



GUIDELINES FOR THE USE OF SHORT RANGE DEVICES IN UGANDA

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Prepared for
All national spectrum users

Prepared by
Spectrum Management Division

CONTENTS

- 1. INTRODUCTION 3
 - 1.1 PURPOSE 3
 - 1.2 BACKGROUND 3
 - 1.3 SCOPE..... 3
- 2.0 OVERVIEW OF SHORT RANGE DEVICES 3
- 3.0 SHORT RANGE DEVICES OPERATIONAL REQUIREMENTS 4
 - 3.1 GENERAL..... 4
 - 3.2 MARKING AND LABELLING..... 4
 - 3.3 TECHNICAL REQUIREMENTS 5
 - 3.3.1 STANDARDS..... 5
 - 3.3.2 SPECTRUM ALLOCATION..... 5
 - 3.3.3 EMISSION MASK 6
 - 3.3.4 ANTENNA..... 6
 - 3.3.5 INTERFERENCE MITIGATION..... 6
- 4.0 REGULATORY CONSIDERATIONS..... 7
 - 4.1 AUTHORIZATION..... 7
 - 4.2 REQUIRED INFORMATION FOR TYPE APPROVAL..... 8
 - 4.3 ENFORCEMENT..... 8
- 5.0 ANNEXES..... 9
 - 5.1 ANNEX 1: FREQUENCY BANDS AND TYPICAL APPLICATION TYPE FOR SRDS IN UGANDA..... 9
 - 5.2 ANNEX 2: MAXIMUM RADIATED POWER VS FREQUENCY BANDS FOR SRDS IN UGANDA..... 11

1. INTRODUCTION

1.1 PURPOSE

These guidelines outline the operational requirement for short range devices (SRDs) in Uganda. The guidelines define the minimum technical considerations, parameters, and regulatory considerations that shall govern the operation of SRDs in the allocated frequency bands in accordance with the Uganda Table of Frequency Allocation (UTFA). The guidelines are based on harmonized spectrum, allocated and aligned to the regional and international agreements.

1.2 BACKGROUND

Over the recent years, the Ugandan spectrum space has seen several changes with the introduction of new services and technologies, among which, is the increased use of SRDs. Regulations of SRDs operations has generally been a challenge due to lack of adequate regulatory tools, however with the introduction and management approval of this document, regulation of SRDs is expected to improve.

These guidelines define the minimum spectral, technical and regulatory standards to govern all operations of SRDs in Uganda. This document is bound to be revised annually, in accordance to industrial trends, regional and international spectrum allocation recommendations and agreements.

1.3 SCOPE

This document provides the minimum spectral, technical, and regulatory considerations to govern the operation of SRDs in the various frequency bands, in accordance with the Uganda Table of Frequency Allocation (NFTA), regional and internationally harmonized spectrum agreements.

2.0 OVERVIEW OF SHORT RANGE DEVICES

A SRD is a radio device that offers a low risk of interference with other radio services. SRDs are designed to operate at low transmit power of less than one (1) Watt, and over short range (distance) of less than one (1) kilometer. SRDs may be fixed, mobile or portable stations that come with a radio frequency output connector and dedicated (integral) antenna.

SRDs majorly operate on secondary bases, i.e. using frequency bands already allocated to other services on primary bases. Hence, SRDs are not expected to cause or claim protection from interference from existing services in a given band.

SRDs are used in various applications depending on the spectrum band, power, distance, and transmission data rates required. The transmission data rates may vary from as low as 100 bps to as high as 1 Gbps or more.

The most common areas of application include; garage doors or gate controls, alarms and motion detectors, industrial controls and monitoring, anti-theft devices, wireless microphones or audio systems and medical implants. Other areas include radio frequency identification (RFID), internet of things (IoT) applications, Satellite machine to machine (M2M) or telemetry (telecommand) operations, low and high data rate transmission applications and model remote controls among many others.

