



**MINISTRY OF ICT, INNOVATION AND YOUTH
AFFAIRS**

**NATIONAL RADIO FREQUENCY SPECTRUM
POLICY**

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1 FOREWORD

The development of the Radio Frequency Spectrum Policy comes at a time when the world is grappling with the effects of a global pandemic. As the world looks for lasting solutions, the lessons learnt on how to mitigate the pandemic effects through utilization of digital technologies, point us to our new realities. A post-COVID-19 era, where the demand of digital platforms for our daily activities is re-instated, emphasizes the need for countries to adequately manage their spectrum resources. At the same time, new and emerging technologies continue to demand for more efficient use of this scarce resource, thus calling us to re-assess and to re-structure how we manage spectrum. This Policy therefore comes at an opportune time.

This Policy is developed with the aim of achieving an effective management Framework for spectrum in Kenya. Effective management of the Radio Frequency Spectrum is essential to the continued growth of the communications sector in Kenya. The growth of mobile phone penetration and use of mobile platforms has unleashed new opportunities for people, businesses and governments in the Digital Economy. The Ministry therefore, endeavors to create an enabling policy and legal environment for the communications sector, whose role in the Kenya's economy cannot be overstated.

I commend the Multi-stakeholder team who gave their invaluable input in the development of this Policy. I further call upon the Communications Authority of Kenya to ensure the implementation of the principles set out in this Policy through subsequent regulations and guidelines.

Hon. Joe Mucheru, EGH
Cabinet Secretary
Ministry of ICT, Innovation and Youth Affairs

2 EXECUTIVE SUMMARY

Over the last two decades, Kenya's ICT sector has become renowned for its advanced developments, which have applied the use of cutting edge solutions. Key to this development has been the use of Radio Frequency Spectrum, a national resource that underpins the growth of various sectors including; ICT, aviation, maritime, meteorological, security and safety, among others.

Radio Frequency Spectrum is a critical resource for future innovation and is a key driver of economic growth in the digital age. Forecasting the demand for these services and allocating adequate spectrum to cater for new technologies in advance, will ensure that services are provided in a timely and efficient manner. This Policy augments the aspirations of the Digital Economy Blueprint which seeks to transform Kenya's economy into a digital economy.

This Policy document aims to:

- establish a strong foundation for the development of Kenya's ICT sector by promoting the efficient use of spectrum;
- strengthen Kenya's strategic position by facilitating the introduction of key new wireless services, while at the same time ensuring the availability of sufficient spectrum for essential public services;
- enhance the Framework for flexibility and transparency in radio frequency spectrum management; and
- give direction on timely introduction of new technologies and services across the radio frequency spectrum bands in order to maximise the economic benefits of the national resource.

The Policy takes cognizance of the global harmonization and the role of international best practice in the distribution and management of radio frequency spectrum.

This Policy comprises of eleven (11) sections:

- Section 1, 2, and 3 outlines the forward, executive summary and preamble.
- Section 4 is the introduction and guiding objectives and key recommendations.
- Section 5 covers the situational analysis
- Section 6 covers the objectives of the National Spectrum Policy.
- Section 7 outlines the current Policy on radio frequency spectrum management.
- Sections 8 highlights the principles for radio frequency spectrum management,
- Section 9 captures the general policy guidelines for users of spectrum
- Section 10 covers the wireless broadband networks
- Section 11 highlight the national emergency telecommunications/ICT plan

- Section 12 and 13 cover the review of the Policy and institutional framework for implementation of the radio frequency spectrum policy

ACRONYMS

ATU	African Telecommunication Union
CA	Communications Authority of Kenya
GSR	Global Symposium for Regulators
ICT	Information Communications Technology
ICTA	The Information and Communication Technology Authority
IMT	International Mobile Telecommunications
ITU	International Telecommunication Union
ITU-R	International Telecommunication Union - Radiocommunication Sector
KICA	Kenya Information and Communications Act No. 2 of 1998
NCS	National Communications Secretariat
PPP	Public Private Partnership
TOFA	Table of Frequency Allocations
WRC	World Radiocommunication Conferences

DEFINITIONS – Aligned with International Standards (ITU)

