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We all have the power to prevent AIDS

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affects
us all



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new
struggle

Prevention is the cure

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DEPARTMENT OF HEALTH

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No. Gazette
No.***GENERAL NOTICE****South African Telecommunications Regulatory Authority***General Notice*

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| 1798 | Telecommunications Act (103/1996): Notice of intention to make regulations in respect of standard specification for telephone attachments for connection to the Public Switched Telephone Network (PSTN) | 3 | 21151 |
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GENERAL NOTICE

NOTICE 1798 OF 2000

SOUTH AFRICAN TELECOMMUNICATIONS REGULATORY AUTHORITY



NOTICE OF INTENTION TO MAKE REGULATIONS IN RESPECT OF STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK (PSTN)

The South African Telecommunications Regulatory Authority ("the Authority") hereby gives notice that it intends making the following regulations in terms of section 96(1) and 96(4) read with section 55 of the Telecommunications Act, 1996 (Act No. 103 of 1996).

This publication solicits input into the final regulations in the form of a technical specification. The final regulations will be published at a later time following this input.

Interested persons are hereby invited to submit written comments or written representations with regard to the proposed regulations, to be received **by no later than 7 August 2000** by post, hand delivery, facsimile transmission and by an electronic version in Microsoft Word 6.0 or lower, for the attention of Mr Mortimer Hope Pr. Eng., South African Telecommunications Regulatory Authority, Private Bag X1, Marlboro, 2063; Block A, Pin Mill Farm, 164 Katherine Street, Sandton; Facsimile +27 (0) 11 321 8581; email: hopem@satra.gov.za

H.N.L. MAEPA, Pr. Eng., PE, FSAAE

Chairperson

South African Telecommunications Regulatory Authority

**STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS FOR CONNECTION TO
THE PUBLIC SWITCHED TELEPHONE NETWORK**

TE-001 REVISION

DRAFT APRIL 2000

STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK

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**STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS
FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK****CHAPTER 1****1 CHAPTER ONE****1.1 COMMENTS**

Comments on the contents of this specification are invited. All comments will be considered, but it is not always practical to indicate to the originator whether the comment was accepted or not.

Comments should be submitted in writing to:

The Senior Manager
Equipment & Supplier Licensing
SATRA
Private Bag X1
Marlboro
2063
South Africa
Fax No.: +27 (0) 11 321 8581

Please note that comments should identify the number of the clause(s)/sub-clause(s) to which they refer. Suggestions for revision of the text should indicate the preferred wording.

**STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS
FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK**

CHAPTER 1

1.2 LIST OF AMENDMENTS

No.	Date	Amendments
1	Apr 2000	Major revision
2		
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STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK

CHAPTER 1

1.3 DEFINITIONS AND ABBREVIATIONS

1.3.1 DEFINITIONS

Client is the registered subscriber of a telecommunications line provided by any holder of a licence to provide a public switched telecommunication service, or any person using such a telecommunications line in a manner that in the opinion of the Postmaster-General renders such a person as a registered subscriber or causes him to be regarded as such a subscriber.

Exchange line is the voice channel (physical or otherwise) that connects the **PABX** or **TLTE** with the **PSTN**.

Extension line is the voice channel (physical or otherwise) that connects the **PABX** switching unit with an **extension terminal** on premises.

Extension terminal is any **TLTE** connected to an **extension line**.

Leased-line is a line rented from any holder of a licence to provide a public switched telecommunication service for the purpose of directly interconnecting two **TLTE** or **PABXs**.

Private Automatic Branch Exchange (PABX) is any automatic telephone switching unit intended for installation at a **client's** premises.

Public Switched Telephone Network (PSTN) consists of the exchanges, inter-exchange connections (cable, microwave, optic fibre etc.) **exchange lines** and **TLTE** owned and operated by any holder of a licence to provide a public switched telecommunication service, for the provision of telephone service to the general public.

South African Telecommunications Regulatory Authority, also referred to as **SATRA**, being the regulatory authority for telecommunication matters in the RSA.

Telecommunication-Line Terminal Equipment (TLTE) is connected to an **exchange line** or an **extension line** to transmit and receive voice, data and video signals.

