

QUARTERLY STATISTICAL BULLETIN ON COMMUNICATIONS IN GHANA

Volume 7 Issue 4

NATIONAL COMMUNICATIONS AUTHORITY

FOURTH QUARTER

OCTOBER - DECEMBER, 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

Tag Line/Slogan – Communications for Development

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

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	156	117
FM Stations	707	513

B1. Total Subscriptions

SUBSCRIPTION	Units	QUARTER-ON-QUARTER			YEAR-ON-YEAR		
		Q3 2022	Q4 2022	*Growth (%)*	Q4 2021	Q4 2022	*Growth (%)*
Mobile Voice Subscription	Million	40.81	40.05[1]	*-1.86%*	40.45	40.05[1]	*-0.99%*
Fixed Voice Subscription	Thousand	325.06	330.02	*1.53%*	315.27	330.02	*4.68%*
Mobile Data Subscription	Million	24.37	22.85[2]	*-6.24%*	23.41	22.85[2]	*-2.39%*
Fixed Data Subscription	Thousand	98.60	102.95	*4.41%*	113.72	102.95	*-9.47%*
Broadband Wireless Access	Thousand	43.40	38.07	*-12.28%*	50.71	38.07	*-24.93%*

B2. Voice, Data and SMS Traffic

TRAFFIC	Units	QUARTER-ON-QUARTER			YEAR-ON-YEAR		
		Q3 2022	Q4 2022	*Growth (%)*	Q4 2021	Q4 2022	*Growth (%)*
Mobile Voice Traffic (Domestic)	Billion minutes	26.20	23.87	*-8.89%*	26.49	23.87	*-9.89%*
Fixed Voice Traffic	Million minutes	9.03	8.80	*-2.55%*	9.60	8.80	*-8.33%*
Incoming International Traffic (Direct to Network Only)	Million minutes	64.62	61.23	*-5.25%*	58.82	61.23	*4.10%*
Outgoing International Traffic	Million minutes	77.25	73.88	*-4.36%*	100.08	73.88	*-26.18%*
Mobile Data Traffic (MB)	Billion MB	366.52	403.04	*9.96%*	296.74	403.04	*35.82%*
BWA Data Traffic (MB)	Billion MB	6.54	4.65	*-28.90%*	6.61	4.65	*-29.65%*
SMS Count	Million	699.13	747.91	*6.98%*	592.91	747.91	*26.14%*

[1] Glo didn't submit report on Mobile Voice Subscriptions for Nov. & Dec. 2022.It's Oct. 2022 Mobile Voice subscriptions report was used in the analysis for the 4th Quarter 2022 Total Mobile Voice Subscriptions.
[2] Glo didn't submit report on Mobile Data Subscriptions for Nov. & Dec. 2022. It's Oct. 2022 Mobile Data Subscription report was used in the analysis for the 4th Quarter 2022 Mobile Data Subscriptions.
[3] 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		
	Q3 2022	Q4 2022	*Growth (%)*	Q4 2021	Q4 2022	*Growth (%)*
Mobile Voice Subscription	129.14	126.05	*-2.39%*	131.38	126.05	*-4.06%*
Fixed Voice Subscription	1.03	1.04	*0.97%*	1.02	1.04	*1.96%*
Mobile Data Subscription	77.10	71.91	*-6.73%*	76.04	71.91	*-5.43%*
Fixed Data Subscription	0.31	0.32	*3.23%*	0.37	0.32	*-13.51%*
Broadband Wireless Access	0.14	0.12	*-14.29%*	0.16	0.12	*-25.00%*

C1. Broadcasting Sector

FM/TV AUTHORISATION & OPERATIONS	QUARTER-ON-QUARTER			YEAR-ON-YEAR		
	Q3 2022	Q4 2022	*Growth (%)*	Q4 2021	Q4 2022	*Growth (%)*
FM Authorisation	707	707	*0.00%*	684	707	*3.36%*
FM Station Operating	513	513	*0.00%*	489	513	*4.91%*
TV Authorisations	155	156	*0.65%*	142	156	*9.86%*
TV Stations Operating	113	117	*3.54%*	112	117	*4.46%*

C2. Categories of Authorised FM Radio Stations

CATEGORIES OF FM RADIO STATIONS	QUARTER-ON-QUARTER			YEAR-ON-YEAR		
	Q3 2022	Q4 2022	*Growth (%)*	Q4 2021	Q4 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%*	24	24	*0.00%*
COMMUNITY	119	121	*1.68%*	114	121	*6.14%*
COMMERCIAL	528	526	*-0.38%*	510	526	*3.14%*

1.0 MOBILE NETWORK

The National Communications Authority (NCA) has licensed four service providers to provide mobile telecoms services in Ghana. These service providers are 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 decreased from 40.81 million in Q3 2022 to 40.05 million at the end of Q4 2022, representing a decline in growth by 1.88%.

Year-on-year subscriptions also decreased from 40.45 million at the end of Q4 2021 to 40.05 million at the end of Q4 2022, recording a decrease of 1.01% growth rate.

The penetration rate as at the end of Q4 of 2022 was 126.05% as compared to 129.14% recorded in Q3 2022, indicating a decrease in growth rate by 2.39% (Figure 1) (Appendix, Table 1).

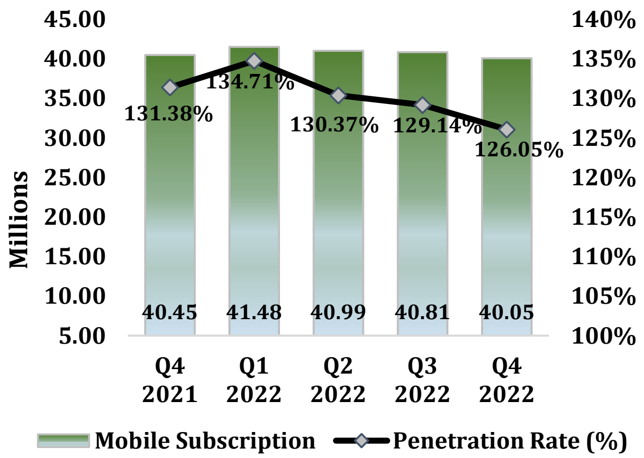


Figure 1: Mobile Voice Subscription and Penetration Rate

1.1.1 Voice Subscription Market Share per Operator

At the end of Q4 2022, MTN recorded 66.46% of the market share with 26.61 million subscriptions.

Vodafone followed with 7.54 million subscriptions (18.82%).

AirtelTigo ended the quarter with a market share of 13.95% with a subscription base of 5.59 million.

Glo followed with 0.31 million subscriptions with a market share of 0.77%

(Figure 2) (Appendix, Table 2).

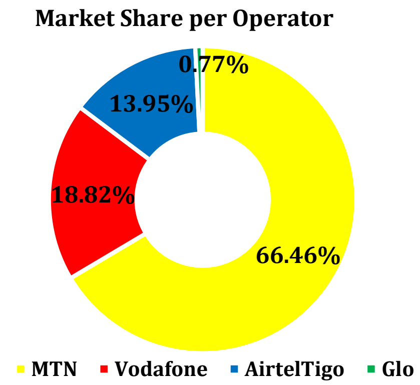


Figure 2: Market Share per Operator

1.1.2 Quarter on quarter market share per operator in percentage

At the end of Q4 2022, MTN increased its market share in percentage from 65.39% in Q3 2022 to 66.46% representing a growth of 1.63%.

Vodafone also had a percentage growth of 3.01% (from 18.27% in Q3 2022 to 18.82% in Q4 2022)

AirtelTigo market share decreased in percentage from 15.47% in Q3 2022 to 13.95% representing a negative growth of 9.83%.

Glo also had a percentage decrease in its market share by 10.94% (from 0.87% in Q3 2022 to 0.77% in Q4 2022.

3The mobile penetration rate is estimated by dividing the total number of mobile subscribers by the total population.

1.1.3 Prepaid and Postpaid Mobile Voice Subscriptions

Mobile voice subscription for prepaid subscribers was 39.62 million representing a market share of 98.93%.

Post-paid subscription at the end of the quarter under review was 0.43 million and a market share of 1.07%. (Figure 3) (Appendix, Table 3).

Mobile voice subscriptions for prepaid subscribers decreased from 40.38 million at the end of Q3 2022 to 39.62 million at the end of Q4 2022 representing a percentage decrease of 1.88%.

Mobile voice subscription for postpaid subscribers declined from 0.44 million in Q3 of 2022 to 0.43 million in Q4 of 2022 representing a percentage decrease of 1.76%

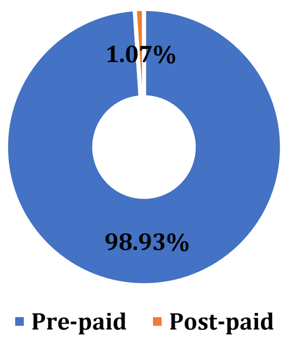


Figure 3: Prepaid and Postpaid Mobile Voice Subscriptions

1.2 Off-Net Domestic Voice Traffic

Mobile-to-mobile Off-Net traffic decreased from 2.14 billion minutes at the end of Q3 2022 to 2.02 billion at the end of Q4 2022 representing a decrease in growth by 5.44%.

Year-on-year mobile-to-mobile Off-Net traffic declined from 2.13 billion minutes at the end of Q4 2021 to 2.02 billion minutes at the end of Q4 2022, representing a decrease in growth by 5.43%.

Quarter-on-quarter mobile to fixed Off-Net traffic increased from 12.52 million minutes in Q3 2022 to 12.99 million minutes at the end of Q4 2022 indicating an increase in growth by 3.72%

Year-on-year mobile-to-fixed Off-Net traffic decreased at 2.14% from 13.27 million minutes at the end of Q4 2021 to 12.99 million minutes at the end of Q4 2022. (Figure 4) (Appendix, Table 4)

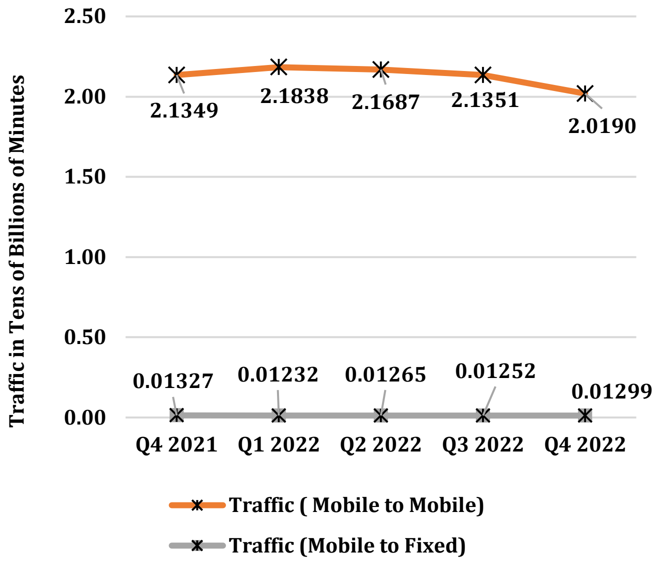


Figure 4: Off-Net Traffic Distribution between Mobile and Fixed Networks

1.2.1 Total Domestic Mobile Voice Traffic

Total domestic mobile voice traffic recorded a decrease from 26.20 billion minutes in Q3 2022 to 23.87 billion minutes in Q4 2022, representing an 8.85% decline in growth.

