

Review of Standards for PSTN Customer Equipment and Customer Access Equipment

BACKGROUND PAPER



Introduction

Communications Alliance is seeking comments from users of the AS AS/CA S002 **Analogue interworking and non-interference requirements for Customer Equipment for connection to the Public Switched Telephone Network¹** and AS/CA S003 **Requirements for Customer Access Equipment for connection to a Telecommunications Network²** Standards. This review is a part of Communications Alliance's periodic review of its publications.

AS/CA S002 specifies the technical requirements for Customer Equipment (CE) designed or intended for connection to an analogue Public Switched Telephone Network (PSTN) two-wire service.

AS/CA S003 (in three Parts) specifies the technical requirements for CE that is designed with multiple ports (local or network) that provides or is intended to provide access (gateway functions) to a Telecommunications Network; these devices being capable of switching, storage, processing, conversion, integration, line isolation/coupling or multiplexing of analogue or digital voice or voice equivalent communication.

These two Standards were developed to assist in managing risks in the supply of analogue telephony services over the copper access network, including in respect of:

- the integrity of networks and facilities;
- individual's health and safety;
- access to emergency services; and
- network interoperability of CE used for standard telephone services.

The rapid adoption of telephony services employing IP-based packet technologies, such as Voice over IP (VoIP), and the Australian Government's Multi Technology Mix (MTM) policy for the nbn network, mean that it is now timely for Communications Alliance to consider the medium-to-longer term relevance of these two Standards in managing the risks associated with the supply, connection and operation of customer equipment used for voice communications.

The following issues have been drawn out for the reader to consider:

- the **types of CE** and underlying technology by which voice telephony services are supplied over an IP-based network;

¹ AS/CA S002:2010 is available from <http://www.commsalliance.com.au/Documents/all/Standards/s002>.

² The three Parts of AS/CA S003 are available from <http://www.commsalliance.com.au/Documents/all/Standards>.

- new or emerging network integrity (or other) **risks** relevant to the connection of CE to fixed line networks;
- the extent to which **compliance** with AS/CA S002 and AS/CA S003 is relevant to the ability of VoIP CE (including gateway devices) to facilitate voice calls;
- whether a single, interface-agnostic standard requiring that CE used to supply standard telephony services can be used to **access emergency call services** might be developed; and
- industry demand for additional standard(s) or provisions to manage risks associated with the use of CE in the supply of **IP-based communications services other than telephony**.

Telephony services over the NBN

With the introduction of IP-based networks, including as part of nbn's Multi-Technology Mix (MTM) infrastructure, voice services are being migrated from Time Division Multiplexing (TDM) to packet-based technologies, with VoIP being a typical example.

Telephone services will be delivered over various access technologies including fibre (to the premises, node, building and distribution point - FTTP, FTTN, FTTB and FTTdp), HFC, fixed wireless and satellite. Although there are a variety of network access technologies, the Standards that apply to the CE are agnostic to the types of networks delivering the communications services.

Fibre-To-The-Premises (FTTP)

For the nbn FTTP product, a Network Termination Device (NTD) is being provided as part of the nbn installation. NTDs incorporate a voice user network interface (UNI-V) for connection of 'plain old analogue telephones' (commonly referred to POTS phones) and a data user network interface (UNI-D) over which voice data, including VoIP, services run. The UNI-V interface has been designed to support nbn's customers in providing carrier grade PSTN equivalent telephone services to their end users. Even though UNI-V interfaces are intended for connection of analogue telephones, the actual voice communications are transmitted over packet-switched circuits within the telecommunications Carriers' networks.

The Network Boundary Point (NBP) in the FTTP access network is defined as the service output port on the nbn NTD. This will be the connection port for data (UNI-D) and port for phone (UNI-V). Equipment connected to the UNI-V or UNI-D ports is classified as Customer Equipment (CE) under the ACMA **Telecommunications (Labelling Notice for Customer Equipment and Customer Cabling) Instrument 2015**³ (the TLN).

