QUARTERLY STATISTICAL BULLETIN ON COMMUNICATIONS IN GHANA

Volume 7 Issue 1

NATIONAL COMMUNICATIONS AUTHORITY

FIRST QUARTER

JANUARY - MARCH, 2022

Communications for Development

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LIST OF ABBREVIATIONS

BWA	Broadband Wireless Access
LTE	Long-Term Evolution
FM	Frequency Modulation
GH₵	Ghana Cedi
GHp	Ghana pesewas
MB	Megabytes
MNO	Mobile Network Operator
MoU	Minutes of Use
NCA	National Communications Authority
SMS	Short Message Service
TV	Television

VISION AND MISSION

Vision

A world-class communications regulator that facilitates innovative, reliable and sustainable communication solutions to meet stakeholders' expectations.

Mission

Regulate the communications industry in a forward-looking and transparent manner that promotes fair and sustainable competition, stimulates innovation, encourages investment, protects stakeholders' interests and facilitates universal access to quality communications services for national development.

Core Values

- Teamwork
- Accountability
- Consistency
- Trust
- Innovation
- Transparency

INTRODUCTION

This Quarterly Statistical Bulletin on Communications is a reference document that entails segregated data, industry trends and analysis of the communications sector of Ghana. The purpose of this document is to promote open and enriched public discussions on policies for telecom analysts, consumers, academia, policy makers, investors and other stakeholders for decision-making.

This bulletin is prepared from the monthly and quarterly data received from various licensees[1]. It also includes data on internet service providers and broadcasting entities and services providers that was gathered in-house.

The publication of this bulletin is consistent with the National Communications Authority's mandate under section 26 (2) (a) of the Electronic Communications Act 2008, Act 775; "to publish the result of research that it carries out or that is carried out on its behalf on its website and in any other manner that it considers appropriate to bring the results to the attention of the public".

[1] MTN, Vodafone, AirtelTigo, Glo, Surfline, BBH, Telesol, Busy and BLU

DEFINITION OF TERMS

Average SMS per subscriptions - This is calculated by dividing the total average volume of SMS for the quarter by the total average mobile subscriptions for that quarter.

BWA Data Usage per Subscriptions - This is calculated by dividing the total average volume of BWA's traffic for the quarter by the total BWA subscriptions for that quarter.

Cellular network or mobile network – refers to a communication network where the last mile connection is wireless. The network is distributed over land areas called cells, each served by at least one fixed-location transceiver, known as a cell site or base station. This base station provides the cell with the network coverage, which can be used for transmission of voice, data and others.

Fixed-line network - The term refers to all of the wired networks that are used for voice and data communications. A fixed-line can be seen as a connection to an end-user, by means of a cable, through which they can make phone calls or connect to the Internet.

Minutes of Use per Subscriptions - It is calculated by dividing the total average volume of traffic for that quarter with the total average subscriptions for that quarter.

Mobile Data-refers to active mobile data subscriptions to GPRS, EDGE, HSPA, UMTS, EV-DO, 3G, and LTE that have generated internet traffic (uploaded and/ or downloaded data) within the last ninety (90) days.

Mobile Data Usage per Subscriptions - It is calculated by dividing the total average volume of data traffic for the quarter with the total average mobile data subscriptions for that quarter.

Mobile Penetration or Teledensity – This represents the total number of mobile subscriptions per every 100 inhabitants in a geographical area.

Net Subscriptions Addition – It refers to the total number of new mobile network subscribers minus customers that terminate a service with the service provider at a given time.

On-net traffic - refers to phone calls made to a recipient on the same network as the caller.

Off-net traffic - refers to phone calls made to a recipient on a different network.

Quarter-on-quarter – This is a comparison of the quarter under review with the preceding quarter.

Q1 – First Quarter (January – March).
Q2 – Second Quarter (April – June).
Q3 – Third Quarter (July – September).
Q4 – Fourth Quarter (October – December).

Year-on-year – This is a comparison of a period under review (month, quarter etc.) with the same period of the preceding year.

THE COMMUNICATIONS INDUSTRY AT A GLANCE[2]

A1. Service Providers Authorised/Licensed to Operate

Operator/Service Providers	Number of Authorisation/Licenses	Number in Operation
Mobile Network Operators	4	4
Fixed Network Operators	3	3
Broadband Wireless Access	5	5
Television Stations	148	112
FM Stations	698	502

B1. Total Subscriptions

SUBSCRIPTION	QUARTER-ON-QUARTER			YEAR-ON-YEAR			Units
	Q4 2021	Q1 2022	*Growth (%)*	Q1 2021	Q1 2022	*Growth (%)*	
Mobile Voice Subscription	40.45	41.48	*2.55*	41.42	41.48	*0.14%*	Million
Fixed Voice Subscription	315.27	320.46	*1.65*	310.00	320.46	*3.37%*	Thousand
Mobile Data Subscription	23.41	23.69	*1.20*	22.94	23.69	*3.27%*	Million
Fixed Data Subscription	113.72	102.74	*-9.66*	85.54	102.74	*20.11%*	Thousand
Broadband Wireless Access	50.71	48.90	*-3.57*	53.10	48.90	*-7.91%*	Thousand

B2. Voice, Data and SMS Traffic

TRAFFIC	QUARTER-ON-QUARTER			YEAR-ON-YEAR			Units
	Q4 2021	Q1 2022	*Growth (%)*	Q1 2021	Q1 2022	*Growth (%)*	
Mobile Voice Traffic (Domestic)	26.49	25.84	-2.45%	27.28	25.84	-5.28%	Billion minutes
Fixed Voice Traffic	9.60	9.77	1.77%	9.32	9.77	4.83%	Million minutes
Incoming International Traffic (Direct to Network Only)	58.83	58.2	-1.07%	64.83	58.20	-10.23%	Million minutes
Outgoing International Traffic	100.08	88.22	-11.85%	120.51	88.22	-26.79%	Million minutes
Mobile Data Traffic (MB)	296.74	304.15	2.50%	205.38	304.15	48.09%	Billion MB
BWA Data Traffic (MB)	6.61	6.55	-0.91%	6.85	6.55	-4.38%	Billion MB
SMS Count	592.91	630.08	6.27%	487.67	630.08	29.20%	Million

[2] The decimals may not be exact due to the rounding-off of the actual figures.

B3. Penetration Rate (%)

PENETRATION RATE (%)	QUARTER-ON-QUARTER			YEAR-ON-YEAR		
	Q4 2021	Q1 2022	*Growth (%)*	Q1 2021	Q1 2022	*Growth (%)*
Mobile Voice Subscription	131.38	134.71	2.53%	133.14	134.71	1.18%
Fixed Voice Subscription	1.02	1.04	1.96%	1	1.04	4.00%
Mobile Data Subscription	76.04	76.94	1.18%	73.74	76.94	4.34%
Fixed Data Subscription	0.37	0.33	-10.81%	0.27	0.33	22.22%
Broadband Wireless Access	0.16	0.16	0.00%	0.17	0.16	-5.88%

C1. Broadcasting Sector

FM/TV AUTHORISATION & OPERATIONS	QUARTER-ON-QUARTER			YEAR-ON-YEAR		
	Q4 2021	Q1 2022	*Growth (%)*	Q1 2021	Q1 2022	*Growth (%)*
FM Authorisation	684	698	*2.05%*	629	698	*10.97%*
FM Station Operating	489	502	*2.66%*	474	502	*5.91%*
TV Authorisations	142	148	*4.23%*	137	148	*8.03%*
TV Stations Operating	112	112	*0.00%*	95	112	*17.89%*

C2. Categories of Authorised FM Radio Stations

CATEGORIES OF FM RADIO STATIONS	QUARTER-ON-QUARTER			YEAR-ON-YEAR		
	Q4 2021	Q1 2022	*Growth (%)*	Q1 2021	Q1 2022	*Growth (%)*
PUBLIC	31	31	*0.00%*	31	31	*0.00%*
PUBLIC FOREIGN	5	5	*0.00%*	5	5	*0.00%*
CAMPUS	24	24	*0.00%*	23	24	*4.35%*
COMMUNITY	114	117	*2.63%*	96	117	*21.88%*
COMMERCIAL	510	521	*2.16%*	474	521	*9.92%*

1.0 MOBILE NETWORK

The National Communications Authority (NCA) has licensed four service providers to provide mobile telecoms services in Ghana, namely AirtelTigo, Glo, MTN and Vodafone.

This section provides details on the Mobile Network Operators (MNOs) in Ghana by looking at the mobile voice subscriptions, net additions to voice subscriptions, mobile penetration, volume of voice/data traffic, SMS and mobile data subscriptions.

1.1 Mobile Voice Subscriptions and Penetration Rate[3]

Mobile voice subscriptions increased from 40.45 million at the end of Q4 2021 to 41.48 million at the end of Q1 2022, representing a rise in growth by 2.54%.

Year-on-year subscriptions also increased from 41.42 million at the end of Q1 2021 to 41.48 million at the end of Q1 2022, recording a 0.15% growth rate. The penetration rate as at the end of Q1 of 2022 was 134.71% as compared to 131.38% recorded in Q4 2021, indicating an increase in growth rate by 2.54% (Figure 1) (Appendix, Table 1).

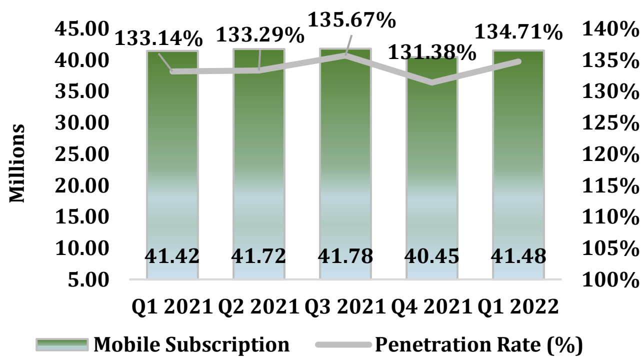


Figure 1: Mobile Voice Subscription and Penetration Rate

1.1.1 Voice Subscription Market Share per Operator

At the end of Q1 2022, MTN recorded 61.61% of the market share with 25.56 million subscriptions.

Vodafone followed with 7.73 million subscriptions (18.64%).

AirtelTigo ended the quarter with a market share of 17.85% with a subscription base of 7.40 million.

Glo followed with 0.79 million subscriptions with a market share of 1.90% (Figure 2) (Appendix, Table 2).

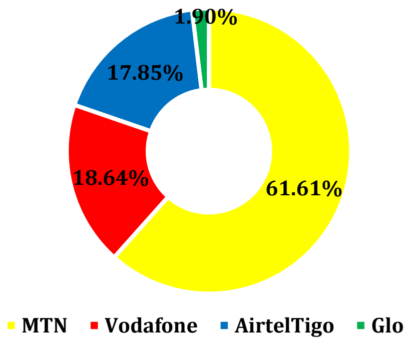


Figure 2: Market Share per Operator

1.1.2 Quarter on quarter market share per operator in percentage

At the end of Q1 2022, MTN increased its market share in percentage from 59.24% in Q4 2021 to 61.61% representing a growth of 4.00%. Vodafone had a percentage growth declined by 8.58% (from 20.39% in Q4 2021 to 18.64% in Q1 2022)

AirtelTigo market share decreased in percentage from 18.27% in Q4 2021 to 17.85% representing a negative growth of 2.30%.

