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INDUSTRY GUIDELINE
ACIF G624:2005
NETWORK INTERFACE VOLTAGE LEVELS

ACIF G624:2005 *Network interface voltage levels*
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TABLE OF CONTENTS

1 GENERAL

1.1 Scope

This Guideline provides guidance for designers of CE and test laboratories, indicating the minimum voltage levels that should be supported for each category of CE in the TLN for which a safety Standard is required.

NOTE: IEC TR 62102 provides further useful information about the classification of network interfaces, including phenomena affecting the safety of interface ports.

1.2 Objectives

This Guideline was developed with the following objectives:

(a) To provide information to designers of CE about the minimum voltage levels expected to be encountered by CE in Australia.

(b) To provide information to test laboratories about the voltage levels to which CE should be tested under each category in the TLN.

2 ACRONYMS, DEFINITIONS AND INTERPRETATIONS

2.1 Acronyms and abbreviations

For the purposes of the Guideline, the following acronyms apply:

3G	Third Generation Mobile Communications
AC	Alternating Current
ACMA	Australian Communications and Media Authority
ACIF	Australian Communications Industry Forum
ADSL	Asymmetric Digital Subscriber Line
AMPS	Advanced Mobile Phone System
ASA	Air Services Australia
AS/NZS	Australian Standard/New Zealand Standard
BRA	Basic Rate Access
CAS	Channel Associated Signalling
CDMA	Code-Division Multiple Access
CE	Customer Equipment
CECRP	Customer Equipment and Cable Reference Panel
CT2	Cordless Telephone Second Generation
DC	Direct Current
DECT	Digital Enhanced Cordless Telecommunications
ETSI	European Telecommunications Standards Institute
GSM	Global System for Mobile Communications
ISDN	Integrated Services Digital Network
LIU	Line Isolation Unit
LMB	Large Mega bit Bearer
MOH	Music on Hold
PABX	Private Automatic Branch Exchange
PHS	Personal Handyphone System
PMTS	Public Mobile Telephone Service
POTS	Plain Old Telephone Service
PRA	Primary Rate Access
SDSL	Symmetric Digital Subscriber Line
SELV	Safety Extra Low Voltage
SHDSL	Symmetrical High-speed Digital Subscriber Loop
TLN	Telecommunications Labelling Notice
TNV	Telecommunications Network Voltage
WC	Working Committee

2.2 Definitions

2.2.1 Voltage Ranges of SELV circuits and TNV circuits

The voltage relationships between SELV circuits and TNV circuits are shown in the following table:

Overvoltage from telecommunication network possible?	Normal operating voltages	
	Within SELV circuit limits	Exceeding SELV circuit limits but within TNV circuit limits
Yes	TNV-1 circuit	TNV-3 circuit
No	SELV circuit	TNV-2 circuit

2.2.2 Over-voltage Conditions: Lightning

Lightning may occur naturally at any location and the maximum open circuit voltage, between the TNV conductors and the main earth bar, could be up to 7 kV peak. This is in accordance with AS 4262.1, i.e. protection is installed if the voltage is likely to exceed 7 kV and when protection is installed the voltage is limited to 7 kV.

2.2.3 Over-voltage Conditions: Power Induction/EPR

In known EPR Zones, the service is isolated to the maximum expected 50 Hz voltage in accordance with the Earth Potential Rise Code.

In other areas, the likely maximum open circuit voltage, is in accordance with HB 101-1997, and could be:

(a) 2.1 kV peak 50 Hz for 350 ms (1.5 kV r.m.s. as specified in HB 101-1997).

(b) 1.4 kV peak 50 Hz for 500 ms (1.0 kV r.m.s. as specified in HB 101-1997).

(c) (610 V peak 50 Hz for 2 s (430 V r.m.s. as specified in HB 101-1997).

(d) 84 V peak 50 Hz continuous (60 V r.m.s. as specified in HB 101-1997).

3 NETWORK INTERFACE VOLTAGE LEVELS

The following table lists the 'A', 'B' and 'C' categories from the ACMA Telecommunications Labelling (Customer Equipment and Customer Cabling) Notice for which safety testing is required, and the corresponding recommended voltage levels.

Where different Carriage Service Providers support an interface at different voltage levels, the 'worst-case' for the relevant category is identified. CE which is designed and tested to this, the most severe voltage requirement, will therefore be supported by all Carriage Service Providers. Where a device is tested to a less severe level, for connection to a specified carrier, it is suggested that the equipment bear a label stating the voltage level to which it can be connected, and that the test laboratory note that the level supported is lower than the one identified herein.

Designers of SELV-rated multiplexers should be aware that cables may run outside the building in which it is located, in which case TNV levels may be encountered. In such cases, care should be taken with link-to-link isolation, and consideration given to the provision of suitable warning notices on the CE.

While wireless equipment doesn't have a conductive network interface, the equipment is subject to the requirements of AS/NZS 60950.