Year-on-year mobile voice traffic also dropped from 26.49 billion minutes at the end of Q4 2021 to 23.87 billion minutes at the end of Q4 2022, representing a decreased growth rate of 9.86%.

Off-Net traffic decreased from 2.15 billion minutes at the end of Q3 2022 to 2.03 billion minutes at the end of Q4 2022, giving a decreased in growth by 5.38%.

Year-on-year Off-Net traffic decreased from 2.15 billion minutes in Q4 2021 to 2.03 billion minutes at the end of Q4 2022 representing a 5.41% decline growth.

On-Net traffic decreased from 24.04 billion minutes in the previous quarter to 21.84 billion minutes at a rate of 9.16% decline in growth during the quarter under review.

Year-on-year On-Net traffic also declined from 24.34 billion minutes in Q4 2021 to 21.84 billion minutes at the end of Q4 2022 representing a 10.25% decrease in growth rate. (Figure 5) (Appendix, Table 5)

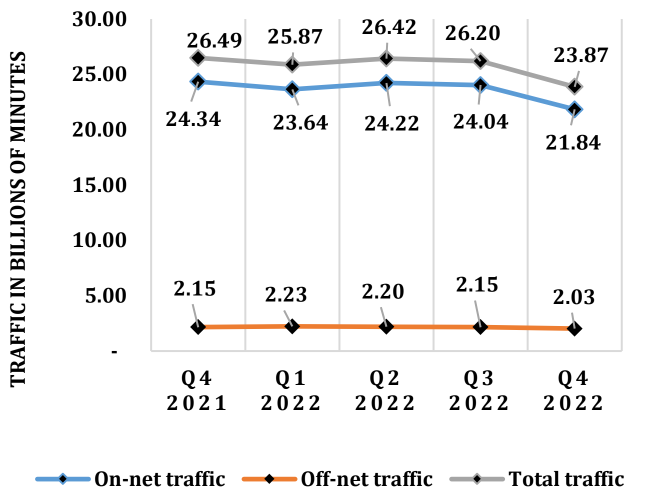


Figure 5: Total Domestic Mobile Voice Traffic in Billions of Minutes

1.2.2 Minutes of Use (MoU)[4]

Quarter-on-quarter average minutes of use per subscription decreased from 642.32 minutes in Q3 2022 to 590.54 minutes (-8.06%) in Q4 2022.

Year-on-year minutes of use per subscription also decreased from 645.92 minutes in Q4 2021 to 590.54 minutes in Q4 2022, representing a 8.57% decline in growth (figure 6) (Appendix, Table 6).

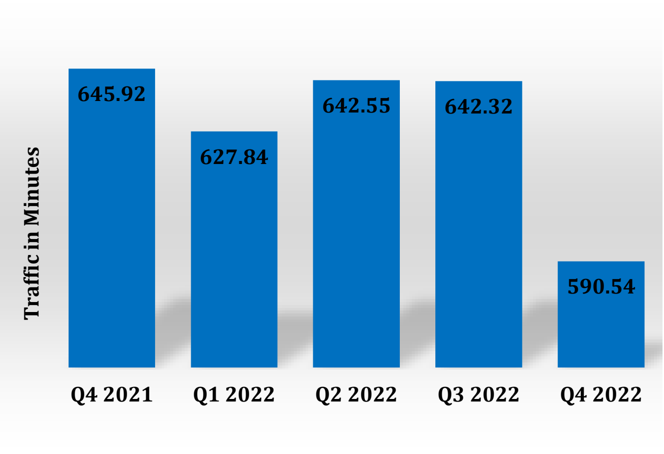


Figure 6: Mobile Voice Traffic Minutes of Use (MoU) per subscriptions

1.3 International Traffic

Inbound international traffic decreased from 64.62 million minutes in Q3 2022 to 61.23 million minutes in Q4 2022, representing a percentage decrease in growth rate by 5.23%.

Year-on-year inbound international traffic increased from 58.83 million minutes in Q4 2021 to 61.23 million minutes in Q4 2022 with a growth rate of 4.09%.

Quarter on quarter outbound international traffic showed a 4.37% decline in growth from 77.25 million minutes in Q3 2022 to 73.88 million minutes at the end of Q4 2022.

Year-on –year outbound international traffic fell from 100.08 million minutes at the end of Q4 2021 to 73.88 million minutes at the end of Q4 2022, indicating a decline of 26.18% (Figure 7) (Appendix, Table 7).

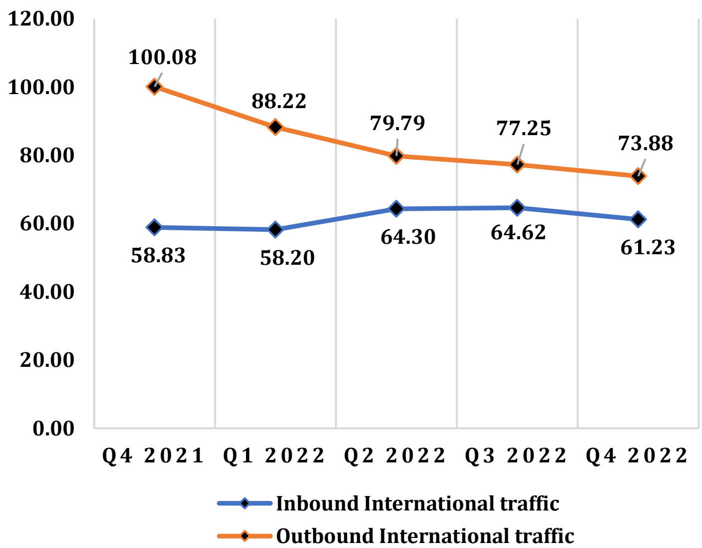


Figure 7: International Traffic in Millions of Minutes

1.3.1 Short Messaging Services (SMS)

The total number of short messages service (SMS) sent at the end of Q4 2022 was 747.91 million as compared to 699.13 million in the preceding quarter, recording an increase of 6.98% in growth.

Year-on-year total SMS counts increased from 592.91 million in Q4 2021 to 747.91 million at the end Q4 2022 representing a growth rate of 26.14% (figure 8) (Appendix, Table 8).

[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.

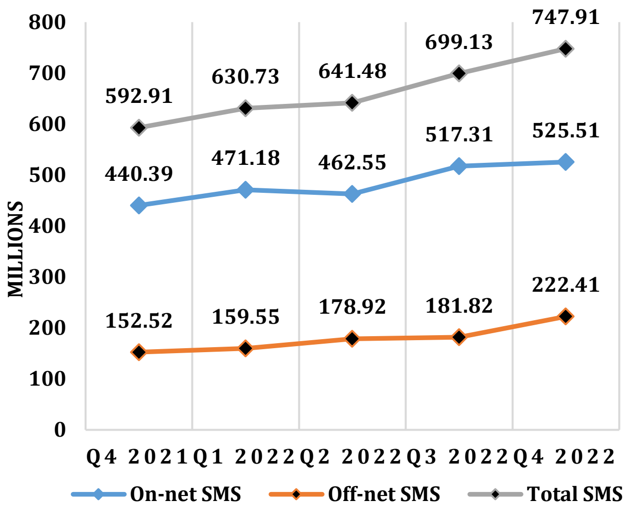


Figure 8: Total Number of SMS in Millions

1.3.2 SMS Counts per Mobile Network Operator/Market Share

The volume of SMS traffic originating from MTN was 547.00 million at the end of Q4 2022; representing a market share of 73.14% of the total, SMS count.

The volume of SMS traffic from Vodafone was 187.46 million, representing a market share of 25.06% of the total SMS count.

AirtelTigo had an SMS count of 13.12 million, representing 1.75% of the market share of the total SMS count.

Glo generated 0.33 million SMS count representing a share of 0.04% (Figure 9) (Appendix, Table 8).

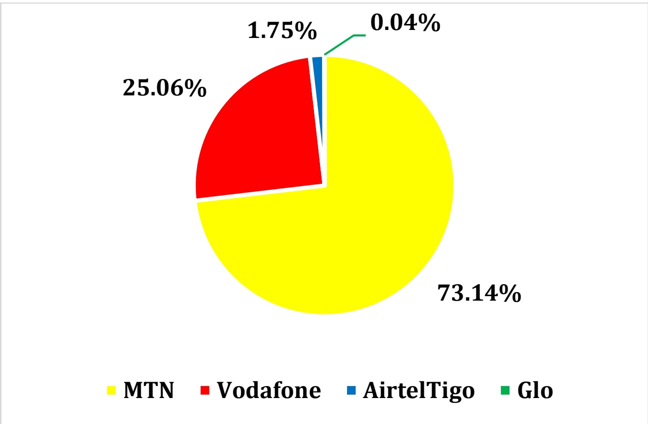


Figure 9: SMS Counts Market Share per Operator

1.3.3 SMS per Subscription

Quarter-on-quarter SMS sent per subscription at the end of Q4 2022 was 18.5 SMS, indicating a 7.90% increase in SMS per subscriptions as compared to the end of Q3 2022 (17.1).

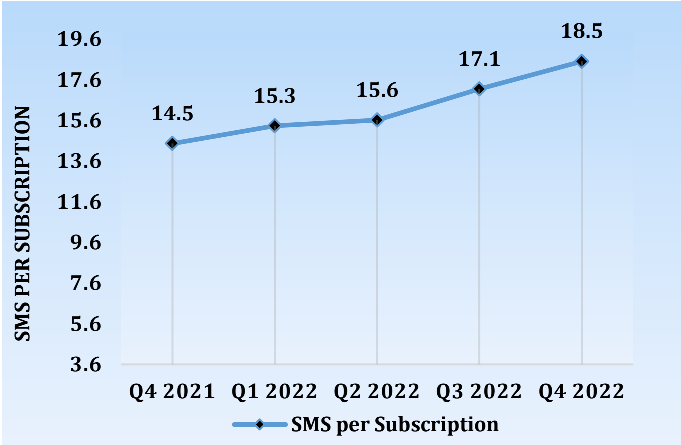


Figure 10: SMS per Subscription

1.4 Mobile Data Subscriptions and Penetration Rate (%)

At the end of Q4 2022, mobile data subscriptions decreased by 6.24% from 24.37 million at the end of Q3 2022 to 22.85 million at the end of Q4 2022.