1.3.2 ABBREVIATIONS

A	Ampere
ac	Alternating current
AGC	Automatic Gain Control
b/s	bits per second
°C	Degree Celsius
C	Capacitor, Capacitance
CCITT	Comité Consultatif International Télégraphique et Téléphonique (International Consultative Committee for Telegraphy and Telecommunications). Now renamed the ITU-T
CEPT	Conférence Européenne des Administrations des Postes et des Télécommunications (European Conference of Posts and Telecommunications Administrations)
CH	Channel
dB	Decibel

STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK

CHAPTER 1

dBm	Decibel relative to 1 Mw
dBmp	Decibel psophometrically weighted
dBV	Decibel relative to 1 V
dBVp	Decibel relative to 1 V psophometrically weighted
dc	Direct current
DTMF	Dual Tone Multi-Frequency Dialing
emf	Electromotive force
ETSI	European Telecommunications Standards Institute
Hz	Hertz
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
ITU-T	International Telecommunication Union – Telecommunications group. Formerly known as the CCITT
log	Logarithm to the base 10
LMO	Licensed Maintenance Organisation
kb/s	kilo-bits per second
kHz	kilo-Hertz
km	Kilometer
kΩ	kilo-Ohm
kPa	kilo-Pascal
m	Meter
mA	milli-Ampere
mm	Millimeter
ms	Millisecond
mW	milli-Watt
MF	Multi-Frequency
MHz	Mega-Hertz
MΩ	Mega-Ohm
NU	Number Unobtainable
Ω	Ohm
pps	Pulses per second
PABX	Private Automatic Branch Exchange
PBX	Private Branch Exchange
PMBX	Private Manual Branch Exchange
PSTN	Public Switched Telephone Network
rms.	Root mean square
R	Resistor
s	Second
SABS	South African Bureau of Standards
SATRA	South African Telecommunications Regulatory Authority
Telkom	Telkom South Africa Limited
TCL	Telkom Certification Laboratories
TLTE	Telecommunication-Line Terminal Equipment
μA	Micro-Ampere
μF	Micro-Farad
μs	Micro-second
μW	Micro-Watt
W	Watt
Z_R	Reference impedance (A complex impedance consisting of a 270Ω resistor in series with a parallel combination of 750Ω and 150nF)

**STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS
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CHAPTER 1

1.4 LIST OF TECHNICAL AND FUNCTIONAL SPECIFICATIONS

The **South African Telecommunications Regulatory Authority** issues the technical and functional specifications for **Telecommunication-Line Terminal Equipment (TLTE)**.

The following specifications are available for TLTE:

Specification	Description
TE-001	Standard Specification for Telephone Attachments for Connection to the Public Switched Telephone Network
TE-002	Functional Requirements for Telephone Answering Machines and Recording Equipment
TE-003	Functional Requirements for Repertory Dialing Equipment
TE-004	Functional Requirements for Remote Supervisory Equipment
TE-005	Functional Requirements for Loudspeaking Equipment
TE-006	Functional Requirements for Facsimile Transceivers
TE-007	Functional Requirements for Automatic Call Diverting Equipment
TE-008	Functional Requirements for Equipment for use in Industrial Environments
TE-009	Functional Requirements for TLTE connected to Leased-Line Circuits
TE-010	Functional requirements for Calling Line Identification (CLI) Customer Premises Equipment (CPE)
TE-011	Reserved
TE-012	Functional Requirements for Second Generation Low-Power Digital Cordless Telephones (CT2) – (864.100 – 868.100 MHz)
TE-013	Functional Requirements for Low-Power Cordless Telephones (46-49 MHz)
TE-014	Functional Requirements for Automatic Fee Recording Equipment
TE-015	Functional Requirements for Call Restriction Devices
TE-016	Reserved
TE-017	Reserved
TE-018	Functional Requirements for Data Modems
TE-019	Reserved

Specification TE-001: Standard Specification for Telephone Attachments for Connection to the Public Switched Telephone Network (PSTN) provides information for PSTN General Standards, Technical Requirements and Safety & RFI Requirements.

**STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS
FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK****CHAPTER 1****1.5 REVISION APPROACH**

The document was revised with the aim to follow ETSI standards as far as possible. The following ETSI documents are referenced in the document:

- | | |
|------------|---|
| TBR 21 | Terminal Equipment (TE); Attachments for pan-European approval for connection to the analogue Public Switched Telephone Networks (PSTNs) of TE (excluding TE supporting the voice telephony service) in which network addressing, if provided, is by means of Dual Tone Multi Frequency (DTMF) signalling |
| EN 301 437 | Terminal Equipment (TE); Attachment requirements for pan-European approval for connection to the analogue PSTNs of TE supporting the voice telephony service in which network addressing, if provided, is by means of Dual Tone Multi Frequency (DTMF) signalling |
| TBR 38 | Public Switched Telephone Network (PSTN); Attachments for terminal equipment incorporating an analogue handset function capable of supporting the justified case service of the PSTN in Europe |
| EG 201 184 | 2-wire analogue voice band interfaces; Multiple line terminal equipment specific characteristics |
| ES 201 187 | 2-WIRE ANALOGUE VOICE BAND INTERFACES; Loop Disconnect (LD) dialling specific requirements |
| EG 201 120 | Public Switched Telephone Network (PSTN); Method of rating terminal equipment so that it can be connected in series and/or in parallel to a Network Termination Point (NTP) |

The relevant ETSI test method will apply.

