



UGANDA
COMMUNICATIONS
COMMISSION

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

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1. INTRODUCTION

The 5GHz band comprises approximately 580MHz. This has been subdivided into three spectrum blocks i.e. A, B, and C. Unlike in block C, the use of spectrum in blocks A and B shall not require any form of spectrum authorization. The entire band is however available for deployments of fixed wireless access systems (FWAS) such as Wireless Access Systems (WAS), Radio Local Area Networks, wireless local area networks (RLAN/WLAN), and fixed broadband wireless access (BBFWA).

The authority to develop this guide is derived from among others, Sections 5(1)(c) and 25 of the Uganda Communications Act, 2013 (the “Act 2013”), the Uganda Communications (Licensing) Regulations concerning radio communication services, and installation and operation of radio communications services’ equipment.

2. OBJECTIVE

The objective of these standards is to guide and facilitate the operation of wireless access systems in the 5GHz frequency band.

3. AMENDMENT

This guide shall be subjected to periodic reviews to enable inclusion of any changes as a result of evolution in the radio communications industry, changes in policy or regulatory direction as well as emerging regional and international best practices.

4. INTERPRETATION

The terms used in this document shall have the same interpretation used in the Uganda Communication Act 2013 and the respective radio regulations issued thereunder unless otherwise defined below;

“Broadband fixed wireless access systems” refers to point and/or point to multipoint radio communication systems capable of high-capacity transmissions over a wide range of frequencies.

Dynamic frequency selection (DFS) is a technique used in IEEE 802.11 wireless network that permits devices to dynamically switch the operating frequency of transmission to avoid interference with other devices.

“Fixed Wireless Access (FWA)” refers to a wireless access application in which the location of the end-user termination and the network access point to be connected to the end-user are fixed.

“Point to point system” radio communication refers to a communication system that establishes a connection between two endpoints only.

Point to multipoint refers to a communication system that establishes connections between a single specified point and more than one other specified point.

“Radio local area network” (RLAN), refers to a Local Area Network utilizing radio frequency (wireless) for the connection of its network terminals.

“Short Range Devices” refers to radio devices that operate at low transmit power and hence range, thus offering a low risk of interference with other radio services.

5. APPLICABLE LEGISLATION AND REGULATIONS

The implementation of this guide is subject to the provisions of:

- i.* The Uganda Communications Act 2013;
- ii.* The Uganda Communications (Licensing) Regulations, 2019;
- iii.* The Uganda Communications (Equipment Type Approval) Regulations 2019;
- iv.* The Uganda Communications Commission Spectrum Assignment Framework 2019;
- v.* Any decisions or directives issued by the Commission however so described;
- vi.* The terms and conditions outlined the radio frequency spectrum authorization.

6. SCOPE

This guide outlines regulatory and technical requirements to facilitate the operation of wireless radio access systems in the 5GHz frequency band.

7. APPLICABILITY

This guide shall apply to all WAS/RLAN operations in the 5GHz band in the ranges 5150-5350MHz (Block A), 5470-5725MHz (Block B), and 5725-5850MHz (Block C).

8. AUTHORISATION AND TECHNICAL REQUIREMENTS

8.1. Regulatory Requirement

Table-1 Regulatory Requirement

Condition	Details		
Terms and Conditions	The terms and conditions of operation specified herein, relevant spectrum management frameworks/guidelines, and directives as shall be issued from time to time.		
Technology and Services	The band is open to any technology that meets the technical requirements specified in section 8.2 herein.		
Geographical area/scope	The guide applies to the operations of WAS/RLAN in the 5.0GHz band in the national geographical territory of the Republic of Uganda.		
Licensing	Block A	5150 - 5350MHz,	The use of frequencies in this range shall not require any radio spectrum authorization (<i>license-exempt</i>).
	Block B	5470 - 5725MHz	
	Block C	5725 - 5850MHz	<p>a) all operations in this frequency range shall require radio frequency spectrum authorization.</p> <p>b) additional licenses under section 22 of the Act 2013 shall apply where the operation /deployment in this band is not for private/own use but rather for provision of communication services to third parties.</p>
Spectrum Fees	Block A and B	Spectrum fees shall not apply.	

	Block C	<p>a) annual spectrum usage fees shall apply to all operations in this block.</p> <p>b) the applicable fees shall be charged in accordance with the Uganda Communications (Fees and Fines) Regulations 2019.</p>
Spectrum Sharing	Blocks A and B (License-exempt)	<p>a) the use of these blocks shall be on shared self-coordinated access;</p> <p>b) All operations in these blocks shall not cause interference and shall not claim protection from other communications services operating in the band or adjacent bands.</p>
	Block C	The use of spectrum in this band shall be protected from interference.
Type approval	Before the importation, installation, and use in Uganda, all radio communication devices/equipment must be type-approved to confirm conformity with the national and applicable international standards.	
Emission exposure and safety.	<p>a) Emission limits shall comply with ICNIRP¹ EMF² exposure limits and/or any other limits as shall be guided by law from time to time;</p> <p>b) Spectrum users may be required to demonstrate compliance with EMF exposure limits from time to time.</p>	
Interference mitigation	<p>Spectrum users are required to;</p> <p>a) Coordinate amongst themselves any deployments in the band;</p> <p>b) Implement measures to mitigate interference to other radio communications systems and/or the duly licensed operations in adjacent bands.</p>	

8.2. Technical Requirement

- a) The applicable band segments and the associated emission limits are highlighted in Annex-1;

¹ ICNIRP: *International Commission on Non-Ionizing Radiation Protection (ICNIRP)* is an international commission specialized in non-ionizing radiation protection

² EMF: *Electro Magnetic Field*

b) Dynamic frequency selection (DFS) system requirements highlighted in the table-2 below shall apply as appropriate.

