TECHNICAL CODE

IMT-ADVANCED (LONG TERM EVOLUTION) - USER EQUIPMENT (FIRST REVISION)

Developed by

Malaysian Technical Standards Forum Bhd

Registered by

MCMC

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MCMC MTSFB TC T015:2022

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.

For further information on the technical code, please contact:

Malaysian Communications and Multimedia Commission (MCMC)
MCMC Tower 1
Jalan Impact
Cyber 6
63000 Cyberjaya
Selangor Darul Ehsan
MALAYSIA

Tel: +60 3 8688 8000
Fax: +60 3 8688 1000
http://www.mcmc.gov.my

OR

Malaysian Technical Standards Forum Bhd (MTSFB)
MCMC Centre of Excellence (CoE),
Off Persiaran Multimedia,
Jalan Impact
Cyber 6
63000 Cyberjaya
Selangor Darul Ehsan
MALAYSIA

Tel: +60 3 8320 0300
Fax: +60 3 8322 0115
http://www.mtsfb.org.my

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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:

Digi Telecommunications Sdn Bhd

edotco Malaysia Sdn Bhd

Harvestnet Sdn Bhd

Huawei Technologies (Malaysia) Sdn Bhd

Maxis Broadband Sdn Bhd

Redsun Engineering Sdn Bhd

Rohde & Schwarz Malaysia Sdn Bhd

SIRIM Berhad

Telekom Malaysia Berhad

Webe Digital Sdn Bhd

Wideminds Pte Ltd

YTL Communications Sdn Bhd

Foreword

This technical code for the IMT-Advanced (Long Term Evolution) - User Equipment ('this Technical Code') was developed pursuant to section 185 of the Act 588 by the Malaysian Technical Standards Forum Bhd via 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.

Major modifications in this revision are as follows:

a) Inclusion of new frequency 800 MHz (band 20) for Long Term Evolution - User Equipment (LTE UE) i.e for utilisation of the frequency bands between 839 MHz to 844 MHz (uplink) paired with 798 MHz to 803 MHz (downlink) for International Mobile Telecommunication (IMT) systems in Malaysia.

b) Inclusion of 3GPP TS 34.229-1 or any equivalent standards as to use as a normative reference and compliance requirement for LTE UE that support Voice over Long Term Evolution (VoLTE).

c) Inclusion of standard for safety, IEC 62368-1.

d) Inclusion of 700 MHz (band 28) for the purpose of anchoring for 5G User Equipment (UE) operations in Non-Standalone (NSA) mode.

This Technical Code replaces the MCMC MTSFB TC T015:2017, Long Term Evolution (LTE) - User Equipment (UE).

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

IMT-ADVANCED (LONG TERM EVOLUTION) - USER EQUIPMENT

1. Scope

This Technical Code specifies the minimum requirements for User Equipment (UE) that is designed or intended for use in connection with IMT Advanced (Long Term Evolution) public mobile telecommunications service in Malaysia. The UE may include, but not limited to, cellular mobile terminals, handheld, portable and vehicle-mounted equipment, and Radio Frequency (RF) interface cards and modems.

This Technical Code applies to IMT Advanced ((Long Term Evolution) User Equipment (LTE UE)) based on the technologies as specified in the following standards:

a) ITU-R M.1457;

b) ITU-R M.2012; and

c) 3GPP TS 34.229-1 or any equivalent standards.

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.

AC	Alternating Current
EDGE	Enhanced Data GSM Environment
EMC	Electromagnetic Compatibility
FDD	Frequency Division Duplexing
GSM	Global System for Mobile Communications
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IMT	International Mobile Telecommunication
LTE	Long Term Evolution
NFC	Near Field Communication
NSA	Non-standalone
PVC	Polyvinyl Chloride
RF	Radio Frequency
SRSP	Standard Radio System Plan
TDD	Time Division Duplexing
UE	User Equipment

UMTS	Universal Mobile Telecommunications Service
WLAN	Wireless Local Area Network

4. Requirements

4.1 General requirements

4.1.1 Power supply

If the LTE UE is equipped with power supply, the Alternating Current (AC) adaptor for LTE UE 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 ± 1 % as according to MS 406 or 230 V ± 10 % and frequency of 50 Hz ± 1 % according to MS IEC 60038 whichever is current.

The adaptor shall be pre-approved by the relevant regulatory body before being used with the LTE UE.