3.0 SHORT RANGE DEVICES OPERATIONAL REQUIREMENTS

SRDs operational requirement range from general (basic), marking (labelling) to technical requirements;

3.1 GENERAL

- a) SRDs operate on unprotected basis subject to not causing interference to other authorized radio communication services.
- b) Short-range device vendors shall be required to be registered and in possession of relevant trading documents.
- c) All SRD devices shall have to be type approved and registered with the Commission.
- d) SRDs are required to operate in the designated spectrum segment on a shared basis and are subject to the same conditions of operation within the band.
- e) The device shall not be constructed with any external or readily accessible control, which permits the adjustments of its operation parameters in a manner that is inconsistent with guidelines.

3.2 MARKING AND LABELLING

The equipment shall be marked with the following information.

- a) Supplier/manufacturer's name or identification mark.
- b) The equipment's trade name, model name and serial number.
- c) Other markings such as type approval and compliance label for equipment as required by the relevant standards. The markings shall be legible, indelible and readily visible. All information on the marking shall be in English Language.

3.3 TECHNICAL REQUIREMENTS

Technical requirements may include but not limited to standards, spectrum allocation, emission mask, antenna and interference.

3.3.1 STANDARDS

- a) In order to ensure co-existence with other services in the authorized bands, SRDs shall comply with the maximum Effective Isotropic Radiated Power (EIRP) and Transmitter & Receiver Spurious Emissions prescribed, refer to the tables specifying power limits (**Annex 2**).
- b) The authorized EIRP powers are expected to self-limit the transmission coverage of SRDs, and where necessary, will be reviewed to ensure that SRDs operate as expected.
- c) The bandwidth of SRDs operating in frequency ranges between 70 MHz and 900 MHz should not be wider than 0.25% of the fundamental frequency.
- d) For operating frequencies higher than 900 MHz, the occupied bandwidth should not exceed 0.5% of the fundamental frequency.
- e) SRD may be AC powered or DC powered. For AC powered equipment, the technical requirements shall be complied with when operating from an AC mains supply of voltage, 240+/-10% and frequency 50Hz+/-2%.
- f) SRD operating with mains power supply shall comply with internationally accepted electrical safety standards (Ref: EN60950).
- g) SRD shall comply with internationally accepted Electromagnetic Compatibility Requirements EMC standards such as but not limited to EN 301 489-1 and EN 301 489-3.

3.3.2 SPECTRUM ALLOCATION

The frequency bands designated for short range devices are indicated in the **Annex 1**. However, it should be noted that SRDs may generally not be permitted to use bands allocated to passive services and those ensuring safety of life such as search and rescue operations.

According to radio regulations (RR) provisions, such services include;

- a) Radio astronomy.
- b) Aeronautical mobile.
- c) Safety of life services including radio navigation.

3.3.3 EMISSION MASK

Short-range devices shall conform to the spurious domain emission limits given in Radio Regulation (RR) Appendix 3. Table II of RR Appendix 3 lists the attenuation values used to calculate maximum permitted spurious domain emission power levels for use with radio equipment.

For example, low power radio device equipment intended for short-range communication or control purposes and operating at output power less than 100 mW, must meet an attenuation level of $56 + 10 \log(P)$, or 40 dBc, whichever is less stringent.

3.3.4 ANTENNA

All SRDs operated in Uganda shall conform to the following antenna characteristics;

- a) Integral (no external antenna socket),
- b) Dedicated (type approved with the equipment) and,
- c) External (equipment type approved with specific external antenna antenna).

The UCC shall only authorize (type approve) SRD transmitter that is designed in such way that no other type of antenna can be used other than the one which designed and type approved by the manufacturer to show conformity with the appropriate emission level.

This is intended to prevent interference to the authorized radiocommunication services.

3.3.5 INTERFERENCE MITIGATION

The SRDs shall not cause interferences to other radio communications services. Upon notification by the UCC, the SRDs suspected of causing interference shall cease all transmissions until the interference is eliminated.

