

# TECHNICAL CODE

## LONG TERM EVOLUTION (LTE) - USER EQUIPMENT

Developed by



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## **MCMC MTSFB TC TXXX:2017**

### **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**

Wireless Terminal Working Group under the Malaysian Technical Standards Forum Bhd (MTSFB) which developed this Technical Code consists of representatives from the following organisations:

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Fraunhofer IIS

Intel Corporation

Maxis Communications Berhad

Measat Broadcast Network Systems Sdn Bhd

SIRIM QAS International Sdn Bhd

Telekom Malaysia Berhad

Telekom Research & Development Sdn Bhd

Universiti Tenaga Nasional

webe digital Sdn Bhd (formerly known as Packet One Networks (Malaysia) Sdn Bhd)

## **Foreword**

This technical code for the Long Term Evolution (LTE) - User equipment ('this Technical Code') was developed pursuant to section 185 of the Act 588 by the Malaysian Technical Standards Forum Bhd ('MTSFB') via its 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 until reviewed or cancelled.



## LONG TERM EVOLUTION (LTE) - USER EQUIPMENT

### 1. Scope

This Technical Code specifies the minimum requirements for user equipment that is designed or intended for use in connection with a Long Term Evolution (LTE) public mobile telecommunications service in Malaysia. The user equipment 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 LTE user equipment based upon the following International Mobile Telecommunication (IMT) technologies:

- a) E-UTRA FDD;
- b) E-UTRA TDD;
- c) ITU-R M.1457;
- d) ITU-R M.2012; and
- e) IR.92.

### 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

EDGE	Enhanced Data GSM Environment
EMC	Electromagnetic Compatibility
E-UTRA	Evolved Universal Terrestrial Radio Access
FDD	Frequency Division Duplexing
GSM	Global System for Mobile Communications
GSM-MT	Global System for Mobile Communications-Mobile Terminal
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IMT	International Mobile Telecommunication
IMT-MT	International Mobile Telecommunication-Mobile Terminal
LTE	Long Term Evolution
RF	Radiofrequency
TDD	Time Division Duplexing
UE	User Equipment

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UMTS	Universal Mobile Telecommunications Service
WTS	Wireless Terminal Station

### **4. Requirements**

#### **4.1 General requirements**

##### **4.1.1 Power supply**

Alternating Current (AC) adaptor for LTE user equipment 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 % as according to MS 406 or 230 V  $\pm$  10 % and frequency of 50 Hz  $\pm$  1 % according to MS IEC 60038 whichever is current.

Adaptor shall be pre-approved by the relevant regulatory body before to be used with the equipment.

##### **4.1.2 Power supply cord and mains plug**

The equipment 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 to be used with the equipment:

- a) the power supply cord shall be certified according to:
  - i) IEC 60227-5 and either MS 2112-5 or BS 6500 or IEC 60227-1, (for PVC insulated - flexible cables/cords); or
  - ii) IEC 60245-4 and either BS 6500 or IEC 60245-1, (for rubber insulated - flexible cables/cords).
- b) the main 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 Keypad**

Any keypad used in the LTE user equipment as defined in Clause 1, shall be alphanumeric and the relationship between the letters and digits shall comply with 2.2, 3.1.1 and 3.6 of ITU-T E.161 (02/2001).

##### **4.1.4 Interoperability and connectivity**

The LTE user equipment 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.

The LTE user equipment shall comply with the minimum requirement that is specified by the regulatory body. The LTE user equipment in the form of cellular mobile terminal shall support voice over LTE.

This does not preclude other categories of user equipment from having all other facilities.



**4.1.5 Marking**

The LTE user 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, inedible and readily visible. All information on the marking shall be either in Bahasa Melayu or English Language.

**4.2 Technical Requirements**

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

**Table 1. Operating band plans**

No.	Band no.	Frequency (MHz)	Duplex Mode	Operating band		Band plan reference
				Uplink (MHz)	Downlink (MHz)	
1	5	850	FDD	824 - 834	869 - 879	SKMM SRSP-504
2	8	900	FDD	880 - 915	925 - 960	SKMM SRSP-504
3	3	1 800	FDD	1 710 - 1 785	1 805 - 1 880	SKMM SRSP-508
4	1	2 100	FDD	1 920 - 1 980	2 110 - 2 170	SKMM SRSP-524M
5	34	2 100	TDD	2 010 - 2 025	2 010 - 2 025	SKMM SRSP-524M
6	40	2 300	TDD	2 300 - 2 400	2 300 - 2 400	SKMM SRSP-532
7	7	2 600	FDD	2 500 - 2 570	2 620 - 2 690	SKMM SRSP-523
8	38	2 600	TDD	2 570 - 2 620	2 570 - 2 620	SKMM SRSP-523

Note:

- 1. Uplink is signal transmit from user equipment and receive by base station.
- 2. Downlink is signal transmit from base station and receive by user equipment.

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### **4.2.1.1 Conformity**

LTE user equipment shall comply with the frequency bands stated in Table 1, requirement stated in IR.92 (at least V9.0), and the requirements of any or combination of the following standards and service specification:

- 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.

Super-wideband service of IR.92 shall be supported. If the LTE user equipment supports GSM, the suppliers shall demonstrate that the LTE user equipment has been tested and certified for conformance to SKMM WTS GSM-MT. For LTE user equipment that supports IMT technologies, the suppliers shall demonstrate that the LTE user equipment has been tested and certified for conformance to SKMM WTS IMT-MT.

If the LTE user equipment also supports other wireless features such as WLAN Bluetooth, NFC and etc., suppliers shall demonstrate that the LTE user equipment has been tested and certified for conformance to MCMC MTSFB TC T007.

LTE user equipment shall support the access network based on network technologies mode as follows:

- a) LTE;
- b) UMTS; and
- c) GSM/EDGE.

### **4.2.2 Electromagnetic Compatibility (EMC)**

LTE mobile terminal shall comply with the EMC emission requirements as defined in the ETSI EN 301 489-1 and ETSI EN 301 489-34.

### **4.2.3 Safety and health**

#### **4.2.3.1 Electrical safety and health**

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

#### **4.2.3.2 Specific Absorption Rate (SAR)**

LTE user equipment shall comply with the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and any or combination of the following standards:

- a) BS EN 50360;
- b) IEC 62209-1; and/or
- c) IEC 62209-2.

**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 IEC 60038, *IEC standard voltages*

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

IEC 60227-1, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - 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 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)*

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

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

ITU-T E.161 (02/2001), *Arrangement of digits, letters and symbols on telephones and other devices that can be used for gaining access to a telephone network*

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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) User Equipment (UE)*

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

ETSI TS 136 521-1, *LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (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 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*

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)*

MCMC MTSFB TC T007, *Specification for Short Range Devices (SRD)*

SKMM SRSP-504, *Requirements for mobile cellular systems and International Mobile Telecommunications (IMT) systems operating in the frequency bands 825 MHz to 835 MHz paired with 870 MHz to 880 MHz and 880 MHz to 915 MHz paired with 925 MHz to 960 MHz*

SKMM 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 Broadband Wireless Access (BWA) systems operating in the frequency band 2504 MHz to 2688 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*

SKMM WTS GSM-MT, *Technical specification for GSM mobile terminals*

SKMM WTS IMT-MT, *Technical specification for IMT-2000 third-generation (3G) cellular mobile terminals*

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

*IR.92, IMS profile for voice and SMS*

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### **Acknowledgements**

#### **Members of the Wireless Terminal Working Group under the Malaysian Technical Standards Forum Bhd**

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