

4. The Network Boundary and requirement to A-tick

In the figures on the preceding page the xDSL DSLAM is clearly shown as customer equipment. Such a definition avoids any mandatory requirement to shape the downstream xDSL signals in Deployment State A of the ULLS Performance Requirements Industry Code when using common cable sheaths with access network xDSL systems. However, such shaping is still recommended (see Section 5 Further Information below).

Customer equipment used for xDSL transmissions that are fully within customer premises should only require to meet the requirements of the TLN when there is the potential to cause detriment to a network service due to use of common cable sheath or direct connection to a PSTN line as addressed above. Where there is no common cable with and no connection to ULLS, then there is no case for compliance with the requirements of the TLN (e.g. for use of Ethernet within premises) and that should apply to customer premises xDSL installations in separate cable.

However, equipment connected to the PSTN must meet the requirements of the TLN. That means that CE filters, modems, 'exchange' filters and xDSL DSLAMs require an A tick or a non-compliance label and have 'Carrier permission to connect'. Clearly there is currently no mechanism to A-tick 'exchange' filters and xDSL DSLAMs in customer premises and 'Carrier permission to connect' would be the only option.

Further it is strongly recommended that an A-tick also be required for xDSL modems and equipment connected to metallic pairs in common cable sheaths (with network originated xDSL or PSTN lines that could carry xDSL in the future). That means xDSL modems would need to be A-ticked to AS/ACIF S043.2. There is currently no mechanism to specify xDSL DSLAMs in this situation apart from a recommendation to comply with the spectral compatibility guidelines of the ULLS Performance Requirements Industry Code.

A specification for xDSL DSLAM 'exchange' filters for connection to PSTN lines appears to be necessary in order to provide the needed A-tick. It is recommended that the exchange end component of Telstra Technical Reference Document RCIT.0004 be used for that specification, either formally through its adoption as a Customer Equipment Standard or informally by declaring it a requirement for 'Carrier permission to connect'.

5. Further information

Extract from Part 1 of the ULLS Performance Requirements Industry Code (C559:2006):

- 11 OPERATION OF SYSTEMS IN CUSTOMER PREMISES (INFORMATIVE)
- 11.1 *Systems that are not operated using the ULLS, but share customer cabling with systems operated using the ULLS may cause excessive crosstalk.*
- 11.2 *It is therefore recommended that all non-ULLS installations of Broadband systems (including LANs and all Deployment Classes other than 3a and 4a) should be kept in separate cable sheaths from ULLS systems.*
- 11.3 *However, if sharing occurs it is recommended that those non-ULLS broadband systems should be installed in the shared cable according to the Deployment Rules for ULLS systems, based on the relevant Deployment Reference Point and Lowest Asymmetric System Feed Point within the access network. Hence the following Deployment Rules are recommended in shared cable within the customer premises:*
- (1) Systems belonging to Spectrally Asymmetric Deployment Classes or LAN systems should not be deployed in shared cabling; and
 - (2) Systems belonging to Spectrally Symmetric Deployment Classes should only be used in shared cabling if the total attenuation from the Deployment Reference Point in the access loop to the most distant point in the customer premise is less than the Deployment Limit for that Deployment Class.

xDSL provision from a DSLAM in a customer building



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There are a number of rules that must be followed when providing broadband xDSL access (VDSL2 or ADSL2+ or ADSL) on customer cabling from a DSLAM (a DSL Access Multiplexer) in the customer building (Basement DSLAM). Neglecting to follow these rules may result in customer services in the building not working correctly or at all.

The main references which contain rules for determining the performance, including interference, of the services are:

- (a) the Communications Alliance *Unconditioned Local Loop Service (ULLS) Network Deployment Code (C559:2006)*; and
- (b) the *Installation requirements for customer cabling (Wiring rules) (AS/ACIF S009:2006)*, specifically Clause 5.11 *Interference to other circuits*.

1. Sharing a pair from the exchange

Providing xDSL on Customer Premises Cabling, i.e. a building customer cable pair that carries an analogue telephony service provided from a source outside of the building (such as from the local exchange or roadside cabinet), is NOT ALLOWED WITHOUT CARRIER PERMISSION except where the filter in the DSLAM complies with the requirements of the Telecommunications Labelling (*Customer Equipment and Customer Cabling*) Notice 2001 (TLN) and is A-Ticked. See Figure 1.

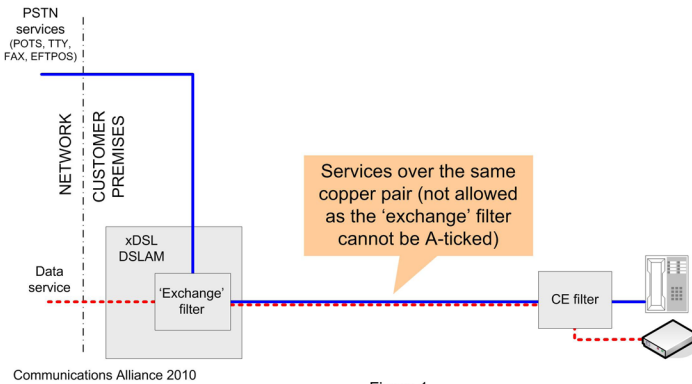


Figure 1
Sharing a pair from the exchange

Note 1: DSLAM filters typically are not able to comply with the TLN and therefore can not be A-Ticked.

