

UNITED REPUBLIC OF TANZANIA  
TANZANIA COMMUNICATIONS REGULATORY AUTHORITY  
ISO 9001: 2015 CERTIFIED



**MINIMUM TECHNICAL SPECIFICATIONS**

**FOR**

**SHORT RANGE DEVICES (SRDs)**

Document Number: **TCRA/TS015**

Version: **Version 1.0**

Date: **June 2024**

Approved by	Title	Signature	Date
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## **PART 1 Introduction**

The Tanzania Communications Regulatory Authority (TCRA), established under the Tanzania Communications Regulatory Authority Act No.12 of 2003, is mandated among other duties, to license communications and broadcasting operators and type approve communication equipment for use in the United Republic of Tanzania pursuant to Section 82 of the Electronic and Postal Communications Act, Revised Edition 2021, hereby stipulating as follows:

1. The Authority shall be responsible for the establishment and publication of technical standards relating to all regulated services in the United Republic of Tanzania.
2. In establishing such standards, the Authority shall-
  - (a) Where appropriate, seek submissions from other interested parties, in particular, those persons likely to be most affected by the publication of such standards; and
  - (b) Participate in standardization activities and take due account of any relevant standards prescribed by international organizations to which the United Republic belongs, such as the International Telecommunications Union and other sub-regional groupings.

Furthermore, pursuant to Regulation 4(1) of the Electronic and Postal Communications (Electronic Communications Equipment Standards and E-Waste Management) Regulations, 2020 empowers the Authority to determine standards for Electronic Communications Equipment in the country and review them from time to time.

The Authority, therefore, wishes to notify all importers of Short Range Devices (SRDs) about the minimum technical requirements and specifications for Short Range Devices (SRDs). The specifications have been revised on grounds of technology advancement, spectrum efficiency and immunity to interference, and safety requirements for people using them and the surrounding environment.

## **PART 2 Scope and Purpose**

This Specification defines the minimum technical requirements for Short Range Devices transmitters and receivers to operate in one of the authorized frequency bands or frequencies, and transmit within the corresponding output power levels as

indicated in this document. Short Range Devices are intended for communications in confined areas of buildings as well as for localized on-site operations and services.

### **PART 3 Definitions and Abbreviations**

#### **Definition**

Short Range Devices may be fixed, mobile or portable stations that come with a radio frequency output connector and dedicated antenna or an integral antenna. Applications include alarms and movement detectors, closed-circuit television (CCTV), access control (including door and gate openers), medical implants, identification systems, radio-detection, vehicle radar systems, wireless local area networks, remote controls, telecommand, telemetry, sockets, light bulbs, plugs and on-site paging systems. Below are the key characteristics of SRDs;

- a) SRDs operates on a Non-Interference and Non-Protection (NINP) basis unless specific protection is afforded;
- b) Since SRDs operate on a NINP basis they are generally required to cease operation when causing harmful interference (or eliminate the harmful interference), even if operating within the defined technical and operational parameters;
- c) SRDs generally operate on a radio frequency spectrum licence exempted basis (unless otherwise specified);
- d) SRDs can operate in either Industrial, Scientific and Medical (ISM) or non-ISM frequency bands;

## Abbreviations

APC	Adoptive Power Control
AFA	Automatic Frequency Agility
BW	Bandwidth
CISPR	International Special Committee on Radio Interference
CW	Continuous Wave
DSSS	Direct Sequence Spread Spectrum
EMC	Electromagnetic compatibility
FHSS	Frequency Hopping Spread Spectrum
ICNIRP	International Commission on Non-ionizing Radiation Protection
ISM	Industrial, Scientific and Medical
ITU	International Telecommunication Union
LBT	Listen Before Talk
LPI	Low Power Indoor
NNIP	Non-Interference and Non-Protection
PMR	Private Mobile Radio
RFID	Radio Frequency Identification
RLAN	Radio Local Area Network
RLPR	Reservoir Level Probing Radar
RR	Radio Regulations
RTTT	Road Transport and Traffic Telematics
SRD	Short Range Device
UWB	Ultra-Wide Band
VLP	Very Low Power
WLAN	Wireless Local Area Network
WAS	Wireless Access Service

