Telecommunications Standards Advisory Committee (TSAC)

Technical Specification

Short Range Devices

IMDA TS SRD
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1. Scope

1.1 This Specification defines the minimum technical requirements for Short-range Radio-communication Devices (SRD) to operate in one of the authorised frequency bands or frequencies, and transmit within the corresponding output power levels and restricted conditions given in Table 1.

1.2 This Specification allows SRDs to share the use of spectrum in a non-exclusive manner, based on technical usage conditions and, where necessary, using spectrum access mechanisms such as duty cycle, frequency hopping, detect and avoid, adaptive power control and listen before talk. It provides flexibility for deployment of a variety of SRD applications, catering to specific (common) as well as non-specific usage scenarios.

1.3 SRDs 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 applications.

1.4 SRDs shall operate according to the relevant technical requirements given in Table 1, and may only be allowed to operate to the requirements given in Table 2 on an exception basis.

2. References

For the technical requirements captured in this Specification, reference has been made to the following standards. Where versions are not indicated, implementation of this Specification shall be based on current and valid versions of these standards published by the respective Standards Development Organisations.

1.	ETSI 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 under article 3.2 of Directive 2014/53/EU
2.	ETSI EN 302 291-1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Close Range Inductive Data Communication equipment operating at 13.56 MHz; Part 1: Technical characteristics and test methods
3.	ETSI EN 300 220-1	Short Range Devices (SRD) operating in the frequency range 25 MHz to 1000 MHz; Part 1: Technical characteristics and test methods
	ETSI EN 300 220-2	Part 2: Harmonised Standard for access to radio spectrum for non-specific radio equipment
	ETSI EN 300 220-4	Part 4: Harmonised Standard covering the essential requirements under article 3.2 of Directive 2014/53/EU; Metering devices operating in designated band 169.400 MHz to 169.475 MHz
4.	ETSI EN 301 357	Cordless audio devices in the range 25 MHz to 2000 MHz; Harmonised Standard covering the essential requirements under article 3.2 of Directive 2014/53/EU
5.	ETSI EN 303 417	Wireless power transmission systems, using technologies other than radio frequency beam, in the 19 – 21 kHz, 59 – 61 kHz, 79 – 90 kHz, 100 – 300 kHz, 6765 – 6795 kHz; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
6.	ETSI EN 300 422-1	Wireless microphones; Audio PMSE up to 3 GHz; Part 1: Class A Receivers; Harmonised Standard covering the essential requirements under article 3.2 of Directive 2014/53/EU

7.	ETSI EN 300 422-4	Wireless microphones; Audio PMSE up to 3 GHz; Part 4: Assistive Listening Devices including personal sound amplifiers and inductive systems up to 3 GHz; Harmonised Standard covering the essential requirements under article 3.2 of Directive 2014/53/EU
8.	ETSI EN 300 433	Citizens' Band (CB) radio equipment; Harmonised Standard covering the essential requirements under article 3.2 of Directive 2014/53/EU
9.	ETSI EN 300 224	Land Mobile Service; Radio Equipment for use in Paging Service operating within the frequency range 25 MHz – 470 MHz; Harmonised Standard covering the essential requirements under article 3.2 of Directive 2014/53/EU;
10.	ETSI 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 under article 3.2 of Directive 2014/53/EU
11.	ETSI EN 300 440	Short Range Devices (SRD); Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Harmonised Standard for access to radio spectrum
12.	ETSI 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 under article 3.2 of Directive 2014/53/EU
13.	ETSI 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 under article 3.2 of Directive 2014/53/EU
14.	ETSI EN 300 390	Land Mobile Service; Radio equipment intended for the transmission of data (and speech) and using an integral antenna; Harmonised Standard covering the essential requirements under article 3.2 of Directive 2014/53/EU
15.	ETSI EN 300 113	Land Mobile Service; Radio equipment intended for the transmission of data (and/or speech) using constant or non-constant envelope modulation and having an integral antenna connector; Harmonised Standard covering the essential requirements under article 3.2 of Directive 2014/53/EU
16.	ETSI EN 301 091-1	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 under article 3.2 of Directive 2014/53/EU; Part 1: Ground based vehicular radar
	ETSI EN 301 091-2	Part 2: Fixed infrastructure radar equipment
17.	ETSI 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 4W; Harmonised Standard covering the essential requirements under article 3.2 of Directive 2014/53/EU
18.	ETSI EN 302 858	Short Range Devices; Transport and Traffic Telematics (TTT); Radar equipment operating in the 24.05 GHz to 24.25 GHz or 24.05 GHz to 24.50 GHz range; Harmonised Standard covering the essential requirements under article 3.2 of Directive 2014/53/EU

19.	ETSI EN 302 372	Short Range Devices; Tank Level Probing Radar (TLPR) equipment operating in the frequency ranges 4.5 GHz to 7 GHz, 8.5 GHz to 10.6 GHz, 24.05 GHz to 27 GHz, 57 GHz to 64 GHz, 75 GHz to 85 GHz; Harmonised Standard covering the essential requirements under article 3.2 of Directive 2014/53/EU
20.	ETSI EN 300 328	Wideband transmission systems; Data transmission equipment operating in the 2.4 GHz ISM band; Harmonised Standard for access to radio spectrum
21.	ETSI EN 301 893	5 GHz RLAN; Harmonised Standard covering the essential requirements of article 3.1(b) of the Directive 2014/53/EU
22.	ETSI EN 302 502	Wireless Access Systems (WAS); 5.8GHz fixed broadband data transmitting systems; Harmonised Standard for access to radio spectrum
23.	ETSI EN 305 550-1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 40 GHz to 246 GHz frequency range; Part 1: Technical characteristics and test methods
	Draft ETSI EN 305 550	Short Range Devices (SRD); Radio equipment to be used in the 40 GHz to 246 GHz frequency range; Harmonised Standard for access to radio spectrum
24.	ETSI EN 302 567	Multiple-Gigabit/s radio equipment operating in the 60 GHz band; Harmonised Standard covering the essential requirements under article 3.2 of Directive 2014/53/EU
25.	ETSI EN 302 217-2	Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 2: Digital systems operating in frequency bands from 1 GHz to 86 GHz; Harmonised Standard for access to radio spectrum
26.	ETSI EN 301 489-1	Electromagnetic Compatibility (EMC) standard for radio equipment and services; Harmonised Standard covering the essential requirements of article 3.1(b) of the Directive 2014/53/EU and the essential requirements of article 6 of the Directive 2014/30/EU; Part 1: Common technical requirements
27.	ETSI EN 301 489-3	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz
28.	ETSI EN 301 489-17	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of the Directive 2014/53/EU
29.	CEPT/ERC/REC 70-03	Relating to the use of Short Range Devices (SRD)
30.	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices
31.	FCC Part 15 Subpart B –	Radio Frequency Devices Unintentional Radiators

	§15.107	Conducted limits
	§15.109	Radiated emission limits
32.	FCC Part 15	Radio Frequency Devices
	Subpart C –	Intentional Radiators
	§15.209	Radiated emission limits, general requirements
	§15.219	Operation in the band 510 – 1705 kHz
	§15.221	Operation in the band 525 – 1705 kHz
	§15.225 (a)	Operation within the band 13.553 – 13.567 MHz
	§15.227	Operation within the band 26.96 – 27.28 MHz
	§15.229	Operation within the band 40.66 – 40.70 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 Operation in the band 433.5 – 434.5 MHz
	§15.240	Operation in the band 174 – 216 MHz
	§15.241	Operation in the bands 174 – 216 MHz and 470 – 668 MHz
	§15.242	Operation within the bands 902 – 928 MHz, 2400 – 2483.5 MHz, and
	§15.247	5725 – 5850 MHz Operation within the bands 902 – 928 MHz, 2400 – 2483.5 MHz, 5725
	§15.249	– 5875 MHz and 24.0 – 24.25 GHz
33.	FCC Part 15	Radio Frequency Devices
	Subpart E –	Unlicenced National Information Infrastructure Devices
	§15.407	General technical requirements
34.	FCC Part 95	The 76-81 GHz Band for Radar Service
	Subpart M	Operating Rules Technical Rules
35.	IEC CISPR 32	Electromagnetic compatibility of multimedia equipment – Emission requirements
36.	IEC CISPR 35	Electromagnetic compatibility of multimedia equipment – Immunity requirements
37.	IEC 62368-1	Audio/video, information and communication technology equipment – Part 1: Safety requirements
38.	ISO 7637-2	Road vehicles - Electrical disturbances from conduction and coupling - Part 2: Electrical transient conduction along supply lines only
39.	ITU-T K.116	EMC requirements and test methods for radio telecommunication terminal equipment
40.	ITU-R Rec. SM.329-12	Unwanted emissions in the spurious domain

