TECHNICAL CODE

SPECIFICATION FOR ANALOGUE TERMINAL EQUIPMENT CONNECTED TO THE TELECOMMUNICATIONS NETWORK (SECOND REVISION)

DRAFT FOR PUBLIC COMMENT

Developed by

Malaysian Technical Standards Forum Bhd

Registered by

MCMC

Registered date:

© Copyright 2026

MCMC MTSFB T001:2026

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.

For further information on the technical code, please contact:

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

Tel : +60 3 8688 8000
Fax : +60 3 8688 1000
Email : stpd@mcmc.gov.my
Website: www.mcmc.gov.my

OR

Malaysian Technical Standards Forum Bhd (MTSFB)
Level 3A, MCMC Tower 2
Jalan Impact
Cyber 6
63000 Cyberjaya
Selangor Darul Ehsan
MALAYSIA

Tel : +60 3 8680 9950
Fax : +60 3 8680 9940
Email : support@mtsfb.org.my
Website: www.mtsfb.org.my

DRAFT FOR PUBLIC COMMENT

Contents

Page

Committee representation ii
Foreword iii

1. Scope 1
2. Normative references 1
3. Abbreviations 1
4. Baseline requirements 2
5. Technical requirements 2
   - 5.1 Connections method 2
   - 5.2 Polarity 3
   - 5.3 Ringing signal and service tones 3
   - 5.4 Impedance limits 3
   - 5.5 Calling function 4

Annex A Analogue handset function 5

DRAFT FOR PUBLIC COMMENT

Committee representation

This technical code was developed by Communications Terminal Working Group of the Malaysian Technical Standards Forum Bhd (MTSFB), which consists of representatives from the following organisations:

SIRIM Berhad

TM Technology Services Sdn Bhd

DRAFT FOR PUBLIC COMMENT

Foreword

This technical code for the Specification for Analogue Terminal Equipment Connected to the Network ('this Technical Code') was developed pursuant to Section 185 of the Communications and Multimedia Act 1998 (Laws of Malaysia Act 588) 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) Revision of the title and scope to reflect analogue terminal equipment connected to modern telecommunications networks, including circuit-switched and IP-based technologies.

b) Revision of the connection method to include connection through an Optical Network Terminal (ONT) via an RJ11 interface, while retaining connection to legacy analogue networks.

c) Removal of the Power Fail Condition and Insulation Resistance requirements, which are no longer applicable to modern public telecommunications networks.

d) Exclusion of marking, interoperability, Electromagnetic Compatibility (EMC) and electrical safety requirements, which are addressed in MCMC MTSFB TC T022, *Communications Equipment – Baseline Requirements.*

e) Inclusion of the requirement for equipment supporting Analogue Caller Identification Presentation (A-CLIP) to comply with MCMC MTSFB TC T002.

f) Update of the normative references and technical requirements to align with the revised scope and current telecommunications network environment.

The Specification for Analogue Terminal Equipment Connected to the Network shall comply with all requirements within this Technical Code and MCMC MTSFB TC T022, *Communications Equipment - Baseline Requirements.*

This Technical Code shall replace the SKMM MTSFB TC T001:2013, *Specification for Terminal Equipment Connecting to the Public Switched Telephone Network (PSTN).* 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.

DRAFT FOR PUBLIC COMMENT

SPECIFICATION FOR ANALOGUE TERMINAL EQUIPMENT CONNECTING TO THE TELECOMMUNICATIONS NETWORK

1. Scope

This Technical Code specifies the minimum requirements for analogue terminal equipment ("the Equipment") connected to a telecommunications network, including networks that support voice and data services through circuit-switched or Internet Protocol (IP)-based technologies, protocols and architectures, including, but not limited to, Voice over Internet Protocol (VoIP), Session Initiation Protocol (SIP) and IP Multimedia Subsystem (IMS).

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.

