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Original Article

Evaluating Latency and Packet Loss of Direct and Hotspot Internet Connections for Quality of Service and Network Selection

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Abstract - *This study evaluates latency and packet loss associated with direct and hotspot internet connections to support quality of service and network selection decisions. Latency and packet loss are critical performance metrics that directly affect user experience in real-life applications and overall network reliability. Using an experimental design, measurements are collected over fourteen consecutive days in Ughelli, Delta State, Nigeria, on four major mobile networks, MTN, Globalcom, 9mobile, and Airtel, at four different times daily (1:00 am, 7:00 am, 1:00 pm, and 7:00 pm). The data, analyzed through average statistical methods, reveal that MTN records the lowest average latency of 200.12 ms, followed by Globalcom (281.25 ms), 9mobile (286.18 ms), and Airtel (462.65 ms). Latency peaks during busy periods (1:00 pm and 7:00 pm) and is notably lower during off-peak times, particularly at 1:00 am. Packet loss results show MTN (1.42%) and Globalcom (2.21%) remain within the acceptable standard limit of 2.5%, while 9mobile (2.57%) slightly exceeds it, and Airtel (4.79%) shows higher packet loss. All networks exceed the recommended latency threshold of 60 ms for 4G LTE networks. Furthermore, hotspot connections consistently experience higher latency and packet loss compared to direct mobile connections. These findings highlight significant differences in performance across operators and connection types, emphasizing the need for users to consider these metrics when selecting networks for latency-sensitive tasks.*

Keywords *- Direct connection, Hotspot connection, Latency, Lte, Packet loss.*

1. Introduction

The development of mobile technologies, starting from Second-Generation (2G) GSM systems and evolving into more advanced generations, has significantly contributed to the advancement of networking and telecommunications. To achieve faster and more reliable communication, many countries, including Nigeria, require extensive and stable network coverage [1]. In response to the rising demand for high-speed connectivity, transitional technologies such as 2.5G General Packet Radio Service (GPRS) and 3G standards like UMTS and CDMA2000 emerged [2]. Wireless technologies, which use radio waves and diverse network types such as Mesh Networks, Mobile Networks, Local Area Networks (LAN or hotspot), and Personal Area Networks (PAN), enable data communication without physical links [3]. Although they are widely used in residential, commercial, and industrial applications, wireless networks are prone to performance issues and security vulnerabilities due to radio interference and environmental factors. Nonetheless, the self-organizing and auto-configuring capabilities of mobile wireless networks [4] have rendered them vital to contemporary communication.

Today, users typically access online services through DSL connections, WLAN hotspots, or mobile networks like UMTS and GPRS. This evolution into IP-based communications has intensified competition among service providers, making Quality of Service (QoS) a critical differentiator [5]. However, as internet usage rises, especially in densely populated areas, network congestion often leads to service degradation, manifesting as increased latency, jitter, and packet loss [2]. These impairments affect user satisfaction and the performance of real-life applications. Quality of Service (QoS) broadly refers to the service guarantees a network provides to ensure stable operation of user

applications [6], and is commonly evaluated using metrics such as latency (delay), jitter, packet loss, and throughput [2]. In Nigeria, the four major mobile network providers (MTN, Globacom, Airtel, and 9mobile) compete aggressively to deliver better service quality. However, customer complaints persist regarding poor QoS, especially in the form of high latency and packet loss. These issues frequently disrupt routine internet activities such as video streaming, file downloads, and real-time communication [7]. Despite significant improvements in mobile infrastructure, user experience remains inconsistent across locations. For example, by 2018, broadband penetration reached 56.8% [9], and smartphone usage climbed to 82% [8], yet service quality still varies from one neighborhood to another within the same city, due to disparities in signal strength, bandwidth capacity, and infrastructure investments. Consequently, users often resort to unreliable feedback to choose between mobile networks, rather than relying on objective, measurable data.

Many prior studies have assessed QoS performance in mobile networks, focusing on general metrics or using simulated environments. However, few studies have directly measured and compared latency and packet loss between direct data connections and hotspot sharing under real-life mobile network use, especially within the Nigerian environment. This study fills that gap by adopting an experimental approach, capturing live network data, and evaluating the practical implications on user QoS. This real-life, side-by-side testing of two internet access modes (direct and hotspot) represents a novel angle not explored in most previous studies.

This study empirically compared latency and packet loss across direct mobile internet connections and hotspot-based access over MTN, Globacom, Airtel, and 9mobile networks. The case study is situated in Ughelli, Delta State, Nigeria, a strategic location connecting several neighboring regions. Measurements were carried out over a two-week period and during different times of day to capture variations in network performance.

By focusing on latency and packet loss, which are two user-critical QoS parameters, this study aims to provide data-driven insights to assist users in making informed decisions when selecting internet connection modes and service providers. These findings offer practical relevance for individuals, educational institutions, and businesses seeking reliable, cost-effective internet access. Furthermore, this study contributes to the broader understanding of mobile network performance in Nigeria and offers a foundation for future network optimization strategies [10].

2. Review of Related Works

Numerous studies have investigated Quality of Service (QoS) in mobile networks, focusing on user perception and technical performance indicators such as latency and packet loss. [11] proposed a QoS assessment methodology using drive-testing, analyzing both voice and data performance. However, this study did not measure specific QoS parameters under simultaneous voice and data use. Similarly, [12] emphasized the importance of user-perceived QoS by evaluating FTP data service quality in 3G networks, yet limited their analysis to a single network and region.

Several studies have concentrated on user perception and satisfaction. [13], A survey of over 6,000 mobile users identified that key factors such as call quality, pricing, customer service, and bundled service options are crucial to perceived QoS. [14] highlighted that in Nigeria, mobile operators have shifted from focusing solely on coverage to offering diverse service bundles to meet user expectations. Similarly, [15] revealed that call quality and price are the most influential factors when selecting a service provider, while product quality and availability also shape perceived QoS.

Focusing specifically on Nigeria, [16] conducted a four-year study combining user surveys and NCC data, identifying six main factors affecting QoS: network coverage, call quality, price, customer care, diversity of service bundles, and promotional incentives. However, this study, like others, did not directly measure latency or packet loss. [17] studied user experience in Afghanistan, finding over 53% of users dissatisfied with mobile network QoS, but again relied on surveys without empirical measurements. Empirical studies measuring actual network performance are fewer but notable. [18] used key performance indicator tools across over twenty base stations in Nigeria, measuring traffic volume, call completion rate, call drop rate, and utilization rate; about 80% of stations were found below NCC standards. [19] analyzed NCC secondary data, revealing that network congestion significantly affects QoS, and emphasized the need for operators to adapt to rising demand.