SRDs users are required to comply with this guideline and shall take reasonable measures to ensure that no interference is caused to other users within or outside the designated band for use by SRDs.

The SRDs shall not be accorded any protection from interferences by other authorized radio communications services and the UCC shall not be obliged to

investigate complaints of interferences logged by SRD operations apart from those designated otherwise.

Should the use of a particular SRD cause harmful interference to other licensed services within and outside their operational band or considered threat to human life and property, the Commission as mandated by law, the Communications Act 2013, Sec 6(2)(3) reserves the right to;

- a) Confiscate the gadgets in stock
- b) Cancel the Dealers' Authorization
- c) Blacklist a given product on market

4.0 REGULATORY CONSIDERATIONS

4.1 AUTHORIZATION

The approval and use of the SRDs shall be subject to the following terms and conditions;

1. All SRD radio apparatus like other radio apparatus must be type-approved by the Commission.
2. The use of SRDs shall be license exempted unless specified otherwise. However, specific authorization should be sought for SRDs operating in the frequency bands marked ¹ specified in the table of **Annex 1**.
3. The Commission shall generate and publish a database for all type approved SRDs.
4. The frequencies, transmitting power and external high-gain antenna of these SRD devices must not be altered without a new type approval certificate being issued.
5. The SRD devices must be operated within and must not exceed the technical parameters set out with respect to the frequency band, maximum radiated power or field strength limits and channel spacing, relevant standard and duty cycles and antennas to be used.
6. The antenna of the SRD end user device must not be higher than the average height above ground level (2 to 3 meters) for efficient operation.
7. The SRD devices must not cause interference to any authorized network issued with a radio frequency spectrum license.
8. The use of SRD devices in the license-exempt frequency spectrum shall be on a non-interference and non-protective basis from interference.

4.2 REQUIRED INFORMATION FOR TYPE APPROVAL

To type approve an SRD, the following information shall be provided together with the application;

- a) Certificate of registration or Incorporation of a company
- b) Company trading License
- c) Complete specifications of the device including.
 - i) Manufacturing Country (Origin)
 - ii) Manufacturing Company
 - iii) Model /Batch No.
 - iv) Operational Frequency Range
 - v) Maximum Radiated Power
 - vi) Application details / Usability
- d) Copies of manufacturer's technical specifications of the SRD equipment.
- e) Dully paid type approval fees.
- f) Description and declaration of conformity of the measurement facilities where conformity tests were performed and relevant technical documentation in English language must accompany the application for certification. **(See type approval guidelines for details)**

Upon fulfilling all the above requirement, a type approval certificate shall be issued.

For SRDs operating in the bands marked ¹, individual authorization with strict licensing conditions and location details shall be issued.

4.3 ENFORCEMENT

All SRD manufacturer, suppliers, agents, vendors and users are strictly required to comply with all provisions of this guidelines. Violation of any provision shall result in serious regulatory measures.

