Telecommunications Standards Advisory Committee (TSAC)

Technical Specification

Cellular Mobile Terminal

IMDA TS CMT
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Technical Specification for Cellular Mobile Terminal

1 Scope

1.1 This Specification defines the minimum technical requirements for Cellular Mobile Terminal (termed "CMT" in this Specification) to be used in the Public Mobile Radio Communication System and services which employ:

(a) ITU IMT-2000 radio interface technologies identified in ITU-R M.1457-14, and transposed from 3GPP Release 8 and 9;
(b) ITU IMT-Advanced radio interface technologies (LTE-Advanced) identified in ITU-R M.2012-4, and transposed from 3GPP Release 10 and beyond;
(c) LTE-Advanced technology series from 3GPP Release 13 onwards, marked with LTE-Advanced Pro; and
(d) ITU IMT-2020 radio interface technologies (5G NR) identified in ITU-R M.2412-0, and transposed from 3GPP Release 15 and beyond.

1.2 The Direct-to-Device Satellite Communication Terminal (D2D-SCT) is a sub-category of CMT, augmented with Non-Terrestrial Network (NTN) satellite access capability in:

(a) Satellite operating band n254 (L/S-band MSS) – FDD
(b) Satellite operating band n255 (L-band MSS) – FDD

For the purpose of this document, the term D2D-SCT may be used interchangeably with CMT, for terminals that have satellite access capability, where the distinction is immaterial. However, D2D-SCT shall be used where it is necessary to mention specifically the satellite communication capability of the terminal.

1.3 This Specification covers handheld, portable and vehicle-mounted equipment, RF interface cards, modules and modems incorporating NR NTN / NB NTN satellite access capability, whether operating exclusively via satellite access or in combination with terrestrial 5G NR / LTE Advanced RITs covered in this document. D2D for enterprise use shall be subject to approval by IMDA.

1.4 A D2D-SCT that also supports terrestrial bands shall additionally conform to all applicable requirements of IMDA TS CMT, including its operating frequency band table (Tables 1.1 and 1.2), radio interface requirements, VoNR / VoLTE requirements and emergency broadcast requirements.

1.5 Compliance with this Specification does not of itself authorise the use of any frequency, the offering of any service, or the operation of any telecom or satellite network in Singapore.

2 References

2.1 For the technical requirements captured in this Specification, reference has been made to the following standards. Where versions are not indicated, implementation of this Specification shall be based on current and valid versions of these standards published by the respective Standards Development Organisations[1].

1. 3GPP TS 23.003: Technical Specification Group Core Network and Terminals; Numbering, addressing and identification

2. 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

[1] Implementers of these ETSI standards should check with the ETSI Web Server (https://ipr.etsi.org) whether Intellectual Property Rights have been declared to ETSI.

specification; Part 1: Protocol conformance specification

3. 3GPP TS 38.101-5: NR; User Equipment (UE) radio transmission and reception; Part 5: Satellite access Radio Frequency (RF) and performance requirements

4. 3GPP TS 38.521-5: NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 5: Satellite access Radio Frequency (RF) and performance

5. CENELEC EN 50360: Product standard to demonstrate the compliance of mobile phones with the basic restrictions related to human exposure to electromagnetic fields (300 MHz – 6 GHz)

6. CENELEC EN 50566: Product standard to demonstrate the compliance of wireless communication devices with the basic restrictions and exposure limit values related to human exposure to electromagnetic fields in the frequency range from 30 MHz to 6 GHz: hand-held and body mounted devices in close proximity to the human body

7. ETSI EN 301 908-1: IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 1: Introduction and common requirements

8. ETSI EN 301 908-13: IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 13: Evolved Universal Terrestrial Radio Access (E-UTRA) User Equipment (UE)

9. ETSI EN 301 908-25: IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 25: New Radio (NR) User Equipment (UE)

10. ETSI EN 301 489-1: EMC standard for radio equipment and services; Part 1: Common technical requirements

11. ETSI EN 301 489-52: Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 52: Specific conditions for Cellular Communication Mobile and portable (UE) radio and ancillary equipment

12. ETSI TS 102 900: Emergency Communications (EMTEL); European Public Warning System (EU-ALERT) using the Cell Broadcast Service

13. ETSI TS 123 041: Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; 5G; Technical realization of Cell Broadcast Service (CBS)

14. ETSI TS 138 508-1: 5G; 5GS; User Equipment (UE) conformance specification; Part 1: Common test environment

15. ETSI TS 138 521-1: 5G; NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Range 1 Standalone

16. ETSI TS 138 521-2: 5G; NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 2: Range 2 Standalone

17. FCC Part 22 Subpart H: Cellular radiotelephone service

18. FCC Part 90 Subpart S: Regulations governing the licensing and use of frequencies in the 806-824, 851-869, 896-901, and 935-940 MHz bands

19. IEC 60086-4: Primary batteries – Part 4: Safety of lithium batteries

20. IEC 62133-2: Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications – Part 2: Lithium systems

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

22. IEC CISPR 32: Electromagnetic compatibility of multimedia equipment – Emission requirements

23. IEC CISPR 35: Electromagnetic compatibility of multimedia equipment – Immunity requirements

24. IEC/EN 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)

25. IEC/EN 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)

26. IEC/EN 62209-3: 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 3: Vector measurement-based systems (frequency range of 600 MHz to 6 GHz)

