NATIONAL 5G STRATEGY

NATIONAL COMMUNICATIONS AUTHORITY

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Table of Contents

Executive Summary 2
Introduction 4
Strategic Goals 5
5G The Network of the Future and Its Socio-economic Impact 5
Implantation of 5G Technology 7
Spectrum Requirements for 5G 13
5G Infrastructure Deployment 16
National 5G strategy Initiatives 18
5G Private Mobile Networks 19
5G Regulatory Sandboxes 20

Executive Summary

The National Communications Authority of Somalia (NCA) has developed the National 5G Strategy after conducting an extensive public consultation with the ICT sector stakeholders, the government, and other interested parties. The Strategy aims to drive transformative changes in Somalia by establishing comprehensive connectivity, stimulating economic growth and innovation, developing effective regulatory frameworks, fostering research leadership, and delivering societal benefits. To achieve comprehensive connectivity, the strategy focuses on the nationwide deployment of 5G infrastructure, ensuring access to affordable high-speed internet and advanced communication services across all regions. The strategy seeks to create equal opportunities for citizens and promote inclusivity by bridging the digital divide.

The strategy recognizes the potential of 5G technology to fuel economic growth and foster innovation. It aims to attract investments and facilitate industry transformation through technological advancements, enhancing productivity, competitiveness, and job creation. By fostering an enabling environment for 5G deployment, the strategy positions Somalia as a hub for innovation and supports the growth of local technology companies. Effective regulation and policy frameworks are vital to the success of 5G implementation. The strategy emphasizes the development of robust regulatory frameworks that ensure fair competition, consumer protection, and adherence to spectrum management, data security, and privacy regulations. The strategy promotes a stable and secure 5G ecosystem by providing clear guidelines and standards.

The strategy also acknowledges the significance of research and development in driving 5G innovation. It aims to foster collaboration in research and position Somalia as a leader in 5G advancements. By encouraging research partnerships and supporting local technology companies, the strategy harnesses the full potential of 5G technology to drive technological growth and socio-economic progress. The strategy's key focus is the societal benefits derived from 5G deployment. It highlights the transformative potential of 5G in sectors such as healthcare, public safety, energy, and urban development. By leveraging 5G technology for advanced healthcare services, improved public safety measures, sustainable energy initiatives, and innovative city applications, the strategy aims to enhance the overall quality of life for the people of Somalia.

The strategy also addresses the critical aspect of spectrum requirements for 5G deployment. Based on the provisions of the National Communication Law, the strategy outlines the need for a substantial amount of harmonized spectrum, both in the mid-bands and high-bands, to support 5G services. It emphasizes the importance of ecosystem maturity, including user devices and network equipment readiness, to ensure the country's booming and timely deployment of 5G.

To facilitate the development and deployment of innovative 5G technologies, services, and applications, the strategy explores the establishment of 5G regulatory sandboxes. These controlled environments enable testing, experimentation, and collaboration among the National Communication Authority (NCA), industry players, and technology providers. The sandboxes aim to identify technical challenges, address regulatory gaps, and facilitate the smooth adoption of 5G technology.

The National Communications Authority (NCA) carefully evaluated several approaches for deploying 5G infrastructure. After thorough consultations, the NCA decided on a strategy where existing private telecom operators will be primarily responsible for deploying the 5G infrastructure. This approach mandates that these operators adhere to strict technical and security standards set by the regulatory authorities. Additionally, the strategy emphasizes aligning with digital inclusion policies to ensure broad and equitable access. The strategy underlines the necessity for a flexible and adaptive approach in infrastructure deployment, aiming to meet diverse requirements and guarantee efficient, reliable connectivity.

Introduction

The National Communications Authority (NCA) of Somalia, established under the Communications Act of 2017, is the regulatory body responsible for overseeing the communications sector in the country and the implementation of the National Communications law and policies of the Ministry of Communications and Technology. With a mandate to regulate various aspects of the sector, including telecommunications, Internet, broadcasting, Information and Communications Technology (ICT), and e-commerce services, the NCA aims to foster the development of the ICT industry, promote fair competition, ensure transparency, protect consumer interests, and maintain its role as an independent regulator. In line with its commitment to managing spectrum resources and facilitating the countrywide development of 5G infrastructure, the NCA has formulated a comprehensive 5G strategy for Somalia. This strategy is designed to leverage the potential of the fourth industrial revolution, commonly known as Industry 4.0. By harnessing the capabilities of 5G technology, the NCA aims to support and enhance the advancements associated with Industry 4.0.

