



## Customer Interface Publication: CIP026

# KCOM Group PLC IPLine Internet Access Service Description and Technical Characteristics

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## 1. INTRODUCTION

The IPLine Internet Access Service (IPLIA) described in this publication enables delivery of Internet Protocol (IP) services between End User (EU) connections and the Internet under the access control of RADIUS (Remote Authentication Dial In User Service) facilities provided by the Customer. It is provided by the Consumer Business and Internet Services (CBIS) division (referred to throughout this document as KCOM) of KCOM Group PLC to Communication Service Providers (CPs) to enable them to supply broadband Internet service in the traditional licensed area of KCOM Group PLC. The EU service connection is provided to a profile agreed with the CP.

This service to EUs will only be delivered on a single KCOM provided PSTN line. This document sets out the scope and detail of the service.

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 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. SERVICE DESCRIPTION

The base service is shown in concept form below in Figure 1. There is a single RADIUS connection to the CP. The characteristics of this connection are subject to agreement between KCOM Group PLC and the CP. The default connection is via the Internet.

End User Internet connections are achieved by a Point-to-Point Protocol (PPP) session being established over the broadband KCOM Network between the EU and the KCOM Broadband Remote Access Server (BRAS). IP allocation to the EU device is carried out by the KCOM Group PLC BRAS from an allocation owned by the CP on a basis agreed between KCOM Group PLC and the Customer.

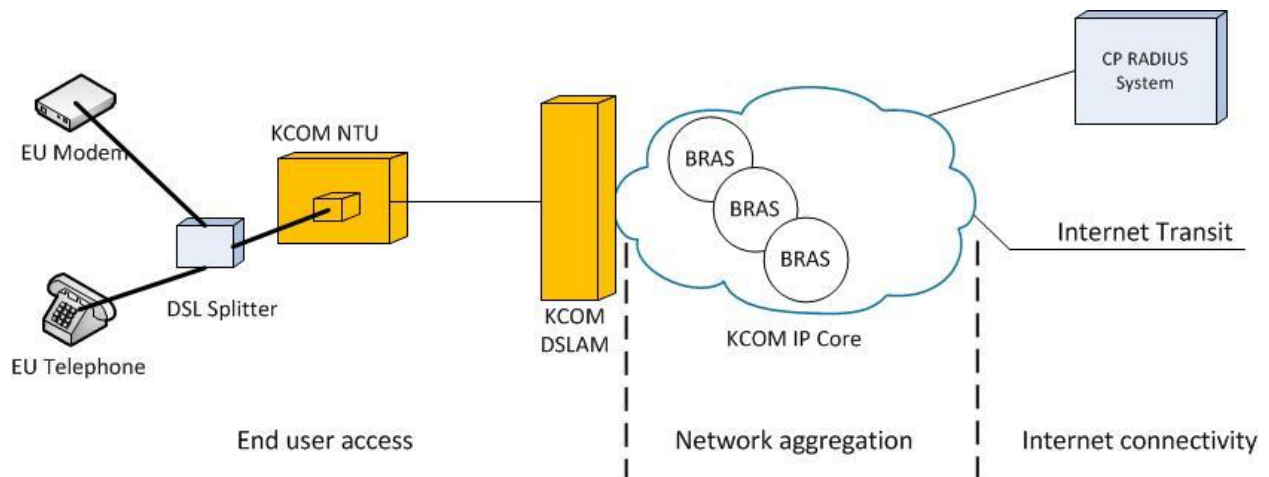


Figure 1

The EU connections are terminated by Customer Network Termination Equipment (NTE) installed on the EU premises. The Network Termination Point (NTP) is the customer/EU side of the NTE.

The EU Internet connections are transported within a VLAN to the Internet. The VLAN is established to an agreed maximum data rate and subjected to traffic measurement for actual capacity utilized. The CP is responsible for ensuring that adequate Internet Transit is purchased to meet contractual commitments to their EUs.