27. IEC/EN 62209-1528: Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-worn wireless communication devices - Human models, instrumentation and procedures (Frequency range of 4 MHz to 10 GHz)

28. IEC/IEEE 63195-1: Assessment of power density of human exposure to radio frequency fields from wireless devices in close proximity to the head and body (frequency range of 6 GHz to 300 GHz) - Part 1: Measurement procedure

29. IEC TR 63170: Measurement procedure for the evaluation of power density related to human exposure to radio frequency fields from wireless communication devices operating between 6 GHz and 100 GHz

30. IEEE/ANSI C63.26-2015: Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

31. ISO 7637-2: Road vehicles - Electrical disturbances from conduction and coupling - Part 2: Electrical transient conduction along supply lines only

32. ITU-R M.1457-14: Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-2000 (IMT-2000)

33. ITU-R M.2012-4: Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-Advanced (IMT-Advanced)

34. ITU-R M.2412-0: Guidelines for evaluation of radio interface technologies for IMT-2020

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

36. ITU-T K.116: EMC requirements and test methods for radio telecommunication terminal equipment

37. UL 1642: Standard for Lithium batteries

3 Abbreviations[2]

3GPP	3rd Generation Partnership Project
A-MPR	Additional Maximum Power Reduction
AC	Alternating Current
ACLR	Adjacent Channel Leakage Ratio
ACS	Adjacent Channel Selectivity
CA	Carrier Aggregation
CBS	Cell Broadcast Service
CENELEC	European Committee for Electrotechnical Standardization
CISPR	International Special Committee on Radio Interference of the IEC
CMT	Cellular Mobile Terminal
D2D	Direct-to-Device
D2D-SCT	Direct-to-Device Satellite Communication Terminal
DC	Direct Current
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EMS	Electromagnetic Susceptibility
EN	European Standard
EN-DC	E-Ultra New Radio Dual Connectivity
ETSI	European Telecommunications Standards Institute
E-UTRA	Evolved Universal Terrestrial Radio Access (also known as LTE)
FDD	Frequency Division Duplex
FR	Frequency Range
ICNIRP	International Commission on Non-Ionizing Radiation Protection
ICT	Information and Communications Technology
IEC	International Electrotechnical Commission
IMEI	International Mobile Station Equipment Identity
IMEISV	International Mobile Station Equipment Identity Software Version number
IMT	International Mobile Telecommunications
ISO	International Organization for Standardization
ITU	International Telecommunication Union
ITU-R	ITU Telecommunication Union – Radiocommunication Sector
ITU-T	ITU Telecommunication Union – Standardisation Sector
LTE	Long Term Evolution (also known as E-UTRA)
MIMO	Multiple-Input Multiple-Output
MPR	Maximum Power Reduction
MSS	Mobile Satellite Service
NB	Narrowband
NR	New Radio
NTN	Non-Terrestrial Network
PC3	Power Class 3
PEI	Permanent Equipment Identifier
REDCAP	Reduced Capability
RF	Radio Frequency
RIT	Radio Interface Technology
SAR	Specific Absorption Rate
SDO	Standards Development Organisation
SUL	Supplementary Link
TDD	Time Division Duplex
UE	User Equipment
VOLTE	Voice over Long Term Evolution
VONR	Voice over New Radio
WLAN	Wireless Local Area Network

[2] 3GPP™ and LTE™ are trademarks registered by ETSI for the benefit of its Members and 3GPP Organizational Partners.

4 General Requirements

4.1 International Mobile Station Equipment Identity or Permanent Equipment Identity

Each individual CMT shall be allocated a unique International Mobile Station Equipment Identity (IMEI); or Permanent Equipment Identity (PEI) in the IMEI format or International Mobile Station Equipment Identity and Software Version number (IMEISV) format. Manufacturer shall ensure that adequate security measures have been taken to protect the IMEI or PEI against duplication, unauthorised removal or change.

4.2 Keypad

Any keypad used in the CMT shall be alphanumeric and the relationships between digits, letters and symbols shall comply with the ITU-T Recommendation E.161.

4.3 Radio Frequency Electromagnetic Field (RF EMF) Safety: SAR and Power Density Requirements

Manufacturers or suppliers shall demonstrate that the CMT has been tested and certified for conformity with the International Commission on Non-Ionizing Radiation Protection (ICNIRP) recommendations. The CMT shall comply with any of the following applicable standards: CENELEC EN 50360, CENELEC EN 50566 (minimum Ed. 2017), IEC/EN 62209-3, IEC/EN 62209-1528[3], IEC TR 63170 and IEC/IEEE 63195-1.

Compliance with the specified RF EMF safety standards does not by itself confer immunity from legal obligations and requirements imposed by national health or safety authorities. IMDA may invalidate the equipment registration if so requested by the relevant authority for reasons of safety or hazards that would likely be caused to users.

Where applicable, the equipment supplier shall provide the SAR and/or power density information in printed form or in other appropriate form such as in the user guide or as a leaflet or brochure in the equipment package. Furthermore, the supplier shall provide each unit of approved CMT with advisory information pertaining to electrical safety and non-ionising radiation hazards and on the safe operation of the CMT at potentially hazardous areas such as in moving vehicles, in aircraft and at fuel depots, chemical plants and blasting sites.

