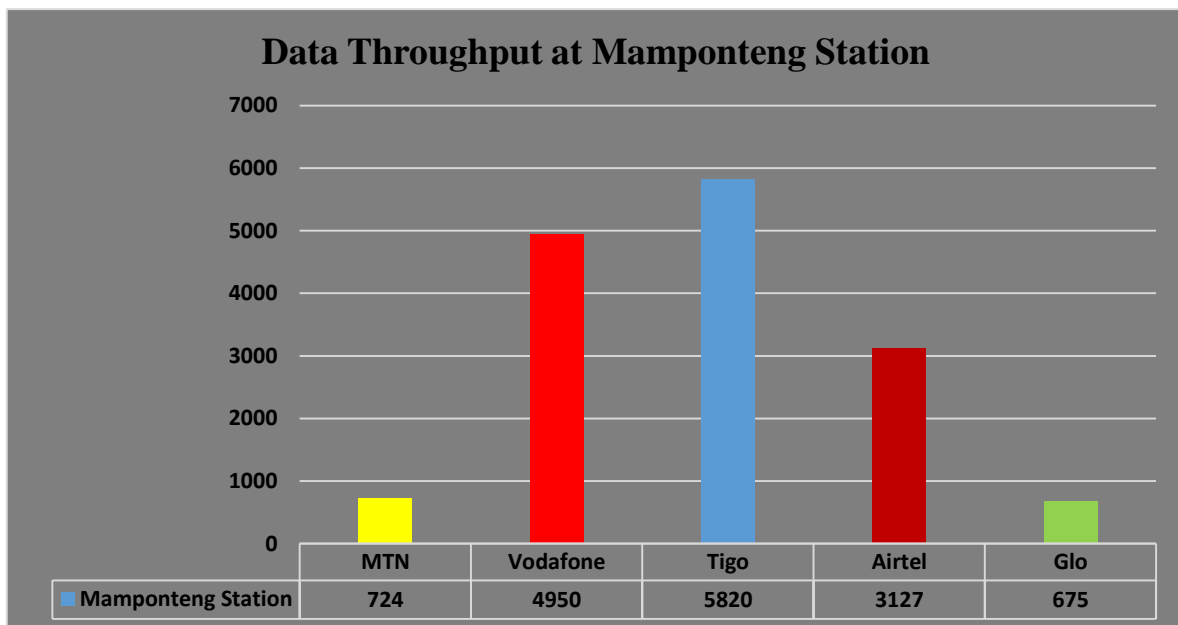
Figure 40. Data Throughput September 2016, Kuntanase District Assembly



REMARKS:

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

Figure 41. Data Throughput September 2016, Mampong Station

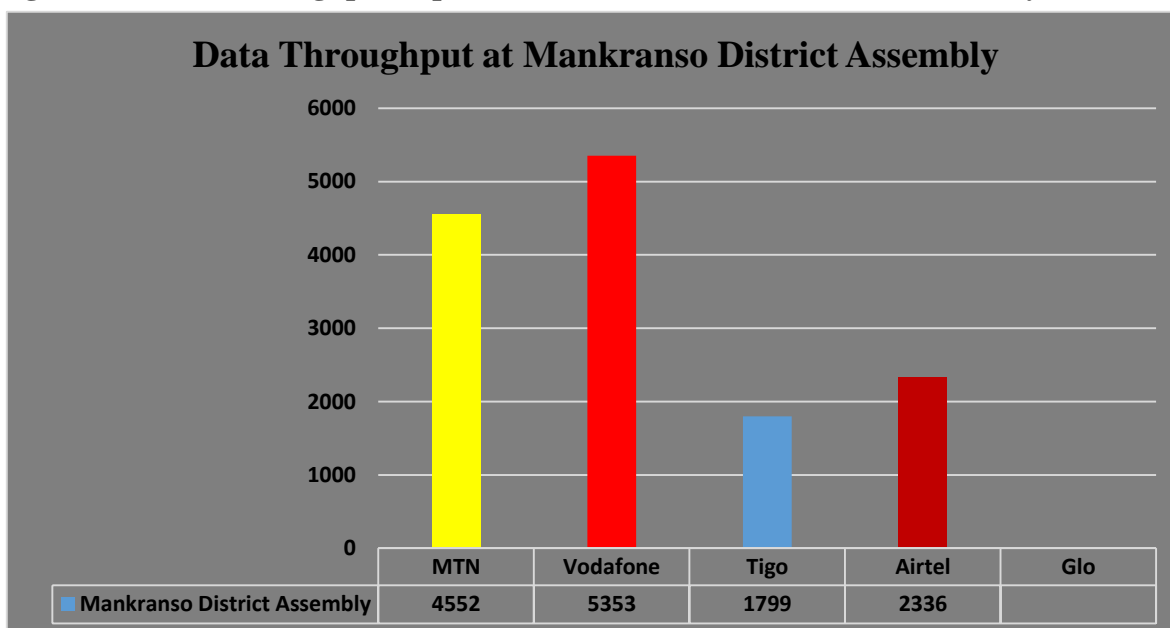


REMARKS:

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

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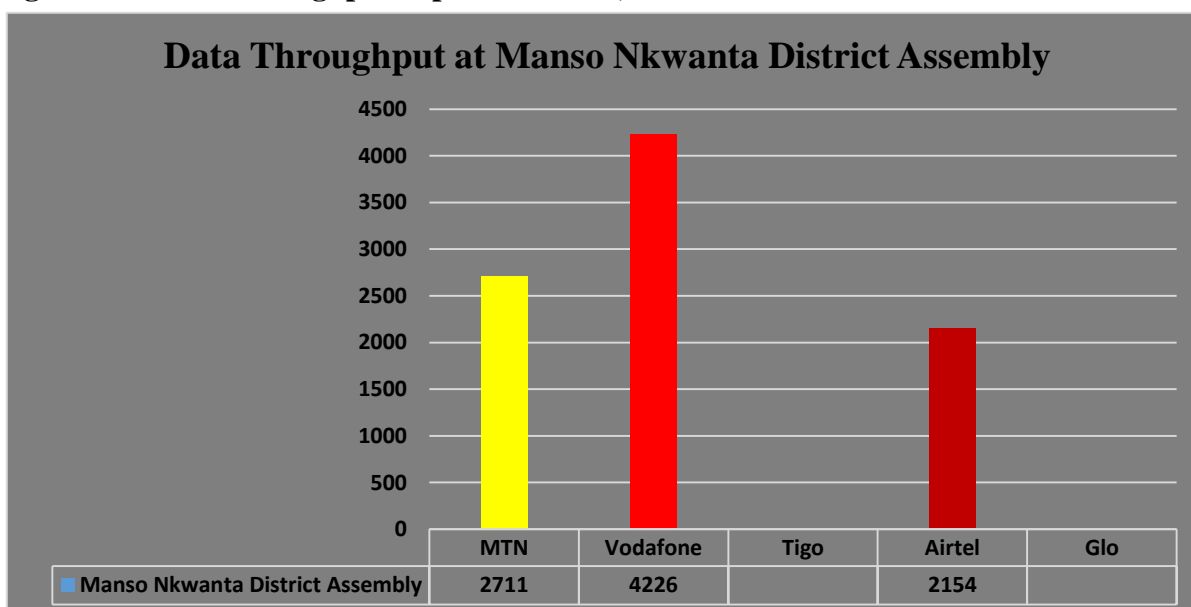
Figure 42. Data Throughput September 2016, Mankranso District Assembly



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 43. Data Throughput September 2016, Manso Nkwanta D.A