A number of specific requirements to the Telkom PSTN are specified in the document. They are referred to in 1.6.

1.6 SPECIFIC REQUIREMENTS FOR TELKOM PSTN IN SOUTH AFRICA

Requirements specific to Terminal Equipment for connection to the Telkom PSTN are covered in paragraph 3.1.3.2.

If any contradiction is found between the content of paragraph 3.1.3.2 and the content of any documentation referred to in this document, paragraph 3.1.3.2 shall be followed.

**STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS
FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK**

CHAPTER 2**2 CHAPTER TWO****2.1 PSTN GENERAL STANDARDS****2.1.1 AUTOMATIC EXCHANGE AREAS****2.1.1.1 Standard Feed-bridges**

The electrical parameters for PSTN and PABX feed-bridges are given in **Table 1.1** below.

OPEN CIRCUIT TERMINAL VOLTAGE (V dc)	FEEDING ARRANGEMENT	EQUIPMENT	MAXIMUM LINE RESISTANCE (Ω)
46 V - 52 V (48 V NOMINAL)	Constant Voltage ($200\ \Omega + 200\ \Omega$) \pm 10% feed	Electro- mechanical, Digital exchanges and PABXs	See Note 1
24 V - 60 V	Current Limiting: 25 mA - 40 mA	PABXs	As approved
44,4 V - 54 V	t Current Limiting: 40 mA \pm 5 mA	Digital exchanges	See Note 1

TABLE 1.1 STANDARD FEEDBRIDGES

Note 1. In order to meet the objectives of the National Transmission Plan, the specified resistance limits for the subscribers loop of electromechanical and digital exchanges is a maximum 1000 Ω and 1500 Ω , respectively.

2.1.1.2 Line seizure

Line seizure is effected by applying a loop across the line that will cause a minimum line current of 25 mA to flow in the loop.

2.1.1.3 Current limiting sources

Regulating telephones apply maximum gain when fed from current limiting sources. On short lines this will result in unacceptably high output levels.

STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK

CHAPTER 2

2.1.1.4 Tones

2.1.1.4.1 Supervisory tones

The composition and cadence of supervisory tones supplied by public exchanges are given in Table 1.2. Tone cadences will be within 50 ms of the nominal cadence specified.

TONE	COMPOSITION	CADENCE
Dial-Tone	400 Hz amplitude modulated by 33,3 Hz between 80% and 100% (383 Hz + 417 Hz for E10 exchanges)	Continuous
Special Dial Tone	400 Hz amplitude modulated by 33,3 Hz	250ms ON; 250ms OFF Continuous
Ring Tone	400 Hz amplitude modulated by 33,3 Hz between 80% and 100% (383 Hz + 417 Hz for E10 exchanges)	400 ms ON; 200 ms OFF; 400 ms ON; 2 s OFF. (cycle repeated).
Busy Tone	400 Hz	500 ms ON; 500 ms OFF etc.
Number Unobtainable (NU) Tone	400 Hz	2,5 s ON; 0,5 s OFF etc.
Congestion Tone	400 Hz	0,25 s ON; 0,25 s OFF etc.
Call waiting tone	400 Hz modulated by 33 Hz Level $-14,5 \pm 2$ dBV when measured at the 0dB _r point for call waiting	400ms ON; 4 000 ms OFF; times 3

TABLE 1.2 SUPERVISORY TONES

2.1.1.4.2 Derivation of tones

All tones are derived from a sinusoidal frequency source having a frequency tolerance of 3% and a maximum total harmonic distortion of less than 15%.

2.1.1.4.3 Tone levels

When measured at the 2-wire speech injection point, the tone level is normally limited to between $-6,5$ dBV to $-10,5$ dBV under all loading conditions. Tone levels at the telephone instrument may be as low as $-25,5$ dBV across the reference impedance Z_R , due to losses in the network.

STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK

CHAPTER 2

2.1.1.5 Ringing voltage

2.1.1.5.1 Public exchanges

Ringing voltage is applied to the line at 60 V - 100 V under all normal loading conditions, at a frequency of 16 Hz \pm 5%, having a sinusoidal waveform. The ringing voltage cadence is identical to that of the ring tone cadence in **Table 1.2**.

2.1.1.5.2 PABXs

PABXs generally supply ringing voltage between 35 V and 100 V at 25 Hz, each with its own particular cadence. Ring voltage frequencies of up to 50 Hz may be encountered.