5.0 ANNEXES

5.1 ANNEX 1: FREQUENCY BANDS AND TYPICAL APPLICATION TYPE FOR SRDS IN UGANDA

Typical Application Type	Frequency Bands	Type of devices
RFID [for: Automotive, Livestock ID, Item Management, Data carrier tooling, manufacturing automation, ticketing, EAS, passports and ID]	9 – 150 KHz 150 – 5000KHz 6765 – 6795 KHz 7400 – 8800 KHz 13.553 – 13.567 MHz 2446 – 2454 MHz 865.0 – 867.6 MHz ¹ 923 – 925 MHz ¹	Inductive loop system
Radio detection alarm system	0.016 – 0.150 MHz 13.553 – 13.567 MHz 240.15 – 240.30 MHz 300 – 300.30 MHz 312.0 – 316.0 MHz 444.40 – 444.80 MHz	Inductive loop system Doppler shift movement detectors, wireless microphones, garage door openers, Vehicle alarm systems Public Mobile Radio (PMR) in the channels ranges (446-461.1MHz)
Wireless microphone and assistive listening devices	0.51 – 1.60 MHz 29.7 – 47.0 MHz 36.26 – 37.24 MHz 88.0 – 108.0 MHz ¹ 470 – 742 MHz ¹ 863 – 865 MHz ¹ 1785 – 1800 MHz ¹	Wireless microphones
Remote control of Garage doors, cameras toys and miscellaneous devices	26.957 – 27.283 MHz 40.665 – 40.695 MHz 72.13 – 72.21 MHz 312 – 315 MHz 433.050 – 434.790 MHz	Inductive loop systems Surface Model Control Wireless microphones
Remote Controls of aircraft and glider models, telemetry, detection and alarm systems	26.96 – 27.28 MHz 29.70 – 30.00MHz	Surface Model Control
Medical and Biological telemetry	40.5 – 41.0 MHz 216.0 – 217 MHz 454.0 – 454.5 MHz 464.5-464.5875MHZ	Medical and Biological Implants systems. Nonspecific SRDs (464.5375-464.5875)
Wireless modem, data communication system	72.08 – 72.6 MHz	Wideband Wireless Systems. WAS/RLANs
Short range radar systems such as automatic cruise control and collision warning systems for vehicles	76 – 77 GHz	RTTT short range radar
Radio Telemetry, Telecomand system	433.05 – 434.79	Non-specific SRD
Wireless video transmitter	2.4 – 2.4835 GHz 10.5 – 10.55 GHz 24 – 24.25 GHz	Wideband Wireless Systems. WAS/RLANs

Bluetooth	2.4 – 2.4835 GHz	Wideband Wireless Systems. WAS/RLANs
Wireless LAN	5.725 – 5.85 GHz 2.446 – 2.454 GHz	
Active Medical Implants and their peripherals	9 – 315 KHz 315 – 600 KHz 12.5 – 20 MHz 30 – 37.5 MHz 401 – 405 MHz	Medical Implants
Codeless Phones	1627.5 – 1796.5 KHz 43.71 – 44.49 MHz	Wideband Wireless Systems. WAS/RLANs
Hearing Aids	3155 – 3400 KHz 169.4 – 174.0	Inductive Loop systems
Tracking, Tracing and data acquisition	456.9 – 457.1 KHz 169.4 – 169.475 MHz	Doppler shift movement detectors systems.
Wide Band Data Transmission Systems	2.4 – 2.4835 GHz 5.150 – 5.350 GHz 17.1 – 17.3 GHz 57 – 66 GHz	Wireless Access Systems/Radio Local Access Network (WAS & RLAN) indoor use only.
Railway Applications	2.446 – 2.454 MHz 7.3 – 23 MHz	Inductive loop systems
Road Transport and Traffic Telematics (RTTT)	5795 – 5815 MHz 63 – 64 GHz 76 – 77 GHz	RTTT short range radar
Radio determination Applications (Equipment and Motion Sensors)	2400 – 2483.5 MHz 9200 – 9975 MHz 10.5 – 10.6 GHz 13.4 – 14.0 GHz 24.05 – 24.25 GHz	Radio frequency identification (RFID) Non-specific SRD
Alarms	169.4 – 169.6 MHz 869.250 – 869.7 MHz¹	