3. Abbreviations & Definitions

AC	Alternating Current
AFA	Adaptive Frequency Agility
ALD	Assistive Listening Devices
ANSI	American National Standards Institute
APC	Adaptive Power Control
CB	Citizens' Band
CISPR	International Special Committee on Radio Interference of the IEC
DAA	Detect-And-Avoid
DC	Direct Current
DFS	Dynamic Frequency Selection
EIRP	Effective Isotropic Radiated Power
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EMS	Electromagnetic Sustainability
EN	European Standard
ETSI	European Telecommunications Standards Institute
FCC	Federal Communications Commission
IEC	International Electrotechnical Commission
ISM	Industrial, Scientific and Medical
ISO	International Organization for Standardization
ITU-R	ITU Radiocommunication Sector
ITU-T	ITU Telecommunication Standardization Sector
LBT	Listen Before Talk
LDC	Low Duty Cycle
LP	Low Power
LPI	Low Power Indoor
LPWAN	Low-power Wide-area Network
MEDS	Medical Data Service
PMSE	ITU-R F.[PMSE] – use of terrestrial audio and video Programme Making and Special Events applications
RLAN	Radio Local Area Network
RF	Radio Frequency
RFID	Radio Frequency Identification
SRD	Short Range Devices
TPC	Transmit Power Control
TS	IMDA Technical Specification
TTT	Transport and Traffic Telematics
ULP-AMI	Ultra Low Power Active Medical Implants
ULP-AMI-P	ULP-AMI and associated Peripherals
VLP	Very Low Power
WLAN	Wireless Local Area Network

Effective Radiated Power (e.r.p.) refers to total power radiated by an antenna w.r.t a half wave tuned dipole, which is used for frequencies below 1 GHz.

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 2.15 dB between e.i.r.p. and e.r.p. [e.i.r.p. (dBm) = e.r.p. (dBm) + 2.15]

4. General Requirements

4.1 Design of Short Range Device

Short range devices (SRDs) 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 shall 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.

4.2 Electromagnetic Compatibility (EMC) and Equipment Safety Requirements

4.2.1 For EMC assessment, the SRD and/or ancillary equipment shall be classified as equipment for fixed use; vehicular use (i.e. mobile terminal connected with vehicular charger or DC supply); or portable/mobile use (i.e. powered by its integral battery). This equipment classification is used to determine the applicability of the EMC (emission and immunity) testing requirements based on §5.5 and §7 of ETSI EN 301 489-1; or §7.5 and §9 of ITU-T K.116. The ETSI EN 301 489-1 standard shall be used in conjunction with the ETSI EN 301 489-3 standard for SRD operating on frequencies between 9 kHz and 246 GHz; or ETSI EN 301 489-17 standard for broadband data transmission systems, where applicable (e.g. Wireless Local Area Network).

4.2.1.1 EMI or emission measurements

(a) Radiated emissions from associated ancillary equipment not incorporated in the SRD shall be measured to Class B requirements defined in §5 and Tables A.4 and A.5 of IEC CISPR 32.

(b) Conducted emission at the DC power port of the SRD intended for vehicular use, shall be measured according to §8.3 of EN 301 489-1.

(c) Conducted emission at the AC mains port shall be measured for SRD with dedicated power adapter/charger to Class B requirements defined in §5 and Table A.10 of IEC CISPR 32. Equipment with DC power port which is powered by a dedicated AC/DC power converter is defined as AC mains powered equipment (§3.1.1 of CISPR 32).

(d) Conducted emission at the wired network port[1] of the SRD shall be measured to Class B requirements defined in Table A.12 of IEC CISPR 32; or §8.7 of ETSI EN 301 489-1.

Note 1: If SRD is a module intended to be marketed and sold separately from a host, it shall be assessed with at least one representative host system. Modules may be internal, mounted, plug-in or external (§6.2 of IEC CISPR 32).

Note 2: Emission measurements performed to FCC Part 15 Subpart B for unintentional radiators (§15.105 and §15.109) may be acceptable as an alternative to IEC CISPR 32.

4.2.1.2 EMS or immunity testing

The following immunity tests may be performed on the SRD to requirements defined in IEC CISPR 35, §11 of ITU-T K.116 or §9 of ETSI EN 301 489-1, where applicable:

(a) RF electromagnetic field (80 MHz to 6 GHz) at the enclosure of the equipment

(b) Electrostatic discharge at the enclosure of the equipment

[1] Wired network port is used for voice, data and signaling transfers intended for connection to a communication network, e.g. CATV, PSTN, ISDN, ADSL and LAN (§3.1.32 of IEC CISPR 32).

(c) Fast transients (common mode) at DC power and AC main power ports that have cables longer than 3 m

(d) RF common mode 0.15 MHz to 80 MHz at DC power and AC mains power ports that have cables longer than 3 m

(e) Transients and surges (vehicular environment) on nominal 12V and 24V DC supply voltage input ports of mobile terminal and ancillary equipment intended also for mobile use in vehicles

(f) Voltage dips and interruptions at AC mains power port of mobile or portable terminal with dedicated charger/power adapter

(g) Surges, common and differential mode at AC mains power port of mobile or portable terminal with dedicated charger/power adapter

4.2.2 Equipment safety testing

Equipment suppliers (including manufacturers, importers, distributors, retailers and other traders) shall ensure that they only place products which are safe on the market. They can enhance the safety of their products by the following ways:

(a) Testing their products before placing them on the market

(b) Ensuring that their products are certified to international safety standards

(c) Where products are already under the purview of other government agencies, ensure that they satisfied the relevant regulatory requirements by the agencies

(d) Informing consumers of any potential hazards or risks arising from the use of their products

The following AV/ICT equipment shall comply with the IEC 62368-1 (minimum Ed. No. 2) standard:

(a) Equipment designed for use with a voltage rating between 50V and 1000V for AC or between 75 V and 1500V for DC; and/or

(b) Mobile/wearable devices which operate within the SRD frequency(s) such as tablets and mobile phones

5. Technical Requirements

5.1 The SRD shall comply with the maximum field strength or radio frequency (RF) output power, spurious emissions and spectrum access conditions given in Table 1 of this Specification, operating in its intended frequency band or frequencies. It shall fulfil the relevant requirements of this Specification on all the permitted frequencies or sub-band(s) which it is intended to operate.

5.2 The SRD shall be tested for compliance with the technical requirements set out in Table 1 of this Specification for the frequencies or sub-band(s) it is intended to operate, following the appropriate measurement methods given in one or more of the references listed in §2. The Checklist given in Annex A should be used to guide the assessment of the SRD for its conformity with the applicable requirements set out in this Specification.

5.3 Compliance with technical requirements set out in Table 2 shall only be applicable to the types of SRD operations permitted on an exception basis.

