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Technical Characteristics of the ADSL Interface

Issue: 3.1

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Note: this document replaces Interface Publication KCL CIP017 on this subject – see document history.

1. Scope

This document specifies the technical characteristics of the Asymmetric Digital Subscriber Line (ADSL) Interface as operated by KCOM Group PLC delivered to a customer at the Network Terminating Point (NTP) over KCOM copper loop infrastructure.

Much of the information contained in this document has been published previously in various documents such as ITU-T, ETSI and other standards.

Changes to the network that affect the correct working of terminal equipment will be published by KCOM Group PLC in various documents made available from the address below. If the changes impact on this document then it will be updated.

Enquiries relating to the technical content of this document and the availability of other publications should be directed to:

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2. General

The KCOM ADSL service is provided over single analogue PSTN telephony where KCOM Group owns and provides the copper loop and provides the exchange based ADSL equipment. The ADSL service operates in the frequency spectrum above that occupied by the analogue telephony.

3. The Network Termination Point

The ADSL interface is presented via an RJ 11 socket with the following pin connections:

Pin Number	Signal
1	Not used
2	Not used
3	ADSL
4	ADSL
5	Not used
6	Not used

Table 1.

The RJ 11 socket will normally be provided as part of a replacement telephone line box master socket which will include the standard telephone socket, ADSL RJ 11 socket and integral splitter circuit which separates the ADSL signals from the analogue PSTN telephony signals.

The service may also be provided as “a wires only service” i.e. to a Master Socket as described in KCH CIP001 (paragraph 2.1) [2]. In this case the Customer or End User is responsible for the deployment of line splitter-filters for the protection of the telephony service. The performance characteristics of the line splitter-filter must conform to or exceed those detailed in the paragraph below. Where the End User has
hard wired extension sockets connected to the Master Socket then splitter-filter units are required to be deployed, to a maximum of 4, at all sockets where telephony equipment is connected.

4. Electrical Characteristics of the Interface

The KCOM Group PLC ADSL interface characteristics are
either:

In accordance with ITU-T G.992.1 [1] and ITU-T G.994.1 [3]. The following options / exclusions are implemented:

- Annex A implemented – "Specific requirements for an ADSL system operating in the frequency band above POTS "
- Non-overlapped spectrum
- ATM mode only

Or:

In accordance with ITU-T G.992.5 Annex A [8] (ADSL2+) and ITU-T G.994.1 [3]. The following options /
exclusions are implemented:

- Non-overlapped spectrum
- ATM mode only

The availability of the ITU-T G.992.5 Annex A service interface is subject to roll out of capable equipment in the KCOM network.

The integral splitter complies with ITU-T G.992.1 [1] Annex G Type 1 with ZComplex(1).

5. Service Delivery

ATM PVC

The service provides a single ATM PVC between the Service Provider and the End User. The End User interface will be normally be presented with a VP with VPI 1. The data channel within the VP is normally presented to the end user on VCI 50.

Service Data Rates

The ITU-T G.992.1 service provides the following maximum data rates as UBR:

Nominal Service options kbit/s (at time of publication)	End User upstream ATM cell Rate (kbit/s)	End User downstream ATM cell Rate (kbit/s)
All Service Products	Up to 832	Up to 8192

Table 2.

The ITU-T G.992.5 Annex A service provides the following maximum data rates as UBR:

Nominal Service options kbit/s (at time of publication)	End User upstream ATM cell Rate (kbit/s)	End User downstream ATM cell Rate (kbit/s)
All Service Products	Up to 1024	Up to 24576

Table 3.

Note: Actual data rates provided to the EU will be provided at the highest speed compatible with stable line operation, the terminal equipment capabilities (see Paragraph 8, below) and the specific Service Provider products. The speed of operation will depend on factors that include the noise conditions and length of loop over which the service is provisioned.

Traffic Shaping

Traffic shaping is applied to downstream traffic and must be applied to the upstream traffic

to ensure effective service operation. Upstream shaping up to the appropriate bitrate is required – see Tables 2 and 3 above.

IP Transport

IP is transported from Service Provider to end user via PPPoA using LLC/SNAP as defined in RFC 2364 [5]

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6. Service Access

In order to access services the end user equipment must be able to

- establish a PPP session in accordance with RFC 1661 [6]
- support PPPoA as defined in section 5 above
- support Challenge Handshake Authentication Protocol (CHAP) in accordance with RFC 1994 [7]
- obtain an IP address from the network
- shape upstream traffic to the maximum upstream service bit-rate.

This is normally achieved by using a modem with characteristics as described in sections 2,3,4,5 above in conjunction with a personal computer with suitable software drivers installed.