<p><i>Electromagnetic Spectrum/Radio frequency Spectrum</i></p>	<p><i>The electromagnetic spectrum refers to the range of frequencies (the spectrum) of electromagnetic radiation. This electromagnetic radiation is made up of waves, of varying wavelengths, which carry energy. From shortest to longest wavelength, the full electromagnetic spectrum comprises gamma rays, x-rays, ultraviolet light, visible light, infrared light, microwaves and radiowaves. The radio spectrum refers to that part of the electromagnetic spectrum which comprises radiowaves; these are waves with wavelengths of between 1mm and 10,000km. Waves are also measured according to their frequency. All waves travel at the same speed meaning the shorter the wavelength, the greater the number of waves that will pass through a given point during a particular period of time. The number of times a wave passes through a point in one second is called its frequency and is measured in Hertz (Hz). The radio spectrum is the part of the electromagnetic spectrum with frequencies from 3 Hz to 3,000,000,000 Hz (or 3,000 GHz).</i></p>
<p><i>Radiocommunication service</i></p>	<p><i>A service involving the transmission, emission and/or reception of radio waves for specific telecommunication purposes. In these Regulations, unless otherwise stated, any radiocommunication service relates to terrestrial radiocommunication. (e.g. Mobile service, Mobile satellite service)’ RR, No. 1.19 Radiocommunication service:</i></p>
<p><i>Wireless Broadband</i></p>	<p><i>Wireless broadband is telecommunications technology that provides high-speed wireless Internet access or computer networking access over a wide area. The term comprises both fixed and mobile broadband.</i></p>
<p><i>Allocation (of a frequency band):</i></p>	<p><i>Entry in the Table of Frequency Allocations of a given frequency band for the purpose of its use by one or more terrestrial or space radiocommunication services or the radio astronomy service under specified conditions. This term shall also be applied to the frequency band concerned: RR, No. 1.16 allocation (of a frequency band)</i></p>
<p><i>Allotment (of a radio frequency or radio frequency channel)</i></p>	<p><i>Entry of a designated frequency channel in an agreed plan, adopted by a competent conference, for use by one or more administrations for a terrestrial or space radiocommunication service in one or more identified countries or geographical areas and under specified conditions: RR, No. 1.17 allotment (of a radio frequency or radio frequency channel):</i></p>
<p><i>Assignment (of a radio frequency or radio frequency channel):</i></p>	<p><i>Authorization given by an administration for a radio station to use a radio frequency or radio frequency channel under specified conditions: RR, No. 1.18 assignment (of a radio frequency or radio frequency channel)</i></p>
<p><i>Base Station</i></p>	<p><i>“One or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying on a radiocommunication service, or the radio astronomy service.” (e.g. mobile earth station): RR, No. 1.61 Station</i></p>
<p><i>Spectrum Refarming (Redeployment)</i></p>	<p><i>“Spectrum redeployment (spectrum refarming) is a combination of administrative, financial and technical measures aimed at removing users or equipment of the existing frequency assignments either completely or partially from a particular frequency band. The frequency band may then be allocated to the same or different service(s). These measures may be implemented in short, medium or long time-scales.”; Recommendation ITU-R SM.1603-2.</i></p>
<p><i>Microwave backhaul</i></p>	<p><i>Microwave backhaul refers to the transportation of traffic (voice, video and data) between distributed sites and a more centralised point of presence via a radio link. ... This trend is likely to continue since microwave is a scalable and economical backhaul option compared to leased line copper and new fibre.</i></p>

<p><i>IMT</i></p>	<p><i>The term International Mobile Telecommunications (IMT) is the generic term used by the ITU community to designate broadband mobile systems. It encompasses IMT-2000, IMT-Advanced and IMT-2020 collectively.</i></p>
<p><i>Millimetre wave bands</i></p>	<p><i>Extremely high frequency (EHF) is the International Telecommunication Union (ITU) designation for the band of radio frequencies in the electromagnetic spectrum from 30 to 300 gigahertz (GHz). It lies between the super high frequency band and the far infrared band, the lower part of which is the terahertz band. Radio waves in this band have wavelengths from ten to one millimetre, so it is also called the millimetre band and radiation in this band is called millimetre waves, sometimes abbreviated MMW or mmWave. Compared to lower bands, radio waves in this band have high atmospheric attenuation: they are absorbed by the gases in the atmosphere. Therefore, they have a short range and can only be used for terrestrial communication for distances up to about a kilometer. Absorption increases with frequency until at the top end of the band the waves are attenuated to zero within a few meters. Absorption by humidity in the atmosphere is significant except in desert environments, and attenuation by rain (rain fade) is a serious problem even over short distances. However the short propagation range allows smaller frequency reuse distances than lower frequencies. The short wavelength allows modest size antennas to have a small beam width, further increasing frequency reuse potential. Millimeter waves are used for military fire-control radar, airport security scanners, short range wireless networks, and scientific research.</i></p> <p><i>In a major new application of millimeter waves, certain frequency ranges near the bottom of the band are being used in the newest generation of cell phone networks, 5G networks.[2] The design of millimeter-wave circuit and subsystems (such as antennas, power amplifiers, mixers and oscillators) also presents severe challenges to engineers due to semiconductor and process limitations, model limitations and poor Q-factors of passive devices.</i></p>
<p><i>Tampere Convention</i></p>	<p><i>The Tampere Convention (fully entitled The Tampere Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations) is a multilateral treaty governing the provision and availability of communications equipment during disaster relief operations, particularly as regards the transport of radio and related equipment over international boundaries by radio amateurs. It was concluded at the First Intergovernmental Conference on Emergency Telecommunications (ICET-98) in Tampere, Finland, in 1998, and went into effect on 8 January 2005.[1] As of September 2014, there are 48 state parties to the agreement.</i></p> <p><i>The first treaty of its kind, the convention was conceived primarily as a means to influence party states to pursue a set of common expectations regarding freedom and access of persons providing emergency services in disaster situations. Hindrances to the deployment of telecommunications equipment and operators across borders have cost lives in past disasters.[2]</i></p> <p><i>Issues pertinent to the jurisdiction of the Tampere Convention are discussed at the Global Amateur Radio Emergency Communications Conference (GAREC), which is held yearly at different international locations.</i></p>

<i>Land Mobile Service:</i>	<i>Land mobile service[1] (short: LMS) is – in line to ITU Radio Regulations – a mobile service between base stations and land mobile stations, or between land mobile stations. In accordance with ITU Radio Regulations (article 1) variations of this radiocommunication service are classified as follows: Mobile service (article 1.24);Land mobile service (article 1.26)</i>
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3 PREAMBLE

The Radio Frequency Spectrum is a scarce, and natural national resource which supports a wide range of services in telecommunications, broadcasting emergency services, transport, scientific research and consumer devices. Higher demand (especially for mobile services), convergence between fixed and mobile services and between telecommunications and broadcasting, and the need for ever greater bandwidth, means that access to spectrum is becoming increasingly important.