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

T1 Sub-band	Authorised Frequency Bands / Frequencies	Maximum Field Strength / RF Output Power	Transmitter Spurious Emissions	Additional Spectrum Access Conditions	Application Types[2]	Recommended Measurement Methods
1	All frequencies	≤ 25 µW (e.r.p.)	Table1-a of this TS; §15.209	-	Medical and Biological telemetry	ANSI C63.10-2013 and FCC Part 15 §15.241 & §15.242; EN 300 220-1 EN 300 330 EN 300 440 EN 301 839 EN 302 537
2	9 – 315 kHz	30 dBµA/m at 10m	EN 302 195	Duty cycle ≤ 10%	Medical and Biological telemetry; ULP-AMI and ULP-AMI-P	EN 302 195
3a	16 – 150 kHz	≤ 66 dBµA/m at 10m	Table1-a of this TS	-	Inductive applications including RFID, NFC and EAS but not ULP-AMI and ULP-AMI-P	EN 300 330
3b	16 – 150 kHz	≤ 66 dBµA/m at 10m	Table1-a of this TS; EN 303 417	-	Wireless power transfer	EN 300 330; EN 303 417
3c	0.016 – 0.15MHz	≤ 100 dBµV/m at 3m	Table1-a of this TS	-	Radio detection, alarm system	EN 300 330
4a	150 – 5000 kHz	≤ 13.5 dBµA/m at 10m	Table1-a of this TS; §15.209	-	Inductive applications including RFID, NFC and EAS but not ULP-AMI and ULP-AMI-P	EN 300 330; FCC Part 15 §15.221 and ANSI C63.10-2013
4b	150 – 5000 kHz	≤ 13.5 dBµA/m at 10m	Table1-a of this TS; EN 303 417	-	Wireless power transfer	EN 300 330; EN 303 417
5	0.51 – 1.60 MHz	≤ 57 dBµV/m at 3m	§15.209	-	Wireless microphone	FCC Part 15 §15.221 and ANSI C63.10-2013

[2] Where terms used are unclear, refer to ERC Recommendation 70-03 for description

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

T1 Sub-band	Authorised Frequency Bands / Frequencies	Maximum Field Strength / RF Output Power	Transmitter Spurious Emissions	Additional Spectrum Access Conditions	Application Types[2]	Recommended Measurement Methods
6a	6765 – 6795 kHz	≤ 42 dBµA/m at 10m	Table1-a of this TS	-	Inductive applications including RFID, NFC and EAS	EN 300 330
6b	6765 – 6795 kHz	≤ 42 dBµA/m at 10m	Table1-a of this TS; EN 303 417	-	Wireless power transfer	EN 300 330; EN 303 417
7	7400 – 8800 kHz	≤ 9 dBµA/m at 10m	Table1-a of this TS	-	Inductive applications including RFID, NFC and EAS	EN 300 330
44	10.20 - 11.00 MHz	≤ 9 dBuA/m @ 10m	Table1-a of this TS	-	Inductive applications and Non-specific SRD	EN 300 330
8a	13.553 – 13.567 MHz	≤ 94 dBµV/m at 10m	Table1-a of this TS; §15.209	-	Inductive applications	EN 300 330; EN 302 291-1; FCC Part 15 §15.225 and ANSI C63.10-2013
8b	13.553 – 13.567 MHz	≤ 10 mW (e.r.p.)	Table1-a of this TS; §15.209	-	Non-specific SRD	EN 300 330; FCC Part 15 §15.225 and ANSI C63.10-2013
9a	26.96 – 27.28 MHz	≤ 500 mW (e.r.p.)	Table1-a of this TS; §15.209	-	Model control	EN 300 220-1; FCC Part 15 §15.227 and ANSI C63.10-2013
9b	26.96 – 27.28 MHz	≤ 100 mW (e.r.p.)	Table1-a of this TS; §15.209	Duty cycle ≤ 0.1% -	Non-specific SRD	EN 300 220-1; FCC Part 15 §15.227 and ANSI C63.10-2013
9c	26.96 – 27.28 MHz	≤ 500 mW (e.r.p.)	EN 300 224	-	On-site radio paging system	EN 300 224

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

T1 Sub-band	Authorised Frequency Bands / Frequencies	Maximum Field Strength / RF Output Power	Transmitter Spurious Emissions	Additional Spectrum Access Conditions	Application Types[2]	Recommended Measurement Methods
10	29.70 – 30.00 MHz	≤ 10 mW (e.r.p.)	Table1-a of this TS;	Bandwidth ≤ 50 kHz	Wireless microphones on a tuning range basis	EN 300 422
11	34.995 – 35.225 MHz	≤ 100 mW (e.r.p.)	Table1-a of this TS	Bandwidth 10 kHz	Control of flying models	EN 300 220-1
12	40.50 – 41.00 MHz	≤ 0.01 mW (e.r.p.)	Table1-a of this TS	-	Medical and Biological telemetry	EN 300 220-1
13a	40.66 – 40.70 MHz	≤ 10 mW (e.r.p.)	Table1-a of this TS; §15.209	-	Non-specific SRD	EN 300 220-1; FCC Part 15 §15.229 and ANSI C63.10-2013
13b	40.66 – 40.70 MHz	≤ 500 mW (e.r.p.)	EN 300 224	-	On-site radio paging system	EN 300 224
13c	40.66 – 40.70 MHz	≤ 100 mW (e.r.p.)	Table1-a of this TS	Bandwidth 10 kHz	Model control	EN 300 220-1
			§15.209	-		FCC Part 15 §15.231 and ANSI C63.10-2013
16a	72.080 MHz	≤ 1000 mW (e.r.p.)	Table1-a of this TS	Channel spacing 12.5 kHz, 20 kHz and 25 kHz	Wireless modem, data communication system	EN 300 390 / EN 300 113
16b	72.200 MHz					
16c	72.400 MHz					
16d	72.600 MHz					
17	72.13 – 72.21 MHz	≤ 500 mW (e.r.p.)	§15.209	-	Intermittent/Periodic transmission of control signals	FCC Part 15 15.231 and ANSI C63.10-2013
18a	88.00 – 108.00 MHz	≤ 42.2 dBµV/m at 10m	Table1-a of this TS	Bandwidth ≤ 200 kHz	Cordless audio devices	EN 301 357

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

T1 Sub-band	Authorised Frequency Bands / Frequencies	Maximum Field Strength / RF Output Power	Transmitter Spurious Emissions	Additional Spectrum Access Conditions	Application Types[2]	Recommended Measurement Methods
18b	88.00 – 108.00 MHz	≤ 60 dBµV/m at 10m	§15.209	-	Non-specific SRD	EN 300 220-1; FCC Part 15 §15.239 and ANSI C63.10-2013
19	146.35 – 146.50 MHz	≤ 100 mW (e.r.p.)	Table1-a of this TS; §15.209	-	Intermittent/Periodic transmission of control signals, radio detection	EN 300 220-1; FCC Part 15 §15.231 and ANSI C63.10-2013
20	151.125 MHz 151.150 MHz	≤ 1000 mW (e.r.p.)	EN 300 224	-	On-site radio paging system	EN 300 224
21a	158.275/162.875 MHz	≤ 1000 mW (e.r.p.)	Table1-a of this TS	Channel spacing 12.5 kHz, 20 kHz and 25 kHz	Wireless modem, data communication system	EN 300 390 / EN 300 113
21b	158.325/162.925 MHz					
22a	169.40 – 169.475 MHz	≤ 500 mW (e.r.p.)	Table1-a of this TS	Bandwidth ≤ 50 kHz	ALD	EN 300 422
22b	169.40 – 175.00 MHz	≤ 10 mW (e.r.p.)	Table1-a of this TS	Bandwidth ≤ 50 kHz	ALD on a tuning range basis	EN 300 422
22c	169.40 – 175.00 MHz	≤ 500 mW (e.r.p.)	Table1-a of this TS	Bandwidth ≤ 50 kHz Duty cycle ≤ 10%	Meter reading	EN 300 220-1
22d	169.40 – 175.00 MHz	≤ 10 mW (e.r.p.)	Table1-a of this TS	Duty cycle ≤ 1%	Non-specific SRD	EN 300 220-1
23a	180.00 – 200.00 MHz	≤ 10 mW (e.r.p.)	Table1-a of this TS	Bandwidth ≤ 50 kHz	ALD on a tuning range basis	EN 300 422
23b	180.00 – 200.00 MHz	≤ 50 mW (e.r.p.)	Table1-a of this TS	-	Wireless microphones	EN 300 422
24	216.00 – 217.00 MHz	> 25 µW to ≤ 100 mW (e.r.p.)	Table1-a of this TS	-	Medical and Biological telemetry	EN 300 220-1
25a	240.15 – 240.30 MHz	≤ 100 mW (e.r.p.)	Table1-a of this TS;	-		EN 300 220-1;

