



**UGANDA
COMMUNICATIONS
COMMISSION**

STANDARD FOR TV WHITE SPACES ACCESS AND USE IN UGANDA

	Item Description	Date
1.0	First Created	November, 2019
1.1	First Revision	January, 2026

Summary of Changes effected on the revised Standard for TV White Spaces access and use in Uganda

Section	Provision Before	Provision After	Explanation of Change
1. Background	Described the purpose of TVWS use and referenced the 2019 standard.	Adds reference to specific sections of the Uganda Communications Act (5, 25, 26) and notes that the review responds to legal and policy updates since 2019.	Strengthens the legal foundation and explains the reason for this revision.
3. Amendment	Included a brief statement regarding the review and update of the standard as needed.	Expanded to state that reviews will align with national ICT policy shifts and international best practices.	Clarifies when and why updates should occur.
4. Interpretation	Listed key terms (Authorization, GLDB, WSD, etc.), but in a non-uniform format.	Same definitions retained and arranged alphabetically; formatting aligned to the UCC adopted documents' style.	Improves readability and consistency.
5. Applicable Legislation and Regulation	Referred to earlier Act and Regulations without full citation.	Updated and referenced the new Act CAP 103, Licensing Regulations 2019, Type-Approval Regulations 2019, and Spectrum Assignment Framework 2019.	Updates to current Regulatory instruments governing spectrum use.
6–7. Scope / Applicability	Highlighted a brief statement limiting use to 470–694 MHz.	Separated into two clear sections defining operational scope and applicability within Uganda.	Clarifies coverage and structure.
8.1 Regulatory Requirements	Contained all operational	Reformatted into a structured	Improves clarity and compliance

	terms.	list/table for licensing, privacy, EMF safety, interference, and type approval.	requirements.
8.2 Administration of Geolocation Database	Listed eligible applicants (operators, consortia, institutions) and approval steps.	Same eligibility remained, but was put under subsections for clarity.	Clearer layout and procedure.
8.3 Technical Specifications/ Annexure 1	Technical limits embedded within the main document body highlighted fewer emission categories.	Technical details moved to Annexure 1; adds multi-band out-of-band emission table and Adjacent Channel Leakage Ratio (ACLR) limits.	Better technical precision for interference management.
8.4 Operational Requirements/ Annexure 2	Operational rules for WSDs and databases were listed briefly.	Expanded and relocated to Annexure 2 with step-wise communication flow between Master WSD, Client WSD, and GLDB.	Provides more precise operational procedure and shutdown conditions.
9. Stakeholder Responsibility	Mentioned Commission and Service Providers.	Adds “importers and vendors” as stakeholders and separates responsibilities by role.	Clarifies accountability across the supply chain.
Annexures (overall)	Contained basic technical and operational notes.	Reformatted, detailed annexures with standard references (ITU-R, IEEE, ETSI, IETF).	Aligns with international specifications and UCC document style

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1. BACKGROUND

- 1.1 The continuous development and increase in use of wireless applications and services have resulted in a significant increase in demand for radio spectrum. Uganda Communications Commission (the Commission), as the regulator of the Communications sector in Uganda, is tasked with ensuring optimal utilisation of the available spectrum resources.
- 1.2 White Spaces technology presents an opportunity to accommodate multiple wireless services through spectrum-sharing arrangements in each band. The Commission, therefore, presents the standard and associated regulatory arrangements for the use of Television White Spaces (TVWS) in Uganda.
- 1.3 The authority to develop these Guidelines is derived from, among others, Sections 5(1)(b)(c)(i), 25, and 26 of the Uganda Communications Act, CAP 103 (the “Act”), as well as the Uganda Communications (Licensing) Regulations 2019.
- 1.4 Since the inception of the standard in 2019, there have been changes in the national laws and regulatory frameworks affecting the access and utilisation of the TVWS spectrum, thus necessitating a revision of the existing standard to ensure its continued relevance and adherence to the current legal landscape.

2. OBJECTIVE

The objective of this standard is to present principles and practices associated with the access and use of TVWS in the frequency range 470-694MHz in Uganda.

3. AMENDMENT

This standard shall be reviewed periodically for alignment with changes in the industry, national ICT policy shifts, or regulatory direction emerging from regional and international best practices.

4. INTERPRETATION

The terms in this guide shall carry the interpretation used in the Uganda Communications Act, CAP 103, and respective regulations, unless otherwise defined below:

- (1) **“Authorisation”** refers to the grant by Uganda Communications Commission of a right to use the specified radio frequency pursuant to sections 5(1)(c), 21, and 24 of the Uganda Communications Act CAP 103.
- (2) **“Communications services”** means services performed consisting of the dissemination or interchange of audio, visual or data content using postal, radio, or telecommunications media, data communication, and includes broadcasting.