Additional studies used survey methods to assess perceived service quality. [20] surveyed over 527 users in Akure, Nigeria, finding MTN most preferred among the four major operators (MTN, Globacom, Airtel, and 9mobile). Interestingly, the study concluded that QoS had no significant effect on customer satisfaction in that area.

[21] Conducted a comprehensive evaluation of QoS across Nigerian mobile networks using call setup success rates, call drop rates, and signal strength across North-Central, Nigeria. While this offered a wide geographic coverage, the study did not investigate packet-level performance metrics such as latency and packet loss under end-user scenarios. [22] Conducted a drive-test-based evaluation of 4G network performance across several urban centers in North-Central Nigeria. Their study analyzed Key Performance Indicators (KPIs), including Reference Signal Received Power (RSRP), Signal-to-Noise Ratio (SNR), and latency, offering a spatial view of service quality across different locations. While their

results provided important insights into the signal behavior and general latency trends across operators, the study was primarily outdoor-focused and did not extend to usage patterns experienced indoors or under user-specific conditions such as hotspot tethering. Moreover, the absence of packet loss as a performance metric limits the study's ability to assess the full spectrum of user Quality of Service. This present research complements their work by introducing a user-centric dimension through the evaluation of latency and packet loss under both modem and hotspot access modes, particularly during varying traffic periods.

[23] assessed mobile broadband performance in Nigeria by conducting empirical field measurements across 2G and 3G networks. Their methodology involved signal strength and throughput analysis using drive-test tools across several locations. The study found that network type, operator infrastructure, and geographical variations significantly influenced broadband performance. However, their scope was limited to legacy technologies (2G/3G), and their performance metrics did not include latency or packet loss. Additionally, indoor or device-level usage contexts such as hotspot tethering were not explored. By focusing on newer network generations (4G/5G) and incorporating real-time latency and packet loss measurements under different connection modes, the present study addresses these methodological and contextual gaps.

[24] Conducted a comprehensive review of mobile broadband performance research, categorizing existing methodologies and measurement parameters such as latency, jitter, and throughput. The paper highlighted the importance of real-life indicators and noted a lack of standardized frameworks across empirical studies. Although latency was frequently referenced, the study emphasized that many existing works relied heavily on download/upload speeds without delving into deeper packet-level analysis. Notably, the review pointed out the underrepresentation of studies that examine the effect of access mode, such as tethered hotspots versus direct modem use, on QoS delivery. Furthermore, packet loss, which is central to evaluating user experience and network stability, was identified as a neglected metric. In contrast, this current study responds directly to these gaps by analyzing both latency and packet loss under controlled dual-mode access scenarios.

Collectively, these various studies illustrate that while user perception, customer satisfaction, and service coverage have been widely explored, few have directly measured latency and packet loss under real-world usage conditions, particularly in comparing direct mobile connections with hotspot connections. Moreover, limited attention has been given to how network performance varies across different times of day to assist users in making informed choices, especially within specific Nigerian regions. This study addresses these gaps by empirically testing the MTN, Globacom, Airtel, and 9mobile networks in Ughelli, Delta State, Nigeria, focusing on delay and packet loss. By comparing performance between direct and hotspot connections over a two-week period and across different time intervals, the research aims to provide practical, data-driven insights into mobile network Quality of Service (QoS). These findings will help users make informed network choices and support service optimization strategies in emerging markets.

3. Materials and Methods

In order to assess the latency and packet loss performance of direct and hotspot internet connections across four major Nigerian mobile networks (MTN, Globacom, Airtel, and 9mobile), an experimental approach was taken using measurements that were taken over two consecutive weeks. This method allowed a comprehensive, practical assessment under real usage conditions to support quality of service (QoS) decisions and network selection. This study focused on Ughelli, Delta State, Nigeria, found at latitude 5.479428 and longitude 6.023210. This site was carefully chosen for its mixed urban and semi-urban characteristics and proximity to busy transportation pathways, ensuring relevance for residents, businesses, and casual users.

3.1. Experimental Setup

The experimental design was guided by an analytical framework that explains how data packets travel between the user device and a remote server, and how latency and packet loss are measured during this exchange. The above framework shows the role of wireless networks in mediating user requests and server responses. Figure 1 presents the Experimental Conceptual Model that shaped the overall data collection process. To implement this model, measurements were conducted using three modes that reflect common user scenarios:

1. Direct connection: Laptop connected via LTE-enabled USB modem.
2. Mobile phone connection: Using an Android phone and a test application.
3. Hotspot connection: Laptop connected to the phone's mobile hotspot.

Devices were chosen for availability and compatibility with Nigerian networks: a Dell M731R Inspiron laptop with USB 2.0 and 802.11b/g/n Wi-Fi; a Samsung A50 smartphone supporting LTE; and a universal HSDPA modem with peak download rates of 7.2 Mbps. Each test used prepaid SIM cards from MTN, Globacom, Airtel, and 9mobile, provisioned with identical 2 GB data plans to keep conditions consistent.

3.2. Data Collection Procedure

Data were collected four times daily, 1:00 am, 7:00 am (off-peak) and 1:00 pm, 7:00 pm (peak) to capture variability due to network congestion. Over two weeks, this resulted in 28 measurement points per network per week.

For the direct connection, latency and packet loss were measured by connecting the modem (with LTE SIM) to the laptop. Using the Windows Command Prompt, continuous ICMP echo requests were sent to www.google.com for two minutes (ping www.google.com -t). After stopping the test, the average round-trip time and packet loss percentage were recorded. To illustrate this setup, Figure 2 shows the modem connected to the laptop used for direct measurements.

For the mobile phone connection, the Network Capture Express (NC Express) application was installed on the Samsung A50 smartphone. The app was configured to ping www.google.com for two minutes, automatically calculating average latency and packet loss. Figure 3 displays the NC Express application interface as used in the experiment.

For the hotspot connection, the phone's mobile hotspot was enabled, and the laptop connected via Wi-Fi. The same continuous ping procedure was repeated from the laptop to measure any added latency and packet loss introduced by hotspot routing.

All measurements were documented in Microsoft Excel immediately after each session to ensure data integrity.