The Government of Kenya aims to explore ways to manage the resource more efficiently so as to encourage the development of new and innovative services and ensure that this Policy supports the digital transformation of our economy and the development of an Information Society.

This Policy is not an end in itself, but rather, it sets the framework for the future development of electronic communications systems and services. It is an enabler for the various sector requirements and policy objectives in the ICT, broadcasting, transport, defence, public security, emergency services, research and development, and scientific sectors. In developing this Policy, due cognizance has been taken of the potential for convergence, occurring between original techno-centric sectors and/or users of technology and regulatory developments. These have been explored for the sole intention of potentially positioning Kenya to become a world leader in the development of innovative spectrum-based applications for posterity.

Unprecedented times occasioned by disasters and pandemics may arise and therefore spectrum is the intrinsic element that guarantees connectivity. Efficient and effective management of spectrum equips stakeholders (governments, licensees and consumers) with the necessary tools to adequately respond to any such state of emergency and demand by ensuring connectivity and access to communication services by all. Spectrum resources made available by governments during such crisis can contribute to the optimisation of communication infrastructure, in order to better serve the need for public services by communities.

4 INTRODUCTION

The International Telecommunication Union (ITU) is responsible for the global coordination of the radio frequency spectrum through the ITU Radiocommunication Sector (ITU-R) Bureau. The ITU-R is charged with maintaining and extending international cooperation among all the Member States of ITU, for the improvement and rational use of radiocommunications of all kinds. In particular, it is responsible for the coordination and implementation of the Radio Regulations, which are annexed to the ITU Constitution and Convention. These Radio Regulations are revised by the ITU World Radiocommunication Conferences (WRC), normally held every four years. Article 5 of the Radio Regulations contains the Table of Frequency allocations listing frequency bands allocated to the various services according to three ITU geographic regions.

The Government is also cognizant of international best practice in spectrum management such as those agreed in 2005, and are still valid today, by the ITU Global Symposium for Regulators (GSR) for spectrum management to promote broadband access. Adopting the set of spectrum management principles and practices, within the regulator's mandate, has the potential of enabling countries to harness the full potential of wireless broadband technologies.

Amongst the set of best practices for spectrum management identified by the GSR to promote broadband access, which this policy fully adopts for integration into Kenya's national spectrum management processes, are captured in the table below.

N °	GUIDELINES OBJECTIVES	KEY ACTIONS RECOMMENDED
1.	Facilitate the deployment of innovative broadband services and technologies.	<ul style="list-style-type: none">- Promote innovation and introduction of new radio applications and technologies;- Reduce or remove unnecessary restrictions on spectrum use;- Adopt harmonized frequency plans defined by ITU-R recommendations;- Embrace the principle of minimum necessary regulation, where possible, to reduce or eliminate regulatory barriers to spectrum access;- Include simplified license and authorization procedures for the use of spectrum resources;- Allocate frequencies in a manner to facilitate entry into the market of new competitors;

N °	GUIDELINES OBJECTIVES	KEY ACTIONS RECOMMENDED
		<ul style="list-style-type: none"> - Ensure that broadband wireless operators have access to as wide a choice as possible for the spectrum, and release spectrum to the market as soon as possible.
2.	Promote transparent and non-discriminatory spectrum management policies.	<ul style="list-style-type: none"> - Implement stable decision-making processes; - Publish forecasts of spectrum usage and allocation needs; - Publish frequency allocation plans and overview of assigned spectrum; - Clearly define and implement stable and predictable spectrum authorisation rules and decision-making processes and procedures; - Clearly define and publish licensing and authorization rules and procedures; - Publish legal requirements for imported equipment.
3.	Embrace technology neutrality.	<ul style="list-style-type: none"> - Adapt to technological convergence and facilitate spectrum use for both fixed and mobile services, ensuring that similar services are not subject to disparate regulatory treatment; - Provide guidelines to mitigate inter-operator interference; - Ensure that bands are not allocated for the exclusive use of particular services and that spectrum allocations are free of technology and service constraints as far as possible;
4.	Adopt flexible measures for the use of wireless broadband services.	<ul style="list-style-type: none"> - Avoid onerous rollout and coverage obligations for small market players so then allowing broadband suppliers to begin operations on a small scale at very low cost; - Allocate and assign spectrum for community or non-commercial use of broadband wireless services; - License conditions that allow operators to provide a full range of converged services; - Adopt lighter regulatory approaches in rural and less congested areas, such as flexible regulation of power levels, the use of specialized antennas, the use of simple authorizations, the use of geographic licensing areas,

N °	GUIDELINES OBJECTIVES	KEY ACTIONS RECOMMENDED
		<p>lower spectrum fees and secondary markets in rural areas;</p> <ul style="list-style-type: none"> - Promote spectrum sharing, as long as interference is controlled, which can be implemented on the basis of geography, time or frequency separation; - Develop strategies and implement mechanisms for clearing bands for new services as appropriate; - For cost-effective backhaul infrastructure from rural and semi-rural areas, consider the use of point-to-point links within other bands, in line with national frequency plans, including any bands for broadband wireless access.
5.	Ensure affordability	Set reasonable spectrum fees for wireless broadband technologies.
6.	Optimize spectrum availability on a timely basis.	<ul style="list-style-type: none"> - Facilitate the effective and timely access to spectrum and equipment authorizations to facilitate the deployment and interoperability of infrastructure for wireless broadband networks; - Make all available spectrum bands for offer, subject to overall national ICT master-plans, in an economically efficient manner; - Issue special research or test authorizations to promote the development of innovative wireless technologies.
7.	Manage spectrum efficiently.	<ul style="list-style-type: none"> - Allocate spectrum in an economically efficient manner, by relying on market forces, economic incentives and technical innovations; - Promote advanced spectrum efficient technologies that allow co-existence with other radio communications services, using interference mitigation techniques, for example, dynamic frequency selection; - Provide swift and effective enforcement of spectrum management policies and regulations.
8.	Ensure a level playing field.	Prevent spectrum hoarding by setting a limit on the maximum amount of spectrum one operator may obtain.