Year-on-year subscriptions also decreased by 2.41% from 23.41 million at the end of Q4 2021 to 22.85 million at the end of Q4 2022. The penetration rate as at the end of the fourth quarter of 2022 was 71.91% (Figure 11) (Appendix, Table 10).

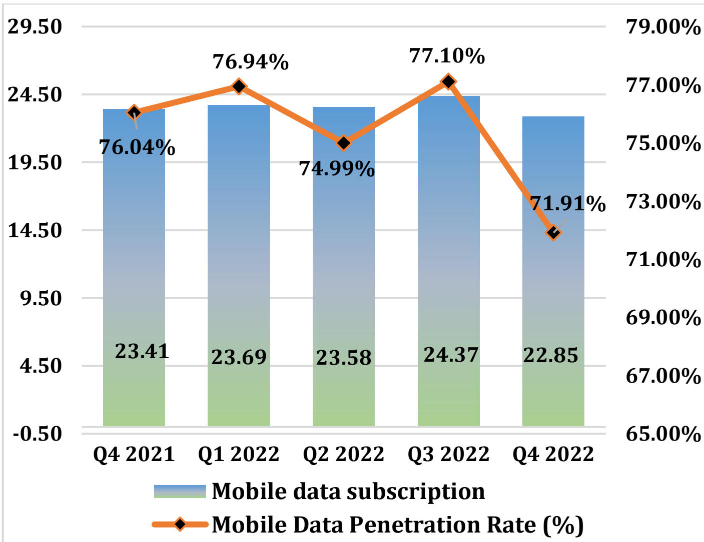


Figure 11: Mobile Data Subscriptions in Millions and Penetration Rate (%)

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

Mobile data pre-paid subscriptions decreased from 24.17 million at the end of Q3 2022 to 22.66 million subscriptions at the end of Q4 2022, representing a market share of 99.18% of the total mobile data subscriptions.

Mobile data post-paid subscriptions decreased from 193,192 at the end of Q3 2022 to 188,331 subscriptions representing a market share of 0.82% of the total mobile data subscriptions at the end of Q4 2022 (Figure: 12) (Appendix, Table 10).

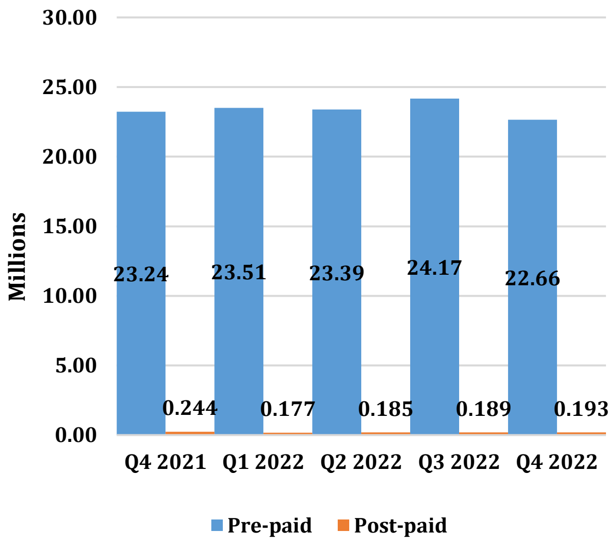


Figure 12: Mobile Data Pre-paid and Post-paid Subscriptions

1.4.2 Mobile Data Subscriptions per Mobile Network Operator /Market Share

MTN recorded 16.74 million subscriptions, which represents 73.29% of the market.

While Vodafone recorded 3.21 million subscriptions with a 14.05% share of the market,

AirtelTigo had 2.73 million in mobile data subscriptions with an 11.95% share of the market.

Glo ended the fourth quarter of 2022 with a total data subscription of 0.16 million and a market share of 0.70% (Figure 13).

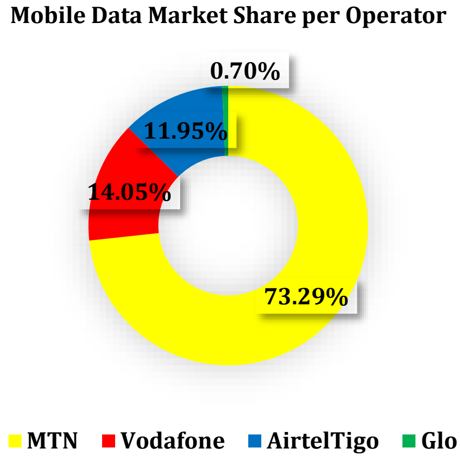


Figure 13: Mobile Data Market Share per Operator

1.5 Mobile Data Traffic in Billions of Megabytes (MB)

At the end of Q4 2022, internet traffic generated by the mobile network operators was 401.53 billion megabytes of data, recording an increase in growth by 9.55% as compared to 366.52 billion megabytes of data at the end of Q3 2022.

Year-on-year internet traffic increased from 296.74 billion megabytes at the end of Q4 2021 to 401.53 billion megabytes at the end of Q4 2022, representing an increase of 35.31% (Figure 14) (Appendix, Table 11).

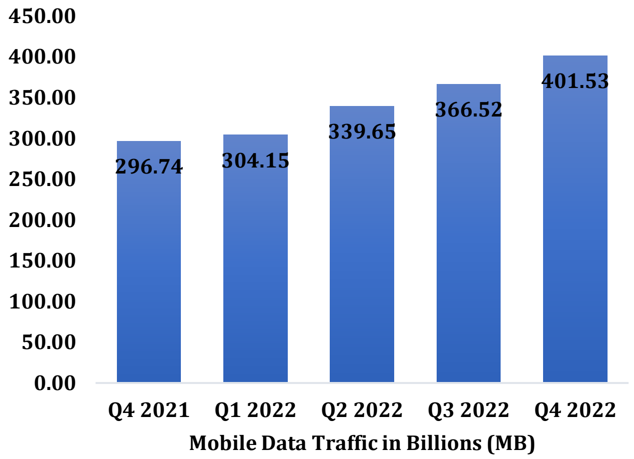


Figure 14: Mobile Data Traffic in Billions of Megabytes (MB)

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

Mobile internet usage per subscription increased from 15,150.0 MB at the end of Q3 2022 to 16,984.2

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

MB at the end of Q4 2022 recording a growth of 12.11%.

Year-on- year mobile data usage per subscription increased from 12,788.0 MB at the end of Q4 2021 to 16,984.2 MB at the end of Q4 2022, recording a growth of 32.81% (Figure 15) (Appendix, Table 12).

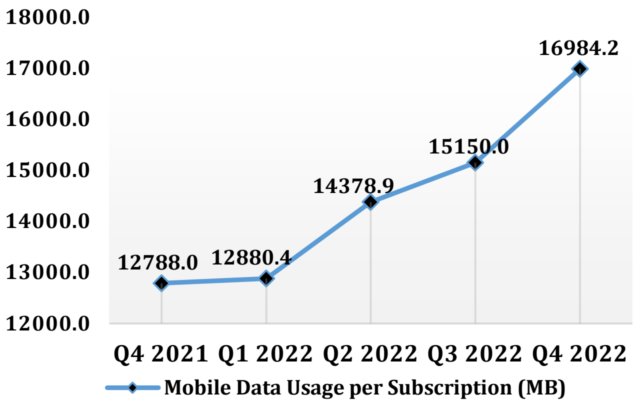


Figure 15: Mobile Data Usage per Subscription (MB)

1.5.2 Mobile Internet Traffic (MB) per Mobile Network Operator

MTN generated the highest volume of internet traffic, 326.12 billion megabytes with a market share of 80.91%.

Vodafone followed with a traffic of 57.51 billion megabytes and a market share of 14.27%.

AirtelTigo also had 17.90 billion megabytes of data, recording a market share of 4.44%.

Glo recorded the least data usage, generating 1.52 billion megabytes with a market share of 0.38% (Figure 16) (Appendix, Table 13)

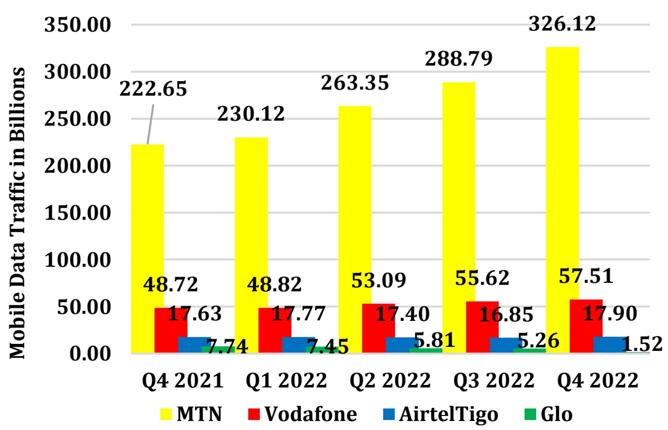


Figure 16: Mobile Internet Traffic (MB) per Operator

1.6 Mobile Telecommunications Service Tariffs

Quarter- on -quarter average tariffs for off net mobile voice was 0.12 pesewas at the end of Q4 2022

Average on net tariff mobile voice was also 0.12 pesewas.

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

The average data tariff for the quarter under review was 0.10 pesewas. (Figure 17) (Appendix, Table 14).

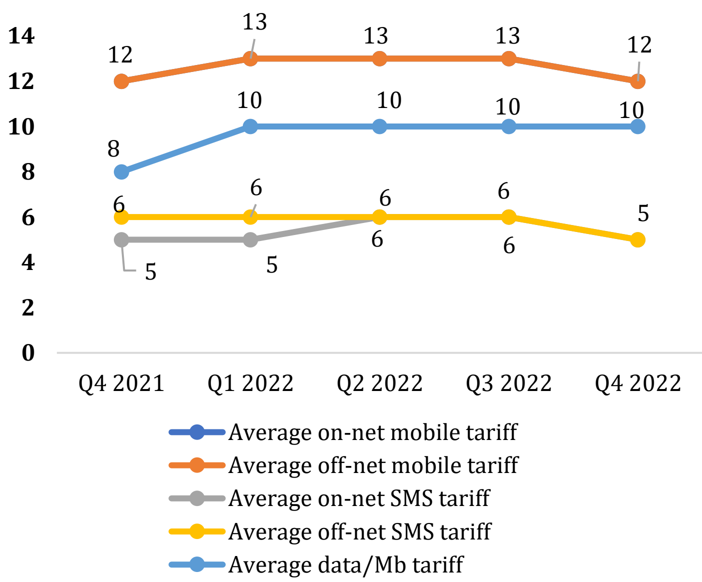


Figure 17: Average Mobile Tariffs per Service

2.0 BROADBAND WIRELESS ACCESS (BWA)

There are five (5) Broadband Wireless Access operators in Ghana namely; BLU Telecommunications[6], Broadband Home (BBH), Busy Internet, Surfline and Telesol.