Note 2: The 'exchange' filter in the DSLAM in the customer premises may be identical to those in exchange DSLAMs. There is no Australian Standard for such 'exchange' filters, although most are tested to the 'exchange' filter requirements of Telstra Reference

Document *Splitter Specification for ADSL/ POTS Spectrum Sharing Service, Retail ADSL & Wholesale ADSL (No. RCIT.0004)* in order to have Carrier permission to use the ULLS for line sharing. In that case, the detriment to the telephone service would not be any worse than with exchange xDSL.

2. Sharing a cable with a pair from the exchange

xDSL from a Basement DSLAM should use a separate building cable sheath to reduce the chance of interfering with broadband service provided from outside the building (such as from the local exchange or roadside cabinet). If a separate cable sheath is used as shown in the upper part of Figure 2, then there should not be any impact on network xDSL services in other sheaths.

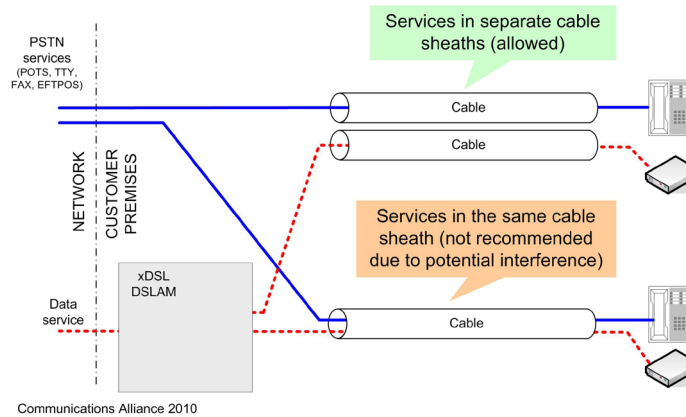


Figure 2
Sharing a cable with a pair from the exchange

If the same cable sheath is used as in the lower part of Figure 2, there are three potential problems.

A. Customers in the building who take xDSL services from an external network source suffer reduced downstream rate as a result of interference from the in building transmissions at higher power in the same cable sheath. Where such unequal level interference may occur in shared access cables, it is avoided by shaping the Power Spectral Density (PSD) of the transmissions from the DSLAM closer to the customer. Telstra shapes the PSD of DSL transmissions from dual feed RIMs to meet the requirement of Deployment State A, as a non Deployment Class System under the *ULLS Performance Requirements Industry Code (C559:2006)*. Deployers of DSLAMs within buildings who wish to share cables that may carry xDSL from the access cables should provide similar shaping to avoid degrading xDSL services from the access network.

- B. Customers receiving VDSL2 services from in-building DSLAMs over cables shared with (future) network fed VDSL2 services could suffer reduced upstream rate as a result of higher power upstream signals originating from VDSL2 Customer Equipment connected to access network DSLAMs. The necessary automated upstream power adjustment of VDSL2 is ineffective in such an environment with disparate DSLAM locations.
- C. The use of VDSL2 services in shared cables in the customer premises introduces a further requirement to use the same band plan 998 (or B8-11 in ITU-T G.993.2 Amdt. 1) that is specified for VDSL2 modems in the *Requirements for Customer Equipment for connection to a metallic local loop interface of a Telecommunications Network— Part 2: Broadband Standard (AS/ACIF S043.2)* and required for modems to obtain an A-tick. Otherwise any upstream transmission at other than the permitted frequencies would cause severe interference to downstream transmissions to network fed modems. To maintain future spectral compatibility, it is strongly recommended that only S043.2 A ticked modems be deployed for customer premises VDSL2 systems in common cabling.

3. DSLAM with PABX local voice

It should also be noted that the implementation of a DSLAM behind a PBX could also adversely affect the operation of the PBX extension service due to attenuation of the voice and ring signals. See Figure 3.

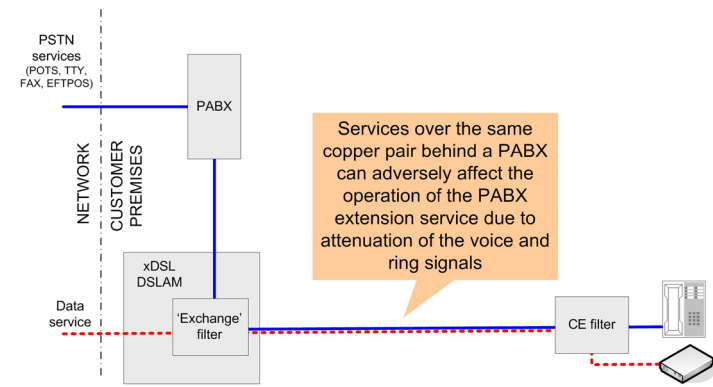


Figure 3
DSLAM with PABX local voice