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

ETSI ES 203 021-2, *Access and Terminals (AT); Harmonized basic attachment requirements for Terminals for connection to analogue interfaces of the Telephone Networks; Update of the technical contents of TBR 021, EN 301 437, TBR 015, TBR 017; Part 2: Basic transmission and protection of the network from harm.*

ETSI ES 203 021-3, *Access and Terminals (AT); Harmonized basic attachment requirements for Terminals for connection to analogue interfaces of the Telephone Networks; Update of the technical contents of TBR 021, EN 301 437, TBR 015, TBR 017; Part 3: Basic Interworking with the Public Telephone Networks.*

ETSI ES 203 038, *Public Switched Telephone Network (PSTN); Attachment Requirements for a terminal equipment incorporating and analogue handset function capable of supporting the justified case service when connected to the analogue interface of the PSTN in Europe*.

ITU-T Recommendation E.161, *Arrangement of digits, letters and symbols on telephones and other*.

3. Abbreviations

For the purposes of this Technical Code, the following abbreviations apply.

A-CLIP	Analogue Caller Identification Presentation
DISA	Direct Inward System Access
DTMF	Dual Tone Multifrequency
LCL	Longitudinal Conversion Loss
ONT	Optical Network Terminal
R_f	Feed Resistance
RLR	Receiving Loudness Ratings
SLR	Sending Loudness Ratings

DRAFT FOR PUBLIC COMMENT

STMR Sidetone Masking Rating

4. Baseline requirements

The Equipment shall be designed to meet the baseline requirements as outlined in MCMC MTSFB TC T022. For DC powered voltage, the operating voltage shall be 48 V in accordance with the applicable Malaysian Standard.

If the Equipment supports Analogue Caller Identitfication Presentation (A-CLIP), it shall comply with the relevant requirement specified in MCMC MTSFB TC T002.

5. Technical requirements

The Equipment shall comply with the requirements specified in this clause and, where it supports an analogue handset function, with the additional requirements specified in Annex B.

5.1 Connections method

5.1.1 Telecommunications network

The Equipment is connected to an Optical Network Terminal (ONT) via an RJ11 interface. The ONT provides connectivity to the IP network, which is linked to the telecommunications network for voice communications services.

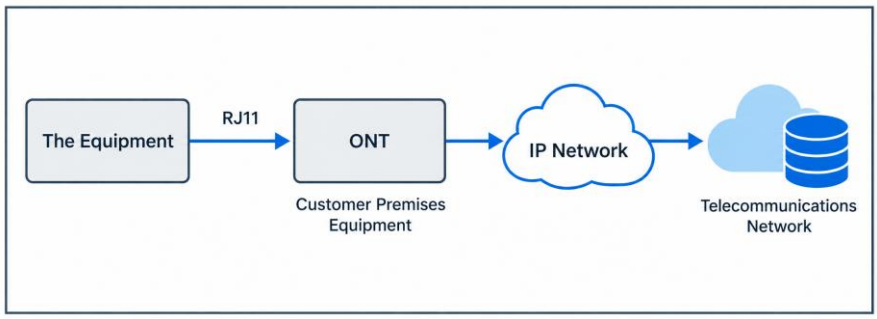


Figure 1. Connection of the Equipment to the telecommunications network

The Equipment is connected directly to the telecommunications network using an RJ11 interface in a legacy analogue voice network configuration.