2.1 BWA Subscriptions and Penetration Rate

BWA subscriptions decreased from 43,400 in Q3 2022 to 38,073 in Q4 2022, representing a decline in growth by 12.27%.

Year-on-year subscriptions also declined by -24.93%, which was from 50,714 in Q4 2021 to 38,073 at the end Q4 2022.

Penetration rate for broadband wireless access was 0.12% at the end of Q4 2022. (Figure 18) (Appendix, Table 15).

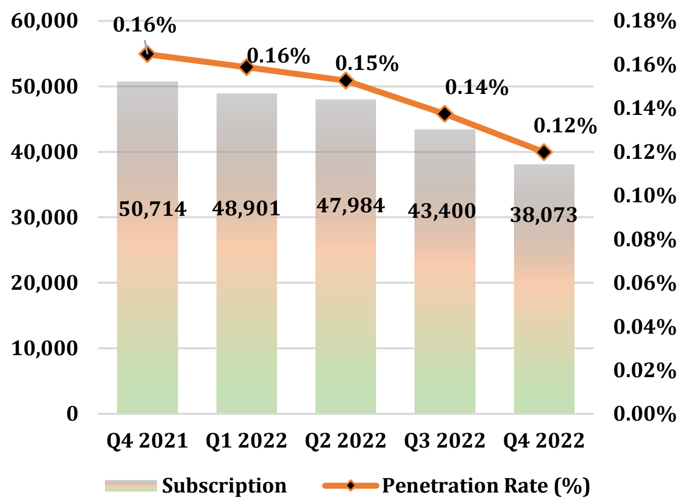


Figure 18: BWA Subscription and Penetration Rate

2.1.1 Subscriptions per Broadband Wireless Access (BWA) Operator

Surfline recorded 35,796 subscriptions at the end of the quarter under review representing 94.02% of the market share, as against 36,510 in the previous quarter.

BBH had a subscription of 292 and a market share of 0.77% at the end of Q4 2022 as against 716 subscriptions in Q3 2022.

Telesol ended this quarter with a subscription of 1,985 and a market share of 5.21%. (Figure 19) (Appendix, Table 16).

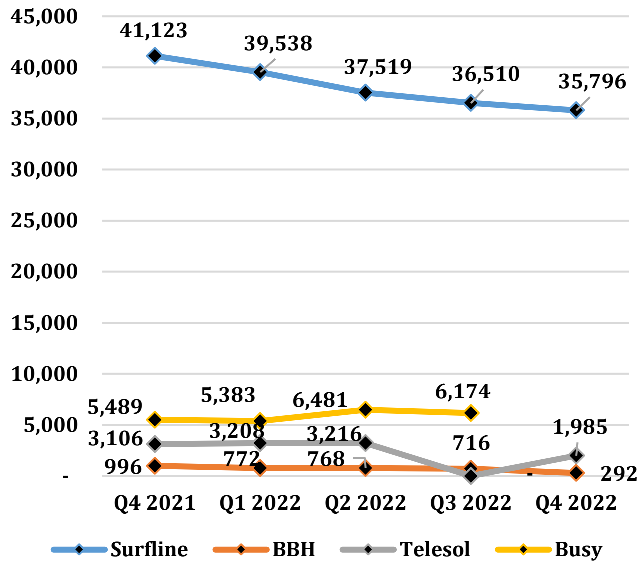


Figure 19: Subscriptions per Broadband Wireless Access (BWA) Operator

2.2 Broadband Wireless Access (BWA) Volume of Internet Traffic

The total volume of internet traffic generated by the BWAs decreased from 6.54 billion megabytes at the end of Q3 2022 to 4.65 billion megabytes at the end of Q4 2022, indicating a decline in growth of 28.84%.

Year-on-year internet traffic generated by the BWAs decrease from 6.61 billion megabytes at the end of Q4 2021 to 4.65 billion megabytes at the end of Q4 2022, representing a decline in growth by 29.65%. (Figure 20) (Appendix A, Table 17).

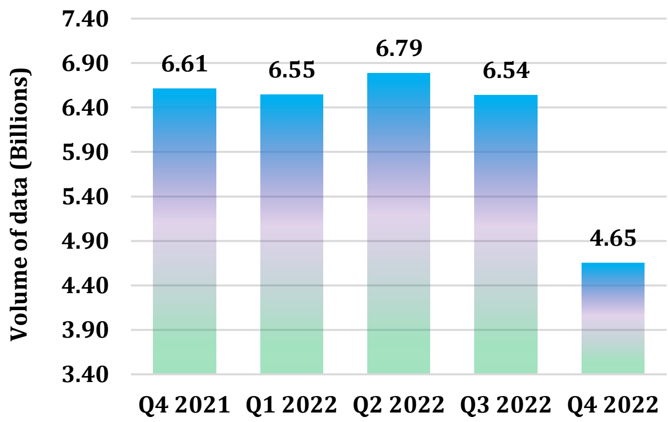


Figure 20: BWA Internet Traffic in Billions of Megabytes (MB)

6 As at the time of preparation of the report, there was no available data for Busy

2.2.1 Volume of BWA Traffic per Operator

Surfline's total volume of internet traffic for the quarter under review was 4.53 billion MB, as against 5.03 billion MB in the previous quarter representing 97.43% of the total volume of traffic.

Telesol recorded 0.111 billion MB with a market share of 2.39%.

BBH ended Q4 2022 with 0.008 billion MB of volume of internet traffic and a market share of 0.18%. (Figure 21) (Appendix, Table 17).

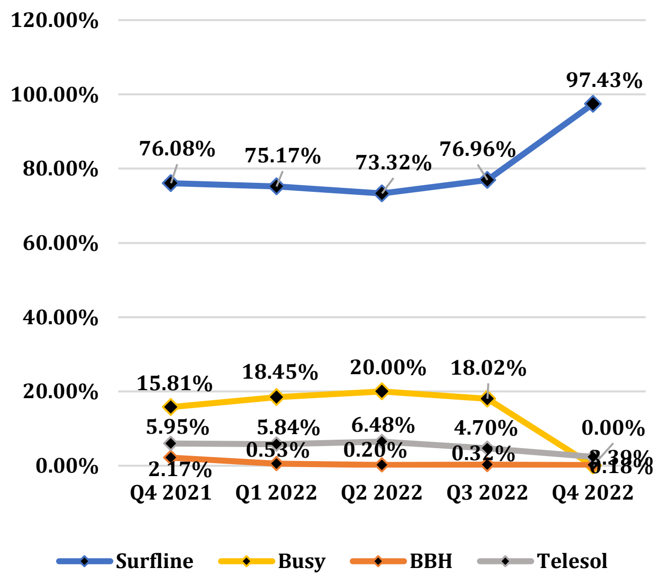


Figure 21: BWA Traffic Market Share per Operator (MB)

2.2.2 Internet Usage per BWA Subscription[7]

Internet usage per BWA subscription decreased from 14.07 thousand megabytes in Q3 2022 to 12.14 thousand megabytes in Q4 2022.

Year-on-year internet usage per subscription also decreased from 12.84 thousand megabytes in Q4 2021 to 12.14 thousand megabytes at the end of Q4 2022 (Figure 22) (Appendix, Table 18).

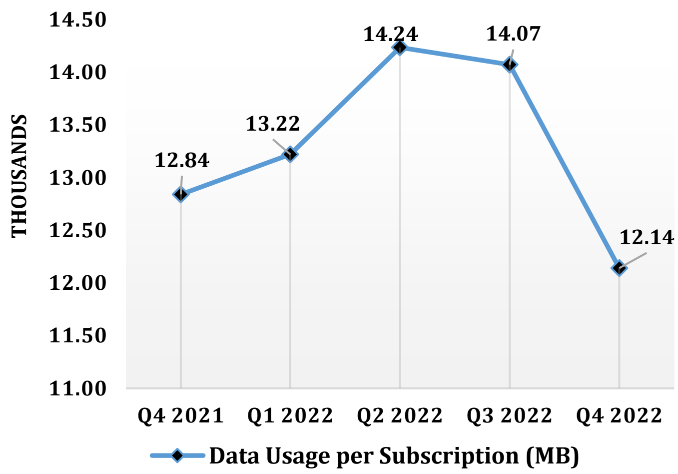


Figure 22: Average Internet Usage per BWA Subscription

7BWA data per subscriptions is calculated by dividing the total 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 325,059 in Q3 2022 to 330,016 at the end of Q4 2022. This shows a penetration rate of 1.04% and a 1.52% growth rate.

Year-on-year subscription increased from 315,271 in Q4 2021 to 330,016 at the end of Q4 2022, representing a growth rate of 4.68% (Figure 23) (Appendix, Table 19).

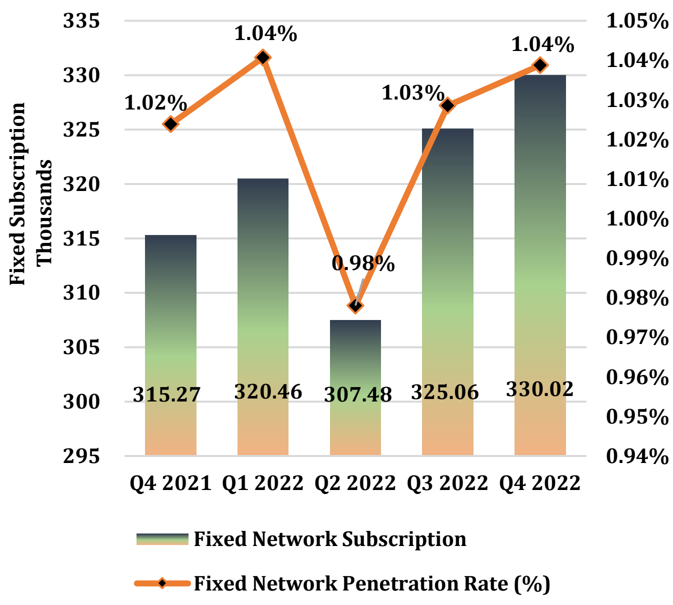


Figure 23: Fixed Network Voice Subscription and Penetration Rate

3.2 Fixed Voice Network Traffic

Total fixed voice traffic decreased by 2.58% from 9.03 million minutes in Q3 2022 to 8.80 million minutes in Q4 2022.

