DRAFT Spectrum Roadmap for the Communications Sector

(2025 – 2030)

This document presents the draft Spectrum Roadmap 2025 – 2030 for Nigeria, drafted for further consultation with Stakeholders.

Disclaimer

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Executive Summary

Spectrum—the range of invisible radio frequencies (RF) that carry wireless signals—is the foundation of modern digital infrastructure. It enables everything from mobile voice and data services to broadband internet, satellite communications, television broadcasting, Wi-Fi, and emerging innovations like 5G, IoT, and smart city applications. As a finite national resource, spectrum must be managed strategically to maximize its value for public and economic good.

Over the past two decades, Nigeria has made commendable strides in digital connectivity. As of Q4 2024, the Information and Communications sector contributed an average of 17.68% to GDP (with telecommunications alone accounting for 14.4%) and recorded a growth rate of 7.40% in Q1, 2025, ranking just behind agriculture and trade. Teledensity exceeded 79% and broadband penetration stood at 48.78% as of June 2025—reflecting sustained growth even after the enforcement of the NIN-SIM linkage policy, which led to the disconnection of millions of lines not linked to the National Identification Number (NIN) in compliance with federal directives. This outcome highlights the resilience of the sector and underscores spectrum's centrality to economic growth, digital innovation, and national competitiveness.

As digital demand accelerates and new technologies emerge, the current pace of progress must be matched with a modern, inclusive, and forward-looking spectrum management approach. The Nigeria Spectrum Roadmap 2025–2030 charts this course—ensuring that spectrum is allocated, assigned, and utilized to deliver broad national impact, in alignment with the National Broadband Plan (NBP) and the National Digital Economy Policy and Strategy (NDEPS).

The strategy is structured around four core pillars that reflect Nigeria's digital ambitions: bridging the digital divide, enabling market-driven investment, enhancing quality of experience, and promoting innovation and future readiness. These pillars serve as the backbone of the roadmap, guiding spectrum policy decisions to ensure that no community

is left behind, private investment is encouraged, service quality is prioritized and Nigeria remains competitive in adopting future technologies.

To operationalize these pillars, the roadmap outlines a coordinated national approach to refarm and release critical spectrum bands, strengthen cross-sectoral collaboration, and institutionalize data-driven decision-making through improved planning, monitoring, and stakeholder engagement. Tools and frameworks to promote spectrum sharing, resilience, and regulatory agility are also embedded into the roadmap to enhance its responsiveness to evolving market needs and global best practices while ensuring spectrum delivers maximum socio-economic benefit to the entire country.

By 2030, we envision a Nigeria where spectrum has:

- Enabled universal, high-speed broadband access across urban and rural areas;
- Powered inclusive digital innovation across health, education, agriculture, and commerce;
- Strengthened national security, public safety, and emergency communications;
- Positioned Nigeria as a top-tier digital economy in Africa and a model for spectrum governance globally.

The roadmap is thus a national commitment to harness the power of spectrum for inclusive growth, digital empowerment, and long-term prosperity for all Nigerians.

Chapter 1: Introduction

Maximizing the societal value of spectrum means ensuring that its allocation and utilization consistently delivers value in ways that promote innovation, investment, and inclusion. To achieve this feat, a governance framework must be in place that empowers the necessary regulatory entities to legally manage spectrum.

In the case of Nigeria, the National Frequency Management Council (NFMC) is the apex entity responsible for RF spectrum management and oversees ALL planning, coordination and bulk trans-sectoral allocation of radio spectrum to government entities, namely the Commission, the National Broadcasting Commission (NBC), the Ministry of Communications, Innovation and Digital Economy (MCI&DE), Aviation and Aerospace Development, Transport, Science, Technology and Innovation as well as Security Services. The NFMC is chaired by the Minister of Communications, Innovation and Digital Economy and consists of high-level representatives of the above listed ministries and agencies.

The roles of the NFMC, the Commission, the FMCI&DE and NBC in the management of frequency spectrum in Nigeria are clearly delineated and specified. Broadly, the Commission oversees all frequency spectrum to commercial providers, users of telecommunications equipment and services; NBC oversees all frequency spectrum for public and private broadcasting organizations; and the Ministry (as Chair of the NFMC) oversees frequency spectrum for Government bodies.

The Nigerian Communications Act, 2003 (NCA 2003) confers on the Commission, the sole and exclusive powers to license and manage frequency spectrum for the telecommunications sector.

In line with the Commission's regulatory powers under the NCA 2003, the Commission can make and publish regulations, plans and standards that promotes and ensures the development of the communications industry and the provision of communications services in Nigeria. As such, the Commission has taken steps to develop a **Spectrum**

Roadmap 2025-2030 *to guide the assignment and efficient management of radio frequency spectrum in Nigeria.*

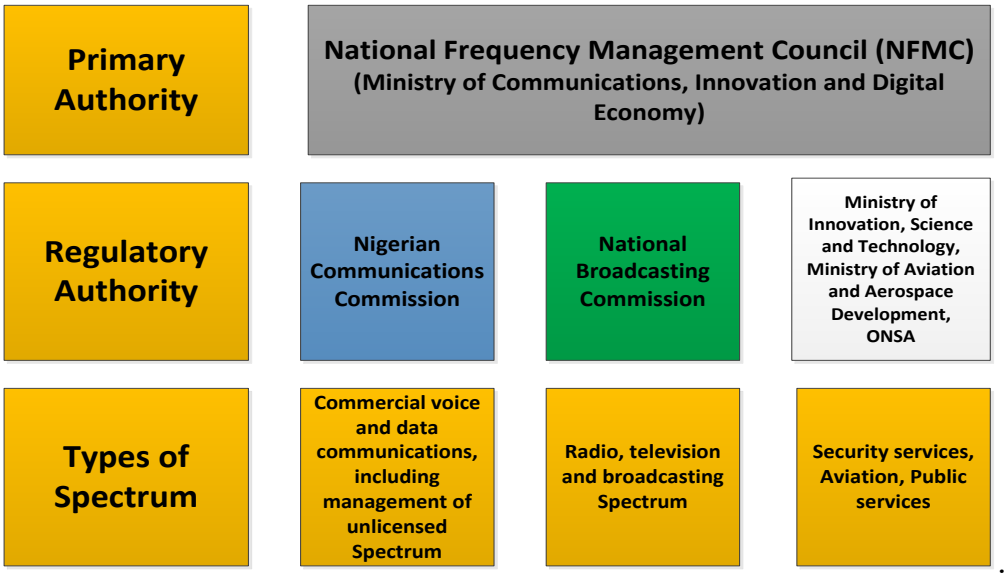


Fig. 1.1. - The framework for regulating frequency Spectrum in Nigeria

1.1. Recap of the Nigerian Communications Landscape: A Story of Transformation

The early 2000s saw transformative policy shifts, notably the National Telecommunications Policy developed in 2000, which set the stage for competitive telecom services.

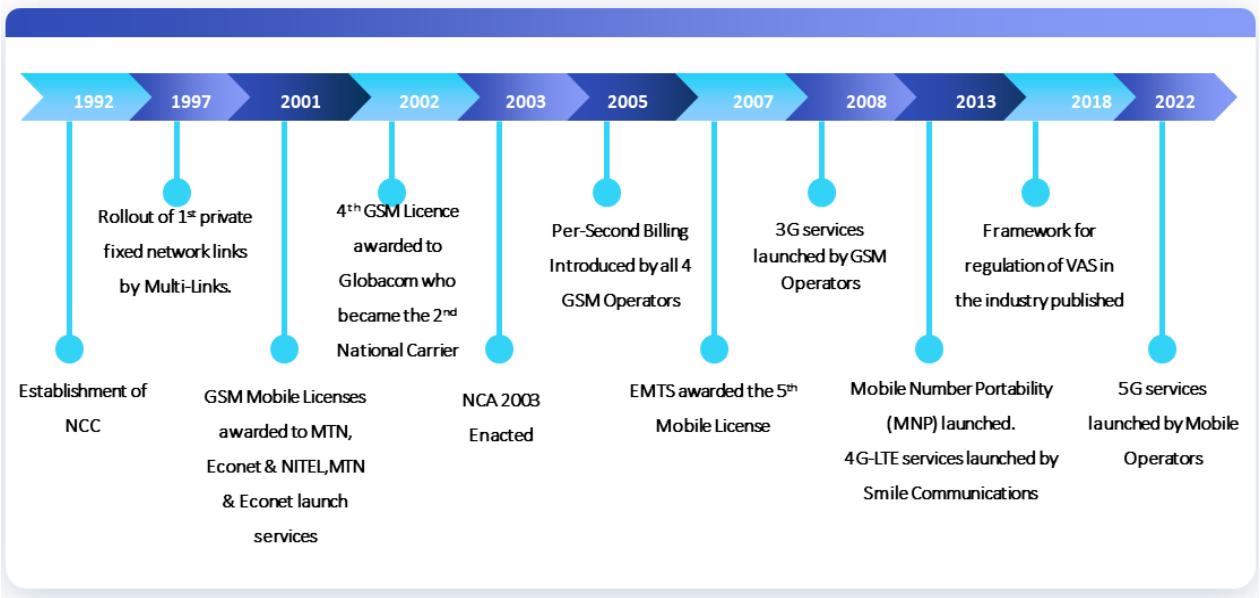


Fig 1.2: History of Nigerian Telecoms Sector

A new dawn in telecommunications was heralded in January 2001 when the sector was totally liberalized through licensing of private telecoms operators and Spectrum auctions to enable provision of telecommunications services.

The key auctions that have taken place since 2001 are highlighted below:

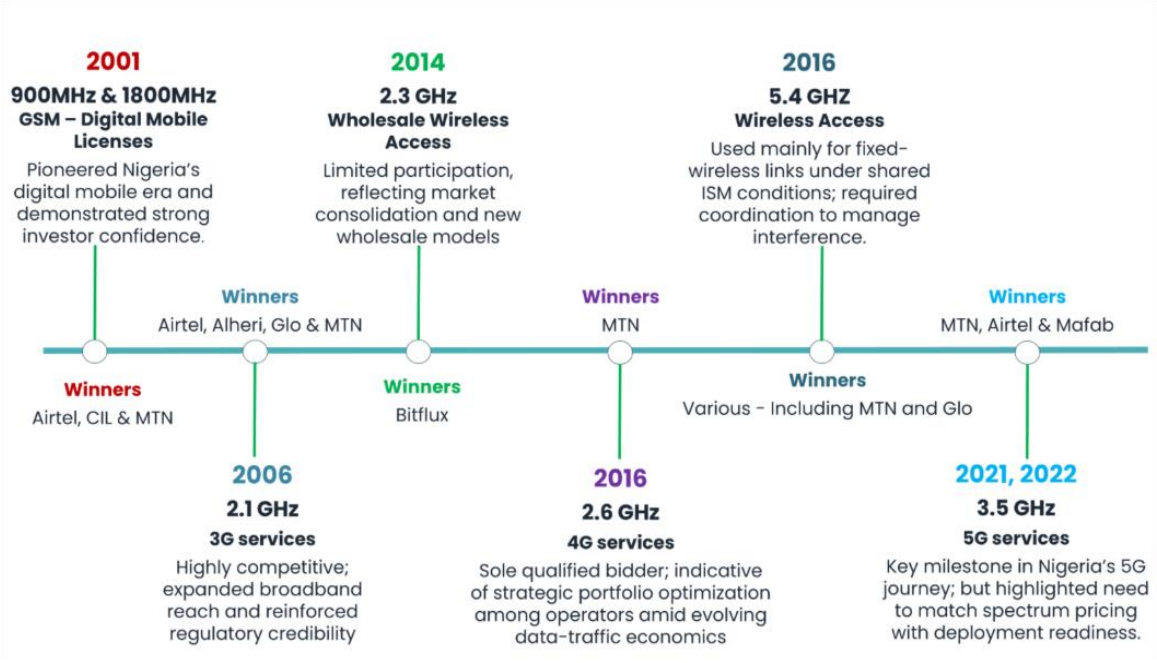


Fig 1.3: Spectrum Auctions conducted by the Commission

The auctions that took place in **2001 (900/1800 MHz)** and **2006 (2.1 GHz)** were highly competitive, demonstrating strong investor confidence in a newly liberalised market that laid the foundation for the 2G/GSM and 3G network roll-outs that transformed connectivity and affordability nationwide.