5G, the fifth generation of wireless technology for cellular networks, represents a significant leap forward compared to its predecessors. It substantially improves data transfer speed, latency, capacity, and connectivity. By enabling faster and more reliable wireless connections, 5G facilitates seamless communication between devices, machines, and systems, crucial for the efficient functioning of various Industry 4.0 technologies that rely on real-time data exchange and collaboration. Furthermore, 5G provides the necessary infrastructure to accommodate the anticipated proliferation of IoT devices in the Fourth Industrial Revolution. With its high capacity and low latency, 5G enables seamless connectivity and communication among many IoT devices, promoting advanced automation and intelligent decision-making.

The high-speed and low-latency capabilities of 5G also enable real-time data collection, transmission, and analysis. This empowers businesses to gather and process real-time data from sensors, machines, and other connected devices. The availability of real-time data facilitates predictive analytics, machine learning, and AI applications, driving optimized operations, improved efficiency, and better decision-making. Moreover, 5G networks facilitate the deployment of edge computing infrastructure, which brings data processing and storage closer to the network's edge. By reducing latency and enabling faster response times, edge computing combined with 5G becomes critical for time-sensitive applications such as autonomous vehicles, smart grids, and remote healthcare. It allows for data processing and analysis at the network's edge, minimizing the need to transmit large volumes of data to centralized cloud servers.

The NCA's 5G strategy aligns with the National Communications Law, the Ministry of Communications and Technology's spectrum policy, the spectrum regulations, and the NCA's strategic plan for 2023-2027. By implementing this strategy, Somalia aims to capitalize on the transformative potential of 5G technology, supporting the country's technological development and embracing the opportunities presented by the Fourth Industrial Revolution.

Strategic Goals

The 5G strategy will achieve the following goals:

Comprehensive Connectivity:	Establish countrywide 5G infrastructure, ensuring access in all areas and bridging the digital divide for affordable high-speed internet and advanced communication services.
Economic Growth and Innovation:	Leverage 5G to stimulate economic growth, attract investments, and transform industries through innovation, enhancing productivity, competitiveness, and job creation.
Effective Regulation and Policy:	Develop robust regulatory frameworks and policies that support 5G deployment, ensuring fair competition, consumer protection, and adherence to spectrum management, data security, and privacy regulations.
Research Leadership:	Foster collaboration in research and development to position Somalia as a 5G innovation leader, driving technological advancements and supporting the growth of local technology companies.
Societal Benefits and Quality of Life:	5G has the potential to deliver societal benefits, such as advanced healthcare, improved public safety, sustainable energy initiatives, and innovative city applications, enhancing the overall quality of life for citizens.

5G The Network of the Future and Its Socio-economic Impact

We are currently experiencing the Fourth Industrial Revolution, characterized by transformative technologies that have the potential to enhance global competitiveness, drive economic growth, achieve sustainable development goals, and reshape social behavior. Disruptive technologies such as the Internet of Things, artificial intelligence, data analytics, automation, robotics, cloud computing, virtual and augmented reality, 3D printing, and drones play a pivotal role in this industrial and social revolution.

However, the true power of these technologies lies in hyperconnectivity—a seamless, secure, and reliable network that enables continuous, high-capacity, high-speed connections between individuals and machines. The fifth generation of mobile technologies, 5G, is a crucial catalyst for this transformation. By delivering wireless broadband services at gigabit speeds, facilitating Internet of Things connections, and offering software virtualization for versatile applications, 5G empowers industrial advancements and fosters innovative business models.

5G applications can be classified into 16 vertical groups, which are listed below:

Each corresponds to a sector of activity or socio-economic sphere that will undergo fundamental transformative changes thanks to access to 5G services and technologies. In these sectors, 5G will positively impact aspects such as the improvement of competitiveness, productivity, efficiency in the use of productive resources, or terms of more excellent quality or performance of the products or services generated in these sectors and areas. Among these verticals, this strategy will promote the application of 5G within the vertical sectors in which "National ICT Policy 2019-2024" promotes sectorial digitalization projects (agri-food, mobility, health, and trade).

Thus, in the industrial field, 5G will be the leading enabler of digital transformation and a key enabler in the ecological transition in mobility, manufacturing, health, energy, agroindustry, and entertainment.

