



Guidelines on Short Range Devices

Spectrum Planning and Licensing

DTE

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INTRODUCTION

Short-range radio devices (SRDs) are low powered transmitters which provide either unidirectional or bidirectional communication and have low capability of causing interference to other radio equipment.

SRDs are widely used in for example, data collection with auto identification systems or item management in supermarkets, baby monitors, garage door openers, wireless home data telemetry and/or security systems, keyless automobile entry systems etc. etc.

SRDs operate in wide frequencies ranges. They share these frequencies with other radio applications and are prohibited from causing harmful interference to or claiming protection from those radio applications. If an SRD does cause interference to authorized radiocommunications service, even if the device complies with all of the technical standards and equipment authorization, that's particular SRD MUST cease to operate, at least until the interference problem is solved.

SRDs are in summary permitted to operate on a secondary basis i.e non-interference and non-protected basis.

APPLICATIONS

The following categories are amongst those devices as SRDs but due to the wide use of these devices, the list might not be comprehensive and will not limit to the list.

Telecommand: The use of radio frequency for the transmission of signals to initiate, modify or terminate functions of equipment at a distance e.g TV remote

Telemetry: The use of radiocommunication for indicating or recording data at a distance. E.g measuring the dam water level.

Voice and video: These are voice cover applications like walkie-talkie, baby monitoring , Citizen band (CB) and private mobile radio (PMR 446) .With video applications, non-professional cordless cameras are meant mainly used for controlling or monitoring purposes.

Equipment for detecting avalanche victims: Avalanche beacons are radio location systems used for searching for and/or finding avalanche victims, for the purpose of direct rescue.

Broadband radio local area networks: Broadband radio local area networks (RLANs) are a replacement of physical cables for the connection of data networks within a building, thus providing a more flexible and, possibly, a more economic approach to the installation, reconfiguration and use of such networks within the business and industrial environments.

Road transport and traffic telematics : Road transport and traffic telematics (RTTT) systems are defined as systems providing data communication between two or more road vehicles and between road vehicles and the road infrastructure for various information-based travel and transport applications, including automatic toll-collection, route and parking guidance, collision avoidance and similar applications.

Equipment for detecting movement and equipment for alert: Equipment for detecting movement and equipment for alert are low power radar systems for radiodetermination purposes. Radiodetermination means the determination of the position, velocity and/or other characteristics of an object, or the obtaining of information relating to these parameters, by means of the propagation properties of radio waves.

Alarms: The use of radiocommunication for indicating an alarm condition at a distant location.

Model control: which is solely for the purpose of controlling the movement of the model (toy), in the air, on land or over or under the water surface.

Inductive applications: Inductive applications include for example car immobilizers, car access systems or car detectors, animal identification, alarm systems, item management and logistic systems, cable detection, waste management, personal identification, wireless voice links, access control, proximity sensors, anti-theft systems including RF anti-theft induction systems, data transfer to handheld devices, automatic article identification, wireless control systems and automatic road tolling.

Radio microphones: Radio microphones (also referred to as wireless microphones or cordless microphones) are small, low power (50 mW or less) unidirectional transmitters.

RF identification systems: The object of any RF identification (RFID) system is to carry data in suitable transponders, generally known as tags, and to retrieve data, by hand- or machine-readable means, at a suitable time and place to satisfy particular application needs.

Ultra low power active medical implant: The ultra-low power active medical implant (ULP-AMIs) are part of a medical implant communication systems (MICS) for use with implanted medical devices, like pacemakers, implantable defibrillators, nerve stimulators, and other types of implanted devices. The MICS uses transceiver modules for radiofrequency communication between external devices referred to as a programmer/controller and a medical implant placed within a human or animal body.

Wireless audio applications: Applications for wireless audio systems include the following: cordless loudspeakers, cordless headphones, cordless headphones for portable use, i.e., portable compact disc players, cassette decks or radio receivers carried on a person, cordless headphones for use in a vehicle, for example for use with a radio or mobile telephone, etc., in-ear monitoring, for use in concerts or other stage productions.

RF (radar) level gauges: RF level gauges have been used in many industries for many years to measure the amount of various materials, primarily stored in an enclosed container or tank. The industries in which they are used are mostly concerned with process control. These SRDs are used in facilities such as refineries, chemical plants, pharmaceutical plants, pulp and paper mills, food and beverage plants, and power plants among others.

