



Technical Specification

for

Short Range Devices

IDA TS SRD
Issue 1, 1 December 2004

Infocomm Development Authority of Singapore
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<p style="text-align: center;">NOTICE</p>
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<p style="text-align: center;">This Specification is subject to review and revision.</p>

1. General Requirements

1.1 Scope of Specification

1.1.1 This Specification defines the minimum technical requirements for short range device transmitters and receivers to operate in one of the authorised frequency bands or frequencies, and transmit within the corresponding output power levels given in Table 1. Short range devices are intended for communications in confined areas of buildings as well as for localised on-site operations.

1.1.2 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, identification systems, radio-detection, vehicle radar systems, wireless local area networks, remote controls, telecommand, telemetry and on-site paging systems. These devices may employ different types of modulation and may have speech application.

1.2 Design of Short Range Device

Short range devices shall be designed to meet the following basic objectives:

- (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 external or readily accessible control which permits the adjustment of its operation in a manner that is inconsistent with this Specification.
- (c) The device shall be marked with the supplier/manufacture's name or identification mark, and the supplier/manufacture's model or type reference. The markings shall be legible, indelible and readily visible.

1.3 References

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|-------------------|---|
| ETSI EN 300 220-1 | 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 300 330-1 | 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 300 440-1 | 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	Broadband Radio Access Network (BRAN); 5 GHz high performance RLAN; Harmonised EN covering essential requirements of article 3.2 of the R&TTE Directive
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
ETSI EN 300 390-1	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 300 113-1	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 300 135-1	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 300 433-1	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 300 224-1	Electromagnetic compatibility and Radio spectrum Matters (ERM); On-site paging service; Part 1: Technical and functional characteristics, including test methods
FCC Part 15 Subpart A – § 15.31 § 15.33 § 15.35	<u>Radio Frequency Devices</u> <u>General</u> Measurement Standards Frequency Range of Radiated Measurements Measurement Detector Functions and Bandwidths

FCC Part 15	<u>Radio Frequency Devices</u>
Subpart C –	<u>Intentional Radiators</u>
§ 15.209	Radiated emission limits, general requirements
§ 15.219	Operation in the band 510 – 1705 kHz
§ 15.225	Operation in the band 13.553 – 13.567 MHz
§ 15.227	Operation in the band 26.96 – 27.28 MHz
§ 15.231	Periodic operation in the band 40.66 – 40.70 MHz and above 70 MHz
§ 15.239	Operation in the band 88 – 108 MHz
§ 15.242	Operation in the bands 174 – 216 MHz and 470 – 668 MHz
§ 15.245	Operation in the bands 902 – 928 MHz, 2435 – 2465 MHz, 5785 – 5815 MHz, 10500 – 10550 MHz and 24075 – 24175 MHz
§ 15.247	Operation within the bands 902 – 928 MHz, 2400 – 2483.5 MHz, and 5725 – 5850 MHz
§ 15.249	Operation within the bands 902 – 928 MHz, 2400 – 2483.5 MHz, 5725 – 5875 MHz and 24.0 – 24.25 GHz
§ 15.253	Operation within the bands 46.7 – 46.9 GHz and 76.0 – 77.0 GHz
FCC Part 15	<u>Radio Frequency Devices</u>
Subpart E –	<u>Unlicensed National Information Infrastructure Devices</u>
§ 15.407	General technical requirements

2. Technical Requirements

The short range device shall comply with the maximum field strength or output power and spurious emissions given in Table 1, operating in its intended frequency band or frequencies. It shall fulfil the relevant requirements of this Specification on all the permitted frequencies which it is intended to operate.

