Customer Interface Publication: CIP-048 Wholesale Fibre Services

KCOM Group Limited
Wholesale Fibre DESCRIPTION AND TECHNICAL CHARACTERISTICS

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1 INTRODUCTION

This document describes the technical characteristics of the KCOM Wholesale Fibre Service.

The Service provides Communications Providers (CPs) with a high-capacity Ethernet Network-to-Network Interface (NNI) for the delivery of Wholesale Fibre services.

The Wholesale Fibre Service supports the aggregation of multiple Wholesale Fibre Virtual Cable Connects (V-Connects) and presents them to a Communications Provider (CP) at an agreed Point of Handover using one of the following Network-to-Network Interface (NNI) models:

- Model A – One or more 10Gb Ethernet interfaces presented as a single logical Link Aggregation Group (LAG).
- Model B – A single 100Gb Ethernet interface.

The Service provides a scalable Ethernet aggregation platform that enables Communications Providers to consume Wholesale Fibre services through a range of interface options.

These interface options provide flexibility for Communications Providers requiring different capacity, resilience and growth requirements, whilst maintaining a common underlying Wholesale Fibre architecture.

KCOM wholesale, the wholesale division of KCOM Group Limited provides this service to Communications Providers, enabling the delivery of their broadband services between the CP Equipment and the service specific equipment within the End-User (EU) Site. References to KCOM within this document refer to KCOM wholesale, unless otherwise stated.

Terms and abbreviations used in this document are included in section 13 of this document, in the Reference Offer for the Provision of Ancillary Services and in the Reference Offer for the provision of KCOM Wholesale Fibre service.

Changes to the technical architecture and network interfaces that affect the correct working of the Service will be published by KCOM Group Limited within documents published on the KCOM website.

This Service may be subject to change due to changes in the UK industry standards and specification forums. It may also be impacted by a change in regulatory requirements applicable to these specifications.

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

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2 Wholesale Fibre Service Architecture Overview

The Wholesale Fibre Service architecture is composed of five key functional layers.

- Access Layer
- Aggregation Layer
- Backhaul Layer
- Physical Connectivity Layer
- Communications Provider Network Layer

2.1 Access Layer (ECI OLT)

Provides fibre access connectivity between End Users (Subscribers) and KCOM aggregation nodes using GPON technology.

2.2 Aggregation Layer (Layer 2 Network)

Provides Ethernet switching, VLAN service separation, and aggregation of multiple End User services into CP-facing NNIs (Network-Network Interfaces).

2.3 Backhaul Layer Local Access Backhaul Service (LABS)

The Local Access Backhaul Service (LABS) provides the Layer 2 transport service between KCOM Wholesale Fibre aggregation locations and the Communications Provider point of handoff.

LABS is an active transport service used to carry Wholesale Fibre traffic and is distinct from the physical connectivity services used to reach the Communications Provider network.

Physical connectivity to the Communications Provider may be provided using Internal Cable Connect (ICC), Exterior Cable Connect (ECC), Ethernet Connect Access Service (ECAS), or other agreed handoff arrangements.

LABS provides KCOM-managed fibre-based transport at defined bandwidths. ECAS provides managed Ethernet-based backhaul over KCOM infrastructure. ECC provides passive physical fibre only.

LABS does not form part of, extend, or modify the NNI service boundary.

2.4 Physical Layer

Physical Connectivity Layer – The Physical Connectivity Layer provides the physical interconnection between the KCOM Wholesale Fibre platform and the Communications Provider's network at the agreed Point of Handover.

This layer comprises the Ancillary Services used to establish and maintain physical connectivity, including:

- Internal Cable Connect (ICC) – connectivity between KCOM network equipment and Communications Provider equipment located within a KCOM exchange.
- Exterior Cable Connect (ECC) – connectivity between KCOM exchange infrastructure and a Communications Provider's external fibre network.

2.5 Communications Provider Network Layer

The Communications Provider (CP) Network Layer comprises the CP's own network connected at the Point of Handover. This layer includes the CP's transport, routing, switching, service delivery, security, and operational infrastructure. The design, operation, resilience, and management of this layer are the responsibility of the Communications Provider and are outside the scope of the Wholesale Fibre Service.