Equipment on the network side of the NTD ports is classified as Network Equipment. So nbn NTDs are network equipment and the TLN is not applicable to these devices.

³ The ACMA TLN is available from <https://www.comlaw.gov.au/Series/F2015L00190>. Further information is available from <http://www.acma.gov.au/Industry/Suppliers/Equipment-regulation/Telecommunications-customer-equipment-and-cabling/new-telecommunications-labelling-notice-and-technical-standards>

Fibre-To-The-Node / Building / distribution point (FTTN / FTTB / FTTdp)

For the nbn FTTN, FTTB and FTTdp products where the VDSL technology is employed, NTDs are not used. nbn refers to the user network interface for this type of service as the UNI-DSL. RSP customers of nbn may choose to provide an IP-based telephone service for an end user using a separate dedicated Analogue Telephone Adaptor (ATA) device (also called an RSP Gateway). The RSP Gateway is CE and may be incorporated within the customer's VDSL modem.

Power resiliency and battery backup

Under the nbn MTM model, different technologies require different in-premises equipment. Much of the in-premises equipment required to provide a functioning end user service is not supplied by nbn. This in-premises equipment would need to have its own battery back-up to continue to operate in a power outage, where nbn has provided power resiliency of differing durations in its networks. As such, nbn is unable to advise which services will and will not operate, or for how long, during a power outage at an end users premises. The simple message to end users is that they should not assume services delivered over nbn's network will continue to operate under mains power failure situations.

NTDs are active devices that require external power for their operation. There are two types of power supply available for each FTTP NTD; an AC-DC power supply or an AC-DC power supply with a battery backup. Both power supplies use 240 V a.c. mains input from the served premises.

The power supply with backup includes a battery facility for providing DC power to the NTD for a limited time during an AC mains failure event until the battery output falls below the power required by the NTD. An NTD with a standard power supply will not operate in the event of mains power failure unless the end user supplies their own 240 V a.c. Uninterrupted Power Supply (UPS) back-up.

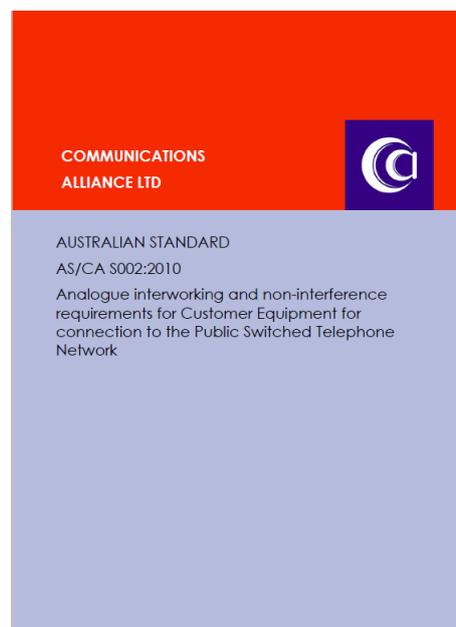
In the case of a voice service supplied over the UNI-D port over FTTP, voice services will only operate in a mains power failure if the RSP Gateway and telephone handset also have a back-up power capability.

Focus on AS/CA S002

Introduction

The AS/CA S002 Standard specifies the requirements and test methods for CE that are designed or intended for connection to an analogue PSTN 2-wire service.

The scope of AS/CA S002 is specifically for CE with a POTS Loop/Ring signalling interface. All AS/CA S002 compliant CE must satisfy the requirements of AS/CA S002 including the out of band requirements in Clause 5.4.2.4, which have been especially chosen to allow coexistence with overlaid DMT-based DSL services (ADSL1/ADSL2/ADSL2+/VDSL2).