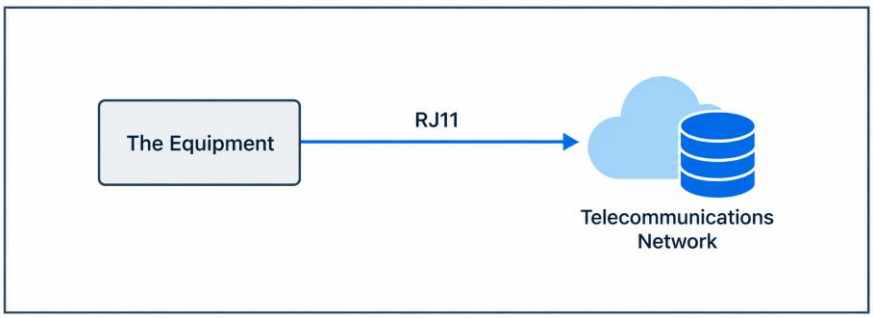


Figure 2. Direct connection of the Equipment to the telecommunications network

DRAFT FOR PUBLIC COMMENT

5.2 Polarity

The performance of the Equipment shall be independent of the telecommunications network line polarity i.e. the Equipment shall conform to the requirements of these requirements for both polarities of the line feeding (ETSI ES 203 021-1, clause A.3).

5.3 Ringing signal and service tones

The Equipment shall be able to work with the ringing signal and services tone from the telecommunications network.

5.4 Impedance limits

<table>
<tr><th>No</th><th>Requirement</th><th>Test requirement</th></tr>
<tr><td>5.4.1</td><td>Unlooped condition</td><td></td></tr>
<tr><td rowspan="3"></td><td>a) The Equipment shall present to the telecommunications network a DC resistance greater than 5 MΩ at 56 Vdc, with a current not exceeding 10 µA.</td><td>ETSI ES 203 021-3, A.4.4.1</td></tr>
<tr><td>b) The Equipment shall present to the telecommunications network an impedance more than 2 000 Ω at 25 Hz.</td><td>ETSI ES 203 021-3, A.4.4.2.1</td></tr>
<tr><td>c) The Equipment shall be able to withstand sustained ringing voltages from the telephone line of 75 V_{rms} to 85 V_{rms} at nominal frequency of 25 Hz ± 2 Hz.</td><td>Not available</td></tr>
<tr><td>5.4.2</td><td>Looped condition</td><td></td></tr>
<tr><td></td><td>a) DC voltage/current characteristics within the operating range as specified in Table 1 and Figure 3.

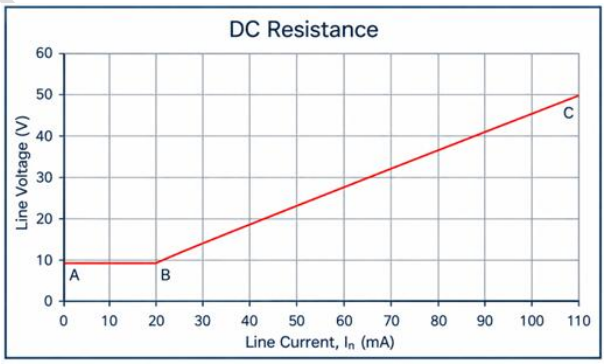
Table 1. DC voltage/current characteristics
<table><tr><th>Point</th><th>Voltage (V)</th><th>Current (mA)</th></tr><tr><td>A</td><td>9.0</td><td>0</td></tr><tr><td>B</td><td>9.0</td><td>20</td></tr><tr><td>C</td><td>49.5</td><td>110</td></tr></table> 

Figure 3. DC voltage/current characteristics</td><td>ETSI ES 203 021-3, A.4.7.1</td></tr>
<tr><td></td><td>b) The return loss of the Equipment supporting only non-voice services shall exceed 8 dB, with respect to 600 Ω, over the frequency range from 300 Hz to 3 400 Hz at line currents up to 110 mA.</td><td>ETSI ES 203 021-3, A.4.7.2</td></tr>
</table>