4.4 Electromagnetic Compatibility (EMC)

4.4.1 EMC assessment

For EMC assessment, the CMT and/or ancillary equipment shall be classified as equipment for vehicular use (i.e. mobile terminal connected with vehicular charger or DC supply); or equipment for portable/mobile use (i.e. powered by its integral battery). This equipment classification is used to determine the applicability of the EMC (emission and immunity) testing requirements based on ETSI EN 301 489-1 or ITU-T K.116. The ETSI EN 301 489-1 standard shall be used in conjunction with the ETSI EN 301 489-52 standard for CMT that supports the E-UTRA RITs and 5G RITs.

4.4.1.1 EMI or emission measurements

(a) Radiated emissions from associated ancillary equipment not incorporated in the CMT shall be measured to Class B requirements defined in §5 and Tables A.4 and A.5 of CISPR 32, or §8.2 of EN 301 489-1;

(b) Conducted emission at the DC power port of the CMT intended for vehicular use, shall be measured according to §8 of ETSI EN 301 489-1; and

(c) Conducted emission at the AC mains port shall be measured for CMT with dedicated charger or adapter to Class B requirements defined in §5 and Table A.10 of CISPR 32. Equipment with DC power

[3] IEC/EN 62209-1528 will replace IEC/EN 62209-1 and IEC/EN 62209-2. These standards will no longer be accepted by IMDA after 1 Oct 2025.

port which is powered by a dedicated AC/DC power converter is defined as AC mains powered equipment.

Note: If CMT is a module intended to be marketed and sold separately from a host, it shall be assessed with at least one representative host system. Modules may be internal, mounted, plug-in or external (§6.2 of CISPR 32).

4.4.1.2 EMS or immunity testing

The following immunity tests may be performed on the CMT to requirements defined in CISPR 35, §11 of ITU-T K.116 or §9 of EN 301 489-1, where applicable:

(a) RF electromagnetic field (80 MHz to 6 GHz) at the enclosure of the equipment;
(b) Electrostatic discharge at the enclosure of the equipment;
(c) Fast transients (common mode) at AC mains power ports, and additionally on signal ports, wired ports, control ports and DC power ports that have cables longer than 3 m;
(d) RF common mode 0.15 MHz to 80 MHz at AC mains power ports, and additionally on signal ports, wired ports, control ports and DC power ports that have cables longer than 3 m;
(e) Transients and surges (vehicular environment) on nominal 12V and 24V DC supply voltage input ports of mobile terminal and ancillary equipment intended also for mobile use in vehicles;
(f) Voltage dips and interruptions at AC mains power port of mobile or portable terminal with dedicated charger/power adapter; and
(g) Surges, common and differential mode at AC mains power port of mobile or portable terminal with dedicated charger/power adapter, and additionally on wired network ports.

4.5 Equipment safety testing

4.5.1 Equipment suppliers (including manufacturers, importers, distributors, retailers and other traders) shall ensure that they only place products which are safe on the market. They can enhance the safety of their products by the following ways:

(a) Rigorously testing their products before placing them on the market;
(b) Ensuring that their products are certified to international safety standards;
(c) Where products are already under the purview of other government agencies, ensuring that they satisfy the relevant regulatory requirements by the agencies; and
(d) Informing users/consumers of any potential hazards or risks arising from the use of their products.

4.5.2 Equipment shall comply with the IEC 62368-1 (minimum Ed. No. 2) standard and any lithium batteries it uses shall adhere to UL 1642, IEC 62133-2 or IEC 60086-4.

5 Technical Requirements

5.1 Operating Frequencies

The CMT shall operate within the frequency bands given in Table 1.1 and Table 1.2.

Table 1.1: Terrestrial E-UTRAN and NR bands

E-UTRAN Band	NR Band	Direction of Transmission	Frequency Range
1	n1	Transmit	1920 MHz – 1980 MHz
		Receive	2110 MHz – 2170 MHz
3	n3	Transmit	1710 MHz – 1785 MHz
		Receive	1805 MHz – 1880 MHz
7	n7	Transmit	2500 MHz – 2570 MHz
		Receive	2620 MHz – 2690 MHz
8	n8	Transmit	880 MHz – 915 MHz
		Receive	925 MHz – 960 MHz
26	n26	Transmit	814 MHz – 849 MHz
		Receive	859 MHz – 894 MHz
28	n28	Transmit	703 MHz – 748 MHz
		Receive	758 MHz – 803 MHz
38	n38	Transmit and Receive	2570 MHz – 2620 MHz
40	n40	Transmit and Receive	2300 MHz – 2400 MHz
-	n77	Transmit and Receive	3300 MHz – 4200 MHz
-	n78	Transmit and Receive	3300 MHz – 3800 MHz
-	n257	Transmit and Receive	26500 MHz – 29500 MHz
-	n258	Transmit and Receive	24250 MHz – 27500 MHz
-	n261	Transmit and Receive	27500 MHz – 28350 MHz

Table 1.2: Non-terrestrial bands

E-UTRAN Band	NR Band	Direction of Transmission	Frequency Range
-	n254	Transmit	1610 MHz – 1626.5 MHz
		Receive	2483.5 MHz – 2500 MHz
-	n255	Transmit	1626.5 MHz – 1660.5 MHz
		Receive	1525 MHz – 1559 MHz

The precise operating frequency range of a CMT shall follow that of the Network Operator from whom the service is obtained.