2.6 Transport and Handoff Service Hierarchy

The Wholesale Fibre architecture distinguishes between three service domains to ensure clear separation of function:

2.6.1 Backhaul Transport Services

- Local Access Backhaul Service (LABS) provides managed fibre-based transport between KCOM aggregation locations and Communications Provider handoff points. LABS is available for 10GbE capacity variant.
- Ethernet Connect Access Service (ECAS) provides managed Ethernet-based transport as an alternative backhaul solution where Ethernet handoff or active transport is required

2.6.2 Network-to-Network Interface (NNI) Services

- The CP-facing handoff is delivered via Ethernet interfaces including 10Gb Aggregated, or 100Gb Aggregation interfaces.
- These interfaces represent the logical service boundary between KCOM and the Communications Provider.

2.6.3 Physical Connectivity Services

- Exterior Cable Connect (ECC) and Internal Cable Connect (ICC) provide passive physical fibre or copper connectivity between network elements and do not provide active transport or bandwidth services.

LABS and ECAS are transport services used to deliver connectivity to an NNI. They are not themselves NNI interfaces.

2.6.4 Strict Service Domain Separation

LABS and ECC are independent services. ECC provides passive physical connectivity only and does not form part of the LABS transport service.

LABS is a Layer 2 backhaul transport service. ECC is a separate ancillary service providing physical fibre connectivity between KCOM and a Communications Provider network.

- LABS definition boundary (transport only)
- ECAS definition boundary (managed access extension)
- NNI definition boundary (service demarcation)

- Explicit prohibition of overlap

LABS is a managed 10Gb backhaul service only. It does not provide 100Gb service variants

2.7 Exterior Connectivity Layer (ECC / ECAS)

The Exterior Cable Connect (ECC) service provides passive fibre connectivity between KCOM infrastructure and a Communications Provider network.

ECC provides a physical fibre path only and does not provide Ethernet transport, switching, aggregation or bandwidth services.

ECC provides fibre connectivity between KCOM infrastructure and a Communications Provider network and may support a range of Communications Provider services.

Provides passive fibre connectivity (ECC) or active Ethernet transport services (Ethernet Connect Access Service (ECAS) between KCOM and CP networks.

2.8 Communication Provider Network

Communications Provider infrastructure beyond the KCOM handoff boundary, Network-to-Network Interface.

2.9 Aggregation and Capacity Model

The Wholesale Fibre platform operates as a shared aggregation network using statistical multiplexing principles.

Individual Wholesale Fibre services, End User connections and Virtual Cable Connects (V-Connects) do not reserve dedicated physical bandwidth within the aggregation platform or Communications Provider handoff interfaces.

The aggregate provisioned service bandwidth associated with a Communications Provider may exceed the physical capacity of the underlying handoff interfaces. Capacity is consumed dynamically based on actual traffic demand and utilisation.

KCOM monitors utilisation across the aggregation platform and Communications Provider handoffs and undertakes capacity planning and augmentation activities to maintain service performance within normal operational thresholds.

Communications Providers remain responsible for forecasting demand and ordering additional handoff capacity where required.

2.10 Service Models

KCOM Wholesale Fibre Services support three Network-to-Network Interface (NNI) delivery models. The appropriate model will depend upon the Communications Provider's capacity, resilience and operational requirements.

Virtual Cable Connects (VCCs). A VCC is a logical Layer 2 connectivity construct used to interconnect the OLT, aggregation network and associated service delivery platforms

using VLAN-based service separation. Further details of VCC operation are provided in Section 2.14.1.

All models support the delivery of multiple Wholesale Fibre services and Virtual Cable Connects (V-Connects) using VLAN-based service separation.

2.10.1 Model A: N x 10GE Interface

The 10Gb Aggregated Interface model provides one or more 10Gb Ethernet Network-to-Network Interfaces (NNIs) between the KCOM aggregation network and the Communications Provider, allowing capacity to scale in line with the Communications Provider's requirements.

Under this model, multiple Wholesale Fibre services share the available bandwidth across the provisioned 10Gb interfaces. Traffic is transported using a statistical multiplexing model and individual services do not reserve dedicated physical bandwidth.

Characteristics

- Single 10Gb Ethernet interface
- SFP+ LR optical presentation
- Single Mode Fibre
- LC Duplex connector
- Shared bandwidth model
- Statistical multiplexing
- Suitable for low to medium traffic volumes

Typical Use Case

The model is intended for Communications Providers with relatively low aggregate traffic volumes or those entering the Wholesale Fibre market for the first time.