OPERATIONAL CONDITIONS.

Below is a table indicating the frequency bands in which SRDs are allowed to operate and the maximum allowed power limits and the following conditions shall apply;

- I. The usage of short range devices is allowed on a secondary basis.
- II. Short range distributors require to be registered with the Authority under the type approval guidelines and they shall be issued with a class license.
- III. Any SRD causing interference on a primary radio communication service shall cease to operate even if it complies with the set technical and operation parameters.
- IV. Any wireless equipment which is not within the identified frequency ranges or radiated power exceeds the maximum radiated power criteria identified in these regulations will be treated as any radiocommunication service and necessary Spectrum regulations identified shall apply.

TECHNICAL PARAMETERS.

The following technical conditions shall apply to the use of short range devices- SRDs

Frequency band	Typical Applications	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Harmonised Standard ¹⁸	Notes (Additional information)
9-90 kHz	Inductive applications	72 dB μ A/m at 10m	None	None	ZS 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)
90-119 kHz		42 dB μ A/m at 10m				
119-135 kHz		66 dB μ A/m at 10m				
135-140 kHz		42 dB μ A/m at 10m				
140-148.5 kHz		37.7 dB μ A/m at 10m				
9-315 kHz	Active medical implants	30 dB μ A/m at 10m	<10%	None	ZS EN 302 195	
3 155-3 400 kHz	Inductive applications	13.5 dB μ A/m at 10m	None	None	ZS EN 300 330	ITU-R M.1076 applies RR No. 5.116 applies
6 765-6 795 kHz	- Inductive applications - Non-specific SRDs	42 dB μ A/m at 10m	None	None	ZS EN 300 330	ISM band (RR No. 5.138)

Frequency band	Typical Applications	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Harmonised Standard	Notes (Additional information)
7 400-8 800 kHz	Inductive applications	9 dB μ A/m at 10m	None	None	ZS EN 300 330	
13.553-13.567 MHz	Inductive applications	42 dB μ A/m at 10m 60 dB μ A/m at 10m (for RFID and EAS only)	None	None	ZS EN 302 291	ISM band (RR No. 5.150)
	Non-specific SRDs	42 dB μ A/m at 10m	None	None	ZS EN 300 330	ISM band (RR No. 5.150)

Frequency band	Typical Applications	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Harmonised Standard	Notes (Additional information)
26.957-27.283 MHz	Inductive applications	42 dB μ A/m at 10m	None	None	ZS EN 300 220	ISM band (RR No. 5.150) ERC/DEC/(01)16
	Model control	100 mW e.r.p.	None	10 kHz	ZS EN 300 220	ERC/DEC/(01)10 (26.995 MHz, 27.045 MHz, 27.095 MHz, 27.145 MHz, 27.195 MHz)
	Non-specific SRDs	42 dB μ A/m at 10m 10 mW e.r.p.	None	None	ZS EN 300 220 ZS EN 300 330	ERC/DEC/(01)02
40.66-40.7 MHz	Non-specific SRDs	10 mW e.r.p.	None	None	ZS EN 300 220	ISM band (RR No. 5.150) ERC/DEC/(01)03
	Model control	100 mW e.r.p.	None	10 kHz	ZS EN 300 220	ERC/DEC/(01)12 (40.665 MHz, 40.675 MHz, 40.685 MHz, 40.695 MHz)
433.05-434.79 MHz	Non-specific SRDs	10 mW e.r.p.	<10% (Note 1)	None	ZS EN 300 220	(Note 2)
		1 mW e.r.p. -13 dBm/10 kHz	None	None	ZS EN 300 220	Power density limited to -13 dBm/10 kHz for wideband modulation with a bandwidth greater than 250 kHz (Note 5)
		10 mW e.r.p.	None	Up to 25 kHz	ZS EN 300 220	(Note 5)
401-402 MHz	Active medical implants and	25 μ W e.r.p.	LBT or duty cycle \leq 0.1%	25 kHz	ZS EN 302 537	ITU-R RS.1346 ¹ Max occupied BW = 100 kHz