5G Use Cases (IMT-2020 is supported by five (5) critical functional drivers, namely**):**

a) **Enhanced Mobile Broadband (eMBB)** for faster data connections, higher throughput, greater capacity (up to 10 Gbps), and extended mobile coverage with the Ability to support a higher number of devices

Agriculture	Automobiles and road transport	Drones	Education
Health	Energy	Fixed wireless access	4.0 Industry
Media and entertainment	Public safety	Smart buildings	Smart Cities
Smart public services	Tourism	Transport	Virtual Reality

using high amounts of data. This driver addresses the requirements for human-centric use cases requiring access to multimedia Content, services, and data.

b) **Ultra-reliable low latency communication (uRLLC)** for time-sensitive connections providing for reduced latency for data uploaded from a device to reach its target (1ms
On 5G compared to 10ms on 4G). This driver requires stringent requirements concerning latency, throughput, and availability to enable wireless control of manufacturing processes, remote medical surgery, and automation of electricity distribution amongst Other uses.

c) **Massive machine-type communications (mMTC) are characteriz**ed by many devices being connected to the network, providing for data-intensive applications transmitting low-volume data. This driver relies on small-cell deployment and spectral efficiency within networks.

d) **Energy efficiency** leading to lower costs is realized on the network via the quantity of information transmitted to or received from users per unit of energy consumption of the radio access network. Similarly, energy efficiency on communications devices is measured based on the quantity of information per unit of power consumption. These drivers support intelligent electricity grids and metering, industrial automation, Smart consumer wearables, to name but a few use cases.

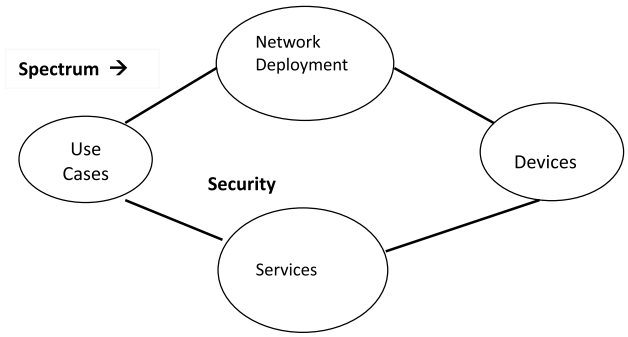
e) **Security** within networks, platforms, and applications leads to high reliability and availability and is a central driver to the adoption of 5G by end users and private and Public institutions.

Table 1: Functional drivers for successful implementation of (5G)

Functional Drivers	Applications
Enhanced Mobile Broadband (eMBB)	Fixed and mobile wireless access services, public protection and disaster response services, massive content streaming services, remote examinations, remote surgery, enhanced in-building broadband services, high-definition cloud gaming, real-time virtual and mixed reality services, etc.
Ultra-reliable Low Latency Communications (uRLLC)	Autonomous vehicles, drones and robotic applications, health monitoring systems /tele health, smart electricity/ water grid and metering, factory automation, mission critical security and safety services, high definition real-time gaming, etc.
Security	
Massive Machine-Type Communications (mMTC)	Asset tracking, smart cities and building, e agriculture, energy/utility management, industrial automation, smart consume wearables, environmental managements, intelligent surveillance, smart retail services, smart electricity/water grid and metering, etc.
Power efficiency	

Implantation of 5G Technology

Implementation of 5G provides a perpetually increasing number of applications and services to add to the services and applications already provided by current telecommunications networks. While services historically focussed on the mass market, the new capabilities inherent to 5G will, going forward, give the capability to develop new applications and services for specific segments within and external to the ICT industry. It is, therefore, necessary to assess the entire 5G ecosystem to ensure sustainable implementation by analyzing the functional drivers to benefit from new technologies and to understand the interdependencies between critical areas of this ecosystem such as spectrum, core and access network deployment, use cases and services, devices, and security.



Source: IMF, 2020

a. 5G Core Network deployment

Different telecommunications service licensees will have different approaches to deploying 5G depending on the existing capabilities of their networks. The 5G network equipment has been designed to interwork existing 4G networks at core and radio access network levels.

The industry has adopted two standardized approaches, namely: -

I) Non-standalone (NSA) 5G network deployment whereby the 5G radio access network connects to and is controlled by the existing 4G core network. Software and hardware within the legacy 4G radio network will need to be upgraded to support 5G spectrum frequency bands to aggregate processing capacity as required by 5G and to support antenna systems for multiple-input and multiple-output (MIMO). This approach does not require the implementation of a 5G core network, and

II) Standalone (SA) 5G network deployment whereby the 5G radio access network only connects to the 5G core network. The 5G core network integrates with the legacy 4G core network at the network level. The SA 5G network deployment will allow telecommunications service licensees to fully utilize 5G radio equipment and new core network capabilities like network slicing. This approach to network deployment will provide for optimal implementation of 5G technologies.