4.1.2 Power supply cord and mains plug

If the LTE UE is equipped with power supply cord and mains plug, the LTE UE shall be fitted with a suitable and appropriately approved 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 being used with the LTE UE:

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); 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 Keypad

Any keypad used in the LTE UE as defined in Clause 1 shall be alphanumeric and the relationship between the letters and digits shall comply to ITU-T E.161.

4.1.4 Interoperability and connectivity

The LTE UE shall have the ability to exchange and use information which has been exchanged between two or more systems or components. It shall have the ability to link with other programmes and devices to allow interoperability.

4.1.5 Marking

The LTE UE 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 Malaysia or English Language.

4.2 Technical requirements

The LTE UE shall comply with the following requirements:

a) RF;

b) Electromagnetic Compatibility (EMC); and

c) safety and health requirements.

4.2.1 Radio Frequency (RF)

The LTE UE shall operate within the following frequency bands as defined in Table 1.

Table 1. Operating band plans

No.	Frequency (MHz)	Duplex mode	Operating band		Band plan reference
			Uplink (MHz)	Downlink (MHz)	
1	800	FDD	839 - 844	798 - 803	MCMC SRSP MS 800
2	850	FDD	824 - 834	869 - 879	MCMC SRSP-504
3	900	FDD	880 - 915	925 - 960	MCMC SRSP-504
4	1 800	FDD	1 710 - 1 785	1 805 - 1 880	MCMC SRSP-508
5	2 100	FDD	1 920 - 1 980	2 110 - 2 170	SKMM SRSP-524M
6	2 100	TDD	1 915 - 1 920	1 915 - 1 920	SKMM SRSP-524M
			2 010 - 2 025	2 010 - 2 025	
7	2 300	TDD	2 300 - 2 400	2 300 - 2 400	SKMM SRSP-532
8	2 600	FDD	2 500 - 2 570	2 620 - 2 690	SKMM SRSP-523
9	2 600	TDD	2 570 - 2 620	2 570 - 2 620	SKMM SRSP-523

NOTE: In the case of LTE band is required for the purpose of anchoring for 5G UE operations in Non-standalone (NSA) mode, the 700 MHz frequency band (LTE Band 28) has been assigned for this purpose only as specified in the MCMC SRSP MS 700.

4.2.1.1 Conformity

The LTE UE shall comply with the frequency bands stated in Table 1, and the requirements of one or more of the following standards:

a) ETSI TS 136 101;

b) ETSI EN 301 908-1;

c) ETSI EN 301 908-13;

d) ETSI TS 136 521-1; and/or

e) 3GPP TS 36.521-1.

The LTE UE that can make voice call via mobile network shall supports Voice over LTE (VoLTE) and to demonstrate compliance for VoLTE, the LTE UE shall complied to 3GPP TS 34.229-1 or any equivalent standards.

The LTE UE shall comply to the 'Caller Ring Back Tone' as stipulated in the MCMC MTSFB TC T003.

If the LTE UE supports technologies other than LTE, for example Universal Mobile Telecommunications Service (UMTS), Global System for Mobile Communications (GSM)/Enhanced Data GSM Environment (EDGE), Wireless Local Area Network (WLAN), bluetooth and Near Field Communication (NFC), suppliers shall demonstrate that the LTE UE has been tested and certified for conformance to related Technical Codes or Class Assignments.

In the case of LTE UE support multiple network modes, the priority shall be configured to LTE followed by UMTS, and/or GSM/EDGE.

4.2.2 Electromagnetic Compatibility (EMC)

The LTE UE shall comply with the conducted emission and radiated emission requirements as defined in the ETSI EN 301 489-1 or any equivalent standards.

Specific to mobile phones adaptor, the adaptor shall comply to ETSI EN 301 489-1 or ETSI EN 301 489-34 or any equivalent standards.

4.2.3 Safety and health

4.2.3.1 Electrical safety and health

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

4.2.3.2 Specific Absorption Rate (SAR)

The LTE UE shall comply with the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and one or more of the following standards:

a) BS EN 50360;

b) IEC 62209-1; and/or

c) IEC 62209-2.