2.1.1.6 Metering

2.1.1.6.1 Meter pulses

The provision of meter pulses to subscriber premises cannot be guaranteed in all areas.

2.1.1.6.2 Pulse characteristics

Where metering pulses are provided, two signaling methods are employed:

2.1.1.6.2.1 Longitudinal pulses

Signal frequency:	50Hz + 2 Hz sinusoidal
Line voltage (detect):	55V + 11V
Line voltage (non-detect):	20V at 50Hz (longitudinal). 100V at 25Hz or 16 ² / ₃ Hz (applied to one leg with the other leg open-circuit).
Signal current to earth:	1,5 mA maximum at 66V
Signal duration:	(Slow pulse train) 100ms to over 1s. (Fast pulse train) 100ms to 500ms. (non-detect) 20 ms.
Pulse separation:	75ms minimum
Maximum rate:	1 per 575ms (1.74 per s).

2.1.1.6.2.2 Transverse pulses

Signal frequency:	16 kHz \pm 0,5% sinusoidal.
Signal source impedance:	200 Ω
Line voltage (detect):	40mV ¹ to 6V into 200 Ω 16kHz signals with a Total Harmonic Distortion equal to or less than 10%
Line voltage (non-detect):	8mV 16kHz signal into 200 Ω White noise, 600 Ω source; + 10dBm _{0p600} Signal between 200 Hz and 4 kHz with a level of 3V
Signal duration:	(Detect) 100 to 350ms. (non detect) 20ms and less
Pulse repetition rate:	1,74 per s maximum
Insertion loss (line-phone):	0,5dB maximum at 300Hz to 3400Hz; 20dB minimum at 16kHz \pm 0,5%

STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK

CHAPTER 2

Overload:	A 16kHz signal of 8V behind 200Ω applied to the exchange line shall not -produce distortion of more than 10% (-20dB) in a signal.
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¹ Provision shall be made to reduce the sensitivity by nominally 20 dB, i.e. approximately 300mV minimum, for short-line working.

2.1.1.7 Line release

The end of a call is indicated by one of the following conditions, depending on the type of public exchange or PABX:

2.1.1.7.1 Silence

Signals below -45,5 dBV will be considered as silence.

2.1.1.7.2 Number unobtainable (NU)

The appearance on the line of number unobtainable (NU) tone at a minimum level of -25,5 dBV, for a period not less than 10s.

2.1.2 MANUAL EXCHANGE AREAS

2.1.2.1 Initiating a call

No dialing facilities exist on exchange lines in manual exchange areas. Calling in both directions is achieved by applying manual ringing to the line.

2.1.2.2 Answering a call

Manual exchanges and PMBXs employ manual ringing. Manual ring current is supplied for a continuous period of not less than 2 s at a voltage of 75 V ac and a frequency of 17 Hz.

2.1.3 METHOD OF CONNECTION

2.1.3.1 Standard Connection

The standard connection is the 6-way FCC (RJ 11) plug and socket combination.

2.1.3.2 Connection blocks or tag strips

When the TLTE uses more than one line, the supplier of the equipment shall terminate his equipment on a connection block or tag strip fitted with lightning protection.

The holder of a licence to provide a public switched telecommunication service shall be contracted to terminate all incoming exchange lines on a connection block or tag strip. Fees payable for such a termination shall be payable by the supplier of the equipment.

Where the TLTE is installed behind a PABX, the PABX supplier or a licensed LMO shall terminate the connections on the PABX side.

The supplier of the TLTE shall be responsible for cross-connection.

2.1.3.3 Responsibility

The connection point marks the limit of responsibility between the holder of a licence to provide a public switched telecommunication service and the supplier.

**STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS
FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK****CHAPTER 2****2.1.3.4 Fault Conditions****2.1.3.4.1 Single line equipment**

Under fault conditions, it is the responsibility of the user to establish whether the fault may be caused by the TLTE, by removing the equipment from the line and attempting a call using an approved telephone. A fault should only be reported once it has been established that the signaling or transmission remains unsatisfactory when the telephone is used, with all parallel or series connected TLTE removed.

2.1.3.4.2 Multi-line equipment

Under fault conditions, it is the responsibility of the equipment supplier to establish whether the fault may be caused by the TLTE. A fault should only be reported once it has been established that the signaling or transmission remains unsatisfactory when an approved telephone is used, with all parallel or series connected TLTE removed.

Note: In case of an abortive call-out the client shall be liable for call-out costs.

**STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS
FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK****CHAPTER 3****3 CHAPTER THREE****3.1 TECHNICAL REQUIREMENTS****3.1.1 ENVIRONMENTAL CONDITIONS****3.1.1.1 Test conditions**

Unless otherwise specified, all tests are carried out under the following laboratory conditions:

Ambient temperature:	15° C to 35° C
Relative humidity:	20 % to 75 %
Air pressure:	84 kPa to 106 kPa

3.1.1.2 Tolerance of components and physical quantities

Except where stated otherwise in this specification, the tolerances associated with values of components and physical quantities referred to in the tests and figures (excluding the standard 200 Ω + 200 Ω Telkom feed-bridge) are as follows:

ITEM	TOLERANCE
Resistance:	± 1 %
Capacitance:	± 1 %
Inductance:	± 1 %
Current:	For currents <5 mA: ± 1 % or $\pm 1\mu\text{A}$, whichever is greater; For currents 5 mA and over: $\pm 1\%$ or ± 1 mA, whichever is greater.
Voltage:	± 1 %
Power:	$\pm 0,2$ dB

3.1.2 CONNECTION TO LINE**3.1.2.1 Standard connection**

TLTE shall connect to the line by means of a standard RJ 11 plug. (Refer to paragraph 2.1.3.1)

3.1.2.1.1 Termination

Termination of the 6-way FCC plug must be according to the following pin configuration (Refer to Figure 2.1):

STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK

CHAPTER 3

Contact No.	Connection
1	Open
2	3rd - wire (if required)
3	A - leg
4	B - leg
5	Earth (if required for Earth Loop Recall)
6	Open

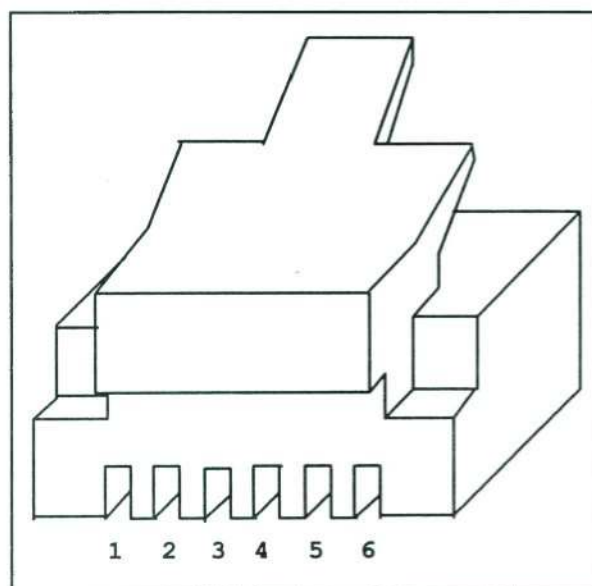


FIGURE 3.1 : FCC 6-WAY PLUG

3.1.2.2 Connection blocks or tag strips

Where the design and/or function of the equipment require that more than one line is used, the supplier shall terminate his equipment on a connection block or tag strip, fitted with lightning protection.

3.1.3 INTERFACING REQUIREMENTS

3.1.3.1 General

TLTE shall be suitable for connection to standard feeding arrangements and shall successfully recognize the PSTN tones, line conditions and other parameters as specified in Chapter 1.

Unless requirements for the fixed line PSTN of any holder of a licence to provide a public switched telecommunication service determine otherwise (see paragraph 3.1.3.2), the terminal equipment defined below shall comply with the standards as indicated:

3.1.3.1.1 Attachments (excluding terminal equipment supporting the voice telephony service) in which network addressing, if provided, is by means of Dual Tone Multi Frequency (DTMF) signalling

Attachments compliant with the requirements of the ETSI technical basis for regulation, TBR 21, January 1998 shall be acceptable subject to the requirements of paragraph 3.1.3.2 Telkom PSTN specific requirements where applicable.

**STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS
FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK****CHAPTER 3****3.1.3.1.2 Attachments represented by terminal equipment supporting the voice telephony service in which network addressing, if provided, is by means of Dual Tone Frequency (DTFM) signalling**

Attachments compliant with the requirements of the ETSI standard EN 301 437, V1.1.1 (1999-03) shall be acceptable subject to the requirements of paragraph **3.1.3.2 Telkom PSTN specific requirements** where applicable.

3.1.3.1.3 Attachments represented by terminal equipment incorporating an analogue handset function capable of supporting the justified case service when connected to the analogue interface of the PSTN.

The technical characteristics for handset telephony of analogue voice terminals shall comply with the requirements of the ETSI technical basis of regulation, TBR 38, May 1998, subject to the requirements of paragraph **3.1.3.2 Telkom PSTN specific requirements** where applicable.