The ADSL service operates in the frequency spectrum above the standard PSTN service and so both services can operate simultaneously. However, the ADSL element of the service is subject to bit-rate and distance limitations.

### 3. INTERFACES

#### 3.1 Service Provider RADIUS Connection

Options for the RADIUS connection are via the Internet or Private Circuit. Interfaces appropriate to the nature of the private circuit will be applicable. See Paragraph 6, below.

This service does not provide RADIUS link encryption.

#### 3.2 End User Access Interface

The EU interface is presented either via an integral splitter or as a “wires only” service.

##### Integral Splitter Presentation

The ADSL interface is presented via an RJ11 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

The RJ11 socket may be provided as part of a replacement telephone line box master socket which will include the standard telephone socket, ADSL RJ11 socket and integral splitter circuit which separates the ADSL signals from the analogue PSTN telephony signals.

The KCOM ADSL interface characteristics are in accordance with ITU-T G.992.1 and ITU-T G.994.1. 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.
- The characteristics of the KCOM Group PLC installed NTE incorporating a line filter are given in paragraphs 3 and 4 of KCH CIP021 Technical Characteristics of the ADSL Interface.
- Connection of EU equipment to the EU access interface is the responsibility of the Customer or EU.
- Wires Only.
- The EU NTP is a wires only service. The detail of the “wires only” standard NTP is given in paragraph 2 of KCH CIP001 Technical characteristics of the Single Analogue Line Interface. For the protection of the telephony service, a filter conforming to or exceeding the requirements of the line filter described in KCH CIP021 Technical Characteristics of the ADSL Interface must be employed by the EU.
- Connection to the EU access interface is the responsibility of the CP.

## 4. SERVICE DATA RATES

The service provides the EU data rates as UBR and for the avoidance of doubt are inclusive of ATM overheads:

IPLIA options	End User upstream ATM cell rate (Kbits)	End User downstream data rate (Kbits)
IPLine Home Max	Up to 448	Up to 8192
IPLine Office Max	Up to 832	

Other data rates may become available in the future or be available by negotiation.

Residential and business services are available only on lines where the appropriate KCOM PSTN service is also provided. The broadband network path to the Internet is shared and so the service will be contended to the maxima determined by the CP.

Service data rates may on occasion be degraded due to deployment conditions such as fault related congestion within the KCOM network, and, as noted above, the nature of ADSL technology which is subject to distance limitations. KCOM will take all reasonable steps to minimize such occurrences.

## 5. ATM LAYER ASPECTS

### 5.1 PVC

The service provides a single ATM PVC between the EU and the BRAS. The EU interface will be presented with a VP with VPI1. The data channel within the VP is presented to the EU on VCI 50. Note these are KCOM standards and are different from other network providers.

### 5.2 Traffic Shaping

Traffic shaping is applied to downstream traffic to the requested service and the EU modem must shape the upstream traffic to ensure effective service operation to prevent upstream flooding of the PPP control packets. Upstream shaping up to actual line rate or as otherwise appropriate is required.

## 6. IP SERVICE FEATURES

### 6.1 Transport

IP is transported between the EU and Internet via the use of PPPoA using LLC/SNAP as defined in RFC 2364 or via PPPoE using LLC/SNAP as defined in RFC 2364 and RFC 2516. The default encapsulation is LLC on the KCOM BRAS. VC Mux can be supported but will require additional support and configuration per EU.

The KCOM network can support PTA mode and LAC / LNS functionality. This CIP describes the support of PTA mode. For LAC /LNS see CIP 024 or 025 and the end-user PPP session will be terminated on the KCOM BRAS. Termination on the BRAS will be PPPoE.

Other IP transport services may become available over a period of time.

### 6.2 RADIUS and IP Allocation

A RADIUS capability must be provided, configured and managed by the CP. The CP RADIUS system must comply with all relevant IETF standards for interconnection and interworking purposes.