Application to IP-based packet technologies

Until now, the AS/CA S002 Standard has been developed to apply to CE designed or intended for connection to an analogue PSTN 2-wire service. With CE now being connected to a UNI-V or (via a RSP gateway) to a UNI-D port of an NTD, are the risks associated with the supply of voice services over IP-based packet technologies (including under the nbn MTM) equivalent to those arising when voice is supplied over a PSTN as defined in AS/CA S002. Should telephones or other CE providing voice capabilities designed or intended for connection to UNI-V or UNI-D interfaces be subject to the scope of AS/CA S002.

Power requirements & emergency access

Clause 5.1.8.3 of AS/CA S002 specifies requirements for mains-powered CE in a loss of mains power condition. In a mains power outage condition, both the nbn's NTD and any connected non-mains-powered CE will not function. Both mains-powered and non-mains-powered CE in such situation would not be able to support dialling of any number. Should this clause be revised to include non-mains powered CE?

Similarly, should Clause 5.1.8.4 of AS/CA S002 on the provision of power-fail advice also be revised to include non-mains powered CE?

AS/CA S002 mandates requirements for emergency services access, where applicable, but for externally powered CE this will, in general, not be possible in the event of loss of power.

Focus on AS/CA S003

Introduction

The AS/CA S003 **Requirements for Customer Access Equipment for connection to a Telecommunications Network** Standard specifies requirements and test methods for CE that provides access (gateway function) to a Telecommunications Network and is capable of switching, storage, processing, conversion, integration, line isolation/coupling or multiplexing of analogue or digital voice or voice equivalent communications.

AN RSP Gateway is Customer Access Equipment (CAE) as defined in AS/CA S003.

AS/CA S003 has been scoped to apply to CE with analogue and digital metallic interfaces, optical interfaces and wireless interfaces. A non-exclusive list of examples is given for guidance. The range of interfaces and signalling schemes is therefore quite wide to cater for any interface that CE connects to over which public network communications can be carried. It encompasses Ethernet, POTS, mobile wireless, E1 metallic, ISDN, optical and ATM.

Application to IP-based packet technologies

Fibre-To-The-Premises (FTTP)

If an RSP gateway is provided to be connected to an NBN NTD, then the gateway is subject to AS/CA S003.

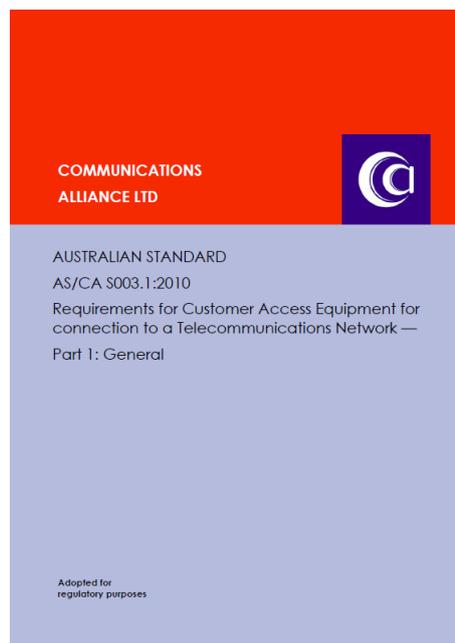
On the other hand, if the gateway is supplied by the Carrier as network equipment, then the gateway is not subject to AS/CA S003. Also, when CAE functionality is included in NTD (including as part of nbn's fibre network), AS/CA S003 is still not applicable since the nbn NTD is network equipment.

HFC

The UNI-V may be incorporated in the HFC cable modem, which includes an Embedded Multimedia Terminal Adapter (eMTA). If the coaxial socket is being considered as the network boundary, the eMTA in the cable modem must comply with AS/CA S003. Otherwise the eMTA and cable modem is considered as network equipment and AS/CA S003 is not applicable.

Fibre-To-The-Node (FTTN)

In nbn's FTTN product and the provision of the UNI-DSL service, the RSP Gateway and the VDSL modem (which may be a single device) are similar to those that are deployed in current VoIP services offered by other Carriers. AS/CA S003 is applicable to these Gateways and VDSL modems.