Year-on-year total fixed voice traffic also decreased by 8.36%, from 9.60 million minutes in Q4 2021 to 8.80 million minutes in Q4 2022. (Figure 24) (Appendix, Table 20).

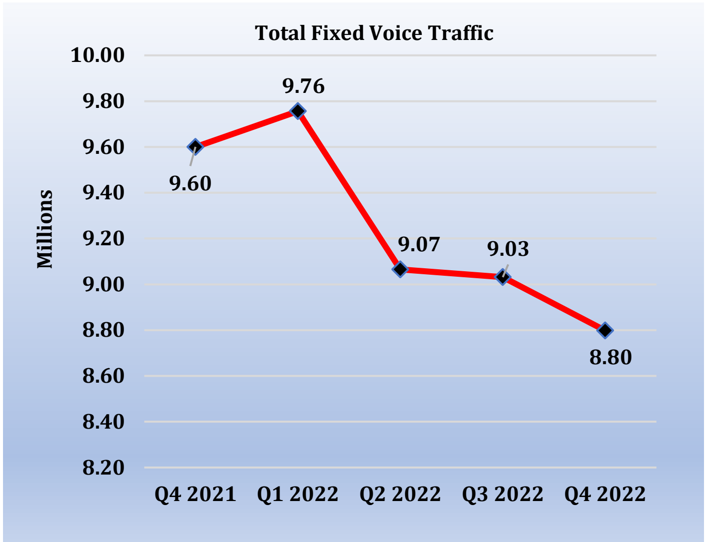


Figure 24: Total Fixed Voice Traffic

3.3 Fixed Voice Minute of Use[8]

Fixed voice traffic per subscription decreased from 28.77 minutes to 26.76 minutes at the end of Q4 2022 (-7.00%).

Year-on-year minutes of use per subscription decreased from 30.52 minutes in Q4 2021 to 26.76 minutes at the end of Q4 2022 (-12.30%) (Figure 25) (Appendix A, Table 21).

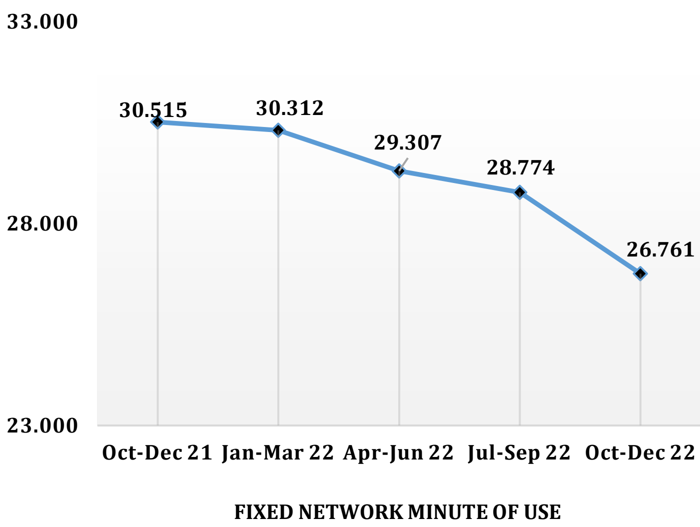


Figure 25: Fixed Network Minute of Use

8 Fixed Network Minutes of use per subscriptions is calculated by dividing the total 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 up from 98,594 in the previous quarter to 102,952 in the quarter under review, which represents a growth rate of 4.42%.

Year-on-year fixed data subscriptions decreased from 113,722 in the preceding year to 102,952 at the end of Q4 2022 representing a decline in growth by of 9.47%.

Fixed data penetration rate at the end of Q4 2022 was 0.32%. (Figure 26) (Appendix, Table 22).

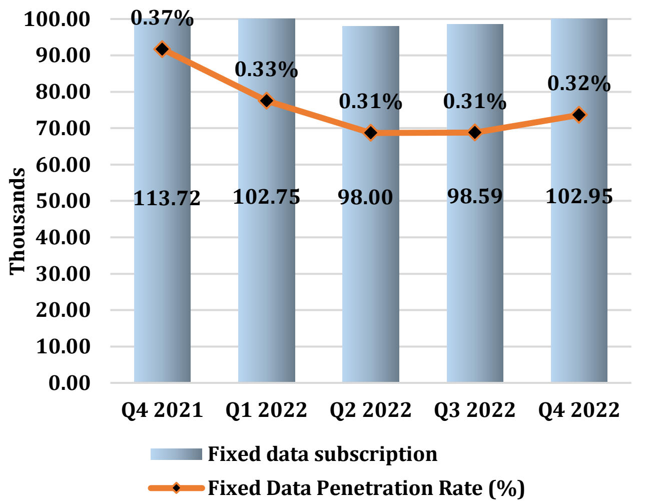


Figure 26: Fixed Data Subscriptions and Penetration

3.5 Fixed Data Subscriptions per Mobile Network Operator

Vodafone's subscriptions at the end of Q4 2022 was 75,078 representing 72.93% of the market share as against 72,547 in Q3 2022.

MTN's subscriptions at the end of Q4 2022 was 27,148 representing 26.37% of the market share as compared to 25,412 in Q3 of 2022.

AirtelTigo recorded 726 subscriptions at the end of Q4 2022 with a market share of 0.71% as compared to 635 in the previous quarter. (Figure 27) (Appendix, Table 23).

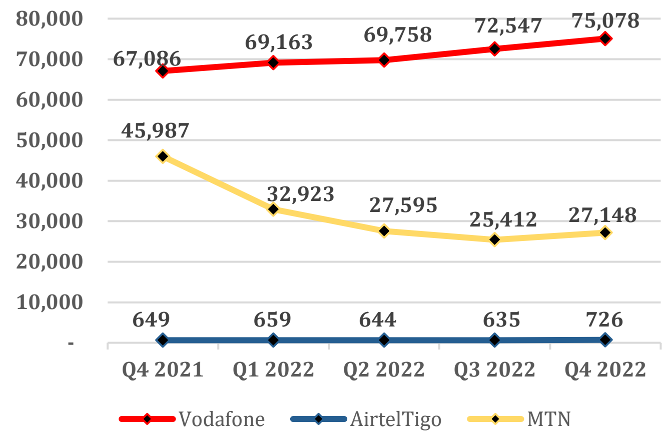


Figure 27: Fixed Data Subscription per Operator

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 Q4 2022 was 707. The total number of FM stations in operation was 513 in the quarter under review.

The Ashanti Region had the highest number of FM stations (102), representing 14.43% of the total number of authorised FM stations in the country. The Savannah Region had the least number of authorised FM Stations (12), representing 1.70% of the total authorised FM Stations in the country. (Figure 28) (Appendix A, Table 25).

