
**CODE OF PRACTICE
ON
TECHNICAL SPECIFICATIONS FOR SHORT RANGE DEVICES**

EFFECTIVE DATE: 12 SEPTEMBER 2017

1. General Requirements

1.1 Scope

1.1.1 In pursuance of the functions and duties entrusted to the Authority under AITI Order, 2001, the Authority hereby exercises the power conferred under Section 8 and Section 26 of Telecom Order, 2001 as amended to issue the following Code of Practice (Technical Specifications for Short Range Devices)

1.1.2 This Code of Practice defines the technical requirements for Short Range Device (SRD) transmitters and receivers to operate in one of the authorised frequency bands or frequencies and transmit within the corresponding output power levels in Table 1.

1.1.3 SRDs are intended for communications in confined areas of buildings and for localised on-site operations. They may be fixed, mobile or portable stations that come with a radio frequency output connector and dedicated or integral antenna. SRD enabled applications include alarms systems, vehicle radar systems, wireless local area networks, remote controls, telemetry and on-site paging systems. These devices may employ different types of modulation and may have speech application.

1.1.4 Design specifications:

- (a) The device is intended for operating in unprotected and shared frequency bands. Its operation shall not cause interference with other authorised radio-communication services, and be able to tolerate any interference caused by other radio-communication services, electrical or electronic equipment.
- (b) The device shall not be constructed with any readily accessible controls permitting the adjustment of its operation in a manner that is inconsistent with this specification.

1.2 Marking Requirements

1.2.1 The device shall be marked with the manufacturer's brand or identification mark, and the manufacturer's model or type reference. The markings required shall be legible, indelible and readily visible.

2. Technical Requirements

SRD's operating in its intended frequency band or frequencies must comply with the maximum field strength or radio frequency (RF) output power and spurious emissions in Tables 1. It must comply with the relevant requirements of this Code of Practice in all of the permitted frequencies which it is intended to operate.

Table 1: Technical Specification for Short Range Devices (SRD)

Typical Applications		Authorised Frequency Bands / Frequencies	Maximum Field Strength / RF Output power	Transmitter Spurious Emissions	Applicable Radio Standards	Remarks
1	On-site radio paging system	26.96 – 27.28 MHz 40.66 – 40.70 MHz	≤ 500 mW (e.r.p.)	≥ 32 dB below carrier at 3 m; or EN 300 135-1 EN 300 433-1 EN 300 224-1	FCC Part 15 EN 300 135-1 EN 300 433-1 EN 300 224-1	
		151.125 MHz 151.150 MHz	>1000 mW (e.r.p.)	≥ 60 dB below carrier over 100 kHz to 2000 MHz or EN 300 224-1	FCC Part 15 EN 300 224-1	
2	Multi-channel Walkie Talkie Transceivers	446.00 – 446.4750 MHz	≤ 500 mW (e.r.p.)			
3	Induction loop system / RFID	16 – 150 kHz	≤ 66 dB μ A/m @ 3m	≥ 32 dB below carrier at 3 m or EN 300 224-1	EN 300 224-1	
		150 – 5000 kHz	≤ 13.5 dB μ A/m @ 10m			
		6765 – 6795 kHz	≤ 42 dB μ A/m @ 10m			
		7400 – 8800 kHz	≤ 9 dB μ A/m @ 10m			
4	Radio detection, alarm system	0.016 – 0.150 MHz	≤ 100 dB μ V/m @ 3m	≥ 32 dB below carrier at 3 m or EN 300 330-1	FCC Part 15 or EN 300 330-1	
		13.553 – 13.567 MHz	≤ 94 dB μ V/m @ 10m			
		868.10 – 869.00 MHz	≤ 65 dB μ V/m @ 10m			
		10.50 – 10.55 GHz	≤ 117 dB μ V/m @ 10m			
		26.96 – 27.28 MHz	≤ 100 mW (e.r.p.) ^{Note 1}			
		146.35 – 146.50 MHz				
		240.15 – 240.30 MHz				
300.00 – 300.30 MHz						