Table 2: DFS requirements

Parameter	Threshold values
DFS ³ Detection Threshold	1. 64dBm for WAS devices with an e.i.r.p. between 200mW and 1W 2. 62dBm for WAS with an e.i.r.p. of less than 200mW.
Channel Availability Check Time	60 seconds before channel use.
Non-Occupancy Period	30 minutes.
Channel Move Time	10 seconds.
Automatic Transmit Power Control	At least 3dB on average (for all devices) and 6 dB at the individual device level.

Note:

- i. A 1dB output reduction for every 3 dB antenna gain above the 6dBi rule shall apply for all point-to-point and point -to-multipoint systems operating in the 5725-5825 MHz frequency range;
- ii. When implementing DFS and Transmit Power Control (TPC) requirements in the 5250-5350MHz and 5470-5725MHz bands, the thresholds in table-2 above shall apply. All DFS systems shall have to run Channel Availability Checks (CAC) for periods not less than 60 seconds.

9. STAKEHOLDER RESPONSIBILITY

9.1. The regulator (the Commission)

The Commission shall regularly review and update the provisions of this guide to ensure continued relevance and effectiveness;

9.2. Stakeholders (Importers, Vendors, and Operators)

- i) To adhere and operate under the provision of this guide;
- ii) Acquaint themselves with the relevant communication laws in Uganda including but not limited to date protection and privacy laws, and the Computer misuse Act 2011.

³ DFS: A channel allocation scheme specified for wireless LAN

Annex-1: Technical Specifications For The Operation of the 5GHz Band for FWAS/RLAN in Uganda

Table 3: Technical Specification for the operation of the 5GHz band

Frequency band (MHz)	Block designation	Maximum permissible power limits	Application/Restrictions	Additional requirements	Harmonized/Relevant standards
5150-5250	Block A	Max. mean e.i.r.p ⁴ = 125mW (21 dBm)	Outdoor (point to point/point to multipoint)	For any elevation above 30 degrees measured from the horizon, the specified e.i.r.p shall not be exceeded.	<ul style="list-style-type: none"> • TS 101 683 • ITU recommandati on ITU-R M. 1652-1 • EN 300 893 • EN 301 489 • EN 60950 • EN 301 893 • EN 301 893 • EN 302 502
		Max. mean e.i.r.p = 200mW <i>Max. mean e.i.r.p density = 10 mW/MHz or 0.25mW/25KHz</i>	i). Industrial, Scientific and Medical ii). WAS/RLAN Indoors operations only;	All Mobile devices shall be restricted to indoor operations	
		Max. e.i.r.p = 40mW	Mobile Stations inside automobiles.		
5250-5350	Max. e.i.r.p = 200mW <i>Max. mean e.i.r.p density = 10 mW/MHz.</i>	Industrial, Scientific and Medical.	i). Transmitter Power Control (TPC) is required as per table 2 of annex 1 ⁵		
	Max. e.i.r.p = 100mW ⁶ <i>Max. mean e.i.r.p density = 10 mW/MHz</i>	WAS Indoors operations only;	ii). Dynamic Frequency Selection (DFS)		

⁴ e.i.r.p= effective isotropic radiated power

⁵ A reference is added to the Dynamic Frequency Selection (DFS) and Transmitter Power Control (TPC) requirement for this band, ITU-Recommendation M.1652.

⁶ Applicable when TCP is not used

5470-5725	Block B	Max. e.i.r.p = 1 W <i>Max. mean e.i.r.p.density = 50mW/MHz</i>	i). Industrial, Scientific and Medical ii). WAS / RLAN both Indoor and outdoor	DFS & TPC must be activated for outdoor use.	
		Max. e.i.r.p = 200mW ⁷	ISM applications	i). Digital modulation (only); ii). Nominal bandwidth of transmission must not be less than 1MHz;	
		Max. mean e.i.r.p = 1W ⁸	Indoor (BBFWA);		

⁷ For operations with max e.i.r.p ≤ 1W within Block C, license exempt requirements shall apply

⁸ For operations with max e.i.r.p ≤ 1W within Block C, license exempt requirements shall apply

5725 – 5850 MHz	Block C	<p>Max. mean e.i.r.p. = 4W</p> <p>Outdoor (BBFWA); point-to- multipoint; point-to- point</p> <p><i>Maximum mean e.i.r.p. density of 23dBm/MHz*</i></p> <p>* The EIRP spectral density of the transmitter emissions should not exceed the following values for the elevation angle θ (degrees) above the local horizontal plane (of the Earth):</p> <p>i). For sectorised (e.g. P-MP Central or Base Station) and Omni-directional deployments: -7 dB(W/MHz) for $0^\circ \leq \theta < 4^\circ$ -2.2 - (1.2*θ) dB(W/MHz) for $4^\circ \leq \theta \leq 15^\circ$ -18.4 - (0.15*θ) dB(W/MHz) for $\theta > 15^\circ$</p> <p>ii). For P-MP Customer Terminal Station and P-P deployments: -7 dB(W/MHz) for $0^\circ \leq \theta < 8^\circ$ -2.68 -(0.54*θ) dB(W/MHz) for $8^\circ \leq \theta < 32^\circ$ -20 dB(W/MHz) for $32^\circ \leq \theta \leq 50^\circ$ -10 - (0.2*θ) dB(W/MHz) for $\theta > 50^\circ$</p>	Point-to-multipoint systems, Omni-directional systems and multiple co-located transmitters transmitting the same information at the same are not permitted.	
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