## PART 4 References

S/N	Reference No.	Title
1.	CISPR 32	Amendment 1 - Electromagnetic compatibility of multimedia equipment - Emission requirements
2.	EN 300 220	Short Range Devices (SRD) operating in the frequency range 25 MHz to 1 000 MHz
3.	EN 300 296	Land Mobile Service; Radio equipment using integral antennas intended primarily for analogue speech; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/5
4.	EN 300 328	Wideband transmission systems; Data transmission equipment operating in the 2.4 GHz band; Harmonised Standard for access to radio spectrum
5.	EN 300 330	Short Range Devices (SRD); Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
6.	EN 300 422	Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range
7.	EN 300 440	Short Range Devices (SRD); Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
8.	EN 300 674	Electromagnetic compatibility and Radio spectrum Matters (ERM); Road Transport and Traffic Telematics (RTTT); Dedicated Short Range Communication (DSRC) transmission equipment (500 kbit/s / 250 kbit/s) operating in the 5,8 GHz Industrial, Scientific and Medical (ISM) band; Part 1: General characteristics and test methods for Road Side Units (RSU) and On-Board Units (OBU)
9.	EN 301 091	Short Range Devices; Transport and Traffic Telematics (TTT); Radar equipment operating in the 76 GHz to 77 GHz range; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU; Part 1: Ground based vehicular radar
10.	EN 301 893	5 GHz RLAN; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
11.	EN 302 195	Short Range Devices (SRD); Ultra Low Power Active Medical Implants (ULP-AMI) and accessories (ULP-AMI-P) operating in the frequency range 9 kHz to 315 kHz Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
12.	EN 302 502	Wireless Access Systems (WAS); 5.8 GHz fixed broadband data transmitting systems; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/E
13.	EN 302 510	Short Range Devices (SRD); Ultra Low Power Active Medical Membrane Implants (ULP-AMI-M) and Peripherals (ULP-AMI-M-P) operating in the frequency range 30 MHz to 37.5 MHz;

		Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
14.	EN 302 208	Radio Frequency Identification Equipment operating in the band 865 MHz to 868 MHz with power levels up to 2 W and in the band 915 MHz to 921 MHz with power levels up to 4 W; Harmonised Standard for access to radio spectrum
15.	EN 302 264	Short Range Devices; Transport and Traffic Telematics (TTT); Short Range Radar equipment operating in the 77 GHz to 81 GHz band; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
16.	EN 302 537	Ultra Low Power Medical Data Service (MEDS) Systems operating in the frequency range 401 MHz to 402 MHz and 405 MHz to 406 MHz; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
17.	EN 301 839	Ultra Low Power Active Medical Implants (ULP-AMI) and associated Peripherals (ULP-AMI-P) operating in the frequency range 402 MHz to 405 MHz; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
18.	EN 303 687	6 GHz WAS/RLAN; Harmonised Standard for access to radio spectrum
19.	EN 55022	Information Technology Equipment - Radio disturbance characteristics - Limits and methods of measurement
20.	EN 55024	Information technology equipment - Immunity characteristics - Limits and methods of measurement
21.	EN 55032	Electromagnetic compatibility of multimedia equipment - Emission requirements
22.	IEC/EN 60950-1	Information technology equipment- Safety – Part1: General requirements.
23.	IEC/EN 62368-1	Audio/video, information and communication technology equipment - Part 1: Safety requirements
24.	ITU-R Recommendation SM.2255-0	Technical characteristics, standards and frequency bands of operation for radio-frequency identification (RFID) and potential harmonization opportunities
25.	ITU-R Recommendation M.1076	Wireless communication systems for persons with impaired hearing
26.	ITU-R RS.1346	Sharing between the meteorological aids service and medical implant communication systems (MICS) operating in the mobile service in the frequency band 401-406 MHz
27.	TU-R Recommendation SM.2153	Technical and operating parameters and spectrum use for short-range radiocommunication devices

## PART 6 Technical Requirements

SRDs shall adhere to the following technical requirements

Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
8.3-9kHz	Inductive applications	82 dB $\mu$ A/m at 10m	None	None	EN 300 330	RFIDs operating in the frequency sub-band 119-135 kHz shall meet the spectrum mask given in EN 300 330. This will permit a simultaneous use of the various sub-bands within the range 90 – 148.5 kHz  (Note 11)
9-90 kHz		72 dB $\mu$ A/m at 10m				
90-119 kHz		42 dB $\mu$ A/m at 10m				
119-135 kHz		66 dB $\mu$ A/m at 10m				
135-140 kHz		42 dB $\mu$ A/m at 10m				
140-148.5 kHz		37.7 dB $\mu$ A/m at 10m				
9-315 kHz	Active medical implants	30 dB $\mu$ A/m at 10m	<10%	None	EN 302 195	For clinical setting such as a hospital or other doctor-patient medical facility setting.

