

MCMC MTSFB TC T019:2021

TECHNICAL CODE

IMT-2020 (FIFTH GENERATION) - CELLULAR BOOSTER EQUIPMENT

Developed by



Registered by



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Development of technical codes

The Communications and Multimedia Act 1998 ('the Act') provides for 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 requirement 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 Cellular Booster Sub Working Group under the Fixed and Wireless Terminal Working Group of the Malaysian Technical Standards Forum Bhd (MTSFB), which consists of representatives from the following organisations:

Celcom Axiata Berhad

Digi Telecommunications Sdn Bhd

Maxis Broadband Sdn Bhd

Redsun Engineering Sdn Bhd

SIRIM Berhad

Telekom Malaysia Bhd

U Mobile Sdn Bhd

Webe Digital Sdn Bhd

Wideminds Pte Ltd

Wilson Electronics Malaysia Sdn Bhd

YTL Communications Sdn Bhd

Foreword

This technical code for the IMT-2020 (Fifth Generation) - Cellular Booster Equipment ('this Technical Code') was developed pursuant to section 185 of the Act 588 by the Malaysian Technical Standards Forum Bhd (MTSFB) via its Fixed and Wireless Terminal Working Group.

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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IMT-2020 (FIFTH GENERATION) - CELLULAR BOOSTER EQUIPMENT

1. Scope

This Technical Code defines the technical requirements for low power Cellular Booster Equipment (CBE) designed or intended for use with IMT-2020 networks in Malaysia. A CBE boosts or amplifies the cellular signal from the nearest network operator's base station in order to enhance or extend the signal coverage.

This Technical Code sets forth the rules and specifications to ensure that any CBE does not cause interference to radiocommunications services. The actual utilisation of CBE is subjected to the successful coordination with the network operator.

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

AC	Alternating Current
CBE	Cellular Booster Equipment
EIRP	Equivalent Isotropic Radiated Power
EMC	Electromagnetic Compatibility
FDD	Frequency Division Duplexing
IMT	International Mobile Telecommunications
NFC	Near Field Communication
PVC	Polyvinyl Chloride
RF	Radio Frequency
SRSP	Standard Radio System Plan
TDD	Time Division Duplexing
WLAN	Wireless Local Area Network

4. Requirements

4.1 General requirements

The CBE shall be designed to meet the following basic requirements:

- a) the CBE shall not cause interference with other authorised radiocommunication services and be able to tolerate any interference caused by other radiocommunication services, electrical or electronic equipment;

- b) the CBE shall not be constructed with any external or readily accessible control which permits the adjustments of its operation in a manner that is inconsistent with this Technical Code;
- c) the CBE default setting shall be such that they only operate within the frequency range stipulated in Standard Radio System Plan (SRSP)s; and
- d) the CBE shall fulfil any additional requirements made by Malaysian Communications and Multimedia Commission (MCMC).

4.1.1 Power supply

If the CBE is equipped with power supply, the Alternating Current (AC) adaptor for CBE shall not affect the capability of the equipment to meet this specification. The operating voltage shall be 240 V + 5 %, - 10 % and frequency of 50 Hz \pm 1 % for single phase equipment as according to MS 406 or MS IEC 60038 whichever is current.

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 CBE is equipped with power supply cord and mains plug, the CBE shall be fitted with a suitable and appropriate approved power supply cord and mains plug. Both are regulated products and shall be pre-approved by the relevant regulatory body before being 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/cords); or
 - ii) MS 2127-4 or IEC 60245-1 and IEC 60245-4 (for rubber insulated - flexible cables/cords).
- b) The mains plug shall be certified according to:
 - i) MS 589-1 or BS 1363-1 (for 13 A, fused plug); or
 - 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 CBE shall be marked with the following information:

- a) supplier/manufacturer's name or identification mark;
- b) equipment's brand name/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 Melayu or English Language.