7. Safety & EMC Information

7.1 Safety

The normal working voltages of the ADSL line interface are defined in ITU-T recommendation G.992.1 [1] and ITU-T G.992.5 Annex A [8]. In addition to the ADSL working voltages the normal working voltages of the single analogue line will also be present. See the interface publication: Technical Characteristics of the Single Analogue Line Interface (KCH CIP001) [2].

The interface presented to the customer is classified as exposed as defined in the CENELEC Report/ETSI Guide ROBT-002/EG 201 212 [4].

7.2 EMC

The network equipment and network terminating equipment related to the provision of the interface comply with the current EMC regulations.

Whilst predominantly installed in residential and commercial environments, this does not preclude the interface being installed in other environments e.g. light industrial and industrial. This should be taken into account by the terminal equipment manufacturer when determining the limits of compliance relevant to their equipment in relation to the protection requirements of the EMC directive.

8. Terminal Equipment Specifications

The minimum recommended terminal equipment performance specification is:

- ITU-T G.992.1 [1] Annex G
- For lines capable of service at ITU-T G.992.5 Annex A [8], terminal equipment must be capable of operation to this specification or optimal stable service delivery rates may not be achieved.

The minimum recommended terminal equipment EMC specifications are listed in the Official Journal of the European Communities for use under the Electromagnetic Compatibility Directive (89/336). The lists are updated regularly and the terminal manufacturer is recommended to comply with the listed standards applicable to their equipment and the target electromagnetic environment.

The minimum recommended terminal equipment electrical safety specifications are listed in the Official Journal of the European Communities for use under the Low Voltage Directive (73/23/EEC). The lists are updated regularly and the terminal manufacturer is recommended to comply with the listed standards applicable to their equipment.

9. Glossary

ADSL	Asymmetric Digital Subscriber Line
ATM	Asynchronous Transfer Mode
BSI	British Standards Institution
CHAP	Challenge Handshake Authentication Protocol
EC	European Community

EMC	Electromagnetic Compatibility
ETS	European Telecommunication Standard
ETSI	European Telecommunications Standards Institute
IETF	Internet Engineering Task Force
IP	Internet Protocol
ITU-T	International Telecommunications Union – Telecommunications Sector
LLC	Logical Link Control

ADSL	Asymmetric Digital Subscriber Line
ATM	Asynchronous Transfer Mode
NTE	Network Termination
Equipment NTP	Network Terminating Point
NTTA	Network Terminating and Test Apparatus
PPP	Point to Point Protocol
PPPoA	Point to Point Protocol over
ATM PVC	Permanent Virtual Circuit
RFC	Request For Comment
SNAP	SubNetwork Attachment Point
SP	Service Provider
TE	Terminal equipment
UBR	Unspecified Bit Rate
VCI	Virtual Channel Idenitifier
VPI	Virtual Path Identifier

10. References

Reference	Standard	Title	Date
[1]	ITU-T G.992.1	Asymmetric Digital Subscriber Line Transceivers	1999
[2] CIP021	KCH Issue 1	Customer Interface Publication KCH CIP001 Technical CharacteristicsDec of the ADSL Interface	2003
[3]	ITU-T G.994.1 2001	Handshake Procedures for digital subscriber line (DSL) transceivers	
[4]	R0BT-002/EG 201 212 V.1.2.1 (1998-11)	Electrical Safety ; Classification of interfaces for equipment to be connected to telecommunications networks	1998
[5]	RFC 2364	IETF : PPP Over AAL5	
[6]	RFC 1661	IETF : The Point to Point Protocol (PPP)	1994
[7]	RFC 1994	IETF : PPP Challenge Handshake Authentication Protocol	1996
[8]	ITU-T G.992.5 (01/05)	Asymmetric Digital Subscriber Line (ADSL) transceivers - Extended bandwidth ADSL2 (ADSL2plus)	2005

Reference documents [1], [3] and [8] may be obtained from: http://www.itu.int/opb/ Reference [2] may be found at: http://www.kcom.com/regulatory/access_info.shtml Reference [4] may be found at: http://www.etsi.org/WebSite/Standards/Standard.aspx Reference [5], [6] and [7] may be found at: http://www.ietf.org/rfc.html

11. History

Date	Issue	Comments	Author
		Precursor document	M. Budd
		Technical Characteristics of the ADSL interface [Issue 1.0 September 2001] KCL CIP017	M. D. Crowther
December 2003	Issue 1.0	KCOM Group PLC publication to replace the above	
May 2005	Issue 2.0	Wires only service added and data rates changed	M. D. Crowther
August 2007	Issue 2.1	Company name change to KCOM Group PLC and change of contact information	M. D. Crowther
March 2008	Issue 2.2	Changes to data rates and minor text changes	M. D. Crowther
August 2008	Issue 3.0	Changes to reflect G.992.5 Annex A service capability	M. D. Crowther
April 2016	Issue 3.1	KC name change to KCOM	Amanda Woodard