N °	GUIDELINES OBJECTIVES	KEY ACTIONS RECOMMENDED
9.	Harmonize international and regional practices and standards.	<ul style="list-style-type: none"> - Reflect regional and international technical and security standards in national arrangements; - Encourage spectrum harmonization for broadband wireless access that could generate economies of scale in the production and manufacture of equipment and network infrastructure; - Ensure inter-operability for global roaming through promoting open, interoperable, non-discriminatory and demand-driven standards; - Implement policies and allocations that are consistent with regional and global best practice and standards; - Establish coordination agreements with neighbours, either on a bilateral or multilateral basis, to hasten licensing and facilitate network planning.
10.	Adopt a broad approach to promote broadband access.	<ul style="list-style-type: none"> - Introduce supporting regulatory measures such as competitive safeguards, open access to infrastructure, universal access/service incentives, promotion of supply and demand, licensing, roll-out obligations and market entry measures, data security and users' rights; - Lower or remove import duties on broadband wireless access equipment; Support the development of backbone and distribution networks.

Kenya is in ITU Region 1 and the Communications Authority of Kenya (CA) is the lead Agency in representing the Government of Kenya at the ITU. In the recent years, there has been an explosion of global spectrum-based technologies and communications systems and in Kenya, there has been an increase in public sector, private and domestic installation of systems using licensed and unlicensed spectrum resources within their premises. To encourage the efficient and effective use of this scarce resource the Government of Kenya is committed to promoting the same through the development and implementation of a national spectrum policy for the 21st Century that will:

- a. Foster the digital transformation of the economy;
- b. Ensure provision of national security, public safety, law enforcement and government services;
- c. Maintain Kenya's regional leadership in information and communications technology (ICT) development and services;

- d. Satisfy other vital Kenyan needs in areas such as scientific research, education, and national transportation infrastructure; and
- e. Ensure allocation and assignment of spectrum is done in an equitable, efficient, productive and sustainable manner.

5 SITUATIONAL ANALYSIS

5.1 Background

The radio frequency spectrum is a key component of the telecommunications infrastructure that underpins the Information Society. In Kenya, like most developing countries, the radio frequency spectrum is managed along the lines of traditional spectrum administration with the Communications Authority of Kenya continuing to play the lead role in developing regulatory Frameworks for effective spectrum management.

Traditional spectrum management is predicated on the basis of spectrum being a limited resource that must be apportioned among uses and users, by the government. The primary objective of the current spectrum management process is premised on protection of spectrum users, from harmful interference by one another. Additional objectives are to achieve economic and technical efficiency of spectrum use, safeguard public services, and balance certainty to attract investment with flexibility, to take advantage of change.

5.2 Advantages and Limitations

A major advantage of the current administration of the radio spectrum is that it is well established following practices that have been in place worldwide for over a century, originating in the early days of radio communication wealth of experiences built up, mainly in the developed, but more recently, in developing and least developed countries. Good practices are well documented with toolkits containing reference documents reflecting *modern spectrum management techniques*.

In the last twenty years, however, the *current spectrum management technique* has had increasing difficulty in responding to fast growth of spectrum demand, new technologies, and changing markets. Convergence among telecommunications, media, and computing is breaking down the traditional association of spectrum to specific applications, such as, the distinction between broadcasting and telecommunications spectrum, and is changing the demand for spectrum among services, such as, between fixed and mobile communication. This has resulted in major technical and economic inefficiencies, excessive regulatory burden on all stakeholders, and obstacles to technological innovation.

5.3 Improving the Current Spectrum Management Process

This Spectrum Policy seeks to improve the current spectrum management process by enhancing spectrum use including availing any unused spectrum.

6 OBJECTIVES OF THE NATIONAL SPECTRUM POLICY

This Policy aims at ensuring that the radio frequency spectrum will be managed in line with public policy objectives, with a view of making it available to all users, under specific and clear conditions. The overarching objective of the Policy is to ensure efficient use of this scarce resource while maintaining a balance between the public and private interests and in the event of conflict, public interest shall prevail.