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		312.00 – 316.00 MHz				
		444.40 – 444.80 MHz				
5	Wireless microphone	0.51 – 1.60 MHz	≤ 57 dBμV/m @ 3m			
		40.66 – 40.70 MHz	≤ 65 dBμV/m @ 10m			
		88.00 – 108.00 MHz	≤ 60 dBμV/m @ 10m			
		180.00 – 200.00 MHz	≤ 122 dBμV/m @ 10m			
		470.00 – 806.00 MHz	≤ 10 mW (e.r.p.)	≥ 32 dB below carrier at 3m or EN 300 220-1	FCC Part 15 EN 300 220-1	
		487.00 – 507.00 MHz	112 dBμV/m @ 10m			
6	Remote controls of miscellaneous devices, Radio Telemetry, Telecommand and Alarm System	26.96 – 27.28 MHz	≤ 100 mW (e.r.p.) ^{Note 1}	≥ 32 dB below carrier at 3 m or EN 300 220-1	FCC Part 15 or EN 300 220-1	
		34.995 – 35.225 MHz				
		26.96 – 27.28 MHz	≤ 500 mW (e.r.p.)			
		29.70 – 30.00 Mhz				
		40.665 – 40.695 MHz				
		72.13 – 72.21 MHz				
		40.770 – 40.830 MHz				
7	Remote control of cranes and loading arms	170.275 MHz	≤ 1000 mW (e.r.p.) ^{Note 1}			Operating under these provisions shall be approved on an exceptional basis.
		170.375 MHz				
		173.575 MHz				
		173.675 MHz				
8	Medical and Biological telemetry	9 - 315 KHz	≤ 30 dBμA/m @ 10m	EN 302 195-1		
		40.50 – 41.00 MHz	≤ 0.01 mW (e.r.p.) ^{Note 1}			

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Typical Applications		Authorised Frequency Bands / Frequencies	Maximum Field Strength / RF Output power	Transmitter Spurious Emissions	Applicable Radio Standards	Remarks
		216.00 – 217.00 MHz	> 25 μ W to \leq 100 mW (e.r.p.)	\geq 32 dB below carrier at 3 m or EN 300 220-1	FCC Part 15 or EN 300 220-1	
		454.00 – 454.50 MHz	\leq 2 mW (e.r.p.)			
		1427.00 – 1432.00 MHz	> 25 μ W to \leq 100mW (e.r.p)			
		all frequencies	\leq 25 μ W (e.r.p.)	FCC Part 15	FCC Part 15	
				EN 300 220-1	EN 300 220-1	
				EN 300 330-1	EN 300 330-1	
				EN 300 440-1	EN 300 440-1	
		EN 301 839-1	EN 301 839-1			
		EN 302 537-1	EN 302 537-1			
9	Wireless modem, data communication system	72.080 MHz	\leq 1000 mW (e.r.p.)	\geq 43 dB below carrier over 100 kHz to 2000 MHz; EN 300 390-1 or EN 300 113-1	EN 300 390-1 or EN 300 113-1	
		72.200 MHz				
		72.400 MHz				
		72.600 MHz				
		158.275/162.875 MHz				
		158.325/162.925 MHz				
		453.7250/458.7250 MHz				
		453.7375/458.7375 MHz				
		453.7500/458.7500 MHz				
		453.7625/458.7625 MHz				
10	Short range radar systems such as automatic cruise control and collision warning systems for vehicle	76 – 77 GHz	\leq 37 dBm (e.r.p.) ^{Note 2} when vehicle is in motion \leq 23.5 dBm (e.r.p.) when vehicle is stationary	FCC Part 15 § 15.253 (c) or EN 301 091	FCC Part 15 or EN 301 091	

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Typical Applications		Authorised Frequency Bands / Frequencies	Maximum Field Strength / RF Output power	Transmitter Spurious Emissions	Applicable Radio Standards	Remarks
11	Radio telemetry, telecommand system	433.05 – 434.79 MHz	≤ 10 mW (e.r.p.) ^{Note 1}	≥ 32 dB below carrier at 3 m or EN 300 220-1	FCC Part 15 or EN 300 220-1	
12	Radio Telemetry, Telecommand, Radio Frequency Identification (RFID) systems	866 MHz – 870 MHz	≤ 500 mW (e.r.p.)	≥ 32 dB below carrier at 3 m; EN 300 220-1 or EN 302 208	FCC Part 15 ; EN 300 220-1 or EN 302 208	
		920 – 925 MHz	≤ 2000 mW (e.r.p.)			Only RFID systems operating in the 920 - 925 MHz frequency band shall be allowed to transmit between 500 mW and 2000mW (e.r.p), and approved on exceptional basis.
		433 MHz - 435 MHz	≤ 100 mW (EIRP)			
13	Low Power Device	10.50 – 10.55 GHz	≤ 117 dB μ V/m @ 10m	FCC Part 15 § 15.209; § 15.249 (d) or EN 300 440-1 EN 302 288-1	FCC Part 15 or EN 300 440-1 EN 302 288-1	
		24.00 – 24.25 GHz	≤ 100 mW (e.i.r.p.)			
		2.4000 – 2.4835 GHz	≤ 100 mW (e.i.r.p.) ^{Note 2}			
14	Wireless LAN	2.4000 – 2.4835 GHz	≤ 200 mW (e.i.r.p.)	FCC Part 15 § 15.209; or EN 300 328	FCC Part 15 § 15.247 or EN 300 328	Operating under this provision shall be allowed to transmit between 100 mW and 200mW (e.i.r.p), and approved on exceptional basis.
15	Bluetooth	2.4000 – 2.4835 GHz	≤ 100 mW (e.i.r.p.) ^{Note 2}			