5.2 Radio Interface Requirements

5.2.1 Manufacturers or suppliers shall demonstrate that the CMTs have been tested and certified for operating in the frequency bands that the device supports, as listed in clause 5.1, and conformity to any or a combination of standards given in Table 2.

Table 2: IMT RITs and the Reference Standards used for CMT

IMT-Advanced / IMT-2020 terrestrial RIT / NTN RIT	RIT name in SDO	Reference standards used
LTE-Advanced / LTE-Advanced Pro	E-UTRA	ETSI EN 301 908-13 / FCC Part 22[4] / FCC Part 90S[4]
IMT-2020 terrestrial	5G NR	ETSI EN 301 908-25 / ETSI TS 138 521-1 / ETSI TS 138 521-2
IMT-2020 with satellite access (NTN)	5G NR NTN / NB NTN	3GPP TS 38.101-5 / 3GPP TS 38.521-5[5]

5.2.2 If the CMT also supports other wireless modes of operation such as WLAN, Bluetooth, suppliers shall demonstrate that the mobile terminal has been tested and certified for conformity to the relevant requirements as given in IMDA Technical Specification for Short Range Devices ("IMDA TS SRD").

5.2.3 2G connectivity in the CMT shall be switched off in the factory default configuration, and the CMT shall not connect or attempt to connect to 2G networks unless explicitly enabled by the user, and activation of 2G shall require deliberate user action such as navigating to a settings menu or entering a confirmation prompt.

5.3 Voice-Over-LTE (VoLTE) requirements

5.3.1 CMT devices operating on terrestrial bands and designed for voice calling shall support VoLTE technology as per 3GPP specifications. The VoLTE functionality shall be turned on by default, and it shall be compatible with VoLTE services provided by all mobile network operators in Singapore. The device shall support the necessary VoLTE profiles for each operator to ensure seamless connectivity and interoperability for making and receiving VoLTE calls in Singapore.

5.3.2 Notwithstanding the above, D2D-SCT operating on MSS bands and designed for voice calling shall not be required to support VoLTE. Such devices may, instead, support VoNR technology as per 3GPP specifications for voice calling functionality. In order to make VoNR calls, D2D-SCT devices shall obtain prior approval from IMDA.

5.3.3 The device shall be able to configure VoLTE settings based on the network operator's profile and shall also allow additional emergency numbers sent by the serving network to be downloaded and designated as emergency numbers.

5.3.4 CMT devices connected to a terrestrial mobile network and designed for voice calling must be able to make emergency calls via VoLTE.

[4] Only for equipment that operates on LTE Band 26

[5] Conformance test methods of 3GPP TS 38.521-5 with the common test environment of ETSI TS 138 508-1 shall be used to ensure conforming to the satellite access radio interface requirements 3GPP TS 38.101-5

5.4 Emergency cell broadcast

5.4.1 Mandated CMT Requirements

A handset-type CMT shall meet the mandatory functional and performance requirements set forth in this section.

5.4.1.1 It shall ensure that it is configured according to the settings in Table 3.

5.4.1.2 It shall support CBS message length up to a maximum of 1395 characters.

5.4.1.3 It shall support receiving and presenting CBS messages in multiple languages.

5.4.1.4 It shall support the display of warning notification upon reception without any user interaction.

5.4.1.5 It shall allow the continuation of the alerting indication for a specific Warning Notification until suppressed by users' manual operation (e.g. by pushing keys).

5.4.1.6 It shall have the ability to present previously displayed warning notifications if requested by user until deleted.

5.4.1.7 It shall support concurrent reception of multiple warning notifications.

5.4.1.8 It shall ensure that alert messages shall take priority over all other CMT functions, but shall not pre-empt active voice or data sessions.

5.4.1.9 User could review the messages at a later time until deleted.

5.4.1.10 It shall support the presentation and use of a Uniform Resource Locator (URL), which is a reference (an address) to a resource on the internet, or an embedded telephone number.

5.4.1.11 It shall ensure that applicable alerts have the following audio attention signal and vibration cadence with the following characteristics:

Audio attention signal

(a) The audio attention signal must have a temporal pattern of one long tone of two (2) seconds, followed by two short tones of one (1) second each, with a half (0.5) second interval between each tone. The entire sequence must be repeated twice with a half (0.5) second interval between each repetition.
(b) For devices that have polyphonic capabilities, the audio attention signal must consist of the fundamental frequencies of 853 Hz and 960 Hz transmitted simultaneously.
(c) For devices with only a monophonic capability, the audio attention signal must be 960 Hz.

Vibration cadence

(a) The vibration cadence must have a temporal pattern of one long vibration of two (2) seconds, followed by two short vibrations of one (1) second each, with a half (0.5) second interval between each vibration. The entire sequence must be repeated twice with a half (0.5) second interval between each repetition.

5.4.2 Optional CMT Requirement

5.4.2.1 CMT may support Device-Based Geo-Fencing (DBGF) as defined in ETSI TS 102 900 and ETSI TS 123 041.

5.4.3 Configurations for different alert types

5.4.3.1 Table 3 provides the CMT configurations used for Cell Broadcast Service, including alert types, message IDs and device behaviours.