The features supported by SA deployment of 5G networks will support new services in that: -

A) **Network slicing** allows for creating dedicated virtual networks over a shared physical network infrastructure. This 5G feature allows telecommunications network operators to address specific quality of service requirements of customers depending on the use case, e.g., e-agriculture applications have different requirements from e-health and e-educations applications. This network feature will also provide enhanced connectivity for mission-critical services deployed in public safety networks and

B) **Virtualization** of the network will support faster service provisions and enhance network maintenance in that 5G networks will allow for the division of hardware resources into functions that can be controlled by software. Centralization of control functions enables routing decisions to fit specific requirements globally and provides end-to-end network visibility for establishing and maintaining connectivity.

b. 5G Access Network Deployment

i. **Site Deployment:** Deployment of IMT-2020 (5G) networks may require denser network deployments, potentially increasing the number of base stations and towers. To this end, telecommunications service licenses will be needed to improve 5G site deployment efficiency by sharing resources such as antennas, power, and transmission and minimizing site infrastructure reconstruction.

ii. **Backhaul** transmission deployment: telecommunications service licensees will face their biggest challenge in providing sufficient backhaul transmission from sites to the core network to support growing mobile data traffic. If backhaul capacity is not provided for during the 5G rollout, it will result in a bottleneck that may lead to a market failure for 5G. Therefore, the backhaul transmission network is critical in deciding on a 5G implementation model.

A) Fiber backhaul deployment: fiber backhaul provides stable connections with very high interference immunity and is suitable for deployment to support outdoor sites, access networks, and core network implementation. Fibre is considered the preferred backhaul technology for 5G Networks. The cost of fiber deployment may decrease with increasing competition and economies of scale. The relatively high cost and period for fiber installation related to trenching, installing ducts, and deploying physical cables to date mean that use will be limited.

B) Microwave backhaul deployment: Microwaves can support 5G cell sites at a lower cost within the spectrum bands 7-40GHz, 70/80GHz, 75-110GHz, and 110-170GHz. It is expected that microwave links will be implemented instead of fiber in Somalia with low fiber penetration due to the cost of implementation.

Microwave (Fixed wireless) backhaul networks can be deployed to support outdoor sites and the 5G access network depending on the spectrum band it provides for backhaul solutions ranging from less than one (1) km to more than thirty (30) km. Fixed wireless backhaul offers a lower-cost alternative to fiber backhaul networks. This can be reduced further through point-to-multipoint deployment and daisy-chaining of multiple small cells to a fiber-connected cell. Such deployment will serve to shorten the time to market.

C) Satellite backhaul: satellite can be a viable solution for backhaul transmission for remote sites within the 5G network.

c. Use cases:

Implementing 5G and associated technologies within the IMT-2020 family provides an opportunity to offer more services to the mass market over the telecommunications network than just voice, SMS, and broadband data. The deployment of IMT-2020 networks provides impactful industrial advances in many industries utilizing ICT. These advances will be attained through enhancing operational effectiveness, improving the safety of workers and the workplace, enabling faster and more effective assembly of products, and using artificial intelligence and robotics, to name a few. The ICT sector will provide the necessary support and underlying networks through: -

A) **Continuity of voice services** Given the importance of voice services to date and the fact the licensees may re-farm spectrum previously used for 2G and 3G, this will necessitate the deployment of voice services. To ensure continuity of voice services when customers move within areas with different access technologies, it is foreseen that operators will deploy VoLTE and VoNR to continue providing voice services to their customers.

B) **eMBB products and services:** IMT -2020 networks will provide bigger capacity, lower latency, and lower cost/bit offered by telecommunications service licensees trending to provide unlimited data bundles. Low latency of up to 1 milliseconds supports use cases in online gaming requiring real-

time feedback, content streaming, and critical communications, e.g., remote visual monitoring of patients, remote control of devices, and industrial automation.

C) **Enterprise products and services:** IMT-2020 networks will be a crucial enabler of the 4th Industrial Revolution because they provide network slicing and quality of service differentiation. These network features offer the capability and flexibility to serve the needs of different enterprise customers.

With the deployment of this network, IoT applications will be able to make use of new IMT-2020 functionality such as ultra-reliable low latency communications and time-sensitive networking required of time-critical manufacturing processes, interpretation of data from diverse assets, production lines, and machine-to-machine interaction, allowing for risk mitigation and infrastructure management, e.g., smart grids, smart metering, factory automation, etc.

