



Customer Interface Publication: CIP040

KCOM GROUP PLC WHOLESALE FIBRELINE LOCAL ACCESS SERVICE DESCRIPTION AND TECHNICAL CHARACTERISTICS

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The information in this Customer Interface Publication (CIP) is provided in accordance with the requirements of the Radio Equipment and Telecommunications Terminal Equipment Regulations 2000 (Statutory Instrument 2000 No. 730) to publish (in accordance with the EC Radio and Telecommunications Terminal Equipment Directive 99/5/EC¹) technical characteristics of interfaces used to connect to a Public Electronic Communications Network (PECN).

Users of this document should not rely solely on the information in this document, but should carry out their own tests to satisfy themselves that terminal equipment supplied by them will work with the PECN provided by KCOM Group PLC (“**KCOM**”).

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¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31999L0005&from=EN>

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DRAFT

1 INTRODUCTION

KCOM provides wholesale network access in the form of FibreLine Local Access (the “Service”) to Communications Providers (CPs) seeking to use KCOM’s Public Electronic Network (PECN) to offer competing fibre-based communications services.² The Service enables CPs to use KCOM’s Gigabit Passive Optical Network (GPON) in order to provide residential and business End Users with broadband solutions by siting access equipment in the individual KCOM Next Generation Access (NGA) exchanges. This transport equipment routes the IP traffic that is conveyed over the fixed network connections that exist between each of the individual NGA exchanges and the premises in the Hull Area served by those exchanges.³

This CIP sets out the scope and technical details of the Service provided to CPs. Changes to the technical architecture and network interfaces that affect the correct working of the Service will be published by KCOM in documents made available from the address provided below. This CIP will be updated to reflect any such changes, with the most recent version available at: <https://www.kcomplc.com/regulatory/kcom-wholesale/service-information/technical-interface-information/>.

The technical architecture and specification of the Service may change due to developments in the global DSL industry and industry forums. These parameters of operation may also be impacted by a change in the associated regulatory requirements.

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

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² Under section 87 of the Communication Act (the “Act”) Ofcom has made a determination that KCOM holds Significant Market Power (SMP) in the market for Wholesale Broadband Access in the Hull Area and has required that KCOM provide relevant network access to its Public Electronic Communications Network (PECN), defined in section 151 of the Communication Act. Communications Providers (within the meaning of section 32(4)) are able to obtain such network access where a person making a reasonable request for such access provides a Public Electronic Communications Service (PECS), or a PECN, as defined in section 151 of the Communication Act. (See: <https://www.legislation.gov.uk/ukpga/2003/21/contents>.)

³ In order for a CP to deliver an end-to-end broadband solution to End Users it will be necessary to consume three component elements: FibreLine Local Access, KCOM’s Accommodation Service, and either KCOM’s External CableConnect service or KCOM’s ECAS service.

2 SERVICE DESCRIPTION

The service is shown in concept form below in *Figure 2-1*. There are 2 fundamental access interfaces required for the ECSP and four main components.

The interface are each an Ethernet interface to each SP Head End and a customer delivery Fibre End User access interface port (FEUP). In addition, the ECSP also need to request, rent and maintain a host type facility called KCOM Access Connect and one of two forms of backhaul.

The network equipment employed by KCOM provides services for multiple ECSPs but has a physical limit on the capacity equal to the installed base of each system.