Subsequent auctions, particularly the ones that took place in **2014 (2.3 GHz)** and **2016 (2.6 GHz)**, marked a strategic inflection point rather than a slowdown in sector growth. Operator participation became more selective, driven by spectrum portfolio optimisation and capital efficiency considerations, where only single operators emerged as the winners in both cases—a reflection of increasing market maturity and disciplined investment behaviour. Furthermore, the **3.5 GHz auction (2021–2022)** represented a pivotal step in Nigeria's transition to next-generation/5G broadband services. The process also attracted notable investor interest and has set a benchmark for future technology-neutral assignments.

(*Details of past auctions can be found on the Commission's website via the URL: Spectrum Auctions | NCC*)

Beyond competitive auctions, the Commission has also leveraged administrative assignments, refarming, and strategic reallocations as depicted in Figure (Fig.) 1.4 to ensure continuity and efficiency in spectrum use across successive technology generations.

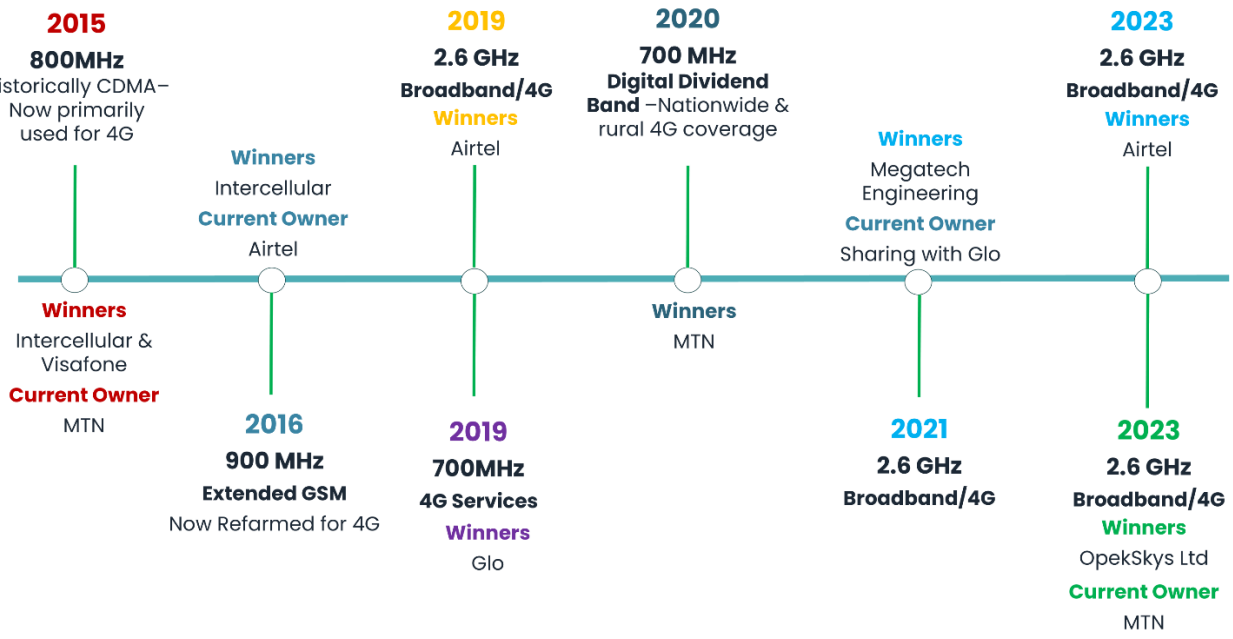


Fig 1.4: Other Spectrum Assignments by the Commission

These interventions—covering legacy CDMA bands, extended GSM (e-GSM) bands and digital dividend bands—played a critical role in sustaining service quality, enabling seamless migration from 2G/3G to 4G and setting the groundwork for future 5G expansion. It also ensured that operators are able to optimise their existing assets while fostering long-term investment stability and network resilience across the ecosystem.

Overall, Nigeria's evolving spectrum landscape demonstrates that long-term market leaders have built spectrum depth through sustained investment, early technology adoption, and consistent participation across multiple assignment cycles—ranging from refarmed GSM holdings to digital dividend and capacity bands.

However, as illustrated in Fig. 1.5, these cumulative assignments have also resulted in uneven spectrum distribution among operators, leading to varying network capacities and

underutilisation in some bands, underscoring the need for a more strategic, forward-looking spectrum management framework—one that optimises spectrum use, promotes equitable access, and aligns future assignments with Nigeria's broadband expansion, competition and digital inclusion goals.

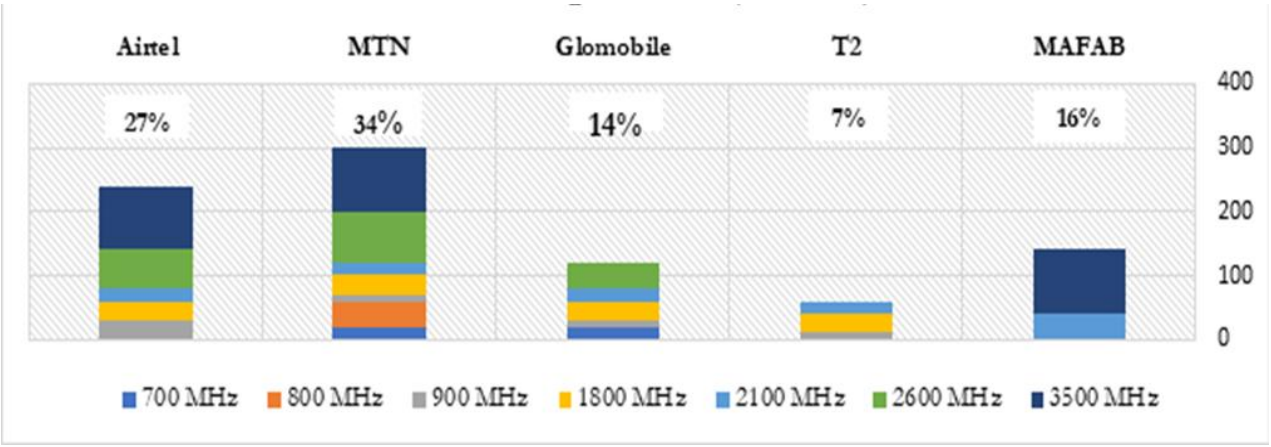


Fig. 1.5: Terrestrial Spectrum assignments for the Major MNOs

1.2. Rationale for a Spectrum Roadmap

Since deregulation, Nigeria has allocated approximately **12.5 GHz** of spectrum (across terrestrial and satellite bands), enabling over **$75 billion** in telecom infrastructure investment. These investments have spurred growth far beyond the sector—supporting financial inclusion, e-commerce, telemedicine, e-government services, and broader digital transformation.

Despite these achievements, the absence of a cohesive national Spectrum Roadmap has left gaps in spectrum holdings and effective long-term planning. With digital technologies now central to every sector—agriculture, health, education, manufacturing, logistics, and trade—a forward-looking spectrum management plan is imperative. The Roadmap is developed to build on the current foundation while charting a course to meet future data and broadband demands in line with Nigeria's 2030 ambition for universal connectivity, inclusive digital innovation, and a globally competitive digital economy.

1.3. Linking Spectrum to Broader Economic Transformation

The transformative impact of spectrum extends far beyond telecommunications. These past investments—though made without a formal roadmap—have yielded substantial socio-economic returns across multiple sectors. With digital infrastructure now deeply embedded in how governments deliver services, how businesses operate and how citizens interact with the economy, the role of spectrum has become foundational to national development.

Recent estimates put the telecom sector's total contribution to GDP at over ₦33 trillion, underpinned by rising broadband penetration, expanded network coverage, and increased digital inclusion. But the true impact of spectrum lies in its multiplier effect across the broader economy—enhancing productivity, access, and efficiency in sectors ranging from agriculture and manufacturing to trade, healthcare, and governance as seen in Fig 1.6 above. Nigeria has already seen improved efficiencies in financial inclusion, use of digital technology for voter registrations etc.

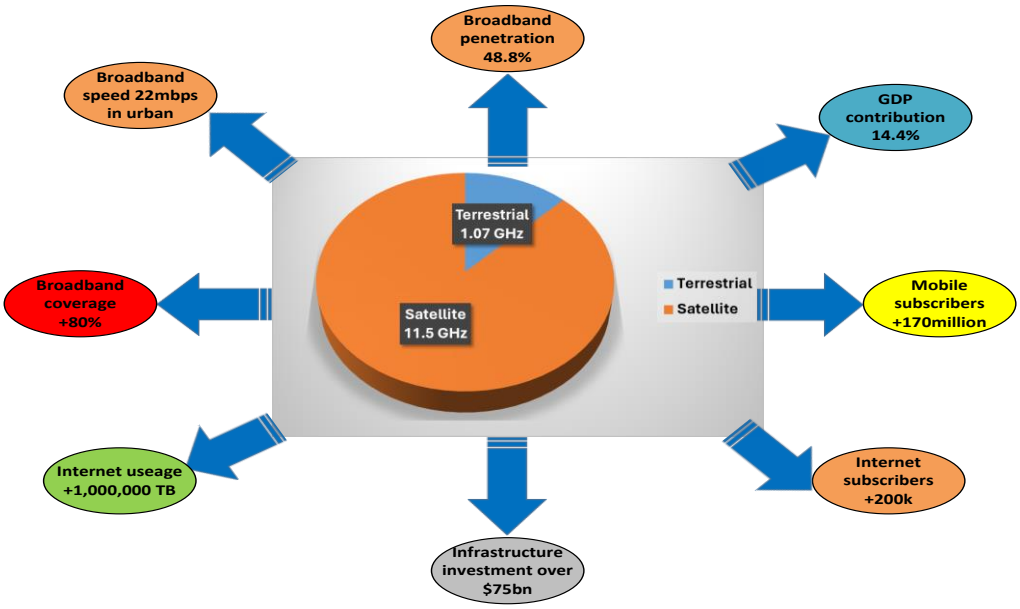


Fig 1.6: Spectrum enabling use of broadband services

Furthermore, studies [1] have shown that digitization of other sectors through the use of wireless services will have a similar positive impact on efficiency, effectiveness and reach of public services as seen in Table 1.1 below:

Sector	Policy objectives	Outcomes from spectrum availability	Impact areas	Predicted expectations
Agriculture 	Agricultural development and agricultural productivity, access to markets, increase and diversify production	Precision agriculture, targeted information, better access to markets	Access to technology by farmers boosts productivity and profits	***Access to technology and precision agriculture increase crop yields between 10.5% and 20%, and profits up to 23%***
Manufacturing 	Diversify and develop manufacturing, attract FDI, increase technology exports	Expand manufacturing capabilities, diversify production, increase FDI and exports	Adoption of new technologies by firms boosts productivity, GDP and exports	***Application of industrial Internet of Things (IoT) and Industry 4.0 increases value-add between 15-25%***
Transport 	Improve trade links, infrastructure for transport and logistics, strengthen competitiveness of ports	Reduce transaction and logistics costs, border delays and tax leaks. Increases productivity and integration in GVCs	Digital platforms and infrastructure increases productivity, port capacity and GDP	***Transport upgrades increase incomes by 10%. Digitising ports reduces logistics costs by 15-25%. Digital customs increases revenue by 54% in 5ys***
Trade 	Economic diversification, strengthen trade and exports	Improves trade flows, growth of E-commerce and exports of ICT services and digitally delivered services	Digital trade increased integration in AfCFTA, E-commerce and service exports	***Potential to increase E-commerce value to 15% GDP and ICT exports value to 7% GDP***
MSME's 	Strengthening competitiveness and formalisation of MSME's	Improves profits of MSMEs. Facilitates business registration, access to finance, formal contracts	Access to digital by MSMEs increased incomes and formalization	***Technology adoption is associated with labour productivity of 2-4% for small firm***