The deployment of these services opens the market for private 5G networks and small licensees, creating an opportunity for smaller licensees to provide applications and services tailor-made to niche markets while leasing the network from 5G network owners wholesale. The scenario fosters entrepreneurship and creates new employment opportunities, contributing to economic and social well-being.

Examples of various use cases identified as relevant to Africa are shown in Table 2 below.

Application	Use Cases	Examples
Communications	• High-speed broadband in the home. • High-speed broadband in the office	• Improved broadband connectivity due to higher-speed, lower-latency connections. • Expand internet access due to new or expanded network deployments.
Agriculture	• Stationary/near-stationary monitoring networks • Collaborative robots	• Connected sensors can be quickly deployed in agriculture settings, allowing for better monitoring of crops, animals, and equipment • Monitoring could also benefit wildlife management and protection • Integration into agricultural processes can increase efficiencies and lower cost for labour-intensive industries
Healthcare	• Virtual meeting • High-speed broadband in the home. • High-speed broadband in the office • Remote objects manipulation • Smart wearables	• Remote access to medical professionals and specialized care through enhanced video conferencing, remote diagnosis, and remote surgery. • Collection and analysis of patients data from connected wearable sensors/ monitors • Personalized medicine leveraging data collected from wearables and improved access to providers.

Education	• High speed broadband in homes, schools and businesses • Virtual meeting • Virtual or augmented reality • Remote object manipulation	• Improved and more immersive distance learning via video conferencing and improved access to rich media resources • Industrial/workplace education due to videoconferencing, augmented reality/ virtual reality, and haptic feedback.
Manufacturing mining, and construction	• Collaborative robots • Remote object manipulation • Virtual meeting • Virtual or augmented reality • Ultra-low-cost networks	• Smart factories, including replacement of wired connections, cell automation. Machine vision, improved efficiency • Realtime assistance via video conferencing and augmented reality • Remote control of industrial equipment
Public safety and disaster response	• Broadband to special events • Remote object manipulation	• Enhanced, secure, mission-critical communications • Coverage extension in out-of-network areas through new device-to-device connectivity models. • Unmanned vehicles for rescue and reconnaissance

Table 2: Selected 5G use cases relevant to Africa

Implementing the use cases will necessitate the National Communications Authority (NCA) to not only provide for spectrum licenses but also to consider licensed shared access to spectrum resources dependent on business cases presented to the authority when considering applications for spectrum licenses.

Spectrum Requirements for 5G

Section 6, Article 35, 36 (5), 37, 38, 39, 40 of National Communication Law mandates the NCA with the planning, monitoring, and licensing of spectrum in "**Consideration and planning the currently existing and future expected needs or any other issues deemed necessary."** Like the existing 4G network, 5G carriers transmit information wirelessly through an electromagnetic spectrum, precisely, certain frequency bands in the radio spectrum. It stands to reason that spectrum is one of the most critical elements in ensuring the successful and timely deployment of 5G in Somalia. The NCA outlines recommendations for implementing spectrum requirements for 5G deployment in Somalia based on the two fundamental principles below:

a) A significant amount of new harmonized spectrum across different countries in the region.
   - Near 100 MHz contiguous for 5G mid-bands (between 1GHz to 6GHz) and around 1GHz contiguous spectrum for 5G high bands (>6GHz).

b) Ecosystem maturity, including user devices and network equipment readiness.

The ITU World Radio Conference 2019 (WRC-19) held in Egypt concluded on the spectrum.
band to be allocated for the implementation of IMT-2020 (5G) and published the resolutions
In the WRC-19 Final Acts on 31 March 2020. This document carries international treaty status
And binds Somalia as an ITU member state to the provisions for spectrum allocation contained therein. The following spectrum bands (referred to as millimeter wave bands) were allocated for IMT-2020 (5G) subject to the WRC-19 Resolutions and radio regulations: -

24.25 – 27.5 GHz	**37.0 – 43.5 GHz**
47.2 – 48.2 GHz	**66.0 – 71.0 GHz**

a. Identified Bands for 5G in Somalia

To support a wide range of use cases and requirements, successful 5G implementation in Somalia must rely on both new and existing IMT 5G spectrums that have been harmonized globally and consist of a multi-layer spectrum within the following three key frequency ranges:

I) Low band (<1GHz): For widespread coverage and to support the Internet of Things (IoT) Services.
II) Mid-band (1GHz to 6GHz): Its large contiguous bandwidth forms the first layer of 5G with the balance between capacity and coverage.
III) High band (>6GHz): For ultra-high broadband speeds envisioned for 5G.