Glo also had a percentage decline in its market share by 9.10% (from 2.09% in Q4 2021 to 1.90% in Q1 2022)

3The mobile penetration rate is estimated by dividing the total number of mobile subscribers by the total population. Population of Ghana was estimated based on the preliminary result of 2021 Population Census figure 30,792,608 published by Ghana Statistical Service (GSS). The High Penetration Rate is partly attributed to people owning more than one SIM card.

1.1.3 Prepaid and Postpaid Mobile Voice Subscriptions

Mobile voice subscription for prepaid subscribers was 41.05 million representing a market share of 98.97%.

Post-paid subscription at the end of the quarter under review was 0.43 million and a market share of 1.03%. (Figure 3) (Appendix, Table 3).

At the end of Q1 2022, Mobile voice subscriptions for prepaid subscribers increased from 40.16 million at the end of Q4 2021 to 41.05 at the end of Q1 2022 representing a percentage increase of 2.22%.

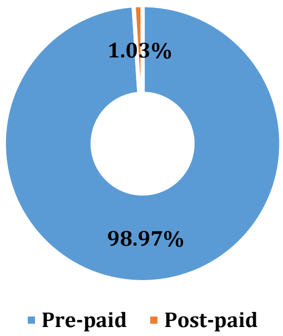


Figure 3: Prepaid and Postpaid Mobile Voice Subscriptions

1.2 Off-net Mobile and Fixed Voice Traffic (Domestic)

Mobile-to-mobile off-net traffic increased from 2.13 billion minutes at the end of Q4 2021 to 2.18 billion minutes at the end of Q1 2022 representing an increase in growth by 2.29%.

Year-on-year mobile-to-mobile off-net traffic rose from 1.92 billion minutes at the end of Q1 2021 to 2.18 billion minutes at the end of Q1 2022, representing a growth of 13.93%.

Quarter-on-quarter mobile to fixed off-net traffic dropped from 13.27 million minutes to 12.32 million minutes indicating a marginal decrease in growth by 7.16%.

Year-on-year mobile-to-fixed off-net traffic grew at 3.75% from 11.88 million minutes at the end of Q1 2021 to 12.32 million minutes at the end of Q1 2022. (Figure 4) (Appendix, Table 4)

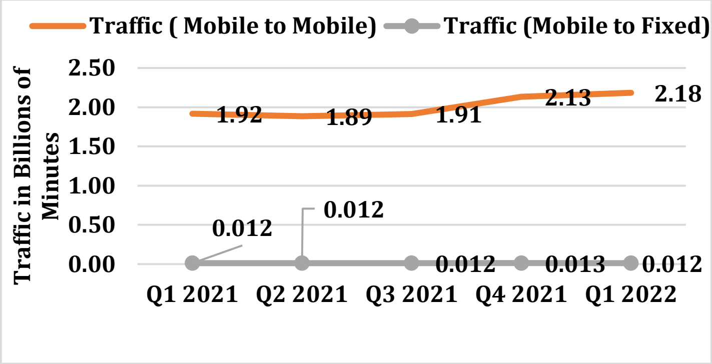


Figure 4: Off-net Traffic Distribution between Mobile and Fixed Networks

1.2.1 Total Domestic Mobile Voice Traffic

Total domestic mobile voice traffic recorded a decrease from 26.49 billion minutes in Q4 2021 to 25.84 billion minutes in Q1 2022, representing a -2.44% decrease in growth. Year-on-year mobile voice traffic also dropped from 27.28 billion minutes at the end of Q1 2021 to 25.84 billion minutes at the end of Q1 2022, representing a decrease rate of 5.29%.

Off-net traffic increased from 2.15 billion minutes at the end of Q4 2021 to 2.20 billion minutes at the end of Q1 2022, giving an increase in growth by 2.23%. Year-on-year off-net traffic moved from 1.93 billion minutes in Q1 2021 to 2.20 billion minutes at the end of Q1 2022 representing 13.86% growth.

On-net traffic dropped from 24.34 billion minutes in the previous quarter to 23.64 billion minutes at a rate of 2.85% during the quarter under review. Year-on-year on-net traffic also declined from 25.35 billion minutes in Q1 2021 to 23.64 billion minutes at the end of Q1 2022 representing a 6.75% decrease in growth rate. (Figure 5) (Appendix, Table 5)

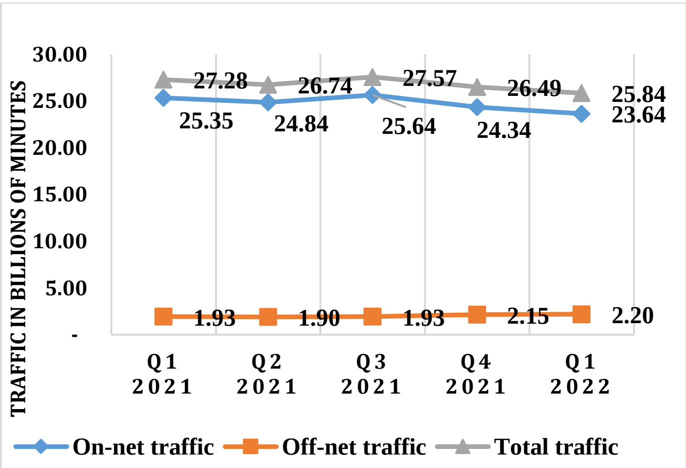


Figure 5: Total Domestic Mobile Voice Traffic in Billions of Minutes

1.2.2 Minutes of Use (MoU)[4]

Quarter-on-quarter average minutes of use per subscription decreased from 215.31 minutes in Q4 2021 to 209.37 minutes (2.76%) in Q1 2022.

Year-on-year minutes of use per subscription dropped from 220.75 minutes in Q1 2021 to 209.37 minutes in Q1 2022, representing 5.15% decline in growth (figure 6) (Appendix, Table 6).

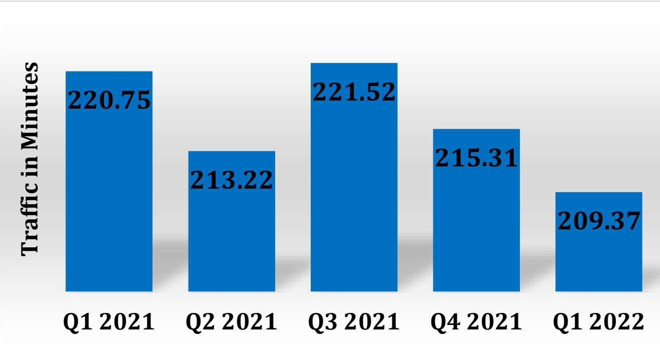


Figure 6: Mobile Voice Traffic Minutes of Use (MoU) per subscriptions

1.3 International Traffic

During the quarter under review, inbound international traffic decreased from 58.83 million minutes in Q4 2021 to 58.20 million minutes in Q1 2022, representing a decrease rate of 1.07%.

Year-on-year inbound international traffic declined from 64.83 million minutes in Q1 2021 to 58.20 million minutes in Q1 2022 showing a decrease in growth by 10.23%.

Outbound international traffic showed 11.85% decline in growth from 100.08 million minutes in Q4 2021 to 88.22 million minutes at the end of Q1 2022. Year- on –year outbound international traffic fell from 120.51 million minutes to 88.22 million minutes, indicating a decline of 26.79% (Figure 7) (Appendix, Table 7).

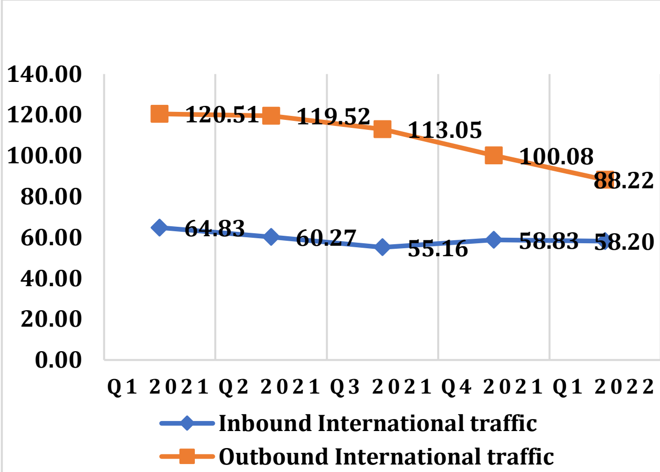


Figure 7: International Traffic in Minutes (Millions)

1.3.1 Short Messaging Services (SMS)

The total number of short messages service (SMS) sent at the end of Q1 2022 was 630.73 million as compared to 592.91 million in the preceding quarter, recording an increase of 6.38% in growth.

Year-on-year SMS counts increased from 487.73 million in Q1 2021 to 630.73 million at the end Q1 2022 representing a growth rate of 29.32% (figure 8) (Appendix, Table 8).

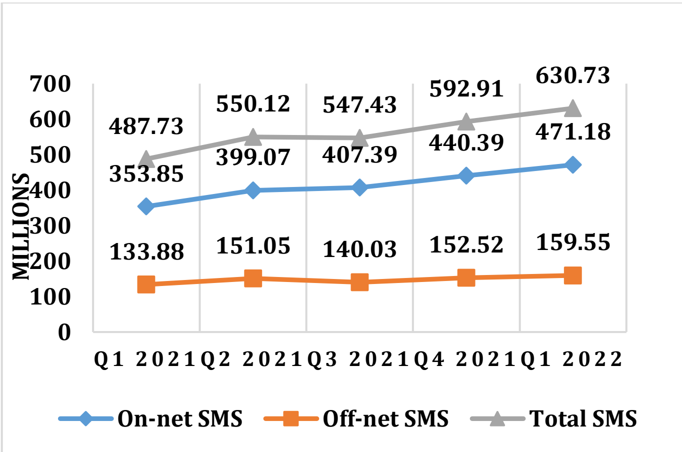


Figure 8: Total Number of SMS

[2]. Minutes of use per subscriptions is calculated by dividing the total average volume of traffic for the quarter by the total average subscriptions for that quarter.

1.3.2 SMS Counts per Mobile Network Operator/Market Share

The volume of SMS traffic originating from MTN was 434.39 million at the end of Q1 2022; representing a market share of 68.87% of the total, SMS count.

The volume of SMS traffic from Vodafone was 184.76 million, representing a market share of 29.29% of the total SMS count.

AirtelTigo had an SMS count of 8.88 million, representing 1.41% of the market share of the total SMS count.

Glo generated 2.70 million SMS count representing a share of 0.43% (Figure 9) (Appendix, Table 8).

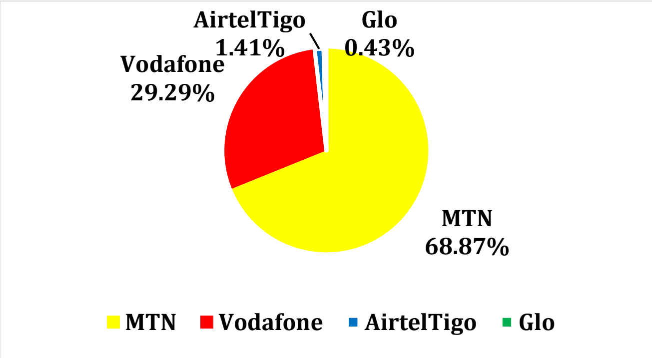


Figure 9: SMS Counts Market Share per Operator

1.3.3 Average SMS per subscription

Quarter-on-quarter average SMS sent per subscription at the end of Q1 2022 was 5.1 SMS, indicating a slight increase in the average SMS per subscriptions as compared to the end of Q4 2021 (4.8).

Year-on-year average SMS volume per subscription also recorded a slight increase from 3.9 at the end of Q1 2021 to 5.1 at the end of Q1 2022. (Figure 10) (Appendix, Table 9).