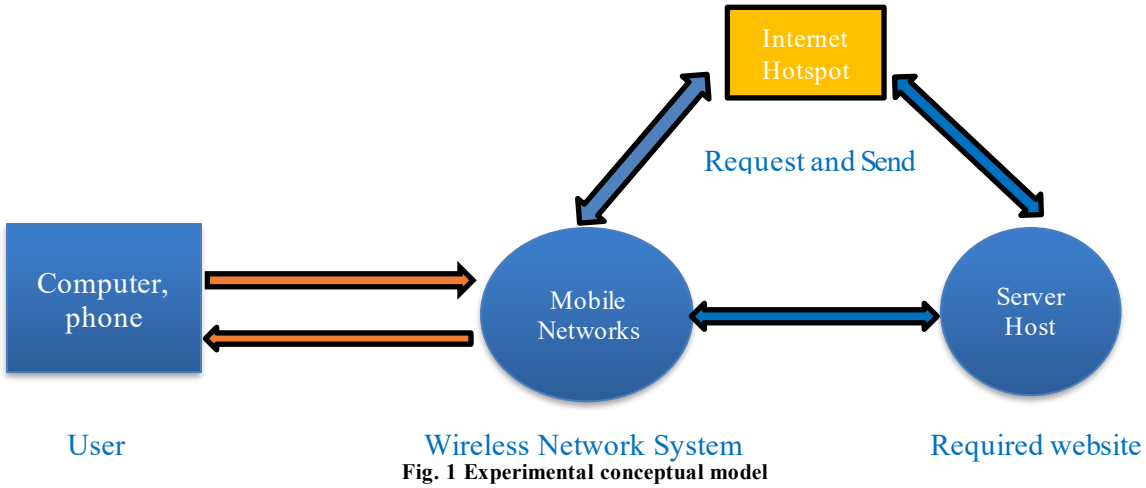

Fig. 1 Experimental conceptual model

Fig. 2 Modem connected to Laptop

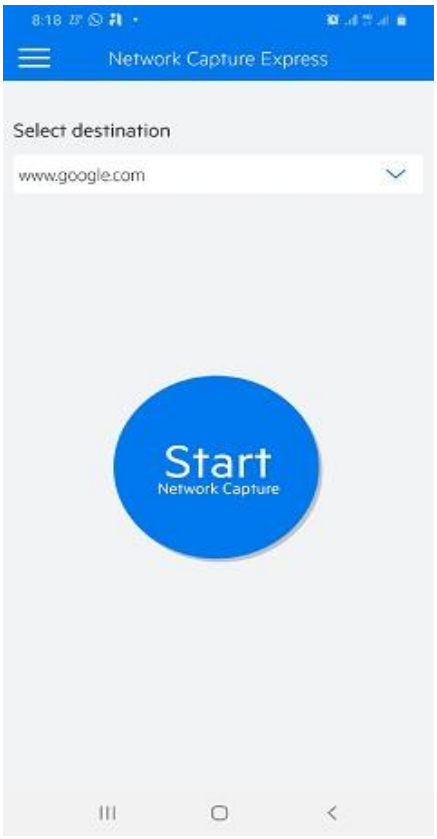

Fig. 3 NC Express Application GUI

3.3. Data Analysis

In total, each network produced 28 daily data points per week for latency and packet loss, across three test modes. Over two weeks and four networks, this yielded 224 measurement periods, or 1,344 individual data entries when counting latency and packet loss separately.

The raw data were processed using the standard average formula as shown in Equation 1 to obtain representative performance values.

$$Average = \frac{Sum\ of\ measured\ values}{Number\ of\ observations} \quad (1)$$

These averages were then visualized through tables and charts (bar graphs and line plots) to highlight the Differences between networks, Effects of peak vs. off-peak periods and Performance gaps between direct and hotspot connections.

This analytical approach enabled a clear, data-driven comparison of network quality, directly supporting the study's goal of guiding informed user decisions.

4. Tests, Results and Discussion

This study successfully conducted an experiment on latency and packet loss among four mobile network operators (MNOs) in Ughelli, Delta State. This study evaluated MTN, Glo, Airtel, and 9mobile over two weeks, testing the quality of service (QoS) using Modem, Network Capture Express application, and Hotspot connection. Latency and packet loss were recorded and compared across operators against accepted standards.

4.1. Latency of Mobile Network Operators

4.1.1. Latency in Relation to Average Values

Latency was measured as the time taken for data packets sent to reach and return from a server (www.google.com). Table 1 below summarizes the minimum, average, and maximum latency values recorded for each network under three test modes. For MTN, the lowest average latency was recorded using the NC Express application (138 ms), followed by Hotspot (229 ms) and Modem (234 ms). Even at its best, MTN's average latency exceeded the global standard of 60 ms for 4G networks, though it remained the lowest among the four operators.

Glo performed second-best, with an average latency of 200 ms on the modem, 238 ms on NC Express, and a higher latency of 406 ms on the hotspot. Airtel recorded the highest average latency across all modes, with the modem at 693 ms, NC Express at 256 ms, and Hotspot at 439 ms. For 9mobile, the average latency ranged from 236 ms (NC Express) to 355 ms (Hotspot).

These results highlight that all four operators delivered latency above the ideal 4G standard; however, MTN consistently outperformed the others.

Table 1. Summary of Latency and Packet Loss for different Test Mode

Test Mode	Modem				NC Express				Hotspot			
Mobile Networks	Latency (ms)			Packet Loss (%)	Latency (ms)			Packet Loss (%)	Latency (ms)			Packet Loss (%)
	Min	Ave	Max		Min	Ave	Max		Min	Ave	Max	
MTN	98	234	1239	1.30	71	138	1213	0.94	79	229	1660	2.02
Glo	80	200	970	0.86	58	238	2609	1.62	69	406	2462	4.14
Airtel	164	693	2622	6.45	94	256	1605	2.67	93	439	1860	5.27
9mobile	102	267	1427	1.79	74	236	1499	1.89	78	355	1811	4.02

4.1.2. Total Average Latency across Operators

To compare overall performance, the total average latency was computed as the mean of the three test modes for each operator, MTN (200.12 ms), Glo (281.25 ms), Airtel (462.65 ms) and 9mobile (286.18 ms). Figure 4 clearly shows MTN as the best performer, followed by Glo and 9mobile, with Airtel showing the highest latency. Although MTN had the lowest latency, all values remain above the global 4G recommendation, indicating room for improvement.

4.1.3. Latency in Relation to Periods of the Day

Latency was also analyzed across four daily periods: 1:00 am, 7:00 am, 1:00 pm, and 7:00 pm. Results revealed that the lowest latency consistently occurred at 1:00 am, corresponding to off-peak hours with minimal network congestion. Latency increased around 7:00 am and 7:00 pm as user activity rose, with the highest latency often observed at 1:00 pm (peak period) during the day.