- (3) **“Equivalent Isotropically Radiated Power (EIRP)”** is the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.
- (4) **“WSD”** is a fixed or mobile radio device that transmits and receives signals using white space spectrum, based on operational information received from a geo-location white space database.
- (5) **“Fixed WSD”** is a WSD that transmits and/receives signals at a specific fixed location.
- (6) **“Geolocation Database (GLDB)”** is a database system approved by Uganda Communications Commission for the provision of TVWS technical and operational parameters to WSDs.
- (7) **“Geolocation Database Administrator”**: this is a legal person authorised by Uganda Communications Commission to manage one or more *GLDBs* in Uganda.
- (8) **“Master WSD”** is a WSD that can communicate with a GLDB and with other WSDs.
- (9) **“Operator”** means a person licensed to provide a communication or broadcasting service.
- (10) **“Portable WSD”** a WSD that transmits at a non-specified or changing location.
- (11) **“Private network”** is a communication network established by a person for the sole use of its members, with no monetary gain to the person for the provision of access or use of the network by its members.
- (12) **“Client WSD”** is a WSD that is only able to communicate with other WSDs under the control of a master WSD.
- (13) **“Television White Space (TVWS)”** are the unused frequencies in the range of 470-694MHz with respect to time and/or geographical locations.
- (14) **“TVWS Service Provider”** refers to an Operator using TVWS technology.
- (15) **“Ultra-High Frequency (UHF) TV band”** means the frequency band from 470 to 694 MHz
- (16) **“Uganda Communications Commission (the Commission) also known as UCC”** refers to the regulator of the Communications Sector established by the Uganda Communications Act CAP 103.
- (17) **“Uganda Communications Act (the Act)”** means Uganda

Communications Act CAP 103, the law that governs the communications sector in Uganda.

5. APPLICABLE LEGISLATION AND REGULATION

The following legal and regulatory provisions shall be considered applicable in the implementation of this standard;

- (1) The Uganda Communications Act, CAP 103.
- (2) The Uganda Communications (Licensing) Regulations, 2019.
- (3) The Uganda Communications (Equipment Type Approval) Regulations 2019.
- (4) The Uganda Communications Commission Spectrum Assignment Framework 2019.

6. SCOPE

This document outlines the technical requirements, operational and regulatory requirements for the operation of WSDs and TVWS technology in Uganda.

7. APPLICABILITY

This standard shall apply only to operations in the UHF TV broadcasting band of 470-694MHz in Uganda.

8. AUTHORISATION AND OPERATION OF WHITE SPACE SYSTEMS AND SERVICES IN UGANDA

8.1 Regulatory Requirements

Applicable Requirement	Requirement Description
<u>Terms and Conditions</u>	The terms and conditions of operation specified herein, relevant spectrum management frameworks/guidelines, and any directives as may be issued.
<u>Data and Privacy</u>	All TVWS service providers and geolocation database administrators shall ensure the protection of user information and privacy, in observance of the relevant national laws and regulations.
<u>Geographical area/ scope</u>	<ol style="list-style-type: none"> i) National Geographical Territory of the Republic of Uganda as defined in the 1995 Constitution. ii) Any WSD that is authorized for use by the

	Commission as a fixed WSD shall be operated at the geographical location specified in the authorisation.
<u>Licensing</u>	The use of TVWS for the provision of Communications services in Uganda shall be subject to the possession of a valid service license issued by the Commission.
<u>Spectrum Fees</u>	All TVWS service providers and database administrators shall pay any applicable fees as shall be prescribed by the Commission.
<u>Spectrum Sharing</u>	<ul style="list-style-type: none"> i) The access and use of the TVWS spectrum shall be on a shared basis. ii) The channels available for use for TVWS and the associated operating parameters shall be limited to those obtained from a duly authorized geolocation database.
<u>Type approval</u>	All equipment shall be type-approved as required under the Framework on Type- approval of Communications Equipment in Uganda available on the Commission's website at https://www.ucc.co.ug/type-approval/
<u>Emission exposure and safety.</u>	<ul style="list-style-type: none"> i) Emission limits shall comply with ICNIRP¹ EMF² exposure limits and/or any other limits as shall be guided by law from time to time. ii) Spectrum users may be required to demonstrate compliance with EMF exposure limits.
<u>Interference mitigation</u>	The use of TVWS systems and services shall be on a secondary basis in the subject band and shall therefore not disrupt or cause interference to, nor claim protection from any radio communication systems and services allocated on a primary basis in the band.