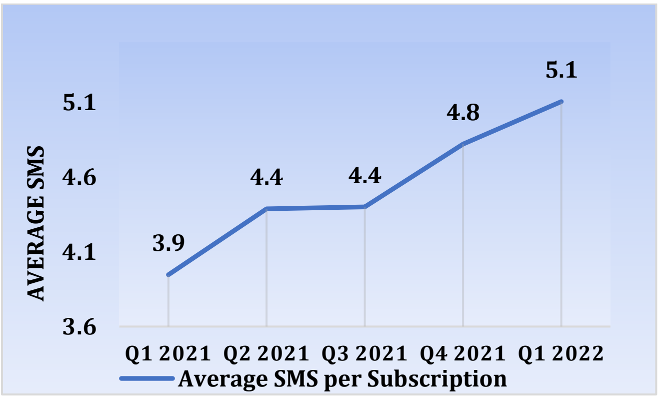


Figure 10: Average SMS per Subscription

1.4 Mobile Data Subscriptions and Penetration Rate (%)

At the end of Q1 2022, mobile data subscriptions increased by 1.19% from 23.41 million at the end of Q4 2021 to 23.69million.

Year-on-year subscriptions increased by 3.28% from 22.94 million at the end of Q1 2021 to 23.69 million at the end of Q1 2022. The penetration rate as at the end of the first quarter of 2022 was 76.94% (Figure 11) (Appendix, Table 10).

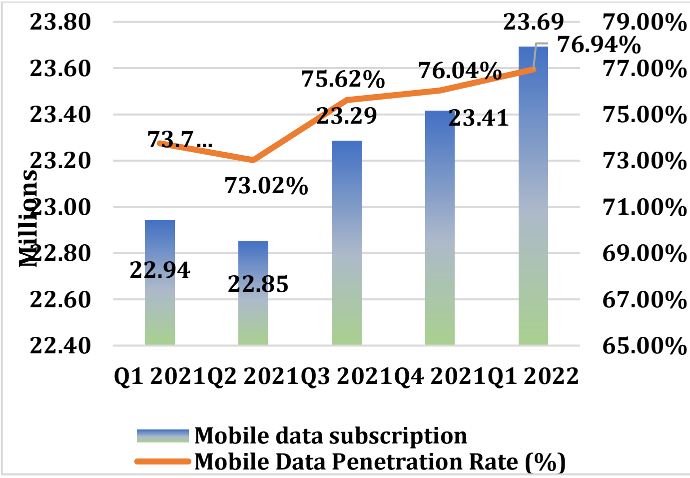


Figure 11: Mobile Data Subscriptions and Penetration Rate (%)

1.4.1 Mobile Data Pre-paid and Post-paid Subscriptions/Market Share

Mobile data pre-paid subscriptions increased from 23.24 million at the end of Q4 2021 to 23.51 million subscriptions at the end of Q1 2022, representing 99.22% of the total mobile data subscriptions.

Mobile data post-paid subscriptions increased from 177,189 at the end of Q4 2021 to 185,085 subscriptions representing 0.78% of the total mobile data subscriptions at the end of Q4 2021 (Figure: 12) (Appendix, Table 10).

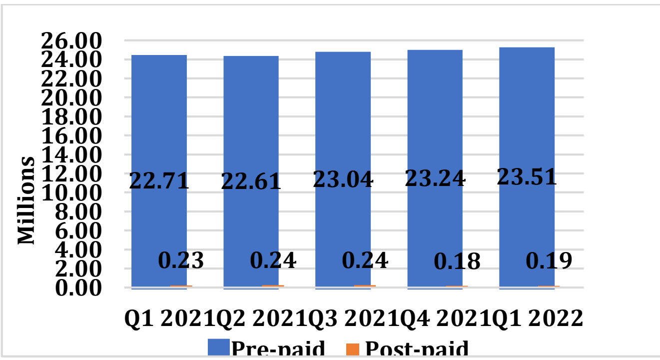


Figure 12: Mobile Data Pre-paid and Post-paid Subscriptions

1.4.2 Mobile Data Subscriptions per Mobile Network Operator /Market Share

MTN recorded 16.92 million subscriptions, which represents 71.41% of the market.

While Vodafone recorded 3.07 million subscriptions with a 12.97% share of the market, AirtelTigo had 3.37 million in mobile data subscriptions with a 14.20% share of the market.

Glo ended the first quarter of 2022 with a total data subscription of 0.34 million and a market share of 1.42% (Figure 13).

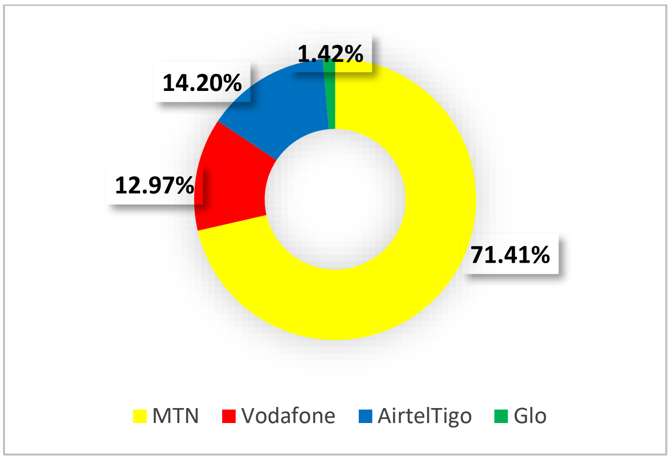


Figure 13: Market Share per Operator

1.5 Mobile Data Traffic in Billions of Megabytes (MB)

At the end of Q1 2022, internet traffic generated by the mobile network operators was 304.15 billion megabytes of data, recording an increase in growth by 2.50 % as compared to 296.74 billion megabytes of data at the end of Q4 2021.

Year-on-year internet traffic increased from 205.38 billion megabytes at the end of Q1 2021 to 304.15 billion megabytes at the end of Q1 2022, representing an increase of 48.09% (Figure 14) (Appendix, Table 11).

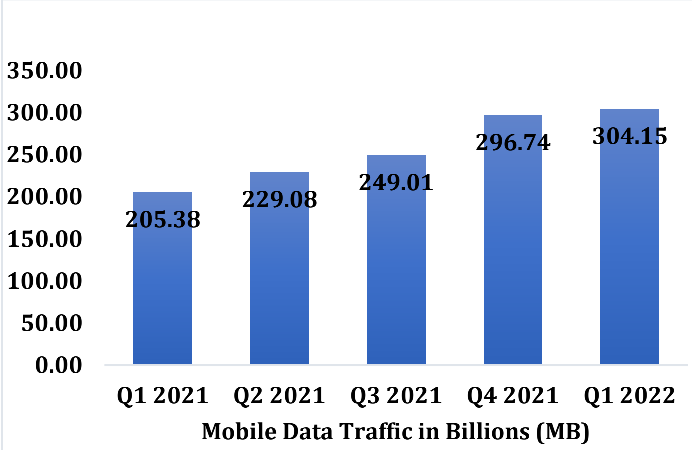


Figure 14: Mobile Data Traffic in Billions of Megabytes (MB)

1.5.1 Mobile Internet Usage per Subscription (MB) [5]

The average mobile internet usage per subscription increased from 4262.7 MB at the end of Q4 2021 to 4293.5 MB at the end of Q1 2022 recording a growth of 0.72%.

Year-on- year average data usage per subscription increased from 2851.0 MB at the end of Q1 2021 to 4293.5 MB at the end of Q1 2022, recording a growth of 50.59% (Figure 15) (Appendix, Table 12).

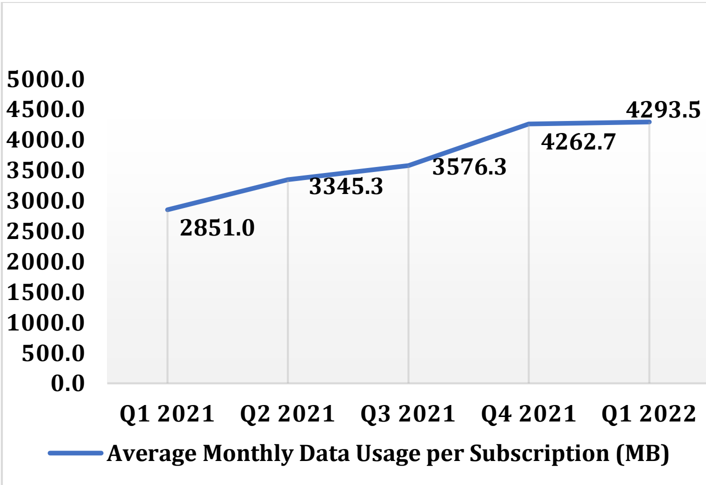


Figure 15: Mobile Data Usage per Subscription (MB)

5 Mobile Internet usage per subscription is calculated by dividing the total average volume of internet traffic for the quarter by the total average mobile internet subscription for that quarter.

1.5.2 Mobile Internet Traffic (MB) per Mobile Network Operator

MTN generated the highest volume of internet traffic of 230.12 billion megabytes with a market share of 75.66%.

Vodafone followed with a traffic of 48.82 billion megabytes and a market share of 16.05%.

AirtelTigo also had 17.77 billion megabytes of data, recording a market share of 5.84%.

Glo recorded the least data usage, generating 7.45 billion megabytes with a market share of 2.45% (Figure 16) (Appendix, Table 13)

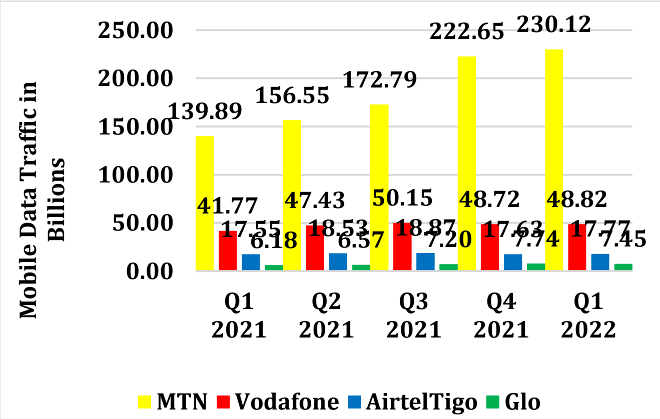


Figure 16: Mobile Internet Traffic (MB) per Operator

1.6 Mobile Telecommunications Service Tariffs

Quarter- on -quarter average tariffs for off net mobile voice stood at 0.13 pesewas at the end of Q1 2022

Average on net tariff mobile voice also remained at 0.13 pesewas.

Average off net and on net SMS tariffs stood at 0.06 and 0.05 pesewas respectively.

The average data tariff for the quarter also maintained its price of 0.10 pesewas. (Figure 17) (Appendix, Table 14).

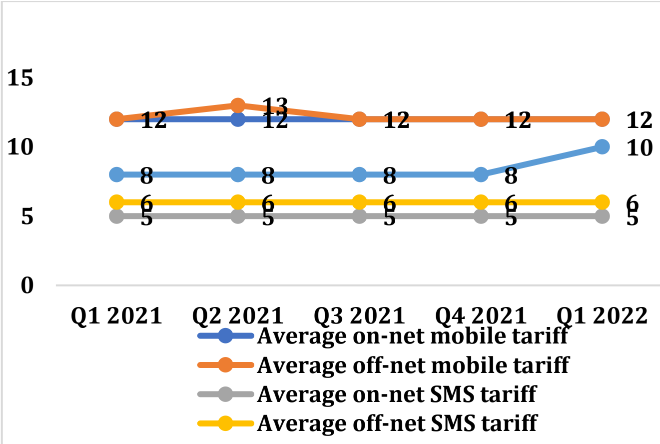


Figure 17: Average Mobile Tariffs per Service

2.0 BROADBAND WIRELESS ACCESS (BWA)

There are five (5) Broadband Wireless Access operators in Ghana namely; BLU Telecommunications6, Broadband Home (BBH), Busy Internet, Surfline and Telesol.