Based on the analysis conducted on global 5G commercial launch and ecosystem readiness, Priority 1, Priority 2, and Priority 3 spectrum for Somalia's 5G deployment have been identified.

i. Mid-band spectrum (between 2 - 4 GHz) – Priority 1

Mid-band spectrum refers to the 3300-4200 MHz (C-band) spectrum bands and is suited for urban and rural IMT-2020 network rollout. The spectrum band 3400-3800 MHz has emerged as a primary band for IMT-2020 deployed in that it is near-globally harmonized and allows for the assignment of large (80-100 MHz) contiguous blocks of the spectrum as per the frequency channeling arrangements contained in ITU-R M.1036-6. Further harmonizing this spectrum band for IMT-2020 will allow for economies of scale regarding equipment availability.

5G	
3300	**4200**

Figure 1: 3.3 – 4.2 GHz Band

The spectrum above bands were not historically allocated to mobile services on a primary basis. Thus, the available spectrum is shared with fixed satellite services and fixed services (point-to-point links and WiMax).
It is, therefore, necessary that the Authority considers the following options going.
Forward before consideration of the spectrum band 3300 - 4200 MHz for IMT-2020.

ii. Mid-band spectrum (1 GHz) – Priority 2

The L-band is an excellent complimentary band to combine with sub 1 GHz (e.g. 700 MHz). The band provides a good combination of capacity and coverage. The ecosystem is developed in Europe for its use by supplemental downlink (SDL), which could lead to benefits from economies of scale. A total of 90 MHz of spectrum is available on a TDD basis.

5G	
1427	**1518**

Figure 2. 1427 – 1518 MHz Band

iii. Mid-band spectrum (4-5 GHz) – Priority 2

The band is identified for IMT in Somalia and some countries through a footnote in ITU Radio Regulations—the band's use conditions for IMT have been confirmed by WRC-23. The ecosystem for the band is still under development and has yet to mature. The band is considered to be released to the market after the decisions of WRC-23.

5G	
4800	**4990**

Figure 3. 4.8 GHz Band

iv. High-band / mmWave (24.25-29.5 GHz) – Priority 2

The 26GHz and 28GHz bands (mmWave, from 24.25GHz – 29.5GHz) frequency range is being considered internationally to supplement 3.5GHz for fiber-like, ultra-high throughput at 5G hotspots and potential for low latency communications. mmWave is unsuitable for comprehensive area coverage as it has a limited range. Line-of-sight is needed, even though it has a mature ecosystem and has been adopted from Telcos globally. Given that, coexistence between FSS and 5G is possible with the following recommendations:

a) **24.25GHz – 27.0GHz** (total bandwidth of 2.75GHz) to be allocated to 5G with resolutions depending on coexistence with Earth Exploration Satellite Service (EESS) in WRC-19; and
b) **27.0GHz – 29.5GHz** (total bandwidth of 2.5GHz) to be allocated to 5G with appropriate interference mitigation (5G Base Station is recommended to be set at this range to avoid interference from FSS earth stations).

v. High-band / mmWave (37-43.5 GHz) – Priority 3

The 40 GHz band is harmonized globally for the deployment of IMT. It is a promising band for the early deployment of 5G millimeter wave systems. It provides extreme bandwidths for ultra-high broadband speeds. Verticals may use it for private 5G networks, though the ecosystem has yet to develop and mature.

vi. High-band / mmWave (40/50 GHz) - Priority 3

The 40/50 GHz bands include the 47.2-48.2 GHz frequency band. The band is identified for deployment of IMT in a few countries. It provides extreme bandwidths for ultra-high broadband speeds. Verticals may use it for private 5G networks, though the ecosystem has yet to develop and mature.

vii. High-band / mmWave (66 – 71 GHz) - Priority 3

The 66 - 71 GHz band is identified for IMT for flexible use for 5G systems, enabling both IMT and non-IMT technologies and sharing with WiGig systems. The band provides extreme bandwidths for ultra-high broadband speeds.