3.1.3.1.4 Multiple line terminal equipment

In addition to the above-mentioned clauses, multiple line terminal equipment shall comply with the cross talk requirements of the ETSI guide EG 201 184, V1.1.1 (1998-10).

3.1.3.1.5 Terminal equipment connected in series and/or in parallel

For equipment connected in series and/or parallel ETSI Guide EG 201 120 applies

3.1.3.2 TELKOM PSTN specific requirements**3.1.3.2.1 Tests to ETSI requirements at loop steady state conditions**

Refer to the paragraphs 3.1.3.1.1 to 3.1.3.1.3.

For tests performed under loop steady state conditions, the feed resistor range of $R_f = 3\ 200\ \Omega$ to $230\ \Omega$, or the value of $R_f = 230\ \Omega$ when no range is specified, may be changed to a resistor range of $1\ 940\ \Omega$ ($1\ 500\ \Omega + 440\ \Omega$) to $400\ \Omega$ or $400\ \Omega$ respectively. These conditions represent feeding conditions in the Telkom PSTN. This is a relaxation of the requirements for the ETSI feeding bridge arrangement. All other values for R_f shall apply.

3.1.3.2.2 DC resistance in quiescent state

The requirement of TBR 21, paragraph 4.4.1, shall also be met when tested at 200 VDC.

3.1.3.2.3 Resistance to earth in quiescent state

The requirement of TBR 21, paragraph 4.4.4, shall also be met when tested at 200 VDC.

3.1.3.2.4 Resistance to earth in loop state

The requirements of TBR 21, paragraph 4.7.5 shall also be met when tested at 200 VDC.

**STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS
FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK****CHAPTER 3****3.1.3.2.5 Mean sending level**

In addition to the requirements of TBR 21, paragraph 4.7.3.1, the mean sending level across the reference impedance Z_R shall not be less than -13,5 dBV.

3.1.3.2.6 Power failure

During a power failure or power restoration, TLTE shall not impair the function of other equipment connected to the same line.

3.1.3.2.7 Receive from line**3.1.3.2.7.1 Sensitivity and Line Losses**

Decoding of audio signals from line, shall be possible at any input level between -0,5 dBV and -43,5 dBV across reference impedance Z_R over the frequency range 300 Hz - 3400 Hz. The test shall be conducted according to annex A, sub-clause A3.1.3.2.7.1

3.1.3.2.7.2 Maximum gain

To limit the amount of cross-talk reproduced, TLTE must not be able to raise input signals of below -65,5 dBV, to an intelligible level.

3.1.3.2.8 Loop disconnect dialing (Optional)**3.1.3.2.8.1 Applicable standard**

Loop disconnect dialing, when applicable, shall conform to ETSI standard ES 201 187.

3.1.3.2.8.2 Spark quench circuit

A spark quench circuit consisting of a resistor of 100 ohm in series with a capacitor of 0,1 μ F to 2,2 μ F shall be fitted on the line side of any rectifier bridge that may be included in the dial circuit.

3.1.3.2.9 Earth recall (Optional)

The test shall be performed on terminals equipped with the facility. The recall or transfer shall be accomplished by connecting the earth wire via a resistance of 100 Ω maximum to one or both legs of the line. The condition shall be maintained for not less than 60 ms.

3.1.3.2.10 Timed break recall (Optional)

This test shall be performed on terminals equipped with the facility. The facility is also referred to as controlled-break or 'flash' facility. When timed break recall is activated, depression of the recall button shall cause the loop to be interrupted for a period of between 90 ms to 120 ms. The interruption shall be defined as a reduction in line current to less than 2,5 mA, with the ringing capacitor removed.

3.1.3.2.11 Ring impedance

The ring detecting circuit shall be capacitively coupled. The value of the capacitor shall be between 0,3 μ F and 2,2 μ F, 250 V. The impedance, when measured at 35 V and 75 V rms and at frequencies of 16 Hz $\pm 5\%$ and 25 Hz $\pm 5\%$ shall be between 4 k Ω and 60 k Ω .

**STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS
FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK****CHAPTER 3****3.1.3.2.12 Ring sensitivity**

For parallel connection the detecting circuit shall operate reliably with a ringing voltage of 30 V rms at 16 Hz $\pm 5\%$ and 25 Hz $\pm 5\%$. Ringing shall not be detected below 10 V. Ringing voltage may be automatic or manual (Refer paragraphs 2.1.1.5.1 and 2.1.2.2).

3.1.3.2.13 Unconditional release

TE shall release the line unconditionally within 60 s after the end of a call.