2.1 BWA Subscriptions and Penetration Rate

BWA subscriptions decreased from 50,714 in Q4 2021 to 48,901 in Q1 2022, representing a decline in growth of 3.57%.

Year-on-year subscriptions also decline by 7.91%, which was from 53,101 in Q1 2021 to 48,901 at the end Q1 2022.

Penetration rate for broadband wireless access still stood at 0.16% in Q1 2022. (Figure 18) (Appendix, Table 15).

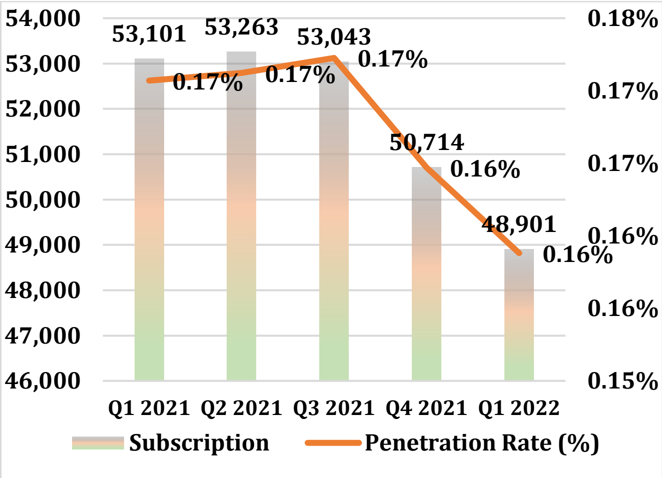


Figure 18: BWA Subscription and Penetration Rate

2.1.1 Subscriptions per Broadband Wireless Access (BWA) Operator

Surfline recorded 39,538 subscriptions at the end of the quarter under review representing 80.85% of the market share, as against 41,123 in the previous quarter.

Busy ended this quarter with a subscription of 5,383 and a market share of 11.01%.

Telesol recorded 3,208 subscriptions this quarter with a market share of 6.56%

BBH had a subscription of 772 and a market share of 1.58% at the end of Q1 2022. (Figure 19) (Appendix, Table 16).

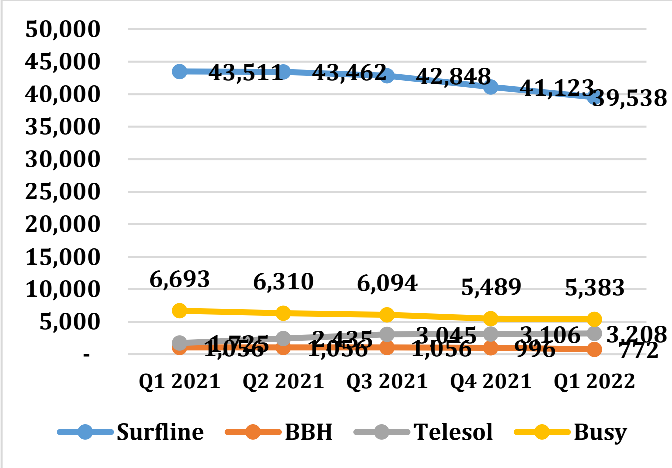


Figure 19: Subscriptions per Broadband Wireless Access (BWA) Operator

2.2 Broadband Wireless Access (BWA) Volume of Internet Traffic

The total volume of internet traffic generated by the BWAs decreased from 6.61 billion megabytes at the end of Q4 2021 to 6.55 billion megabytes at the end of Q1 2022, indicating a decline in growth of 0.89%.

Year-on-year internet traffic generated by the BWAs decrease from 6.85 billion megabytes at the end of Q1 2021 to 6.55 billion megabytes at the end of Q1 2022, representing a decline in growth by 4.38% (Figure 20) (Appendix A, Table 17).

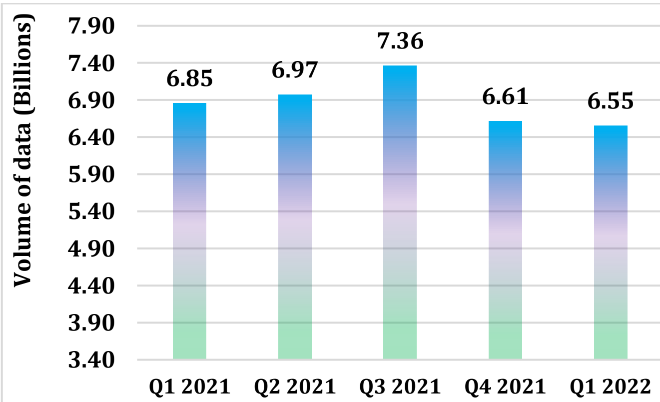


Figure 20: BWA Internet Traffic in Megabytes (MB)

6 As at the time of preparation of the report, there was no available data for BLU Telecommunications.

2.2.1 Volume of BWA Traffic per Operator

Surfline's total volume of internet traffic for the quarter under review was 4.92 billion MB, as against 5.03 billion MB in the previous quarter representing 75.17% of the total volume of traffic.

Busy had a total internet traffic of 1.21 billion MB at the end of Q1 2022 with a market share of 18.45%

Telesol recorded 0.383 billion MB with a market share of 5.84%.

BBH ended Q4 2021 with 0.035 billion MB of volume of internet traffic and a market share of 0.53%. (Figure 21) (Appendix, Table 17).

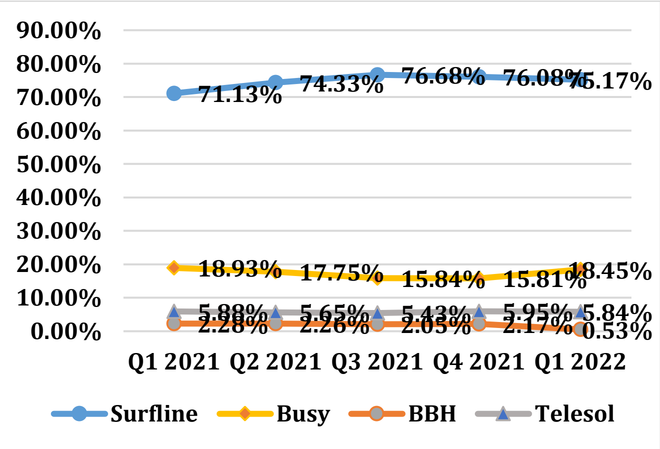


Figure 21: BWA Traffic Market Share per Operator (MB)

2.2.2 Average Monthly Internet Usage per BWA Subscription[7]

Average internet usage per BWA subscription increased from 4.28 thousand megabytes in Q4 2021 to 4.30 thousand megabytes in Q1 2022.

Year-on-year internet usage per subscription also increased from 4.11 thousand megabytes in Q1 2021 to 4.30 thousand megabytes at the end of Q1 2022 (Figure 22) (Appendix, Table 18).

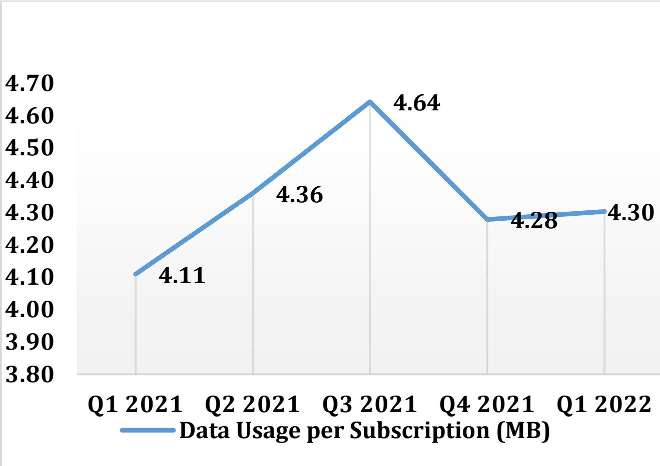


Figure 22: Average Internet Usage per BWA Subscription

7BWA data per subscriptions is calculated by dividing the total average volume of BWA's traffic for the quarter by the total average of BWA subscriptions for that quarter.

3.0 FIXED NETWORK

This section analyses the fixed telephone industry in Ghana. Three (3) operators namely Vodafone, AirtelTigo and MTN have been licensed by the NCA to provide this service.

3.1Fixed Voice Subscriptions and Penetration Rate

Total number of fixed line subscriptions increased from 315,271 in Q4 2021 to 320,460 at the end of Q1 2022. This shows a penetration rate of 1.04% and a 1.65% increase in growth.

Year-on-year subscription increased from 310,001 in Q1 2021 to 320,460 at the end of Q1 2022, representing a growth rate of 3.37% (Figure 23) (Appendix, Table 19).

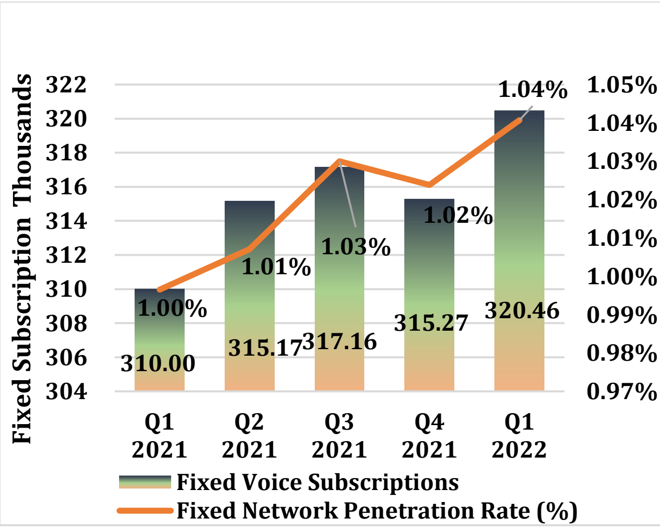


Figure 23: Fixed Network Voice Subscription and Penetration Rate

3.2 Fixed Voice Network Traffic

Total fixed voice traffic increased by 1.72% in Q1 2022, from 9.60 million minutes in Q4 2021 to 9.76 million minutes.

Year-on-year total fixed voice traffic increased by 4.80%, from 9.32 million minutes in Q1 2021 to 9.76 million minutes in Q1 2022. (Figure 24) (Appendix, Table 20).

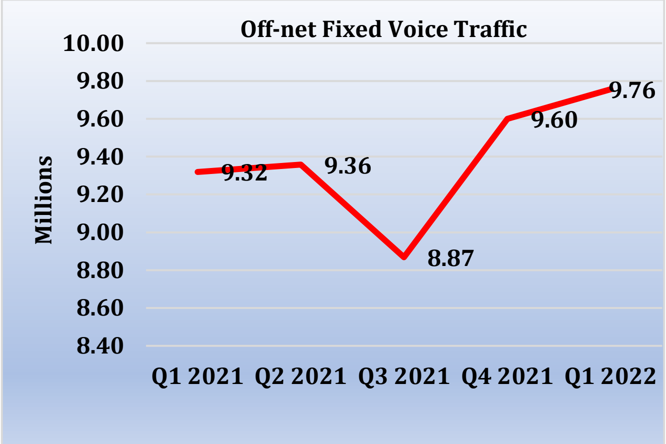


Figure 24: Total Fixed Voice Traffic

3.3 Fixed Voice Average Minute of Use[8]

Average fixed voice traffic per subscription decreased from 10.172 minutes to 10.114 minutes at the end of Q1 2022 (0.57%).