Table 3: CMT configurations on CBS Alert Types

Configurations	**Types of alert**			
Alert title behaviour				
Alert Title	SG Alert	Test Alert	SG Alert - Silent	SG Alert - Advisory
Message ID	4370	4380	4373	4374
Message ID in additional language	4383	4393	4386	4387
Language filtering	On	On	On	On
Menu setting				
Enabled by default	Yes	No	Yes	Yes
Allow user opt-out	No	Yes	No	No
Sound and Vibration				
Override "Do not disturb mode"	Yes	No	Yes	Yes
Alert volume	Max Volume	Device setting	Silent	Max Volume
Alert notification duration	10.5 sec	10.5 sec	0 sec	1 sec
Alert vibration	See 5.4.1.11 for vibration pattern	See 5.4.1.11 for vibration pattern	No	See 5.4.1.11 for vibration pattern
Alert tone	See 5.4.1.11 for audio attention signal	See 5.4.1.11 for audio attention signal	Silent	Single beep

5.5 Calling name requirements

5.5.1 CMTs designed to support VoLTE / VoNR calling shall comply with the calling name presentation requirements specified from sections 5.5.2 to 5.5.5.

5.5.2 Calling name source and order of precedence

5.5.2.1 The CMT shall select the calling name (or tagging) associated with an incoming call in the following order of precedence:

(a) The calling name stored in the CMT's address book for the calling number;
(b) The calling name provided by the network, where no corresponding calling name is available in the handset's address book; and
(c) The calling name provided by a third-party application, where no corresponding calling name is available from either the CMT's address book or the network.

Notwithstanding paragraphs (b) and (c), when the user of the CMT has explicitly chosen to prioritise the calling name provided by a third-party application over the calling name provided by the network, the CMT may apply that preference, provided that no corresponding calling name is available in the CMT's address book.

5.5.2.2 A calling name/tagging obtained from a lower-priority source shall not replace a calling name available from a higher-priority source.

5.5.2.3 Where the calling number matches an address book entry containing a name, the CMT shall display that name irrespective of the value or absence of the verstat parameter.

5.5.2.4 A network-provided name shall be displayed only where the verstat parameter associated with the incoming call equals TN-Validation-Passed.

5.5.3 Calling name length and supported characters

5.5.3.1 The CMT shall support the display of calling names of at least 25 characters.

5.5.3.2 For the purposes of the minimum supported length, each letter, digit, space, and full stop (.) shall count as one character.

5.5.3.3 The minimum supported character set shall comprise:

(a) Uppercase letters A-Z;
(b) Lowercase letters a-z;
(c) Digits 0-9;
(d) The space character; and
(e) The full stop (.)

5.5.4 Check mark indicator

5.5.4.1 The CMT shall display a check mark indicator only where the network-provided verstat parameter associated with the incoming call equals TN-Validation-Passed.

5.5.4.2 The CMT shall not display the check mark indicator where the verstat parameter:

(a) Has any value other than TN-Validation-Passed;
(b) Is absent; or
(c) Cannot be interpreted.

5.5.4.3 A match between the calling number and an address book entry shall not, by itself, cause the CMT to display a check mark indicator.

5.5.4.4 The check mark indicator shall be visually distinguishable from the calling name text. A check mark character contained within a calling name shall not be treated as the verification indicator.

5.5.4.5 The check mark indicator shall comprise a white tick centred within a circle with a solid green background. The indicator shall use the same design on the incoming call display and in the corresponding call history entry.

5.5.5 Call history display

5.5.5.1 The CMT shall comply with the following requirements, for each call history entry:

(a) The calling name is displayed at the time the call was received, where available;
(b) The check mark indicator associated with that call, is displayed, where available; and
(c) A subsequent call from the same number shall not change the check mark indicator retained for an earlier call history entry

Annex A
CMT Conformance Testing / Verification Checklist

This Checklist is intended for facilitating Supplier's Declaration of Conformity to the requirements defined in the IMDA Technical Specification for Cellular Mobile Terminal ("IMDA TS CMT").

Please note:

"**CR**" indicates that the general or technical requirement set out in a particular section or sub-section ("§") of the IMDA TS CMT is a **Compliance Requirement**.

"**M**" means that it shall be **Mandatory** for the CMT to comply with the requirement set out in the IMDA TS CMT § cited in this Checklist (Table given below).

"**C**" means that compliance with the technical requirement set out in the IMDA TS CMT § cited in this Checklist is **Conditional**. In this case, the need to comply is contingent on the type of CMT, RIT and application indicated in the remarks column.

"**V**" means that compliance with the requirement is **Voluntary**.

"NA" means that the requirement is **Not Applicable**.

A1 General requirements for CMT

IMDA TS CMT §	Parameter	Reference standard	CR	Remarks
1	IMT-Advanced / LTE-Advanced / LTE-Advanced Pro / IMT-2020 RITs		M	State the type of CMT
4.1	International Mobile Station Equipment Identity (IMEI); or Permanent Equipment Identity (PEI) in the IMEI format or international Mobile Station Equipment Identity and Software Version number (IMEISV) format		M	See 3GPP TS 23.003 for more information on PEI
4.2	Keypad	ITU-T E.161	C	
4.3	RF EMF safety (SAR; power density) requirements	See section 4.3 for standards	M	
4.4	**EMC**			
4.4.1.1 (a)	Radiated emissions	IEC CISPR 32 / ETSI EN 301 489-1 (to be used with ETSI EN 301 489-52)	C	Applicable to ancillary equipment not incorporated in the radio equipment
4.4.1.1 (b)	Conducted emission: DC power port		C	Applicable to CMT for vehicular use (regardless of DC cable length)
4.4.1.1 (c)	Conducted emission: AC mains power port		C	Applicable to CMT with dedicated charger/power adapter
4.4.1.2 (a)	RF electromagnetic field (80 MHz to 6 GHz)	IEC CISPR 35 / ETSI EN 301 489-1 (to be used with ETSI EN 301 489-52)	V	
4.4.1.2 (b)	Electrostatic discharge		V	
4.4.1.2 (c)	Fast transients common mode		V	Applicable to CMT with dedicated charger/power, and DC power port with cable longer than 3 m
4.4.1.2 (d)	RF common mode 0.15 MHz to 80 MHz		V	
4.4.1.2 (e)	Transients and surges, vehicular environment		V	Applicable to CMT intended for mobile use in vehicles; refer to ISO 7637-2 for conducted

