

# TECHNICAL CODE

## SPECIFICATION FOR PRIVATE AUTOMATIC BRANCH EXCHANGE (PABX) SYSTEM FOR CONNECTION TO PUBLIC SWITCHED TELEPHONE NETWORK (PSTN)

First Revision

Developed by



Registered by



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## **SKMM MTSFB TC T003:2013**

### **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**

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

AJV Holding Sdn Bhd

Epson Malaysia

NEC Corporation of Malaysia Sdn. Bhd.

Packet One Networks (Malaysia) Sdn. Bhd.

SIRIM QAS International Sdn Bhd

Telekom Malaysia Berhad

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Panasonic Malaysia

Panasonic System Networks

**FOREWORD**

This technical code for the Specification for Private Automatic Branch Exchange (PABX) System for Connection to Public Switched Telephone Network (PSTN) ('this Technical Code') was developed pursuant to section 185 of the Act 588 by the Malaysian Technical Standard Forum Berhad ('MTSFB') via its Fixed 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 cancels and replaces Technical Specification for Private Automatic Branch Exchange (PABX) System for Connection to Public Switched Telephone Network (PSTN), SKMM FTS P PABX Rev. 1.01:2007.

This Technical Code shall continue to be valid and effective until reviewed or cancelled.

# SKMM MTSFB TC T003:2013

## SPECIFICATION FOR PRIVATE AUTOMATIC BRANCH EXCHANGE (PABX) SYSTEM FOR CONNECTION TO PUBLIC SWITCHED TELEPHONE NETWORK (PSTN)

### 1. Scope

This document describes the requirement of Private Automatic Branch Exchange (PABX) system connected to Public Switched Telephone Network (PSTN).

### 2. Normative references

The following normative references are indispensable for the application of this document. 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 document, the symbols and abbreviations given in Table 1 apply.

AC	Alternating Current
DC	Direct Current
EIRP	Effective Isotropic Radiated Power
ETSI	European Telecommunications Standards Institute
FCC	Federal Communications Commission
IEC	International Electrotechnical Commission
SKMM	Malaysian Communications and Multimedia Commission
TE	Terminal equipment

## 4. Requirements

### 4.1 General requirements

#### 4.1.1 Power supply requirements

4.1.1.1 - For AC powered TE, the operating voltage shall be rated/ marked at 230V or 240V in line with the country's nominal voltage and frequency in accordance to MS IEC 60038. If the product is rated with multiple or a range of voltages, voltage range between 230V (+10%,-6%) shall be included. Testing shall be conducted based on 230V (+10%,-6%) or 240V and other relevant voltages, if the product is marked with multiple or a range of voltages.

4.1.1.2 - Product shall be rated/ marked at 50Hz and testing shall be conducted at 50Hz. If the product is marked at 50/60Hz or 50-60Hz then testing shall be conducted either at 50Hz or 60Hz, whichever is more unfavourable.

4.1.1.3 - The design of the TE shall be such that all essential items of equipment of the TE shall be powered from batteries on float charge such that the performance of the system shall not deteriorate in any way on failure of the electricity mains supply. Non essential test equipment and other auxiliary devices may directly work off the electricity mains supply.

4.1.1.4 - The system shall operate on 48 volts (nominal) with positive earthing, and shall function satisfactorily within a voltage range of 42 volts to 54 volts for not less than 80% of the calls and shall function satisfactorily within a voltage range of 44 to 52 volts for 100% of the calls.

4.1.1.5 - Where external power supply is used, e.g. AC adaptor or battery, it shall not affect the capability of the TE to meet this specification.

4.1.1.6 - Adaptor shall be pre-approved by the relevant regulatory body before it can be used with the TE.

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

TE shall be fitted with a suitable and appropriate approved power supply cord and mains plug. Both are regulated products and shall be pre-approved by the relevant regulatory body before it can be used with the TE.

The power supply cord shall be certified according to:

- MS 140; or
- BS 6500; or
- IEC 60227-5; or
- IEC 60245-4.

