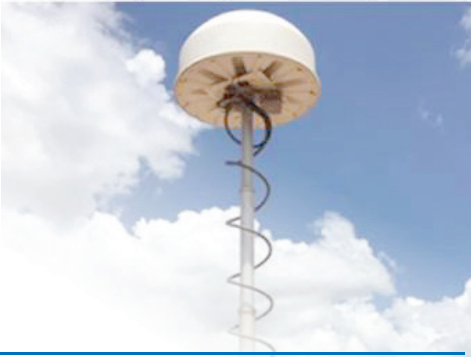


# Unlocking Uganda's potential through effective radio frequency spectrum management



BY ENG. IRENE KAGGWA

*Did you know that any device or equipment that operates or communicates using wireless means uses radio waves and thus needs to use radio frequencies?*

This includes remote control keys, toys, walkie talkies, radios, Internet of Things (IoT) systems, flight control, mobile phones, satellites, etc. These invisible waves are like vehicles or road runners carrying information from one place to another through the air.

Radio waves travel at the speed of light and continue moving until they are blocked by an obstacle, e.g., a hill or concrete building, or run out of energy/power and fade. Notably, radio frequencies do not recognise administrative or geographical boundaries.

Any type of wave is characterized by a series of movement uphill, down through a valley and back uphill again. This span of movement from one peak to the next peak in a wave is called a cycle. The number of cycles a wave completes in one second defines its frequency, measured in hertz (Hz). A low-frequency radio wave, thus a longer wavelength, takes more time to complete one cycle, while a high-frequency wave, thus a shorter wavelength, does so much quicker.

Just like vehicles on a road crossing in the same lane risk collision, when different networks use the same or close frequencies in the same area, interference becomes a concern. Spectrum management,

therefore, encompasses the administrative, scientific, and technical procedures necessary to ensure smooth operation of radio communication equipment and services without causing interference.

The radio frequency spectrum encompasses electromagnetic waves ranging from 10 Hz to 300 GHz, which are significantly below the range of x-rays and gamma rays.

As noted earlier, these frequencies serve a multitude of services across various sectors. The spectrum is divided into frequency bands, each allocated to specific services based on factors such as propagation and carriage characteristics of the different frequency bands.

This allocation process begins at the international level, with the World Radio Conference organized by the International Telecommunications Union (ITU), a United Nations specialized body for ICTs, held every 3 to 4 years. The conference results in binding treaties for all countries. It was in this conference that the migration from analogue to exclusively digital terrestrial television was decided. The next conference is scheduled to take place in Dubai, UAE, later this year.

At the national level, each country has a dedicated organization responsible for efficiently managing the radio frequency spectrum on behalf of the Government, to ensure interference-free access to the radiofrequency spectrum for a wide range of users while maximizing the resource's potential.

In Uganda, Section 25 of the Uganda Communications Act 2013 bestows on Uganda Communications Commission the exclusive responsibility for planning, monitoring, managing, and allocating the use of the radio spectrum. The Commission is also charged with establishing technical requirements and standards in respect of radio communications apparatus, as well as negotiating with the ITU or its affiliated bodies on matters relating to radio spectrum.

## Using radio frequencies in Uganda

Several factors influence availability of a new frequency, including the type of service, proximity to international borders, terrain profile, and existing users in the area. Beware of individuals offering to help set up a radio station and select a frequency, as this contravenes the law and risks causing interference due to omission of vital steps such as inter-regional analysis and cross-border coordination to prevent interference.

The Uganda Communications Act 2013 makes it illegal to import, install, alter, replace or operate radio communications equipment without the Commission's approval. This measure helps to ensure electromagnetic compatibility and prevents interference with authorized users. The law permits the Commission to confiscate any apparatus, which is possessed, installed, connected, or operated unlawfully.

Besides, the assignment of a radio frequency does

not confer ownership of the subject frequency to the assignee but rather only grants the assignee a right to use the respective frequency. This right cannot be transferred to another person or party without prior assessment and explicit authorisation by the Commission.