4.2 Technical requirements

The CBE shall comply with the following requirements:

- a) Radio Frequency (RF);
- b) Electromagnetic Compatibility (EMC); and
- c) Safety.

4.2.1 Radio Frequency (RF)

The CBE shall operate in any of the frequency bands as defined in Table 1 and any other frequency bands as specified in SRSP document issued by MCMC.

The CBE shall comply with the test parameters of RF output power (EIRP), spurious emissions and out of band gain inclusive of the technical features as specified in 4.2.1.2 i.e. automatic gain control and anti-oscillation.

The RF output power limit shall comply with ETSI TS 136 104 whereby it shall not exceed 22 dBm (EIRP) per carrier. The spurious emissions and out of band gain limit shall comply with the standards given in 4.2.1.1.

Table 1. IMT-2020 (Fifth Generation) operating band plans

Operating band	Duplex mode	Operating band		Band plan reference
		Uplink (MHz)	Downlink (MHz)	
700	FDD	703 - 743	758 - 798	MCMC SRSP MS 700
3 500	TDD	3 400 - 3 600		MCMC SRSP MS 3500
28 000	TDD	26 500 - 28 100		MCMC SRSP MS 28000

The specific operating frequency range of a CBE shall follow the frequency range allocated/assigned by MCMC to the network operator.

4.2.1.1 Conformity

The CBE shall comply with the frequency bands stated in 4.2.1 and shall comply with the requirements as stipulated in the related 3GPP or ETSI standards.

If the CBE supports technologies other than listed above, for example, Wireless Local Area Network (WLAN), Bluetooth and Near Field Communication (NFC), suppliers shall demonstrate that the CBE has been tested and certified for conformance to related Technical Codes and Class Assignments.

4.2.1.2 Automatic gain control and anti-oscillation

4.2.1.2.1 Automatic gain control

The CBE shall be capable of monitoring its operations to ensure compliance with the limits of transmit frequency, applicable noise and gain.

The gain of the system shall be controlled automatically so that it does not exceed maximum RF output EIRP as given in 4.2.1.

4.2.1.2.2 Anti-oscillation

The CBE shall be able to detect and mitigate (i.e. by automatic gain reduction or shut down) any unintended oscillations in uplink and downlink bands that could occur due to insufficient isolation between donor and serving antennas.

Oscillation detection and mitigation must occur automatically within:

- a) 0.3 s in the uplink band; and
- b) 1 s in the downlink band.

When the CBE no longer serves an active device connection, it shall, after no more than 5 minutes, reduce any uplink noise power to no more than -70 dBm/MHz EIRP.

In cases where oscillation is detected, the CBE shall continue mitigation for at least 1 minute before restarting. After five such restarts, the CBE shall not resume operation until manually reset.

4.2.2 Electromagnetic Compatibility (EMC)

The CBE shall comply with the EMC emission requirements as defined in the ETSI EN 301 489-1 or any equivalent standards.

4.2.3 Safety

The CBE shall comply with the safety requirements defined in any of the following or equivalent standards:

- a) MS IEC 60950-1; or
- b) IEC 62368-1.

Annex A

(normative)

Normative references

MCMC SRSP MS 700, *Requirements for International Mobile Telecommunications Systems Operating in the Frequency Bands of 703 MHz to 743 MHz and 758 MHz to 798 MHz*

MCMC SRSP MS 3500, *Requirements for International Mobile Telecommunications systems operating in the frequency bands of 3400 MHz to 3600 MHz*

MCMC SRSP MS 28000, *Requirements for International Mobile Telecommunications systems operating in the frequency bands of 26.5 GHz to 28.1 GHz*

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 1577, *Specification for 15A 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*

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 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 TS 136 104, *LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception (3GPP TS 36.104 version 15.3.0 Release 15)*

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

BS 1363-1, 13 A plugs, socket-outlets, adaptors and connection units- Specification for rewirable and non-rewirable 13 A fused plugs

Acknowledgements

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