Year-on-year minutes of use per subscription also increased from 10.016 minutes in Q1 2021 to 10.114 minutes at the end of Q1 2022 (0.97%) (Figure 25) (Appendix A, Table 21).

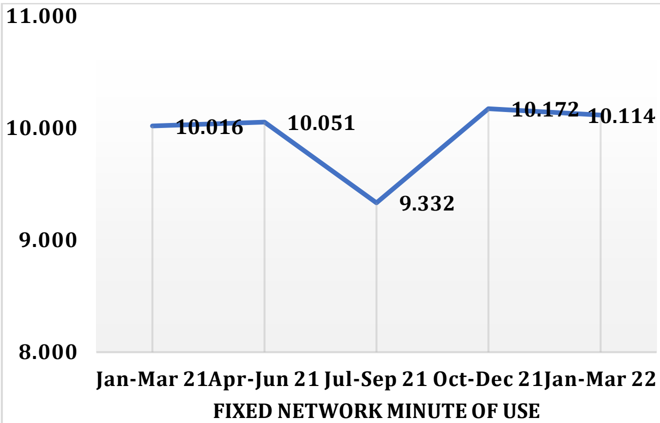


Figure 25: Fixed Network Minute of Use

8 Fixed Network Minutes of use per subscriptions is calculated by dividing the total average volume of traffic for the quarter by the total average fixed subscriptions for that quarter.

3.4 Fixed Data Subscriptions and Penetration

Fixed data subscriptions went down from 113,722 in the previous quarter to 102,745 in the quarter under review, which represents a growth rate of 9.65%.

At a growth rate of 20.12%, year-on-year fixed data subscriptions increased from 85,537 in the preceding year to 102,745 at the end of Q1 2022.

Fixed data penetration rate decreased from 0.37% at the end of Q4 2021 to 0.33% at the end of Q1 2022. (Figure 26) (Appendix, Table 22).

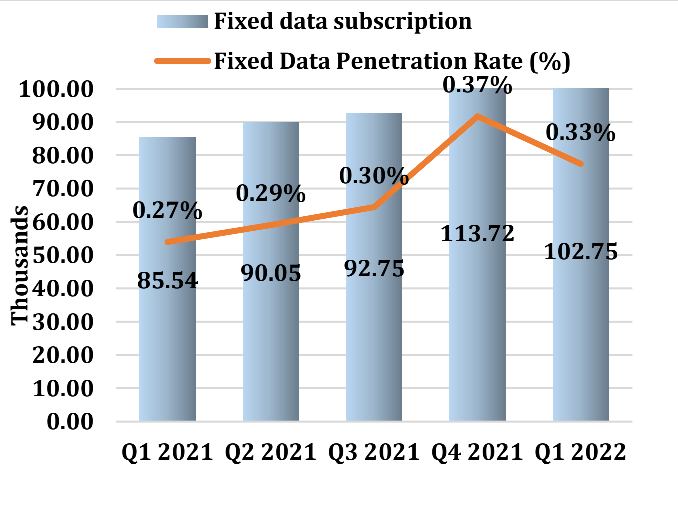


Figure 26: Fixed Data Subscriptions and Penetration

3.5 Fixed Data Subscriptions per Mobile Network Operator

Vodafone's subscriptions at the end of Q1 2022 was 69,163 representing 67.32% of the market share as against 67,086 in Q4 2021.

MTN's subscriptions at the end of Q1 2022 was 32,923 representing 32.04% of the market share.

AirtelTigo recorded 659 subscriptions at the end of Q1 2022 with a market share of 0.64%. (Figure 27) (Appendix, Table 23).

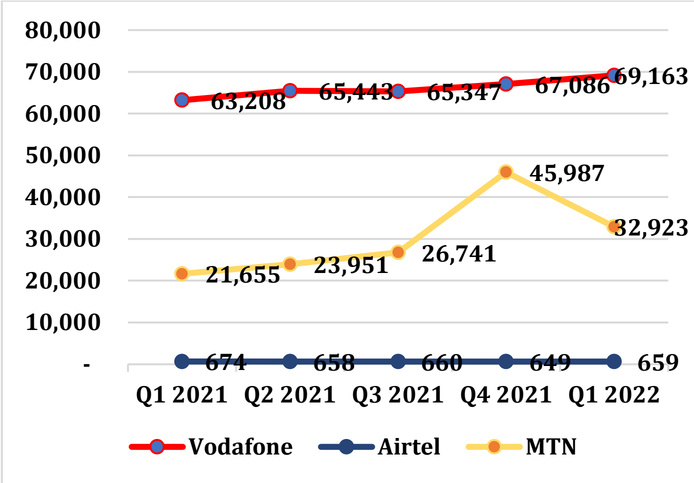


Figure 27: Fixed Data Subscription per Operator

4.0 BROADCASTING

4.1 Authorised Frequency Modulation (FM) Radio Station

The total number of authorised FM stations in Ghana as at the end of Q1 2022 was 698. The total number of FM stations in operation was 502 in the quarter under review.

The Ashanti Region had the highest number of FM stations (101), representing 14.47% of the total number of authorised FM stations in the country. The Savannah Region had the least number of authorised FM Stations (12), representing 1.72% of the total authorised FM Stations in the country. (Figure 28) (Appendix A, Table 25).

Figure 28: Regional distribution of authorised FM stations as at end of Q1 2022

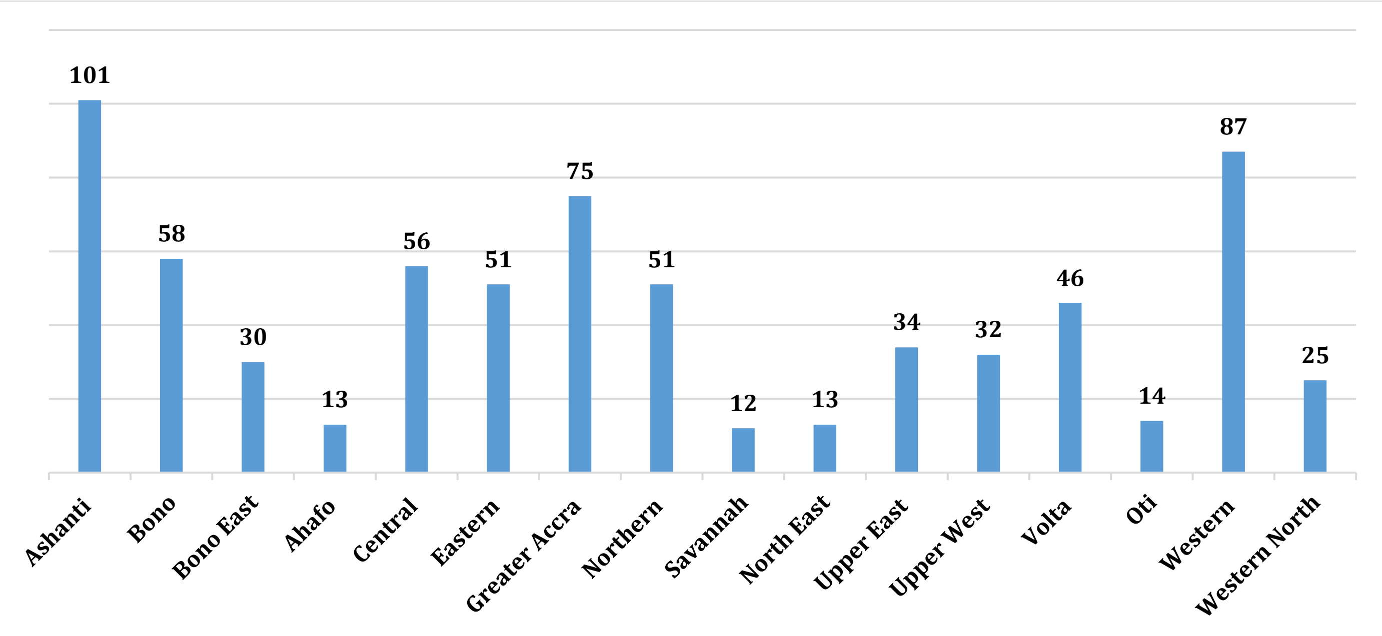


Figure 29: Regional distribution of On-air and Off-air FM stations as at end of Q1 2022

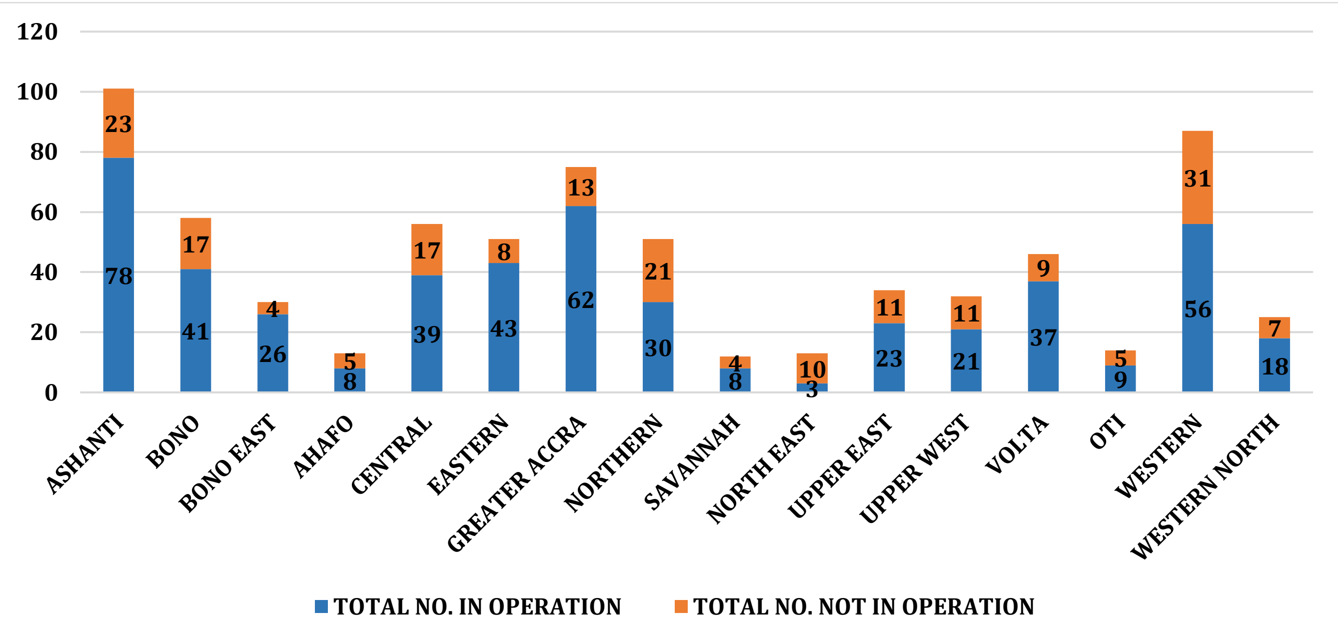
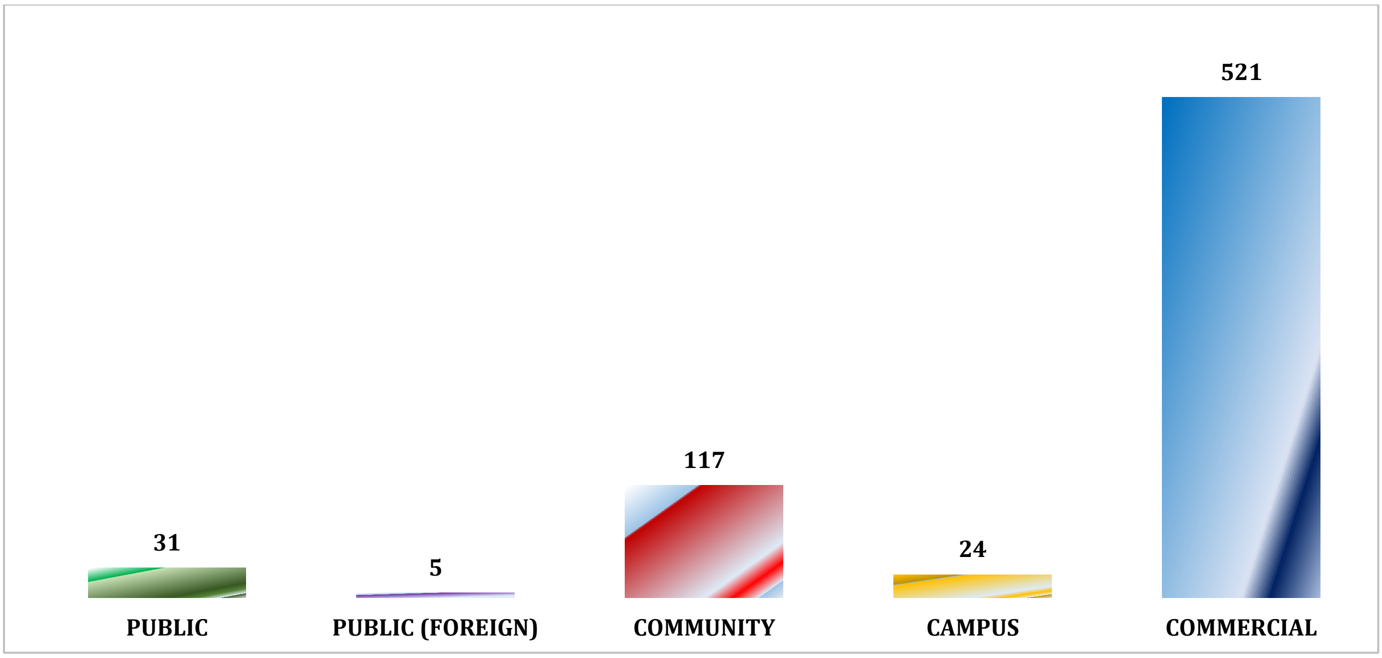


