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TECHNICAL SPECIFICATION
FOR
AMATEUR RADIO EQUIPMENT

Suruhanjaya Komunikasi dan Multimedia Malaysia
Off Pesiaran Multimedia, 63000 Cyberjaya, Selangor Darul Ehsan, Malaysia

FOREWORD

This Technical Specification was developed under the authority of the Malaysian Communications and Multimedia Commission (SKMM) under the Communications and Multimedia Act 1998 (CMA 98) and the relevant provisions on technical regulation of Part VII of the CMA 98. It is based on recognised International Standards documents.

This Technical Specification specifies the specification to conform for approval of telecommunications devices.

NOTICE

This Specification is subject to review and revision

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TECHNICAL SPECIFICATION FOR AMATEUR RADIO EQUIPMENT

1. Scope

This Technical Specification defines the minimum technical requirements for amateur radio equipment.

Details of the authorised frequency bands for radio amateur service are shown in sublause 4.2.1 and "Guidelines for Amateur Radio Services in Malaysia".

2. Normative references

The following normative references are indispensable for the application of this Technical Specification. For dated references, only the edition cited applies. For undated references, the latest edition of the normative references (including any amendments) applies.

See Annex A.

3. Abbreviations

For the purpose of this Technical Specification, the following abbreviation applies.

HF	High Frequency
PEP	Peak envelope power
ppm	Parts per million
UHF	Ultra High Frequency
VHF	Very High Frequency

4. Requirements

4.1 General requirements

4.1.1 Power supply requirements

AC adaptor used for amateur radio equipment shall not affect the capability of the equipment to meet this specification. The operating voltage shall be 240 V +5 %, −10 % and frequency 50 Hz ± 1 % as according to MS 406 or 230 V ± 10 % and frequency 50 Hz ± 1 % as according to MS IEC 60038 whichever is current.

Adaptor must be pre-approved by the relevant regulatory body before it can be used with the equipment.

4.1.2 Power supply cord and mains plug requirements

The equipment shall be fitted with a suitable and appropriate approved power supply cord and mains plug. Both are regulated products and must be pre-approved by the relevant regulatory body before it can be used with the equipment.

The power supply cord shall be certified according to:

- MS 140; or
- BS 6500; or
- IEC 60227-5; or
- IEC 60245-4.

The main plug shall be certified according to:

- 13 A fused plugs: MS 589: Part 1 or BS 1363: Part 1; or
- 2.5 A, 250 V, flat non-rewirable two-pole plugs: MS 1578 or BS EN 50075.

4.1.3 Design of equipment and marking requirements

The amateur radio equipment shall not be constructed with any external or readily accessible control which permits the adjustment if its operation in a manner that is inconsistent with this specification.

The equipment shall be marked with the following information:

a) supplier/manufacturer's name or identification mark;

b) supplier/manufacturer's model or type reference; and

c) other markings as required by the relevant standards.

The markings shall be legible, indelible and readily visible.

4.1.4 Language

All markings and related documents shall be in Bahasa Melayu or English language.

4.2 Technical requirements

The equipment shall comply with the following requirements:

a) Radio Frequency (RF).

b) Electromagnetic Compatibility (EMC).

c) Electrical safety and health.

4.2.1 Radio Frequency requirements

The amateur radio equipment shall comply with the frequency bands, maximum power limits and class of emission as defined in Tables 1 and 2 for class A and class B privilege respectively.

Table 1. Radio frequency for class A privilege

Category of product	Frequency band (MHz)	Maximum power level (Watts PEP)	Class of emission
HF	1.800 – 2.000	25	1A,A2A
	3.500 – 3.900	400	A3E, R3E, J3E, F1A, F2A and F3E
	7.000 – 7.100	400	
	10.100 – 10.150	400	
	14.000 – 14.350	400	
	18.068 – 18.168	400	
	21.000 – 21.450	400	
	24.890 – 24.990	400	
	28.000 – 29.700	400	
	50.000 – 54.000	50	
	144.000 – 148.000	50	A1A, A2A, A3E and F1A
	145.800-146.000	50	F2A, J3E, R3E and F3E
VHF	430.000 – 440.000	50	F3E and F1W
		50	
		50	

Table 1. Radio frequency for class A privilege *(continued)*

Category of product	Frequency band (MHz)	Maximum power level (Watts PEP)	Class of emission
UHF	1 240.000 – 1 300.000	50	A1A, A2A
	2 300.000 – 2 450.000 3 300.000 – 3 500.000 5 650.000 – 5 850.000	50	A3E, R3E
	10 000.000 – 10 500.000 47 000.000 – 47 200.000	50	J3E and F1
	24 000.000 – 24 050.000 75 500.000 – 81 000.000	50 50	A3C, C3F
	241 000.000 – 250 000.000	25	

Table 2. Radio frequency for class B privilege

Category of product	Frequency band (MHz)	Maximum power level (Watts PEP)	Class of emission
HF	28.000 – 29.700	50	A3E, F1A, F2A, F3E, J3E and R3E
VHF	50.000 – 54.000	50	
	144.000 – 148.000	50	
UHF	430.000 – 440.000	50	

4.2.2 Measurement methods and test limit requirements

Measurement methods and test limit requirements is defined in Table 3.

