TECHNICAL CODE

IMT-ADVANCED (FOURTH GENERATION) - USER EQUIPMENT (SECOND REVISION)

Developed by

Malaysian Technical Standards Forum Bhd

Registered by

MCMC

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MCMC MTSFB TC T015:2026

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 the 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 the Communications Terminal Working Group of the Malaysian Technical Standards Forum Bhd ('MTSFB'), which consists of representatives from the following organisations:

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Huawei Technologies (M) Sdn Bhd

International Islamic University Malaysia

ITS Testing Services (M) Sdn Bhd

SIRIM Berhad

TM Technology Services Sdn Bhd

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Foreword

This technical code for the IMT-Advanced (Fourth Generation) - User Equipment ('Technical Code') was developed pursuant to Section 185 of the Act by the Communications Terminal Working Group of the Malaysian Technical Standards Forum Bhd ('MTSFB').

This Technical Code was developed for the purpose of communications equipment's compliance with the Communications and Multimedia (Technical Standards) Regulations 2000.

Major modifications in this revision are as follows:

a) Inclusion of a new frequency band, 450 MHz (Band 31) and 1 900 MHz (Band 39) and the applicable technical requirements;

b) Removal of IMT-2000 technologies (i.e. UMTS/EDGE or 3G), due to the 3G network sunset in 2021;

c) Exclusion of marking, interoperability, Electromagnetic Compatibility (EMC), electrical safety and Specific Absorption Rate (SAR) requirements, which are addressed in the MCMC MTSFB TC T022, *Communications Equipment - Baseline Requirements*; and

d) Editorial updates to reflect the latest Standard Radio System Plan ('SRSP') references, including revisions of the SRSP titles, corresponding to the respective frequency bands.

In the event of any discrepancy between the requirements specified in this Technical Code and those stipulated in the corresponding SRSP documents, the requirements specified in the relevant SRSP shall take precedence and serve as the primary reference.

The IMT- Advanced (Fourth Generation) User Equipment shall comply with the requirements within this Technical Code and MCMC MTSFB TC T022, *Communications Equipment - Baseline Requirements*.

This Technical Code shall replace the MCMC MTSFB TC T015:2022, *IMT-Advanced (Long Term Evolution) - User Equipment (First Revision).* The latter shall be deemed to be invalid to the extent of any conflict with this Technical Code.

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

MCMC MTSFB TC T015:2026

IMT-ADVANCED (FOURTH GENERATION) - USER EQUIPMENT SPECIFICATIONS

1. Scope

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

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.

EDGE	Enhanced Data rates for GSM Evolution
EMC	Electromagnetic Compatibility
FDD	Frequency Division Duplexing
GSM	Global System for Mobile Communications
IMT	International Mobile Telecommunications
IoT	Internet of Things
NFC	Near Field Communication
NSA	Non-Standalone
RF	Radio Frequency
SRSP	Standard Radio System Plan
TDD	Time Division Duplexing
TV	Television
UE	User Equipment
VoLTE	Voice over LTE
WLAN	Wireless Local Area Network

4. Baseline requirements

The Equipment shall be designed to meet the baseline requirements as outlined in MCMC MTSFB TC T022.

5. Technical requirements

The Equipment configuration shall comply with the conditions specified in the MCMC Standard Radio System Plans (SRSPs) and the MCMC Class Assignment, and shall conform to the requirements set out in Table 1 and Table 2. The frequency band specified in Table 1 shall be allocated for general public end-user use, whereas the frequency band specified in Table 2 shall be allocated exclusively for designated operational purposes and shall operate in accordance with the defined usage conditions, and shall not be used for general public end-user use.

Where the maximum output power of the Equipment exceeds the limits specified in Table 1 and Table 2, the Equipment shall comply with the limits applicable to its declared Power Class, as prescribed in the relevant Standards, Test References, and/or SRSPs. In the event of any inconsistency between the requirements specified in Table 1 and Table 2 and those prescribed in the applicable SRSPs and Standards, the requirements in the SRSPs shall prevail.

The RF requirements for the Equipment shall comply with the minimum parameters specified as follows:

a) Radiated emissions of User Equipment (UE).

b) Control and monitoring functions of UE (if specified in the relevant standards).

c) Transmitter maximum output power.

d) Transmitter spectrum emission mask.

e) Transmitter spurious emissions.

f) Transmitter minimum output power.

g) Receiver spurious response.

h) Receiver spurious emissions.

i) Transmitter adjacent channel leakage power ratio.