Figure 30: Purpose of Authorised Radio Stations as at Q1 2022



4.2 Authorised Television Stations

The total number of authorised TV stations in Ghana at the end of the first quarter of 2022 was 148 out of which 112 were operational during the quarter under review, representing 75.17% of the total number of authorised TV stations in the country (Figure 32) (Appendix A, Table 26).

Figure 31: Authorised TV Stations Q1 2022

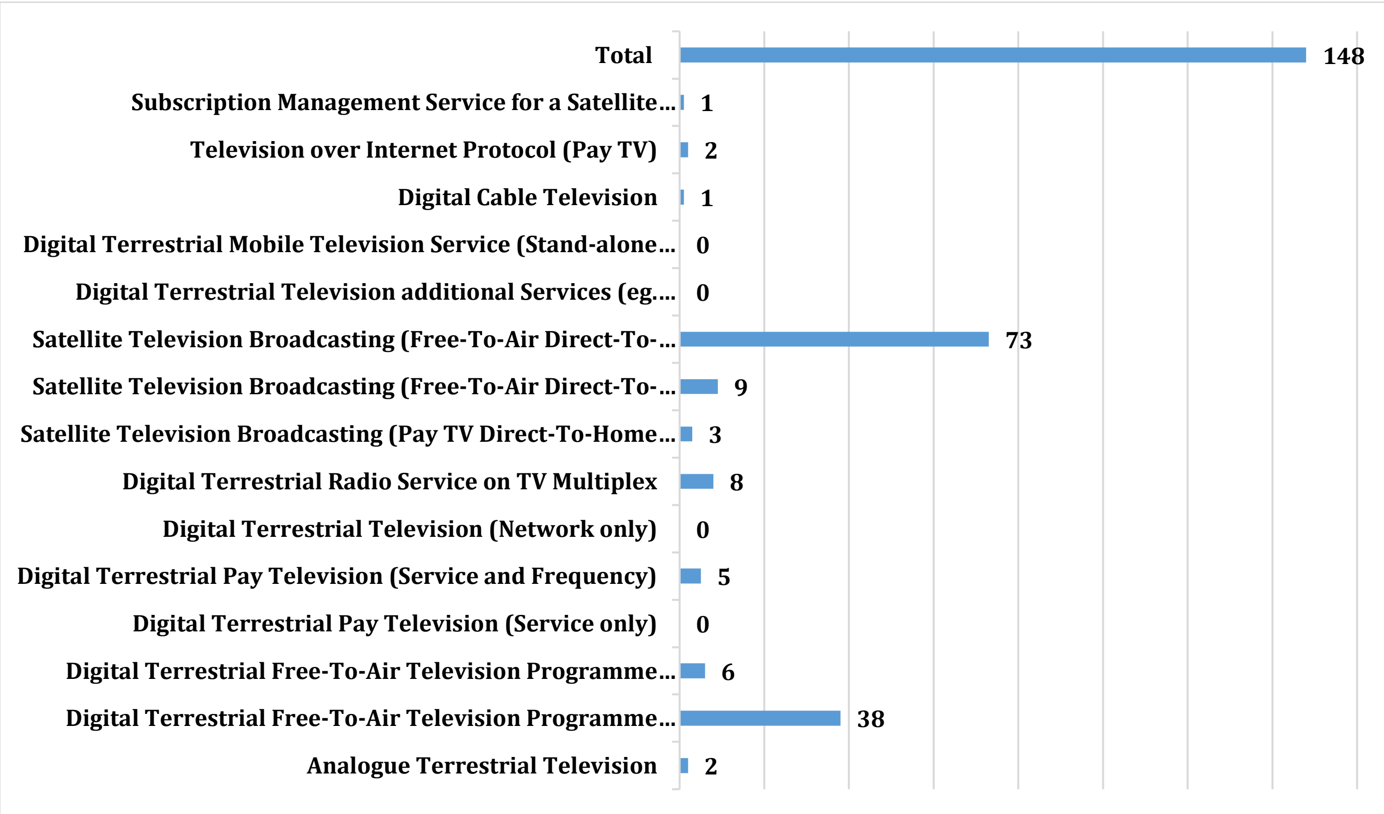
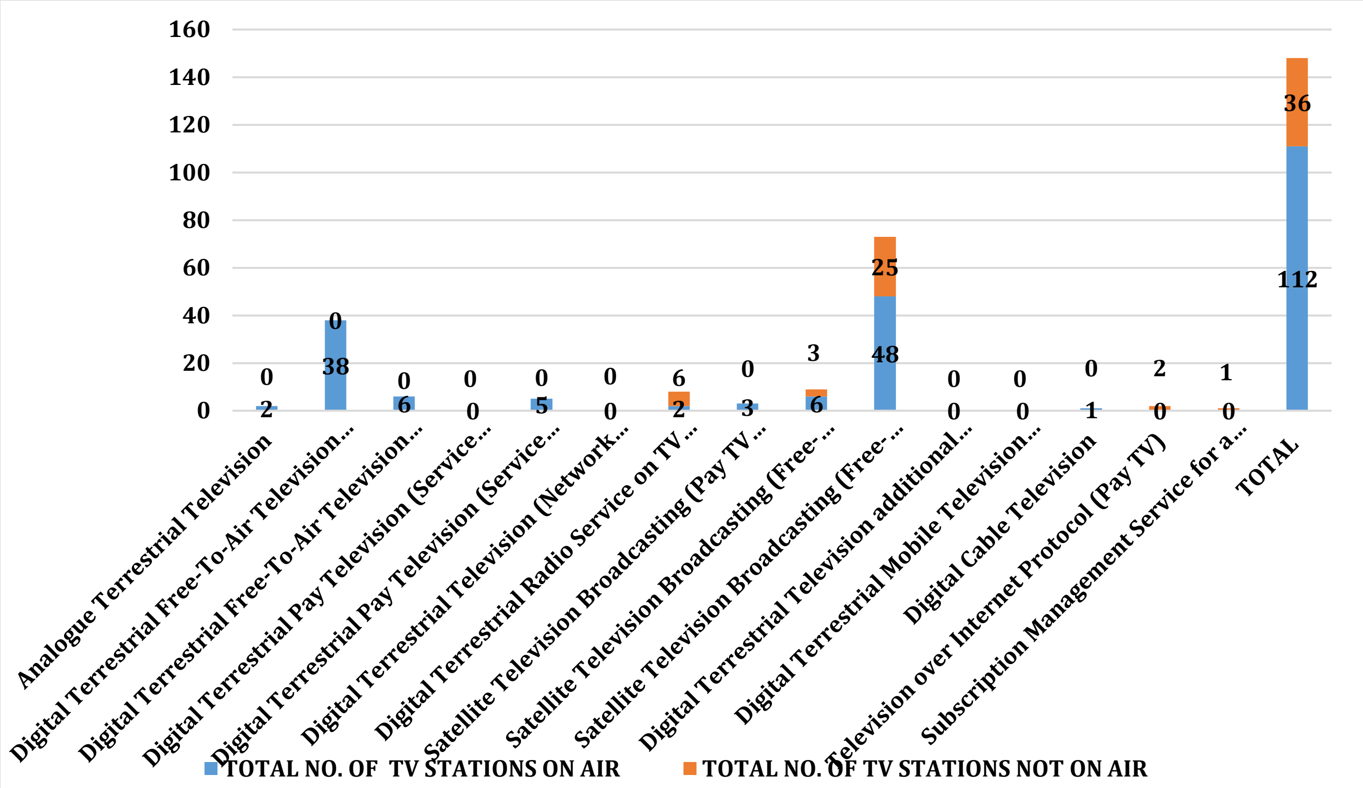


Figure 32: Distribution of Types of TV Services (On-Air and Off-Air TV Stations) as at end of Q1 2022



Appendix A (List of Tables)

Table 1: Mobile Voice Subscriptions and Penetration Rate

Subscription	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
Mobile Subscription	41,418,710	41,715,259	41,777,633	40,454,073	41,481,767
Mobile Subscription Growth rate (%)	2.37%	0.72%	0.15%	-3.17%	2.54%
Net additions	957,101.00	296,549.00	62,374.00	1,323,560.00	1,027,694.00
Net additions Growth Rate (%)	781%	-69%	-79%	-2222%	-178 %
Population[9]	31,108,574	31,295,599	30,792,608	30,792,608	30,792,608
Penetration Rate (%)	**133.14%**	**133.29%**	**135.67%**	**131.38%**	**134.71%**

Table 2: Mobile Voice Subscriptions and Market Share per Operator

Mobile Network Operator		Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
MTN	Subscriptions	23,392,300	23,504,397	23,618,300	23,966,302	25,558,928
	Market Share (%)	56.48%	56.34%	56.53%	59.24%	61.61%
Vodafone	Subscriptions	8,917,137	9,412,253	9,554,809	8,250,436	7,732,622
	Market Share (%)	21.53%	22.56%	22.87%	20.39%	18.64%
AirtelTigo	Subscriptions	8,324,512	7,984,134	7,719,165	7,390,278	7,403,254
	Market Share (%)	20.10%	19.14%	18.48%	18.27%	17.85%
Glo	Subscriptions	784,761	814,475	885,359	847,057	786,963
	Market Share (%)	1.89%	1.95%	2.12%	2.09%	1.90%
Total Industry Subscription		**41,418,710**	**41,715,259**	**41,777,633**	**40,454,073**	**41,481,767**

Table 3: Prepaid and Post-paid Voice Subscriptions and Market Share

Subscription	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
Prepaid	41,134,101	41,342,136	41,485,279	40,158,443	41,054,936
Market Share	99.31%	99.11%	99.30%	99.27%	98.91%
Post-paid	284,609	373,123	292,354	295,630	426,831
Market Share	0.69%	0.89%	0.70%	0.73%	1.03%
Total mobile subscription	**41,418,710**	**41,715,259**	**41,777,633**	**40,454,073**	**41,481,767**

[9] The Ghana Statistical Service released the results of the 2021 Population and Housing Census in September 2021, which occasioned the change in population figures for Q3 2021.