RADIUS operating information is presented to the CP via an agreed delivery mechanism. The default connection will be via the Internet unless otherwise agreed.

RADIUS attribute support is in accordance with IETF documents RFC 2865, RFC 2866 (formerly RFC 2138 & 2139). The CP RADIUS server(s) must comply with these standards in order to successfully interconnect and interwork.

The CP must provide full details of RADIUS host IP addresses for Authentication and Accounting server UDP ports and shared secrets with and resilience details where applicable.

It is recommended that the CP has a back-up RADIUS server so that forwarded access request packets are processed and respond to in a timely manner. Failure to do so will result in the RADIUS processes associated with incoming EU authentication requests will be disconnected in the event of a lack of response by the primary server. If a back-up server is successfully accessed then this will be used for future requests for a configurable period. Connection tests are performed to the CP RADIUS as part of the normal operating process.

The access-request packet attributes that will be forwarded to the CP are:

Number	Attribute
1	User-name
2	User's PAP password
3	User's CHAP-Password
4	NAS-IP address
5	NAS-Port



and the access-accept response must include the following attributes

Number	Attribute
6	Service-type ("Framed")
7	Framed-Protocol ("PPP")
8	Framed-IP-Address

Refer to IETF document RFC 2865 for a more detailed description of the attributes.

CPs requiring specific attribute configuration, or intending to use non-standard RADIUS attributes, must discuss these requirements with KCOM prior to service connection in order to avoid the potential for unexpected operation or service denial.

### 6.3 IP Addresses

IP addresses may be assigned dynamically, statically or consistently to the EU by the Customer RADIUS. These addresses must be owned and supplied by the CP. A dynamic IP address pool only can be hosted by KCOM, if required. IP address requirements should be discussed with KCOM prior to service connection. The CP must provide the appropriate ASN and BGP details to KCOM to allow for the service to be correctly routed.

### 6.4 Record keeping for Legal compliance

The CP is responsible for their customers in respect of all legal compliance and record keeping to meet any legislative requirements. KCOM will retain business records and system information history to meet any legislative requirement placed directly on KCOM by the appropriate legislation.