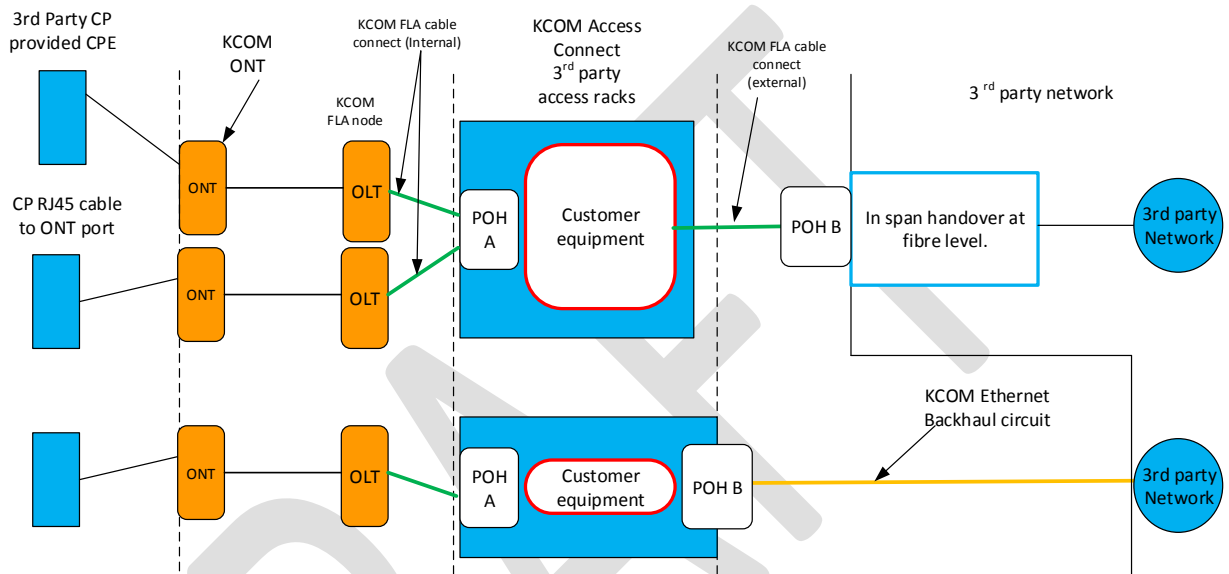


Figure 2-1

2.1 Service availability

The service is designed as an 'always on' as per standard industry terminology. A shared VLAN is designed to carry data communications traffic.

The service is available where ONT port capacity is available at the location requested and an order for that capacity is not in processing.

2.2 Interfaces

There are two interfaces that require description

2.2.1 The End User Connection

The End User connection (ECu) is a port on the fibre connected Optical Network Termination (ONT) device. This is a 1000 Base TX port presented as an RJ45 type 8 wire connection. Each ONT has 4 ports available, each of which can be configured to an individual ECSP. Each port can support multiple services on a FIFO basis. The ONT has maximum capability of 1Gb throughput.

If a single port is used the physical limit of the port in 1000 Base-TX mode will apply.

The service connections are terminated by Optical Network Termination equipment (ONT) installed on the End User premises. The Network Termination Point (NTP) is the designated customer port on the user side of the ONT for a given ECSP.

The ONT port assigned to an ECSP may not be the same port on each ONT requested as ports are provided on a first ordered basis.

2.2.2 VLAN assignment and operation

The service provides a shared VLAN structure per ECSP using VLAN N to 1 technology that allows the ECSP to communicate to the ECu group on an OLT via the use of a single ECu provided MAC address for a Layer 2 delivery.

The service operates as an Ethernet channel system utilising the IEEE 802.1D Mac Bridging protocol to provide a IEEE 802.1q VLAN per access node per CP.

The assigned VLAN encapsulates all traffic at the ECu ONT under a single VLAN tag and forwards it to the assigned OLT headend port facing the ECSP Connection.

Security measures in the MAC bridging system operate the same systems as for VLAN separation with additional features to protect all system users.

2.2.2.1 CP VLAN tags

CPs can optionally add C-tags to the data traffic in both directions with the values between 10 and 3999. These tags will be ignored by the KCOM network and transported end to end based on the destination MAC address.

All ECSP VLAN tags will be set to Ethertype of 0x8100 as per IEEE802.1ad.

3 INTERFACES

3.1 End customer interface

The following ECSP End Customer Access physical interfaces are available: 1000 Base-Tx. This is presented for all connections as an electrical RJ45 8 wire interface.

The interface is located on the KCOM ONT sited on the EU premises. The NTP demarcation is the port interface on the KCOM equipment.

The ONT and PSU will require a flat surface. The ONT will require a customer supplied 240V A.C. at a Nominal 2A supply to be available within 2.0m of the NTE location. A standard IEC 13A lead will be supplied or Plug top PSU will be fitted as part of the Installation. A clear 10cm radius is required in the plane of the surface of the power socket faceplate.