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

Authorised Frequency Bands / Frequencies		Maximum Field Strength / Output power	Transmitter & Receiver Spurious Emissions	Test Reference	Examples of SRD Applications	Remarks
1	16 – 150 kHz	≤ 100 dB μ V/m at 3 m	≥ 32 dB below carrier at 3 m or EN 300 224-1 § 9.2.3 and 9.3.1	EN 300 224-1	Induction loop system	Replaced provision in TS 7.
2	0.016 – 0.150 MHz	≤ 100 dB μ V/m at 3 m	≥ 32 dB below carrier at 3 m or EN 300 330-1 § 7.4 and 8.3	FCC Part 15 or EN 300 330-1	Radio detection, alarm system	Replaced provisions in TS 10.
3	13.553 – 13.567 MHz	≤ 94 dB μ V/m at 10 m				
4	146.350 – 146.500 MHz 240.150 – 240.300 MHz 300.000 – 300.330 MHz 314.700 – 315.000 MHz 444.500 – 444.800 MHz	≤ 100 mW ERP	≥ 32 dB below carrier at 3 m or EN 300 220-1 § 8.7 and 9.4	FCC Part 15 or EN 300 220-1	Wireless microphone	Replaced provisions in TS 5.
5	0.51 – 1.60 MHz	≤ 57 dB μ V/m at 3 m				
6	40.66 – 40.70 MHz	≤ 65 dB μ V/m at 10 m				
7	88.00 – 108.00 MHz	≤ 60 dB μ V/m at 10 m				
8	180.000 – 200.000 MHz 487.000 – 507.000 MHz	≤ 112 dB μ V/m at 10 m				
9	26.96 – 27.28 MHz	≤ 65 dB μ V/m at 10 m			Remote control of aircraft, glider, boat and car models, garage door, camera and toys	Replaced a provision in TS 9.

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

Authorised Frequency Bands / Frequencies		Maximum Field Strength / Output power	Transmitter & Receiver Spurious Emissions	Test Reference	Examples of SRD Applications	Remarks
10	26.96 – 27.28 MHz 29.70 – 30.00 MHz	≤ 500 mW ERP	≥ 32 dB below carrier at 3 m or EN 300 220-1 § 8.7 and 9.4	FCC Part 15 or EN 300 220-1	Remote control of aircraft and glider models and machines, telemetry and alarm systems	Replaced provisions in TS 9. Operating under these provisions is subject to IDA's licensing.
11	170.275 MHz 170.375 MHz 173.575 MHz 173.675 MHz 451.750 MHz 452.000 MHz 452.050 MHz 452.325 MHz	≤ 1000 mW ERP			Remote control of cranes and loading arms	Replaced provisions in TS 9. Operating under these provisions is subject to IDA's licensing.
12	26.96 – 27.28 MHz 40.66 – 40.70 MHz	≤ 3000 mW ERP	≥ 32 dB below carrier at 3 m; EN 300 135-1 § 5.2.6 and 5.3.4; EN 300 433-1 § 5.2.4 and 5.3.4 or EN 300 224-1 § 7.5 and 8.2.13	FCC Part 15; EN 300 135-1; EN 300 433-1 or EN 300 224-1	On-site radio paging system	Replaced provisions in TS 6. Operating under these provisions is subject to IDA's licensing.
13	151.125 MHz 151.150 MHz	≤ 3000 mW ERP	≥ 60 dB below carrier over 100 kHz to 2000 MHz or EN 300 224-1 § 7.5 and 8.2.13	FCC Part 15 or EN 300 224-1		Replaced provisions in TS 8. Operating under these provisions is subject to IDA's licensing.

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

Authorised Frequency Bands / Frequencies		Maximum Field Strength / Output power	Transmitter & Receiver Spurious Emissions	Test Reference	Examples of SRD Applications	Remarks
14	40.500 – 41.000 MHz	≤ 0.01 mW ERP	≥ 32 dB below carrier at 3 m or EN 300 220-1 § 8.7 and 9.4	FCC Part 15 or EN 300 220-1	Medical and biological telemetry	Replaced provisions in TS 11.
15	454.000 – 454.500 MHz	≤ 2 mW ERP				
16	72.080 MHz 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	≤ 1000 mW ERP	≥ 43 dB below carrier over 100 kHz to 2000 MHz; EN 300 390-1 § 5.1.4 and 5.2.8 or EN 300 113-1 § 5.1.5 and 5.2.9	EN 300 390-1 or EN 300 113-1	Wireless modem, data communication system	Replaced provisions in TS 12.
17	76 – 77 GHz	≤ 37 dB EIRP when vehicle is in motion ≤ 23.5 dB EIRP when vehicle is stationary	FCC Part 15 § 15.253 (c) or EN 301 091 § 7.5	FCC Part 15 or EN 301 091	Short range radar systems such as automatic cruise control and collision warning systems for vehicle	Replaced provision in TS SRRS.
18	433.79 – 434.79 MHz	≤ 10 mW ERP	≥ 32 dB below carrier at 3 m or EN 300 220-1 § 8.7 and 9.4	FCC Part 15 or EN 300 220-1	Radio telemetry, telecommand system	Replaced a provision in TS 14.