Table 1. Technical requirements for the Equipment

No.	Frequency (MHz)	Band name	Duplex mode	Operating band		Maximum output power (dBm)[a]	Band plan reference	Standards or test reference	Remarks
				Uplink (MHz)	Downlink (MHz)				
1	800	20	Frequency Division Duplexing ('FDD')	839 - 844	798 - 803	23 dBm ± tolerance	MCMC SRSP MS 800	3GPP TS 36.521-1; or ETSI EN 301 908; or ETSI TS 136 521-1	Subscribers' applications, i.e. voice, internet, video, images, interactive multimedia, high-speed data and mobile television ('TV').
2	850	5	FDD	824 - 834	869 - 879	23 dBm ± tolerance	MCMC SRSP MS 850 & 900	3GPP TS 36.521-1; or FCC Part 22 Subpart H	Wireless connectivity, including applications such as voice, internet, video, images, interactive multimedia, high-speed data and mobile TV.
3	900	8	FDD	880 - 915	925 - 960	23 dBm ± tolerance	MCMC SRSP MS 850 & 900	3GPP TS 36.521-1; or ETSI EN 301 908; or ETSI TS 136 101; or ETSI TS 136 521-1	Subscriber's applications, i.e. voice, internet, video, images, interactive multimedia, high-speed data and mobile TV.
4	1 800	3	FDD	1 710 - 1 785	1 805 - 1 880	23 dBm ± tolerance	MCMC SRSP 508	3GPP TS 36.521-1; or ETSI EN 301 908; or ETSI TS 136 101; or ETSI TS 136 521-1	Subscriber's applications, i.e. voice, internet, video, images, interactive multimedia, high-speed data and mobile TV.
5	2 100	33/39	Time Division Duplexing ('TDD')	1 915 - 1 920	1 915 - 1 920	23 dBm ± tolerance	MCMC SRSP MS 2100	3GPP TS 36.521-1; or ETSI EN 301 908; or ETSI TS 136 101; or ETSI TS 136 521-1	Subscriber's applications, i.e. voice, internet, video, images, interactive multimedia, high-speed data and mobile TV.

[a] The tolerance values as specified in the test standards or test references.

Notes:

1. Notwithstanding the frequency bands listed in Table 1 above, The Equipment may operate in other frequency bands identified for International Mobile Telecommunications ('IMT') systems, as specified in the MCMC *Spectrum Plan* and/or the relevant *SRSP* documents, subject to approval and issuance of the relevant instrument by MCMC. In all cases, the use of these frequency bands and the maximum output power shall be subject to the assignment issued by MCMC in accordance with the applicable laws.
2. All equipment is required to comply with the aforementioned standards or any relevant standards. For equipment that requires certification, the certifying agency will assess the relevance of standards as part of the certification process, including conducting a comprehensive suitability assessment and gap analysis, subject to the regulator's approval.

Table 1. Technical requirements for the Equipment *(continued)*

No.	Frequency (MHz)	Band name	Duplex mode	Operating band		Maximum output power (dBm)[a]	Band plan reference	Standards or test reference	Remarks
				Uplink (MHz)	Downlink (MHz)				
6	2 100	1	FDD	1 920 - 1 980	2 110 - 2 170	23 dBm ± tolerance	MCMC SRSP MS 2100	3GPP TS 36.521-1; or ETSI EN 301 908; or ETSI TS 136 101; or ETSI TS 136 521-1	Subscriber's applications, i.e. voice, internet, video, images, interactive multimedia, high-speed data and mobile TV.
7	2 100	34	TDD	2 010 - 2 025	2 010 - 2 025	23 dBm ± tolerance	MCMC SRSP MS 2100	3GPP TS 36.521-1; or ETSI EN 301 908; or ETSI TS 136 521-1	Wireless telecommunications connectivity to subscribers and may include applications such as voice, internet, video, images, interactive multimedia, high-speed data and mobile TV.
8	2 300	40	TDD	2 300 - 2 400	2 300 - 2 400	23 dBm ± tolerance	SKMM SRSP 532	3GPP TS 36.521-1; or ETSI EN 301 908; or ETSI TS 136 101; or ETSI TS 136 521-1	Providing wireless broadband connectivity to subscribers and can include applications such as voice, video, images, interactive multimedia, high-speed data and mobile TV.
9	2 600	7	FDD	2 500 - 2 570	2 620 - 2 690	23 dBm ± tolerance	SKMM SRSP 523	3GPP TS 36.521-1; or ETSI EN 301 908; or ETSI TS 136 101; or ETSI TS 136 521-1	Wireless broadband connectivity to subscribers' applications, i.e. voice, video, images, interactive multimedia, high-speed data and mobile TV.
10	2 600	38	TDD	2 570 - 2 620	2 570 - 2 620	23 dBm ± tolerance	SKMM SRSP 523	3GPP TS 36.521-1; or ETSI EN 301 908; or ETSI TS 136 101; or ETSI TS 136 521-1	Wireless broadband connectivity to subscribers' applications, i.e. voice, video, images, interactive multimedia, high-speed data and mobile TV.