IMDA TS CMT §	Parameter	Reference standard	CR	Remarks
				electrical transients of equipment installed on vehicles
4.4.1.2 (f)	Voltage dips and interruptions		V	Applicable to CMT with dedicated charger/power adapter
4.4.1.2 (g)	Surges		V	
4.5	Equipment safety testing	IEC 62368-1 (min. Ed. no. 2)	M	Lithium batteries to comply with UL 1642, IEC 62133 or IEC 60086-4

A2 Conformance requirements for all CMT

IMDA TS CMT §	Parameter	Reference standard	CR	Remarks
5.1	Operating frequencies	As specified by IMDA	M	
5.2.1	Radiated emissions	ETSI EN 301 908-1	M	
	Control and monitoring functions		M	
5.2.2	Other wireless modes such as WLAN, Bluetooth, etc.	IMDA TS SRD	C	If applicable, the CMT shall also be tested to the relevant requirements given in IMDA TS SRD.
5.2.3	Disabling of 2G networks connectivity by default	-	M	
5.4	Emergency cell broadcast	-	M	

A3 Conformance requirements for 4G CMT

IMDA TS CMT §	Parameter	Reference standard	CR	Remarks
5.2.1	Transmitter spectrum emissions mask	ETSI EN 301 908-13	M	
	Transmitter adjacent channel leakage power ratio		M	
	Transmitter spurious emissions		M	
	Transmitter maximum output power		M	
	Transmitter minimum output power		M	
	Receiver spurious emissions		M	
	Receiver blocking characteristics		M	
	Receiver spurious response		M	
	Receiver intermodulation characteristics		M	
	Receiver Adjacent Channel Selectivity (ACS)		M	
	Receiver reference sensitivity level		M	

A4 Conformance requirements for 5G FR1 CMT

IMDA TS CMT §	Parameter	Reference standard	CR	Remarks
5.2.1	**Transmitter**			
	UE maximum output power	ETSI EN 301 908-25	M	In addition to the common requirements in ETSI EN 301 908-1, the CMT shall be tested to the additional requirements for the NR technology, which includes CA, UL MIMO and SUL where applicable.
	Minimum output power		M	
	Out of band emission		M	
	Spurious emissions		M	
	Receiver			
	Reference sensitivity		M	
	Adjacent channel selectivity		M	
	Blocking characteristics		M	
	Spurious response		M	
	Intermodulation characteristics		M	
	Spurious emissions		M	
	RedCap parameters			
	UE maximum output power	ETSI TS 138 521-1 / ETSI TS 138 521-2	C	Applicable for CMT with RedCap
	Reference sensitivity		C	

A5 Conformance requirements for 5G FR2 CMT

IMDA TS CMT §	Parameter	Reference standard	CR	Remarks
5.2.1	**Transmitter**			
	UE Maximum Output Power	ETSI EN 301 908-25	M	In addition to the common requirements in ETSI EN 301 908-1, the CMT shall be tested to the additional requirements for the NR technology, which includes CA, UL MIMO and SUL where applicable.
	Minimum output power		M	
	Out of band emission		M	
	Spurious emissions		M	
	Receiver			
	Reference sensitivity		M	
	Adjacent channel selectivity		M	
	Blocking characteristics		M	
	Spurious response		M	
	Spurious emission		M	

A6 Conformance requirements for CMT with 5G FR1 and FR2 interworking operation with other radios

IMDA TS CMT §	Parameter	Reference standard	CR	Remarks
5.2.1	**Transmitter**			
	UE maximum output power	ETSI EN 301 908-25	M	In addition to the common requirements in ETSI EN 301 908-1, the CMT shall be tested to the additional requirements for the NR technology, which includes CA and EN-DC where applicable.
	Minimum Output Power		M	
	Out-of-band emissions		M	
	Spurious emissions		M	
	Receiver			
	Reference sensitivity		M	
	Adjacent channel selectivity		M	
	Blocking characteristics		M	
	Spurious response		M	
	Spurious emission		M	

A7 Conformance requirements for CMT that operates on band 26

IMDA TS CMT §	Parameter	Reference Standard	CR	Remarks
5.1	Operating frequencies	As specified by IMDA	M	
5.2.1	Radio interface requirements	FCC Part 22 / FCC Part 90S / IEEE ANSI C63.26-2015	M	