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

Authorised Frequency Bands / Frequencies		Maximum Field Strength / Output power	Transmitter & Receiver Spurious Emissions	Test Reference	Examples of SRD Applications	Remarks
19	866 – 869 MHz	≤ 500 mW ERP	≥ 32 dB below carrier at 3 m; EN 300 220-1 § 8.7 and 9.4 or EN 302 208 § 8.5 and 9.6	FCC Part 15 ; EN 300 220-1 or EN 302 208	Radio telemetry, telecommand, RFID system	Replaced a provision in TS 10 & 14
20	923 – 925 MHz	≤ 500 mW ERP				Replaced a provision in TS 14.
21	923 – 925 MHz	> 500 mW ERP ≤ 2000 mW ERP				Only Radio Frequency Identification (RFID) systems operating in the 923 -925 MHz frequency band are allowed to transmit between 500 mW and 2000 mW ERP, subject to IDA's licensing.
22	2.4000 – 2.4835 GHz	≤ 100 mW EIRP	FCC Part 15 § 15.209; § 15.249 (d) or EN 300 440-1 § 7.3 and 8.4	FCC Part 15 or EN 300 440-1	Wireless video transmitter and other SRD applications	Replaced a provision in TS 13 & 14.
23	10.50 – 10.55 GHz	≤ 117 dB μ V/m at 10 m				Replaced a provision in TS 10.
24	24.00 – 24.25 GHz	≤ 100 mW EIRP				Replaced a provision in TS 14. Radar gun devices are not allowed to operate under this provision.
25	630 – 710 MHz	≤ 76 dB μ V/m at 3 m	EN 300 220-1 § 8.7 and 9.4	EN 300 220-1	Wireless video transmitter	Replaced a provision in TS 13.

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

Authorised Frequency Bands / Frequencies		Maximum Field Strength / Output power	Transmitter & Receiver Spurious Emissions	Test Reference	Examples of SRD Applications	Remarks
26	2.4000 – 2.4835 GHz	≤ 100 mW EIRP	FCC Part 15 § 15.209; or EN 300 328 § 4.3.4 and 4.3.5	FCC Part 15 § 15.247 or EN 300 328	Bluetooth	Replaced a provision in TS WLAN.
27	2.4000 – 2.4835 GHz	≤ 200 mW EIRP			Wireless LAN only	Replaced provisions in TS WLAN.
28	5.725 – 5.850 GHz	≤ 1000 mW EIRP	FCC Part 15 § 15.209	FCC Part 15 § 15.247 or 15.407	Wireless LAN and broadband access only	Non-localised operations are subject to IDA's licensing.
29	5.725 – 5.850 GHz	> 1000 mW EIRP ≤ 4000 mW EIRP				Operating under this provision is subject to IDA's licensing.
30	5.150 – 5.350 GHz	≤ 200 mW EIRP	FCC Part 15 § 15.407 (b) or EN 301 893	FCC Part 15 § 15.407 or EN 301 893	Wireless LAN	Replaced a provision in TS WLAN. WLAN operating in the 5.250 – 5.350 GHz band under this provision shall employ a Dynamic Frequency Selection (DFS) mechanism and implement Transmit Power Control (TPC). Non-localised operations are subject to IDA's licensing.