6.1 Specific Objectives

- 6.1.1 Ensure sufficient amount and equitable allocation of Radio Frequency Spectrum to users to enable delivery of the greatest socio-economic impact and meet demand for ICT services uptake by Kenyans;
- 6.1.2 Spectrum is pivotal for a wide variety of wireless communications and a wide variety of other devices, technologies and industries that are critical to the social and economic success of the country. As spectrum is a scarce resource essential for the provision of services, effective management is required to maximise its use, both from an economic, technological and social perspective;
- 6.1.3 Increasing the availability, penetration and use of ICT services: ICTs have become predominantly dependent on wireless technologies which in turn rely solely on radio frequency spectrum. There is therefore need to encourage spectrum efficiency so that the use of the resource can be maximised to enable sufficient wireless communications infrastructure and investment, adequate population coverage of wireless communication networks, high quality services and reasonable consumer prices. Usage of services is the main cause of the economic spill-over effects attributed to ICT ecosystem and the lever that policymakers should aim to maximise. Wireless networks are often the most cost-effective way of reaching rural and remote areas, especially with the advent of technologies that use lower frequencies with a wider reach;
- 6.1.4 Minimise interferences nationally and internationally: Radio frequency spectrum should be availed clean and free from harmful interference. International and regional frequency coordination and harmonisation results in economies of scale leading to lower cost of equipment, such as user devices and enable global roaming.
- 6.1.5 Providing a level playing field for competition in allocating spectrum: Spectrum plays a fundamental role in developing competition. Firstly, since spectrum is scarce, this means that there is a limited amount available for operations, and dictates the number of operators that can feasibly be licensed, leading naturally, to concentrated markets. Therefore, spectrum will be allocated in an equitable manner in any given band.

6.2 Role of Government

- 6.2.1 Undertake a comprehensive review of spectrum management practices in the country, with the objective of identifying strategies that promote more efficient and beneficial use of spectrum, without harmful interference to users;
- 6.2.2 Unlock the economic value and entrepreneurial potential of Kenyan spectrum assets while ensuring that sufficient spectrum is available to support critical Government functions;
- 6.2.3 Create a broad Framework for spectrum management of which the detailed Implementation Plan will be put in place by the CA;
- 6.2.4 Create a fair and competitive environment that encourages service and infrastructure-based competition, through establishment of open access networks built through partnership investment. The CA will introduce the requisite Regulations, where necessary, to support the implementation of this Policy and encourage infrastructure sharing;
- 6.2.5 Ensure that all public institutions at the National and County level benefit from broadband connectivity with the expectation that this connectivity will eventually be extended to the communities that these institutions serve;
- 6.2.6 Ensure public services, such as e-government, are better delivered by aggregating broadband requirements by public institutions;
- 6.2.7 Ensure that measures are put in place, as per the National Broadband Strategy, which makes certain that:
 - 6.2.7.1 Broadband penetration reaches a critical mass nationally for its impact to be felt in the economy;
 - 6.2.7.2 Universal access to broadband is affordable;
 - 6.2.7.3 Capacity and skills are developed for optimal and effective use of broadband services by end users; and
 - 6.2.7.4 Supply-side skills are developed so that the economic and innovative potential of broadband can be exploited fully by Kenyans.
- 6.2.8 The Ministry of Information, Communication, Technology, Innovation and Youth Affairs, may issue, if necessary, additional policies to:

- 6.2.8.1 Facilitate a modernized and improved spectrum management system;
- 6.2.8.2 Create incentives for more efficient and beneficial use of spectrum and to provide higher degree of predictability and certainty in the spectrum management process, as it applies to incumbent users;
- 6.2.8.3 Promote accessibility and affordability of ICT services by providing tax incentives on ICT products and services and minimising spectrum acquisition and usage fees;
- 6.2.8.4 Streamline the deployment of new and expanded services and technologies, while preserving national security and public safety, and encouraging scientific research; and
- 6.2.8.5 Develop means to address the critical spectrum needs of national security, public safety, national transportation infrastructure, and science.

7 CURRENT POLICY ON RADIO FREQUENCY SPECTRUM MANAGEMENT

The National ICT Policy Guidelines 2019 spell out broad policy objectives and the strategies to achieve the aims of promoting use of radio frequency spectrum resources within the national, regional and international boundaries.

Under the existing Framework as contained in the said Policy Guidelines, the Government, through the National Regulatory Authority – the CA, generally reviews every change in spectrum use, a process that is often slow and inflexible, and one that can delay the introduction of new and evolving technologies. This process may be viewed as unresponsive to the requirements of rapidly evolving changes in the ICT sector.

To keep pace with the rapidly developing technological landscape and regulatory changes globally, it is important that the existing spectrum policy principles, practices and strategies to be constantly reviewed to align with these new global developments.

8 PRINCIPLES FOR RADIO FREQUENCY SPECTRUM MANAGEMENT

Spectrum management, principally a governmental activity, is expected to ensure effective, efficient and prudent use of the electromagnetic spectrum, and to ensure electromagnetic compatibility among radio equipment and services. Spectrum management is an interdisciplinary activity involving technical, economic and governmental policy and regulatory considerations. The growth in the wireless services has highlighted the importance of spectrum as a natural resource and, indeed, the government expects the national regulatory authority, the CA, to act expeditiously to identify additional spectrum for new wireless services and also develop the appropriate supporting regulatory provisions needed to implement the new allocations.

The following are some of the Principles that will be adopted to ensure efficient and effective management of this scarce and essential resource, that is an enabler of communications services.

8.1 Radio Frequency Spectrum Management Should Be Dynamic and Responsive to User Needs

The regulatory framework for radio frequency spectrum shall:

- 8.1.1 Be equitable, transparent, efficient, cost effective, sustainable, and promoting a level playing field;
 - 8.1.2 Foster competition, growth and innovation in the use of spectrum;
 - 8.1.3 Promote flexible, open and responsive management of spectrum;
 - 8.1.4 Promote universal access to broadband services;
 - 8.1.5 Provide clarity and certainty to stakeholders and the general public regarding spectrum usage;
 - 8.1.6 Take into account the needs of consumers of services that rely on spectrum, and of the Kenyan citizens, more generally
 - 8.1.7 Be technology neutral
 - 8.1.8 Take into account the developments in radio frequency spectrum management in the international environment, such as the ITU at the global level, embracing best practices in use within the East African Community and other regional blocs.
- 8.2 Enable and Encourage Spectrum, as much as possible, to move to its Highest Value Use or Uses

Spectrum should be allocated aiming for the highest usage value to ensure maximum benefits to society. Various mechanisms can be put in place to enable and encourage spectrum to reach its highest socio-economic benefit to society.