3.1.3.2.14 Lightning protection

For the purpose of this test, the product manufacturer/vendor or its representative will indicate clearly and unambiguously the way the product with the associated lightning protection must be installed in practice. The configuration declared by the manufacturer/vendor must be used during the lightning protection test and documented in the test report.

3.1.3.2.14.1 TLTE shall be fitted with lightning protection. Equipment shall be subjected to lightning protection tests in both the idle and seized conditions and shall withstand these tests without damage to the equipment.**3.1.3.2.14.1.1 *Line powered equipment***

Line powered equipment shall be subjected to lightning protection tests applied as transverse surges, that is between the A and B leads.

3.1.3.2.14.1.2 *Mains powered equipment*

Mains powered equipment or equipment referenced to earth shall be subjected to lightning protection tests applied as longitudinal surges, that is between the A lead and earth and the B lead and earth, as well as transverse surges.

3.1.3.2.14.1.3 *Test connection*

The transverse test is done by applying the pulse between the A and B wires. The pulse shall be applied five times in both the idle and seized conditions. The polarity of the pulse shall be reversed for consecutive pulses.

The longitudinal test is done by applying the pulse between the A wire and earth, and the B wire and earth. The pulse shall be applied five times in both the idle and seized conditions. The polarity of the pulse shall be reversed for consecutive pulses.

**STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS
FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK****CHAPTER 3****3.1.3.2.14.1.4** *Pulse characteristics*

TLTE shall be able to withstand the following surge pulses:

3.1.3.2.14.1.4.1 *Pulse 1*

Peak open circuit voltage: 4 kV
Open circuit voltage waveform: 1,5/50 μ s
Short circuit current waveform: 8/20 μ s
Source impedance: 2 Ω
Tolerance of the open-circuit voltage: $\pm 10\%$
Short-circuit output current: 2 kA
Repetition rate: more than 1 per minute

This test pulse conforms to the combination-wave pulse description of SABS IEC 61000-4-5: 1995

3.1.3.2.14.1.4.2 *Pulse 2*

Peak open circuit voltage: 180 V
Open circuit voltage waveform: 10 / 700 μ s
Source impedance: 15 Ω
Tolerance of open-circuit voltage: $\pm 10\%$
Repetition rate: more than 1 per minute

WARNING

Suppliers of TLTE must take note that very high voltages are associated with safety tests. Neither SATRA, TCL, SABS nor any other designated laboratory will accept any responsibility for damage to equipment that may occur due to the execution of such tests.

**STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS
FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK****CHAPTER 3
ANNEX A****3.2 CHAPTER 3 ANNEX A: TEST METHODS****A3.1.3.2.7.1 Sensitivity and Line Losses**

Requirement: Paragraph 3.1.3.2.7.1

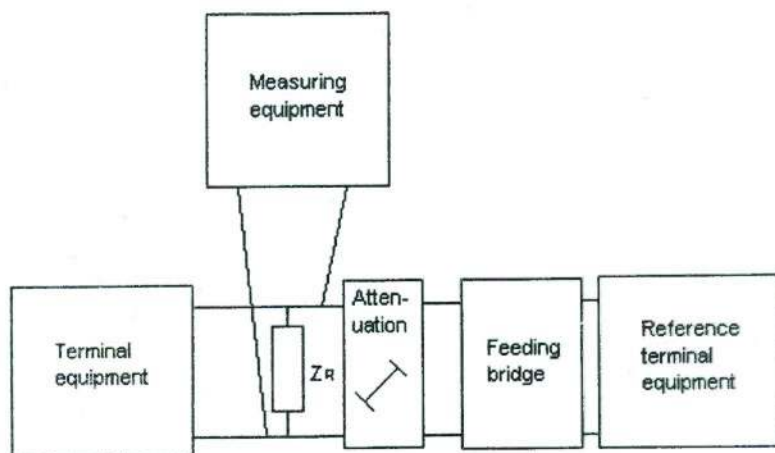
Purpose: To check that the sensitivity of the TE complies with paragraph 3.1.3.2.7.1.

Measurement principle:

Preamble: Set the TE and the reference TE in the loop state.

Test state: The TE shall be in the receiving mode and the reference TE in the transmitting mode.

Test configuration:



DC Feeding arrangement:

Feed voltage: 50V. Feed resistance: 400 Ω

Polarity shall be switched between feed resistance.

**STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS
FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK****CHAPTER 3
ANNEX A**

AC termination of TE: Z_R

Measurement execution:

The reference TE shall be in the transmitting mode and the TE under test in the receiving mode. Adjust the attenuation for the levels given in paragraph 3.1.3.2.7 across the reference impedance Z_R .

Formal processing:

None

Verdict:

If the TE receives data for the levels specified in paragraph 3.1.3.2.7.1 then Pass; else Fail.