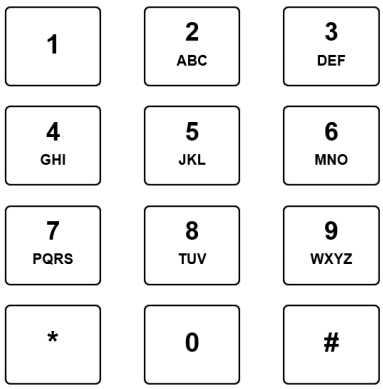
DRAFT FOR PUBLIC COMMENT

No	Requirement	Test requirement
	c) The return loss of the Equipment supporting analogue handset function, shall exceed 14 dB, with respect to 600 Ω, over the frequency range from 300 Hz to 3 400 Hz at line currents up to 110 mA. Note. This requirement is applicable to the Equipment that supports an analogue handset function only.	ETSI ES 203 038, A.2.8
5.4.3	**Impedance unbalance about earth**	
	Impedance unbalance about earth expressed in Longitudinal Conversion Loss (LCL) shall be at least 40 dB in the frequency range of 300 Hz to 600 Hz and at least 46 dB in the frequency range of 600 Hz to 3 400 Hz.	ETSI ES 203 021-2, A.4.1
5.4.4	**Signal frequencies and sending levels**	
	a) The mean sending level in the frequency range 200 Hz to 3800 Hz over a one-minute period shall not be greater than -9.7 dBV when the The Equipment interface is terminated with the reference impedance Z_R (600 ohm). Note. This requirement does not apply to Dual Tone Multifrequency (DTMF) signals.	ETSI ES 203 021-2, A.4.2.1
	b) The sending level across the termination points of the Equipment shall be in the frequency range 4.3 kHz to 200 kHz, is less than or equal to the limits -35.7 dBV in the range 4.3 kHz to 20 kHz and -40.7 dBV in the range 20 kHz to 200 kHz.	ETSI ES 203 021-2, A.4.2.4

5.5 Calling function

No	Requirement	Test requirement
5.5.1	**Dual Tone Multifrequency (DTMF) signalling**	
	a) The Equipment shall transmit call address information using the DTMF signalling codes specified in Table 2**.** **Table 2. DTMF signalling frequency combination** **Low group (Hz)** / **High group (Hz)**: **1 209**, **1 336**, **1 477** 697: 1, 2, 3 770: 4, 5, 6 852: 7, 8, 9 941: *, 0, #	ETSI ES 203 021-3, A.4.8.2.1
	b) The transmitted signalling frequencies shall be within ± 1.5% of the nominal frequencies**.**	ETSI ES 203 021-3, A.4.8.2.1
	c) The sending level for low group frequencies shall be −10 dBm ± 2 dB.	ETSI ES 203 021-3,

DRAFT FOR PUBLIC COMMENT

No	Requirement	Test requirement
		A.4.8.2.2
	d) The sending level for high group frequencies line shall be −8 dBm ± 2 dB.	ETSI ES 203 021-3, A.4.8.2.2
	e) During sending of any DTMF frequency combination, the level of the tone in the high frequency group shall be 1 dB to 4 dB higher than the level of the tone in the low frequency group.	ETSI ES 203 021-3, A.4.8.2.2
	f) The total power of unwanted frequency components during signalling shall be at least 20 dB below the power level of signal frequencies**.**	ETSI ES 203 021-3, A.4.8.2.3
5.5.2	**Decadic pulse**	
	a) The nominal dial speed is 10 pulses per second (pps) ± 1 pps.	Not Available
	b) The nominal pulse widths shall be: Break pulse : 66.7 ms ± 2.5 ms Make pulse : 33.3 ms ± 2.5 ms	
	c) The inter-digital pause shall be between 600 ms to 1 000 ms.	
	This requirement applies only to Equipment that supports pulse dialling.	
5.5.3	**Keypad dialing**	
	a) The alphanumeric keypad layout shall comply with ITU-T Recommendation E.161, option A, as shown in Figure 4.  **Figure 4. Alphanumeric keypad layout**	Not available
	b) The associated letters shall not impair the legibility of the digits, in accordance with ITU-T Recommendation E.161, clause 3.1.1.	Not Available
	c) The tactile identifier on the “5” button shall be provided in accordance with ITU-T Recommendation E.161 clause 3.6. Note. This requirement does not apply to Equipment that incorporates touchscreen functionality	
5.5.4	**Automatic dialling**	
	a) The DTMF signal duration shall be at least 65 ms**.**	ETSI ES 203 021-3,