For instance, MTN showed an average latency increase from 138.29 ms at 1:00 am to 251.81 ms at 7:00 pm. Airtel recorded the highest latency during peak periods, rising from 354.07 ms at 1:00 am to 499.02 ms at 1:00 pm and 446.43 ms at 7:00 pm. These patterns underline the impact of network congestion on latency during busy hours.

4.2. Packet Loss of Mobile Network Operators

4.2.1. Packet Loss in Relation to Average Values

Packet loss, measured as the percentage of data packets not received at the destination, directly affects the quality of service, especially for voice and video streaming. Average packet loss values were also recorded under Modem, NC Express, and Hotspot modes (see Table 1).

Using Modem, Glo had the lowest average packet loss at 0.86%, followed by MTN (1.30%), 9mobile (1.79%), and Airtel (6.45%).

For NC Express, MTN had the lowest at 0.94%, while Airtel was again the highest at 2.67%. With Hotspot, MTN still performed best (2.02%), whereas Airtel recorded 5.27%.

4.2.2. Average Packet Loss across Operators

Total average packet loss across test modes, as shown in Figure 5, was computed as MTN (1.42%), Glo (2.21%), Airtel (4.79%), and 9mobile (2.57%).

By standard (≤2.5% for acceptable service quality), MTN and Glo met acceptable limits, while Airtel and 9mobile exceeded them. Thus, MTN again proved to deliver better quality of service in terms of packet loss.

4.2.3. Packet Loss in Relation to Periods of the Day

Analysis by period showed packet loss was lowest at 1:00 am across all operators and rose during peak hours. For example, MTN's packet loss increased from 0.03% at 1:00 am to 2.04% at 7:00 pm. Airtel consistently showed the highest packet loss, peaking at 6.10% at 7:00 pm. These results confirm that network congestion during peak hours significantly increases packet loss, affecting service quality.