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16	Wireless LAN	5.150 – 5.350 GHz	≤ 1000 mW (e.i.r.p.)	FCC Part 15 § 15.407 (b) or EN 301 893	FCC Part 15 § 15.407 or EN 301 893	WLAN operating in 5.250 – 5.350 GHz under this provision shall employ Dynamic Frequency Selection (DFS) mechanism and implement Transmit Power Control (TPC). Non-localised operations shall be approved on an exceptional basis.
17	Wireless LAN and Broadband access	5.470 – 5.725 GHz	≤ 1000 mW (e.i.r.p.) ^{Note 2}			WLAN operating under this provision shall employ Dynamic Frequency Selection (DFS) mechanism and implement Transmit Power Control (TPC). Non-localised operations shall be approved on an exceptional basis.

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Typical Applications		Authorised Frequency Bands / Frequencies	Maximum Field Strength / RF Output power	Transmitter Spurious Emissions	Applicable Radio Standards	Remarks
18		5.725 – 5.850 GHz	≤ 4000 mW (e.i.r.p.)	FCC Part 15 § 15.209	FCC Part 15 § 15.247 or 15.407	Operating under this provision shall be allowed to transmit between 1000mW and 4000mW (e.i.r.p), and approved on exceptional basis.
19	Low Power Device	5.725 – 5.850 GHz	≤ 100 mW (e.i.r.p.)			
20	Digital Enhanced Cordless Telecommunications	1880.00 – 1900.00 MHz	≤ 250 mW (e.i.r.p.)	EN 300 176	EN 300 176	
21	Cordless Telephone or Wireless PABX	1.605 – 1.800 MHz	≤ 94 dBµV/m @ 3m			
		40.00 – 40.50 MHz	≤ 57 dBµV/m @ 3m			
		46.50 – 47.00 MHz	≤ 90 dBµV/m @ 3m			
		49.50 – 50.00 MHz	≤ 90 dBµV/m @ 3m			
		1880.00 – 1900.00 MHz	≤ 250 mW (e.i.r.p.)			
22	Hearing Aids and Audio Assistance Aids	169.40 – 175.00 MHz	≤ 500 mW (e.i.r.p.)			

Note1: Effective Radiated Power (e.r.p) refers to radiation of a half wave tuned dipole, which is used for frequencies below 1 GHz

Note2: Equivalent Isotropic Radiated Power (e.i.r.p) is a product of the power supplied to the antenna and the maximum antenna gain, relative to an isotropic antenna, and is used for frequencies above 1 GHz. There is a constant difference of 2.15dB between e.i.r.p and e.r.p. [e.i.r.p (dBm)= e.r.p. (dBm)+2.15

* Other SRD's that operate in radio frequency bands other than those listed in the above table, but which meet the output power limits specified for the same type of equipment are exempted from licensing as long as both the output power limits and the radio frequency bands are approved by the Authority.

3. Conformity Assessment Requirements

The short range device shall be tested for compliance with the applicable technical requirements stipulated in paragraph 2 and Table 1 of this Specification, following test methods and conditions given in one or more of the following references which may be applicable to the device under test (refer to Table 1 for guidance):