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

² Electro Magnetic Field

8.2 Administration of Geolocation Database

The geolocation database (GLDB) may be established, operated, and maintained by any of the following persons.

- (1) An eligible person under the Laws of Uganda.
- (2) An operator already licensed under the Act.
- (3) A consortium of Operators under the Act. Where the consortium is in the form of a Trust, the Operators that are named as the trustees of the Trust at the time of applying for authorisation by the Commission shall be recognized as the directors of the administrator. A new authorisation shall be required when all the named licensees have ceased to be trustees.
- (4) A statutory institution established under the laws of Uganda, whether this is an academic or government agency.

8.2.1 Authorization to administer a Geolocation Database

- (1) An application shall be submitted to the Commission to establish and administer a geolocation database.
- (2) Upon meeting the criteria for authorisation and where the GLDB is for use other than in a private network, the Commission shall subject such an application to public notice.
- (3) The applicant's planned telecommunication or radio communication equipment shall then be subjected to approval review.
- (4) Upon successful completion of the above and payment of the associated fees, an authorisation shall be issued by the Commission.

8.3 Technical Requirements

The channel arrangements and applicable emission limits are highlighted in Annexure 1 attached herewith.

8.4 Operational Requirements

The requirements for the operation of TVWS devices and the GLDB are highlighted in Annexure 2 attached herewith.

9. STAKEHOLDER RESPONSIBILITY

9.1 The regulator (the Commission) shall

- (1) Regularly review and update the provisions of this standard to ensure its continued relevance and effectiveness.

- (2) Respond to inquiries related to the provisions herein and the implementation of this standard.

9.2 Stakeholders (*importers, vendors, and operators*)

- (1) Comply with the operational requirement herein.
- (2) Acquaint themselves with the laws, regulations, and frameworks referenced herein.

9.3 Geolocation Database Administrator

- (1) The GLDB administrator(s) shall be responsible for the establishment and management of the database,
- (2) ensure full functionality, accessibility, availability and provision of accurate operational parameters to request WSDs in a non-discriminatory manner, in accordance with the requirements specified herein,
- (3) establishing processes and submission of necessary information to the UCC,
- (4) ensure that the collection, storage, and use of WSD customer information complies with the database security requirements as well as relevant national laws on data protection and privacy,
- (5) facilitate interference-free operations of the WSDs in all locations,
- (6) Cooperate and coordinate with other GLDB administrators to ensure consistency and interference-free operations.

10 INFORMATION MANAGEMENT

The Commission shall publish the register of authorised GLDB administrators and TVWS service providers.

Annexure 1

TECHNICAL SPECIFICATIONS FOR THE OPERATION OF TVWS IN THE 470-694 MHz BAND

A. Permissible Frequencies and Channel Arrangement

TVWS operations in Uganda shall only be allowed in the UHF TV broadcasting frequency band of 470-694MHz.

The maximum permissible channel bandwidth is 8MHz. Higher bandwidth may be achieved by aggregation.

B. In-band Power Limits

Parameter	Fixed WSD	Portable WSD
Transmission Power (EIRP)	36 dBm	20 dBm
Maximum antenna Height	50m	

C. Out-of-Band Emission Limits

Frequency Range	Maximum power	Measurement Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
694 MHz to 862 MHz	-54 dBm	100 kHz
862 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 4 GHz	-30 dBm	1 MHz

D. Adjacent Channel Leakage Ratios (ACLR)

The ACLR shall depend on the device class and will be as shown below for the first, second, and third adjacent channels:

Adjacent Channel(n)	ACLR (dB)				
	Class 1	Class 2	Class 3	Class 4	Class 5
n = ±1	74	74	64	54	43
n = ±2	79	74	74	64	53
n ≥ +3 or n ≤ -3	84	74	84	74	64

E. Additional Technical Standards

TVWS installations and operations in Uganda shall additionally be guided by the following industry standards. However, if there is any conflict between a requirement specified by the Commission herein and the industry standards listed below, the UCC requirement shall prevail:

- (1) International Telecommunications Union recommendations: ITU-R SM.2405-1 and ITU-R M.2330.0,
- (2) Institute of Electrical and Electronics Engineers (IEEE) Standardisation; IEEE 802.11af, IEEE 802.22, IEEE 802.19.1, IEEE 802.15.4m, and IEEE 1900.7,
- (3) European Standard; ETSI EN 301 598,
- (4) Internet Engineering Task Force (IETF) Standardisation Protocol to access TV white spaces (PAWs Protocol),
- (5) European Computer Manufacturers Association (ECMA 392).