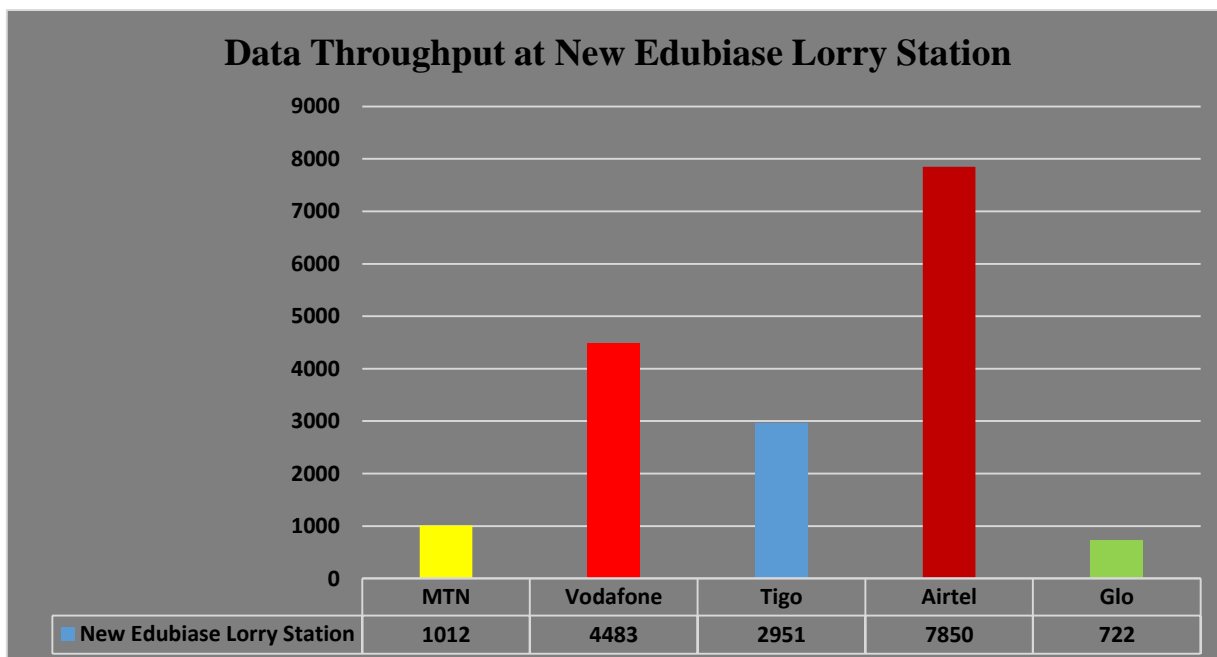


REMARKS:

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

QUALITY OF SERVICE (QoS) MONITORING OF CELLULAR MOBILE DATA SERVICES IN ASHANTI REGION, SEPTEMBER 2016

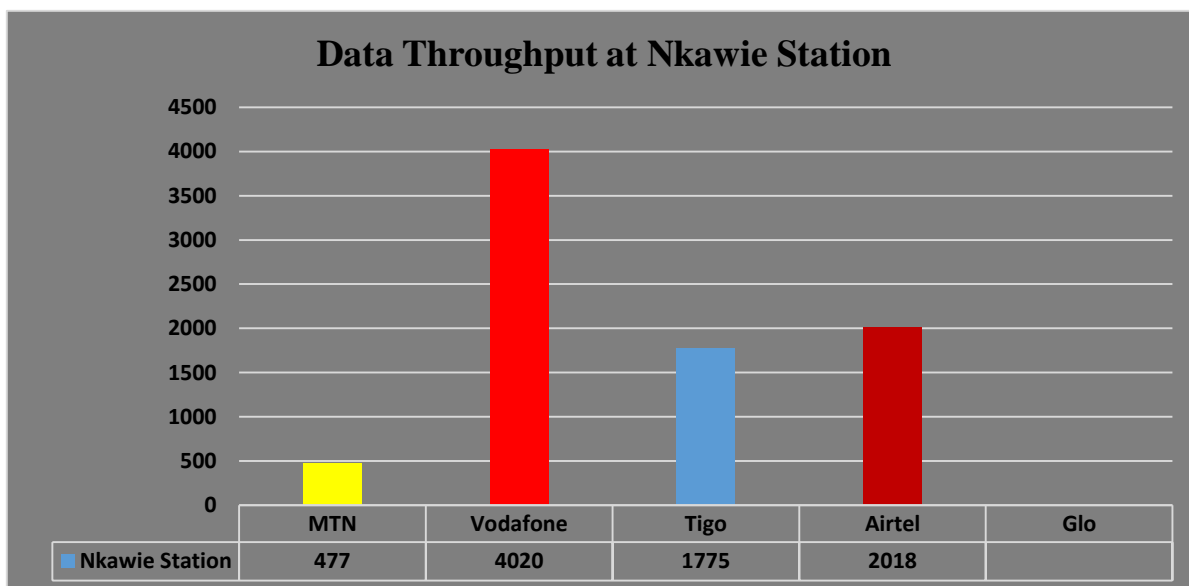
Figure 44. Data Throughput September 2016, New Edubiase Lorry Station



REMARKS:

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

Figure 45. Data Throughput September 2016, Nkawie Station

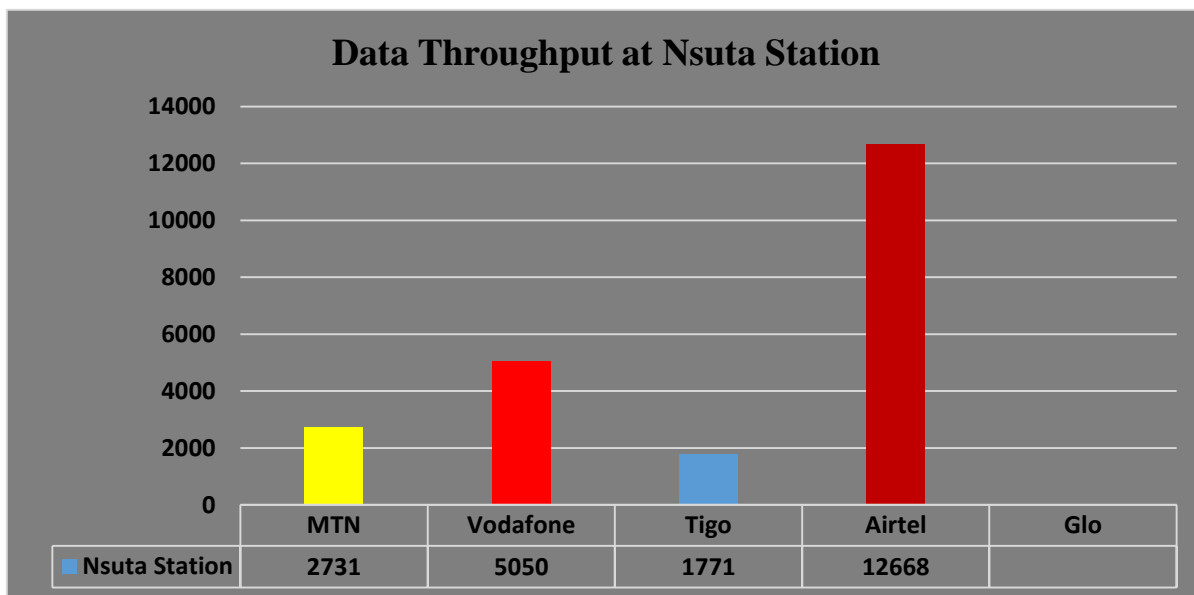


REMARKS:

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

QUALITY OF SERVICE (QoS) MONITORING OF CELLULAR MOBILE DATA SERVICES IN ASHANTI REGION, SEPTEMBER 2016

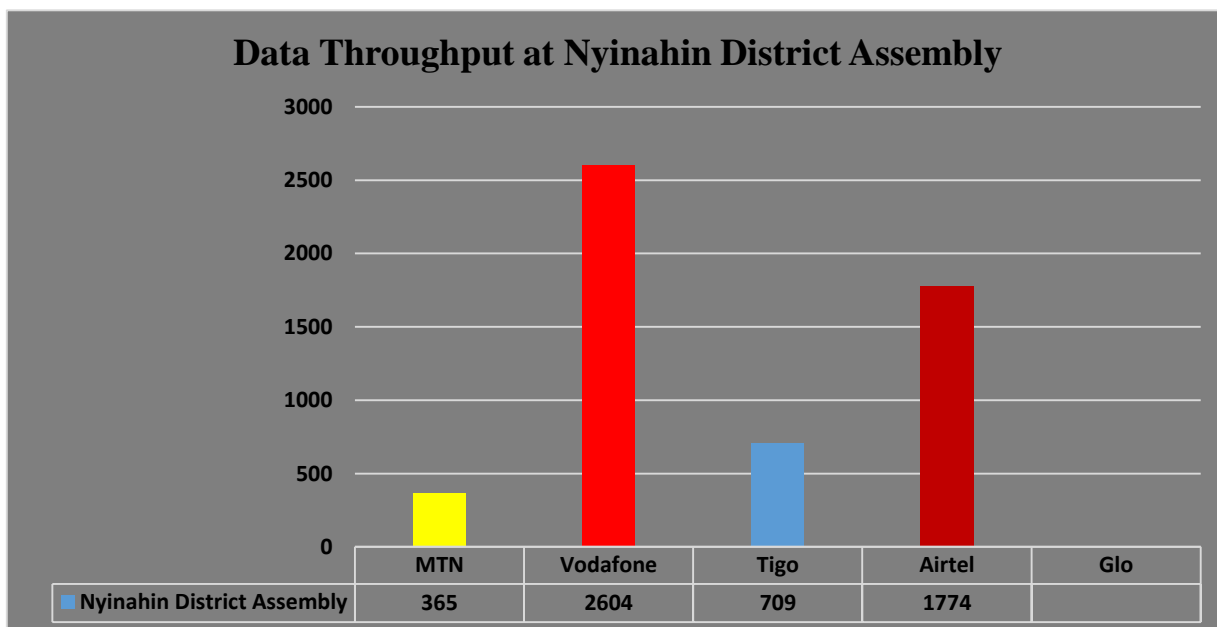
Figure 46. Data Throughput September 2016, Nsuta Station