Healthcare 	Increase access to healthcare, improve well-being, increase productivity of healthcare sector	Telemedicine, digital health records, digital payments for insurance contributions increase access to health services and productivity	Digital health implies increased access to health services and productivity	***Digital health solutions enable doctors to increase visits by 30%***
Government 	Strengthening domestic revenue mobilisation, prevent corruption, improve services delivery	Increases tax revenue and provides saving in public expenditure through better targeting, transparency and reduction of corruption	Mobile money, P2G, G2P adoption increases GDP, tax revenue, reduce leakage	***Mobile money adoption increases tax revenue by 12% on average. Digital ID for social protection decreases leakage by 41.47%***

Table 1.2: Mapping digitalization to policy objectives and estimating the impact [1]

Both Table 1.1 and Fig. 1.7 illustrate how spectrum availability directly supports Nigeria's strategic objectives across key sectors, using global and local evidence to highlight the productivity, innovation and service delivery gains that spectrum unlocks. These cross-sector benefits reinforce the urgent need for a cohesive, future-ready roadmap that institutionalizes strategic spectrum planning as a pillar of Nigeria's development framework.

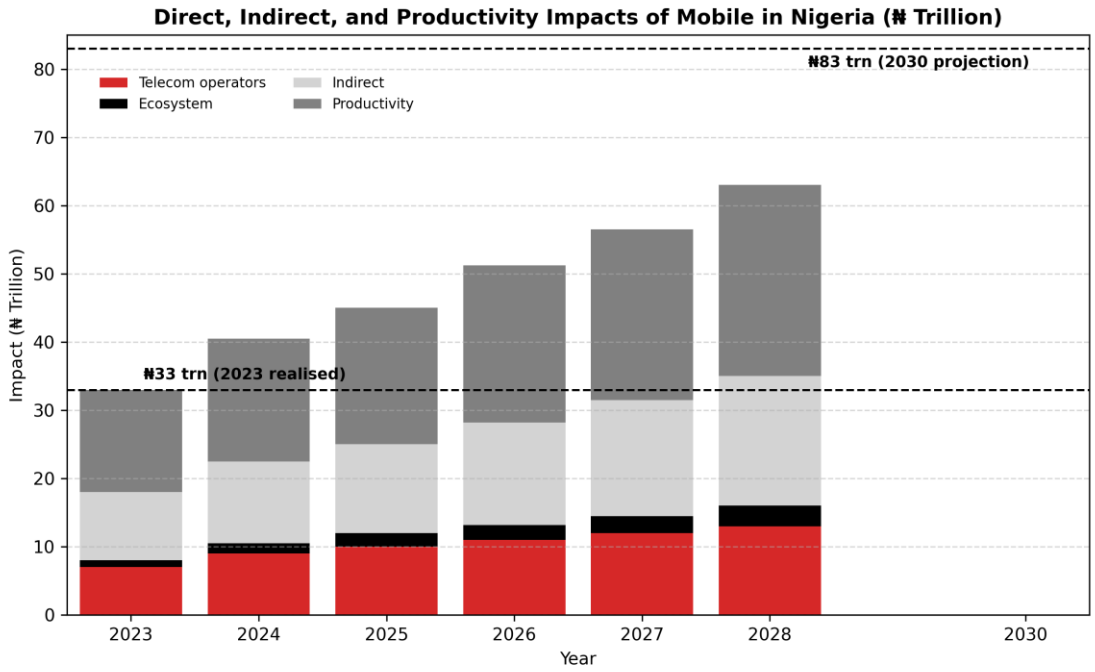


Fig 1.7: Direct, indirect and productivity impacts of mobile in Nigeria, billion NGN [1]

[1] GSMA Report 2024: "The role of mobile technology in driving the digital economy in Nigeria"

1.4. Goal and objectives of the Spectrum Roadmap

The goal of the Spectrum Roadmap is to develop a comprehensive, forward-looking plan that provides clear guidance and certainty for stakeholders, while optimizing the allocation and management of RF Spectrum to meet current and future demands. This Roadmap will ensure that Spectrum resources are efficiently utilized to support emerging technologies, drive innovation and enable sustainable growth in the telecoms and digital services sectors. The objectives include:

1. Provide regulatory clarity and reduce uncertainty to encourage long-term investment.
2. Optimize spectrum efficiency for current and emerging technologies.
3. Accelerate connectivity across underserved and rural areas.
4. Support digital innovation and sustainable economic growth.

The roadmap is anchored on four strategic pillars as depicted below:

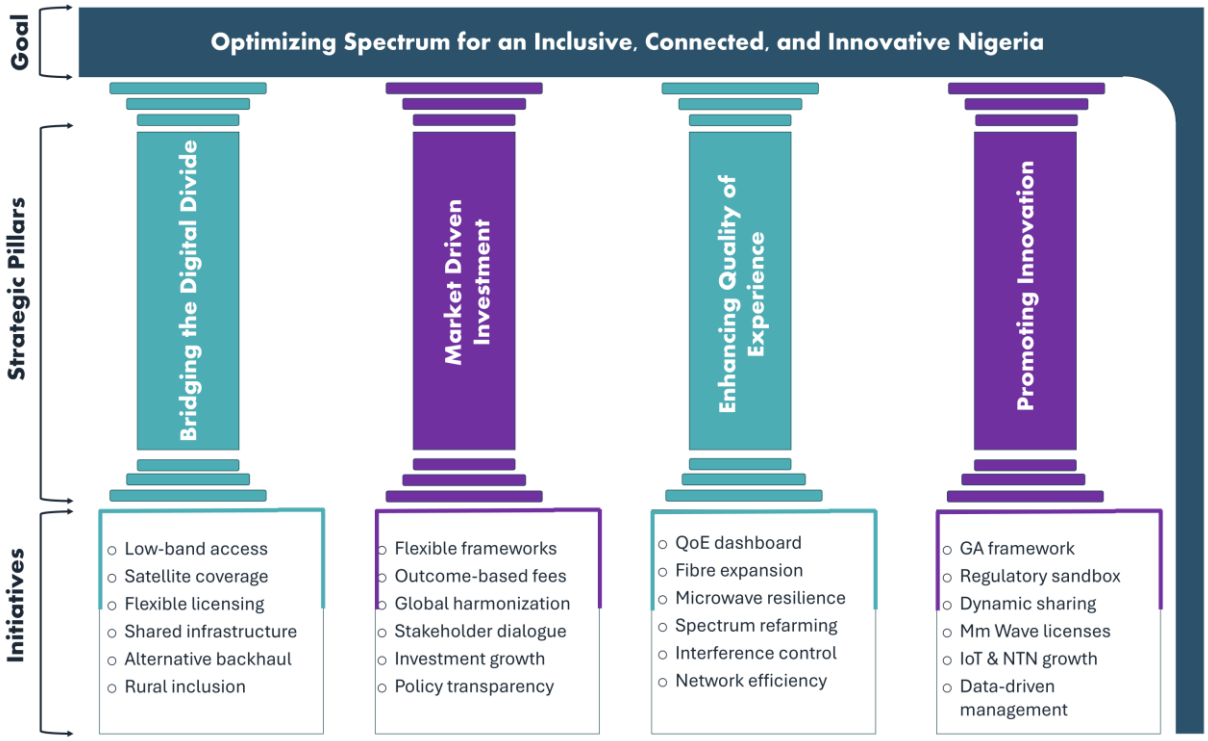


Fig 1.8: Goal, Pillars and Initiatives of the Spectrum Roadmap

These four major focus areas—bridging the digital divide, market driven investment, enhancing quality of experience and promoting innovation—will serve as the pillars of the Commission's strategy. Together, they will guide the Commission's efforts to build an inclusive and resilient digital ecosystem, ensuring that all Nigerians have access to reliable and affordable broadband, regardless of their geographic location.

Chapter 2: Strategic Pillars (Focus Areas) for Spectrum Roadmap

The four pillars (strategic focus areas) of the Spectrum Roadmap that will guide the Commission's efforts to build an inclusive, resilient and digitally advanced Nigeria and are here presented in greater detail:

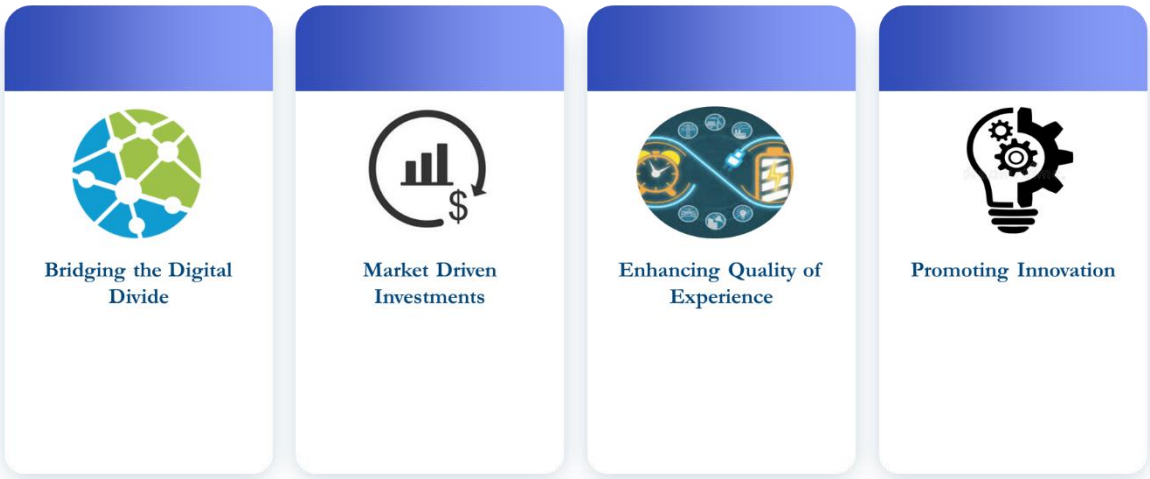


Fig. 2.1 – The Four Strategic Focus Areas of this Spectrum Roadmap

2.1. Bridging the Digital Divide

The digital divide remains a significant barrier to Nigeria's inclusive growth. While urban centers continue to enjoy rapid digital transformation, rural areas—home to an estimated **46% of the population**—remain largely underserved. According to data from the Universal Service Provision Fund (USPF), **87 clusters of unserved and underserved areas** have been identified, impacting approximately **23 million Nigerians**. This disparity limits opportunities for economic participation and overall development.

Expanding coverage to rural and underserved areas requires addressing both supply- and demand-side factors. This Spectrum Roadmap focuses primarily on supply-side interventions, particularly those related to Spectrum management and policy. By optimizing the Commission's approach to Spectrum allocation and usage, we can lay a foundation for sustainable rural broadband expansion and help bridge Nigeria's digital divide, with the goal of achieving widespread, equitable access to broadband connectivity

across the country. The following insights outline the guiding principles and specific outcomes we aim to achieve

2.1.1. Optimizing Spectrum for Universal Access in Nigeria

Our goal is to prioritize optimal Spectrum utilization that ensures widespread coverage in underserved and rural areas with minimal infrastructure requirements through maximizing already assigned low-Band Spectrum and making the unassigned bands available.