A8 Conformance requirements for D2D-SCT

IMDA TS CMT §	Parameter	Requirements	Reference standard	CR
5.2.1	**Common radio configuration**			
	TX-RX separation	As per TS 38.101-5 Table 5.4.4-1	3GPP TS 38.101-5 Table 5.4.4-1	M
	Channel bandwidths	As per TS 38.101-5 Table 5.3.5-1	3GPP TS 38.101-5 Table 5.3.5-1	M
	Transmitter			
	UE maximum output power	PC3, 23dBm +/- 2dB	3GPP TS 38.101-5 §6.2.1	M
	Maximum power reduction (MPR)	As per 3GPP TS 38.101-5 §6.2.2	3GPP TS 38.101-5 §6.2.2	M
	Network-signalling label	As per TS 38.101-5 Table 6.2.3.1-1A	3GPP TS 38.101-5 Table 6.2.3.1-1A	C
	Additional maximum power reduction (A-MPR)	As per TS 38.101-5 clause 6.2.3	3GPP TS 38.101-5 §6.2.3	C
	Minimum output power	-40dBm	3GPP TS 38.101-5 Table 6.3.1-1	M
	Transmit OFF power	-50dBm	3GPP TS 38.101-5 Table 6.3.2-1	M
	Frequency error	+/- 0.1 ppm	3GPP TS 38.101-5 §6.4.1	M
	ACLR (PC3)	30dB	3GPP TS 38.101-5 Table 6.5.2.4.1-2	M
	Intermodulation	As per TS 38.101-5 Table 6.5.4-1	3GPP TS 38.101-5 Table 6.5.4-1	M
	Transmit spurious emissions	As per TS 38.101-5 Table 6.5.3.1-2	3GPP TS 38.101-5 Table 6.5.3.1-2	M
	Receiver			
	Reference sensitivity	As per TS 38.101-5 Table 7.3.2-1	3GPP TS 38.101-5 Table 7.3.2-1	M
	Maximum input level	-40dBm	3GPP TS 38.101-5 Table 7.4-1	M
	Adjacent channel selectivity	33dB, 30dB, 27dB according to channel bandwidth	3GPP TS 38.101-5 Table 7.5-1	M
	In-band blocking	As per TS 38.101-5 Table 7.6.2-2	3GPP TS 38.101-5 Table 7.6.2-2	M
	Out-of-band blocking	As per TS 38.101-5 Table 7.6.3-2	3GPP TS 38.101-5 Table 7.6.3-2	M
	Narrow-band blocking, CW interferer	-55dBm	3GPP TS 38.101-5 Table 7.6.4-1	M
	Spurious response	-44dBm	3GPP TS 38.101-5 Table 7.7-2	M
	Intermodulation	As per TS 38.101-5 §7.8	3GPP TS 38.101-5 §7.8	M
	Spurious emissions	As per TS 38.101-5 Table 7.9-1	3GPP TS 38.101-5 Table 7.9-1	M

A9 Conformance requirements for CMT devices designed for voice calling

A9.1 VoLTE requirements

S/N	Section number in 3GPP TS 34.229-1	Description	CR
		Registration	
1	8.1	Initial registration	M
2	8.2	User initiated re-registration	M
3	8.4	Invalid behaviour - 423 Interval	M
4	8.16	User initiated re-registration – 423 Interval	M
		Authentication	
5	9.1	Invalid Behaviour – MAC Parameter Invalid	M
6	9.2	Invalid Behaviour – SQN out of range	M
		Subscription	
7	10.1	Invalid Behaviour – 503 Service Unavailable	M
		Notification	
8	11.1	Network initiated deregistration	M
9	11.2	Network initiated re-authentication	M
		Call Control	
10	12.2	MO Call with preconditions at both originating UE and terminating UE – 503 Service Unavailable	M
11	12.2a	MO Call with preconditions at both originating UE and terminating UE – 504 Server Time-out	M
12	12.12	MO MTSI Voice Call Successful with preconditions at both originating UE and terminating UE	M
13	12.13	MT MTSI speech call with preconditions at both originating UE and terminating UE	M
		Codec selecting	
14	16.2	Speech AMR, indicative selective codec modes	M
15	16.3	Speech AMR-WB, indicate all codec modes	M
16	16.4	Speech AMR-WB, indicate selective codec modes	M
		Emergency Service over IMS	
17	19.1.2	Emergency call with emergency registration/Success/Location information not available	M
18	19.4.2	Emergency call without emergency registration / EPS / UE contains an ISIM or USIM / UE is in state EMM-REGISTERED.LIMITED-SERVICE	M
19	19.4.5	Emergency call without emergency registration / UE credentials are not accepted	M
20	19.5.1	New initial emergency registration / UE obtains from the serving IP-CAN an IP address different than the IP address used for the emergency registration	M

A9.2 Calling name requirements

S/N	IMDA TS CMT §	Requirements	CR
1	5.5.2	Calling name source and order of precedence	M
2	5.5.3	Calling name length and supported characters	M
3	5.5.4	Check mark indicator	M
4	5.5.5	Call history display	M

Annex B
Corrigendum / Addendum

Revised TS Reference	Items Changed	Date of Issue
Changes to IMDA TS CMT Issue 1 Rev 4, Dec 2024		
	The IMDA TS CMT Issue 1 Rev 4 has been replaced by the IMDA TS CMT Issue 1 Rev 5. Main changes include: (b) Inclusion of MSS bands (c) Addition of two configurations – SGAlert – Silent and SGAlert - Advisory (a) Calling name requirements (b) Addition of reference standard ETSI TS 138 521-2 for RedCap (c) Conformance requirements for D2D-SCT (d) Check list for calling name requirements	xxx 2026
§5.1 §5.4.3.1 §5.5 Annex A4 Annex A8 Annex A9.2		