Summary of 5G frequency Bands

Priorities	Range	Band	Status
Priority 1	3300-4200	n78	Current utilization: 4G / C-band
Priority 2	4800-4990	n79	FSS and Fixed wireless access (FWA)
Priority 2	1427 – 1518	n50	Radio astronomy And satellite services
Priority 3	24.25-29.5 GHz	n57 and n58	Current utilization: Microwave
Priority 3	37-43.5 GHz	n260	Current utilization: Microwave
Priority 3	40/50 GHz	40/50 GHz	Fixed point-to-point microwave links And satellite communications
Priority 3	66 – 71 GHz	66 GHz	Microwave

5G Infrastructure Deployment

In the swiftly evolving world of telecommunications, the National Communications Authority (NCA) has assessed various methods for rolling out 5G technology. This strategic process has resulted in a decision to rely mainly on existing private telecom operators for deployment, effectively utilizing their established infrastructure and market familiarity. This approach hinges on two main goals:

- Adhering to stringent technical and security standards set by regulatory authorities
- Ensuring digital inclusion
- Providing equal access for all demographics

The strategy's strength lies in its adaptability and flexibility, aimed at meeting diverse needs while maintaining high-quality, consistent, and reliable connectivity.

However, Somalia's path to 5G faces significant hurdles. The limited reach of 4G networks, mainly in urban areas, is a considerable challenge, as a robust 4G foundation is critical for a smooth transition to 5G. Additionally, operators' reluctance to share infrastructure, essential for cost efficiency and rapid deployment, underscores the need for a collaborative mindset and regulatory incentives for shared infrastructure usage.

Another concern is telecom operators' apparent disinterest in extending services to rural and underserved areas, potentially widening digital gaps. To address this, it's crucial to offer strategic incentives encouraging operators to expand into these regions, possibly through public-private partnerships, tax breaks, or specific regulatory actions.

A coordinated effort from all stakeholders is essential to ensure a successful 5G deployment in Somalia. Strategies should include enforcing coverage obligations, encouraging infrastructure sharing, and incentivizing rural area investments. Raising public awareness of 5G's transformative potential could also build support for this technological leap. Overcoming these challenges will place Somalia at the forefront of 5G adoption, promoting equal access and the full benefits of this technology.

The plan to deploy 5G through current telecom operators, backed by clear regulatory obligations and spectrum licensing conditions, is a solid path for efficient and effective technology rollout. This strategy prioritizes nationwide coverage, service quality, security, and support for various industry players. Crucially, it includes regulatory measures to spur competition and ensure service affordability.

Competition is vital in telecom, fostering innovation, improving service quality, and reducing costs. The NCA's responsibility is to embed competitive elements in spectrum licensing, advocating for infrastructure sharing, fair access to essential network resources, and transparent interconnection policies. These steps will promote a competitive market and encourage multiple operators to invest in 5G, enhancing services and making pricing more consumer-friendly.

Affordability is also crucial. With 5G's myriad benefits, it's imperative to make these services accessible to everyone, from individuals to businesses. The NCA should enforce regulatory requirements for operators to provide affordable 5G plans and pricing. Tariff regulation, cost-based pricing, and budget-friendly data packages will prevent a widening digital divide, allowing all societal sectors to enjoy 5G's advantages.

The NCA needs a comprehensive telecommunications industry regulatory framework to address competition and affordability. The framework should include fair competition, consumer protection, service quality, and investment incentives. The framework could set rules against anti-competitive behavior, ensure equal opportunities for operators, and mandate transparent, non-discriminatory access to network infrastructure. It should also enforce network resilience and reliability standards, which are vital for integrating 5G into critical and mission-critical applications. Requirements may include redundancy measures and emergency recovery plans for service continuity.

Data protection and privacy are also crucial. With 5G's increased connected devices and data exchanges, strict regulations are essential for user privacy and robust security. The NCA must ensure compliance through regular audits and collaborations

with stakeholders.

The pricing for the 5G spectrum follows the existing structure, aligning with technology-neutral licenses held by current operators.

While deploying 5G through existing operators is beneficial, it has challenges. The underdevelopment of 4G infrastructure in Somalia is a significant barrier, affecting the transition to and effectiveness of 5G.

Furthermore, operators' reluctance to engage in infrastructure sharing, vital for optimal resource use and avoiding duplication, may lead to deployment inefficiencies. This hesitance, possibly due to competitive fears or financial considerations, calls for a strategic shift towards collaborative infrastructure development.