The Commission will continue to promote flexible Spectrum licensing allowing for more efficient Spectrum utilization to support expansion in a cost-effective way. Several approaches may be considered to "incentivize Spectrum fees for deployment" to offset the high infrastructure cost and encourage operators to expand their services.

2.1.2. Harnessing Satellite and Non-Terrestrial Networks

Satellite communications is playing a crucial role in expanding coverage in remote areas of Nigeria that are challenging or uneconomical to reach with terrestrial networks.

Our objectives will focus on enhancing the role of Low-Earth Orbit (LEO) satellites, to provide high-speed internet in the most remote locations, bridging the connectivity gap for millions of Nigerians who currently lack reliable broadband.

In addition to expanding the use of LEO satellites, we will optimize the potential of Geostationary Satellites (GEO) and explore emerging high-altitude platforms, such as stratospheric balloons, to support mobile backhaul solutions and extend internet connectivity to rural regions.

2.1.3. Enabling Alternative Backhaul Solutions

The infrastructure costs for deploying broadband networks in rural Nigeria are significant, especially when it comes to backhaul connectivity. Our goal is to explore and adopt alternative technologies that will lower the total cost of ownership for rural broadband infrastructure.

2.1.4. New Business Models for Cost-Effective Rural Deployment

To overcome the barriers associated with rural network deployment as seen in Fig. 2.2 (survey on MNO's barriers to infrastructure investment), will advocate for innovative business models that lower both capital and operating expenditures. The Commission will work with stakeholders to facilitate Infrastructure Sharing, Neutral Host Models, Co-Investment Ventures and Government Interventions and Policy Measures.

2.2. Market Driven Investment

The Commission recently conducted a survey to better understand the market demand for Spectrum and improve decision making for future directions of Spectrum Management. Two key areas the survey focused on included:

a. Demand for Spectrum

This survey question inquired about what constituted the greatest consideration in terms of demand for Spectrum, with the results showing that consideration for newer technologies and collaboration with stakeholders as the two topmost considerations in terms of demand for Spectrum – as shown in Fig. 2.3.

Fig. 2.3 – Consideration in terms of demand Spectrum

b. Priorities areas to be included in a Spectrum Roadmap

Another survey question inquired about what Stakeholders saw as priority in a Spectrum Roadmap. The bulk of responses leaned towards enhanced efficiency of Spectrum utilization– as shown in Fig. 2.4

Fig. 2.4 – Stakeholders Spectrum priorities

In view of the above results from stakeholders, the Commission will ensure specific Spectrum needs of industry players are being met by further implementing flexible policies and regulations to support market driven investment and enhance efficient utilization of Spectrum in the telecommunications sector.

In terms of new technologies, the Commission will closely be monitoring the activities of the International Telecommunications Union's Radiocommunication (ITU-R) sector with specific focus on opening of Spectrum bands for newer technologies such as IoT services and Satellite Direct-to-Device connectivity in the bands 694MHz to 2600 MHz.

In so doing, the Commission will:

- Ensure early adoption of the ITU-R's Recommendations and timely release of globally harmonized Spectrum bands to foster investment in the telecommunications sector.
- Ensure continuous stakeholder consultation as a strategic instrument to support collaboration in decision making in such a way that fosters investment in the telecoms industry.
- Prioritize achieving the targets set in the Strategic Plan of the FMCI&DE to secure between 300-500% increases in broadband investment.

2.3. Enhancing Quality of Experience

We are fully committed to enhancing the Quality of Experience (QoE) for all Nigerians, focusing on both urban and rural areas, including achieving a minimum threshold of data

download speed in urban and rural areas by the end of 2030, and remarkable improvement in Quality of Service (QoS). While meeting these targets remains a challenge, significant progress has been made, and we are working to ensure we meet global benchmarks.

To achieve these goals, we will continue to focus on expanding coverage to meet national connectivity targets. Moving forward, the strategic consolidation of existing and future networks is a priority for us, with efforts aimed at improving both coverage and service quality. We have already implemented Spectrum trading guidelines and continue to refine them to ensure more flexibility and efficiency in network operations.

Furthermore, we will support national efforts at achieving 90,000 Km of fiber as well as prioritizing fibre deployments to base stations in addressing infrastructure challenges. For resilience, and hard-to-reach areas, microwave deployments will be optimized to strengthen backhaul capacity, ensure redundancy, and enhance overall network reliability and Quality of Service (QoS).

In addition, we will work collaboratively with industry stakeholders to explore efforts aimed at providing greater operational flexibility, reducing costs and improving overall network efficiency while ensuring operators make the most of technology for better service delivery.

The Commission shall remain committed to driving improvements in both QoS and QoE across the country. With sustained efforts and strategic focus, the Commission is confident that it will make progress towards achieving targets set out in our policies.

2.4. Promoting Innovation

The Commission will prioritize making Spectrum available for both *licensed and unlicensed use* in the near, medium and long term to enable entry of emerging technologies.

In consultation with the industry, the Commission will review its Spectrum management processes in such a way that promotes innovation. It will secure sufficient Spectrum to support immediate and projected future needs to ensure support for next generation

technologies and various uses, including, but not limited to, terrestrial wireless broadband, innovative space services, IoT and autonomous vehicular operations.

The Commission will regularly review its extant regulations, guidelines and business rules to support innovation. Consequently, the Commission is developing a General Authorization (GA) Framework that will incubate ideas and services designed to drive innovation and implement more flexible licensing regimes. The GA Framework will:

- Enable new services for which the licensing frameworks have not been developed
- Provide seamless avenues for Proof-of-Concept trials to be conducted.
- Provide Regulatory Sandboxes for testing of incubated ideas

Such approach would also enable the Commission to issue an authorization for new services pending when a requisite licence will be developed.

Some other approaches to promote innovation that the Commission will consider include

(i) Introducing a database approach to the management of Spectrum in Nigeria

(ii) Automate Spectrum licensing for efficiency and transparency.

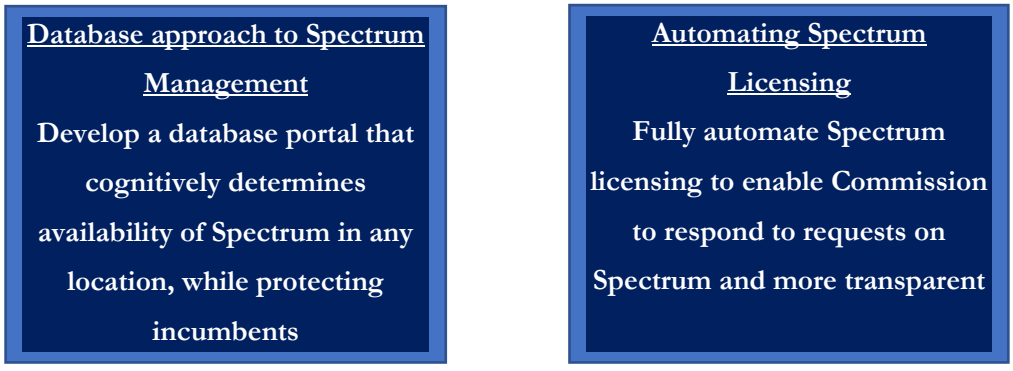


Fig. 2.5 – Dynamic Spectrum sharing/ online licensing

Chapter 3: Nigeria's Approach to Spectrum Management

For communications services, the NFMC bulk allocation typically aligns with globally harmonized Spectrum in the ITU-R's Radio Regulations, except in rare extenuating circumstances where National interests supersede the provisions of the Radio regulations. As such, the Commission assigns Spectrum to licensed telecom operators with the following objectives:

1. Encouraging the use of Spectrum ***efficiently*** for driving national economic and social development.
2. Encouraging competition in frequency assignment to maximize effective use of the limited radio Spectrum.
3. Optimising the price of Spectrum to prevent waste or speculative purchase of a scarce resource.
4. Ensuring technology neutrality in the utilization of Spectrum.
5. Generating moderate revenue for the government.
6. Ensuring equal and fair Spectrum distribution to benefit the nations citizens.

Within the framework of these objectives, the Commission's Spectrum management approach will prioritize five (5) cardinal principles as shown in Fig. 3.1.

1. **Developing a Spectrum Roadmap**: A forward-looking approach to spectrum allocation that anticipates future demands and aligns with national and global technological trends.
2. **Efficient Spectrum Assignment & Utilization**: Ensures that spectrum resources are allocated fairly and utilized optimally to maximize societal and economic benefits.
3. **Fair Spectrum Pricing**: Establishes pricing frameworks that balance affordability with value, fostering healthy competition and investment in the telecom sector.
4. **Technology Neutrality**: Promotes innovation by allowing operators to deploy technologies of their choice within allocated spectrums, encouraging dynamic market solutions.

5. **Secondary Spectrum Market**: Facilitates the trading and leasing of spectrum to improve flexibility and efficiency, unlocking additional value from underutilized spectrum.

These principles underscore the Commission's commitment to sustaining a robust and inclusive digital ecosystem that supports the pillars mentioned in Chapter 2 (bridging the digital divide, fostering investment through market demand, improving quality of experience and promoting innovation).

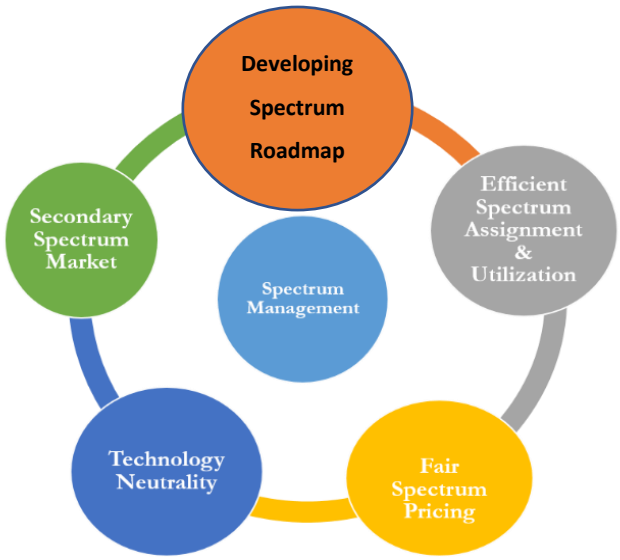


Fig. 3.1- The Cardinal principles of Spectrum management

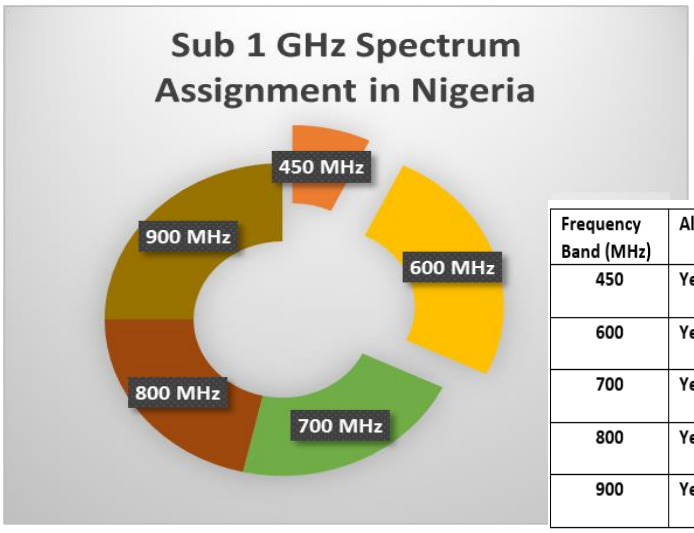
3.1. Current Spectrum Assignments in Nigeria

This section provides overview on the assignment and utilization of allocated Spectrum bands in the low, mid and high bands.