Table 4: Mobile Off-net Traffic Distribution between Mobile and Fixed Network

Breakdown of Off-net Traffic	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
Traffic (Mobile to Mobile)	1,916,850,431	1,885,009,496	1,912,874,245	2,134,948,003	2,183,773,095
Share (%)	99.38%	99.37%	99.36%	99.38%	99.44%
Growth (%)	-0.14%	-1.66%	1.48%	11.61%	2.29%
Traffic (Mobile to Fixed)	11,879,043	11,913,424	12,247,440	13,274,791	12,324,522
Share (%)	0.62%	0.63%	0.64%	0.62%	0.56%
Growth (%)	-2.94%	0.29%	2.80%	8.39%	-7.16%
Total Off-net Traffic	**1,928,729,474**	**1,896,922,920**	**1,925,121,685**	**2,148,222,794**	**2,196,097,617**

Table 5: Total Domestic Mobile Voice Traffic in Billions of Minutes

Traffic	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
Traffic (Off-net)	1,928,729,474	1,896,922,920	1,925,121,685	2,148,222,794	2,196,097,617
Share (%)	7.07%	7.10%	6.98%	8.11%	8.50%
Growth (%)	-0.16%	-1.65%	1.49%	11.59%	2.23%
Traffic (On-net)	25,354,235,060	24,838,177,542	25,644,671,167	24,337,097,120	23,643,478,673
Share (%)	92.93%	92.90%	93.02%	91.89%	91.50%
Growth (%)	2.66%	-2.04%	3.25%	-5.10%	-2.85%
Total traffic	**27,282,964,534**	**26,735,100,463**	**27,569,792,852**	**26,485,319,914**	**25,839,576,289**

Table 6: Mobile Voice Traffic Minutes of Use (MoU) per Subscriptions

Traffic	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2021
Total mobile voice traffic (Average)	9,094,321,511	8,911,700,154	9,189,930,951	8,828,439,971	8,617,037,713
Mobile voice subscription (Average)	41,198,050	41,795,710	41,485,243	41,003,757	41,156,208
Minutes of Use (MoU) per Subscription	220.75	213.22	221.52	215.31	209.37
MoU growth rate (%)	-0.22%	-3.41%	3.89%	-2.81	-2.76%

Table 7: International Traffic

Traffic	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
Incoming International Traffic	64,828,793	60,270,936	55,163,669	58,828,681	58,199,657
Growth (%)	15.65%	-7.03%	-8.47%	6.64%	-1.07%
Outgoing International Traffic	120,507,233	119,521,985	113,046,604	100,076,292	88,218,754
Growth (%)	1.21%	-0.82%	-5.42%	-11.47%	-11.85%

Table 8: Total Number of SMS per Mobile Network Operator in Millions

Mobile Operators	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
Off-net					
MTN	49,379,750	55,278,726	62,742,323	62,104,351	71,706,837
Vodafone	81,174,285	92,190,382	73,772,560	86,602,956	78,586,700
AirtelTigo	1,664,913	1,761,762	2,097,966	2,157,469	6,933,089
Glo	1,599,201	1,814,990	1,419,660	1,650,792	1,677,127
Total	**133,818,149**	**151,045,860**	**140,032,509**	**152,515,568**	**158,903,753**
On- net					
MTN	256,833,104	239,764,050	253,028,977	289,367,097	362,681,706
Vodafone	94,284,185	156,798,754	151,516,314	148,434,883	106,170,295
AirtelTigo	2,479,842	2,234,062	2,5 89,368	2,270,195	1,947,850
Glo	255,839	274,538	259,395	321,341	379,052
Total	**353,852,969**	**399,071,404**	**407,394,054**	**440,393,516**	**471,178,903**
Total					
MTN	306,212,854	295,042,776	315,771,300	322,781,615	434,388,543
Vodafone	175,458,470	248,989,136	225,288,874	226,048,540	184,756,995
AirtelTigo	4,144,755	3,995,824	4,687,334	4,667,142	8,880,939
Glo	1,855,040	2,089,528	1,679,055	1,669,271	2,056,179
Total	**487,671,118**	**550,117,264**	**547,426,563**	**592,909,085**	**630,082,656**

Table 9: Average SMS per Subscription

	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
Total SMS (Average)	162,557,039	183,372,421	182,475,521	197,636,404	210,027,552
Mobile Subscription (Average)	41,198,050	41,795,710	41,485,243	41,003,757	41,156,208
Average SMS per Subscription	3.9	4.4	4.4	4.8	5.1

Table 10: Mobile Data Subscriptions (Prepaid/Postpaid)

Mobile Data Subscriptions		Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
Prepaid	Subscriptions	22,711,711	22,608,751	23,041,438	23,237,338	23,507,496
	Market Share %)	99.00%	98.93%	98.95%	99.24%	99.22
Post-paid	Subscriptions	229,029	243,664	243,738	177,189	185,085
	Market Share %)	1.00%	1.07%	1.05%	0.76%	0.78%
Total mobile data subscriptions		**22,940,740**	**22,852,415**	**23,285,176**	**23,414,527**	**23,692,581**

Table 11: Mobile Data Traffic in Billions of Megabytes (MB)

Mobile Operator	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
Mobile data usage (MB)	205,383,959,042	229,082,453,700	249,013,730,795	296,738,560,185	304,154,750,559

Table 12: Mobile Internet Usage per Subscription (MB)

Mobile Operator	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
Average Mobile data usage (MB)	68,461,319,681	76,360,817,900	83,004,576,932	98,912,853,395	101,384,916,853
Average Total Subscription	24,013,079	22,826,343	23,209,722	23,204,483	23,613,836
Average Data Usage per Subscription (MB)	2851.0	3345.3	3576.3	4262.7	4293.5

Table 13: Mobile Data Traffic (MB) per Operator

Mobile Operator	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
MTN	139,889,378,482	156,551,111,192	172,790,095,331	222,647,497,298	230,117,454,491
	68.11%	68.34%	69.39%	75.03%	75.66%
Vodafone	41,765,769,242	47,425,832,605	50,148,377,173	48,721,266,699	48,820,372,630
	20.34%	20.70%	20.14%	16.42%	16.05%
AirtelTigo	17,545,739,422	18,534,563,652	18,872,129,145	17,630,556,987	17,771,836,916
	8.54%	8.09%	7.58%	5.94%	5.84%
Glo	6,183,071,896	6,570,946,251	7,203,129,146	7,739,239,202	7,445,086,522
	3.01%	2.87%	2.89%	2.61%	2.45%
Total Industry Traffic (MB)	**205,383,959,042**	**229,082,453,700**	**249,013,730,795**	**296,738,560,185**	**304,154,750,559**

Table 14: Average Mobile Tariff per Service (GHp)

Tariff	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
Average on-net mobile tariff	0.12	0.12	0.12	0.12	0.13
Average off-net mobile tariff	0.12	0.13	0.12	0.12	0.13
Average on-net SMS tariff	0.05	0.05	0.05	0.05	0.05
Average off-net SMS tariff	0.06	0.06	0.06	0.06	0.06
Average data/Mb tariff	0.08	0.08	0.08	0.08	0.10

Table 15: BWA Data Subscriptions and Penetration

BWA Operator	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
Subscription	53,101	53,263	53,043	50,714	48,901
Growth rate (%)	25.86%	0.31%	-0.41%	-4.39%	-3.57%
Net Additions	10909	162	-220	-2329	-1813
Population	31,108,574	31,295,599	30,792,608	30,792,608	30,792,608
Penetration Rate (%)	0.17%	0.17%	0.17%	0.16%	0.16%

Table 16: Subscriptions per Broadband Wireless Access (BWA) Operator

BWA Operator	Subscription and Market Share	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
Surfline	Subscription	43,511	43,462	42,848	41,123	39,538
	Market share (%)	81.94%	81.60%	80.78%	81.09%	80.85%
Busy	Subscription	6,693	6,310	6,094	5,489	5,383
	Market share (%)	12.60%	11.85%	11.49%	10.82%	11.01%
Telesol	Subscription	1,725	2,435	3,045	3,106	3,208
	Market share (%)	3.25%	4.57%	5.74%	6.12%	6.56%
BBH	Subscription	1,056	1,056	1,056	996	772
	Market share (%)	1.99%	1.98%	1.99%	1.96%	1.58%
BLU	Subscription	116				
	Market share (%)	0.22%				
Industry Total		**53,101**	**53,263**	**53,043**	**50,714**	**48,901**

Table 17: Data Traffic (MB) per Broadband Wireless Access (BWA) Operator

BWA Operator		Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
Surfline	Data usage (MB)	4,875,666,810	5,182,843,180	5,643,384,650	5,031,694,350	4,920,450,040
	Market share (%)	71.13%	74.33%	76.68%	76.08%	75.17%
Busy	Data usage (MB)	1,297,511,257	1,237,829,479	1,165,766,895	1,045,337,772	1,207,650,049
	Market share (%)	19.15%	17.75%	15.84%	15.81%	18.45%
BBH	Data usage (MB)	156,318,030	157,627,020	150,607,300	143,258,920	34,938,110
	Market share (%)	2.28%	2.26%	2.05%	2.17%	0.53%
BLU	Data usage (MB)	121,838,581				
	Market share (%)	1.78%				
Telesol	Data usage (MB)	403,392,124	394,015,521	399,911,382	393,595,726	391,752,190
	Market share (%)	5.88%	5.65%	5.43%	5.95%	5.84%
Industry Total (MB)		**6,854,726,802**	**6,972,315,200**	**7,359,670,228**	**6,613,886,768**	**6,545,608,897**

Table 18: Internet Usage per BWA Subscriptions (MB)

BWA Operator	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
Volume of Data Traffic (Average)	2,258,868,421	2,324,105,067	2,453,223,409	2,204,628,923	2,184,930,304
Subscription (Average)	54,968	53,313	52,843	51,507	49,515
Data Usage per Subscription (MB)	41,094.49	43,593.86	46,424.76	42,786.73	44,126.93

Table 19: Fixed Network Voice Subscriptions and penetration

Fixed Operator	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
Vodafone	303,749	307,585	309,461	307,278	312,981
	97.98%	97.59%	97.57%	97.46%	97.67%
AirtelTigo	3,565	3,489	3,415	3,634	3,088
	1.15%	1.11%	1.08%	1.15%	0.96%
MTN	2,687	4,093	4,284	4,359	4,391
	0.87%	1.30%	1.35%	1.38%	1.37%
Total industry subscription	310,001	315,167	317,160	315,271	320,460
Population	31,108,574	31,295,599	30,792,608	30,792,608	30,792,608
Fixed Network Penetration Rate (%)	1.00%	1.01%	1.03%	1.02%	1.04%