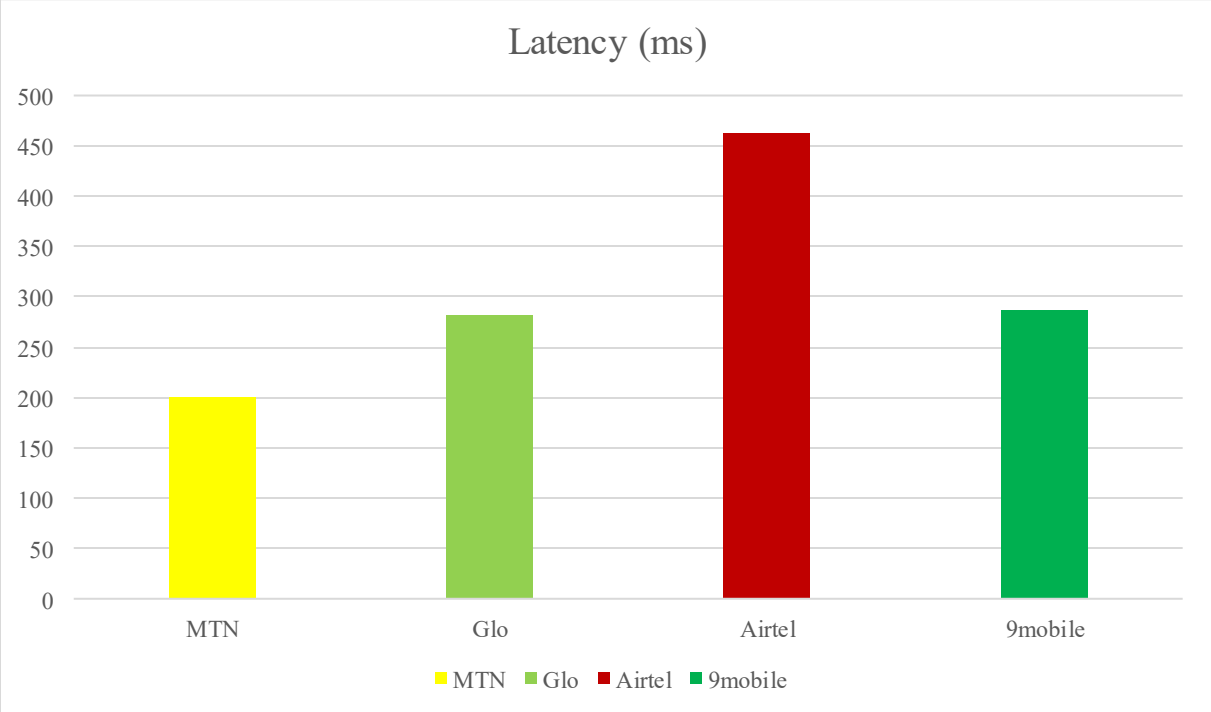

Fig. 4 Total Average Latency Value for Mobile Network Ope

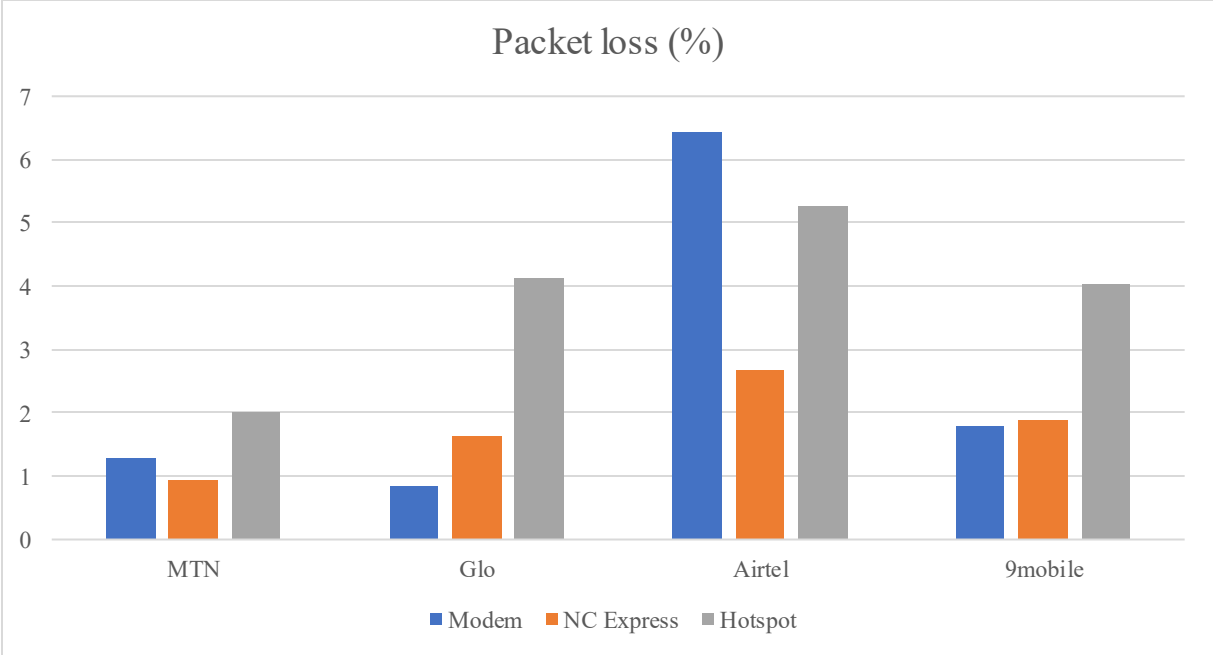

Fig. 5 Average Packet Loss Value for Mobile Network Operators

4.3. Discussion of Findings

This study shows that MTN delivered the lowest average latency (200.12 ms) and packet loss (1.42%), making it the best performer among the four operators in the study area. Glo followed closely, while Airtel exhibited the poorest performance, with both the highest latency and packet loss. The influence of peak and off-peak periods was also evident: latency and packet loss were lowest during off-peak hours (1:00 am) and highest around midday and evening, emphasizing the role of network congestion.

Compared with existing works such as [12], [14], [18], and [21], this study introduces several methodological and empirical advancements that offer more accurate assessments of mobile network Quality of Service (QoS) in Nigeria. While previous studies focused primarily on subjective user surveys or broad indicators like coverage, throughput, and uptime, this study employed direct measurements of latency and packet loss under both modem and hotspot configurations. For instance, [12] emphasized user satisfaction without capturing empirical network performance data, and [14] discussed mobile data trends without directly measuring packet delay or loss. Technically inclined studies like [18] and [21] focused on call setup rates and signal strength but ignored distinctions between connection mode (direct versus hotspot), which are crucial for practical usage scenarios in homes and offices.

Furthermore, while [20] were centered in urban areas, this research fills a critical gap by targeting a semi-urban area, where signal propagation and congestion dynamics differ. The two-week time-distributed data collection across morning, afternoon, and evening periods enabled the capture of daily network fluctuations, thereby improving the reliability.

The novelty of this study lies in its experimental design. Isolating direct modem and hotspot usage under the same network conditions allows a fair, empirical comparison. Prior studies, such as [16] and [18], either aggregated access modes or assumed uniformity, thus overlooking the performance degradation often introduced by hotspots, such as additional delays from interference or intermediary device limitations. Unlike [21], which relied on simulations, this work presents real-world, ground-truth measurements in a typical Nigerian semi-urban context. Similarly, where [23] measured delay in controlled environments, this research used non-intrusive, real-life data capture, making the results more representative of end-user experiences.

This study also stands out for its dual-mode testing strategy, which reflects actual user behavior in Nigeria, where mobile data is often accessed both directly and via hotspot sharing. Unlike previous works that used short test durations or single timeframes, this study's time-distributed measurement over two weeks provides a more detailed view of diurnal performance variations. The use of Network Capture Express tools ensured accurate latency and packet loss logs under real traffic and signal conditions.

Consequently, this approach generated granular insights that were particularly relevant to Ughelli and Delta State users, where terrain and infrastructure affect network performance. In summary, by combining real-time, packet-level analysis with dual-mode evaluation and time-sensitive sampling, this study offers a more rigorous and contextually relevant framework for mobile QoS assessment in emerging markets, outperforming prior works both methodologically and empirically.

5. Conclusion

This study set out to evaluate the quality of service of mobile network operators in Ughelli, Delta State, Nigeria, by focusing on two critical performance metrics: latency and packet loss. Against the background of rapid evolution in cellular networks from 1G to 4G, and the increasing demand for reliable internet and telecommunication services, it became important to identify which of the four major mobile network operators, MTN, Globalcom (Glo), Airtel, and 9mobile, delivers better service quality within the study location. Recognizing that many users lack the technical expertise to measure and compare these parameters themselves, the study aimed to fill this gap through systematic empirical investigation.

The data collection process involved two weeks of experimental measurements, covering different periods of the day (1:00 am, 7:00 am, 1:00 pm, and 7:00 pm) and using multiple test modes, including Modem, Network Capture Express application, and hotspot connections. Data were collected through ping functions targeting the same server (www.google.com), and both latency and packet loss were carefully processed and analyzed. This study did not rely solely on raw figures but contextualized the findings by comparing them with international standards: an acceptable latency limit of 60 ms for 4G networks, and an acceptable packet loss threshold of up to 2.5%.

The results revealed significant differences among the mobile network operators. MTN recorded the lowest average latency (200.12 ms) and packet loss (1.42%), followed by Glo (281.25 ms latency, 2.21% packet loss), then 9mobile (286.18 ms latency, 2.57% packet loss), while Airtel had the highest average latency and packet loss (462.65 ms and 4.79%, respectively). Although none of the operators met the ideal latency standard, MTN and Glo remained within the acceptable packet loss threshold, indicating better reliability in data transmission.

Beyond raw figures, these findings emphasize the practical implications for users and network planners. Lower latency translates to faster response times and smoother user experience, particularly in real-life communication, online gaming, and streaming applications. Lower packet loss ensures better integrity of data transmission, which is critical for video calls, VoIP, and business data services. This research also identified factors contributing to poor quality of service, such as distance from the mobile network server, network congestion during peak hours, and the technical limitations of using hotspot connections compared to dedicated modem setups.

This study concludes that, within the experimental location, MTN offers a comparatively better quality of service in terms of both latency and packet loss, making it the preferred choice for users seeking more reliable internet performance. Glo is also a viable alternative, while Airtel and 9mobile show higher latency and packet loss levels that could affect user experience.

In view of these findings, it is recommended that users should actively test the quality of service of mobile networks before choosing a provider, rather than relying solely on brand reputation or pricing. The simple method applied in this study, using modems, network monitoring applications, and periodic ping tests, can be replicated by individuals or institutions to make informed choices. Furthermore, future research could extend beyond latency and packet loss to include other quality of service parameters like throughput and jitter, allowing a more comprehensive understanding of network performance. It is also suggested that more comprehensive research be conducted across different geographical regions to find broader trends and guide policy and investment decisions in Nigeria's telecommunication industry. Overall, this work adds to the field by offering practical, data-based insights into actual usage of mobile networks in the Nigerian context, empowering users to make better choices and highlighting opportunities for network providers to enhance service quality.