3.1.1. Spectrum assignment in the low/sub 1 GHz band

The sub-1 GHz bands generally offer better propagation characteristics, allowing signals to travel farther and are the most cost-effective to deploy due to their simpler hardware requirements and lower power consumption. This makes the bands ideal for accelerating the expansion of broadband access in low-density, hard-to-reach regions, ensuring more efficient and widespread connectivity across underserved areas. From Fig. 3.2, the 450 MHz and 600 MHz band is yet to be assigned and the Commission will thus take steps

towards making both the 450 MHz and 600 MHz bands available for service delivery to Nigerians.



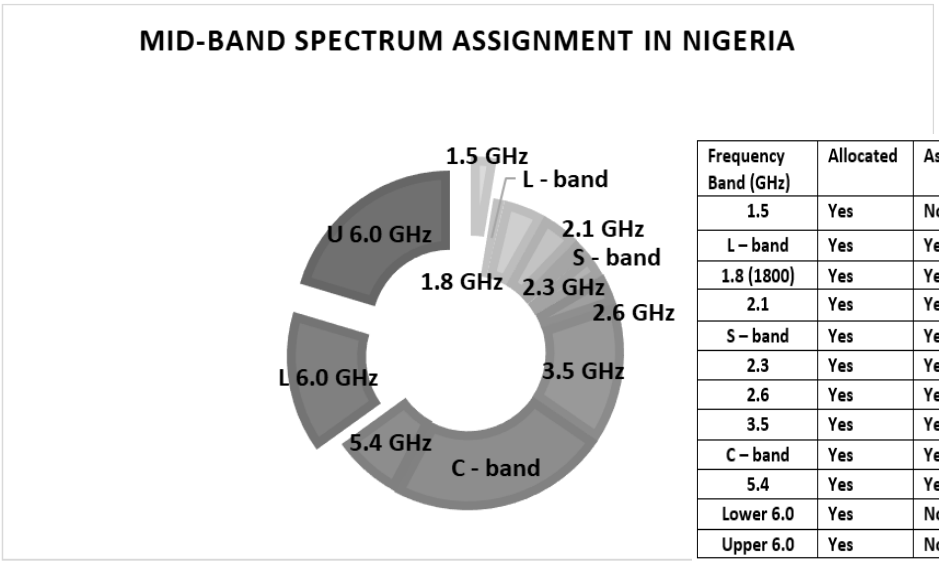
Frequency Band (MHz)	Allocated	Assigned	Quantum assigned
450	Yes	Not yet	_
600	Yes	Not yet	_
700	Yes	Yes	40 MHz
800	Yes	Yes	60 MHz
900	Yes	Yes	70 MHz

Fig. 3.2 – Sub 1 GHz Spectrum assignment in Nigeria

From Fig. 3.2, the 450 MHz and 600 MHz band is yet to be assigned and the Commission will thus take steps towards making both the 450 MHz and 600 MHz bands available for service delivery to Nigerians.

3.1.2. Spectrum assignment in the mid – band (1 – 6) GHz

This range offers a balance of speed, capacity, and coverage, making it ideal for addressing issues of quality of experience for users.



Frequency Band (GHz)	Allocated	Assigned	Quantum assigned
1.5	Yes	Not yet	_
L – band	Yes	Yes	40 MHz
1.8 (1800)	Yes	Yes	150 MHz
2.1	Yes	Yes	120 MHz
S – band	Yes	Yes	60 MHz
2.3	Yes	Yes	130 MHz
2.6	Yes	Yes	180 MHz
3.5	Yes	Yes	300 MHz
C – band	Yes	Yes	800 MHz
5.4	Yes	Yes	250 MHz
Lower 6.0	Yes	Not yet	_
Upper 6.0	Yes	Not yet	_

Fig. 3.3 – Mid – band Spectrum assignment in Nigeria

It sits between the low-band and the higher millimeter wave frequencies and is arguably the most widely assigned, deployed and utilized in the country. Over 70% of the 1.07 GHz quantum of IMT Spectrum currently licensed by the Commission lies within this band, which in itself is significantly more than the 477 MHz generally accepted baseline for IMT Spectrum assignments as seen in Fig 3.4 below.

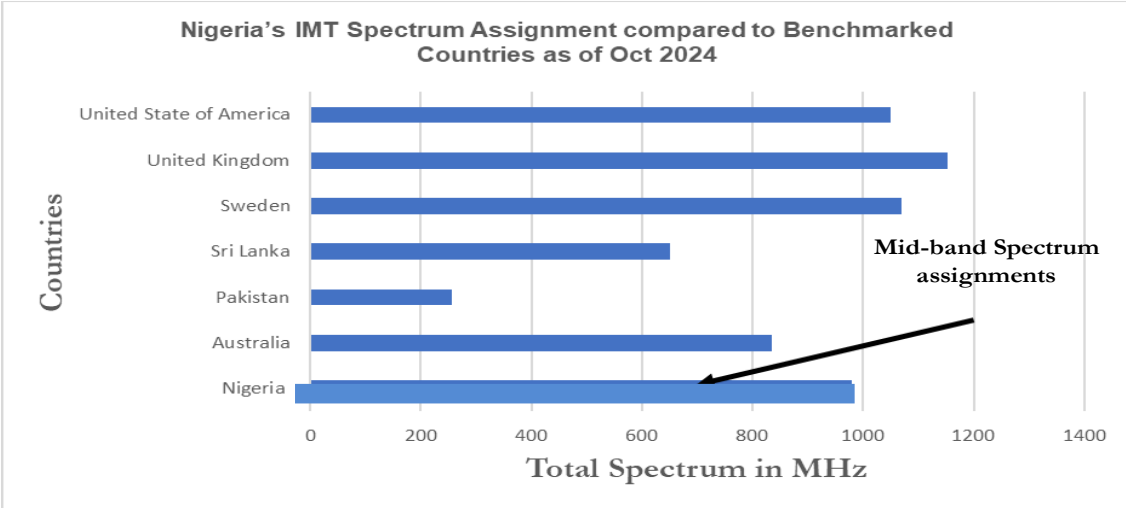


Fig. 3.4 – Nigeria IMT Spectrum assignment compared to benchmarked countries

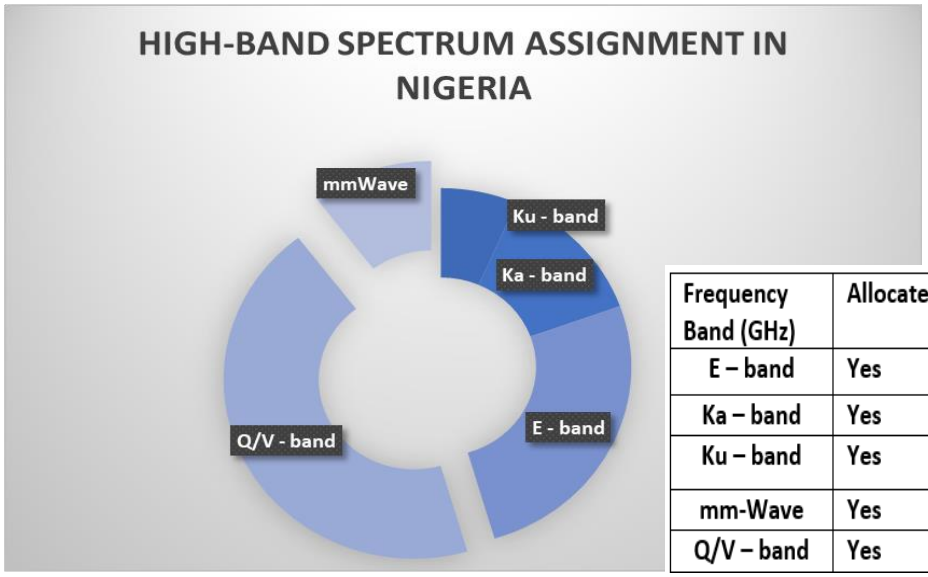
The Commission will provide clear pathways that will optimize utilization of assigned bands and make unassigned bands (especially the upper and lower 6 GHz bands) available to expand coverage and foster greater investment.

3.1.3. Spectrum assignment in the high band (above 10 GHz)

This range offers extremely high speeds and capacity for data transmission over short distances, making it ideal for users needing high-speed connections simultaneously for innovative applications such as connected devices, virtual reality etc. (see Fig 3.5 below). Such use-cases encourage innovation for wireless services. The range has also become the choice Spectrum for emerging Space-based communications, which could be the key to unlocking solutions for deploying high-speed internet in the most remote locations

Fig. 3.5 innovative applications are likely to be most data-intensive

The specific bands that are available but not widely assigned include the Q/V band and the mmWave band.



Frequency Band (GHz)	Allocated	Assigned	Quantum available
E – band	Yes	Yes	8 GHz
Ka – band	Yes	Yes	8 GHz
Ku – band	Yes	Yes	2.5 GHz
mm-Wave	Yes	Not yet	_
Q/V – band	Yes	Not yet	_

Fig. 3.6 – High – band Spectrum assignment in Nigeria

Important key analyses of the current Spectrum assignment reveals that it is critical for Nigeria to consider and always promptly migrate Spectrum to its highest value use and to its highest value users, who would make the best use of it for Nigerian consumers.

3.2. Improving Efficiency in Spectrum Use

The Commission administers Spectrum for the telecoms sector through the following Spectrum management functions depicted in Fig. 3.7. These functions will also be significant to this Spectrum Roadmap 2025 – 2030.

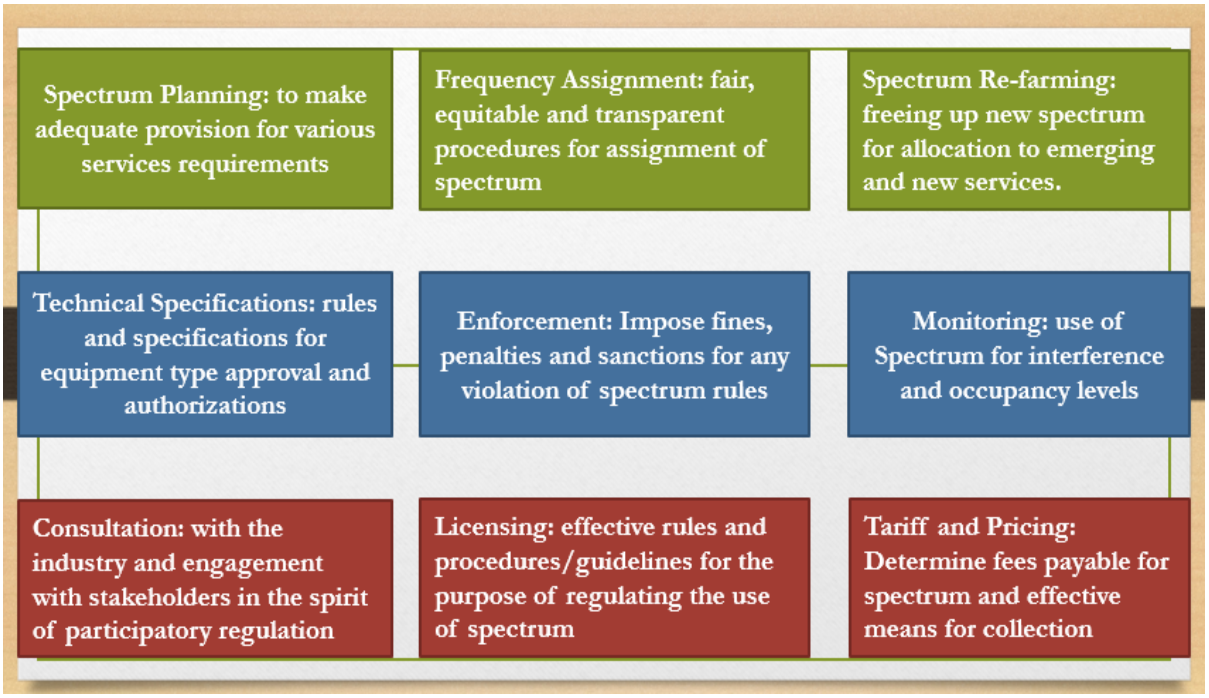


Fig. 3.7 – The Commission's Spectrum Management Functions

3.3. The Commission's Practices & the Way Forward

The Commission adopts and implements the above represented Spectrum management functions to drive efficient use of Spectrum in Nigeria, maximize benefits for end users, promote competition and foster market development. Furthermore, the Commission responds to changing user demands, market dynamics, and technological advancements by implementing regulatory tools for secondary spectrum transactions (Transfer, Leasing and Sharing), technology neutrality, spectrum re-farming, infrastructure sharing etc. that are adaptable, open and effective for the development of a stable and predictable Spectrum management ecosystem.