DRAFT FOR PUBLIC COMMENT

No	Requirement	Test requirement
	b) The inter-digit pause between consecutive DTMF signals shall be at least 65 ms**.**	A.4.8.2.4 and A.4.8.2.5
	This requirement applies only to Equipment that supports automatic dialling.	
5.5.5	**Automatic answering**	
	a) The Equipment shall have a ringing signal detector and answer an incoming call by looping the line within 9 seconds from the start of the ringing signal.	Not Available
	b) The Equipment shall restore the exchange line to unlooped condition:	
	i) upon detection of busy tone sent by the telecommunications network indicating that the calling party has cleared the call	
	ii) upon expiry of the preset timer for automatic message transmission or recording of message;	
	iii) If failure occurs when the Equipment is answering an incoming call, the telecommunications network shall be immediately released and the Equipment reset on resumption of mains supply	
	This requirement applies only to Equipment that supports telephone answering functionality, e.g. Direct Inward System Access (DISA) and voice message systems.	

DRAFT FOR PUBLIC COMMENT

Annex A
(Normative)

Analogue handset function

Equipment supporting an analogue handset function shall comply with the additional requirements specified in this Annex. The circuit for measuring the transmission characteristics is shown in Figure A.1.

A.1 Sending Loudness Ratings (SLR) and Receiving Loudness Ratings (RLR)

No	Requirement	Test requirement
A.1.1	**Sending Loudness Rating (SLR)** The SLR shall be: a) +3 dB ± 4 dB at feed resistances (R_f) of 2 800 Ω and 1 000 Ω; and b) +3 dB +7/−4 dB at a R_f of 600 Ω. For the Equipment supporting handsfree or loudspeaking functions which is not powered from a separate power supply, the requirement to measure with R_f set to 2,800 Ω shall be replaced by a requirement to measure with R_f set to 2,300 Ω.	ETSI ES 203 038, A.2.2.1
A.1.2	Receiving Loudness Ratings (RLR) The RLR shall be: a) −8 dB ± 4 dB at R_f of 2 800 Ω and 1 000 Ω; and b) −8 dB +7/−4 dB at R_f of 600 Ω. For the Equipment supporting handsfree or loudspeaking functions which is not powered from a separate power supply, the requirement to measure with R_f set to 2,800 Ω shall be replaced by a requirement to measure with R_f set to 2,300 Ω.	ETSI ES 203 038, A 2.2.1

A.2 Sidetone Masking Rating (STMR)

No	Requirement	Test requirement
A.2	Sidetone Masking Rating (STMR) shall not be less than +10 dB.	ETSI ES 203 038, A.2.3