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Appendix 1: Experimental Data

Table A: Experimental Unprocessed Data

		Modem				NC Express				Hotspot			
Date & Time	Mobile Networks	Latency (ms)			PL (%)	Latency (ms)			PL (%)	Latency (ms)			PL (%)
		Min	Ave	Max		Min	Ave	Max		Min	Ave	Max	
28/04/2025	MTN	40	262	1553	0	30	37	111	0	32	132	1049	0
1:00	Glo	68	118	955	0	40	80	1566	0	41	187	1487	0
	Airtel	224	1319	3508	18	35	760	2795	21	48	1150	6900	40
	9mobile	77	255	1976	4	43	144	1242	1.6	47	294	1076	0
7:00	MTN	99	330	2601	10	25	34	269	0	28	118	1048	0
	Globalcom	87	113	594	0	35	65	558	0	37	206	1654	0
	Airtel	141	334	2277	0	35	51	2965	0	37	76	457	0
	9mobile	90	298	1147	0	43	69	587	0.6	44	253	1376	3
13:00	MTN	67	114	1167	1	44	87	1567	2	67	211	2018	3
	Globalcom	86	181	755	0	73	543	2406	1	83	789	3688	5
	Airtel	131	828	3218	9	138	245	3514	3	141	377	3521	7
	9mobile	89	390	1876	1	61	344	2256	2.9	84	345	2676	4
19:00	MTN	77	210	600	0	24	49	4230	0.5	27	171	1727	7
	Globalcom	90	112	339	0	42	116	1955	0.5	43	398	3095	5
	Airtel	141	1177	3657	13	33	48	376	0.4	35	76	489	0
	9mobile	108	310	1871	10	97	290	1034	0	92	492	2418	0
29/04/2025	MTN	204	365	1676	0	135	148	335	0	137	245	912	0
1:00	Globalcom	68	82	104	0	35	208	2976	1.1	37	603	2971	14
	Airtel	124	592	2554	1	134	151	407	0.6	36	74	497	0
	9mobile	95	263	1217	1	41	68	592	0.2	43	167	908	0
7:00	MTN	72	246	991	0	26	35	189	0	27	103	740	0
	Globalcom	67	92	429	0	36	109	3303	0.6	40	456	2992	4
	Airtel	122	686	3642	6	34	120	471	0	34	84	947	0
	9mobile	95	255	588	1	44	85	1167	0.2	45	224	1271	0
13:00	MTN	57	94	1102	2	53	95	1437	2.4	63	219	1980	3
	Globalcom	66	191	833	1	89	611	2306	1	93	813	3611	4
	Airtel	87	721	2111	3	121	342	2517	2	124	398	2712	6
	9mobile	78	290	1734	2	64	422	2187	3.7	83	389	2516	5
19:00	MTN	99	283	1952	2	24	35	327	0	25	129	970	0
	Globalcom	69	117	1092	1	39	222	4767	4.8	41	890	3014	12
	Airtel	152	796	3313	19	310	528	827	0	221	505	1082	0
	9mobile	91	388	1977	3	45	128	1111	3.8	47	242	1156	8

30/04/2025	MTN	46	110	560	0	37	45	410	0	28	121	740	0
1:00	Globalcom	67	96	410	0	43	198	2710	0.8	48	321	2832	3
	Airtel	76	296	2189	2	56	93	521	1	54	112	671	3
	9mobile	82	315	1217	0	52	87	672	0.3	59	332	789	1
7:00	MTN	101	236	573	0	21	40	220	0	22	209	3017	6
	Globalcom	71	107	702	0	40	120	3371	1	43	363	2772	4
	Airtel	133	1192	3557	5	148	177	437	3.2	140	263	658	5
	9mobile	90	272	930	2	46	114	581	1.3	47	200	1366	3
13:00	MTN	97	250	1238	3	25	44	4428	3.1	25	211	2018	2
	Globalcom	68	108	455	0	37	453	5606	4.5	38	537	3688	12
	Airtel	111	828	3456	14	138	178	2691	1.5	140	277	2595	8
	9mobile	83	290	1739	2	41	244	2124	1.9	44	345	2676	11
19:00	MTN	99	214	804	0	22	42	770	0	24	221	1537	1
	Globalcom	78	118	543	0	37	157	4054	4.4	39	466	2821	2
	Airtel	128	654	3509	8	33	54	313	0	32	211	2506	2
	9mbile	145	364	1295	3	45	168	1314	6.5	48	235	1947	8
01/05/2025	MTN	77	170	700	0	26	34	310	0.2	27	114	780	0
1:00	Globalcom	70	86	360	0	34	172	3710	0.6	38	431	3056	5
	Airtel	123	309	3150	1	32	42	254	0	36	77	551	0
	9mobile	80	215	1320	1	43	67	526	0.4	49	223	823	1
7:00	MTN	76	187	644	1	41	89	329	1.8	53	209	2718	7
	Globalcom	67	211	890	2	67	278	3211	1	87	436	2419	5
	Airtel	89	1021	2155	5	136	219	1441	2.2	157	667	2739	12
	9mobile	70	178	823	0	65	124	711	0.8	76	219	1274	3
13:00	MTN	188	317	2016	2	141	161	318	0	130	299	1255	0
	Globalcom	77	315	3061	4	37	137	932	0.4	39	374	2622	4
	Airtel	730	1816	3106	16	36	59	313	0.5	40	164	917	0
	9mobile	80	298	1671	1	49	237	1194	0.8	54	461	2243	8
19:00	MTN	193	340	852	2	120	348	1421	2.5	121	403	2541	1.9
	Globalcom	68	96	722	1	37	252	5344	7	37	399	2977	9
	Airtel	142	1064	3479	18	27	440	1129	6	30	473	2571	8
	9mobile	225	384	1674	3	44	175	1402	4.1	47	568	2657	9
02/05/2025	MTN	53	214	726	0	36	124	929	0	44	55	370	0
1:00	Globalcom	67	104	665	0	36	378	4238	3.6	39	706	3547	4
	Airtel	132	1131	3473	2	27	140	729	0	30	75	524	0
	9mobile	83	268	1451	1	43	275	1504	1.6	42	196	1219	2