The Commission will continue to work towards the following:

- Making sure that its regulatory tools, policies, and pricing frameworks are engaging and dynamic such that they permit periodic review to stay up to date with the ever-evolving telecom ecosystem.
- Adopting novel Spectrum management concepts to increase efficiency and effectiveness. These include but are not limited to Open Radio Access Networks

(RANs), the role of artificial intelligence in Spectrum management and regulatory sand boxes.

- Prioritizing Spectrum audits to enhance Spectrum utilization. This will boost confidence in data accuracy and aid in directing Spectrum management decisions. We will also use the output of the Spectrum audit to identify strategies for optimizing Spectrum utilization for greater advantages.

Chapter 4: Spectrum Outlook and Future Opportunities

This chapter provides an outlook of the Spectrum landscape in Nigeria taking cognizance of the market demands, device availability and technological advancements amongst others. It features critical areas for development to stimulate opportunities in the ICT sector over the duration of the Spectrum Roadmap especially in order to expand coverage that will meet the growing demand for broadband services, taking note that that the sector will evolve significantly over time. A brief overview of the factors that shape the future Spectrum Outlook for Nigeria is discussed is discussed along with future projections and forecasts that would be taken into consideration in any new Spectrum assignments.

4.1. Factors that shape the Future Spectrum Outlook in Nigeria

One of factors that shape Spectrum outlook is the ability to repurpose it based on need to enhance its efficiency with the ***first digital dividend*** (that freed up **broadcasting spectrum** for Mobile services in the 700 MHz and 800 MHz bands) serving as evidence of the impact efficient Spectrum utilization can have on national development.

The Commission will therefore continue making efforts towards implementing the ***second digital dividend*** i.e. repurposing a portion of the 600 MHz for IMT. The most recent World Radio Communications Conference in 2023 (WRC-23) proved that there is still significant demand to retain the entire 600 MHz for broadcasting, with the outcomes of the WRC-23 limiting mobile service allocation to secondary basis. This implies that the Commission will go ahead to repurpose on condition that cross-border coordination will be carried out to mitigate interference with neighboring states.

We will also explore all allocated/assigned Spectrum resources with a view to repurposing them where necessary, for efficient, economic and equitable utilization to drive the nation's growth, as seen with repurposing of a portion of Satellite Spectrum for 5G services that was done in 2021 to usher in 5G services in Nigeria in 2022.

Some other key factors that could shape the Spectrum landscape in Nigeria include:

a. Increased Demand for Broadband Connectivity
b. 5G network deployment/consolidation

c. Market based Licensing Mechanisms and advocacy for new allocations
d. Regulatory Framework and Policy Development
e. Focus on Rural Connectivity and Digital Inclusion
f. Innovation
g. International Collaboration and Standards

4.2. Outlook for the Future of Broadband Connectivity in Nigeria

Increasing demand for broadband connectivity remains the primary driver of spectrum planning in Nigeria. While exact future requirements vary with market and technology trends, current evidence allows an informed estimate of the spectrum quantum needed to support projected data growth to 2030.

As of August 2025, Nigeria had 171.6 million active mobile subscriptions and a population of 216 million, yielding a teledensity of ~79 %. By 2030, the total is expected to reach ~220 million active subscriptions, representing 85 – 90 % penetration and a CAGR of 5 %. Three possible market evolution scenarios are projected, as summarized in Table 4.1.

Scenario	Description	Estimated Subscriptions (M)	Teledensity (%)	Assumptions
Optimistic	Robust infrastructure investments, strong incentives for fibre rollout, affordable device market, macro stability	240–250	95–100	Full 4G coverage nationwide, 5G in all state capitals and major towns; ~1.05 SIMs per adult
Average/ Base Case	Moderate investments, gradual 5G uptake, steady 4G densification	215–225	85–90	4G near-universal, 5G in all urban areas; growth tracks population
Pessimistic	Economic slowdown, persistent insecurity, high CAPEX risk, delayed rural expansion	190–200	70–75	Slower rollout, higher churn, affordability constraints

Table 4.1: Market Trajectories to 2030

The optimistic scenario reflects sustained policy support, improved power and fibre infrastructure, and strong public-private collaboration—delivering near-universal 4G with 5G coverage across all state capitals.

The base case assumes steady, organic growth aligned with current population trends. The pessimistic case, however, underscores the risks of under-investment, vandalism, and insecurity that could stall rural rollout and widen the digital divide.

4.3 Extending Broadband Connectivity with Non-Terrestrial Networks

In terms of new technologies, non-terrestrial networks, and specifically Direct-to-Device (D2D) satellite services are emerging as a vital complement to terrestrial mobile networks, providing seamless connectivity directly to standard mobile handsets in areas where traditional coverage is unavailable or unreliable.

In Nigeria, D2D connectivity could play a transformative role by extending voice and data coverage to signal blackspots, vast rural, riverine, and border communities currently beyond the reach of mobile towers. It would also strengthen network resilience—serving as a fallback during fibre cuts, power outages, or emergencies that disrupt terrestrial networks.

The adoption of D2D services can enhance universal access, improve public safety and disaster response, and support new IoT and smart-agriculture applications in underserved areas. It also opens investment opportunities for mobile network operators (MNOs) and satellite service providers to collaborate on shared spectrum use, enabling more efficient utilization of national spectrum resources.

4.4. Data Consumption and Broadband Demand

According to GSMA Intelligence in Fig 4.1, average mobile data usage per connection is expected to rise from 5.8 GB/month (2025) to 12.0 GB/month (2030). With active subscriptions increasing from 171 million to ~220 million, total national mobile data traffic will grow from 11.9 exabytes (EB) in 2025 to 31.7 EB in 2030 (≈ 2,640 petabytes per month) as depicted in Fig 4.2.

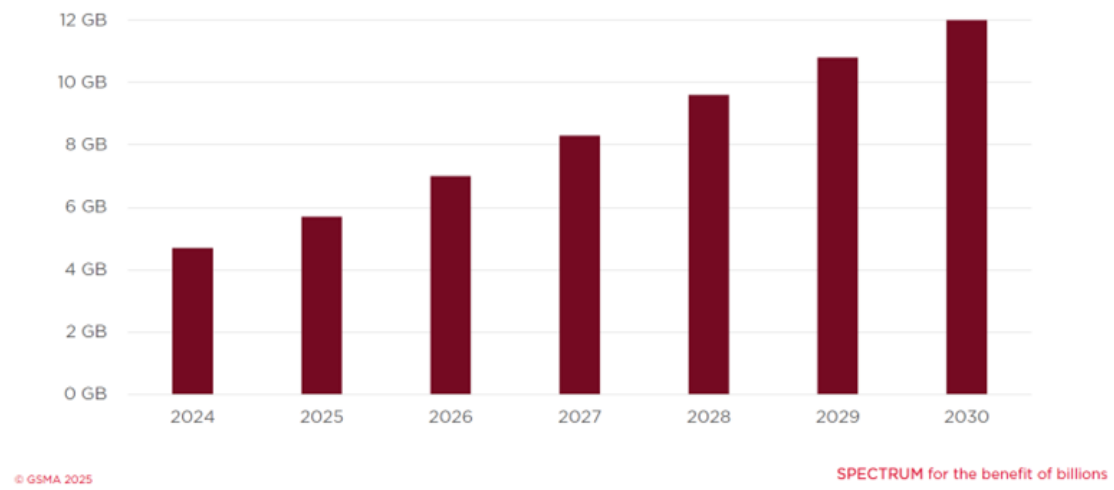


Fig 4.1: GSMA Data Usage Forecast in Nigeria (GB/month/connection)

In effect, Nigeria's national data traffic will nearly triple within five years. While 4G will remain the dominant workhorse for connectivity, 5G will increasingly form the high-capacity layer in cities and enterprise corridors, supporting new applications in AI, IoT, cloud computing, and immersive media.

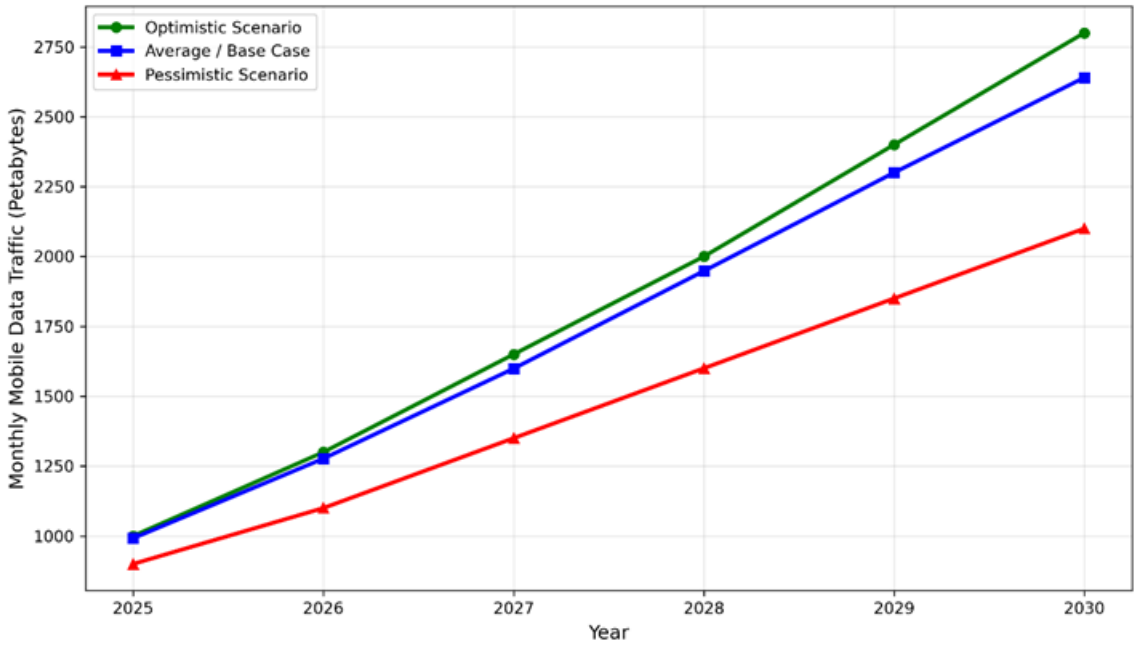


Fig 4.2: Projected National Mobile Data Traffic under 3 Growth Scenarios (2025-2030)

Fig 4.2 illustrates Nigeria's projected surge in monthly mobile data traffic across the three market scenarios. Even in the pessimistic case, total monthly traffic nearly doubles by 2030, underscoring sustained broadband dependency. The average/base case shows a steady climb from ~1,000 petabytes in 2025 to over 2,600 petabytes by 2030—driven by

continued 4G densification, 5G expansion, and device affordability. Under the optimistic scenario, traffic exceeds 2,700 petabytes per month, reflecting rapid 5G adoption, fibre-to-site integration, and data-intensive applications such as AI and streaming. Collectively, these trajectories highlight the urgency of expanding mid-band spectrum and backhaul capacity to maintain service quality in a data-driven economy.