More so, this right to use a specified frequency can be altered or withdrawn by the Commission in public interest. Grounds for this include where the assignee is not utilizing the frequency or there is interference with another spectrum assignee/user. When an assignee does not utilize the frequency (referred to as spectrum hoarding), they deny other potential users of that frequency the opportunity to realise the utility of this scarce resource. Consequences of such hoarding include limiting the different options of communications across the country, potentially leaving some geographic areas without access or with limited access to communication or preventing individuals in the relevant geographical area from being able to use the services that operate on that part of the spectrum. This is the basis for the common international spectrum management principle and practice of "Use it or lose it".

It is noteworthy that where a radio frequency was assigned to an individual for the provision of telecommunications or broadcasting services, the eligibility of that person to use the respective frequency ceases when that person ceases to have a valid licence issued in accordance with the Uganda Communications Act 2013. Thus, not having a valid broadcasting/telecommunications licence is one of the grounds for withdrawal by the Commission of the associated frequency assignment.

## Obtaining the right to use spectrum

Globally, there are three types of ways of granting the right to use spectrum. The default one is where the radiocommunication equipment or use of a certain frequency requires prior, explicit authorisation on an exclusive use basis. An example of this is the authorisation for a radio broadcasting station. Where the respective frequencies are observed to be sufficient to meet the demand, the first come first served approach is used to assign frequencies. However, where the demand for spectrum exceeds the available frequencies, the Commission in keeping with the standard practice uses the beauty contest competitive approach in which the best proposal is selected against the specified criteria. An example of the latter is the recent multiband award of spectrum conducted by the Commission in June 2023 for telecommunications (broadband) services.

The second is a commons approach or general authorisation, also called un-licensed or licence-exempt use. No specific spectrum authorisation is required or issued to the spectrum users and the number of users is not capped. This approach is used by spectrum regulators where the risk of harmful interference from the operation of the subject equipment or operations is deemed low. However, users must adhere to specified technical restrictions to ensure that the equipment used does not cause interference to other devices.

Users in such bands are also not expected to claim protection from the regulator for any interference they may receive or experience from other users. This is applicable to low power, short range wireless devices and operations such as remote controls and WiFi hotspots. It should be noted though, that where such is being used for provision of telecommunications or broadcasting services, a provider licence is required.

Lastly, the light licensing approach typically comprises of a registration procedure rather than an authorisation and is used where the demand for spectrum does not exceed the supply, often on a shared basis but with a level of coordination greater than that in the licence-exempt scenario. Interference handling for this authorisation is based on resolving interference if it occurs.

## Efficiency and effectiveness in spectrum management

As the national spectrum management organisation, the Commission is expected to conduct its affairs in an impartial and transparent way, regulating the efficient and adequate use of the spectrum, while considering the need to avoid harmful interference and safeguard the public interest.

The Commission has accordingly developed various regulatory tools outlining the technical and other regulatory requirements, procedures, and practices in respect of the different spectrum management activities and frequency bands. These are available at [www.ucc.co.ug/spectrum/](http://www.ucc.co.ug/spectrum/).

The Commission has also digitalised its spectrum management processes, making spectrum management related services exclusively available via <https://eservices.ucc.co.ug/>. This includes application for frequencies for the different services or frequency bands, compliance related submissions and interference reporting.

The public is called upon to note that all fees payable to the Commission for any of its services must be based on an EFRIS invoice and are only payable into the Commission's bank accounts. The Commission has a zero-tolerance policy towards corruption and requests any person with information about such misconduct to share this via our whistleblower contacts: [whistleblower@ucc.co.ug](mailto:whistleblower@ucc.co.ug) or +256200901092.

In conclusion, the growing use of radiocommunications across various sectors has increased the demand for the limited, but critical spectrum resource. The Commission remains committed to ensuring efficient and effective spectrum management processes, exploring new technologies and techniques, such as Low Power FM radio and Digital Audio Broadcasting (DAB+), to support growth, innovation, and investment in Uganda's communication sector. For more information and services, please visit the Commission's website at [www.ucc.co.ug](http://www.ucc.co.ug).

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