7:00	MTN	56	175	766	1	59	129	1763	1.4	69	311	2419	4
	Globalcom	62	317	920	1	71	286	2918	1.7	93	511	2316	3
	Airtel	79	833	2671	4	121	349	1874	3.1	143	3459	1453	10
	9mobile	68	186	923	2	79	225	2978	4.2	97	732	2674	6
13:00	MTN	188	717	2016	2	141	361	1318	0.9	130	299	1255	2
	Globalcom	77	1315	3061	4	37	237	932	1.4	39	374	2622	4
	Airtel	730	1816	3106	16	36	559	2313	5.5	40	664	2917	9
	9mobile	80	298	1671	2	49	237	1194	1.8	54	461	2243	8
19:00	MTN	174	280	971	1	138	219	532	0.6	181	501	2715	1
	Globalcom	97	137	1066	2	75	345	2786	2.6	67	398	1863	3
	Airtel	121	549	3211	13	37	211	1539	4	71	747	2853	6
	9mobile	145	290	543	1	64	1119	3760	6.8	76	989	2834	14
03/05/2025	MTN	43	114	812	0	37	126	760	0	39	89	770	0
1:00	Globalcom	76	106	556	0	56	275	498	0	44	117	871	0
	Airtel	112	331	1651	0	76	214	714	0	42	175	654	0
	9mobile	78	213	1342	0	87	253	672	0	30	156	912	0
7:00	MTN	62	275	661	1	79	137	1712	1.2	89	334	1412	1
	Globalcom	56	318	914	1	71	256	2178	0.6	136	441	1367	2
	Airtel	87	551	1671	3	115	412	1672	2.4	156	467	1871	5
	9mobile	73	412	1123	2	89	318	1779	0.7	143	661	2215	3
13:00	MTN	82	175	1161	1	133	155	1181	2.2	98	433	2141	3
	Globalcom	123	229	1974	2	53	128	4324	3.4	126	334	2361	7
	Airtel	178	431	2214	3	189	443	5123	7.6	143	415	2871	8
	9mobile	272	356	1789	4	178	267	3112	4.8	128	551	2167	7
19:00	MTN	145	175	1978	3	122	432	2241	3.8	134	443	2416	5
	Globalcom	156	418	1267	0	34	263	2976	0.2	89	289	2356	1
	Airtel	143	421	2671	2	67	317	3156	4.9	126	423	3317	6
	9mobile	98	237	2113	1	70	221	2116	2.3	156	451	2167	4
04/05/2025	MTN	67	121	912	0	75	135	1216	0.1	89	131	1276	1
1:00	Globalcom	35	89	441	0	53	171	651	0	65	131	772	0
	Airtel	89	123	1237	0	66	141	817	0	56	125	715	0
	9mobile	87	113	1156	0	112	198	712	0	98	212	1102	0
7:00	MTN	87	216	1678	0	79	189	1431	0	99	238	1786	0
	Globalcom	98	116	897	0	79	172	561	0	88	219	912	0
	Airtel	97	238	1121	0	112	267	1439	0.1	71	246	789	1
	9mobile	87	178	1412	0	121	354	1269	0	65	165	871	0
13:00	MTN	91	127	1415	1	112	215	1218	0	121	274	1710	1

	Globalcom	87	115	890	0	91	175	679	0	86	191	1067	0
	Airtel	85	211	1204	0	102	222	1231	0	114	256	1489	1
	9mobile	87	113	891	0	97	158	817	0	61	128	947	0
19:00	MTN	128	289	2156	3	131	319	2165	2.9	145	362	3178	6
	Globalcom	137	243	1678	2	121	273	1967	2.4	128	218	2112	4
	Airtel	121	221	1689	3	136	329	3174	7.5	142	425	3398	10
	9mobile	143	213	1789	1	161	331	2561	5.3	171	441	2893	7
05/05/2025	MTN	201	316	1676	0	135	148	335	0	137	245	912	0
1:00	Globalcom	69	98	114	0	35	208	2976	1.2	37	603	2971	3
	Airtel	114	592	2554	1	134	151	407	1.4	36	74	497	0
	9mobile	97	276	1323	1	41	68	592	0.2	43	167	908	0
7:00	MTN	103	236	573	0	21	40	220	0	22	209	3017	5
	Globalcom	73	126	745	0	40	120	3371	1	43	363	2772	5
	Airtel	123	1192	3557	6	148	177	437	3.3	140	263	658	7
	9mobile	98	275	991	2	46	114	581	1.5	47	200	1366	3
13:00	MTN	88	225	1161	1	133	155	1181	2.1	98	433	2141	5
	Globalcom	113	229	2121	2	53	128	4324	3.1	126	334	2361	8
	Airtel	167	394	2214	3	189	443	5123	6.7	143	415	2871	7
	9mobile	257	356	1832	4	178	267	3112	4.8	128	551	2167	8
19:00	MTN	167	332	945	2	120	348	1421	2.6	121	403	2541	4
	Globalcom	72	96	822	1	37	252	5344	8	37	399	2977	8
	Airtel	132	921	3125	15	27	440	1129	3	30	473	2571	5
	9mobile	215	327	1723	3	44	175	1402	1.4	47	568	2657	6
06/05/2025	MTN	46	110	560	0	37	45	410	0	28	121	740	0
1:00	Globalcom	67	96	410	0	43	198	2710	0.8	48	321	2832	3
	Airtel	76	296	2189	2	56	93	521	1	54	112	671	3
	9mobile	82	315	1217	0	52	87	672	0.3	59	332	789	1
7:00	MTN	56	175	766	1	59	129	1763	1.4	69	311	2419	4
	Globalcom	62	317	920	1	71	286	2918	1.7	93	511	2316	3
	Airtel	79	833	2671	4	121	349	1874	3.1	143	3459	1453	11
	9mobile	68	186	923	2	79	225	2978	5.2	97	732	2674	6
13:00	MTN	97	250	1238	3	25	44	4428	3.1	25	211	2018	2
	Globalcom	68	108	455	0	37	453	5606	5.5	38	537	3688	11
	Airtel	111	787	3215	12	138	178	2691	1.5	140	277	2595	8
	9mobile	83	290	1739	2	41	244	2124	1.9	44	345	2676	10
19:00	MTN	77	210	600	0	24	49	4230	0.5	27	171	1727	7
	Globalcom	90	112	339	0	42	116	1955	0.5	43	398	3095	5