4.4 Spectrum Outlook and Capacity Requirements

To sustain this growth, and based on established radio standards as well as the most recent Spectrum allocations in the ITU-R's Radio Regulations, Nigeria must expand total assignable spectrum to IMT from the current 1.07 GHz to around 3 GHz across low-, mid-, and high-band terrestrial ranges, plus ≈ 30.5 GHz for space services, by 2030 as seen in Fig 4.3. below.

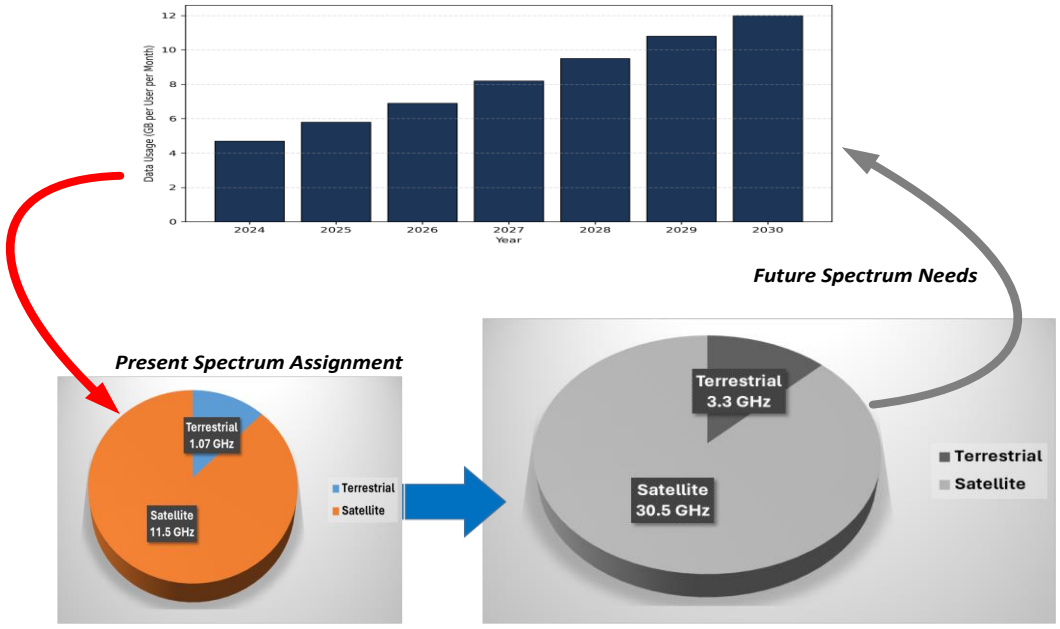


Fig 4.3: Projected Spectrum enabling use of broadband services

This aligns with GSMA's 2.4 – 3.3 GHz spectrum benchmark for 5G-ready markets. Fig. 4.4 further illustrates Nigeria's projected evolution across key IMT domains:

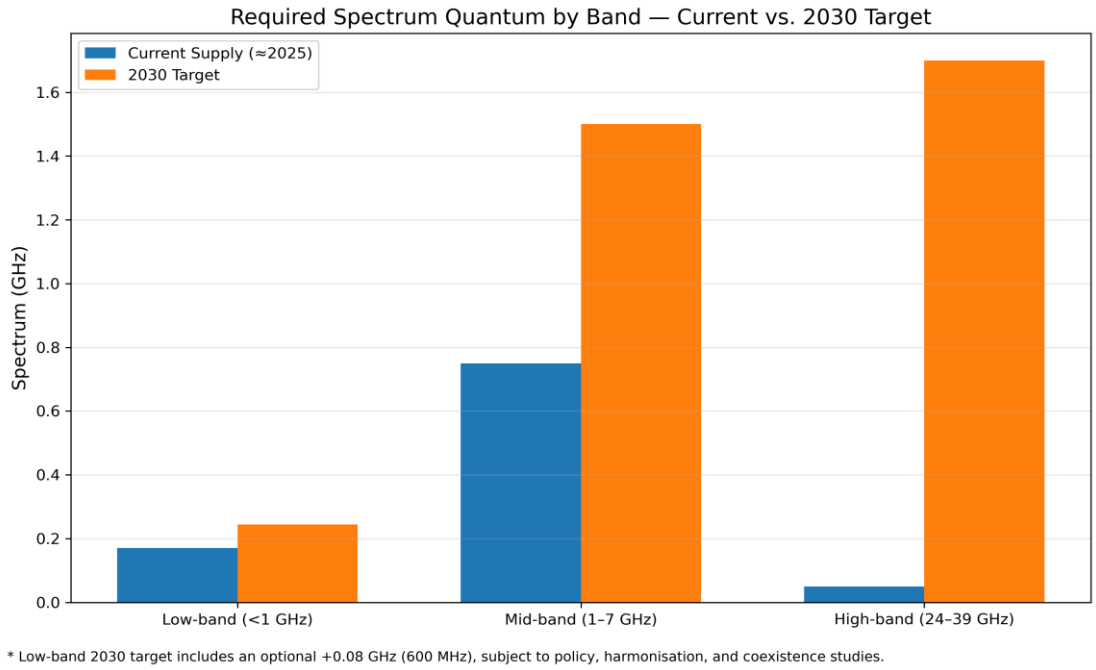


Fig 4.4: Potential Spectrum Quantum Required by Band – Current vs. 2030

Low-Band (< 1 GHz): Currently ~170 MHz; a potential addition of 70–80 MHz in the 600 MHz band could strengthen rural and indoor coverage.

Mid-Band (1–7 GHz): Expanding from ~0.75 GHz to 1.25–1.5 GHz through greater 3.5 GHz contiguity and upper-6 GHz adoption.

High-Band (24–39 GHz): Rising from minimal use to ≈ 1.8 GHz by 2030 for mmWave Fixed Wireless Access and enterprise networks.

Collectively, these actions will triple Nigeria's terrestrial spectrum supply, forming the foundation for next-generation broadband expansion and 5G innovation.

4.5 The 2030 Vision: A Connected, Resilient Nigeria

By 2030, Nigeria's broadband ecosystem will exhibit measurable transformation:

Metric	2025	2030 (Target)
Active mobile subscriptions	171M	~220M
Average data use per user	5.8 GB/month	12.0 GB/month
Total annual traffic	11.9 EB	~31–32 EB

4G coverage	~85% population	≥98% population
5G coverage	~13% population	≥50% population, all state capitals
National spectrum supply	~1 GHz	~3.0 GHz
QoS benchmark	20–40 Mbps median	65–100 Mbps median

Table 4.2: Nigeria's broadband ecosystem (current and projected)

4.6. Stakeholder Engagement

In developing this Spectrum Roadmap, a comprehensive survey was developed and circulated to relevant Government Agencies/ Departments, Original Equipment Manufacturers (OEM's), IMT & Satellite Service Providers and Managed Service Providers amongst other stakeholders in the ICT Sector.

A total of 40 vertical and horizontal players in the sector were reached and feedback from 60% of the stakeholders was received.

Furthermore, a hybrid (virtual and physical) Stakeholder Consultative Forum (SCF) was convened to undertake further deliberation on the Spectrum Roadmap.

Key findings from the Survey and Stakeholder engagements:

The following is a summary of some of the key findings from the Stakeholder Survey and Consultative Forum to date.

1. Reduced cost of Spectrum, particularly for low-frequency bands, to encourage service deployment and coverage in rural and underserved areas. This aims to address the lack of investment interest from operators and investors in bridging the national digital divide.
2. Addressing the perceived high cost of Spectrum acquisition.

3. Encourage Spectrum re-arrangement to make efficient use of Spectrum.
4. Focus on Spectrum availability, the efficiency of use, cross-border coordination between neighbouring countries and engage stakeholders during the development of the Spectrum Roadmap. The availability of Spectrum should also include satellite services, especially for the emerging NGSO systems, to foster innovation and inclusivity in the digital economy.
5. Develop policies to support the development of subsea cables
6. Improve Spectrum management policies, particularly around resource sharing, promoting public-private partnerships and stakeholder collaboration.
7. Predict wireless technology advancements, rising mobile broadband demand, and growing IoT adoption that will influence Spectrum usage and demand within the next five years.
8. Address the concerns raised by the operators regarding Spectrum-pricing models, emphasizing the need for frameworks that reflect market demand and incentivize adequate Spectrum.

Chapter 5: Spectrum Roadmap Implementation Plan

This chapter outlines the Action Plan for this Spectrum Roadmap, Risk Management and how the Roadmap Plan will be monitored and evaluated (M&E).

5.1. Action Plan for Spectrum Management

The proposed Action Plan for this Roadmap covers the short-, medium- and long-term goals as follows:

SHORT – TERM 2025 – 2026

The Commission will in the short-term complete the process of assigning the 600 MHz band, to support deployment of broadband in the rural areas (especially to support services like precision agriculture, improved healthcare delivery, facilitating MSME). The 600 MHz band will also provide the much-needed coverage spectrum to support 5G expansion.

Furthermore, the Commission will carry out comprehensive audit of its assigned Spectrum to identify opportunities for optimization (in bands such as 700 MHz, 2.3 GHz etc.) and potentially repurposing/reassigning such Spectrum to highest value users.

Internally, the Commission will focus on developing cutting-edge spectrum management capabilities (such as online licensing, data analytics for improved decision-making, enhanced Spectrum monitoring etc.) that will benefit all stakeholders.

In terms of regulatory instruments, the Commission will complete the guidelines for use of the lower 6 GHz and 60 GHz for Wifi and also review its existing regulatory policies and pricing frameworks in a manner that makes them stay relevant in an ever changing and evolving environment.

The Commission will continue actively engaging with the ITU-R's studies on non-terrestrial networks (NTN)/Satellite D2D communications within the bands 694 – 2700 MHz, as well as monitoring Proof-of-concept (PoC) trials with the view to be in the position to develop relevant frameworks for such services.

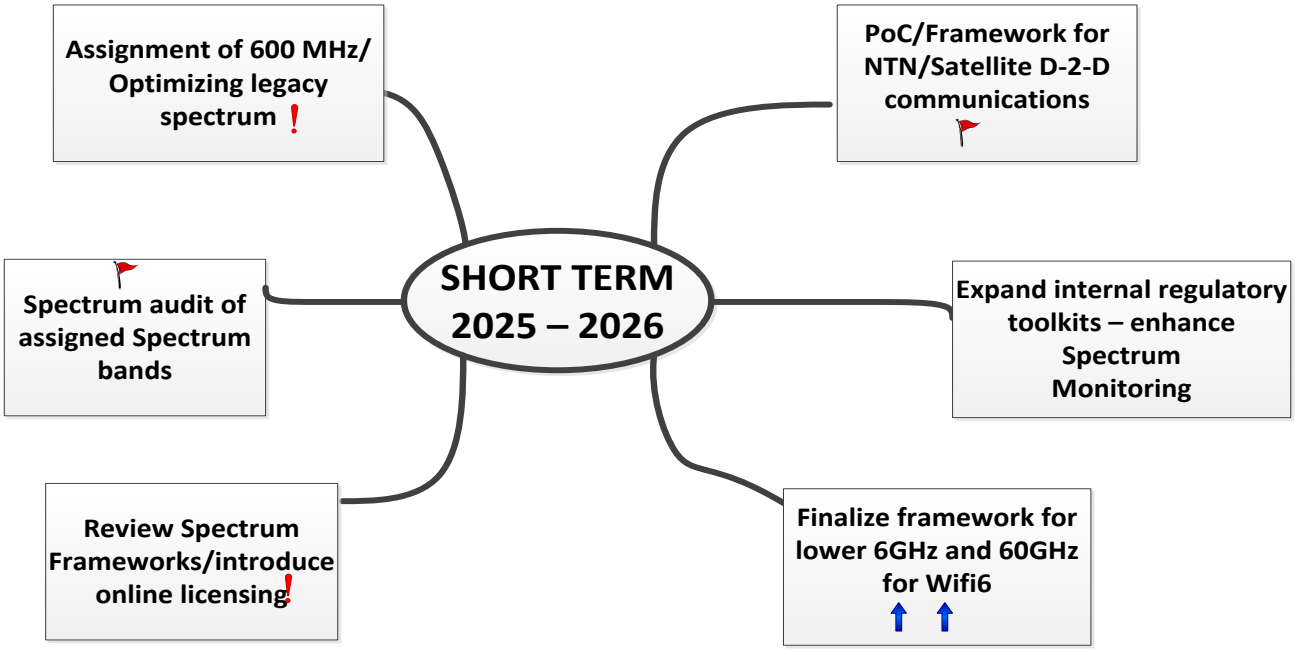


Fig 5.1. Short term implementation map of Spectrum Roadmap

MEDIUM – TERM 2027 – 2028

In the medium-term, the Commission will prepare for the upcoming WRC-27, with the aim of achieving clear regulatory directions best suited to the core pillars of this roadmap and enabling the Commission develop frameworks for emerging technologies.