Revised TS Reference	Items Changed	Date of Issue
Changes to IMDA TS CMT Issue 1 Rev 3, Dec 2024		
	The IMDA TS CMT Issue 1 Rev 3 has been replaced by the IMDA TS CMT Issue 1 Rev 4. Main changes include: (a) Re-ordering of references (b) Addition of reference standard IEC 60086-4 for lithium battery (c) Addition of requirements for CMT to disable 2G connectivity by default (d) Addition of requirements for CMT for emergency cell broadcast	Mar 2026
§2 §4.5 §5.2.3 §5.4		

Revised TS Reference	Items Changed	Date of Issue
Changes to IMDA TS CMT Issue 1 Rev 2, Sep 2020		
	The IMDA TS CMT Issue 1 Rev 2 has been replaced by the IMDA TS CMT Issue 1 Rev 3. Main changes include: (a) Changes to RF EMF standards – IEC/EN 62209-1 and IEC/EN 62209-2 will no longer be allowed for compliance from 1 Oct 2025 onwards; replaced by IEC/EN 62209-1528:2020. Addition of IEC/EN 62209-3, IEC/EN 62209-1528:2020 and IEC/IEEE 63195-1 as reference standards (b) Changes to clauses (c) and (d) to clarify that tests are to be done on all AC power ports regardless of cable lengths, and that tests are to be done on signal, wired, controlled and DC power ports that have cables longer than 3 m (c) Changes to clauses (g) to include tests on wired network ports (d) Changes to requirements on equipment safety testing (e) Addition of band 26 and band 28 (f) Removal of reference standards for UTRA FDD (g) Addition of VoLTE requirements (h) Removal of reference standard ETSI EN 301 908-2 for UTRA testing (i) Addition of testing parameters for 5G FR1 devices with RedCap capability (j) Addition of requirements for CMTs operating on band 26 (k) Provision of VoLTE requirements	Dec 2024
§4.3 §4.4.1.2 §4.5 §5.1, Table 1 §5.2.1, Table 2 §5.3 Annex A2 and A3 Annex A4 Annex A7 Annex A8		

Revised TS		Items Changed	Date of Issue
Page	Reference		
Changes to IMDA TS CMT Issue 1 Rev 1, 1 July 17			
		The IMDA TS CMT Issue 1 Rev 1 has been replaced by the IMDA TS CMT Issue 1 Rev 2. Changes were made to include specifications for 5G NR and to keep up with new developments that have taken place in the IMT systems of the network operators and standards. Main changes include: (a) Support for 5G NR and revision of Checklist to include support for 5G NR and to reflect changes in new developments in standards (b) Addition of CMT RF EMF standards to include considerations to the body and higher frequencies (c) Replacing CISPR 24 with CISPR 35 for immunity testing (d) Updating of CMT operating bands to include 5G NR	Sep 2020
2, 7 and 9 5 6 7	§1, §2, §5.2.1 and Annex A §4.3 §4.4.1.2 §5.1.1 Table 1		

Revised TS		Items Changed	Date of Issue
Page	Reference		
Changes to IMDA TS CMT Issue 1, Oct 16			
		The IMDA TS CMT Issue 1 has been replaced by the IMDA TS CMT Issue 1 Rev 1. Main changes include: (a) Support for LTE-Advanced TDD RIT (E-UTRAN RAT); (b) Use of E-UTRAN band 38 and band 40 (c) CMT safety testing to be performed to the IEC 60950-1 safety standard	1 July 2017
2, 7 and 8 7 6	§1, §5.2.1 and Annex A §5.1.1 Table 1 §4.4.2		

Revised TS		Items Changed	Date of Issue
Page	Reference		
Changes to IDA TS CMT Issue 1, Jun 11			
		The IDA TS CMT Issue 1 has been replaced by the IMDA TS CMT Issue 1. Changes are largely editorial to provide clarity of requirements for conformity assessment by equipment suppliers, in line with standards development that has taken place in the SDOs and the IMT systems adopted by network operators. Main changes include: (a) Cessation of support for the GSM RITs by 1 April 2017; (b) Updating of measurement procedure for assessment of SAR; (c) Updating of EMC requirements for CMT; (d) Updating of essential requirements for the support of IMT-Advanced / LTE-Advanced RITs; and (e) Addition of a Checklist for facilitating suppliers' declaration of conformity to requirements defined in the Specification.	1 Oct 2016
2 5 5 7 8	§1 §4.3 §4.4 §5.2 Annex A		

Revised TS		Items Changed	Effective Date
Page	**Reference**		
Changes to IDA TS GSM-MT and 3G-MT Issue 1 Rev 2, May 11			
		Title of Specification has been renamed as "Technical Specification for Cellular Mobile Terminal)" (IDA TS CMT Issue 1). The Technical Specification has superseded the following two IDA Technical Specifications: (a) IDA TS GSM-MT Issue 1 Rev 2 (b) IDA TS 3G-MT Issue 1 Rev 2 Changes are mainly editorial in nature, in which the essential technical requirements for compliance formerly defined under the two Specifications (TS GSM-MT and 3G-MT) are now incorporated as one.	Jun 2011
3 4	§1.1 §2.2.1	It also includes the requirements for the Radio Access Technology, E-UTRA.	