¹ 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	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Harmonised Standard	Notes (Additional information)
	associated peripherals		(Note 3), p21			
402-405 MHz		25 μ W e.r.p.	(Note 4), p21	25 kHz	ZS EN 301 839	ITU-R RS.1346 Max occupied BW = 300 kHz ERC/DEC/(01)17
405-406 MHz		25 μ W e.r.p.	LBT or duty cycle $\leq 0.1\%$ (Note 4), p21)	25 kHz	ZS EN 302 537	ITU-R RS.1346 Max occupied BW = 100 kHz
446 – 446.1 MHz	PMR446	500 mW		12.5 kHz	ZS EN 300 296	
863-865 MHz	Wireless Audio applications	10 mW e.r.p.	None	None	ZS EN 301 357	
864.8-865 MHz		10 mW e.r.p.	None	50 kHz	ZS EN 300 220	Narrow band analogue voice devices (only this band)
865.0-865.6 MHz	RFID	100 mW e.r.p.	None	200 kHz	ZS EN 302 208	
865.6-867.6 MHz		2 W e.r.p.	None	200 kHz	ZS EN 302 208	
867.6-868.0 MHz		500 mW e.r.p.	None	200 kHz	ZS EN 302 208	
863-870 MHz	Non-specific SRDs	≤ 25 mW e.r.p.	$\leq 0.1\%$ or LBT (notes 1 and 5)	≤ 100 kHz for 47 or more channels (note 3)	ZS EN 300 220	FHSS modulation

Frequency band	Typical Applications ¹⁷	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Harmonised Standard ¹⁸	Notes (Additional information)
863-870 MHz	Non-specific SRDs	≤ 25 mW e.r.p. (note 7) Power density : - 4.5 dBm/100 kHz (note 8)	≤ 0.1% or LBT+AFA (notes 1, 6 and 7)	No spacing	ZS EN 300 220	DSSS and other wideband modulation other than FHSS
		≤ 25 mW e.r.p.	≤ 0.1% or LBT+AFA (notes 1 and note 6)	≤ 100 kHz, for 1 or more channels. Modulation bandwidth ≤ 300 kHz (note 3)		Narrow/wide-band modulation
868-868.6 MHz	Non-specific SRDs	≤ 25 mW e.r.p.	≤ 1% or LBT+AFA (note 1)	No spacing, for 1 or more channels (note 3)	ZS EN 300 220	Narrow / wide-band modulation. No channel spacing, however the whole stated frequency band may be used
868.6-868.7 MHz	Alarms	10 mW e.r.p.	< 1%	25 kHz	ZS EN 300 220	Or whole band may be used as 1 channel
868.7-869.2 MHz	Non-specific SRDs	≤ 25 mW e.r.p.	≤ 0.1% or LBT+AFA (note 1)	No spacing, for 1 or more channels (note 3)	ZS EN 300 220	Narrow / wide-band modulation. No channel spacing, however the whole stated frequency band may be used
869.25-869.3 MHz	Alarms	10 mW e.r.p.	< 0.1%	25 kHz	ZS EN 300 220	Note
869.2-869.25 MHz	Alarms	10 mW e.r.p.	< 0.1%	25 kHz	ZS EN 300 220	Social alarms Note

Frequency band	Typical Applications ¹⁷	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Harmonised Standard ¹⁸	Notes (Additional information)
869.3-869.4 MHz	Alarms	10 mW e.r.p.	< 1%	25 kHz	ZS EN 300 220	
869.400-869.650 MHz	Non-specific SRDs	≤ 500 mW e.r.p.	≤ 10% or LBT+AFA (note 1)	25 kHz (for 1 or more channels)	ZS EN 300 220	Narrow / wide-band modulation The whole stated frequency band may be used as 1 channel for high speed data transmission
869.65-869.7 MHz	Alarms	25 mW e.r.p.	< 10%	25 kHz	ZS EN 300 220	Note (TZA)
869.700-870.000 MHz	Non-specific SRDs	≤ 5 mW e.r.p.	No requirement	No spacing (for 1 or more channels)	ZS EN 300 220	Narrow / wide-band modulation. No channel spacing, however the whole stated frequency band may be used (Note 5) Note (TZA)
		≤ 25 mW e.r.p.	up to 1% or LBT+AFA (note 1)			
2 446-2 454 MHz	RFID	≤ 500 mW e.i.r.p.	None	None	ZS EN 300 440	2 400-2 500 is a ISM band (RR No. 5.150) (Note 12)
2 446-2 454 MHz		> 500 mW – 4 W e.i.r.p.	≤ 15% FHSS techniques should be used	None	ZS 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 cycle of all transmissions shall in this case be ≤15 % in any 200 ms period (30 ms on /170 ms off). (Note 12)