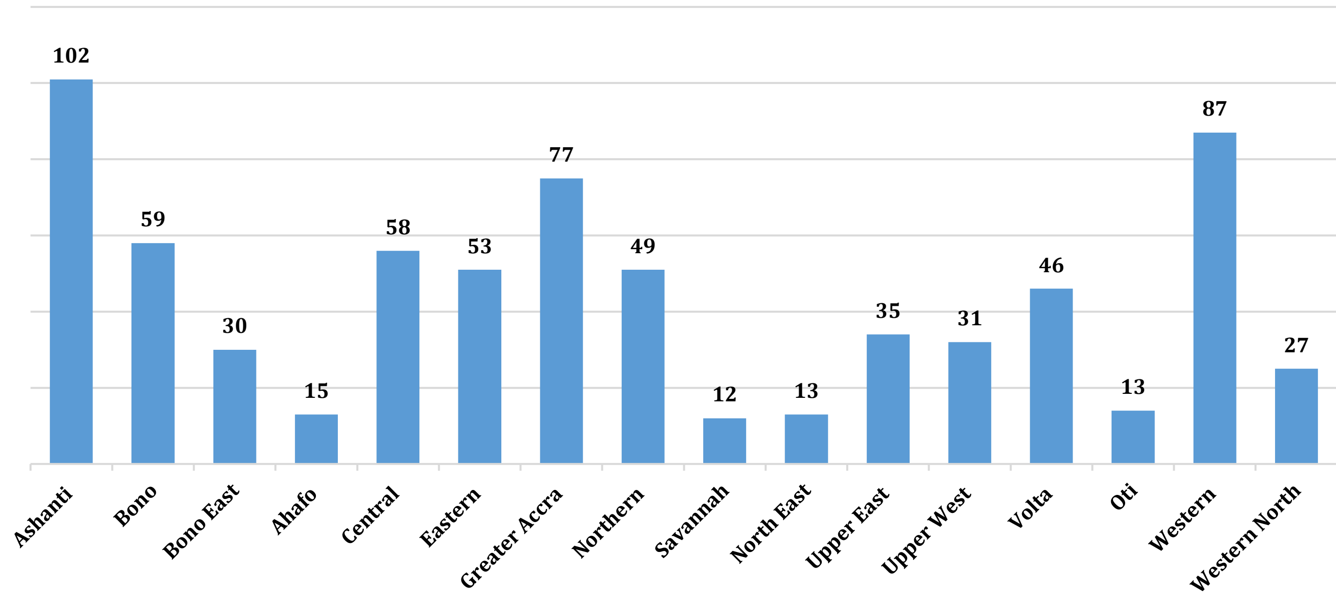


Figure 28: Regional distribution of authorised FM stations as at end of Q4 2022

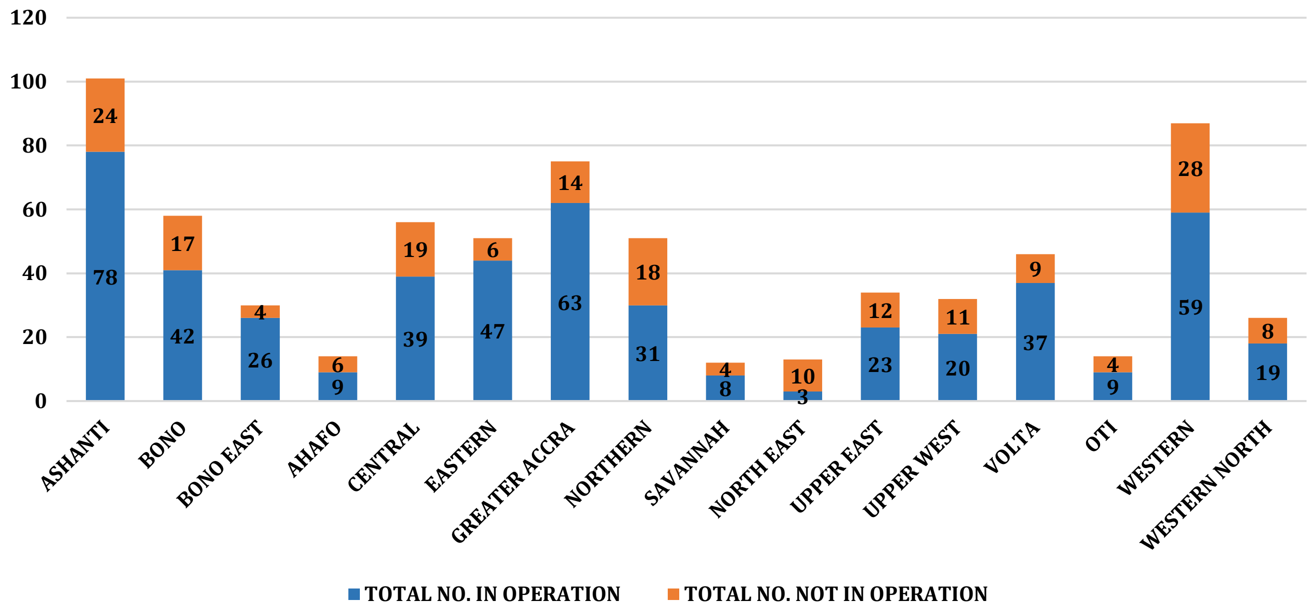


Figure 29: Regional distribution of On-air and Off-air FM stations as at end of Q4 2022

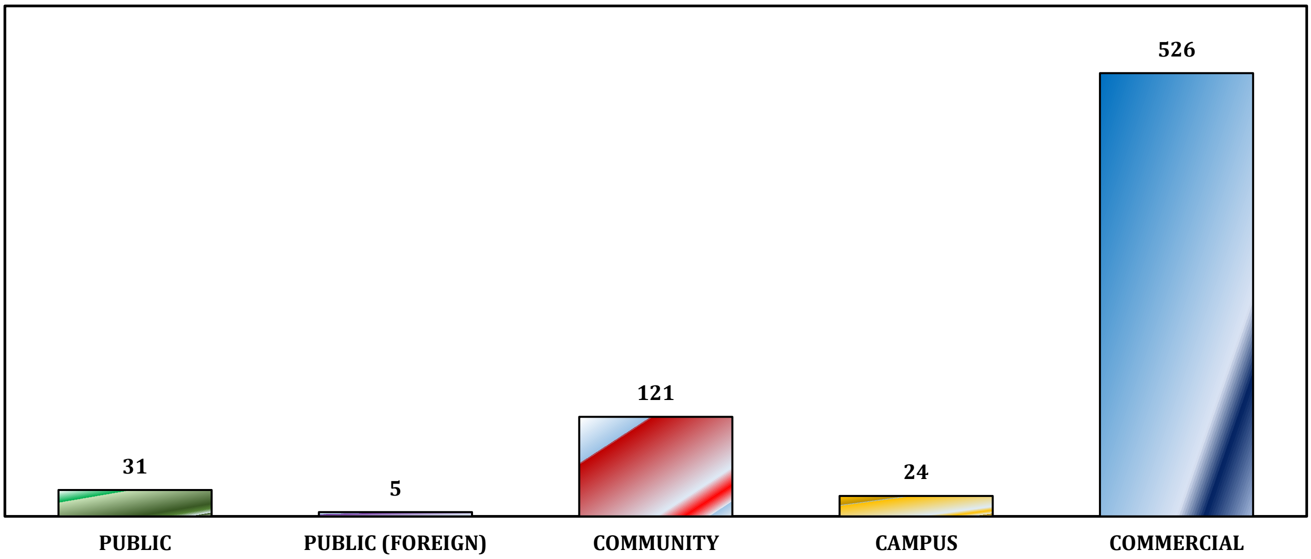


Figure 30: Purpose of Authorised Radio Stations as at Q4 2022

4.2 Authorised Television Stations

The total number of authorised TV stations in Ghana at the end of the fourth quarter of 2022 was 156 out of which 117 were operational during the quarter under review, representing 75.00% of the total number of authorised TV stations in the country (Figure 32) (Appendix A, Table 26).

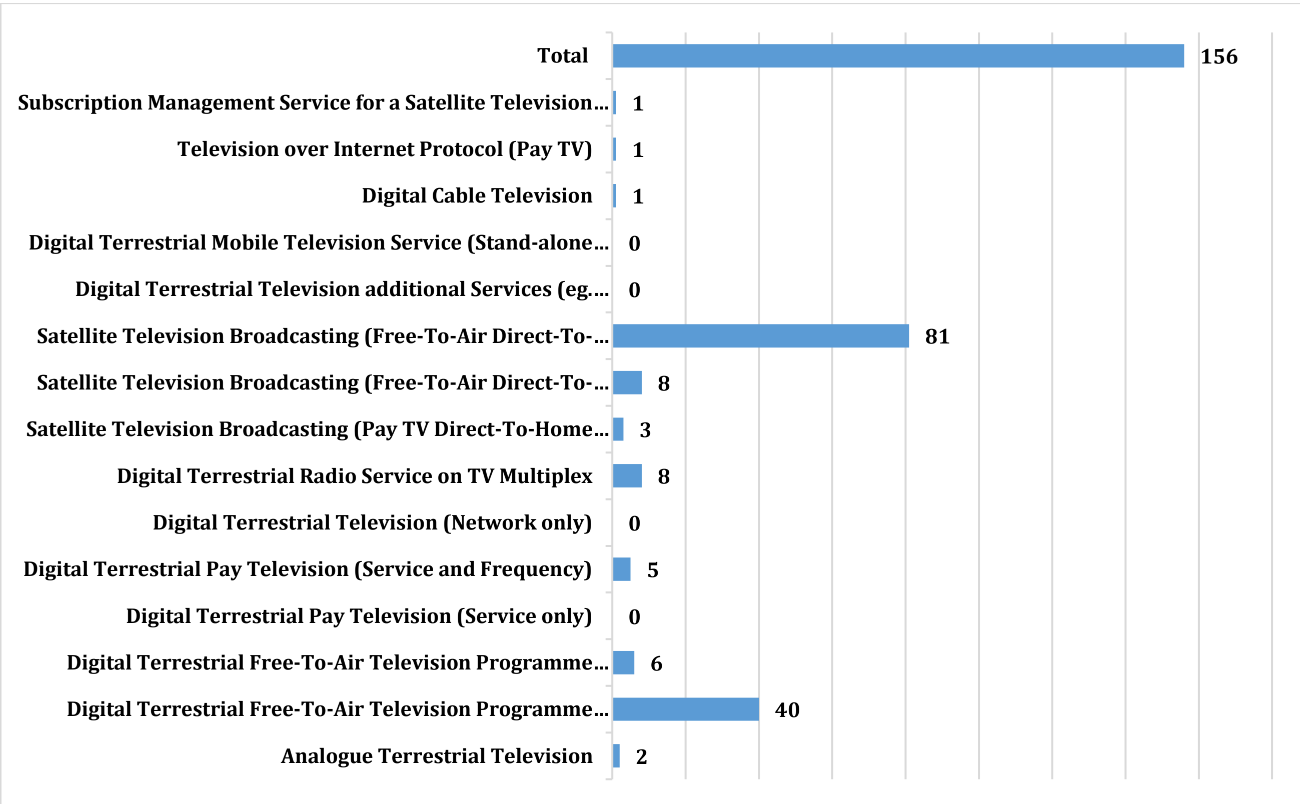


Figure 31: Authorised TV Stations Q4 2022

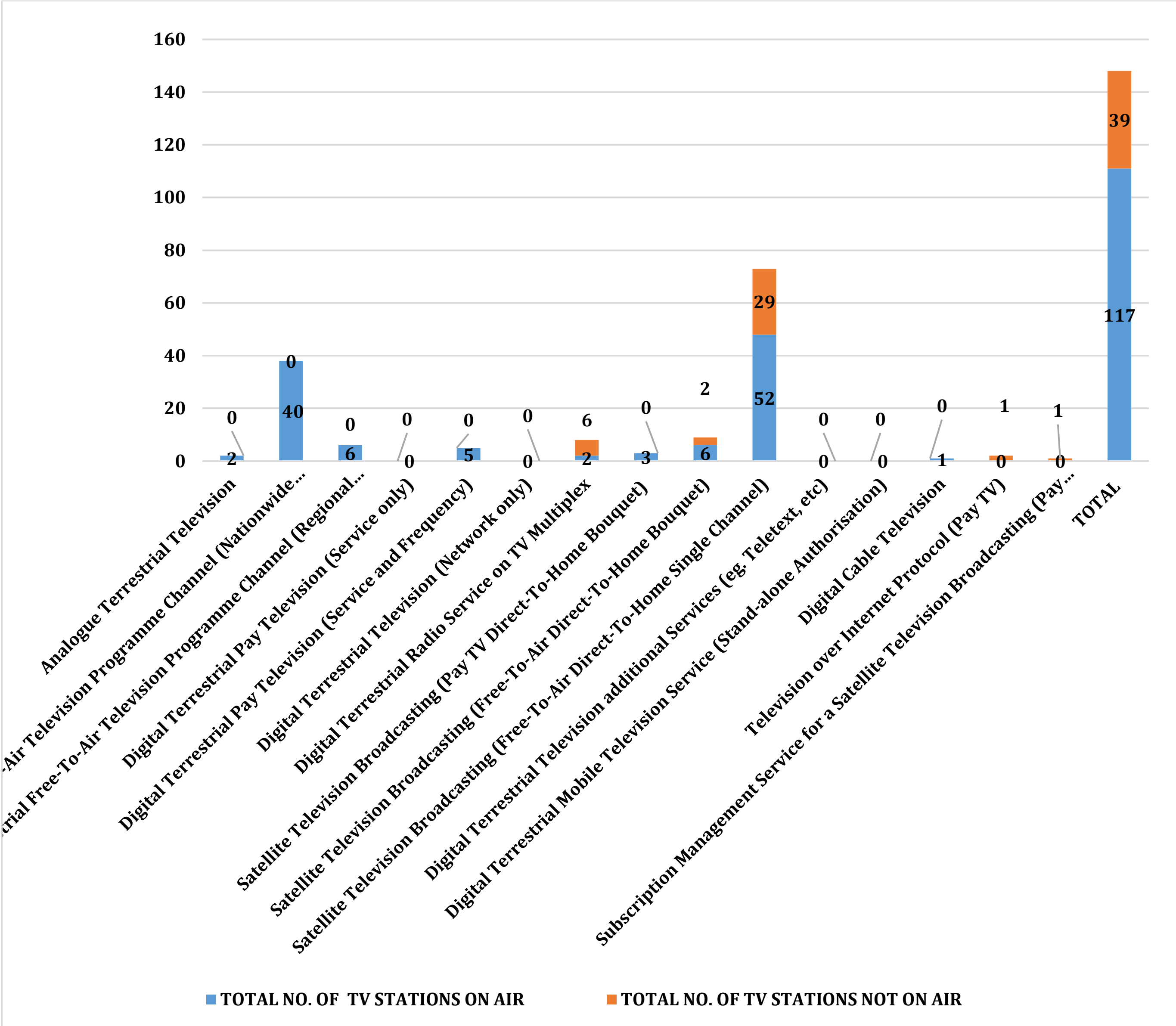


Figure 32: Distribution of Types of TV Services (On-Air and Off-Air TV Stations) as at end of Q4 2022