¹ Special Authorization is required for SRDs operating in these bands

5.2 ANNEX 2: MAXIMUM RADIATED POWER VS FREQUENCY BANDS FOR SRDS IN UGANDA

Maximum Radiated Power	Frequency Bands
-20dB (μA/m) at 10m	5 – 30 MHz
-15dB (μA/m) at 10m	148.5 KHz – 5 MHz
-8dB (μA/m) at 10m	7.3 – 23 MHz
-7dB (μA/m) at 10m	400 – 600 MHz
-5dB (μA/m) at 10m	148.5 – 1600 KHz ; 315 – 600 KHz
7dB (μA/m) at 10m	456.9 – 457.1 KHz ; 516 – 8515 KHz
9dB (μA/m) at 10m	984 – 7484 KHz
13.5dB (μA/m) at 10m	3155 – 3400 KHz
30dB (μA/m) at 10m	9 – 315 KHz
37.7dB (μA/m) at 10m	140 – 148.5 KHz
42dB (μA/m) at 10m	90 – 119 KHz ; 135 – 140 KHz ; 6765 – 6795 KHz ; 13.553 – 13.567 MHz 26.957 – 27.283 MHz
66dB (μA/m) at 10m	119 – 135 MHz
60dB (μA/m) at 10m	13.553 – 13.567 MHz (RFID and EAS only)
72dB (μA/m) at 10m	
50nW ¹	87.5 – 108 MHz
25μW ¹	401 – 402 MHz ; 402 – 405 MHz; 405 – 406 MHz
0.1mW	24.075 – 24.150 GHz
1mW ¹	30 – 37.5 MHz 433.050 – 434.790 MHz
2mW ¹	173.965 – 174.015 MHz
5mW ¹	869.7 – 870.0 MHz
10mW ¹	26.957 – 27.283 MHz ; 29.7 – 47.0 MHz ; 138.2 – 138.45 MHz ; 169.4 – 174.0 MHz ; 433.050 – 434.79 MHz ; 863 – 865 MHz 868.2 – 869.4 MHz ; 2400 – 2483.5 MHz
20mW ¹	1785 – 1800 MHz
25mW ¹	863 – 870 MHz ; 2400 – 2483.5 MHz ; 5725 – 5875 MHz 9200 – 9975 MHz ; 13.4 – 14 GHz
50mW ¹	174 – 216 MHz ; 470 – 862 MHz ; 1785 – 1800 MHz
100mW ¹	26.99 – 27.2 MHz ; 34.995 – 35.225 MHz (for flying models only) ; 40.660 – 40.700 MHz ; 865.0 – 865.6 MHz ² 2400 – 2483.5 MHz (for RLANS only) ; 17.1 – 17.3 GHz ; 24.050 – 24.250 GHz ; 61.0 – 61.5 GHz ; 122 – 123 GHz ; 244 – 246 GHz
200mW ¹	5150 – 5350 MHz (for indoor use only)

316mW ¹	57 – 66 GHz (Fixed outdoor installation devices are not allowed. The maximum mean eirp density is limited to -2dBm / MHz)
400mW ¹	
500mW ¹	169.4 MHz – 167.475 MHz ; 867.8 – 868.0 MHz ² ; 869.4 – 869.65 MHz 2446 – 2454 MHz (railway applications and RFID outdoor use) ; 10.5 – 10.6 GHz
1W ¹	5470 – 5725 MHz
2W ¹	865.6 – 867.6 MHz ² ; 5795 – 5815 MHz (for specific Licenses applications only)
4W ¹	2446 – 2454 MHz (for RFID indoor use only)
8W ¹	5795 – 5815 MHz (For specific licenses applications only)
4W ¹	2446 – 2454 MHz (For RFID indoor use only)
10W ¹	57 – 66 GHz (Restricted to indoor use. The max mean eirp density is limited to 13dBm / MHz)
24 dBm eirp ; 30 dBm eirp ; 43 dBm eirp ; 43 dBm eirp ; 43 dBm eirp	4.5 – 7.0 GHz ; 8.5 – 10.6 GHz ; 24.05 – 27.0 GHz 57.0 – 64.0 GHz ; 75.0 – 85.0 GHz (All the above bands are designated for use by tank level probing radar)
55dBm peak power ¹ 50 dBm average power ¹ 23.5 dBm average power ¹ (pulsed radar only)	76 – 77GHz

¹ The indicated power is e.r.p for band below 1 GHz and e.i.r.p for bands above 1 GHz