Annex A
(normative)

Normative references

MCMC MTSFB TC T003, *Specification for Private Automatic Branch Exchange (PABX) System for Connection to Public Switched Telephone Network (PSTN)*

MCMC SRSP-504, *Requirements for mobile cellular systems and International Mobile Telecommunications (IMT) systems operating in the frequency bands 824 MHz to 834 MHz paired with 869 MHz to 879 MHz and 880 MHz to 915 MHz paired with 925 MHz to 960 MHz*

MCMC SRSP-508, *Requirements for mobile cellular systems and International Mobile Telecommunications (IMT) systems operating in the frequency bands 1710 MHz to 1785 MHz and 1805 MHz to 1880 MHz*

SKMM SRSP-523, *Requirements for International Mobile Telecommunications (IMT) systems operating in the frequency band 2500 MHz to 2690 MHz*

SKMM SRSP-524M, *Requirements for International Mobile Telecommunications (IMT) systems operating in the frequency bands 1885 MHz to 2025 MHz and 2110 MHz to 2200 MHz*

SKMM SRSP-532, *Requirements for Broadband Wireless Access (BWA) systems operating in the frequency band 2300 MHz to 2400 MHz*

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 800, *Requirements for International Mobile Telecommunications Systems Operating in The Frequency Bands of 839 MHz to 844 MHz and 798 MHz to 803 MHz*

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*

Recommendation ITU-R M.1457, *Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-2000 (IMT-2000)*

Recommendation ITU-R M.2012, *Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications Advanced (IMT-Advanced)*

Recommendation ITU-T E.161, *Arrangement of digits, letters and symbols on telephones and other devices that can be used for gaining access to a telephone network*

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 62209-1, *Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Part 1: Devices used next to the ear (Frequency range of 300 MHz to 6 GHz)*

IEC 62209-2, *Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)*

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 EN 301 489-34, *Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 34: Specific conditions for External Power Supply (EPS) for mobile phones*

ETSI EN 301 908-1, *IMT cellular networks; harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive; Part 1: Introduction and common requirements*

ETSI EN 301 908-13, *IMT cellular networks; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 13: Evolved Universal Terrestrial Radio Access (E-UTRA) UE (UE)*

ETSI TS 136 101, *LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); UE (UE) radio transmission and reception*

ETSI TS 136 521-1, *LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); UE (UE) conformance specification; Radio transmission and reception; Part 1: Conformance testing*

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

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 50360, *Product standard to demonstrate the compliance of mobile phones with the basic restrictions related to human exposure to electromagnetic fields (300 MHz - 3 GHz)*

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*

3GPP TS 34.229-1, *Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification*

3GPP TS 36.521-1, *3rd generation partnership project; technical specification group radio access network; Evolved Universal Terrestrial Radio Access (E-UTRA); UE (UE) conformance specification radio transmission and reception Part 1: Conformance testing*

Acknowledgements

Members of the Fixed and Wireless Terminal Working Group

Mr Ahmad Faizan Pardi (Chairman)	SIRIM Berhad
Mr Najib Fadil Mohd Bisri @ Bisri (Vice Chairman)	Telekom Malaysia Berhad
Mr Muhammad Rezza Alui (Secretary)	Digi Telecommunications Sdn Bhd
Ms Wan Zarina Wan Abdullah (Draft lead)	SIRIM Berhad
Mr Muhaimin Mat Salleh/ Ts Mohammad Hafiz Halal (Secretariat)	Malaysian Technical Standards Forum Bhd
Ms Irma Syafrida Abd Majid	edotco Malaysia Sdn Bhd
Mr Abdul Ghani Zainal Abidin	Harvestnet Sdn Bhd
Mr Ahmad Shab Fizie Che Mood/ Mr Dikhwan Hady Darnalis/ Mr Khor Yew Shin	Huawei Technologies (Malaysia) Sdn Bhd
Mr Pang Chee Wai	Maxis Broadband Sdn Bhd
Mr Leong Woon Min	Redsun Engineering Sdn Bhd
Ms Ng Shiong Nien	Rohde & Schwarz Malaysia Sdn Bhd
Mr Ahmad Amzar Hanis/ Ms Khairunnisa Ab Halim/ Mr Mohd Rizal Ali/ Ms Nurul Ain Ab Karim	SIRIM Berhad
Mr Ahmad Syamil Wahid/ Mr Amran Naemat/ Mr Fazli Shamsuddin/ Mr Mohd Sabri Mohd Jamil/ Mr Sufian Harris Ab Hadi	Telekom Malaysia Berhad
Mr Sarvesh Gopalakrishnan/ Ms Siti Najwa Muhammad	Webe Digital Sdn Bhd
Mr Low Wei Yap	Wideminds Pte Ltd
Mr Amarjit Singh Karthar Singh/ Mr Yew Kuan Min	YTL Communications Sdn Bhd

By invitation:

Ms Preetha M Nadarajah	Nokia Siemens Networks Sdn Bhd