Annexure 2

OPERATIONAL REQUIREMENTS FOR TVWS

A. TVWS Access Mode

- (1) TVWSD in Uganda shall use a geolocation database to access resources for transmission,
- (2) Access to TVWS channels shall be on a non-exclusivity and non-discriminatory basis.

B. Requirements of TVWS devices and database

TVWS service shall be categorised as master and slave WSDs. A master WSD is capable of directly interfacing with a GLDB to acquire necessary operational parameters, whereas a slave WSD can only function with a master WSD.

A WSD client should have the following capabilities:

- (1) the relevant capabilities associated with the technical requirements specified herein to ensure that no harmful interference is caused to any duly licensed or authorised Communication services or operation,
- (2) ability to transmit and receive within the frequency range 470 MHz to 694 MHz,
- (3) WSD used as a master WSD shall possess in-built geo-location capability,
- (4) TVWSD shall transmit identifying information with sufficient data to determine the device and its geographic coordinates,

A TVWS geolocation database is used for the following:

- (1) To assign available channels in the band 470 – 694MHz to a TVWS device at the power level for each channel,
- (2) To store location and identification information for TVWS devices,
- (3) To verify and authenticate the identifiers provided by a master or client TVWS device seeking access,
- (4) To provide a list of available channels that TVWS devices can access and have a registry of reserved channels.

C. Requirements for communication between a GLDB and a Master WSD

(1) A Master WSD must register with a GLDB:

- i).* When first installed or rebooted.
- ii).* When its location or coordinates have as changed.

(2) Prior to any transmission, a Master WSD shall establish contact with an authorised GLDB and request parameters necessary to operate in the respective location(s). Such communication shall include the provision of the following information:

- i).* Its height is above the ground level (m);
- ii).* Its channel bandwidth (MHz) requirement;
- iii).* Emission class in accordance with ETSI EN 301 598 or any other applicable standards specified herein;
- iv).* Its operating mode, master, or client;
- v).* Its unique identity as serialised by the Manufacturer of the device;
- vi).* Its unique identifier;
- vii).* Its geographical coordinates.

(3) A Master WSD must also query the serving GLDB for operational parameters when:

- i).* Activated from a power-off state,
- ii).* When the channel validity period expires.

(4) A GLDB shall:

- i)* upon request, provide a Master WSD with all the information necessary to facilitate interference-free communication,
- ii)* only provide operational parameters to Master WSDs that are duly registered.
- iii)* have security mechanisms to ensure secure communication between itself and the master WSDs, including the prevention of manual modification of parameters at any stage during communication

(5) The operational parameters provided by the GLDB shall be in accordance with the specification in Annexe 1.

(6) Upon confirmation of the information provided by the master WSD, the GLDB

shall respond by providing;

- i)* Available channels and bandwidth,
- ii)* Associated signal quality,
- iii)* Maximum permissible transmission power,
- iv)* Channel validity.

(7) Upon receipt of the operational parameters, the Master WSD shall regularly:

- i)* update the GLDB on its on usage of TVWS channels and its client WSDs,
- ii)* poll the GLDB to confirm the validity of the operational parameters in use.

(8) Master WSDs shall be required to immediately cease operation in any of the following situations:

- i)* The serving GLDB indicates the channel is no longer available or valid.
- ii)* The GLDB itself becomes unavailable.

(9) When a master WSD does not have a direct connection to GLDB, it shall operate as a client WSD and depend on another master WSD to obtain the respective operational information/parameters from the GLDB.

D. Requirements for communication between the master WSD and the Client WSD

(1) In requesting for operational parameters, the Client WSD shall communicate the following information to the GLDB through the Master WSD:

- i)* Its operating mode – master or client;
- ii)* the unique identifier of the serving Master WSD;
- iii)* Its unique identifier as serialised by the Manufacturer of the device;
- iv)* Its type – fixed or portable
- v)* Its emission class based on ETSI EN 301 598, or any other applicable standards specified herein.
- vi)* its antenna height (m)

(2) The Master WSD shall only communicate with and to the client WSDs operational parameters that have been determined by the serving GLDB.

(3) A master WSD shall instruct all its associated Client WSDs to stop transmission upon receipt of information from the serving GLDB indicating

that the operational parameters are no longer valid.

- (4) The Client WSD must stop transmission immediately upon receipt from the master WSD of such instruction described in D(3) above.