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

T1 Sub-band	Authorised Frequency Bands / Frequencies	Maximum Field Strength / RF Output Power	Transmitter Spurious Emissions	Additional Spectrum Access Conditions	Application Types[2]	Recommended Measurement Methods
			§15.209	-	Intermittent/Periodic transmission of control signals, radio detection	FCC Part 15 §15.231 and ANSI C63.10-2013
25b	300.00 – 300.30 MHz			-		
25c	312.00 – 316.00 MHz			-		
25d	444.40 – 444.80 MHz			-		
26a	433.05 – 434.79 MHz	≤ 10 mW (e.r.p.)	Table1-a of this TS	Duty cycle ≤ 10% for bandwidth over entire band	Non-specific SRD	EN 300 220-1
26b	433.05 – 434.79 MHz	≤ 1 mW (e.r.p.)	Table1-a of this TS	-	Non-specific SRD	EN 300 220-1
26c	433.05 – 434.79 MHz	≤ 10 mW (e.r.p.)	§15.209	-	Intermittent/Periodic transmission of control signals	FCC Part 15 15.231 and ANSI C63.10-2013
26d	433.05 – 434.79 MHz	≤ 10 mW (e.r.p.)	§15.209	-	RFID for commercial shipping containers Comments to application: Limited to areas such as ports, rail terminals and warehouses	FCC Part 15 §15.240 and ANSI C63.10-2013
27a	470.00 – 534.00 MHz	≤ 50 mW (e.r.p.)	Table1-a of this TS; §15.209	-	Wireless microphone	EN 300 220-1 / EN 300 422; FCC Part 15 §15.236 / FCC Part 74H and ANSI C63.10-2013
27b	487.00 – 507.00 MHz	≤ 112 dBµV/m at 10m				
27c	534.00 – 614.00 MHz	≤ 10 mW (e.r.p.)				

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

T1 Sub-band	Authorised Frequency Bands / Frequencies	Maximum Field Strength / RF Output Power	Transmitter Spurious Emissions	Additional Spectrum Access Conditions	Application Types[2]	Recommended Measurement Methods
27d	614.00 – 698.00 MHz	≤ 50 mW (e.r.p.)				
29	866 – 869 MHz[3]	≤ 500 mW (e.r.p.)	Table1-a of this TS	-	Tracking, tracing and data acquisition including LPWAN[4], RFID	EN 302 208 / EN 300 220-1;
30a	917 – 925 MHz	≤ 500 mW (e.r.p.)	Table1-a of this TS; §15.209	Bandwidth ≤ 400 kHz; Only allowed to transmit for not longer than necessary to complete the intended operation	RFID	EN 302 208 / EN 300 220-1; FCC Part 15 §15.247 and ANSI C63.10-2013
30b	917 – 925 MHz	≤ 500 mW (e.r.p.)	Table1-a of this TS; §15.209	Duty cycle ≤ 10% for network access points; Suitable mitigation techniques are to be employed[5]	Non-LPWAN end devices, LPWAN network access points	EN 300 220-1; FCC Part 15 §15.247 and ANSI C63.10-2013
30c	917 – 925 MHz	≤ 100 mW (e.r.p.)	Table1-a of this TS; §15.209	Duty cycle ≤ 1% Suitable mitigation techniques are to be employed	LPWAN end devices	EN 300 220-1; FCC Part 15 §15.247 and ANSI C63.10-2013
30d	917 – 925 MHz	≤ 100 mW (e.r.p.)	§15.209	Suitable mitigation techniques are to be employed	Non-specific SRD	FCC Part 15 §15.249 and ANSI C63.10-2013
32a	2.4000 – 2.4835 GHz	≤ 10 mW (e.i.r.p.)	Table1-a of this TS; §15.209	-	Non-specific SRD	EN 300 440; FCC Part 15 §15.247 / §15.249 and ANSI C63.10-2013

[3] Provision for operating in 866-869 MHz is under review with the intent to refarm

[4] Refers to non-cellular LPWAN. Examples are Sigfox, LoRa etc.

[5] Refer to ECC Report 181, "Improving Spectrum Efficiency in the SRD Bands" for suitable mitigation techniques

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

T1 Sub-band	Authorised Frequency Bands / Frequencies	Maximum Field Strength / RF Output Power	Transmitter Spurious Emissions	Additional Spectrum Access Conditions	Application Types[2]	Recommended Measurement Methods
32b	2.4000 – 2.4835 GHz	≤ 25 mW (e.i.r.p.)	Table1-a of this TS	-	Radio-determination devices	EN 300 440; FCC Part 15 §15.247 / §15.249 and ANSI C63.10-2013
32c	2.4000 – 2.4835 GHz	≤ 100 mW (e.i.r.p.)	Table1-a of this TS	-	RFID, model control, wireless video, hearing aid	EN 300 440; FCC Part 15 §15.247 / §15.249 and ANSI C63.10-2013
32d	2.4000 – 2.4835 GHz	≤ 100 mW (e.i.r.p.)	Table1-a of this TS; §15.209	-	Wideband Data Transmission equipment such as Bluetooth, Zigbee devices	EN 300 328 FCC Part 15 §15.247 and ANSI C63.10-2013
32e	2.4000 – 2.4835 GHz	≤ 200 mW (e.i.r.p.)	Table1-a of this TS	Bandwidth not specified Adequate spectrum sharing mechanism (e.g. LBT, DAA) shall be implemented For wideband modulations other than FHSS, PSD ≤ 10 mW/MHz	RLAN	EN 300 328
			§15.209	-		FCC Part 15 §15.247 and ANSI C63.10-2013
33a	5.150 – 5.350 GHz	> 100 mW (e.i.r.p.) ≤ 200 mW (e.i.r.p.)	Table1-a of this TS; §15.407	Operation in 5.15-5.25 GHz under this provision need not employ TPC and DFS. Operation in 5.25- 5.35 GHz under this provision	RLAN	EN 301 893; FCC Part15 §15.407 and ANSI C63.10-2013

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

T1 Sub-band	Authorised Frequency Bands / Frequencies	Maximum Field Strength / RF Output Power	Transmitter Spurious Emissions	Additional Spectrum Access Conditions	Application Types[2]	Recommended Measurement Methods
				shall employ TPC and DFS		
33b	5.150 – 5.350 GHz	≤ 100 mW (e.i.r.p.)	Table1-a of this TS; §15.407	Operation in 5.15-5.25 GHz under this provision need not employ TPC and DFS. Operation in 5.25- 5.35 GHz under this provision shall employ DFS	RLAN	EN 301 893; FCC Part15 §15.407 and ANSI C63.10-2013
34	5.470 – 5.725 GHz	≤ 1000 mW (e.i.r.p.)	Table1-a of this TS; §15.407	Operation under this provision shall employ TPC and DFS	RLAN	EN 301 893; FCC Part15 §15.407 and ANSI C63.10-2013
35	5.725 – 5.850 GHz	≤ 1000 mW (e.i.r.p.)	Table1-a of this TS	Operation under this provision shall employ TPC and DFS	RLAN / Fixed Broadband Systems	EN 302 502
			§15.209 / §15.407	-		FCC Part 15 §15.247 / §15.407 and ANSI C63.10-2013
36a	5.725 – 5.875 GHz	≤ 100 mW (e.i.r.p.)	Table1-a of this TS; §15.209	-	Non-specific SRD	EN 300 440; FCC Part 15 §15.247 / §15.249 and ANSI C63.10-2013
36b	5.725 – 5.875 GHz	≤ 100 mW (e.i.r.p.)	Table1-a of this TS §15.209	Max. occupied bandwidth ≥ 1 MHz and ≤ 20 MHz Adequate spectrum sharing mechanisms (e.g. DFS and DAA) shall be implemented APC is able to reduce the e.i.r.p. to ≤ 25 mW	Wireless Industrial Applications (WIA)	EN 303 258; FCC Part 15 §15.247 / §15.249 and ANSI C63.10-2013