Table 20: Fixed Network Volume of Traffic in Minutes

Traffic	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
On-net Fixed voice traffic	-	-	-	-	-
Off-net fixed voice traffic	9,318,844	9,357,301	8,868,159	9,600,469	9,765,791
Total Fixed Voice Traffic	9,318,844	9,357,301	8,868,159	9,600,469	9,765,791

Table 21: Fixed Network Minute of Use per Subscriptions

Traffic (Average)	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
Total Fixed Voice Traffic	3,106,281	3,119,100	2,956,053	3,200,156	3,255,264
Subscription (Average)	310,119	310,312	316,775	314,614	321,856
Minutes of Use per Subscription (MoU)	10.0	10.1	9.3	10.2	10.114
Growth Rate	3.69%	0.35%	-7.15%	9.00%	-0.57%

Table 22: Fixed Broadband Data Subscriptions and Penetration

Fixed network operator	Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
Vodafone	63,208	65,443	65,347	67,086	69,163
	73.90%	72.67%	70.46%	58.99%	67.32%
Airtel	674	658	660	649	659
	0.79%	0.73%	0.71%	0.57%	0.64%
MTN	21,655	23,951	26,741	45,987	32,923
	25.32%	26.60%	28.83%	40.44%	32.04%
Total fixed data subscription	85,537	90,052	92,748	113,722	102,745
Population	31,108,574	31,295,599	30,792,608	30,792,608	30,792,608
Fixed Data Penetration Rate (%)	0.27%	0.29%	0.30%	0.37%	0.33%

Table 23: Regional Distribution of FM Stations by Purpose as at the end of Q1 2022

Name of Regions	Public	Public (Foreign)	Community	Campus	Commercial
Ashanti	2	1	16	4	78
Bono	1	-	6	2	49
Bono East	2	-	4	-	24
Ahafo	-	-	1	-	12
Central	2	-	13	3	38
Eastern	2	-	13	1	35
Greater Accra	2	3	10	4	56
Northern	3	-	10	2	36
Savannah	3	-	4	-	5
North East	1	-	5	-	7
Upper East	2	-	9	3	20
Upper West	2	-	10	2	18
Volta	3	-	5	1	37
Oti	1	-	3	-	10
Western	2	1	8	2	74
Western North	3	-	-	-	22
Total	**31**	**5**	**117**	**24**	**521**

Table 24: Regional Distribution of FM Stations as at the end of Q1 2022

Name Of Regions	Authorized FM Stations	FM Stations In Operation
Ashanti	101	78
Bono	58	41
Bono East	30	26
Ahafo	13	8
Central	56	39
Eastern	51	43
Greater Accra	75	62
Northern	51	30
Savannah	12	8
North East	13	3
Upper East	34	23
Upper West	32	21
Volta	46	37
Oti	14	9
Western	87	56
Western North	25	18
Total	**698**	**502**

Table 25: Authorised TV Stations as at the end of Q1 2022

Type of Television Service	Authorised TV Stations		No. of TV Stations in Operation (Q1 2022)	No. of TV Stations not in Operation (Q1 2022)
	End of Q4 2021	End of Q1 2022		
Analogue Terrestrial Television	2	2	2	0
Digital Terrestrial Free-To-Air Television Programme Channel (Nationwide Coverage)	38	38	38	0
Digital Terrestrial Free-To-Air Television Programme Channel (Regional Coverage)	6	6	6	0
Digital Terrestrial Pay Television (Service only)	0	0	0	0
Digital Terrestrial Pay Television (Service and Frequency)	5	5	5	0
Digital Terrestrial Television (Network only)	0	0	0	0
Digital Terrestrial Radio Service on TV Multiplex	8	8	2	6
Satellite Television Broadcasting (Pay TV Direct-To-Home Bouquet)	3	3	3	0

Satellite Television Broadcasting (Free-To-Air Direct-To-Home Bouquet)	9	9	6	3
Satellite Television Broadcasting (Free-To-Air Direct-To-Home Single Channel)	68	73	48	25
Digital Terrestrial Television Additional Services (e.g. Teletext, etc.)	0	0	0	0
Digital Terrestrial Mobile Television Service (Stand-alone Authorisation)	0	0	0	0
Digital Cable Television	1	1	1	0
Television over Internet Protocol (Pay TV)	1	2	0	2
Subscription Management Service for a Satellite Television Broadcasting (Pay TV Direct-To-Home Bouquet)	1	1	1	0
Total	**142**	**148**	**112**	**36**

Source: NCA, 2022

NCA CONTACTS AND PRESENCE COUNTRYWIDE

The Authority currently has eight (8) regional offices to support its operations. Their addresses are listed below

- ### Accra, Head Office

National Communications Authority,
NCA Tower, No 6 Airport City
Close to the Marina Mall
P. O. Box CT 1568, Cantonments, Accra
Tel: +233 (0) 302 776621, 771701
Fax: +233 (0) 302 763449
E-mail: info@nca.org.gh
Complaints: +233 (0) 30 701 1419
complaints@nca.org.gh
Website: www.nca.org.gh

- ### Accra Office

National Communications Authority
1st Rangoon Close,
Switchback Road, Cantonment, Accra
P. O. Box CT 1568,
Cantonment, Accra
Tel: +233 (0) 553 369862, (0) 553 432215
E-mail: complaints.accra@nca.org.gh

- ### Bolgatanga Office

National Communications Authority,
Zorbisi Zaare Residential Area in Bolgatanga Municipality
Private Mail Bag, Bolgatanga,
Upper East Region
Tel: +233 (0) 3820 21141
E-mail: complaints.bolgatanga@nca.org.gh

- ### Ho Office

National Communications Authority,
Plot No. 75, Stadium Road, Kabore Junction
P. O. Box HP1576, Ho, Volta Region
Tel: +233 (0) 3620 26339
E-Mail: complaints.ho@nca.org.gh

- ### Koforidua Office

National Communications Authority,
Block C along the Galloway Road
Private Mail Bag, Koforidua, Eastern Region
Tel: +233 (0) 3420 28378, 28380, 28382
E-Mail: complaints.koforidua@nca.org.gh

- ### Kumasi Office

National Communications Authority,
Fuller Road, Danyame, Kumasi
P. O. Box KS 10768, Kumasi,
Ashanti Region, Ghana
Tel: + 233 (0) 32 202 0014 / 32 202 0018 / 32 202 0019
Fax: (+233) 32 002 0064
E-Mail: complaints.kumasi@nca.org.gh

- ### Sunyani Office

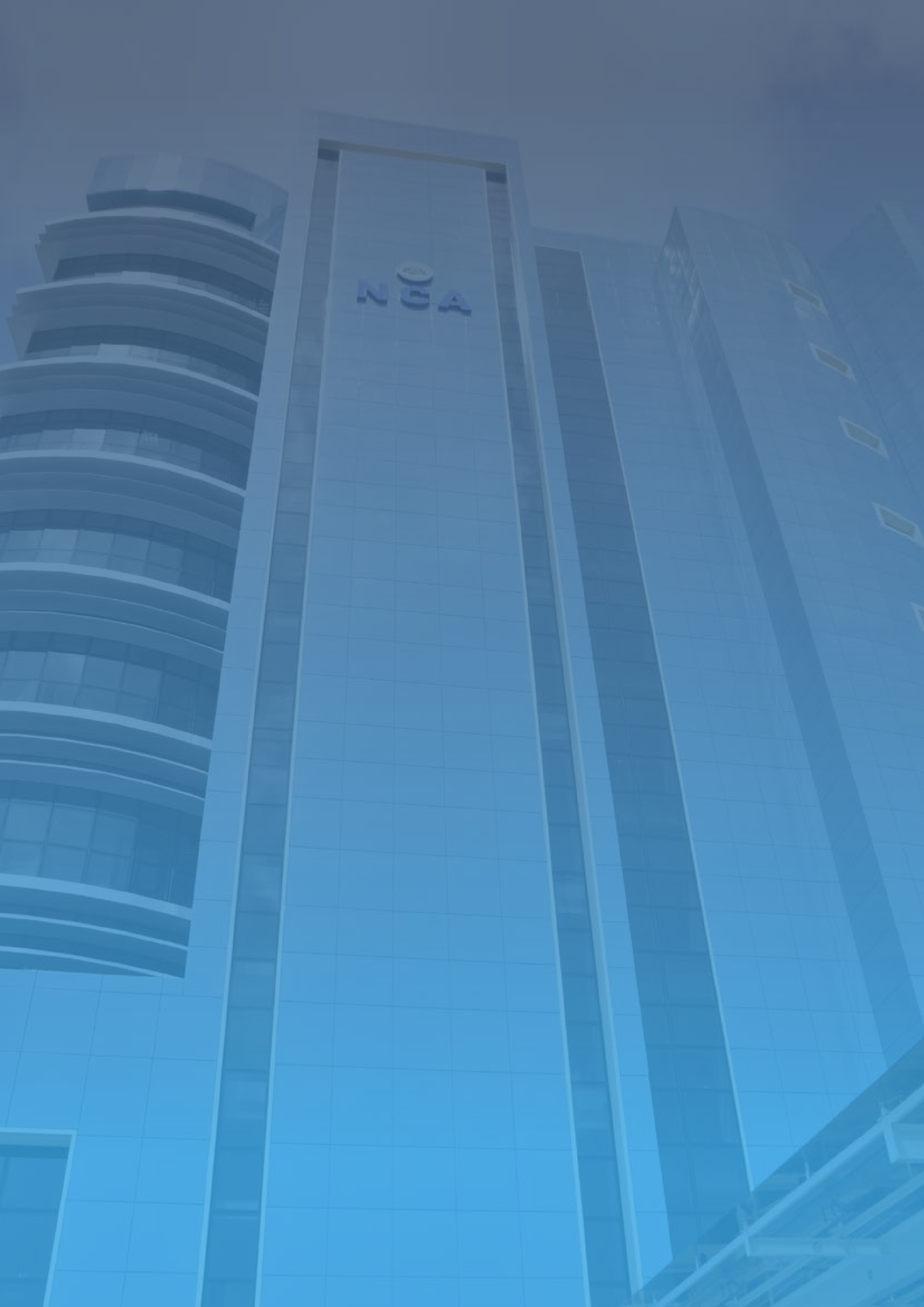
National Communications Authority,
House No 83, North Nkwabeng
P. O. Box SY125, Sunyani, Bono Region
Tel: +233 (0) 3520 27564
E-Mail: complaints.sunyani@nca.org.gh

- ### Takoradi Office

National Communications Authority,
Bakado, 3kms away from the Prisons
(R.S.,K. Barnes Ct, Sekondi - Takoradi
P. O. Box SL 409, Sekondi,
Western Region, Ghana
Tel: +233 (0) 31 202 8073 / 31 202 8049
Fax: +233 (0) 31 202 8063
E-Mail: complaints.takoradi@nca.org.gh

- ### Tamale Office

National Communications Authority,
Watherson Residential Area
Plot No. 3 & 4, Tamale
P. O. Box TL 1590, Tamale,
Northern Region, Ghana
Tel: + 233 (0) 37 202 8105 / 37 020 8104
Fax: +233 (0) 37 202 8104
E-Mail: complaints.tamale@nca.org.gh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