Appendix A (List of Tables)

Table 1: Mobile Voice Subscriptions and Penetration Rate

Subscription	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Mobile Subscription	40,454,073	41,481,767	40,988,879	40,813,018	40,045,308
Mobile Subscription Growth rate (%)	-3.17%	2.54%	-1.19%	-0.43%	-1.88%
Net additions	-1,323,560	1,027,694	-492,888	-175,861	-767,710
Population	30,792,608	30,792,608	31,439,251	31,604,308	31,769,363
Penetration Rate (%)	**131.38%**	**134.71%**	**130.37%**	**129.14%**	**126.05%**

Table 2: Mobile Voice Subscriptions and Market Share per Operator

Mobile Network Operator		Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
MTN	Subscriptions	23,966,302	25,558,928	25,848,409	26,689,330	26,613,845
	Market Share (%)	59.24%	61.61%	63.06%	65.39%	66.46%
Vodafone	Subscriptions	8,250,436	7,732,622	7,323,652	7,457,708	7,537,400
	Market Share (%)	20.39%	18.64%	17.87%	18.27%	18.82%
AirtelTigo	Subscriptions	7,390,278	7,403,254	6,826,853	6,312,864	5,585,510
	Market Share (%)	18.27%	17.85%	16.66%	15.47%	13.95%
Glo	Subscriptions	847,057	786,963	989,965	353,116	308,553
	Market Share (%)	2.09%	1.90%	2.42%	0.87%	0.77%
Total Industry Subscription		**40,454,073**	**41,481,767**	**40,988,879**	**40,813,018**	**40,045,308**

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

Subscription	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Prepaid	40,158,443	41,054,936	40,543,100	40,377,746	39,617,681
Market Share	99.27%	98.97%	98.91%	98.93%	98.93%
Post-paid	295,630	426,831	445,779	435,272	427,627
Market Share	0.73%	1.03%	1.09%	1.07%	1.07%
Total mobile subscription	**40,454,073**	**41,481,767**	**40,988,879**	**40,813,018**	**40,045,308**

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

Breakdown of Off-Net Traffic	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Traffic (Mobile to Mobile)	2,134,948,003	2,183,773,095	2,168,717,436	2,135,102,224	2,019,023,010
Share (%)	99.38%	99.44%	99.42%	99.42%	99.36%
Growth (%)	11.61%	2.29%	-0.69%	-1.55%	-5.44%
Traffic (Mobile to Fixed)	13,274,791	12,324,522	12,654,883	12,524,403	12,990,823
Share (%)	0.62%	0.56%	0.58%	0.58%	0.64%
Growth (%)	8.39%	-7.16%	2.68%	-1.03%	3.72%
Total Off-Net Traffic	**2,148,222,794**	**2,196,097,617**	**2,181,372,319**	**2,147,626,627**	**2,032,013,833**

Table 5: Total Domestic Mobile Voice Traffic in Minutes

Traffic	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Traffic (Off-Net)	2,148,222,794	2,227,373,879	2,203,886,562	2,147,629,899	2,032,013,833
Share (%)	8.11%	8.61%	8.34%	8.20%	8.51%
Growth (%)	11.59%	3.68%	-1.92%	-2.55%	-5.38%
Traffic (On-Net)	24,337,097,120	23,643,478,673	24,215,251,832	24,043,275,209	21,841,970,013
Share (%)	91.89%	91.39%	91.66%	91.80%	91.49%
Growth (%)	-5.10%	-2.85%	2.42%	-0.71%	-9.16%
Total traffic	**26,485,319,914**	**25,870,852,552**	**26,419,138,394**	**26,190,905,107**	**23,873,983,846**

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

Traffic	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Total mobile voice traffic	26,485,319,914	25,870,852,552	26,419,138,394	26,190,905,107	23,873,983,846
Average Mobile voice subscription	41,003,757	41,156,208	41,080,956	40,775,738	40,427,086
Minutes of Use (MoU) per Subscription	645.92	628.60	643.10	642.32	590.54
MoU growth rate (%)	**-2.81**	**-2.68%**	**2.31%**	**-0.12%**	**-8.06%**

Table 7: International Traffic

Traffic	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Incoming International Traffic	58,828,681	58,199,657	64,296,540	64,615,058	61,233,303
Growth (%)	6.64%	-1.07%	10.48%	0.50%	-5.23%
Outgoing International Traffic	100,076,292	88,218,754	79,794,526	77,253,782	73,877,581
Growth (%)	**-11.47%**	**-11.85%**	**-9.55%**	**-3.18%**	**-4.37%**

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

Mobile Operators	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Off-Net					
MTN	62,104,351	71,706,837	70,917,153	78,335,284	92,778,474
Vodafone	86,602,956	78,586,700	94,748,489	93,371,708	117,962,480
AirtelTigo	2,157,469	6,933,089	11,557,613	9,232,475	11,403,412
Glo	1,650,792	2,325,071	1,700,940	879,715	262,563
Total	**152,515,568**	**159,551,697**	**178,924,195**	**181,819,182**	**222,406,929**
On- net					
MTN	289,367,097	362,681,706	392,514,195	442,680,314	454,222,145
Vodafone	148,434,883	106,170,295	68,192,778	72,975,081	69,500,826
AirtelTigo	2,270,195	1,947,850	1,656,882	1,425,920	1,714,490
Glo	321,341	379,052	188,593	227,807	68,354
Total	**440,393,516**	**471,178,903**	**462,552,448**	**517,309,122**	**525,505,815**
Total					
MTN	322,781,615	434,388,543	463,431,348	521,015,598	547,000,619
Vodafone	226,048,540	184,756,995	162,941,267	166,346,789	187,463,306
AirtelTigo	4,667,142	8,880,939	13,214,495	10,658,395	13,117,902
Glo	1,669,271	2,704,123	1,889,533	1,107,522	330,917
Total	**592,909,085**	**630,730,600**	**641,476,643**	**699,128,304**	**747,912,744**

Table 9: Average SMS per Subscription

	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Total SMS	592,909,085	630,730,600	641,476,643	699,128,304	747,912,744
Average Mobile Subscription	41,003,757	41,156,208	41,080,956	40,775,738	40,427,086
SMS per Subscription	**14.5**	**15.3**	**15.6**	**17.1**	**18.5**

Table 10: Mobile Data Subscriptions (Prepaid/Postpaid)

Mobile Data Subscriptions		Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Prepaid	Subscriptions	23,237,338	23,507,496	23,388,524	24,174,770	22,657,917
	Market Share %)	99.24%	99.22	99.20%	99.21%	99.18%
Post-paid	Subscriptions	177,189	185,085	189,077	193,192	188,331
	Market Share %)	0.76%	0.78%	0.80%	0.79%	0.82%
Total mobile data subscriptions		**23,414,527**	**23,692,581**	**23,577,601**	**24,367,962**	**22,846,248**

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

Mobile Operator	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Total Mobile data usage (MB)	296,738,560,185	304,154,750,559	339,648,306,422	366,524,897,339	401,527,017,627

Table 12: Mobile Internet Usage per Subscription (MB)

Mobile Operator	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Total Mobile data usage (MB)	296,738,560,185	304,154,750,559	339,648,306,422	366,524,897,339	401,527,017,627
Average Data Subscription	23,204,483	23,613,836	23,621,298	24,193,140	23,641,217
Data Usage per Subscription (MB)	**12788.0**	**12880.4**	**14378.9**	**15150.0**	**16984.2**

Table 13: Mobile Data Traffic (MB) per Operator

Mobile Operator	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
MTN	222,647,497,298	230,117,454,491	263,350,389,862	288,793,194,188	326,118,124,526
	75.03%	75.66%	77.54%	78.79%	80.91%
Vodafone	48,721,266,699	48,820,372,630	53,086,746,466	55,623,494,664	57,510,398,564
	16.42%	16.05%	15.63%	15.18%	14.27%
AirtelTigo	17,630,556,987	17,771,836,916	17,403,073,281	16,851,920,062	17,898,494,537
	5.94%	5.84%	5.12%	4.60%	4.44%
Glo	7,739,239,202	7,445,086,522	5,808,096,813	5,256,288,425	1,515,363,255
	2.61%	2.45%	1.71%	1.43%	0.38%
Total Industry Traffic (MB)	**296,738,560,185**	**304,154,750,559**	**339,648,306,422**	**366,524,897,339**	**403,042,380,881**

Table 14: Average Mobile Tariff per Service (GHp)

Tariff	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Average On-Net mobile tariff	0.12	0.13	0.13	0.13	0.12
Average Off-Net mobile tariff	0.12	0.13	0.13	0.13	0.12
Average On-Net SMS tariff	0.05	0.05	0.06	0.06	0.05
Average Off-Net SMS tariff	0.06	0.06	0.06	0.06	0.05
Average data/Mb tariff	0.08	0.10	0.09	0.10	0.10

Table 15: BWA Data Subscriptions and Penetration

BWA Operator	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Subscription	50,714	48,901	47,984	43,400	38,073
Growth rate (%)	-4.39%	-3.57%	-1.88%	-9.55%	-12.27%
Net Additions	-2,329	-1,813	-917	-4,584	-5,327
Population	30,792,608	30,792,608	31,439,251	31,604,308	31,769,363
Penetration Rate (%)	**0.16%**	**0.16%**	**0.15%**	**0.14%**	**0.12%**