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

T1 Sub-band	Authorised Frequency Bands / Frequencies	Maximum Field Strength / RF Output Power	Transmitter Spurious Emissions	Additional Spectrum Access Conditions	Application Types[2]	Recommended Measurement Methods
45a	5.945 – 6.425 GHz	≤ 25 mW (e.i.r.p)	Table1-a of this TS §15.209	Adequate spectrum sharing mechanism shall be implemented / Employ contention-based protocol Maximum mean EIRP density of 1dBm/MHz or 10dBm/MHz for narrowband usage	RLAN Comments to application: Very Low Power (VLP) devices Use on unmanned aircraft systems/drones is prohibited	EN 303 687; FCC Part 15E
45b	5.945 – 6.425 GHz	≤ 250mW (e.i.r.p)	Table1-a of this TS §15.209	Adequate spectrum sharing mechanism shall be implemented / Employ contention-based protocol Maximum mean EIRP density of 11dBm/MHz	RLAN Comments to application: Low Power Indoor (LPI) Outdoor use, including in road vehicles, is not permitted. An LPI access point or bridge that is supplied power from a wired connection, has an integrated antenna and is not battery powered. An LPI client device that is connected to an LPI access point or another LPI client	EN 303 687; FCC Part 15E

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

T1 Sub-band	Authorised Frequency Bands / Frequencies	Maximum Field Strength / RF Output Power	Transmitter Spurious Emissions	Additional Spectrum Access Conditions	Application Types[2]	Recommended Measurement Methods
					and may or may not be battery powered	
37	10.50 – 10.55 GHz	≤ 117 dBµV/m at 10m	Table1-a of this TS; §15.209	-	Radio-determination devices	EN 300 440; FCC Part 15 §15.245 and ANSI C63.10-2013
38a	24.00 – 24.25 GHz	≤ 100 mW (e.i.r.p.)	Table1-a of this TS	-	Automotive radars	EN 302 858
38b	24.00 – 24.25 GHz	≤ 100 mW (e.i.r.p.)	Table1-a of this TS	-	Tank level probing radar	EN 302 372
38c	24.00 – 24.25 GHz	≤ 100 mW (e.i.r.p.)	Table1-a of this TS	-	Non-specific SRD Comments to application: Radar gun devices are not allowed to operate under this provision	EN 300 440
39a	57 – 64 GHz	≤100 mW (e.i.r.p)	Table1-a of this TS	-	Tank level probing radar	EN 302 372
39b	57 – 64 GHz	≤100 mW (e.i.r.p)	Table1-a of this TS; §15.209	-	Non-specific SRD	EN 305 550 FCC Part 15 §15.255 and ANSI C63.10-2013
40	57 – 66 GHz	≤ 10 W (e.i.r.p)	Table1-a of this TS	Adequate spectrum sharing mechanism shall be implemented Adaptivity (medium access protocol) shall be implemented (LBT) Maximum mean EIRP density of 13dBm/MHz	RLAN	EN 305 550 / EN 302 567
41	76 – 77 GHz	≤ 55 dBm peak (e.i.r.p.), ≤ 23.5 dBm average (e.i.r.p.) for pulse radar	Table1-a of this TS; FCC Part 95 Subpart M	-	Radar equipment for fixed infrastructure TTT and ground based vehicle applications	EN 301 091-1, -2; FCC Part 95 Subpart M

6. Table 1: Technical Requirements for Short Range Devices (SRD)						
T1 Sub-band	**Authorised Frequency Bands / Frequencies**	**Maximum Field Strength / RF Output Power**	**Transmitter Spurious Emissions**	**Additional Spectrum Access Conditions**	**Application Types[2]**	**Recommended Measurement Methods**
		≤ 55 dBm peak (e.i.r.p.), ≤ 50 dBm average (e.i.r.p.) for all other radar types				
42	122 – 123 GHz	≤ 100 mW (e.i.r.p.)	Table1-a of this TS; FCC Part 15 §15.258		Non-specific SRD	EN 305 550 FCC Part 15 §15.258
43	244 – 246 GHz	≤ 100 mW (e.i.r.p.)	Table1-a of this TS; FCC Part 15 §15.258		Non-specific SRD	EN 305 550 FCC Part 15 §15.258

7. Table 1-a: Category B of Spurious Domain Emission Limits

(ITU-R Rec. SM.329-12 §4.3, Table 3)

Type of SRD	Limits
SRD operating below 30 MHz	29 – 10 log(f (kHz)/9) dB(µA/m) at 10 m for 9 kHz < f < 10 MHz –1 dBµA/m at 10 m for 10 MHz < f < 30 MHz –36 dBm for 30 MHz ≤ except frequencies below < 1 GHz –54 dBm for f within the bands 47-74 MHz, 87.5-118 MHz, 174-230 MHz, 470-862 MHz –30 dBm for 1 GHz ≤ f < (see ITU-R Rec. SM.329-12 §2.5)
SRD operating above 30 MHz	–36 dBm for 9 kHz ≤ except frequencies below< 1 GHz –54 dBm for f within the bands 47-74 MHz, 87.5-118 MHz, 174-230 MHz, 470-862 MHz –30 dBm for 1 GHz ≤ f < (see ITU-R Rec. SM.329-12 §2.5)

8. Table 2: Technical Requirements for Short Range Devices (SRD) – Operation Requires Approval

T2 Sub-band	Authorised Frequency Bands / Frequencies	Maximum Field Strength / RF Output power	Transmitter Spurious Emissions	Recommended Measurement Methods	Application Types	Remarks
1	170.275 MHz 170.375 MHz 173.575 MHz 173.675 MHz	≤ 1000 mW (e.r.p.)	§15.209	FCC Part 15 §15.231 and ANSI C63.10-2013	Remote control of cranes and loading arms	Operating under these provisions may be approved on an exceptional basis.
2	26.96 – 27.28 MHz 40.66 – 40.70 MHz	> 500 mW (e.r.p.) ≤ 3000 mW (e.r.p.)	Table1-a of this TS	EN 300 224	On-site radio paging system	Operating under these provisions may be approved on an exceptional basis.
3	151.125 MHz 151.150 MHz	>1000 mW (e.r.p.) ≤ 3000 mW (e.r.p.)	Table1-a of this TS	EN 300 224		
4	920 – 925 MHz	> 500 mW (e.r.p.) ≤ 2000 mW (e.r.p.)	§15.209	FCC Part 15 §15.245 and ANSI C63.10-2013	Radio Frequency Identification (RFID) systems	Only RFID systems may be allowed to use this provision and approved on an exceptional basis.

8. Table 2: Technical Requirements for Short Range Devices (SRD) – Operation Requires Approval						
T2 Sub-band	**Authorised Frequency Bands / Frequencies**	**Maximum Field Strength / RF Output power**	**Transmitter Spurious Emissions**	**Recommended Measurement Methods**	**Application Types**	**Remarks**
			Table1-a of this TS	EN 300 220-1 and -2; or EN 302 208		
5	5.725 – 5.850 GHz	> 1000 mW (e.i.r.p.) ≤ 4000 mW (e.i.r.p.)	§15.209	FCC Part 15 §15.247 and ANSI C63.10-2013	Wireless LAN and broadband access	Operating under this provision may be approved on an exceptional basis.
			§15.407	FCC Part15 §15.407 and ANSI C63.10-2013		
6	57.1 – 62.9 GHz	> 40dBm (e.i.r.p.) ≤ 55dBm (e.i.r.p.)	Table1-a of this TS	EN 302 217-2	Fixed point systems	Operating under this provision may be approved on an exceptional basis.

Annex A : Conformity Assessment Checklist for SRD

Suppliers/testers should use this Checklist to guide their conformity assessment of the SRDs.
It is mandatory that the "Measured Value(s)" and "Ref Clause No." columns be completed, whilst for item 3, 4 or 5, these two columns are to be completed contingent on which measurement method is deemed appropriate for the equipment under test.
"Measured Values" shall be within the max field strength or RF output power limits indicated in the corresponding sub-band given in Table 1 of the TS SRD. Table 2 sets out provisions that may only be applied on an exception basis.
"Ref Clause No." identifies the reference standard and clause number where measurement method is based.
"CR" indicates the "Compliance Requirement", "M" means Mandatory, and "C" means Conditional, which is contingent on supplier's claimed function of that equipment.