The Commission will be focusing on licensing the upper 6GHz as well as the mmWave bands to enhance IMT capacity to support innovations such as augmented reality, machine-to-machine communications etc., which will directly impact cross-sector productivity. The medium-term phase of implementation will provide the Commission with an opportunity to review the roadmap where necessary to ensure it remains relevant towards achieving the Commission's vision for 2030.

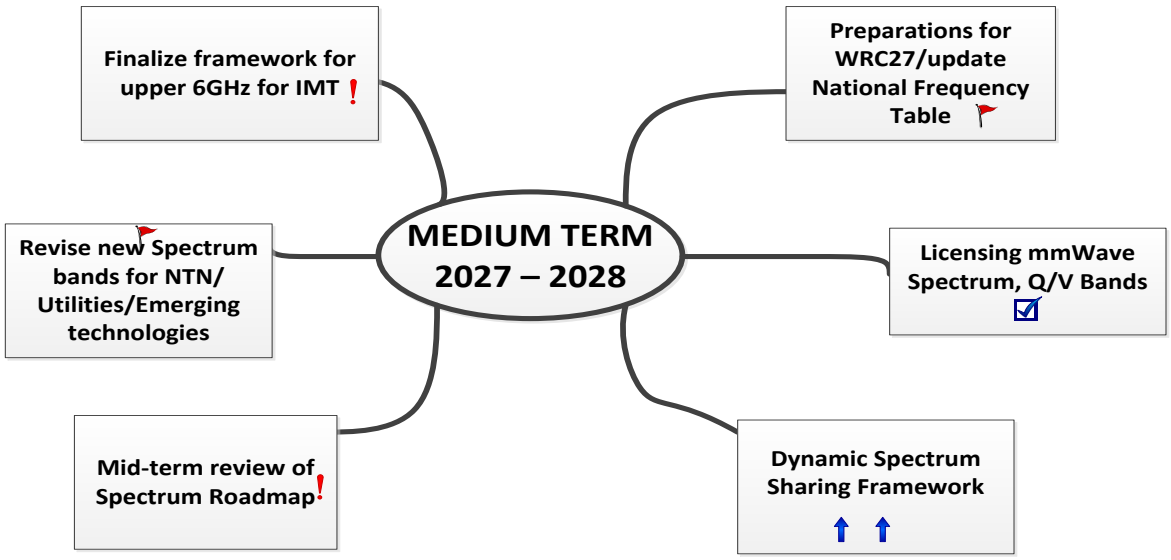


Fig 5.2. Mid-term implementation map of Spectrum Roadmap

In terms of Spectrum management policies, the Commission will be adopting a database driven and more dynamic approach to managing spectrum.

LONG – TERM 2029 – 2030

The mid-term review of roadmap will inform the Commission of the impact the roadmap has had on industry and the challenges that may have been encountered. This information will provide a clear path forward in developing Spectrum outlook beyond 2030 and identifying mitigating actions to overcome challenges.

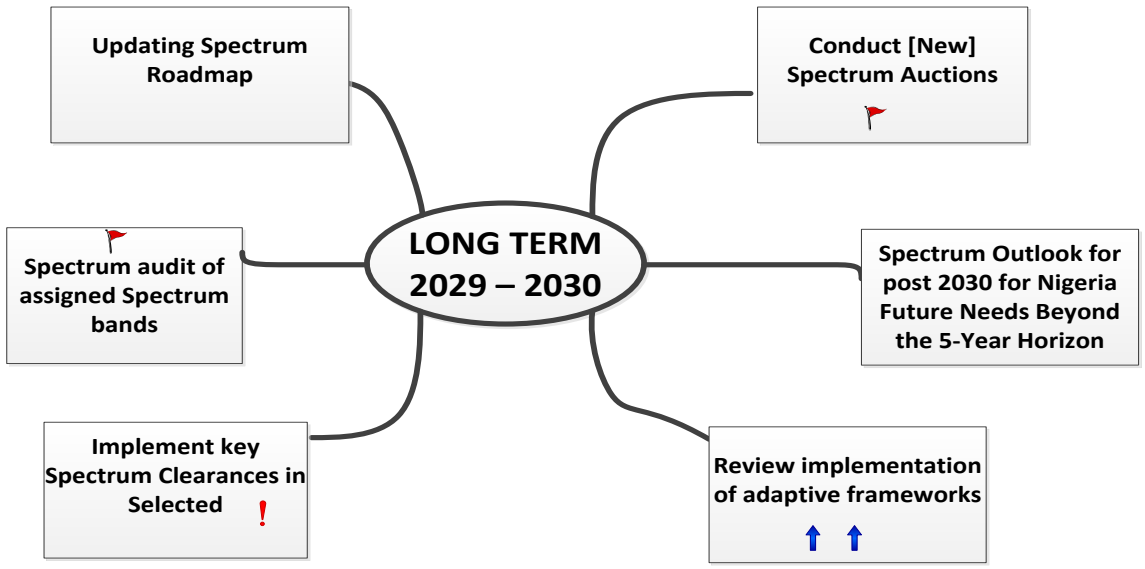


Fig 5.3. Long term implementation map of Spectrum Roadmap

5.2. Risk Management and Contingency Planning

In a bid to manage the economic and social risk associated with the non-implementation of this Spectrum Roadmap, the approach to risk mitigation and swift solution to potential issues and challenges is expected to be every 6 months and is documented below:

i. Identify and rank risk factors
    - Tier 1: Capable of economic, social, and market risk that could result in economic downturns, technological disruptions, or regulatory challenges.
    - Tier 2: Capable of a combination of economic, social, and market failure to some degree
    - Tier 3: Capable of a combination of economic, social, and market failures but without significant impact.

ii. Contingency plans
    - Tier 1: Immediate escalation of Tier 1-risk scenarios and operators who consistently fall short of established thresholds, including alternative Spectrum allocation strategies or accelerated trading processes during emergencies.
    - Tier 2: Engagement of Operators and stakeholders related to risk elements with a view to establishing a regulatory solution.
    - Tier 3: Engage and monitor

5.3. Monitoring and Evaluation (M&E) Framework

This M&E framework provides a structured approach to assess the efficiency and effectiveness of the Spectrum Roadmap, and utilization within the Nigerian telecommunications industry. It ensures that the plan remains on course Spectrum is being used optimally, deviations from set targets are identified early, and corrective actions are implemented promptly.

Key M&E Reports

Two key Spectrum status reports per annum, which will provide insights on the following aspects:

i. Spectrum Utilization (Rollout Obligations) & Trading Potential

This report will focus on identifying and escalating the underutilized Spectrum and provide recommendations for trading opportunities.

Key Indicators	Activities	Corrective Action
Underutilized Spectrum (>30% usage) June December each year	▪ Identify frequency bands with utilization rates greater than 30% below the allocated Spectrum. ▪ Classify underutilized Spectrum by band and by region. ▪ Assess the cause of underutilization	▪ Review Spectrum trading guidelines to allow for the flexible and manageable process to trade underutilized (>30%) Spectrum of > 2 consecutive quarters. ▪ Identify key stakeholders for engagement.
Spectrum Trading	▪ Assess the feasibility of Spectrum trading for identified underutilized bands. ▪ Review regulatory framework to ensure it supports Spectrum trading. ▪ Propose a path for Spectrum trading	
Impact on Industry and Market	▪ Evaluate how the underutilization of Spectrum impacts market competition, innovation, and service delivery. ▪ Estimate potential economic benefits if underutilized Spectrum is traded.	

Table 2.2 – Monitoring & Evaluation Components

ii. Performance Against Targets & Corrective Actions

This document will report deviations from established Spectrum Roadmap targets contained in Chapter 4 above, along with analysis and actionable recommendations for staying on track.

Indicators	Activities	Corrective Action
Deviation from Targets	▪ Measure progress against pre-established Spectrum usage, allocation, and trading targets ▪ Quantify any shortfalls in meeting targets for Spectrum utilization, or industry coverage.	▪ Provide specific recommendations for addressing identified performance gaps. ▪ Suggest corrective measures such as policy adjustments, capacity-building initiatives, increased regulatory support, or incentivization of market players. ▪ Set timelines and accountability mechanisms for implementing corrective actions.
Root Cause Analysis of Deviations	▪ Identify the underlying causes of performance gaps ▪ Categorize causes into internal vs. external factors	▪

Table 5.3 – Monitoring & Evaluation Components – 2

5.4. Other Key M&E Components

In addition to the two core reports, there are additional monitoring and evaluation components to ensure a comprehensive and responsive approach. These activities include:

- **Periodic Publication of Utilization Reports on the COMMISSION Website**

Conduct consultations with industry stakeholders annually to gather insights on current challenges and opportunities in the review period.

- **Focus Groups**:

Host regular focus groups to review progress, discuss challenges, and align priorities.

- **Data Collection and Real-Time Monitoring**

Effective Spectrum management requires accurate and real-time data. This includes the deployment of real-time monitoring systems to track Spectrum usage across different bands across the country by January 2026 and the implementation of a Spectrum dashboard to identify trends in Spectrum usage, including underutilization patterns. It is also expected that a model capable of integrating market data on consumer demand, economic factors, and technology adoption rates to is implemented to feed into the dashboard to improve forecasting and decision-making.

- **Transparent Reporting and Public Accountability**

In addition to the two biannual reports, a comprehensive annual report that summarizes Spectrum allocation, utilization, and trading activities will be published annually.

- **Review Cycles**

To keep the M&E framework current, it will be reviewed and adjusted by internal reviews every year to assess progress and make adjustments where necessary.

Conclusion

This Spectrum Roadmap represents a commitment to a dynamic and adaptive framework for spectrum management. The strategy acknowledges the rapidly evolving nature of the telecommunications landscape, emphasizing the need for continuous reassessment and refinement of implementation efforts. By fostering close collaboration between the government, industry stakeholders, and other partners, we aim to address emerging challenges and leverage innovative solutions to maximize the efficient use of spectrum resources.

Our approach is rooted in inclusivity, sustainability, and adaptability, ensuring that the roadmap remains responsive to Nigeria's unique challenges and opportunities. Through strategic deployment of spectrum, we aim to unlock the full potential of advanced wireless technologies, drive digital transformation, and bridge the digital divide, ultimately fostering socio-economic growth and improving the quality of life for all Nigerians.