

SKMM FTS P PABX
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**TECHNICAL SPECIFICATION FOR PRIVATE
AUTOMATIC BRANCH EXCHANGE (PABX) SYSTEM
FOR CONNECTION TO PUBLIC SWITCHED
TELEPHONE NETWORK (PSTN)**



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FOREWORD

This Technical Specification was developed under the authority of the Malaysian Communications and Multimedia Commission (SKMM) under the Communications and Multimedia Act 1998 (CMA 98) and the relevant provisions on technical regulation of Part VII of the CMA 98. It is based on recognised International Standards documents

This Technical Specification specifies the standards to conform for testing and certification on telecommunications equipments.

NOTICE

This Specification is subject to review and revision

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

1. Scope

This technical specification describes 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 Technical Specification. 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

TE may be AC or DC powered. For AC powered TE, the operating voltage shall be 240 V +5 %, -10 % and frequency 50 Hz \pm 1 % as according to MS 406 or 230 V \pm 10 % and frequency 50 Hz \pm 1 % as according to MS IEC 60038 whichever is current.

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.

The system shall operate on 48 volts (nominal) with positive earthen, 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.

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.

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
- 2.5 A, 250 V, flat non-rewirable two-pole plugs: MS 1578 or BS EN 50075.

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 TBR 21, clause 4.3.1).

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

The markings shall be legible, 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:

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- 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, SKMM FTS PSTN.
- b) Where PABX system supported A-CLIP, in addition to complying this technical specification, it shall comply with A-CLIP requirement, SKMM FTS P ACLIP.

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 $60 V_{rms}$.

Table 1. Ringing Signal and Service Tone

NO	TYPE OF TONE		CADENCE (Second)	FREQUENCY (Hz)	LEVEL (dBm)
1	Ringing Current		0.4 ON 0.2 OFF 0.4 ON 2.0 OFF	16-25	75 V _{rms}
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 OR 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.

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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.
- c) Extension to tie line circuit less than 0.5 dB.
- d) Tie line to tie line circuit less than 0.5 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 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 TBR 21	Terminal Equipment (TE); Attachment Requirements for pan-European approval for connection to the analogue Public Switched Telephone Networks (PSTNs) to TE (excluding TE supporting the voice telephony service) in which network addressing, if provided, is by means of Dual Tone Multi Frequency (DTMF) signalling
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 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

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MS 406	Specification for voltages and frequency for alternating current transmission and distribution systems
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
SKMM FTS PSTN	Technical specification for terminal equipment connecting to the Public Switched Telephone Network (PSTN)
SKMM FTS P ACLIP	Technical specification for Analogue calling line Identity presentation (A-CLIP) facility for connection to Public Switched Telephone Network (PSTN)