

MCMC MTSFB TC T020:2023

TECHNICAL CODE

AERONAUTICAL RADIOCOMMUNICATIONS EQUIPMENT - SPECIFICATIONS

Developed by



Registered by



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Development of technical codes

The Communications and Multimedia Act 1998 (Laws of Malaysia Act 588) ('the Act') provides for a Technical Standards Forum designated under section 184 of the Act or the Malaysian Communications and Multimedia Commission ('the Commission') to prepare a technical code. The technical code prepared pursuant to section 185 of the Act shall consist of, at least, the requirements for network interoperability and the promotion of safety of network facilities.

Section 96 of the Act also provides for the Commission to determine a technical code in accordance with section 55 of the Act if the technical code is not developed under an applicable provision of the Act and it is unlikely to be developed by the Technical Standards Forum within a reasonable time.

In exercise of the power conferred by section 184 of the Act, the Commission has designated the Malaysian Technical Standards Forum Bhd ('MTSFB') as a Technical Standards Forum which is obligated, among others, to prepare the technical code under section 185 of the Act.

A technical code prepared in accordance with section 185 shall not be effective until it is registered by the Commission pursuant to section 95 of the Act.

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Committee representation

This technical code was developed by Fixed and Wireless Terminal Working Group of the Malaysian Technical Standards Forum Bhd (MTSFB), which consists of representatives from the following organisations:

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Foreword

This technical code for the Aeronautical Radiocommunications Equipment - Specifications ('this Technical Code') was developed pursuant to Section 185 of the Communications and Multimedia Act 1998 (Laws of Malaysia Act 588) by the Fixed and Wireless Terminal Working Group of the Malaysian Technical Standards Forum Bhd (MTSFB).

This Technical Code was developed for the purpose of certifying communications equipment under the Communications and Multimedia (Technical Standards) Regulations 2000.

This Technical Code shall continue to be valid and effective from the date of its registration until it is replaced or revoked.

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AERONAUTICAL RADIOCOMMUNICATIONS EQUIPMENT - SPECIFICATIONS

1. Scope

This Technical Code specifies the minimum requirement for Aeronautical Equipment (“the Equipment”) designed for use in ground-to-air and air-to-ground aeronautical communications for civil aviation in Malaysia.

2. Normative references

The following normative references are indispensable for the application of this Technical Code. 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 purposes of this Technical Code, the following abbreviations apply.

AA	Apparatus Assignment
AC	Alternating Current
ADS-B	Automatic Dependent Surveillance-Broadcast
AMRS	Aeronautical Mobile Route Service
DC	Direct Current
DME	Distance Measuring Equipment
DVOR	Doppler VHF Omnidirectional Range
EMC	Electromagnetic Compatibility
GBAS	Ground Based Augmentation System
GP	Glide Path
HF	High Frequency
ILS	Instrument Landing System
MLAT	Multilateration
NDB	Non-Directional Beacon
PSR	Primary Surveillance Radar
PVC	Polyvinyl Chloride
RF	Radio Frequency
SAR	Search And Rescue
SSR	Secondary Surveillance Radar
UAS	Unmanned Aircraft System
VHF	Very High Frequency
VOR	VHF Omni-directional Range

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4. Requirements

4.1 General requirements

The Equipment shall not cause interference with other authorised radiocommunications services and be able to tolerate any interference caused by other radiocommunications services, electrical or electronic equipment.

4.1.1 Power supply

The Equipment may be powered by Alternating Current (AC) or Direct Current (DC).

For AC powered equipment, the operating voltage shall be 240 V + 5 %, - 10 % and frequency 50 Hz ± 1 % in accordance with MS 406 or 230 V ± 10 % and frequency 50 Hz ± 1 % in accordance with MS IEC 60038 whichever is current.

Where external power supply is used, e.g. AC adaptor, it shall not affect the capability of the Equipment to meet this Technical Code. The adaptor shall be pre-approved by the relevant regulatory body before being used with the Equipment.