IMDA TS SRD §	Description	Measured Value(s)	Ref Clause No.	CR	Conditions
1.3	The SRD is classified for (a) fixed; (b) mobile; or (c) portable use.	Please indicate.		M	
1.3	The SRD comes with (a) a RF output connector and dedicated antenna; or (b) an integral antenna.	Please indicate.		M	
4.1	The SRD must not have any external or readily accessible control for adjustment of its operation that can affect its compliance with the IMDA TS SRD.	Please indicate Yes or No.		M	
4.2.1	EMC shall be assessed accordingly to the SRD classification indicated in §1.3.			C	
4.2.2	Where applicable, equipment safety testing or assessment shall be performed to requirements defined in IEC 62368-1.			C	Applicable only to electrical and electronic equipment within the field of audio, video and information and communication technology
5	IMDA authorised frequency band(s) or frequencies	Indicate either TS SRD Table 1 or 2, and sub-band no.		M	
	Operating frequency range(s) or frequency over which equipment is transmitting	Shall be within the frequency band indicated by the sub-band no.		M	

IMDA TS SRD §	Description	Measured Value(s)	Ref Clause No.	CR	Conditions
	ERP or EIRP			C	ERP applies to transmitters operating below 1 GHz EIRP applies to transmitters operating above 1 GHz
	H-field or E-field measurement			C	H-field measurement applies to inductive loop coil transmitters only
	Power Spectral Density			C	
	Unwanted emissions in the spurious domain			M	
	Spectrum access techniques			C	For example, equipment using FHSS, LBT, DAA, AFA, Duty cycle, APC, OCW, OBW restrictions, etc.

Annex B : Addendum/Corrigendum

Revised TS Section (§)	Items Changed	Effective Date
Changes to IMDA TS SRD, Issue 1r2, Aug 2021		
The IMDA TS SRD Issue 1 Revision 3 (April 2023) has replaced the IMDA TS SRD Issue 1 Revision 2 (Aug 2021).		Sep 23
§4.2.2	Changes to equipment safety specifications	1 Sep 23
Table 1 (3b, 4b, 6b)	Listing of additional ETSI standard EN 300 330	
Table 1 (44)	Added band 10.20-11 MHz	
Table 1 (8b)	The max field strength for 13.553-13.567 MHz has been revised from 94 dBµV/m at 10m to max RF output power 10mW (e.r.p.)	
Table 1 (13a)	The max field strength for 40.66-40.7 MHz has been revised from 65 dBµV/m at 10m to max RF output power 10mW (e.r.p.)	
Table 1 (13c)	Replace 14a by 13c Amended band from 40.665-40.695 MHz to 40.66-40.70 MHz	
Table 1 (14b)	Removed; subsumed under 13a	
Table 1 (15)	Removed; band 40.77-40.83 MHz removed	
Table 1 (23a)	The max field strength for 180.00-200.00 MHz from 112dBuV/m at 10m to max RF output power 10mW (e.r.p.)	
Table 1 (23b)	The max field strength for 180.00-200.00 MHz from 112dBuV/m at 10m to max RF output power 50mW (e.r.p.)	
Table 1 (27a, 27c, 27d)	Replaced 27	
Table 1 (28)	Renumbered to 27b	
Table 1 (30a, 30b, 30c, 30d)	Amended band from 920-925 MHz to 917-925 MHz	
Table 1 (31)	Removed; band 1427.00-1432.00 MHz removed	
Table 1 (33b)	Amended access conditions for operation in 5.15-5.25 GHz from “need not employ DFS” to “need not employ ***TPC*** and DFS”	
Table 1 (35)	Amended application type from “Wireless LAN and broadband access” to “RLAN / Fixed Broadband Systems”	
Table 1 (41)	Does not distinct if vehicle is in motion or stationary Amended max RF output power	
Table 1 (42)	Added band 122-123 GHz	
Table 1 (43)	Added band 244-246 GHz	
Table 1 (45a, 45b)	Added band 5.945 – 6.425 GHz	
Table 2 (6)	Added 57-63 GHz	

Revised TS Section (§)	Items Changed	Effective Date
Changes to IMDA TS SRD, Issue 1r1, April 2018		
The IMDA TS SRD Issue 1 Revision 2 (Aug 2021) has replaced the IMDA TS SRD Issue 1 Revision 1 (April 2018). The Specification has been revised to cater for wider variety of SRD applications coexisting in the frequency sharing environment to the extent possible by implementing different criteria for spectrum access.		Aug 21
§1.1	Deleted Table 2 from § 1.1 to emphasise that the main intent of this Specification is to lay down requirements and spectrum access conditions in Table 1 for allowing coexistence of all kinds of SRD, wherever possible, and hence, added "restricted conditions" after "corresponding output power levels".	10 Aug 21
§1.4	Added text to further clarify the use of Table 2: "SRDs … may only be allowed to operate to requirements given in Table 2 on an exception basis."	
§4.2	Added "Equipment Safety Requirements" to § 4.2 and new § 4.2.2 for "Equipment safety testing", applicable to SRD powered by dedicated power supply (charger/power adapter).	
§4.2.1.2	CISPR 35 to replace CISPR 24.	
§5.1 & 5.2	Removed citing of Table 2 in § 5.1 and 5.2 to separate the use of Table 2 from Table 1. § 5.2 also indicated that "Checklist given in Annex A should be used as a guide for assessment of the SRD for conformity with applicable requirements set out in this Specification."	
§5.3	Added to clarify that: "Table 2 may only be applicable to the types of SRD operations permitted on an exception basis."	
Table 1	List of items is now ordered in ascending frequency bands. A column on "Additional Spectrum Access Conditions" has been added to Table 1 to provide clarity of conditions for frequency band sharing. See Annex B1 for detailed changes to Table 1.	

Revised TS Page	Revised TS Section	Items Changed	Effective Date
Changes to IMDA TS SRD, Issue 1, October 2016			
2	§1 & §2	The IMDA TS SRD Issue 1 Revision 1 (April 2018) has replaced the IMDA TS SRD Issue 1 (October 2016). Changes are intended to provide updates to the reference standards and clarity in generic as well as specific conformity assessment requirements for use of SRD applications, in line with standards development taken place in the related Standards Development Organisations.	1 Apr 18

Revised TS		Items Changed	Effective Date
Page	**Section**		
Changes to IMDA TS SRD, Issue 1, October 2016			
2	§1.1	Responding to technological and market developments in SRDs, deleted the text "*Short range devices are intended for communications in confined areas of buildings as well as for localised on-site operations*."	1 Apr 18
8 – 15	There no changes to the technical requirements captured in §5 of this Specification, except for the following:		1 Apr 18
13	§5 Table 1	Corresponding to the editorial change in §1.1, under provisions of items 25, 27 to 30, also removed the need for non-localised operations to be approved on exceptional basis.	
11 & 12	§5 Table 1	Removed provisions for SRD usage of the 450-470 MHz frequency band under items 14 and 17, as service relocation is taking effect from 1 April 2018.	
14	§5 Table 1-a	Streamlined spurious emission requirements for SRDs to align with category B limits defined in §4.3 Table 3 of the ITU-R Rec. SM.329-12.	
15	§5 Table 2	Removed provisions for SRD usage of the 450-470 MHz frequency band under item 1, as service relocation is taking effect from 1 April 2018.	