<sup>1</sup> See Annexure B for definitions

<sup>2</sup> For list of ETSI Standards see Annexure C



Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
400-600 kHz	Inductive applications	-8 dB $\mu$ A/m at 10 m			ITU-R SM.2255-0	For RFID only
442.2-450 kHz	Tracking, Tracing and Data Acquisition	7 dB $\mu$ A/m at 10m	None	Continuous wave (CW) - no modulation, channel spacing $\geq$ 150 Hz		Person detection and collision avoidance
456.9-457.1 kHz	Tracking, Tracing and Data Acquisition	7 dB $\mu$ A/m at 10 m	None	Continuous wave (CW) at 457 kHz – no modulation		Emergency detection of buried victims and valuable items
3 155-3 400 kHz	Inductive applications	13.5 dB $\mu$ A/m at 10m	None	None	EN 300 330	ITU-R M.1076 applies

Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
6 765-6 795 kHz	- Inductive applications - Non-specific SRDs	42 dB $\mu$ A/m at 10m	None	None	EN 300 330	ISM band (RR No. 5.138)
7 400-8 800 kHz	SRDs Applications	9 dB $\mu$ A/m at 10m	None	None	EN 300 330	
10200-11000kHz	Inductive applications	9 dB $\mu$ A/m at 10m	None	None	EN 300 330	
13553-13567 kHz	Inductive applications	42 dB $\mu$ A/m at 10m 60 dB $\mu$ A/m at 10m (for RFID and EAS only)	None	None	EN 302 291	ISM band (RR No. 5.150)
	Non-specific SRDs	10 mW e.r.p	None	None	EN 300 330	ISM band (RR No. 5.150)
26957-27283 kHz	Inductive applications	42 dB $\mu$ A/m at 10m	None	None	EN 300 220	ISM band (RR No. 5.150)

Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
					ITU-R Rec.SM.2153	
	Model control (26990-27200 kHz)	100 mW e.r.p	None	10 kHz	EN 300 220	
	Non-specific SRDs	10 mW e.r.p.	None	None	EN 300 220 EN 300 330	
26990-27200 kHz	Non-specific SRDs	100 mW e.r.p	≤ 0.1 %	None	EN 300 220	
29.7-47 MHz	Radio Microphones	10 mW e.r.p.	None	≤ 50 kHz	EN 300 422	
30-37.5 MHz	Active Medical Implants	1 mW e.r.p.	≤ 10%	None	EN 302 510	
34.995-35.225 MHz	Model Control	100 mW e.r.p	None	10 kHz	EN 300 220	Only flying models
	Non-specific SRDs	10 mW e.r.p.	None	None	EN 300 220	ISM band (RR No. 5.150)

Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
40.66-40.7 MHz	Model control	100 mW e.r.p.	None	10 kHz	EN 300 220	
	Wireless Microphone	65 dBµV/m at 10m	None	Not Specified	EN 300 220	
138.2-138.45 MHz	Non-specific SRDs	10 mW e.r.p.	≤ 1%	None		
169.4-174 MHz	Radio Microphones	10 mW e.r.p.	None	≤ 50 kHz		
169.4-169.5875MHz	Assistive listening devices	500 mW e.r.p.	None	≤ 50 kHz		
169.4-169.475 MHz	Tracking, Tracing and Data Acquisition	500 mW e.r.p.	≤ 10%	≤ 50 kHz		
169.4-169.4875 MHz	Non-specific SRDs (169.4-169.475 MHz)	500 mW e.r.p.	≤ 1%	≤ 50 kHz		

Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
	Non-specific SRDs (169.4-169.4875 MHz)	10 mW e.r.p.	≤ 1%	Not Specified		
169.5875-169.8125 MHz	Non-specific SRDs	10 mW e.r.p.	≤ 0.1%	Not Specified		
173.965-216 MHz	Assistive listening device	10 mW e.r.p.	None	≤ 50 kHz		
174-216 MHz	Radio Microphones	50 mW e.r.p.	None	None		
401-402 MHz	Active medical implants and associated peripherals	25 μW e.r.p.	LBT or duty cycle ≤0.1% (Note 3)	25 kHz	EN 302 537	ITU-R RS.1346 <sup>3</sup> Max occupied BW = 100 kHz
402-405 MHz		25 μW e.r.p.	(Note 4)	25 kHz	EN 301 839	ITU-R RS.1346 Max occupied BW = 300 kHz

<sup>3</sup> Sharing between the meteorological aids service and medical implant communication systems (MICS) operating in the mobile service in the frequency band 401-406 MHz.

Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
						ERC/DEC/(01)17
405-406 MHz		25 µW e.r.p.	LBT or duty cycle ≤0.1% (Note 4), p21)	25 kHz	EN 302 537	ITU-R RS.1346 Max occupied BW = 100 kHz
446 – 446.1 MHz	PMR446	500 mW	None	12.5 kHz	EN 300 296	
433.05-434.79 MHz	Non-specific SRDs	10 mW e.r.p. (433.05-434.79 MHz)	<10% (Note 1)	None	EN 300 220	(Note 2)
		1 mW e.r.p. -13 dBm/10 kHz (433.05-434.79 MHz)	None	None	EN 300 220	Power density limited to -13 dBm/10 kHz for wideband modulation with a bandwidth greater than 250 kHz (Note 5)

Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
		10 mW e.r.p. (434.04-434.79 MHz)	None	Up to 25 kHz	EN 300 220	(Note 5)
470-786 MHz	Radio Microphones	50 mW e.r.p.	None	None		
862-863 MHz	Non-specific SRDs	25 mW e.r.p.	≤ 0.1%	≤ 350 kHz		
863-865 MHz	Wireless Audio applications	10 mW e.r.p.	None	None	EN 301 357	
	Non-specific SRDs	25 mW e.r.p.	≤ 0.1% duty cycle or LBT+AFA			
864.8-865 MHz	Wireless Audio applications	10 mW e.r.p.	None	50 kHz	EN 300 220	Narrow band analogue voice devices (only this band)

Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
865-868 MHz	Non-specific SRDs	25 mW e.r.p.	≤ 1% duty cycle or LBT+AFA			
	Tracking, Tracing and Data Acquisition	500 mW e.r.p.	Adaptive Power Control (APC) required for spectrum sharing (note 1) and the following duty cycle restrictions also apply: ≤ 10%	≤ 200 kHz		



Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
			duty cycle for network access points; ≤ 2.5% duty cycle otherwise			
865.0-865.6 MHz	RFID	100 mW e.r.p.	None	200 kHz	EN 302 208	(Note 13)
865.6-867.6 MHz		2 W e.r.p.	None	200 kHz	EN 302 208	
867.6-868.0 MHz		500 mW e.r.p.	None	200 kHz	EN 302 208	
863-868 MHz	Non-specific SRDs	≤ 25 mW e.r.p.	≤ 0.1% or LBT (notes 1 and 5)	≤ 100 kHz for 47 or more channels (note 3)	EN 300 220	FHSS modulation Note4, Note 2, Note 7 and Note 9

Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
863-868 MHz	Non-specific SRDs	$\leq 25$ mW e.r.p. (note 7) Power density : - 4.5 dBm/100 kHz (note 8)	$\leq 0.1\%$ or LBT+AFA (notes 1, 6 and 7)	No spacing	EN 300 220	DSSS and other wideband modulation other than FHSS (Notes 2, 4, 7 and 9)
		$\leq 25$ mW e.r.p.	$\leq 0.1\%$ or LBT+AFA (notes 1 and note 6)	$\leq 100$ kHz, for 1 or more channels. Modulation bandwidth $\leq 300$ kHz (note 3)		Narrow/wide-band modulation (Notes 2, 4, 7 and 9)
868-868.6 MHz	Non-specific SRDs	$\leq 25$ mW e.r.p.	$\leq 1\%$ or LBT+AFA	No spacing,	EN 300 220	Narrow / wide-band modulation.

Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
			(note 1)	for 1 or more channels (note 3)		No channel spacing, however the whole stated frequency band may be used (Note 2)
868.6-868.7 MHz	Alarms	10 mW e.r.p.	≤ 1%	25 kHz	EN 300 220	Or whole band may be used as 1 channel
870-874.4 MHz	Tracking, Tracing and Data Acquisition	500 mW e.r.p.	Adaptive Power Control (APC) required for spectrum sharing (note 1) and the following duty cycle restrictions	≤ 200 kHz		

Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
			also apply: $\leq 10\%$ duty cycle for network access points; $\leq 2.5\%$ duty cycle otherwise			
	Non-specific SRDs.	25 mW e.r.p.	$\leq 1\%$ duty cycle. For ER-GSM protection (873-876 MHz, where applicable): the duty	$\leq 600$ kHz		

Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
			cycle is limited to $\leq 0.01\%$ and to a maximum transmit on time of 5ms/1s			
2446-2454 MHz	RFID	$\leq 500$ mW e.i.r.p.	None	None	EN 300 440	2 400-2 500 is a ISM band (RR No. 5.150) (Note 12)
		$> 500$ mW – 4 W e.i.r.p.	$\leq 15\%$ FHSS techniques should be used	None	EN 300 440	2 400-2 500 is a ISM band (RR No. 5.150)  Power levels above 500 mW are restricted to be used inside the boundaries of a building and the duty

Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
						cycle of all transmissions shall in this case be ≤15 % in any 200 ms period (30 ms on /170 ms off).  (Note 12)
2400-2483.5 MHz	Non-specific SRDs	10 mW e.i.r.p.	None	None	EN 300 440	2 400-2 500 is a ISM band (RR No. 5.150)
	Wideband Data Transmission systems (WAS/RLANs)	100 mW e.i.r.p.	See Rec 70-03 note 1	None	EN 300 328	2 400-2 500 is a ISM band (RR No. 5.150)  ERC/DEC/(01)07
	Radiodetermination	25 mW e.i.r.p.	None	None	EN 300 440	2 400-2 500 is a ISM band (RR No. 5.150)  ERC/DEC/(01)08

Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
2483.5-2500 MHz	Active Medical Implants	10 dBm e.i.r.p.	LBT+AFA and ≤ 10% duty cycle. The equipment shall implement a spectrum access mechanism as described in the applicable harmonised standard or an equivalent spectrum	1 MHz		For Low Power Active Medical Implants and associated peripherals, covered by the applicable harmonised standard. Individual transmitters may combine adjacent channels on a dynamic basis for increased bandwidth higher than 1 MHz. Peripheral units are for indoor use only.

Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
			access mechanism			
5150-5350 MHz	Wideband Data Transmission systems (WAS/RLANs)	200 mW mean e.i.r.p. See note 4	See notes 1 and 3	None	EN 301 893	Restricted to indoor use. The maximum mean e.i.r.p. density shall be limited to 10 mW/MHz in any 1 MHz band.
5470-5725 MHz	Wideband Data Transmission systems (WAS/RLANs)	250 mW e.i.r.p	See notes 1 and 3	None	EN 301 893	Indoor as well as outdoor use allowed. The maximum mean e.i.r.p. density shall be limited to 50 mW/MHz in any 1 MHz band



Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
5725-5875 MHz	Wideband data transmission  BFWA is limited to 5725 - 5850 MHz (to protect satellite)	1W			EN 302 502	ISM band (RR No. 5.150)  One of the main bands for wideband data transmission and BFWA (incl. Wi-Fi in laptops, cell phones, etc.)
5725-5875 MHz	Tracking, Tracing and Data Acquisition	400 mW e.i.r.p. Adaptive  Power Control (APC) required	Adequate spectrum sharing mechanisms (e.g. DFS and DAA) shall be implemented	≥ 1 MHz and ≤ 20 MHz		
5725-5875 MHz	Non-specific SRDs	25 mW e.i.r.p.	None	None	EN 300 440	

Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
5795-5805 MHz	RTTT	2 W e.i.r.p. 8 W e.i.r.p.	None	None	EN 300 674	Note 10
5805-5815 MHz			None	None	EN 300 674	Note 10
5945-6425 MHz	UWD SRDs Applications	23 dBm for LPI usage 14 dBm for VLP usage	The duty cycle of NarrowBand (NB) transmissions by a VLP device with a PSD above 1 dBm/MHz shall not exceed 1/15 on any transmission frequency	None	EN 303 687	6 GHz WAS/RLAN

Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
24.00-24.25 GHz	Non-specific SRDs	100 mW e.i.r.p.	None	None	EN 300 440	ISM band (RR No. 5.150)
	Radiodetermination	100 mW e.i.r.p.	None	None	EN 300 440	
	RTTT (24.05-24.075 GHz)	100 mW e.i.r.p.	None		EN 300 440	For vehicle radars
	RTTT(24.075-24.15 GHz)	0.1mW e.i.r.p.	None		EN 300 440	For vehicle radars
24.15-24.25 GHz	RTTT	100 mW e.i.r.p.	None)		EN 300 440	For vehicle radars.  The spectrum access and mitigation requirement is given for devices mounted behind a bumper. If mounted without a bumper, the requirement should be 3µs/40kHz maximum dwell time every 3ms

Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
		100 mW e.i.r.p.	≤ 1ms/40kHz dwell time every 40ms (note 1)		EN 300 440	The spectrum access and mitigation requirement is given for devices mounted either behind a bumper or mounted without a bumper
			None		EN 300 440	For vehicle radars
57-64 GHz	Non-Specific SRDs	100 mW e.i.r.p. 10 mW output power	None			
61.0-61.5 GHz	Non-specific SRDs	100 mW e.i.r.p.	None	None		ISM band (RR No. 5.138)
76-77 GHz	SRDs (RTTT, RLPR)	55 dBm peak e.i.r.p.	None	None	EN 301 091	Power level 55 dBm peak power e.i.r.p. 50 dBm average power - 23.5 dBm average power for pulse radar only

Frequency band	Typical Applications <sup>1</sup>	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Applicable RF Standard <sup>2</sup>	Typical Applications/Additional Information
						Vehicle and infrastructure radar systems
77-81 GHz	Automotive Short-Range Radars				EN 302 264	
122-122.25 GHz	Non-Specific SRDs	10 dBm/250MHz e.i.r.p. -48 dBm/MHz at >30° elevation	None	None		
122.25-123 GHz	Non-Specific SRDs	100 mW e.i.r.p.	None	None		
244-246 GHz	Non-Specific SRDs	100 mW e.i.r.p.	None	None		

### Footnotes

**Note 1:** When either duty cycle, Listen-Before-Talk (LBT) or equivalent technique applies then it shall not be user dependent/adjustable and shall be guaranteed by appropriate technical means. For LBT devices without Adaptive Frequency Agility (AFA), or equivalent techniques, the duty cycle limit applies. For any type of frequency agile device the duty cycle limit applies to the total transmission unless LBT or equivalent technique is used.

**Note 2:** Audio and video applications are allowed provided that a digital modulation method is used with a maximum bandwidth of 300 kHz. Analogue and digital voice applications are allowed with a maximum bandwidth  $\leq 25$  kHz.

**Note 3:** The preferred channel spacing is 100 kHz allowing for a subdivision into 50 kHz or 25 kHz.

**Note 4:** Sub-bands for alarms are excluded (see ERC/REC 70-03 Annex 7).

**Note 5:** Audio and video applications are excluded. Analogue or digital voice applications are allowed with a maximum bandwidth  $\leq 25$  kHz and with spectrum access technique such as LBT or equivalent. The transmitter shall include a power output sensor controlling the transmitter to a maximum transmit period of 1 minute for each transmission.

**Note 6:** Duty cycle may be increased to 1% if the band is limited to 865-868 MHz.

**Note 7:** For other wide-band modulation than FHSS and DSSS with a bandwidth of 200 kHz to 3 MHz, duty cycle can be increased to 1% if the band is limited to 865-868 MHz and power to  $\leq 10$  mW e.r.p.

**Note 8:** The power density can be increased to +6.2 dBm/100 kHz and -0.8 dBm/100 kHz, if the band of operation is limited to 865-868 MHz and 865-870 MHz respectively.

**Note 9:** Certain channels may be occupied by RFID operating at higher powers (See Annex 11 for further details). To minimise the risk of interference from RFID, SRDs should use LBT with AFA or observe suitable separation distances. (In the high power RFID channels typically these may vary from 918 m (indoor) to 3.6 km (rural outdoor). In the remaining 2.2 MHz, where tags at -20 dBm e.r.p. occupy the spectrum, this may vary from 24 m (indoor) to 58 m (rural outdoor)). The adjacent frequency bands below 862 MHz and above 870 MHz may be used by high power systems. Manufacturers should take this into account in the design of equipment and choice of power levels.