Connection between the ECu port and the customer equipment is the responsibility of the customer, and the port to be used will be identified on the EU handover document.

The Ethernet interface characteristics are in accordance with the KCOM Customer Interface Publication KCH CIP 016 [2](available from <https://www.kcomplc.com/regulatory/kcom-wholesale/service-information/technical-interface-information/>).

The physical plug for connection should conform to **ETS 300 001 § 8.2 (GB) [6]**

3.2 ECSP Headend interface

Each OLT that the ECSP requests connectivity to will have either a 1Gb or 10Gb interface assigned on the unit.

For capacity management ECSP is allowed a single 10Gb port (or resilient pair if ordered). For 1Gb interface there is a limit of six 1Gb ports allowed across the resilient cards as part of a single LAG group.

Each ECSP shall reference the service SLAs when considering a resilient or non-resilient connection.

The interfaces are:

1. A single 1 Gbit/s port on a single interface card. The port is either fibre based 1000Base LR Single mode or 1000Base-TX Copper.

2. A LAG of 2-6 1Gbit/s ports spread evenly as possible over two interface cards, the ports are fibre based 1000Base LR Single mode or 1000Base-TX Copper.
3. A single 10Gbit/s port on a single interface card. The 10Gbit/s port is 10000Base-LR single mode only.
4. A Dual 10Gbit/s port LAG spread over two interface cards. The 10Gbit/s ports are 10000Base-LR single mode only.

All the connections above require a KCOM FLA Cable Connect(Internal) product to connect from the port on the OLT to the ECSP Point of Handover A within the KCOM building.

3.3 KCOM Access Connect Site

The KCOM Access Connect site product is designed to provide the required ECSP location within the KCOM building for the Handover Point A to the ECSP equipment.

This product consists of a 600x600 rack space with non-resilient 240V AC power. The product provides for a cooling factor and connectivity as per the Product documentation. Reference **YYY**. The ECSP shall refer to the KCOM ACS product documentation for the equipment that can be fitted in the space.

3.3.1 Physical connections

The ECSP will need to provide the locations and types when ordering the link products. The interface is the connector on the KCOM FLA Cable connect. The ECSP can provide an interface panel or an equipment interface id for the connections. A KCOM Patch Panel will be fitted in the ECSP KCOM ACS rack for the specific delivery type (Fibre / Copper). The ECSP is responsible for ensuring space is available for the panel to be fitted.

The Connector type is LC as standard but other types may be available on request. Access is required to the rack for fitting and testing of the connections. The Ethernet interface characteristics are in accordance with the KCOM Customer Interface Publication KCH CIP 016 [2](available from <https://www.kcomplc.com/regulatory/kcom-wholesale/service-information/technical-interface-information/>). Other interfaces may be available by negotiation.

The connection is presented according to the following IETF specifications:

RFC 791[3]	IETF document : Internet Protocol DARPA Internet Program Protocol Specification
RFC 826[4]	IETF document : An Ethernet Address Resolution Protocol -- or -- Converting Network Protocol Addresses to 48.bit Ethernet Address for Transmission on Ethernet Hardware
RFC 1042[5]	IETF document : A Standard for the Transmission of IP Datagrams over IEEE 802 Networks

3.4 Ethernet configuration

3.4.1 Frame sizes

The KCOM product supports a maximum frame size of 1530 bytes as industry standard. (pre-amble and Inter Frame Gap excluded).

3.4.2 Transparency

The service is transparent to all valid Ethernet frames except for:

- Slow Protocols – the group of protocols that provide service operation including 802.3ah OAM and LACP.
- 802.1X authentication
- Any physical layer signalling such as LLF or auto negotiation.
- 803.2x PAUSE.

3.4.3 Multicast

No multicast replication or handling is provided.

Multi MAC address shall ensure that IP group addresses are unique in the lower 23 bits as per UK industry practise.