The main plug shall be certified according to:

- 13 A fused plugs: MS 589: Part 1 or BS 1363: Part 1; or
- 15A plugs complying to MS 1577 or BS 546; or
- 2.5 A, 250 V, flat non-rewirable two-pole plugs: MS 1578 or BS EN 50075.

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### **4.1.3 Polarity**

The performance of the TE shall be independent of the PSTN line polarity i.e. the TE shall conform to both polarities of the line feeding (ETSI ES 203 021-1, clause A.3).

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

TE shall comply with the minimum requirement that is specified by the regulatory body.

#### **4.1.4.1 Interoperability**

TE shall be able to exchange information and to use the information that has been exchanged between two or more systems or components.

#### **4.1.4.2 Connectivity**

TE shall be able to link with other programs and devices to allow interoperability.

### **4.1.5 Marking requirements**

TE shall be marked with the following information:

- a) supplier/manufacture's name or identification mark;
- b) supplier/manufacture's model or type reference; and
- c) other markings as required by the relevant standards.

The markings shall be legible, indelible and readily visible.

### **4.1.6 Language**

All markings, software and related documents shall be in Bahasa Melayu or English language.

### **4.1.7 Electromagnetic Compatibility and electrical safety requirements**

**4.1.7.1** TE shall comply with the limits for conducted disturbance at the mains terminals and telecommunication ports, and the limits for radiated disturbance defined in the IEC CISPR 22.

**4.1.7.2** TE shall comply with the MS IEC 60950-1 safety standard. The requirements in MS IEC 60950-1 that are applicable to the TE [e.g. class of equipment, type of telecommunication network voltage (TNV) circuit and types of components] shall be identified and complied with.

## **4.2 Technical requirements**

### **4.2.1 Extension Telephones & Exchange Lines**

The PABX supplied shall be able to accept the use of :

- i) Dual tone multi-frequency (DTMF) push-button telephones.
- ii) Rotary dial telephones.
- iii) Mixture of i) and ii) above.



PABX connected to PSTN shall be designed to meet the following requirements:

- a) Where PABX system is connected to PSTN, in addition to complying this technical specification, it shall comply with the requirements for connection to PSTN, MTFSB PSTN : 2011
- b) Where PABX system supported A-CLIP, in addition to complying this technical specification, it shall comply with A-CLIP requirement, MTFSB ACLIP : 2011.

**4.2.2. Tones, Cadences**

**4.2.2.1** The frequency and cadence for the tones shall comply with the specification in Table 1. The allowable frequency deviation is  $\pm 5\%$  of nominal value.

**4.2.2.2** The ring back tone shall be returned to the calling party whenever an extension line in the system is being rung, irrespective of whether the call is internal or external.

**4.2.2.3** PABX with capacity above 100 extensions shall be incorporated with NU tone facilities and shall comply with Table 1.

**4.2.3 Ringing Current**

**4.2.3.1** Cadence of ringing current shall comply with the specification in Table 1.

**4.2.3.2** Ringing current generator shall have open circuit voltage of not less than  $75 V_{rms}$  and not greater than  $85 V_{rms}$  and a design nominal frequency within the range of 16 Hz to 25 Hz. The total harmonic distortion shall not exceed 30 %.

**4.2.3.3** Terminal voltage on full load shall be at least  $60 V_{rms}$ .

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Table 1. Ringing Signal and Service Tone

NO.	TYPE OF TONE	CADENCE (Second)	FREQUENCY (Hz)	LEVEL (dBm)	
1	Ringling Current	0.4 ON 0.2 OFF 0.4 ON 2.0 OFF	16-25	75 V <sub>rms</sub>	
2	Dial Tone	Continuous	425	-15 to -9	
3	Ring tone	Internal call	1.0 ON, 3.0 to 5.0 OFF	425	-12
		External call	0.4 ON, 0.2 OFF 0.4 ON, 2.0 OFF	425	-15 to -9
4	Ring back tone	Internal call	0.4 ON, 0.2 OFF 0.4 ON, 2.0 OFF	425	- 12.0
		External call	0.4 ON, 0.2 OFF 0.4 ON, 2.0 OFF	425	-15 to -9
5	Busy Tone (Engage tone)	0.5 ON, 0.5 OFF	425	-15 to -9	
6	Congestion tone	Either, i) 0.5 ON, 0.5 OFF <b>OR</b> ii) 0.25 ON, 0.25 OFF	425	-15 to -9	
7	Intrusion warning tone	0.2 ON, 0.2 OFF 0.2 ON, 5.0 OFF	425	-15 to -9	
8	Number Unobtainable (NU) tone	2.5 ON, 0.5 OFF	425	-15 to -9	