Frequency band	Typical Applications ¹⁷	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Harmonised Standard ¹⁸	Notes (Additional information)
2 400-2 483.5 MHz	Non-specific SRDs	10 mW e.i.r.p.	None	None	ZS 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 (p9)	None	ZS 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	ZS EN 300 440	2 400-2 500 is a ISM band (RR No. 5.150) ERC/DEC/(01)08
5 150-5 350 MHz	Wideband Data Transmission systems (WAS/RLANs)	200 mW mean e.i.r.p. See note 4, p9	See notes 1 and 3 (p9)	None	ZS EN 301 893	ECC/DEC/(04)08 Restricted to indoor use. The maximum mean e.i.r.p. density shall be limited to 10 mW/MHz in any 1 MHz band For RLANs Resolution 229 (WRC-03) applies.
5 470-5 725 MHz	Wideband Data Transmission systems (WAS/RLANs)	1 W mean e.i.r.p. See note 4 (p9)	See notes 1 and 3 (p9)	None	ZS EN 301 893	ECC/DEC/(04)08 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 In MWI, TZA and ZMB this band is used for BFWA on a licensed basis.

Frequency band	Typical Applications ¹⁷	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Harmonised Standard ¹⁸	Notes (Additional information)
5 725-5 875 MHz	Wideband data transmission BFWA is limited to 5725 - 5850 MHz (to protect satellite)	PTP/PTMP: max mean e.i.r.p = 4 W Mesh/AP-MP: max mean e.i.r.p = 2 W			ZS 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.) ECC/REC(06)04 refers In MWI this band is used for BFWA on a licensed basis. In AFS this band can be used up to 8W in specific circumstances (refer to national regulations)
5 725-5 875 MHz	Non-specific SRDs	25 mW e.i.r.p.	None	None	ZS EN 300 440	
5 795-5 805 MHz	RTTT	2 W e.i.r.p. 8 W e.i.r.p.	None	None	ZS EN 300 674	ECC/DEC/(02)01 Note 10
5 805-5 815 MHz			None	None	ZS EN 300 674	ECC/DEC/(02)01 For this band an individual licence is required in EU Note 10
24.00-24.25 GHz	Non-specific SRDs	100 mW e.i.r.p.	None	None	ZS EN 300 440	ISM band (RR No. 5.150)
	Radiodetermination	100 mW e.i.r.p.	None	None	ZS EN 300 440	
	RTTT	100 mW e.i.r.p.	None		ZS EN 300 440	For vehicle radars
	RTTT	0.1mW e.i.r.p.	None		ZS EN 300 440	For vehicle radars
24.00-24.25 GHz	RTTT	100 mW e.i.r.p.	≤ 4µs/40kHz dwell time every 3ms (note 1)		ZS EN 300 440	For vehicle radars. The spectrum access and mitigation requirement is given for devices mounted behind a

Frequency band	Typical Applications ¹⁷	Maximum power or magnetic field strength	Duty Cycle restriction	Prescribed Channel Spacing	Harmonised Standard ¹⁸	Notes (Additional information)
						bumper. If mounted without a bumper, the requirement should be 3µs/40kHz maximum dwell time every 3ms
		100 mW e.i.r.p.	≤ 1ms/40kHz dwell time every 40ms (note 1)		ZS EN 300 440	The spectrum access and mitigation requirement is given for devices mounted either behind a bumper or mounted without a bumper
			None		ZS EN 300 440	For vehicle radars
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	RTTT	55 dBm peak e.i.r.p.	None	None	ZS EN 301 091	ECC/DEC/(02)01 Power level 55 dBm peak power e.i.r.p. 50 dBm average power - 23.5 dBm average power for pulse radar only Vehicle and infrastructure radar systems