Again for the nbn MTM for future access, AS/CA S003 compliant CE must satisfy the same out-of-band requirements as for AS/CA S002 compliant CE to allow coexistence with DSL services that may be overlaid on POTS or carried in the same cable sheath.

The current requirements in AS/CA S002 and AS/CA S003 address the interference and coexistence with DSL services both overlaid and within the same cable sheath.

Alignment with AS/CA S002

Clauses 5.1.3.2, 5.1.7, and 5.8.7 of AS/CA S003.1 specify or reference requirements for Loop-in PSTN line and the PSTN interface and are proposed to be removed. These requirements were in an earlier version of AS/CA S002 but have been removed from the current 2010 version.

Power requirements & emergency access

Emergency services access is mandated (where applicable) but practically all AS/CA S003 compliant CE will be externally powered and as with AS/CA S002 compliant CE emergency services access cannot be guaranteed under powerfail conditions unless some form of standby power is provided. If there is no power available then the CE becomes inoperative.

With the increasing number of IP-based voice services replacing PSTN services, the use of ATA and Voice Gateways in conjunction with access devices (e.g. modems, Optical Network Termination Units) that do not incorporate standby power, together with the pervasiveness of wireless mobile networks, it could be argued that the requirements for emergency services access under powerfail conditions for AS/CA S002 and AS/CA S003 compliant CE are becoming redundant.

This especially appears to be the case where AS/CA S002 compliant CE that operates with a current PSTN connection under powerfail conditions becomes inoperative when it is connected to a replacement VoIP service that uses a gateway that is itself inoperative under powerfail conditions.

A possible requirement to mandate a minimum period of operation under powerfail conditions for AS/CA S003 compliant CE would make much of this class of CE expensive, add to the design complexity and operational requirements for backup reliability (e.g. battery testing, replacement and recycling).

Invitation to comment

Communications Alliance invites interested parties to make submissions to the review of the AS/CA S002 and AS/CA S003 Standards. Submissions should be made:

By email to: m.johns@commsalliance.com.au

Via our website at: <http://www.commsalliance.com.au/Documents/Documents-under-Review>

By mail: Mike Johns
 Project Manager
 Communications Alliance
 P.O. Box 444 Milsons Point NSW 1565

The closing date for submissions is **5 p.m. Wednesday 13 July 2016**.

Additional regulatory information

The Australian Communications and Media Authority (ACMA) has the ability to 'make' technical standards for customer equipment under telecommunications legislation (specifically the *Telecommunications Act 1997*). Under section 376 of this Act, the ACMA may make a technical standard relating to specified customer equipment for:

- (a) protecting the integrity of a telecommunications network or a facility; or
- (b) protecting the health or safety of persons who:
 - (i) operate; or
 - (ii) work on; or
 - (iii) use services supplied by means of; or
 - (iv) are otherwise reasonably likely to be affected by the operation of; a telecommunications network or a facility; or
- (c) ensuring that customer equipment can be used to give access to an emergency call service; or
- (d) ensuring, for the purpose of the supply of a standard telephone service, the interoperability of customer equipment with a telecommunications network to which the equipment is, or is proposed to be, connected; or
- (da) ensuring, for the purpose of the supply of a carriage service using:
 - (i) the national broadband network; or
 - (ii) any other superfast telecommunications network;the interoperability of customer equipment with such a network; or
- (db) ensuring that customer equipment or customer cabling that is, or is proposed to be, connected to:
 - (i) the national broadband network; or
 - (ii) any other superfast telecommunications network;meets particular performance requirements; or
- (dc) ensuring that customer equipment or customer cabling that is, or is proposed to be, connected to:
 - (i) the national broadband network; or
 - (ii) any other superfast telecommunications network;has particular design features; or
- (e) achieving an objective specified in the regulations.

AS/CA S002 and AS/CA S003 have been made under s376 of the Act. These two Standards are listed in Schedule 1 of the ***Telecommunications (Labelling Notice for Customer Equipment and Customer Cabling) Instrument 2015*** as high risk Standards.