National 5G strategy Initiatives

The National Communications Authority (NCA) establishes the following strategic initiatives for the 5G development in Somalia:

5G Strategy Objectives	Strategic Initiatives	Key Outputs
1. Comprehensive Connectivity	a) Achieve nationwide 5G coverage, ensuring access in both urban and rural areas. b) Promote digital inclusion by making 5G accessible and affordable for all. c) Promotion of infrastructure sharing between the operators to enhance network availability and reduce deployment costs.	1. 25% 5G Network Coverage by 2027 2. 30% Reduction in Digital Divide 3. 20% Lower Deployment Costs: Through infrastructure sharing among operators.
2. Effective Regulation and Policy Development	a) Development of a Comprehensive Regulatory Framework: Establish clear guidelines and regulations for 5G deployment, including spectrum allocation, infrastructure development, and service delivery standards. b) Promotion of Fair Competition and Consumer Protection: Implement policies to ensure a competitive 5G market, protect consumer interests, and prevent monopolistic practices.	1. Finalize and publish the 5G spectrum allocation, infrastructure sharing regulations, and quality of service standards regulations 2. Improve the market competitiveness by having at least 3 operators providing competitive 5G services. 3. Enhance consumer protection measures leading to a 20% increase in consumer satisfaction ratings within 18 months, as indicated by surveys on service quality and pricing fairness.
3. Secure Infrastructure and Risk Management	a) Implement robust cybersecurity measures to protect 5G infrastructure. b) Establish risk management frameworks to address vulnerabilities and threats in the 5G network. c) Promote collaboration for security standards and best practices with global and industry partners.	1. Finalize and deploy cybersecurity measures within 6 months, aiming for zero breaches related to 5G infrastructure annually. 2. Risk Management Framework Establishment: Create and apply a comprehensive risk management framework for the 5G network within 9 months, reducing identified risks by 50% within the first year. 3. Security Collaboration Index: Develop and initiate at least three international or industry partnerships for security standards within the first year, aiming for a 20% increase in compliance with global best practices annually.

5G Private Mobile Networks

5G private networks refer to the deployment of 5G technology specifically for dedicated, private use by organizations rather than being part of a public telecommunications network. These networks offer several advantages, including high data speeds, low latency, increased capacity, and enhanced security, making them attractive to manufacturing, logistics, healthcare, transportation, and utilities.

With its ability to handle massive amounts of data quickly and reliably while accommodating a high density of connected devices, 5G promises to transform businesses' operations. It enables enhanced and flexible processes, improved productivity and safety, and seamless integration with artificial intelligence. The benefits of private 5G networks extend across a wide range of industries, including oil and gas, shipping, transportation, manufacturing, retail, sports and entertainment, healthcare, hospitality, and government sectors. By delivering wired performance without physical wires, 5G opens new possibilities for autonomous or remote operations and introduces advanced functionalities that can significantly enhance operational efficiency and effectiveness. As the adoption of private 5G networks grows, regulatory considerations play a crucial role in ensuring their successful implementation. The regulatory framework should address various aspects, including spectrum allocation, licensing, security, and compliance. Spectrum allocation for private networks requires careful planning to ensure sufficient spectrum resources are available for deployment. Licensing mechanisms need to be designed to enable organizations to acquire the necessary spectrum and establish and operate private 5G networks efficiently.

The National Communications Authority (NCA) has adopted two primary models for deploying 5G private mobile networks. The first adopted model capitalizes on the services of existing telecom operators, allowing enterprises to use licensed 5G public service providers for their private networks. This approach enables businesses to focus more on their core operations. However, it also means reliance on the public network's performance and coverage, which might only sometimes meet the business's specific requirements.

The second model adopted by the NCA enables enterprises to create their own independent 5G private mobile networks on their premises. For this, the NCA issues spectrum licenses to qualified enterprises, allowing them to manage and operate their network infrastructure. This approach offers enterprises complete control over network management and flexibility in adapting to evolving business needs. The challenge here lies in the substantial investment in in-house expertise or subcontracting parts of the network's implementation and management.

By adopting both these models, the NCA provides enterprises with comprehensive options for deploying 5G private mobile networks, each with distinct advantages and considerations.

5G Regulatory Sandboxes

The National Communications Authority (NCA) has embraced a dual-model approach for deploying 5G private networks, enhancing flexibility and fostering innovation. This strategy allows businesses to choose between or combine two distinct models for their 5G network needs.

On the one hand, businesses can utilize services from existing telecom operators, integrating their 5G private networks with licensed public 5G services. This model is particularly beneficial for companies looking to focus on their core operations while still benefiting from the advancements in 5G technology without the need for extensive infrastructure investment.

On the other hand, the NCA also facilitates enterprises in establishing their own independent 5G private networks. Issuing spectrum licenses enables businesses to build and manage their own 5G infrastructure on-site. This model offers unparalleled control and customization, allowing businesses to tailor their networks to their specific needs and adapt quickly to technological advancements and changing business requirements.

Using both models, the NCA will enable businesses to leverage each approach's strengths. This dual-model strategy offers flexibility and encourages a more innovative and adaptive 5G network deployment approach.