3.4.4 Frame replication.

The ECSP shall obey Ethernet Bridging rules. Frames sent from the KCOM network shall not be transmitted back into the KCOM network without the source MAC being altered. This applies in all directions.

3.5 Quality and class of service.

The KCOM service provides a strict FIFO service within the boundaries of the requested service. The ECSP is expected to control all queuing and control mechanisms at both ends of the connection.

The ECSP shall prioritise the traffic flows and connection capacity at both ends of the interface as strict policing is used to manage the capacity to allow for equal operation between all users.

The KCOM CoS is set on the KCOM VLAN transport tag across the KCOM network for the service. This is of equal weight as to the other traffic for the service. Voice traffic services and system management are given a higher priority.

3.6 ECSP external Connectivity

There are two Backhaul options.

- KCOM FLA Cable Connect (external)
- KCOM Ethernet EDAS service.

3.6.1 KCOM FLA Cable Connect (external)

The KCOM FLA Cable connect (external) Product provides for a ECSP to connect the KCOM Access Connect Product to the ECSP own fibre network.

KCOM will provide a costed option to connect between the ECSP's KCOM ACP and a passive footway box in the public domain.

The KCOM fibre will run from the KCOM ACP to the external edge of the KCOM property domain at a location at KCOM sole discretion. A Distance limits of 50m then applies to the external as run distance to the POH B with the length of the cable provided. KCOM will then provide an underground tube connection for the ECSP to tie into.

This connection and / or cable cannot be used for another purpose.

3.6.2 KCOM Ethernet EDAS service

The interface is located on a Fibre NTE sited on the CP premises or POI. The NTP demarcation is the port interface on the KCOM equipment.

This is presented for 1Gb interfaces as either a) an RJ45 socket [1] or b) a 1310 SMF dual fibre working SC/LC connector and for 10Gb interfaces as a 1310 SMF dual fibre working LC connector.

The NTE will require a 19" rack mount with the environmental conditions as provided for in the Manufacturer specification in section XXX. The NTE will require a customer supplied 240V A.C., at a Nominal 5A, supply to be available within 3m of the NTE location. A standard IEC 13A lead will be supplied.

Connection between the NTP and the customer equipment is the responsibility of the CP.

The Ethernet interface characteristics are in accordance with the KCOM Customer Interface Publication KCH CIP 016 [2](available from <https://www.kcomplc.com/regulatory/kcom-wholesale/service-information/technical-interface-information/>). Other interfaces may be available by negotiation.

The IP is presented according to the following IETF specifications:

RFC 791[3]	IETF document : Internet Protocol DARPA Internet Program Protocol Specification
RFC 826[4]	IETF document : An Ethernet Address Resolution Protocol -- or -- Converting Network Protocol Addresses to 48.bit Ethernet Address for Transmission on Ethernet Hardware
RFC 1042[5]	IETF document : A Standard for the Transmission of IP Datagrams over IEEE 802 Networks

4 SERVICE DATA RATES

The Service is provided to the EU over Fibre GPON technology conforming to the KCOM Customer Interface specified in CIP 016 [8].

Publication KCH CIP021 [7], Technical Characteristics of the ADSL interface, Paragraph 5.

Service data rate is based on service selected as part of the order process.

The availability of the service is via the Post Code and address checking system and will be made available to the ECSP.

The broadband network path is shared and so the service will be contended to the maxima determined by the SP. Lower service data rates may on occasion result due to deployment conditions such as fault related congestion within the KCOM Group PLC network. KCOM will take all reasonable steps to minimize such occurrences.

5 KCOM ONT

The Fibre Derived Exchange Line service consists of an active Optical Network Termination unit (ONT) supplied, fitted and operated by KCOM. The ONT is a main electrically powered, 230V 50-60Hz unit that terminates the fibre connection in the customer premise.

There are a number of variants of the ONT but all are of similar size and shape. See section AAA for the outline details.

5.1 ONT Technical Specification

The current four Ethernet / two Voice (4GE+2V) ONT consists of:

- One ATA providing up to 2 independent numbered, same provider, Analogue copper interfaces / lines with either two BT601A (4GE+2VA) or two 4 wire RJ11 interfaces (4GE+2VR).
- 1 Gb Ethernet Layer 2 switch.
- Up to 4 10/100/1000 Base-T Ethernet Data Interfaces.