### 4.2.4 Numbering Scheme

4.2.4.1 The numbering scheme shall be as follows:

2xxx )	
3xxx )	
4xxx )	Extension Numbers
5xxx )	
6xxx )	
7xxx )	Extension Number/Abbreviated Dialling
8x	Tie Lines *
9	Access to Exchange Lines
0	PABX Operator
1xx	Services

NOTE. \* Tie lines is a leased/dedicated circuit linking two PABXs located in different premises.

4.2.4.3 TE with up to 50 extension lines, two digits numbering is acceptable.

4.2.4.4 TE with more than 50 extension lines and up to 500 extension lines, three digits numbering shall be used.

**4.2.4.5** TE with more than 500 extension lines, four digits and above shall be used, depending on the capacity of the system.

**4.2.4.6** Access digit for the public exchange lines shall be '9'.

**4.2.4.7** Access digit for the operator shall be '0'.

**4.2.4.8** The first digit of tie-lines access code shall be '8'.

#### **4.2.5 Transmission Requirements**

##### **4.2.5.1 Extension Line Circuit**

The equipment shall function satisfactorily with an extension line loop resistance of up to 1 500 ohms with a leakage resistance of down to 20 000 ohms.

##### **4.2.5.2 Attenuation**

Transmission attenuation for the following call at 1,000 Hz, measured at respective termination of the system shall be as follows:

- a) Extension to Extension less than 8 dB.
- b) Extension to Exchange line circuit less than 2.5 dB.

##### **4.2.6 Route Restrictions**

**4.2.6.1** The route restriction equipment shall be of the type that counts the total number of digits dialled as well as analyse the number of pulses of the first two or three digits so as to render the route restriction facility as fool-proof as possible.

**4.2.6.2** Alternatively the digit analysis in the route restriction equipment shall commence analysis of the first digit dialled only after the route restriction equipment detects the public exchange dial tone.

The route restriction equipment shall reactivate the digit analysis function whenever the public exchange dial tone is detected.

**4.2.6.3** First two digit "00" and first three digit "101", "103" and "108" are barred.

**Annex A**  
(Normative)

**Normative references**

BS 1363: Part 1	13 A plugs, socket-outlets, adaptors and connection units - Part 1: Specification for rewirable and non-rewirable 13 A fused plugs
BS 546	Specification for AC power plugs and sockets
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
ETSI ES 203 021	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
IEC 60227-5	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 5: Flexible cables (cords)
IEC 60245-4	Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 4: Cords and flexible cables
IEC CISPR 22	Information Technology Equipment - Radio disturbance characteristics - Limits and methods of measurement
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
MS 140	Specification for insulated flexible cords and cables
MS 1577	Specification for 15A plugs and socket-oulets 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 589: Part 1	Specification for 13 A plugs, socket outlets, adaptors and connection units Part 1: Specification for rewirable and non-rewirable 13 A fused plugs
MS IEC 60038	IEC standard voltages
MS IEC 60950-1	Information technology equipment - Safety - Part 1: General requirements

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SKMM MTFSB TC T001:  
2012

Specification for terminal equipment connecting to the Public  
Switched Telephone Network (PSTN)

SKMM MTFSB TC T002:  
2012

Specification for Analogue calling line Identity presentation (A-CLIP)  
facility for connection to Public Switched Telephone Network (PSTN)

## **SKMM MTSFB TC T003:2013**

### **Acknowledgements**

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