DRAFT FOR PUBLIC COMMENT

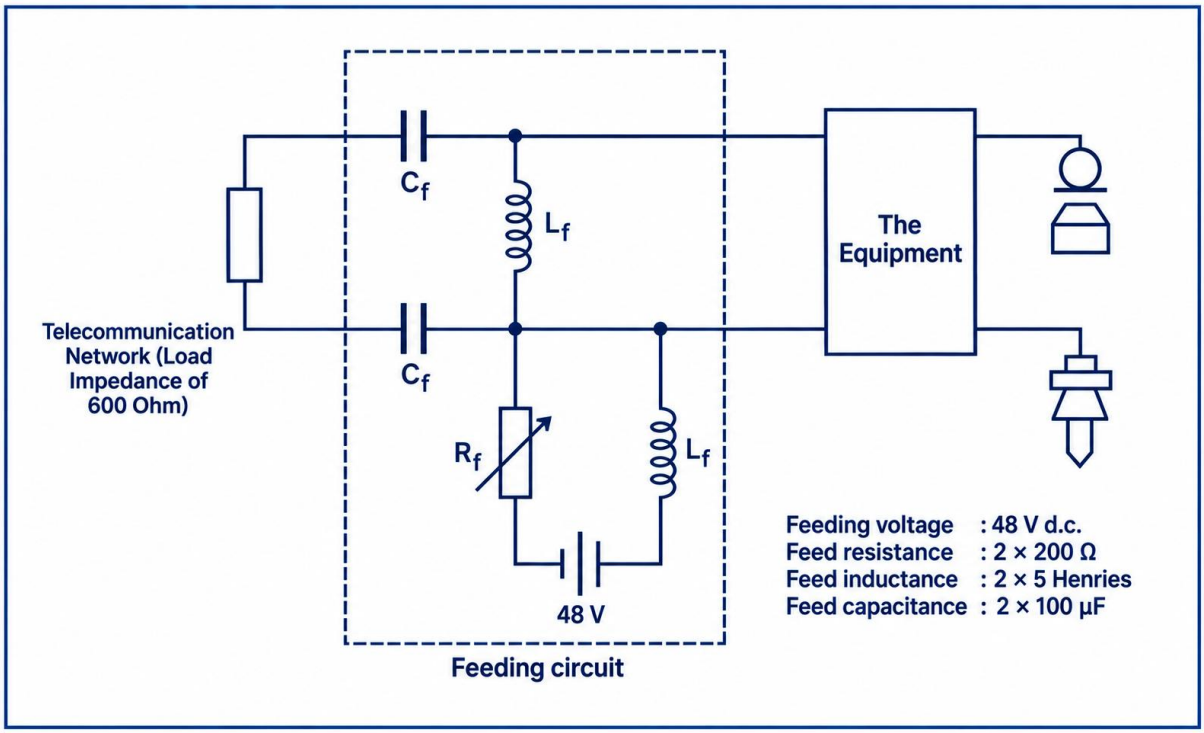


Figure A.1. Circuit for measurement of transmission characteristics

DRAFT FOR PUBLIC

Acknowledgements

Members of the Communications Terminal Working Group

Working Group Leaders

Ms. Wan Zarina Wan Abdullah (Chair)	SIRIM Berhad
Ts. Low Wei Yap (Vice Chair I)	Wideminds Pte Ltd
Asooc. Prof. Ir. Dr. Khaizuran Abdullah (Vice Chair II)	International Islamic University Malaysia

Drafting Committee Members

The following subject matter experts served as members of the Drafting Committee and involved in the development, drafting, and technical deliberation of this Technical Code:

Ms Nurhafenah binti Abdul Jalil (Draft Lead)	SIRIM Berhad
Ms Humairah binti Ahmad Nasir (WG Counsellor)	Malaysian Technical Standards Forum Bhd
Mr Azahari Bin Aziz	SIRIM Berhad
Ms Hafizah binti Zainal Abiddin	SIRIM Berhad
Ms Wan Zarina binti Wan Abdullah	SIRIM Berhad
Mr Mior Mohd Hadzlan bin Hamid	TM Technology Services Sdn Bhd
Mr Mohd Ekhsan Bin Mohamed Manshawi	TM Technology Services Sdn Bhd
Ms Nor Mastura binti Abdol Mohid	TM Technology Services Sdn Bhd
Ms Roshayati binti Jamil	TM Technology Services Sdn Bhd

Contributors

The following members were not part of the Drafting Committee but supported the development of this Technical Code by participating in the review process and providing technical comments, recommendations, and feedback to enhance the quality and completeness of the Technical Code:

Ms Nurfarah Diyanah Binti Mahat	SIRIM Berhad
Ts Amir Subhi Wan Omar	TM Technology Services Sdn Bhd
Mr Fazli Shamsuddin	TM Technology Services Sdn Bhd
Mr Khairul Anuar Awang	TM Technology Services Sdn Bhd
Mr Mohamad Nadzri Abdul Rashid	TM Technology Services Sdn Bhd

DRAFT FOR PUBLIC COMMENT