Guidance:

The output level of the reference TE shall be set to satisfy the conditions specified in paragraph 3.1.3.2.7.

**STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS
FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK****CHAPTER 4****4 CHAPTER FOUR****4.1 SAFETY AND RFI REQUIREMENTS****4.1.1 ADDITIONAL SAFETY REQUIREMENTS****4.1.1.1 Standards**

Telecommunication line terminal equipment that is mains operated or referenced to earth and intended for direct connection to the public network shall conform to the safety standards according to the latest issue of **SABS IEC 60950**.

4.1.1.2 Certificate of compliance

A certificate of compliance shall be obtained from the SABS or any other designated laboratory for all TLTE that is mains operated, and shall be submitted to SATRA together with the application for a licence to connect TLTE to the public network.

4.1.1.3 Protection

Adequate protection shall be provided in order to minimize fault conditions and to prevent the following:

- 4.1.1.3.1 hazardous voltages being encountered by operators and service personnel during normal operation and/or minor servicing of the equipment,
- 4.1.1.3.2 hazardous voltages originating in the equipment from reaching the telephone network,
- 4.1.1.3.3 hazardous voltages which may appear on the network during abnormal conditions, e.g. lightning etc., from reaching any user-accessible part of the TLTE,
- 4.1.1.3.4 inadvertent contact with normal telephone network voltages by operators and service personnel, in order to minimize discomfort to the user and to safeguard the installation.

4.1.1.4 Adverse line voltages

TLTE shall withstand the following line conditions without damage:

- 4.1.1.4.1 A voltage feed of 56 V via a 200 Ω resistor for a period of 20 s while in the off-hook state.
- 4.1.1.4.2 A voltage of 100 V rms. at 16 Hz with a cadence of 0,4 s on; 0,2 s off; 0,4 s on and 2 s off superimposed on 56 V dc while in the on-hook state.
- 4.1.1.4.3 The back-emf generated by exchange pulsing relays.

4.1.1.5 Exclusion from Safety Tests

The following equipment need not be tested in terms of **SABS IEC 60950**:

- 4.1.1.5.1 Personal computer (PC) based modules, such as plug-in modem or fax card modules. These units will however require testing against RFI requirements.

**STANDARD SPECIFICATION FOR TELEPHONE ATTACHMENTS
FOR CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK****CHAPTER 4**

- 4.1.1.5.2 Equipment which depend on the telecommunication line as their only source of power and does not form an integral part of the telephone instrument or TLTE, such as line monitoring devices etc..
- 4.1.1.5.3 Passive devices requiring no source of electric power.
- 4.1.1.5.4 Standard telephone terminals.
- 4.1.1.5.5 Battery operated equipment.

4.1.2 RADIO FREQUENCY INTERFERENCE (RFI)**4.1.2.1 Interference**

TLTE shall comply with the limits for Class B equipment, as stipulated in the latest issue of CISPR 22.

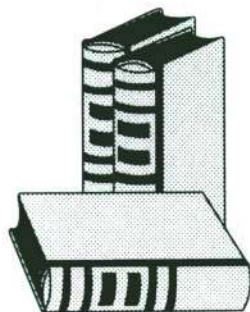
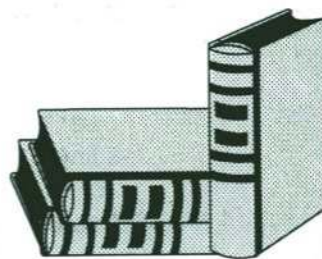
4.1.2.2 Electromagnetic compatibility

Equipment shall operate satisfactorily in the presence of electromagnetic fields in the frequency range 50 kHz - 200 MHz.

4.1.2.3 Certification

Compliance tests will be performed by the SABS or any other designated laboratory and a certificate of compliance must be obtained and submitted to SATRA as part of the application documentation. Should this certificate not be submitted the application would not be considered.

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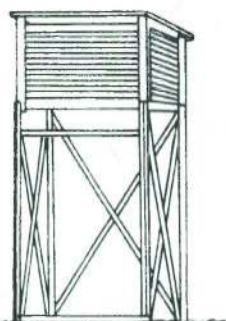
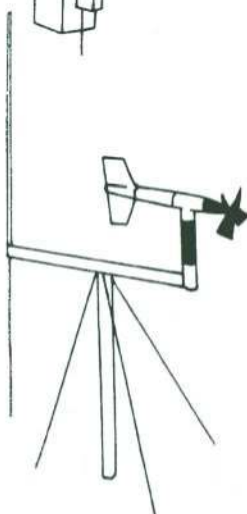
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