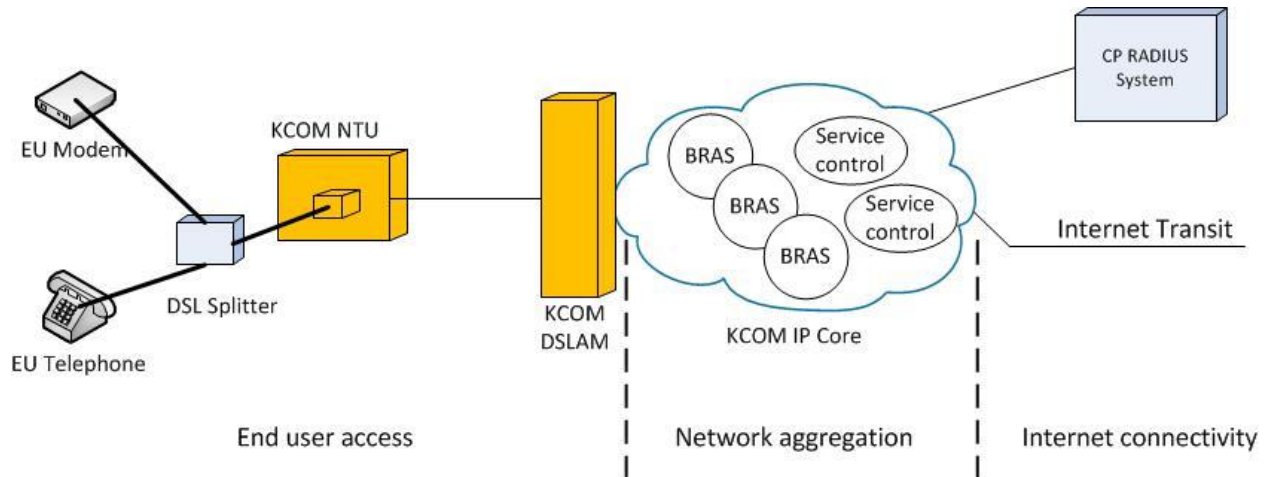
## 7. CP PRIORITIZATION AND CONTROL

### 7.1 Outline Profile Service Operation

This service option provides a mechanism for the CP to provide EU service differentiation based on their own EU service profiles. This option requires the CP to purchase the IPLIA Home Max or IPLIA Office Max EU connections. A web service interface is provided for the CP to establish a service profile to each EU.

Deep packet inspection coupled with an agreed number of prioritized queues on the service connection provides a policy based bandwidth sharing mechanism to the CP for service profiles at the indicated control point of the DPI system.

The outline of this extended service variant is shown below:



KCOM will provide up to 10 service profiles for the CP to agreed specifications at the start of service. Each service profile is defined by the following minimum parameter set:

Key Parameter	Comment
Peak Information Rate (PIR) expressed in kbps for both Upstream and Downstream service	The peak speed/throughput a subscriber will experience based on having the line speed available.
Committed Information Rate (CIR) expressed in kbps for both Upstream and Downstream service	The guaranteed speed/throughput a subscriber have assigned at the control point.  (NB Note paragraph 4 all overhead and the requirement in paragraph 2 for adequate Internet Transit to be purchased)
Subscriber Priority expressed as an integer.	The priority a subscriber is allocated when traffic is queued. This relates to the logical queue structure, see below.
Traffic Quota	Daily, weekly, monthly byte quota values by time of day

## 7.2 Detailed Profile Service Operation

KCOM Group PLC will provide up to 10 initial profiles with an associated logical queue structure in the Internet Transit as agreed with the CP. The profiles will be established for the CP in the In-Line Profile Traffic management control point. The CP is responsible for assigning an EU to a specific service profile via the Web Services interface as described in KCOM Group PLC CIP-027, Technical Characteristics and Service Description of the KCOM Group PLC Wholesale Web Application Service Provider Interface.

Where a service profile has a traffic quota enforced (e.g. to implement a fair usage policy) a subscriber may only download the amount of data determined by the service profile. Radius accounting data is provided at an agreed frequency to enable the CSP to implement usage based service options. Alternatively, when the download has exceeded the quota, the service profile for that subscriber will be marked as "in breach" and a pre-determined set of "breach" service profile parameters will be enforced. Typically the PIR and/or CIR will be reduced to a low value, until the quota is reset at the end of the day, week or month OR the service profile is reset using the web service interface (as per CIP-027).

## 8. POSSIBLE END USER TERMINAL EQUIPMENT

An example of typical EU terminal equipment to enable successful inter-working with the service is an ITU-T G.992.1/ANSI T1.413 compliant ADSL ATU-R modem with a USB interface connected to a personal computer (PC). In this case, the combined PC and CPE must be able to:

- Establish a PPP session in accordance with RFC 1661.
- Support PPPoA or PPPoE as defined in section 6 above.
- Support Challenge Handshake Authentication Protocol (CHAP) in accordance with RFC 1994.
- Obtain an IP address and default routing information via the RADIUS / PPPoA or E process.
- Use ATM Channel PVC VPI1 and VCI 50 for data transmission/reception.
- Carry out upstream traffic shaping to the ATM rate as specified above to ensure correct PPPoA or E operation.

All EU equipment shall comply and be operated in accordance with the KCOM ANFP as defined in NICC ND1604 and the associated documents. Compliance is the sole responsibility of the CP.

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

## **9. SAFETY & EMC INFORMATION**

### **9.1 Safety**

The information relating to the EU interface is set out within the following publications: KCH CIP001 Technical characteristics of the Single Analogue Line Interface and KCH CIP021 Technical Characteristics of the ADSL Interface.