4.1.2 Power supply cord and mains plug

If the Equipment is equipped with power supply cord and mains plug, the Equipment shall be fitted with a suitable and certified power supply cord and mains plug. The power supply cord and mains plug are regulated products and shall be pre-approved by the relevant regulatory body with the following requirements, before they can be used with the Equipment.

- a) The power supply cord shall be certified according to:
 - i) MS 2112-5 or BS EN 50525-2-11 or IEC 60227-5 (for Polyvinyl Chloride (PVC) insulated - flexible cables or cords); or
 - ii) MS 2127-4 or IEC 60245-1 and IEC 60245-4 (for rubber insulated - flexible cables or cords).
- b) The mains plug shall be certified according to:
 - i) MS 589-1 or BS 1363 (for 13 A, fused plug);
 - ii) MS 1577 (for 15 A, fused plugs); or
 - iii) MS 1578 or BS EN 50075 (for 2.5 A, 250 V, flat non-rewireable two-pole plugs with cord for the connection of class II equipment).

4.1.3 Marking

The Equipment shall be marked with the following information:

- a) supplier or manufacturer's name or identification mark;
- b) equipment's brand name or trademark and model; and
- c) other markings as required by the relevant standards.

The markings shall be legible, indelible and readily visible. All information on the marking shall be either in Bahasa Malaysia or English language.

4.2 Technical requirements

The Equipment shall comply with the following requirements:

- a) Radio Frequency (RF);
- b) Electromagnetic Compatibility (EMC); and
- c) safety and health requirements.

4.2.1 Radio Frequency (RF)

The Equipment shall operate within the specified frequency bands and transmitter output power. It shall conform to the test references as specified in Table B.1 of Annex B and fulfil the relevant requirements of this Technical Code on all the permitted frequencies which it is intended to operate.

4.2.2 Electromagnetic Compatibility (EMC)

The Equipment shall comply with the conducted emission and radiated emission requirements as defined in the RTCA DO 160G or any equivalent standards.

4.2.3 Safety and health

4.2.3.1 Electrical safety and health

The Equipment shall comply with the safety requirements defined in MS IEC 60950-1, IEC 62368-1, or any equivalent standards.

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Annex A
(Normative)

Normative references

MS 406, *Specification for voltages and frequency for alternating current transmission and distribution systems*

MS 589-1, *13 A plugs, socket-outlets, adaptors and connection units - Part 1: Specification for rewirable and non-rewirable 13 A fused plugs*

MS 1577, *Specification for 15 A plugs and socket-outlets for domestic and similar purposes*

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 2112-5, *Electric cable and wire - Polyvinyl Chloride (PVC) insulated cables of rated voltages up to and including 450/750 V - Part 5: Flexible cables*

MS 2127-4, *Rubber insulated cables of rated voltages up to and including 450/750 V - Part 4: Cords and flexible cables*

MS IEC 60038, *IEC Standard voltages*

MS IEC 60950-1, *Information technology equipment - Safety - Part 1: General requirements*

IEC 60227-5, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 5: Flexible cables (cords)*

IEC 60245-1, *Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 1: General requirements*

IEC 60245-4, *Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 4: Cords and flexible cables*

IEC 62368-1, *Audio/video, information and communication technology equipment - Part 1: Safety requirements*

ETSI EN 300 220-1, *Short Range Devices (SRD) operating in the frequency range 25 MHz to 1 000 MHz; Part 1: Technical characteristics and methods of measurement*

ETSI EN 300 328-1, *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; Part 1: Technical characteristics and test conditions*

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 300 676-1, *Ground-based VHF hand-held, mobile and fixed radio transmitters, receivers and transceivers for the VHF aeronautical mobile service using amplitude modulation; Part 1: Technical characteristics and methods of measurement*

ETSI EN 302 152-1, *Electromagnetic compatibility and Radio spectrum Matters (ERM); Satellite Personal Locator Beacons (PLBs) operating in the 406,0 MHz to 406,1 MHz frequency band; Part 1:*

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Technical characteristics and methods of measurement

ETSI EN 303 084, *Ground Based Augmentation System (GBAS) VHF ground-air Data Broadcast (VDB); Technical characteristics and methods of measurement for ground-based equipment; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU*