Revised TS		Items Changed	Date of Issue
Page	**Section**		
Changes to IDA TS SRD, Issue 1 Rev 7, April 2013			
6	§3.2	The IMDA TS SRD Issue 1 (October 2016) has replaced the IDA TS SRD Issue 1 Rev 7 (April 2013). Changes are largely editorial to provide updates and clarity in the application of EMC requirements, in line with standards development that has taken place in the Standards Development Organisations concerned.	1 Oct 16

Page	TS Ref.	Items Changed	Effective Date
Changes to IDA TS SRD, Issue 1 Rev 6, May 11			
3	Table 1 (1)	The max field strength for 16 – 150 kHz has been revised from 66 dBµA/m @ 3m to 66 dBµA/m @ 10m	25 Apr 13
3	Table 1 (3)	Listing of additional ETSI standard - EN 302 291-1	25 Apr 13
3	Table 1 (9)	Listing of additional ETSI standard - EN 300 422-1	25 Apr 13
5	Table 1 (14)	Allow max field strength of Medical Telemetry applications operating in the range 9 – 315 kHz up to 30 dBµA/m @10m.	25 Apr 13
5	Table 1 (16)	Listing of additional ETSI standard - EN 301 839-1 and EN 302 537-1	25 Apr 13
6	Table 1 (23)	Listing of additional ETSI standard - EN 302 288-1	25 Apr 13
9	Table 1 (31)	Listing of additional ETSI standard - EN 305 550-1	25 Apr 13
Changes to IDA TS SRD, Issue 1 Rev 5, Apr 11			
		Change of IDA's address at cover page to Mapletree Business City.	1 May 11

Page	TS Ref.	Items Changed	Effective Date
Changes to IDA TS SRD, Issue 1 Rev 4, Jul 09			
4	Table 1 (1)	Inclusion of reference to EN 300 330-1 – Technical Characteristics and Test Methods for Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz	1 Apr 11
10	Table 1 (30)	The band 5.470 – 5.725 GHz at ≤ 1000 mW (e.i.r.p.) is an additional frequency allocation for Wireless LAN / broadband access applications.	1 Apr 11
10	Table 1 (31)	The band 57 – 66 GHz at ≤ 10W (e.i.r.p) is an additional frequency allocation for Wireless LAN / broadband access applications.	1 Apr 11

Page	TS Ref.	Items Changed	Effective Date
Changes to IDA TS SRD, Issue 1 Rev 3, Jan 08			
-	-	Changes are purely editorial in nature. The Short Range Devices (SRD) requiring IDA's approval for operation are listed separately in Table 2 for better clarity.	July 09
4	Table 1	Short Range Devices (SRD) which does not require IDA's approval for operation remain in Table 1. Those that require IDA's approval are extracted and listed in Table 2	July 09
10	Table 2	The following are Short Range Devices (SRD) which require IDA's approval for operation ≤ 1000 mW (e.r.p.): 170.275 MHz 170.375 MHz 173.575 MHz 173.675 MHz 451.750 MHz 452.000 MHz 452.050 MHz 452.325 MHz	July 09
		26.96 – 27.28 MHz > 500 mW (e.r.p.) 40.66 – 40.70 MHz ≤ 3000 mW (e.r.p.)	July 09
		151.125 MHz >1000 mW (e.r.p.) 151.150 MHz ≤ 3000 mW (e.r.p.)	July 09
		920 – 925 MHz > 500 mW (e.r.p.) ≤ 2000 mW (e.r.p.)	July 09
		5.725 – 5.850 GHz > 1000 mW (e.i.r.p.) ≤ 4000 mW (e.i.r.p.)	July 09

Page	TS Ref.	Items Changed	Effective Date
Changes to IDA TS SRD, Issue 1 Rev 2, Aug 06			
4	Table 1	Provisions have been revised in line with the Schedule to the Telecommunications (Exemption from sections 33, 34(1)(b) and 35) (Amendment) Notification 2008.	2 Jan 08
4	Table 1 (1)	The following are additional frequency allocations that may be used for induction loop and RFID systems: (a) 0.150 – 5.00 MHz, ≤ 13.5 dBµA/m @ 10m (b) 6.765 – 6.795 MHz, ≤ 42 dBµA/m @ 10m (c) 7.400 – 8.800 MHz, ≤ 9 dBµA/m @ 10m Please note that the unit for field strength has been standardised to magnetic field strength: the former 0.016 – 0.15 MHz, ≤ 100 dBµV/m @ 3m has been replaced by 0.016 – 0.15 MHz, ≤ 66 dBµA/m @ 3m.	
4	Table 1 (4)	Frequency band 312.00 - 315.00 MHz has been changed to 312.00 - 316.00 MHz.	
4	Table 1 (8)	The band 470.00 – 806.00 MHz at ≤ 10 mW (e.r.p.) is an additional frequency allocation for wireless microphones applications.	
4	Table 1 (9)	The band 169.40 – 175.00 MHz at ≤ 500 mW (e.r.p.) is an additional frequency allocation for hearing/audio assistance aids applications.	
5	Table 1 (10)	RF output power for the 26.96 – 27.28 MHz band for remote control devices applications has been increased to ≤ 100 mW (e.r.p.). The following are additional frequency allocations that may be used for remote control devices applications: (a) 34.995 – 35.225 MHz, ≤ 100 mW (e.r.p.) (b) 40.665 – 40.695 MHz, ≤ 500 mW (e.r.p.) (c) 40.770 – 40.830 MHz, ≤ 500 mW (e.r.p.) (d) 72.130 – 72.210 MHz, ≤ 500 mW (e.r.p.)	
6	Table 1 (15)	The following are additional frequency allocations that may be used for medical telemetry applications: (a) 216.00 – 217.00 MHz, ≤ 100 mW (e.r.p.) (b) 1427.00 – 1432.00 MHz, ≤ 100 mW (e.r.p.) (c) All frequencies at ≤ 25 µW	
7	Table 1 (20)	Frequency band 433.79 - 434.79 MHz has been changed to 433.05 – 434.79 MHz	

Page	TS Ref.	Items Changed	Effective Date
Changes to IDA TS SRD, Issue 1 Rev 1, Jul 05			
4 and 7	Table 1 (4), 1(20) And 1(21)	Provisions have been revised in line with the Schedule to the Telecommunications (Exemption from sections 33, 34(1)(b) and 35) (Amendment) Notification 2006: a. 314.7 – 315 MHz frequency band revised to 312 – 315 MHz b. 923 – 925 MHz frequency band revised to 920 – 925 MHz	Jun 06
5	Table 1 (10)	Amended remark: "Use of remote controls of aircraft and glider models is subject to IDA's licensing."	Jun 06
7	Table 1 (25)	Provision to operate in the 630 – 710 MHz band is deleted from the Specification.	Jun 06

Page	TS Ref.	Items Changed	Effective Date
Changes to IDA TS SRD, Issue 1, Dec 04			
—	—	Specification has been reissued as IDA TS SRD Issue 1 Rev 1.	21 Jul 05
8	Table 1(30), And 1(31)	Changes are mainly editorial in nature. The essential technical requirements for conformity assessment remain unchanged.	21 Jul 05

Page	TS Ref.	Items Changed	Effective Date
Changes to IDA TS 5 to TS 14, TS SRRS and TS WLAN			
—	—	This Specification supersedes the following IDA Type Approval Specifications: 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
—	—	Title of Specification has been renamed as "Technical Specification for Short Range Devices" (IDA TS SRD Issue 1). Changes are mainly editorial in nature and carried out to streamline the essential technical requirements for compliance. The few changes in technical requirements are summarised below.	1 Dec 04
6	TS SRD Table 1(1)	Maximum output power for induction loop systems has been revised from "100 dBµV/m at 30 m" to "100 dBµV/m at 3 m" in line with the Schedule to	1 Dec 04

Page	TS Ref.	Items Changed	Effective Date
Changes to IDA TS 5 to TS 14, TS SRRS and TS WLAN			
		the Telecommunications (Exemption from sections 33, 34(1)(b) and 35) Notification.	
6	TS SRD Table 1(6)	Maximum output power has been revised from "57 dBµV/m at 3 m" to "65 dBµV/m at 10 m" in line with the Schedule to the Telecommunications (Exemption from sections 33, 34(1)(b) and 35) Notification.	1 Dec 04
6	TS SRD Table 1(8)	Maximum output power has been revised from "60 dBµV/m at 10 m" to "112 dBµV/m at 10 m" in line with the Schedule to the Telecommunications (Exemption from sections 33, 34(1)(b) and 35) Notification.	1 Dec 04
8	TS SRD Table 1(14) And 1(15)	Maximum output power has been revised from "20 dBµV/m at 15 m" to "0.01 mW ERP" and from "54 dBµV/m at 30 m" to "2 mW ERP" in line with the Schedule to the Telecommunications (Exemption from sections 33, 34(1)(b) and 35) Notification.	1 Dec 04