This approach requires a regulatory system that has the flexibility to enable licensees to adapt spectrum access and usage to both market requirements and technological advances. A change in use may be facilitated via secondary trading or third-party authorisation, or by the same licensee employing their spectrum for a different use through technology and service neutrality, by design.

The Regulator will research and formulate clear rules that will define and facilitate secondary trading of spectrum, taking into account international best practices.

8.3 Use the Least Cost and Least Restrictive Approach to Achieving Policy Objectives

Planning, licensing, allocation, assignment and compliance measures should aim to minimise the total cost of achieving the objectives of Radio Frequency Spectrum management, including the cost to government, licensees and the public. Imposing appropriate license conditions and universal access targets, as well as, government investment may be necessary in order to achieve sector goals, provided market forces are unable to adequately meet the set objectives.

Equally important, minimising the total cost of radio frequency spectrum management will require a focus on regulatory effectiveness, taking into account developments in technology. Only regulations that generate the greatest net benefit for the economy, taking into account all the impacts, will be adopted.

8.4 Access to Radio Frequency Spectrum Resources Should be Simple, Fair and Timely

In authorising the right to use radio frequency spectrum resources, the approach adopted should be appropriate for the uses/sectors under consideration.

8.4.1 Market mechanisms may be appropriate where its use is directly subject to market forces (e.g., provision of electronic communications services).

8.4.2 Where the use of spectrum is not subject to market forces or is required for the provision of security, social, cultural objectives; the Regulator may use other mechanisms as appropriate, including imposing conditions and direct participation in projects to spur efficient use.

8.4.3 Bolster long term investments and shareholder confidence by providing legal certainty, transparency and service continuity, in line with international best practice.

8.4.4 Undergo public consultations and hearings in order to guarantee transparency and fair rules in any type of spectrum assignment mechanisms and related rules, including regular statistics on current use.

8.4.5 Consider simple and clear public announcements and publications in terms of technology and service neutrality, assignment procedures and conditions of use and renewal.

8.5 Public Consultations and Transparency

Measures will be put in place to:

8.5.1 Allow stakeholders to provide inputs to ensure that the radio frequency spectrum management process is more responsive to technological advances and user demands;

8.5.2 Assignment of spectrum should be subjected to public consultations and participation;

8.5.3 Government-sponsored initiatives to direct use of spectrum resources, will also be subject to consultation processes to elicit feedback on the proposed initiatives, as well as, potential alternative approaches;

8.5.4 The Regulator to take into account the results of public consultations when developing rules and guidelines for assigning spectrum.

8.6 Exemption from Payment of Spectrum Licence and Usage Fees

8.6.1 National security, public safety and emergency services may be exempted by the Regulator from paying the requisite spectrum licence and usage fees. Guidelines on exemptions shall be prescribed by the Regulator;

8.6.2 Trials and pilots using spectrum shall be conducted under the auspices of the Regulator and shall not be required to pay frequency fees. Licensees should not charge users of services during such trials. A trial license is not a guarantee for issuance of an operating license at the end of the trial.

8.6.3 Research and development using spectrum conducted in coordination with the Regulator shall not be required to pay any licence fees.

8.7 Prioritisation of Deployment of Services in Rural Areas

8.7.1 The Government may consider discounting incentives, based on the provisions of the universal service and access, through fee-exempt spectrum resources in rural and unserved/underserved areas, to encourage operators to deploy services in these areas.

8.7.2 The Government will also undertake specific actions or initiatives to foster the deployment of services in rural and unserved/underserved areas. This may include encouraging regional-based service providers to offer last mile access to Kenyans via sharing agreements.

8.7.3 Other general actions to promote rural coverage :

8.7.3.1 provide incentives, while including possible trade-offs between reduced spectrum fees and carefully considered wider coverage obligations;

8.7.3.2 Provide non-discriminatory and timely access to public infrastructure, especially in rural areas;

8.7.3.3 Simplify the planning approval process for new base stations to incentivise and speed-up deployments;

8.7.3.4 Adopt competition policy which supports investment in high quality mobile networks; and

8.7.3.5 Allow infrastructure sharing on commercial agreements that are market-led, based on each operators' interests.

8.7.4 The Government shall take initiatives to increase wireless broadband penetration for the provision of internet services that are fast, reliable, and of good quality to people in the unserved and the underserved areas.

8.7.5 All wireless service providers shall be required to participate in the provision of universal service, to ensure the achievement of the Government's development goals.

8.8 Clarity on Rights and Access to Radio Frequency Spectrum

In line with international best practice, clear rules shall be developed and applied by the CA on, inter alia:

8.8.1 Minimum qualification of spectrum users:

8.8.1.1 Networks that are already in existence; and

8.8.1.2 Consumers to be served

8.8.2 The rights and obligations of spectrum users, including:

8.8.2.1 Licence duration and position regarding renewal of licence;

8.8.2.2 Rights and obligations regarding change of use of the spectrum (flexibility & neutrality);

8.8.2.3 Rights and obligations concerning interference; and

8.8.2.4 Rights and obligations regarding exclusive use for the spectrum for the period of the licence.

8.8.3 The rights and obligations of the Government, including to:

- 8.8.3.1 Charge for licenses;
- 8.8.3.2 Place conditions on the use of spectrum;
- 8.8.3.3 Change licence conditions;
- 8.8.3.4 Withdraw licences and recover spectrum, if necessary; and
- 8.8.3.5 Monitor and enforce spectrum use.