TLN Category	TLN Category Item	Voltage Level	Examples and notes
A1	CE designed to connect to PSTN – Analogue for voice	TNV-3	Analogue PABX trunk circuits, telephones
A2	CE Designed to connect to PSTN – Analogue for data	TNV-3	Analogue PABX trunk circuits, modems
A3	CE designed to connect to PSTN – digital channel associated signalling (CAS) for voice operation	SELV	Some non-Telstra CAS services
A4	CE designed to connect to PSTN – digital CAS interface for data only	SELV	Some non-Telstra CAS services
A7	CE designed to connect to ISDN – TS014 PRA incorporating voice	SELV	Some non-Telstra ISDN services
A8	CE designed to connect to ISDN – TS014 PRA for data	SELV	Some non-Telstra ISDN services
A9	CE designed to connect to ISDN – BRA incorporating voice	SELV	Telstra's 'on-Ramp-2' service
A10	CE designed to connect to ISDN – BRA for data	SELV	Telstra's 'on-Ramp-2' service

TLN Category	TLN Category Item	Voltage Level	Examples and notes
A11	CE designed to connect to ISDN – ETSI PRA incorporating voice	SELV	Telstra's 'on-Ramp-30' service
A12	CE designed to connect to ISDN – ETSI PRA for data	SELV	Telstra's 'on-Ramp-30' service
A14	CE designed to connect to dedicated digital – LMB (2.048 Mbit/s interface)	TNV-1	Telstra's 'Megalink' services. Note: may be subject to surges.
	CE designed to connect to dedicated digital – LMB (over 2.048 Mbit/s)	SELV	Telstra's 'Megalink' services
A18	Dedicated video CE – without TS024 broadcaster LIU	SELV	Analogue video service
A19	Broadcaster LIU	SELV	Analogue video service
A20	ASA LIU	TNV-3	
A21	CE designed to connect to telex	TNV-3	
A23	Mobile equipment – AMPS	SELV	
A24	Mobile equipment – GSM	SELV	
A25	Mobilesat terminal	SELV	
A26	Cordless telecommunications – CT2	SELV	Cordless handsets
A27	Cordless telecommunications – PHS	SELV	Cordless handsets
A28	Cordless telecommunications – DECT	SELV	Cordless handsets
A39	Mobile equipment – CDMA	SELV	
A49	CE designed for connection to a non-switched voiceband only service	TNV-3	Voice-grade private lines with ring signal, e.g. outdoor extensions
A50	CE designed for connection to a metallic local loop (including broadband, DC power feeding, DC signalling, low frequency AC, voiceband or signalling up to 20 kHz)	TNV-3	xDSL equipment Note: Test laboratories should determine, at time of testing, any special requirements to accommodate remote power-feed systems.
A51	Disability CE	TNV-3	

TLN Category	TLN Category Item	Voltage Level	Examples and notes
A52	Surge protective devices	TNV-3	
A53	CE used in the supply of a PMTS	SELV	'3G' mobile services
B29	System integral terminal that is part of a system	System dependant	Test laboratories should determine, at time of testing, the appropriate voltage level for the device, taking into account the characteristics of the interface to which it is to be connected.
B30	Wireless equipment (CT2, PHS, DECT), including proprietary wireless, that is part of a system	SELV	
B31	Interface for connection of extensions	TNV-2	Indoor extension interface
		TNV-3	Outdoor extension interface
C33	System integral terminal supplied separately	System dependant	Test laboratories should determine, at time of testing, the appropriate voltage level for the device, taking into account the characteristics of the interface to which it is to be connected.
C34	Wireless equipment (CT2, PHS, DECT), including proprietary wireless	SELV	
C35	Digital isolator	System dependant	
C36	Headset or amplifier	TNV-3	
C38	Music-on-hold LIU	System dependant	The test laboratory must determine the appropriate voltage level to protect the CE and network from unknown voltages occurring in the MOH source

4 REFERENCES

Publication	Title
Australian Standards	
AS 4262.1-1995	Telecommunication Overvoltages – Protection of Persons
AS/NZS 60950:2000	Safety of information technology equipment, including Amendment 1
AS/NZS 60950.1:2003	Information technology equipment - Safety - Part 1: General requirements
HB 101-1997 (CJC 5)	Coordination of power and telecommunications - Low Frequency Induction (LFI): Code of practice for the mitigation of hazardous voltages induced into telecommunications lines
Other references	
ACMA TLN	Telecommunications Labelling (Customer Equipment and Customer Cabling) Notice 2001
IEC TR 62102	Electrical Safety – Classification of interfaces for equipment to be connected to information and communications technology networks
Earth Potential Rise Code (Note)	Code of Practice for the Protection of Personnel and Equipment Against Earth Potential Rises Caused by High Voltage Power System Faults

NOTE: The Earth Potential Rise Code (EPR Code), Issue 1, 1984 was published jointly by the Australian Telecommunications Commission (ATC) (now Telstra Corporation) and ESAA. This publication is available from Energy Supply Association of Australia Ltd, GPO Box 1823Q, Melbourne, Victoria 3001.

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This Working Committee was chaired by Merv Sewell of Telstra until June 2004, then Bob Davis. Mike Johns of ACIF provided project management support

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