### **9.2 EMC**

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

Whilst predominantly intended to be installed in residential, commercial and light industrial environments, this does not preclude NTEs being installed in other environments e.g. industrial.

## **10. CUSTOMER BASE**

The target customer base is intended to be providers of broadband Internet. The KCOM Broadband platform is capable of offering services to CPs wishing to provide Internet service to residential telephony customers and businesses that are served by copper local loop cable. For avoidance of doubt, service will not be provided on PABX Group exchange lines. Service will only be provided on KCOM Centrex exchange lines where the KCOM telephony supply equipment is co-located with the DSLAM equipment.

## **11. AVAILABILITY**

The service will only be available within the area covered by the KCOM PTO license granted in 1987<sup>1</sup>.

All ADSL delivery is subject to the caveat over distance related restrictions of service as mentioned above.

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<sup>1</sup> 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

## 12. INTERCONNECTION ARRANGEMENTS

Interconnect with other CP networks is not part of this service.

## 13. GLOSSARY

ADSL	Asymmetric Digital Subscriber Line
ATM	Asynchronous Transfer Mode
ATU-R	ADSL Terminal Unit – Remote
BRAS	Broadband Remote Access Server
CIR	Committed Information Rate
CP	Communications Provider. (Providers of Electronic Communication Services)
CSP	Communications Service Provider
DSLAM	(Asymmetric) Digital Subscriber Line Access Multiplexer
EU	End User
IETF	Internet Engineering Task Force
IP	Internet Protocol
IPLIA	IPLine Internet Access service
ITU-T	International Telecommunications Union – Telecom Standardisation Sector
KCH	Kingston Communications (Hull) PLC (previous company name)
KCOM	KCOM Group PLC
L2TP	Layer 2 Tunneling Protocol
LAC	L2TP Access Concentrator
NTE	Network Terminating Equipment
NTP	Network Termination Point
PABX	Private Automatic Branch Exchange
PC	Personal Computer
PPPoA	Point to Point Protocol over ATM AAL5 (RFC 2364)
PIR	Peak Information Rate
PPPoE	Point to Point Protocol over Ethernet (RFC 2364 and RFC 2516)
PSTN	Public Switched Telephone Network
PTO	Public Telecommunications Operator
PVC	Permanent Virtual Circuit
RADIUS	Remote Authentication Dial In User Service
RFC	Request For Comment – IETF Publications
RJ11	Registered Jack Type 11

SNAP	SubNetwork Attachment Point
UBR	(ATM) Unspecified Bit Rate
VCI	(ATM) Virtual Channel Identifier
VC Mux	Virtual Channel Multiplexing
VPI	(ATM) Virtual Path Identifier

## 14. REFERENCES

Source	Standards	Notes
KCOM Group PLC	Customer Information Publications (CIPs) as referenced in this document	Available at: <a href="http://www.kcomplc.com/regulatory/kcom-wholesale/service-information/technical-interface-information/">http://www.kcomplc.com/regulatory/kcom-wholesale/service-information/technical-interface-information/</a>
Internet Engineering Task Force	RFC Documents	Available at: <a href="http://www.rfc-editor.org/">http://www.rfc-editor.org/</a>
International Telecommunications Union	ITU-Telecommunications Standards	Available at: <a href="http://www.itu.int/en/Pages/default.aspx">http://www.itu.int/en/Pages/default.aspx</a>

## 15. HISTORY

Version No.	Issue Date	Author	Reason for change
1.0	June 2006	M. D. Crowther	Initial Version.
2.0	September 2006	M. D. Crowther	Introduction of profile service option and new EU connection options.
2.1	August 2007	M. D. Crowther	Company name change and logo changed. associated changes
2.2	April 2016	Amanda Woodard	Change of company name from KC to KCOM and document formatting changes
2.3	July 2017	Ian Peet	Updated version for core technology.