3. Testing for Compliance with Technical Requirements

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

- (a) ETSI EN 300 220-1;
- (b) ETSI EN 300 330-1;
- (c) ETSI EN 300 440-1;
- (d) ESTI EN 300 390-1;
- (e) ETSI EN 300 113-1;
- (f) ETSI EN 300 328;
- (g) ETSI EN 301 893;
- (h) ETSI EN 302 208;
- (i) ETSI EN 301 091;
- (j) ETSI EN 300 135-1;
- (k) ETSI EN 300 433-1;
- (l) ETSI EN 300 224-1; or
- (m) FCC Part 15 Rules for radio frequency devices, § 15.31, § 15.33 and § 15.35

Addendum/Corrigendum

Changes to IDA TS 5 to TS 14, TS SRRS and TS WLAN			
Page	TS Ref.	Items Changed	Effective Date
—	—	<p>This Specification supersedes the following IDA Type Approval Specifications:</p> <ul style="list-style-type: none"> a. IDA TS 5 Issue 1 Rev 5 b. IDA TS 6 Issue 1 Rev 3 c. IDA TS 7 Issue 1 Rev 3 d. IDA TS 8 Issue 1 Rev 3 e. IDA TS 9 Issue 1 Rev 3 f. IDA TS 10 Issue 1 Rev 8 g. IDA TS 11 Issue 1 Rev 4 h. IDA TS 12 Issue 1 Rev 3 i. IDA TS 13 Issue 1 Rev 6 j. IDA TS 14 Issue 1 Rev 5 k. IDA TS SRRS Issue 1 l. IDA TS WLAN Issue 1 Rev 11 	1 Dec 04
—	—	<p>Title of Specification has been renamed as “Technical Specification for Short Range Devices” (IDA TS SRD Issue 1).</p> <p>Changes are mainly editorial in nature and carried out to streamline the essential technical requirements for compliance.</p> <p>The few changes in technical requirements are summarised below.</p>	1 Dec 04
6	TS SRD Table 1(1)	Maximum output power for induction loop systems has been revised from “100 dB μ V/m at 30 m” to “100 dB μ V/m at 3 m” in line with the Schedule for Exemption in respect of in-building or on-site operation (Telecoms Act).	1 Dec 04
6	TS SRD Table 1(6)	Maximum output power has been revised from “57 dB μ V/m at 3 m” to “65 dB μ V/m at 10 m” in line with the Schedule for Exemption in respect of in-building or on-site operation (Telecoms Act).	1 Dec 04
6	TS SRD Table 1(8)	Maximum output power has been revised from “60 dB μ V/m at 10 m” to “112 dB μ V/m at 10 m” in line with the Schedule for Exemption in respect of in-building or on-site operation (Telecoms Act).	1 Dec 04
8	TS SRD Table 1(14) and 1(15)	Maximum output power has been revised from “20 dB μ V/m at 15 m” to “0.01 mW ERP” and from “54 dB μ V/m at 30 m” to “2 mW ERP” in line with the Schedule for Exemption in respect of in-building or on-site operation (Telecoms Act).	1 Dec 04

Addendum/Corrigendum

Changes to IDA TS 5 to TS 14, TS SRRS and TS WLAN			
Page	TS Ref.	Items Changed	Effective Date
9	TS SRD Table 1(19), 1(20) and 1(21)	<p>Provisions have been revised for RFID applications as follows (Schedule for Exemption, Telecoms Act):</p> <ul style="list-style-type: none"> a. 866.1 – 869 MHz frequency band revised to 866 – 869 MHz b. 924 – 925 MHz frequency band revised to 923 – 925 MHz c. Output power limit for both bands increased from 10 mW ERP to 500 mW ERP <p>For RFID applications in the 923 – 925 MHz frequency band, output power up to 2 W ERP is allowed, subject to IDA's licensing.</p>	2 Nov 04
10	TS SRD Table 1(27), 1(28) and 1(29)	<p>Provisions for WLAN operating in 2.4 GHz and 5.8 GHz frequency bands have been revised as follows (Schedule for Exemption, Telecoms Act):</p> <ul style="list-style-type: none"> a. Output power limit for 2.4000 – 2.4835 GHz band increased from 100 mW EIRP to 200 mW EIRP b. Output power limit for 5.725 – 5.850 GHz band increased from 100 mW EIRP to 1 W EIRP c. Output power limit of 4 W EIRP is allowed for operations in the 5.725 – 5.850 GHz band, subject to IDA's licensing. 	1 Dec 04
—	—	<p>Provisions given in IDA TS 10 for mobile phone sensors to operate in the 824 – 915 MHz and 1710 – 1910 MHz bands are deleted from this Specification.</p>	1 Dec 04