**Note 10:** The frequency band 5795-5805 MHz is intended for road to vehicle systems, particularly (but not exclusively) road toll systems. The frequency bands 5795-5805 MHz and 5805-5815 MHz are recommended for 5 MHz channel spacing systems with the frequencies: 5797.5 MHz, 5802.5 MHz, 5807.5 MHz and 5812.5 MHz. For 10 MHz channel spacing systems 5800 MHz and 5810 MHz. 5805 - 5815 MHz on a national basis for multi-lane road junctions, particularly, but not exclusively road toll systems. The use of 8 W e.i.r.p. allows for 1 Mbit/s in accordance with

ETSI standard ES 200 674-1. 2W e.i.r.p. allows for 500 kbit/s downlink and 250 kbit/s uplink in accordance with EN 300 674-1 and for low data rates (31 kbit/s) in accordance with EN 300 674-2.

**Note 11:** RFIDs operating in the frequency sub-band 119-135 kHz shall meet the spectrum mask given in EN 300 330. This will permit a simultaneous use of the various sub-bands within the range 90 – 148.5 kHz.

**Note 12:** To assist enforcement authorities any emissions due to the RFID device when measured outside of the building at a distance of 10 metres shall not exceed the equivalent field strength for a 500 mW RFID device mounted outside the building when measured at the same distance. Where a building consists of a number of premises, such as shops within a shopping arcade or Mall then the measurements shall be referenced to the boundary of the user's premises within the building. In addition, antenna beamwidth limits shall be observed as described in the standard EN 300 440. In addition, for an RFID device which can exceed 500 mW, the device should be fitted with an automatic power control to reduce the radiated power below 500 mW; this automatic power control shall guarantee the reduction of the power to a maximum of 500 mW in cases where the device is moved and used outside the boundary of the user's building or premises as described above.

**Note 13:** Channel centre frequencies are  $864.9 \text{ MHz} + (0.2 \text{ MHz} * \text{channel number})$ . The available channel numbers for each sub-band are:

Band 865.0-865.6 MHz – channel numbers 1 to 3

Band 865.6-867.6 MHz – channel numbers 4 to 13

Band 867.6-868.0 MHz – channel numbers 14 to 15

The same equipment is allowed to operate in several sub-bands. Frequency hopping or other spread spectrum techniques shall not be used.

## 6.1 Environment and Safety Requirements

S/N	Requirement	Details
1.	General Safety	The Short Range Device shall conform with the safety requirements as specified in <b>IEC/EN 60950-1</b> or <b>IEC/EN 62368-1</b> or any relevant international safety standards depending on the applications.
2.	Radiation Safety	The SRD shall be tested and certified for conformity with the ICNIRP limits for human exposure to electromagnetic fields.
2.	Restriction of Hazardous substance use.	Where applicable, Short Range Device shall be tested and certified for conformity to the standards that govern the restriction for the use of hazardous substances. Under this requirement, the standards <b>IEC 63000</b> shall apply.

## 6.2 Electromagnetic Compatibility

Short Range Device shall conform to electromagnetic emission and immunity limits as per **CISPR 32, EN 55022, EN 55024, EN 55032** and **EN 61000** standards. Test reports shall be provided from internationally accredited test laboratories indicating conformance to the aforementioned standards.

## PART 7 Testing and Certification Requirements

Short Range Device shall comply with this minimum technical specifications and other national and international standards accepted and adopted in our country.

## PART 8 Document Administration

### 8.1 Amendment

TCRA may from time to time review, update or modify this document to ensure its continued service and to meet the international and/or national performance requirements as necessary.

### 8.2 Compliance

This document is enforced by appropriate provisions of the TCRA Act, 2003, the Electronic and Postal Communications Act, Revised Edition 2021 and the Electronic and Postal Communications (Electronic Communications Equipment Standards and E-Waste Management) Regulations, 2020 and effective from the date it has been published.

### 8.3 Publication

This document shall be published on the TCRA website <https://www.tcra.go.tz> for public information, compliance and reference purposes.

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