8.8.4 Application for spectrum for new and innovative services.

8.8.5 Access and usage of spectrum

8.9 Discourage Market Concentration

Safeguards shall be provided to prevent and/or address over-concentration of spectrum in the hands of a few operators that would prevent other operators from acquiring and effectively using spectrum. The CA will put appropriate corrective measures in place to address any such concentration in a particular sub-sector.

8.10 Enforcement Measures after Frequency Assignment

In order to ensure that assigned frequencies are valued, used appropriately and brought into use in a timely manner, Appropriate spectrum management and monitoring system/tools shall be used. In case of violation, corrective measures shall be applied by the Regulator.

8.11 Promoting Research and Innovation

8.11.1 Access to radiofrequency spectrum resources is an essential prerequisite for research and innovation in wireless technologies.

8.11.2 To promote and encourage research and innovation, the test-and-trial regime for new wireless technologies, applications and services, shall be encouraged and continue to be developed by CA, so as to maintain responsiveness to the industry's research and development requirements, and the development of services for end users;

8.12 Technology & Service Neutrality

Licences and regulations should be service and technology neutral: they should neither impose nor discriminate a particular technology or service. Technology and service neutrality facilitates efficient use of spectrum. Neutrality allows radio frequency spectrum users to deploy different technologies and to provide the services that generate higher economic value. Technology-neutral licensing shall be of help to facilitate the spectrum refarming process.

Taking into account national policy objectives and provided that the associated electronic communications network complies with the relevant technical obligations related to spectrum;

8.12.1 Regulations and licences shall be technology and service neutral.

8.12.2 Any limitations on applying the principle of technology and service neutrality in any given band should be avoided, but if strictly needed, shall be carefully considered and justified.

8.12.3 Simplify the approval process where licensees who wish to reform their existing spectrum resources to deploy new technology can do so with ease.

8.13 Efficient Use of Radiofrequency Spectrum

Efficient use of spectrum will be encouraged and the usage will focus on technical, economic, as well as, social and policy objectives, such as:

8.13.1 The parameters used to assess efficiency should be appropriate for the use/sector involved as well as the current state of technology development for that use/sector;

8.13.2 Implement incentives that encourage investment, innovation and efficient use of spectrum.

8.13.3 A balance shall be struck between efficient use, flexibility/technology neutrality and promoting innovative development;

8.13.4 Balance shall be sought between the benefits of flexibility of use against the benefits of harmonised use taking account of the need to meet the public good and international obligations;

8.13.5 Market focused pricing may be used to promote the efficient utilisation of spectrum;

8.13.6 Addressing the growing demand for spectrum by exploring ways to improve spectrum efficiency and maximize its use, in order to ensure that it can be shared without affecting current users;

8.13.7 Encourage the appropriate use of microwave backhaul, in order to unlock the next generation of wireless technology that will optimise and expand available bandwidth, to promote additional growth and economic development;

8.13.8 Encourage the use of unlicensed spectrum, the invisible backbone to many wireless technologies, in order to unlock the next generation of wireless technology that will optimize and expand available bandwidth to promote additional growth and economic development; and

8.13.9 In order to ensure network efficiency and affordability, along with better quality of service and coverage, the Regulator may consider prioritising contiguous spectrum when assigning spectrum to users.

8.14 Monitoring and Enforcement

The methodology for monitoring and enforcement of proper use of radiofrequency spectrum resources shall be regularly reviewed by the Regulator, so as to be able to respond to any interference issues that may arise within a liberalised spectrum management environment.

9 GENERAL POLICY GUIDELINES FOR USERS OF SPECTRUM

- 9.1 The radio frequency spectrum will be planned and allocated in a timely manner in order to advance public policy objectives while ensuring a balance between government and commercial use. A Spectrum Roadmap will be available to promote legal certainty and for the benefit of Kenyans.
- 9.2 To conserve and optimise spectrum use in critical frequency bands, some existing radio networks may be encouraged to use alternative frequency bands,
- 9.3 To ensure that Kenya's interests are secured and protected when harmonising and coordinating spectrum policies and use with other countries, sub-regional, regional and international organisations and with treaty obligations including those under the auspices of the International Telecommunication Union.
- 9.4 Promote and support innovation, research and development in new spectrum management and utilisation techniques and spectrum-based services and applications.
- 9.5 A radio communication license shall not confer any ownership rights of the frequency on the licensee. A radio license however does entitle the licensee to a continued right to a particular frequency band, considering the expiration date. If for any reason this legal certainty needs to be ceased, the CA will be required to give a public benefit reason and reasonable notice to users of any frequency band of any conditions or circumstances which may require their services to be discontinued or systems to be relocated to other bands. Such an affected licensee shall:
 - 9.5.1 Be granted a reasonable notice of any conditions or circumstances which may require their services or systems to be displaced to other bands
 - 9.5.2 Be allowed input into the displacement exercise.
 - 9.5.3 To face as little disruption to their services as possible.
- 9.6 Market mechanisms will be preferred for spectrum assignment, where demand is higher than supply

10 WIRELESS BROADBAND NETWORKS

10.1 Identification of Spectrum Bands for Deployment of Wireless Broadband

The ITU-R has identified a range of frequency bands for International Mobile Telecommunication (IMT) System Services.