[a] The tolerance values as specified in the test standards or test references.

Notes:

1. Notwithstanding the frequency bands listed in Table 1 above, The Equipment may operate in other frequency bands identified for International Mobile Telecommunications ('IMT') systems, as specified in the MCMC *Spectrum Plan* and/or the relevant SRSP documents, subject to approval and issuance of the relevant instrument by MCMC. In all cases, the use of these frequency bands and the maximum output power shall be subject to the assignment issued by MCMC in accordance with the applicable laws.
2. All equipment is required to comply with the aforementioned standards or any relevant standards. For equipment that requires certification, the certifying agency will assess the relevance of standards as part of the certification process, including conducting a comprehensive suitability assessment and gap analysis, subject to the regulator's approval.

Table 2. Technical requirements for the Equipment - specific usage

No.	Frequency (MHz)	Band name	Duplex mode	Operating band		Maximum output power (dBm)[a]	Band plan reference	Standards or test reference	Remarks
				Uplink (MHz)	Downlink (MHz)				
1	450	31	FDD	452.5 - 457.5	462.5 - 467.5	23 dBm ± tolerance	MCMC SRSP MS 450	3GPP TS 36.521-1; or ETSI EN 301 908; or ETSI TS 136 521-1	Machine type communications and Internet of Things ('IoT') applications for utilities, i.e. smart grids and smart meters.
2	700	28	FDD	703 - 743	758 - 798	23 dBm ± tolerance	MCMC SRSP MS 700	3GPP TS 36.521-1; or ETSI EN 301 908; or ETSI TS 136 101; or ETSI TS 136 521-1	Only for anchoring 5G UE operations in Non-Standalone ('NSA') mode.
3	1 900	39	TDD	1 900 - 1 915	1 900 - 1 915	23 dBm ± tolerance	MCMC SRSP MS 1900	3GPP TS 36.521-1; or ETSI TS 136 521-1; or ETSI TS 136 101	Wireless telecommunication connectivity for railway radiocommunications only.

[a] The tolerance values as specified in the test standards or test references.

Notes:

1. Notwithstanding the frequency bands listed in Table 2 above, The Equipment may operate in other frequency bands identified for IMT systems, as specified in the MCMC *Spectrum Plan* and/or the relevant SRSP documents, subject to approval and issuance of the relevant instrument by MCMC. In all cases, the use of these frequency bands and the maximum output power shall be subject to the assignment issued by MCMC in accordance with the applicable laws.
2. All equipment is required to comply with the aforementioned standards or any relevant standards. For equipment that requires certification, the certifying agency will assess the relevance of standards as part of the certification process, including conducting a comprehensive suitability assessment and gap analysis, subject to the regulator's approval.

The Equipment that is capable of voice call over the mobile network shall support Voice over Long Term Evolution (VoLTE) and shall comply with 3GPP TS 34.229-1 or any equivalent standards to demonstrate VoLTE compliance.

If the Equipment supports technologies other than IMT-Advanced (4G), such as Global System for Mobile Communications (GSM)/Enhanced Data rates for GSM Evolution (EDGE), Wireless Local Area Network (WLAN), Bluetooth or Near Field Communication (NFC), the Equipment shall be certified in accordance with the relevant Technical Codes and/or MCMC *Class Assignments*.

In the case of the Equipment supports multiple network modes, the priority shall be configured to 4G followed by GSM and/or EDGE.

Annex A
(Normative)

Normative references

MCMC MTSFB TC T022, *Communications Equipment - Baseline Requirements*

MCMC SRSP MS 450, *Requirements for International Mobile Telecommunications systems operating in the frequency bands of 452.5 MHz to 457.5 MHz and 462.5 MHz to 467.5 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*

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*

MCMC SRSP MS 850 & 900*, Requirements for Mobile Cellular Systems and International Mobile Telecommunications Systems Operating in the Frequency Bands of 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 MS 1900*, Requirements for International Mobile Telecommunications systems operating in the frequency band of 1900 MHz to 1915 MHz*

MCMC SRSP MS 2100*, Requirements for International Mobile Telecommunications systems operating in the frequency bands of 1915 MHz to 1980 MHz, 2010 MHz to 2025 MHz, and 2110 MHz to 2170 MHz*

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

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

ETSI EN 301 908, *IMT cellular networks; Harmonised Standard for access to radio spectrum*

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); UE (UE) conformance specification; Radio transmission and reception; Part 1: Conformance testing*

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*

Code of Federal Regulations, Title 47, Chapter I, Subchapter B, Part 22, Subpart H, *Cellular Radiotelephone Service*

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