Table 3. Test reference and test limit requirements

Parameter	HF band	VHF band	UHF band	Test reference
Transmitter frequency error Note. The frequency tolerance is the maximum permissible departure of the transmitter output frequency from the reference frequency which shall be the nominal carrier frequency.	The frequency drift shall not be more than 100 Hz over any period of 15 minutes, after 30 minutes of warm up period.	± 2.5 ppm (0.00025 %)	± 2.5 ppm (0.00025 %)	Subclause 8.1 of ETSI EN 300 086-1 V1.2.1 (2001-03)
Transmitter modulation/ deviation	Between 50 % to 100 % (AM)	± 5 kHz	± 5 kHz	VHF and UHF band: - subclause 8.4 of ETSI EN 300 086-1 V1.2.1 (2001-03) HF band: - subclause 10.4 of ETSI EN 300 373-1 V1.2.1 (2002-10)

Table 3. Test reference and test limit requirements *(continued)*

Parameter	HF band	VHF band	UHF band	Test reference
Transmitter spurious emissions	−36 dBm or −40 dBc whichever is higher	−36 dBm or −60 dBc whichever is higher	−36 dBm or −60 dBc whichever is higher −30 dBm or −50 dBc whichever is higher (for frequency > 1 000 MHz)	ETSI EN 301 783-1
Receiver operating frequency	The receiver shall operate on the same frequency bands as the transmitter (see Tables 1 and 2). Synthesized receiver operating in the frequency bands between 150 kHz and 30 MHz may be used.	The receiver shall operate within the frequency bands given in paragraph (see Tables 1 and 2).	The receiver shall operate within the frequency bands given in paragraph (see Tables 1 and 2).	Receiver operating frequency range is based on supplier's declaration of conformity.

Table 3. Test reference and test limit requirements *(continued)*

Parameter	HF band	VHF band	UHF band	Test reference
Receiver sensitivity	0.25 µV at 10 dB SINAD	0.5 µV at 12 dB SINAD	0.5 µV at 12 dB SINAD	VHF and UHF band: - subclause 9.1 of ETSI EN 300 086-1 V1.2.1 (2001-03) HF band: - subclause 11.5 of ETSI EN 300 373-1 V1.2.1 (2002-10)
Receiver antenna conducted	N/A	−57dBm	−57dBm (for frequency < 1 000 MHz) −47 dBm (for frequency < 1 000 MHz)	ETSI EN 301 783-1

4.2.3 Electromagnetic Compatibility (EMC) requirements

The equipment shall comply with the EMC emissions requirements from the DC power or AC mains power input/output ports as defined in the ETSI EN 301 489-1. The requirements shall cover radiated and conducted emission.

4.2.4 Electrical safety and health requirement

The equipment shall comply with the safety requirements defined in MS IEC 60950-1. The supplier shall submit full type test report to MS IEC 60950 -1 or equivalent standards.

4.2.5 Radiation hazards

Where appropriate, amateur radio equipment shall comply with the International commission on Non-Ionising radiation protection (ICNIRP) guidelines for limiting exposure to time varying Electromagnetic Field (EMF) in the frequency range up to 300 GHz.

Annex A
(normative)

Normative references

BS 1363: Part 1	13 A plugs, socket-outlets, adaptors and connection units - Part 1: Specification for rewirable and non-rewirable 13 A fused plugs
BS 6500	Electric cables Flexible cords rated up to 300/500 V, for use with appliances and equipment intended for domestic, office and similar environments
BS EN 50075	Specification for flat non-wirable two-pole plugs 2.5 A 250 V, with cord, for the connection of class II-equipment for household and similar purposes
ETSI EN 300 086-1 V1.2.1 (2001-03)	Electromagnetic compatibility and Radio Spectrum Matters (ERM); Land Mobile Service; Radio equipment with an internal or external RF connector intended primarily for analogue speech; Part 1: Technical characteristics and methods of measurement
ETSI EN 300 373-1 V1.2.1 (2002-10)	Electromagnetic compatibility and Radio spectrum Matters (ERM); Maritime mobile transmitters and receivers for use in the MF and HF bands; Part 1: Technical characteristics and methods of measurement
ETSI EN 301 489-1	Electromagnetic compatibility and Radio Spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements
ETSI EN 301 783-1	Electromagnetic compatibility and Radio Spectrum Matters (ERM); Land Mobile Service; Commercially available amateur radio equipment; Part 1: Technical characteristics and methods of measurement
IEC 60227-5	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 5: Flexible cables (cords)
IEC 60245-4	Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 4: Cords and flexible cables
MS 140	Specification for insulated flexible cords and cables
MS 406	Specification for voltages and frequency for alternating current transmission and distribution systems

MS 589: Part 1	Specification for 13 A plugs, socket outlets, adaptors and connection units part 1: Specification for rewirable and non-rewirable 13 A fused plugs
MS 1578	Specification for flat non-rewirable two-pole plugs, 2.5 A, 250 V, with cord, for the connection of class II-Equipment for household and similar purposes
MS IEC 60038	IEC standard voltages
MS IEC 60950-1	Information technology equipment - Safety - Part 1: General requirements