BS 1363 (all parts), *13 A plugs, socket-outlets, adaptors and connection units.*

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*

BS EN 50525-2-11, *Electric cables. Low voltage energy cables of rated voltages up to and including 450/750V (U0/U) Cables for general applications. Flexible cables with thermoplastic PVC insulation*

FCC Part 15, *Radio Frequency Devices*

RTCA DO 160G, *Environmental Conditions and Test Procedures for Airborne Equipment*

Annex B
(Normative)

Technical requirements

Table B.1. Technical requirements for aeronautical equipment

No.	Operating frequency	Type of product	Output power (maximum)	Test reference
1.	433 MHz - 435 MHz	Unmanned Aircraft System (UAS)	100 mW	ETSI EN 300 220-1
2.	2 400 MHz - 2 500 MHz	UAS	500 mW	ETSI EN 300 328-1 or FCC Part 15 §15.247
3.	5 725 MHz - 5 875 MHz	UAS	1 W	ETSI EN 300 440-1 or FCC Part 15 §15.247 or FCC Part 15 § 15.407
4.	24.05 GHz - 24.25 GHz	UAS	100 mW	ETSI EN 300 440-1 or FCC Part 15 sub Part C
5.	5 060.5 MHz - 5 090.5 MHz	UAS	Manufacturer declaration	N/A
6.	2 216 MHz - 2 256 MHz	UAS	Manufacturer declaration	N/A
7.	117.975 MHz - 137.000 MHz	Very High Frequency (VHF) Communications (Voice)	50 W	ETSI EN 300 676-1
8.	136 MHz - 137 MHz	VHF Communications (Data)	50 W	ETSI EN 300 676-1
9.	2.8 MHz - 22.0 MHz	High Frequency (HF) Communications - Aeronautical Mobile Route Service (AMRS)	Manufacturer declaration	N/A
10.	121.5 MHz	International air distress and emergency communications	50 W	ETSI EN 300 676-1
11.	406.1 MHz	International air distress and emergency communications	100 mW	ETSI EN 302 152-1
12.	3 023 kHz and 5 680 kHz	Search and rescue	Manufacturer declaration	N/A
13.	123.100 MHz	Search and rescue	50 W	ETSI EN 300 676-1
14.	108.000 MHz - 111.975 MHz ^a	Localizer for Instrument Landing System (ILS)	25 W	N/A
15.	328.6 MHz - 335.4 MHz ^a	Glide Path (GP) for ILS	8 W	N/A
16.	111.975 MHz - 117.975 MHz ^a	VHF Omnidirectional Range (VOR)	200 W	N/A
17.	190 kHz - 415 kHz ^a	Non Directional Beacon (NDB)	250 W	N/A
18.	1 606.5 kHz - 1 632.0 kHz ^a	NDB	250 W	N/A
19.	960 MHz - 1 215 MHz ^a	Distance Measuring Equipment (DME) for GP	100 W	N/A
		DME for Doppler VHF Omnidirectional Range (DVOR)	1 000 W	

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Table B.1. Technical requirements for aeronautical equipment *(continued)*

No.	Operating frequency	Type of product	Output power (maximum)	Test reference
20.	1 030 MHz and 1 090 MHz	Secondary Surveillance Radar (SSR) Interrogation Frequency and Multilateration (MLAT)	Manufacturer declaration	N/A
		Automatic Dependent Surveillance-Broadcast (ADS-B)		
21.	2 700 MHz - 2 900 MHz ^b	Primary Surveillance Radar (PSR)	Manufacturer declaration	N/A
22.	108.000 MHz - 117.975 MHz ^b	Ground Based Augmentation System (GBAS)	Manufacturer declaration	ETSI EN 303 084
<p>Notes: <i>The operational testing parameters are under the jurisdiction of Civil Aviation Authority of Malaysia (CAAM). Therefore, item ^a and ^b may be referring to ICAO Doc 8071 Vol I and ICAO Doc 8071 Vol III respectively for the functionality.</i></p>				

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