

GUIDELINES FOR UTILISATION OF THE 5 GHZ BAND FOR WIRELESS ACCESS NETWORKS IN UGANDA

1. Introduction

The Commission has been receiving requests from some operators, particularly the Internet service provider community, and some members of the public, seeking Uganda Communications Commission (UCC) to designate frequency bands in 5 GHz band for Wireless Access Systems/Networks.

The World Radiocommunication Conference of 2003 (WRC-03) allocated some portions in the 5 GHz band to Mobile Services, for the deployment of wireless Access Systems including Radio Local Area Networks (WAS/RLAN's).

Uganda Communications Commission proposes to make these bands available within its territories. The purpose of opening up the bands is to provide sufficient radio spectrum for new wireless systems that will provide users greater freedom of choice of access and distribution technologies. This will advance the competitiveness of the telecommunications industry in Uganda.

2. Spectrum utilization policy for Wireless Networks

The UCC notes that, the use of wireless devices in the bands 5150-5350 MHz, 5470-5725 MHz and 5725-5825 MHz for Wireless Access Systems including Radio Local Area Networks (WAS/RLAN's) would be used mainly to support point-to-point and point-to-multipoint high-speed digital wireless services. The UCC believes that these services will enhance Uganda's information infrastructure by facilitating wireless access and distribution of services.

The UCC believes that this amount of spectrum designated for WAS/RLAN is sufficient at this time until otherwise reviewed for future traffic needs. UCC further notes that experience in many other countries where they use these bands for provision of WAS/RLAN support these policy objectives.

3. Licensing policy for Wireless Networks

The UCC proposes to issue an installation permit for any wireless equipment that will be used in these bands. It is therefore illegal to install and operate the wireless equipment in these bands without permission. Although, few developed countries where these devices have been deployed, require permits for wireless devices that are used and/or carried by businesses or individuals, for operations of these devices for indoor, use UCC shall issue a Low Power Class License to cover operation of these systems.

With regard to outdoor point-to-point to and point-to-multipoint usage of Wireless Access Systems, UCC will also require that the use of these equipment be registered and licensed for purposes of protecting sensitive incumbent services or national assets and/or just in case of potential coordination issues. In this case the details for licences will include type of the equipment, power, frequency, location of the equipment.

The main purpose of the licensing of these low power wireless devices is to initially establish the pattern of use of these devices for a certain period of time, following which period, the licensing of these devices will be reviewed.

4. Operation restrictions and power limits for wireless devices

The UCC proposes a policy that, in order to protect existing radio services in these bands, the use of the spectrum for WAS/RLAN devices in the bands 5150-5350 MHz, and 5470-5725 MHz is that such devices cannot claim protection from other primary radio systems and cannot cause harmful interference into other primary radio services in these bands.

The power levels and conditions under which these devices shall be operated are contained in Table 1 below.

Table 1: Operational and Power Limits on Wireless Devices

Frequency band (MHz)	Power limits	Operational Restrictions
5150-5250	Maximum mean EIRP=200mW Maximum EIRP spectral density of 10 mW in any 1 MHz	Devices shall be restricted to indoor operations in order to reduce any potential for harmful interference to other operations in this band.
5250-5350	Maximum mean EIRP= 200mW EIRP and Maximum EIRP spectral density of 10 mW in any 1 MHz. For systems operating above 200mW EIRP, the maximum mean EIRP= 1W and maximum EIRP spectral density is 50 mW in any 1 MHz; these systems should use an antenna mask as per WRC03, Resolution COM 5/16. DFS & TPC are required as per table 2 ¹	Operated predominantly indoors;
5470-5725	Maximum EIRP= 1 W Maximum transmitter power =250mW Maximum mean EIRP spectral density of 50mW in any 1 MHz DFS & TPC are required as per table 2 ²	Used for both indoor and outdoor applications
5725-5825	Maximum transmitter power = 1W Peak power spectral density shall not exceed 17dBm in any 1 MHz Maximum EIRP= 4W for Point to multipoint systems. For Point-to-Point systems the transmitter power must be reduced by 1dB for every 3dB the antenna gain exceeds 6dBi.	This band is also designated for ISM applications

With regard to the frequencies above 5725 MHz, we note that higher gain antennas can greatly increase the usefulness of point-to-point systems as well as point to multipoint systems. On the other hand, theory and practical experience indicate that higher gain antennas with narrow beams do not pose more threat to users or other services than other transmitters operating at the same output power. Therefore rule of 1dB output reduction for every 3 dB antenna gain above 6 dBi be applied to all point - to- point and point- to-multipoint systems that operate in the 5725-5825 MHz frequency range. This flexibility will provide great benefits in rural areas as it allows

¹ A reference is added to the DFS and Transmitter Power Control (TPC) requirement for this band

² A reference is added to the DFS and TPC requirement for this band

operators to reach many more customers. Table 2 below provides the DFS requirements and provisions of the ITU-Recommendations for operations of the RLAN devices in the bands.

Table 2: DFS – TPC Requirements (5250 -5350 and 5470- 5725 MHz)

Parameter	Value
DFS Detection Threshold	-64dBm for WAS devices with an e.i.r.p. between 200mW and 1 W -62dBm for WAS with an e.i.r.p. of less than 200mW
Channel Availability Check Time	60 sec prior to channel use
Non Occupancy Period	30 min
Channel Move Time	10 sec
Automatic Transmit Power Control	At least 3dB on average (all devices) 6 dB on a device level

5. DFS requirements, comments on the 60 second CAC time

The DFS requirements formulated in ITU-Recommendation M.1652 require that a wireless system is able to monitor an RF channel for 60 seconds before beginning operations on that channel. This is known as the Channel Availability Check (CAC).

6. Equipment Certification

In order to realize the full benefits of RLAN technology, its deployment by users and businesses should be easy and not unnecessarily constrained. Experience in Europe and the United States and many other countries has shown that a regulatory regime based on suitable RF power limits in combination with equipment class licensing rather than user licensing provides adequate protection of incumbents while facilitating easy deployment.

In this case, UCC will adopt technical and operational regulatory requirements that are consistent with internationally adopted requirements and with various Mutual

Recognition Agreements. The UCC therefore considers that compliance to these international standards will be adequate to allow products to be sold and operated in Uganda without further national type approval requirements.

7. Protecting RLAN's

As noted above, wireless systems like RLAN's provide very important economic benefits to consumers, business and government. This importance was reflected by the decision of the WRC-2003 to upgrade the status of the Mobile Service in the 5GHz range to Primary – in the understanding that Wireless Access Systems, including RLAN's belong to the Mobile Service.

The UCC will make sure that the 5 GHz frequencies allocated to Mobile Services remains available and free of interference from other types of licensed wireless devices such as cordless phones.

8. Conclusion

The UCC is adopting rules and regulations for 5 GHz bands, which will facilitate the growth and rapid deployment of this technology in Uganda. The users of these devices shall comply with the guidelines as outlined in this document, failure of which the necessary regulatory actions will be instituted in accordance with Uganda Communications Act provisions.