The Voice ports are not further described in this document.

Other ONT types are in use or may be introduced and KCOM reserves the right to change any of the specifications at any time with reasonable notice.

The ONT contains a laser transmitter compliant to appropriate standards for installation in a domestic environment. [7]

5.1.1 ONT size

The unit currently fitted dimensions are (H x W x D) as fitted vertically on a wall:
4GE+2VA: up to 200mm x 160mm x 36mm.
Different variants have differing styles and shapes.

5.1.2 ONT positioning requirements

As an Active unit, the ONT needs to be fitted to a fixed surface such as a wall or vertical surface and within 1m of a domestic indoor main power socket. The KCOM fitting engineer will have final decision as to the suitability of the customer location.

Where the current PSTN Master socket is not co located then the KCOM fitting engineer will wire to the master socket where reasonably practical and technically possible.

5.1.3 Power supply

The ONT is powered via a low voltage single feed including the capability for a battery backup unit in-line with the low voltage supply line.

The mains PSU is suitable for use with a normal UK indoor domestic 230V (AC) supply.

The units should only be used in-conjunction with the KCOM power units.

For the 4GE+2VA unit:

- Mains supply – 100 to 240V AC 50-60Hz
- ONT input supply – 11-14V DC, 1.1 Amp

Power consumption:

- Minimum 5.2W, Maximum 14W Average 7.6W

5.1.4 Battery Backup Unit

The service is not supplied with a Battery Backup Unit. Should the ECSP require Power resilience they need to provide this capability.

5.1.5 Ethernet ports

The ONT has

- Four 100/1000 Base-T Ethernet data ports.
- Data transfer at wire speed to the 1 Gb limit of the ONT.
- Auto-Negotiation

- MDI/MDIX auto sensing

6 POSSIBLE END USER TERMINAL EQUIPMENT

6.1 Fibre to the premises option

The minimum recommended terminal equipment performance specification is: ITU-T G.992.1 Annex G [13]

For lines capable of service at ITU-T G.992.5 Annex A [14], terminal equipment must be capable of operation to this specification or optimal stable service delivery rates may not be achieved.

An example of typical end user terminal equipment to enable successful inter-working with the service is an Ethernet PPPoE capable or RFC bridge CPE connected to a personal computer (PC). In this case, the combined PC and CPE must be able to: **XXX**

KCOM are not responsible for the provision or operation of any end user equipment, PC operating systems, drivers and any associated software.

7 SAFETY & EMC INFORMATION

7.1 Safety

Where the ECSP Customer Interface is presented in optical presentation this is classified as a class 1 laser product as defined in the laser safety product standards BS EN 60825-1/2 [17].

The 10/100Mbps interfaces are classified as unexposed as defined in CENELEC Reports/ETSI Guide ROBT-002/EG 201 212.[18]

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 intended to be installed in commercial and light industrial environments, this does not preclude the Customer Interface or End User NTEs being installed in other environments e.g. industrial.

The service will only be available within the area covered by the KCOM PTO licence granted in 1987¹ or as otherwise specifically agreed with the Customer.

All service delivery is subject to the caveat over fibre rollout related restrictions of service as mentioned within the Product description.

8 AVAILABILITY

The service will only be available within the services will only be provided in the Hull Area as defined in the Licence⁴ granted by the Secretary of State for Trade and Industry to KCOM under section 7 of the Telecommunications Act 1984, on 30th November 1987. This is in recognition of the geographical boundary of the SMP status

All service delivery is subject to the caveat over fibre rollout related restrictions of service as mentioned within the Product description.