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

BWA Operator	Subscription and Market Share	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Surfline	Subscription	41,123	39,538	37,519	36,510	35,796
	Market share (%)	81.09%	80.85%	78.19%	84.12%	94.02%
Busy	Subscription	5,489	5,383	6,481	6,174	-
	Market share (%)	10.82%	11.01%	13.51%	14.23%	-
Telesol	Subscription	3,106	3,208	3,216	-	1,985
	Market share (%)	6.12%	6.56%	6.70%	-	5.21%
BBH	Subscription	996	772	768	716	292
	Market share (%)	1.96%	1.58%	1.60%	1.65%	0.77%
Industry Total		**50,714**	**48,901**	**47,984**	**43,400**	**38,073**

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

BWA Operator		Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Surfline	Data usage (MB)	5,031,694,350	4,920,450,040	4,975,295,210	5,032,423,490	4,533,551,472
	Market share (%)	76.08%	75.17%	73.32%	76.96%	97.43%
Busy	Data usage (MB)	1,045,337,772	1,207,650,049	1,357,054,445	1,178,623,480	-
	Market share (%)	15.81%	18.45%	20.00%	18.02%	-
BBH	Data usage (MB)	143,258,920	34,938,110	13,303,327	20,805,337	8,242,456
	Market share (%)	2.17%	0.53%	0.20%	0.32%	0.18%
Telesol	Data usage (MB)	393,595,726	391,752,190	439,706,672	307,328,919	111,372,030
	Market share (%)	5.95%	5.84%	6.48%	4.70%	2.39%
Industry Total (MB)		**6,613,886,768**	**6,545,608,897**	**6,785,359,654**	**6,539,181,227**	**4,653,165,958**

Table 18: Internet Usage per BWA Subscriptions (MB)

BWA Operator	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Total Volume of	6,613,886,768	6,545,608,897	6,785,359,654	6,539,181,227	4,653,165,958
Average BWA	51,507	49,515	47,666	46,470	38,325
Data Usage per	**128,406.70**	**132,195.35**	**142,351.20**	**140,719.35**	**121,413.33**

Table 19: Fixed Network Voice Subscriptions and penetration

Fixed Operator	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Vodafone	307,278	312,981	299,897	321,260	326,579
	97.46%	97.67%	97.53%	98.83%	98.96%
AirtelTigo	3,634	3,088	2,566	2,658	2,247
	1.15%	0.96%	0.83%	0.82%	0.68%
MTN	4,359	4,391	5,020	1,141	1,190
	1.38%	1.37%	1.63%	0.35%	0.36%
Total industry subscription	315,271	320,460	307,483	325,059	330,016
Population	30,792,608	30,792,608	31,439,251	31,604,308	31,769,363
Fixed Network Penetration Rate (%)	**1.02%**	**1.04%**	**0.98%**	**1.03%**	**1.04%**

Table 20: Fixed Network Volume of Traffic in Minutes

Traffic	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
On-Net Fixed voice traffic	-	-	-	-	-
Off-Net fixed voice traffic	9,600,469	9,765,791	9,065,187	9,031,430	8,798,173
Total Fixed Voice Traffic	**9,600,469**	**9,765,791**	**9,065,187**	**9,031,430**	**8,798,173**

Table 21: Fixed Network Minute of Use per Subscriptions

Fixed Network (MoU)	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Total Fixed Voice Traffic	9,600,469	9,765,791	9,065,187	9,031,430	8,798,173
Average Fixed Subscription	314,614	321,856	309,318	313,878	328,773
Minutes of Use per Subscription (MoU)	30.515	30.312	29.307	28.774	26.761
Growth Rate	**9.00%**	**-0.67%**	**-3.32%**	**-1.82%**	**-7.00%**

Table 22: Fixed Broadband Data Subscriptions and Penetration

Fixed network	Q4 2021	Q1 2022	Q2 2022	Q3 2022	Q4 2022
Vodafone	67,086	69,163	69,758	72,547	75,078
	58.99%	67.32%	71.18%	73.58%	72.93%
Airtel	649	659	644	635	726
	0.57%	0.64%	0.66%	0.64%	0.71%
MTN	45,987	32,923	27,595	25,412	27,148
	40.44%	32.04%	28.16%	25.77%	26.37%
Total fixed data	113,722	102,745	97,997	98,594	102,952
Population	30,792,608	30,792,608	31,439,251	31,604,308	31,769,363
Fixed Data Penetration	**0.37%**	**0.33%**	**0.31%**	**0.31%**	**0.32%**

Table 23: Regional Distribution of FM Stations by Purpose as at the end of Q4 2022

Name of Regions	Public	Public (Foreign)	Community	Campus	Commercial
Ashanti	2	1	16	4	79
Bono	1	0	6	2	50
Bono East	2	0	4	0	24
Ahafo	0	0	1	0	14
Central	2	0	13	3	40
Eastern	2	0	15	1	35
Greater Accra	2	3	10	4	58
Northern	3	0	10	2	34
Savannah	3	0	4	0	5
North East	1	0	5	0	7
Upper East	2	0	10	3	20
Upper West	2	0	11	2	16
Volta	3	0	5	1	37
Oti	1	0	3	0	9
Western	2	1	8	2	74
Western North	3	0	0	0	24
Total	**31**	**5**	**121**	**24**	**526**

Table 24: Regional Distribution of FM Stations as at the end of Q4 2022

Name Of Regions	Authorized FM Stations	FM Stations In Operation
Ashanti	102	78
Bono	59	42
Bono East	30	26
Ahafo	15	9
Central	58	39
Eastern	53	47
Greater Accra	77	63
Northern	49	31
Savannah	12	8
North East	13	3
Upper East	35	23
Upper West	31	20
Volta	46	37
Oti	13	9
Western	87	59
Western North	27	19
Total	**707**	**513**

Table 25: Authorised TV Stations as at the end of Q4 2022

Type of Television Service	Authorised TV Stations		No. of TV Stations in Operation (Q4 2022)	No. of TV Stations not in Operation (Q4 2022)
	End of Q3 2022	End of Q4 2022		
Analogue Terrestrial Television	2	2	2	0
Digital Terrestrial Free-To-Air Television Programme Channel (Nationwide Coverage)	40	40	40	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)	8	8	6	2

Satellite Television Broadcasting (Free-To-Air Direct-To-Home Single Channel)	79	81	52	29
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)	2	1	0	1
Subscription Management Service for a Satellite Television Broadcasting (Pay TV Direct-To-Home Bouquet)	1	1	0	1
Total	**155**	**156**	**117**	**39**

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

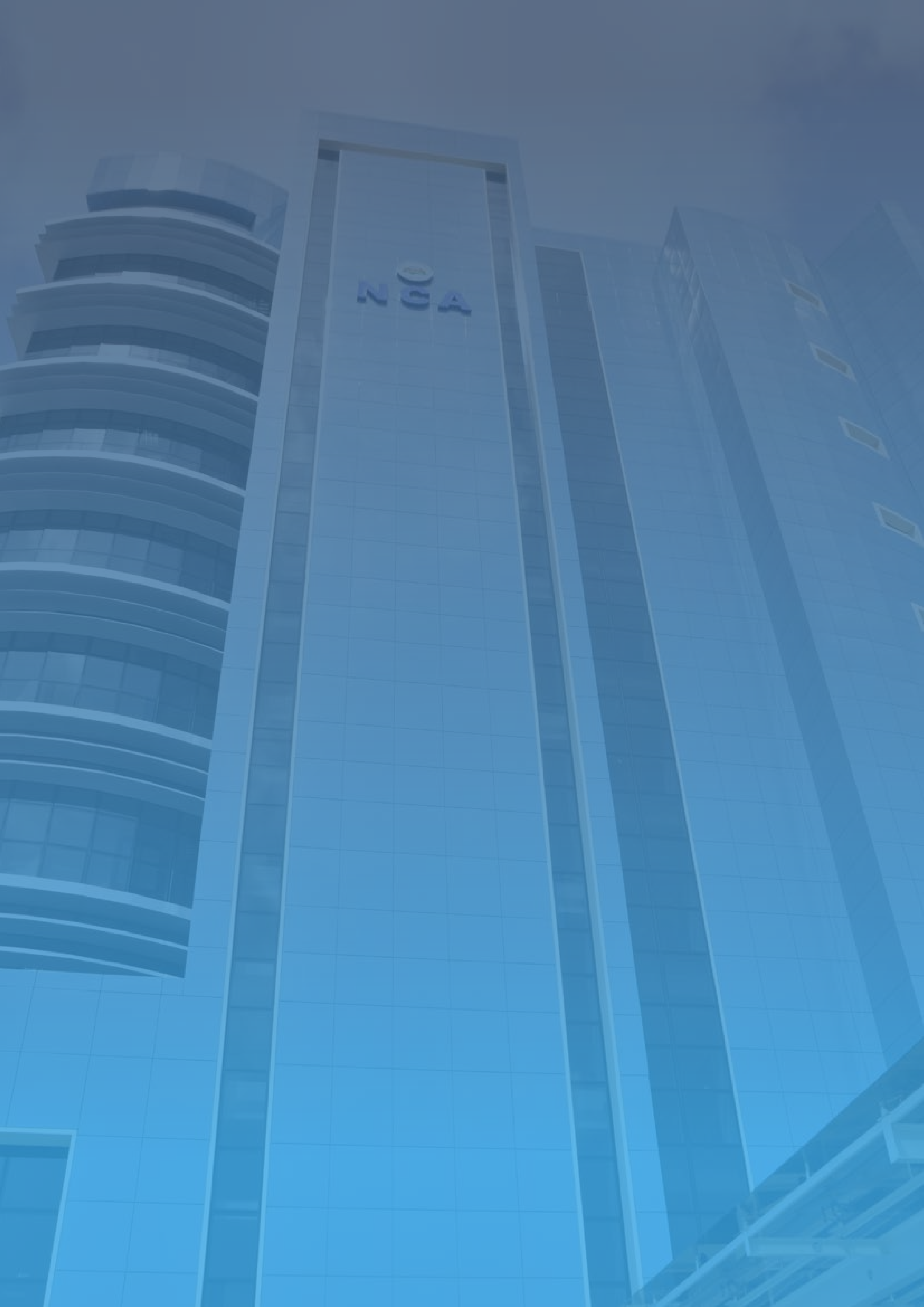
National Communications Authority,
House No 83, North Nkwabeng
P. O. Box SY125, Sunyani, Brong Ahafo Region
Tel: +233 (0) 3520 27564
E-Mail: complaints.sunyani@nca.org.gh

- ### 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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