	Airtel	141	1177	3657	13	33	48	376	0.4	35	76	489	0
	9mobile	108	310	1871	10	97	290	1034	0	92	492	2418	0
07/05/2025	MTN	40	262	1553	0	30	37	111	0	32	132	1049	0
1:00	Glo	68	118	955	0	40	80	1566	0	41	187	1487	0
	Airtel	224	1319	3508	18	35	760	2795	21	48	1150	6900	40
	9mobile	77	255	1976	4	43	144	1242	####	47	294	1076	0
7:00	MTN	72	246	991	0	26	35	189	0	27	103	740	0
	Globalcom	67	92	429	0	36	109	3303	0.6	40	456	2992	4
	Airtel	122	686	3642	6	34	120	471	0	34	84	947	0
	9mobile	95	255	588	1	44	85	1167	0.2	45	224	1271	0
13:00	MTN	188	717	2016	2	141	361	1318	0.9	130	299	1255	2
	Globalcom	77	1315	3061	4	37	237	932	1.4	39	374	2622	4
	Airtel	730	1816	3106	16	36	559	2313	5.5	40	664	2917	9
	9mobile	80	298	1671	2	49	237	1194	1.8	54	461	2243	8
19:00	MTN	174	280	971	1	138	219	532	0.6	181	501	2715	1
	Globalcom	97	137	1066	2	75	345	2786	2.6	67	398	1863	3
	Airtel	121	549	3211	13	37	211	1539	4	71	747	2853	6
	9mobile	145	290	543	1	64	1119	3760	6.8	76	989	2834	14
08/05/2025	MTN	53	214	726	0	36	124	929	0	44	55	370	0
1:00	Globalcom	67	104	665	0	36	378	4238	3.6	39	706	3547	4
	Airtel	132	1131	3473	2	27	140	729	0	30	75	524	0
	9mobile	83	268	1451	1	43	275	1504	1.6	42	196	1219	2
7:00	MTN	99	330	2601	10	25	34	269	0	28	118	1048	0
	Globalcom	87	113	594	0	35	65	558	0	37	206	1654	0
	Airtel	141	334	2277	0	35	51	2965	0	37	76	457	0
	9mobile	90	298	1147	0	43	69	587	0.6	44	253	1376	3
13:00	MTN	57	94	1102	2	53	95	1437	2.4	63	219	1980	3
	Globalcom	66	191	833	1	89	611	2306	1	93	813	3611	4
	Airtel	87	721	2111	3	121	342	2517	2	124	398	2712	6
	9mobile	78	290	1734	2	64	422	2187	3.7	83	389	2516	5
19:00	MTN	128	289	2156	3	131	319	2165	2.9	145	362	3178	6
	Globalcom	137	243	1678	2	121	273	1967	2.4	128	218	2112	4
	Airtel	121	221	1689	3	136	329	3174	7.5	142	425	3398	10
	9mobile	143	213	1789	1	161	331	2561	5.3	171	441	2893	7
09/05/2025	MTN	43	114	812	0	37	126	760	0	39	89	770	0
1:00	Globalcom	76	106	556	0	56	275	498	0	44	117	871	0

	Airtel	112	331	1651	0	76	214	714	0	42	175	654	0
	9mobile	78	213	1342	0	87	253	672	0	30	156	912	0
7:00	MTN	76	187	644	1	41	89	329	1.8	53	209	2718	7
	Globalcom	67	211	890	2	67	278	3211	1	87	436	2419	5
	Airtel	89	1021	2155	5	136	219	441	2.2	157	367	739	12
	9mobile	70	178	823	0	65	124	711	0.8	76	219	1274	3
13:00	MTN	67	114	1167	1	44	87	1567	2	67	211	2018	3
	Globalcom	86	181	755	0	73	543	2406	1	83	789	3688	5
	Airtel	131	828	3218	9	138	245	3514	3	141	377	3521	7
	9mobile	89	390	1876	1	61	344	2256	2.9	84	345	2676	4
19:00	MTN	99	283	1952	2	24	35	327	0	25	129	970	0
	Globalcom	69	117	1092	1	39	222	4767	4.8	41	890	3014	12
	Airtel	152	796	3313	19	310	528	827	0	221	505	1082	0
	9mobile	91	388	1977	3	45	128	1111	3.8	47	242	1156	8
10/05/2025	MTN	87	167	727	0	56	99	1021	0.1	77	124	881	0
1:00	Globalcom	72	98	440	0	74	145	2650	0.5	78	331	2876	8
	Airtel	113	214	2678	2	62	102	379	0	89	112	651	0
	9mobile	81	236	1356	1	83	112	626	0.5	97	213	790	0
7:00	MTN	67	265	789	0	96	137	1893	1.3	111	239	1678	1
	Globalcom	66	267	1023	2	88	216	2102	1.1	125	367	1754	2
	Airtel	78	245	1653	3	121	310	1894	2	157	411	1563	4
	9mobile	93	241	1238	2	112	253	1873	0.5	167	432	2764	2
13:00	MTN	178	231	2172	3	109	178	512	0	131	278	1234	0
	Globalcom	87	267	2876	4	73	173	1034	0.7	80	318	2672	3
	Airtel	712	764	2786	11	45	91	708	0	59	210	1071	0
	9mobile	83	238	1724	1	56	159	1423	1.1	87	316	2103	5
19:00	MTN	142	216	2014	2	86	285	2104	2.8	167	267	1978	4
	Globalcom	136	315	1423	2	44	216	2568	0.2	86	257	2561	1
	Airtel	123	327	2561	2	79	301	2798	3.9	121	321	2714	7
	9mobile	101	277	2216	3	84	251	2187	2.7	132	315	2562	5

11/05/2025	MTN	77	112	876	0	87	135	1143	0	97	141	1311	0
1:00	Globalcom	55	93	568	0	83	185	1235	0.1	87	191	1079	2
	Airtel	99	114	1023	0	98	141	892	0	97	145	1215	0
	9mobile	78	121	1045	1	104	210	1429	0	103	221	1426	0
7:00	MTN	85	187	1512	1	121	189	1326	0.2	139	238	1815	1
	Globalcom	79	156	975	0	156	198	991	0	198	219	1251	0
	Airtel	91	211	1211	1	121	267	1211	0	171	259	1786	1

	9mobile	80	189	1523	0	104	216	1342	0	121	231	1871	2
13:00	MTN	84	141	1526	1	132	215	1467	2.1	121	274	1710	3
	Globalcom	79	137	1023	2	108	191	1671	1.2	126	207	2101	4
	Airtel	102	221	1405	0	121	222	1268	0	141	256	1489	1
	9mobile	79	125	1055	1	105	167	1126	0	89	186	1447	1
19:00	MTN	79	187	1267	1	55	105	1382	0	121	121	1537	0
	Globalcom	92	129	917	1	87	137	2617	2.1	107	166	2821	5
	Airtel	112	279	2178	8	127	196	1423	1.5	138	211	2506	4
	9mbile	123	233	1987	3	151	138	1314	3.4	167	235	1947	7