ETSI EN 300 220	Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio Equipment to be used in the 25 MHz to 1000 MHz frequency range with power levels ranging up to 500 mW; Part 1: Technical characteristics and test methods.
ETSI EN 300 330	Electromagnetic compatibility and Radio spectrum Matters (ERM); 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; Part 1: Technical characteristics and test methods.
ETSI EN 300 440	Electromagnetic compatibility and Radio spectrum Matters (ERM); Short range devices; Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Part 1: Technical characteristics and test methods.
ETSI EN 300 328	Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2.4 GHz ISM band and using spread spectrum modulation techniques; Harmonised EN covering essential requirements under article 3.2 of the R&TTE Directives.
ETSI EN 301 893	Electromagnetic compatibility and Radio spectrum Matters (ERM); Radio Frequency Identification equipment operating in the band 865 MHz to 868 MHz with power levels up to 2 W.
ETSI EN 300 390	Electromagnetic compatibility and Radio spectrum Matters (ERM); Land mobile service; Radio equipment intended for the transmission of data (and speech) and using an integral antenna; Part 1: Technical characteristics and methods of measurement.
ETSI EN 300 113	Electromagnetic compatibility and Radio spectrum Matters (ERM); Land mobile service; Radio equipment intended for the transmission of data (and speech) using constant or non-constant envelope modulation and having an antenna connector; Part 1: Technical characteristics and methods of measurement.
ETSI EN 301 091	Electromagnetic compatibility and Radio spectrum Matters (ERM); Road Transport and Traffic Telematics (RTTT); Technical characteristics and test methods for radar equipment operating in the 76 GHz to 77 GHz band.
ETSI EN 300 135	Electromagnetic compatibility and Radio spectrum Matters (ERM); Angle-modulated Citizens Band radio equipment (CEPT PR 27 Radio Equipment); Part 1: Technical characteristics and methods of measurement.
ETSI EN 300 433	Electromagnetic compatibility and Radio spectrum Matters (ERM); Land Mobile Service; Double Side Band (DSB) and/or Single Side Band (SSB) amplitude modulated citizen's band radio equipment; Part 1: Technical characteristics and methods of measurement.
ETSI EN 300 224	Electromagnetic compatibility and Radio spectrum Matters (ERM); On-site paging service; Part 1: Technical and functional characteristics, including test methods.

ETSI EN 302 195	Electromagnetic compatibility and Radio spectrum Matters (ERM); Radio equipment in the frequency range 9 kHz to 315 kHz for Ultra Low Power Active Medical Implants (ULP-AMI) and accessories.
ETSI EN 301 839	Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Ultra Low Power Active Medical Implants (ULP-AMI) and Peripherals (ULP-AMI-P) operating in the frequency range 402 MHz to 405 MHz.
ETSI EN 302 208	Electromagnetic compatibility and Radio spectrum Matters (ERM); 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.
ETSI EN 302 288	Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices; Road Transport and Traffic Telematics (RTTT); Short range radar equipment operating in the 24 GHz range.
ETSI EN 302 567	Broadband Radio Access Networks (BRAN); 60 GHz Multiple-Gigabit WAS/RLAN Systems; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive.
ETSI EN 305 550	Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 40 GHz to 246 GHz frequency range.
ETSI EN 300 176	Digital Enhanced Cordless Telecommunications (DECT).
ETSI EN 302 729	Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Level Probing Radar (LPR) equipment operating in the frequency ranges 6 GHz to 8,5 GHz, 24,05 GHz to 26,5 GHz, 57 GHz to 64 GHz, 75 GHz to 85 GHz.
FCC Part 15 Subpart A § 15.31 § 15.33 § 15.35	<u>Radio Frequency Devices General</u> Measurement Standards. Frequency Range of Radiated Measurements. Measurement Detector Functions and Bandwidths.
FCC Part 15 Subpart C § 15.209 § 15.219 § 15.225 § 15.227 § 15.231 § 15.239 § 15.242 § 15.245 § 15.247 § 15.249 § 15.253	<u>Radio Frequency Devices Intentional Radiators</u> Radiated emission limits, general requirements. Operation in the band 510 – 1705 kHz. Operation in the band 13.553 – 13.567 MHz. Operation in the band 26.96 – 27.28 MHz. Periodic operation in the band 40.66 – 40.70 MHz and above 70 MHz. Operation in the band 88 – 108 MHz. Operation in the bands 174 – 216 MHz and 470 – 668 MHz. Operation in the bands 902 – 928 MHz, 2435 – 2465 MHz, 5785 – 5815 MHz, 10500 – 10550 MHz and 24075 – 24175 MHz. Operation within the bands 902 – 928 MHz, 2400 – 2483.5 MHz, and 5725 – 5850 MHz. Operation within the bands 902 – 928 MHz, 2400 – 2483.5 MHz, 5725 – 5875 MHz and 24.0 – 24.25 GHz. Operation within the bands 46.7 – 46.9 GHz and 76.0 – 77.0 GHz.
FCC Part 15 Subpart E § 15.407	<u>Radio Frequency Devices Unlicensed National Information Infrastructure Devices</u> General technical requirements