Page	TS Ref.	Items Changed	Effective Date
Changes to IDA TS 5 to TS 14, TS SRRS and TS WLAN			
9	TS SRD Table 1(19) 1(20) And 1(21)	Provisions have been revised for RFID applications as follows [The Schedule to the Telecommunications (Exemption from sections 33, 34(1)(b) and 35) (Amendment) Notification 2004]: 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 For RFID applications in the 923 – 925 MHz frequency band, output power up to 2 W ERP is allowed, subject to IDA's licensing.	2 Nov 04
Changes to IDA TS 5 to TS 14, TS SRRS and TS WLAN			
10	TS SRD Table 1(27), 1(28) and 1(29)	Provisions for WLAN operating in 2.4 GHz and 5.8 GHz frequency bands have been revised as follows [The Schedule to the Telecommunications (Exemption from sections 33, 34(1)(b) and 35) (Amendment) Notification 2004]: 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
—	—	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.	1 Dec 04

Annex B1 : Detailed changes to IMDA TS SRD Issue 1 Revision 1 in Table 1

New numbering	Frequency bands	Last revision numbering	Changes
1	All frequencies	16	-
2	9 – 315 kHz	14a	Added Duty cycle ≤ 10% Added 'ULP-AMI and ULP-AMI-P' as application type
3a	16 – 150 kHz	1a	Added 'not ULP-AMI and ULP-AMI-P' in application types
3b	16 – 150 kHz	New	Included 'Wireless power transfer' as application type
3c	16 – 150 kHz	2	-
4a	150 – 5000 kHz	1b	-
4b	150 – 5000 kHz	New	Included 'Wireless power transfer' as application type
5	0.51 – 1.60 MHz	5	-
6a	6765 – 6795 kHz	1c	Changed 'inductive loop/RFID applications' to 'inductive applications'
6b	6765 – 6795 kHz	New	Included 'Wireless power transfer' as application type
7	7400 – 8800 kHz	1d	Changed 'inductive loop/RFID applications' to 'inductive applications'
8a	13.553 – 13.567 MHz	3	Changed 'close range inductive' to 'inductive applications'
8b	13.553 – 13.567 MHz	3	Added FCC Part 15 §15.225 as reference standard
9a	26.96 – 27.28 MHz	10a	Generalised to 'model control'; Added FCC Part 15 §15.227 as reference standard
9b	26.96 – 27.28 MHz	New	Included 'Non-specific SRD' as application type
9c	26.96 – 27.28 MHz	12a	Removed EN 300 433 as reference standard
10	29.70 – 30.00 MHz	11b	Changed application types to 'Wireless microphones on a tuning range basis'; Output power limited to 10mW (e.r.p.)
11	34.995 – 35.225 MHz	10b	Changed application types to 'Control of flying models'
12	40.50 – 41.00 MHz	14b	-
13a	40.66 – 40.70 MHz	6	Replaced 'wireless microphone' with 'non-specific SRD'
13b	40.66 – 40.70 MHz	12b	-
14a	40.665 – 40.695 MHz	New	Included 'Model control' as application type
14b	40.665 – 40.695 MHz	10c	Maximum output power reduced to 10mW; FCC reference standard changed to Part 15 §15.229
15	40.77 – 40.83MHz	-	-
16a, b, c, d	72.080 MHz, 72.200 MHz, 72.400 MHz, 72.600 MHz	17	Added Access conditions
17	72.13 – 72.21 MHz	10e	-
18a	88.00 – 108.00 MHz	7	Changed application type from 'Wireless microphone' to 'Cordless audio devices'; Power limit reduced to ≤ 42.2 dBµV/m at 10m; Changed ETSI reference standard to EN 301 357
18b	88.00 – 108.00 MHz	7	Added 'Non-specific SRD' as application type
19	146.35 – 146.50 MHz	4a	Added FCC Part 15 §15.231 as reference standard; Added 'Intermittent/Periodic transmission of control signals' as application type
20	151.125 MHz 151.150 MHz	13	-
21a, b	158.275/162.875 MHz; 158.325/162.925 MHz	17	Added new access conditions
22a	169.40 – 169.475 MHz	9a	Frequency range to move out of 'Application types'
22b	169.40 – 175.00 MHz	9a	Power limit reduced to 10mW

22c	169.40 – 175.00 MHz	New	Included 'Meter reading' as application type
22d	169.40 – 175.00 MHz	9a	Max power for 'Non-specific SRD' reduced to 10mW
23a	180.00 – 200.00 MHz	9b	Added access conditions for ALD on a tuning range basis
23b	180.00 – 200.00 MHz	9b	-
24	216.00 – 217.00 MHz	14c	-
25a, b, c, d	240.15 – 240.30 MHz; 300.00 – 300.30 MHz; 312.00 – 316.00 MHz; 444.40 – 444.80 MHz	4b, c, d, e	Added FCC Part 15 §15.231 as reference standard; Added 'Intermittent/Periodic transmission of control signals' as application type
26a	433.05 – 434.79 MHz	19	-
26b	433.05 – 434.79 MHz	19	Included 'Non-specific SRD' as application type but has lower max output power limit (1mW)
26c	433.05 – 434.79 MHz	New	Included 'Intermittent/Periodic transmission of control signals' as application type; Added FCC Part 15 §15.231 as reference standard
26d	433.05 – 434.79 MHz	New	Included 'RFID for commercial shipping containers, limited to areas such as ports, rail terminals and warehouses' as application type; Added FCC Part 15 §15.240 as reference standard
27	470.00 – 698.00 MHz	8	Changed frequency bands from '470.00 – 806.00 MHz' to '470.00 – 698.00 MHz'; Added EN 300 422 as reference standard; Added FCC Part 15 §15.236 as reference standard;
28	487.00 – 507.00 MHz	9c	Added FCC Part 15 §15.236 as reference standard
29	866 – 869 MHz	20a	Added EN 300 220-1 as reference standard
30a	920 – 925 MHz	20b	Added EN 302 208 / EN 300 220-1 as reference standard for RFID applications; Added access conditions; Used FCC Part 15 §15.247 instead of Part 15 §15.249
30b	920 – 925 MHz	20b	Included access conditions for network access points; Added EN 300 220-1 as reference standard; Used FCC Part 15 §15.247 instead of Part 15 §15.249
30c	920 – 925 MHz	20b	Power limit reduced to 100mW; Included access conditions for devices communicating with network access points; Added EN 300 220-1 as reference standard; Used FCC Part 15 §15.247 instead of Part 15 §15.249
30d	920 – 925 MHz	New	Included 'Non-specific SRD' as application type
31	1427.00 – 1432.00 MHz	15	-
32a	2.4000 – 2.4835 GHz	24	Max output power information moved to correct column; Included FCC reference standards
32b	2.4000 – 2.4835 GHz	21	Reduced max output power from 100mW to 25mW; Included FCC reference standards
32c	2.4000 – 2.4835 GHz	21	Application types defined

			-> RFID, model control, wireless video, hearing aid; Included FCC reference standards
32d	2.4000 – 2.4835 GHz	24	Used 'Wideband Data Transmission equipment' to define application types Added FCC Part 15 §15.247 as reference standard
32e	2.4000 – 2.4835 GHz	25	Added access conditions
33a	5.150 – 5.350 GHz	28	-
33b	5.150 – 5.350 GHz	29	-
34	5.470 – 5.725 GHz	30	-
35	5.725 – 5.850 GHz	27	Added EN 302 502 as reference standard; Added access conditions
36a	5.725 – 5.875 GHz	26	Frequency band changed from '5.725 – 5.850 GHz to '5.725 – 5.875 GHz'; Added FCC Part 15 §15.247 as reference standard
36b	5.725 – 5.875 GHz	New	Included 'Wireless Industrial Applications (WIA)' as application type; Added access conditions
37	10.50 – 10.55 GHz	22	Added FCC Part 15 §15.245 as reference standard; Application type defined more clearly
38a	24.00 – 24.25 GHz	23	Application type defined more clearly
38b	24.00 – 24.25 GHz	New	Included 'Tank level probing radar' as application type
38c	24.00 – 24.25 GHz	New	Included 'Non-specific SRD' as application type
39a	57 – 64 GHz	New	Included 'Tank level probing radar' as application type
39b	57 – 64 GHz	New	Included 'Non-specific SRD' as application type
40	57 – 66 GHz	31	Added additional access conditions
41	76 – 77 GHz	18	Adopted average power for both vehicle in motion and when stationary