9 GLOSSARY

CP	Communications Provider
ECSP	Electronic Communications Service Provider
EUC	End User Customer
EMC	Electromagnetic Compatibility
IETF	Internet Engineering Task Force
FEUP	Fibre End User Port
IP	Internet Protocol
ISP	Internet Service Provider
ITU-T	International Telecommunications Union – Telecom
KCH	KCOM Group PLC, formerly Kingston Communications (HULL) PLC
KC	Kingston Communications: the Consumer Business and Internet Services Division of KCOM
KCOM	KCOM Group PLC
L2TP	Layer 2 Tunneling Protocol
LLC	Logical Link Control
LAG	Link Aggregation Group
NTE	Network Terminating Equipment
NTP	Network Termination Point
OLT	Optical Line Terminator
ONT	Optical Network Termination
PC	Personal Computer
PSTN	Public Switched Telephone Network
PTO	Public Telecommunications Operator
PVC	Permanent Virtual Circuit
RFC	Request For Comment – IETF Publications
RJ11	Registered Jack Type 11

⁴ Licences granted by the Secretary of State for Trade and Industry to Kingston upon Hull City Council and KCOM Group PLC (formerly Kingston Communications (HULL) PLC) under section 7 of the Telecommunications Act 1984, granted on 30th November 1987

RJ45	Registered Jack Type 45
SNAP	SubNetwork Attachment Point
SPN	Service Provider Network
UBR	(ATM) Unspecified Bit Rate
UNI	(ATM) User Network interface
VCI	(ATM) Virtual Channel Identifier
VC Mux	Virtual Channel Multiplexing
VPI	(ATM) Virtual Path Identifier

10 REFERENCES

[1]	IEEE 802.3	Information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements— Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications	1988
[2]	KCH CIP 016	Technical Characteristics of the 10Mbit/s and 100Mbit/s digital leased line	
[3]	RFC 791	Internet Protocol DARPA Internet Program Protocol Specification	
[4]	RFC 826	An Ethernet Address Resolution Protocol -- or -- Converting Network Protocol Addresses to 48.bit Ethernet Address for Transmission on Ethernet Hardware	
[5]	RFC 1042	A Standard for the Transmission of IP Datagrams over IEEE 802 Networks.	
[6]	ETS 300 001 § 8.2 (GB)	Attachments to Public Switched Telephone Network (PSTN); general requirements for equipment connected to an analogue subscriber interface in the PSTN	1997
[7]	KCH CIP 021	Technical Characteristics of the ADSL Interface	
[8]	KCH CIP 001	Technical characteristics of the Single Analogue Line Interface	
[9]	RFC 2364	PPP Over AAL5	
[10]	RFC 2516	A Method for Transmitting PPP Over Ethernet (PPPoE)	
[11]	RFC 2865	Remote Authentication Dial In User Service (RADIUS)	
[12]	RFC 2866	RADIUS Accounting	

[13]	ITU-T G.992.1 Annex G	Asymmetric digital subscriber line (ADSL) transceivers	02/07/1999
[14]	ITU-T G.992.5 Annex A	Asymmetric digital subscriber line (ADSL) transceivers – Extended bandwidth ADSL2 (ADSL2plus)	Jan-09
[15]	RFC 1661	IETF: The Point-to-Point Protocol (PPP)	
[16]	RFC 1994	IETF: PPP Challenge Handshake Authentication Protocol (CHAP)	
[17]	BS EN 60825-1/2	[17] Safety of laser products – Part 1: Equipment classification and requirements	2007
[18]	ROBT-002/EG 201 212	Electrical Safety ; Classification of interfaces for equipment to be connected to telecommunications networks	1998

Reference [1] may be obtained through <http://www.ieee802.org/>

References [13] and [14] may be obtained from: <http://www.itu.int/>

References [2],[7] and [8] may be found at:
http://www.kcom.com/regulatory/access_info.shtml

References [6] and [18] may be found at:
<http://www.etsi.org/WebSite/Standards/Standard.aspx>

References [3], [4], [5], [9], [10], [11], [12], [15] and [16] may be found at:
<http://www.ietf.org/rfc.html> Reference 17 may be obtained through
<http://www.standardsuk.com/>

11 HISTORY

Date	Issue	Comments	Author
18/07/2018	1.0	Version 1. New CIP to support new local access (fibre) Wholesale Reference Offer. New technical document to support new interface	D&D TSO KCOM GROUP PLC