However, countries may deploy IMT systems in bands other than those identified in the Radio Regulations, and they may also deploy IMT systems only in some or parts of the bands identified for IMT in the Radio Regulations.

This Policy recommends a spectrum plan for Kenya that proposes certain bands for wireless broadband services in the country, such as; lower, mid and higher range bands, as well as, millimetre wave bands, for deployment of IMT, among others.

The envisaged wireless broadband infrastructure and services can either be implemented in the newly available lower frequency bands or in the higher frequency bands. The low frequency bands are key for driving nationwide coverage (particularly in sparsely populated areas), while the high frequency bands are required for capacity and urban hotspot coverage. This makes the lower bands ideally suited for achieving broadband nationwide coverage, and the higher bands optimal for coverage in densely populated areas.

The use of the lower frequencies has the potential to provide mass market broadband at a lower cost, because broadband wireless coverage of a given area could be achieved with fewer base stations as compared to coverage of the same area using higher frequency bands. Thus, utilization of this spectrum will enable the Government to achieve the objectives of delivering efficient, competitive, affordable and responsive wireless mobile broadband infrastructure and services.

10.2 Spectrum Assignment Strategies to be adopted for Wireless Broadband Rollout

The CA will employ strategies that promote deployment of efficient and affordable communications services, research and development as well as social progress and economic development.

Furthermore, the CA shall promote fair competition and equality of treatment among licensees, and promotion of the public interest; will ensure efficient allocation of spectrum to both existing licensed operators and new entrants in the mobile broadband sub-sector, taking into account the need for universal access to broadband, market conditions and the availability of radio spectrum resources.

In addition:

- a) Efforts shall also be made to facilitate infrastructure sharing and national data roaming in order to maximize seamless connectivity;

- b) Critical government services such as public safety/protection and disaster management may also be provided through commercially deployed and operated networks on mutually agreed terms and conditions. However, deployment of broadband access technologies for government and other communication needs may also be implemented through public-private partnerships;
- c) CA shall provide a transparent, market-based mechanism for allocation of spectrum to facilitate investment decisions by licensees and government;
- d) CA shall develop a clear services rollout obligation framework, based on geographical and population coverage, subject to appropriate roll out timelines,
- e) Radio frequency Spectrum Refarming:-
 - (i) Spectrum refarming (redeployment) is a process where existing operators use their existing spectrum holdings to deploy new technologies that provide greater social and economic benefits.
 - (ii) The National Broadband Strategy calls for expediting frequency refarming to optimise the utilisation of the currently allocated spectrum for deployment of mobile broadband services.
 - (iii) CA shall encourage the existing operators to re-farm their current spectrum holdings in line with the existing unified licensing framework

10.3 Public Private Partnership (PPP) for Deployment of Wireless Broadband

The Government may opt to embrace the PPP Framework to deploy wireless broadband networks in order to bridge the access gaps for broadband at any point in future, depending on the economic, social or technological exigencies. In this initiative, the Government may consider making available sufficient and suitable spectrum and existing government owned optical fibre infrastructure/ network to the PPP company based on a revenue sharing model related to the value of the spectrum. The model will have to be economically viable to the PPP investors and Government, and will enable service providers to focus on the broadband service delivery rather than infrastructure provision.

11 NATIONAL EMERGENCY TELECOMMUNICATIONS/ICT PLAN

The CA shall develop a clear, flexible and user-friendly Framework for the effective and efficient use of ICTs/ telecommunication networks and services for early warning and during emergencies. The Framework shall include the following:

- i. Standard operating procedures that identify the types of ICT/telecommunications technologies that are required for a given type of emergency
- ii. Regulations regarding temporary licensing, type approval, import/export of equipment, frequency allocation, network redundancy and priority call routing, among others.
- iii. Adherence to the Tampere Convention and the necessary actions at National and County level that need to be taken to ensure that the Convention will be effective in a disaster situation

12 REVIEW OF POLICY

The Policy will be reviewed after every 5 years to take into account new developments and trends in spectrum management.

13 INSTITUTIONAL FRAMEWORK FOR IMPLEMENTATION OF THE SPECTRUM POLICY

13.1 Ministry of Information, Communications, Technology, Innovation and Youth Affairs

The Ministry's role will include:

- a) Oversight in the implementation of the policy
- b) Strengthening existing institutions to champion and deliver on the objectives of the policy.
- c) Provision of an enabling environment for investment in the sector.

13.2 The National Communications Secretariat (NCS)

The National Communications Secretariat was established through the Kenya Information and Communications Act 1998. It was operationalised through the Legal Notice No.22 of 15th February 1999 which brought the Section 84 of the KICA 1998 to operation. The mandate of NCS as stipulated in Section 84 of the Kenya Information and Communication Act, 1998, is to advise the Government on the adoption of a communication policy.

13.3 The Communications Authority of Kenya (CA)

The Communications Authority of Kenya (CA) is the regulatory authority for the communications sector in Kenya established through the Kenya Information and Communications Act 1998. The Authority is responsible for facilitating the development of the information and communications sectors including; broadcasting, multimedia, telecommunications, and postal services and electronic commerce.

13.4 The ICT Authority (ICTA)

The Information and Communication Technology Authority (ICTA) is a State Corporation under the Ministry of ICT, Innovation and Youth Affairs established through Legal Notice No.183 of 16th August 2013. The functions of the Authority are as stipulated in Section 4 of the Order, 2013.