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 47. Data Throughput September 2016, Nyinahin District Assembly

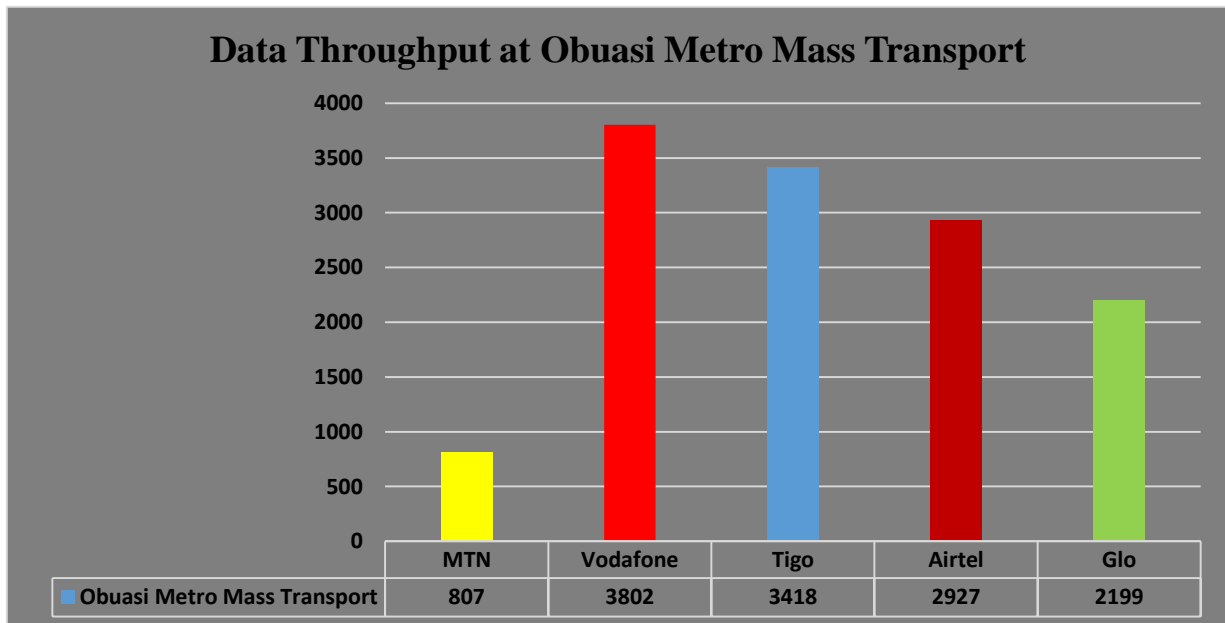


REMARKS:

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

QUALITY OF SERVICE (QoS) MONITORING OF CELLULAR MOBILE DATA SERVICES IN ASHANTI REGION, SEPTEMBER 2016

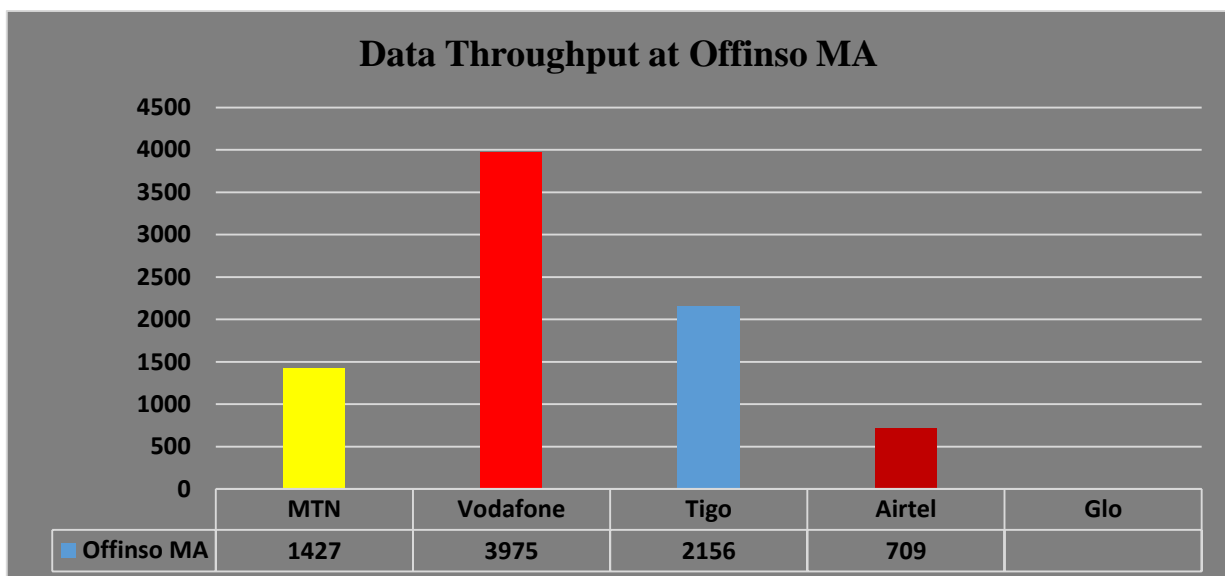
Figure 48. Data Throughput September 2016, Obuasi MMT



REMARKS:

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

Figure 49. Data Throughput September 2016, Offinso M.A

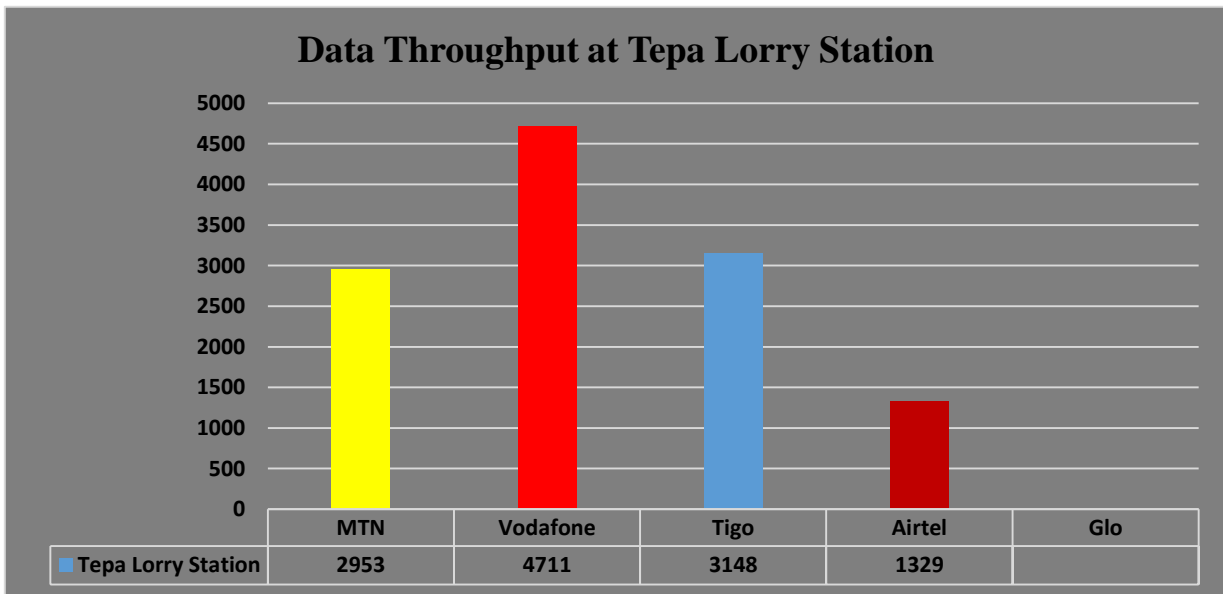


REMARKS:

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

QUALITY OF SERVICE (QoS) MONITORING OF CELLULAR MOBILE DATA SERVICES IN ASHANTI REGION, SEPTEMBER 2016

Figure 50. Data Throughput September 2016, Tapa Lorry Station



REMARKS:

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