Resilience

The interface is provided as a single Ethernet connection.

Capacity Management

As aggregate traffic demand increases, KCOM will work with the Communications Provider to review utilisation trends and may recommend the provision of additional 10Gb interfaces where sustained traffic levels approach operational capacity thresholds.

2.10.2 Model B 100G Aggregation Interfaces

The 100G Aggregation Interface model provides a single high capacity 100Gb Ethernet NNI between the KCOM aggregation platform and the Communications Provider.

The interface is intended for Communications Providers with significant traffic volumes and provides a simplified handoff architecture.

Although presented as a dedicated physical interface, the 100Gbps handoff continues to operate as an aggregated Wholesale Fibre service interface supporting multiple VCCs and End User services.

The 100Gb Aggregation interface operates as a shared aggregation point supporting multiple V-Connect services. Capacity is consumed dynamically based on aggregate utilisation rather than being statically allocated as discrete 10Gb equivalents

Characteristics

- Single 100Gb Ethernet interface
- QSFP28 LR4 optical presentation
- Single Mode Fibre
- LC Duplex connector
- 10km optical reach
- High-capacity aggregation interface
- Simplified operational model

Capacity Model

The 100Gb interface operates as a shared aggregation point for Wholesale Fibre services.

Bandwidth is allocated dynamically based on aggregate demand and individual services do not reserve dedicated portions of the physical interface.

Typical Use Case

This model is intended for Communications Providers with:

- Large subscriber bases
- High aggregate traffic volumes
- Dedicated Points of Interconnect
- Long-term growth requirements

The standard model provides a single 100Gb interface.

Where additional resilience is required, future deployments may support:

- Dual 100Gb interfaces
- Diverse aggregation node delivery

Note: Subject to network capability and commercial agreement.

2.11 Wholesale Fibre Architecture Selection

The two delivery models represent a progression of capacity, resilience and scalability for the Communications Provider (CP) handoff.

Model	Capacity Range	Resilience	Typical Deployment
Model A	Up to 10Gbps	Single Interface	Small CP
Model B	100Gbps+	Optional Dual 100G	Large CP

The Wholesale Fibre Service supports two handoff architectures

- One or more 10Gb Ethernet handoff interfaces.
- A single 100Gb Ethernet handoff interface.

Both models utilise the same underlying Wholesale Fibre service architecture and support

the same service functionality. The choice of model primarily affects the capacity, resilience, and operational management of the CP handoff rather than the services delivered to end users.

Communications Providers should select the most appropriate model based on current traffic volumes, resilience requirements, and anticipated future growth. As demand increases, a CP may migrate between models to obtain additional capacity or resilience.

The interfaces are an Ethernet interface to the CP Equipment and a customer delivery Fibre EU Access Interface Port (FEUP). In addition, the CP also needs to request, rent and maintain any required Ancillary Services.

Connectivity Requirements

Regardless of the handoff model selected, the Communications Provider must establish the necessary physical and logical connectivity to the KCOM Wholesale Fibre platform.

The handoff is presented as an Ethernet interface between KCOM's Layer 2 Aggregation platform and the CP's network equipment via a Fibre Ethernet User Port (FEUP). To consume Wholesale Fibre services, the CP must also procure the associated connectivity and accommodation services required to connect to the platform.

These may include:

- V-Connects (VCCs) between OLTs and the Layer 2 Aggregation platform;
- Ancillary Services and/or Distant WSF Services to provide connectivity between exchange locations;
- Co-location facilities within KCOM exchange sites;
- Internal Cable Connects (ICCs) between KCOM aggregation equipment and CP equipment; and
- Backhaul connectivity, either through:
    - Exterior Cable Connects (ECC) to CP infrastructure located within 100 metres of the exchange curtilage; or
    - Ethernet Connect Access Service (ECAS) circuits connecting the exchange site to the CP's nominated Point of Handover within the Hull (OLA).

The Wholesale Fibre platform is a shared infrastructure supporting multiple Communications Providers. Capacity is scalable through the addition of network resources; however, the total available capacity is ultimately constrained by the installed network infrastructure and physical interface availability.

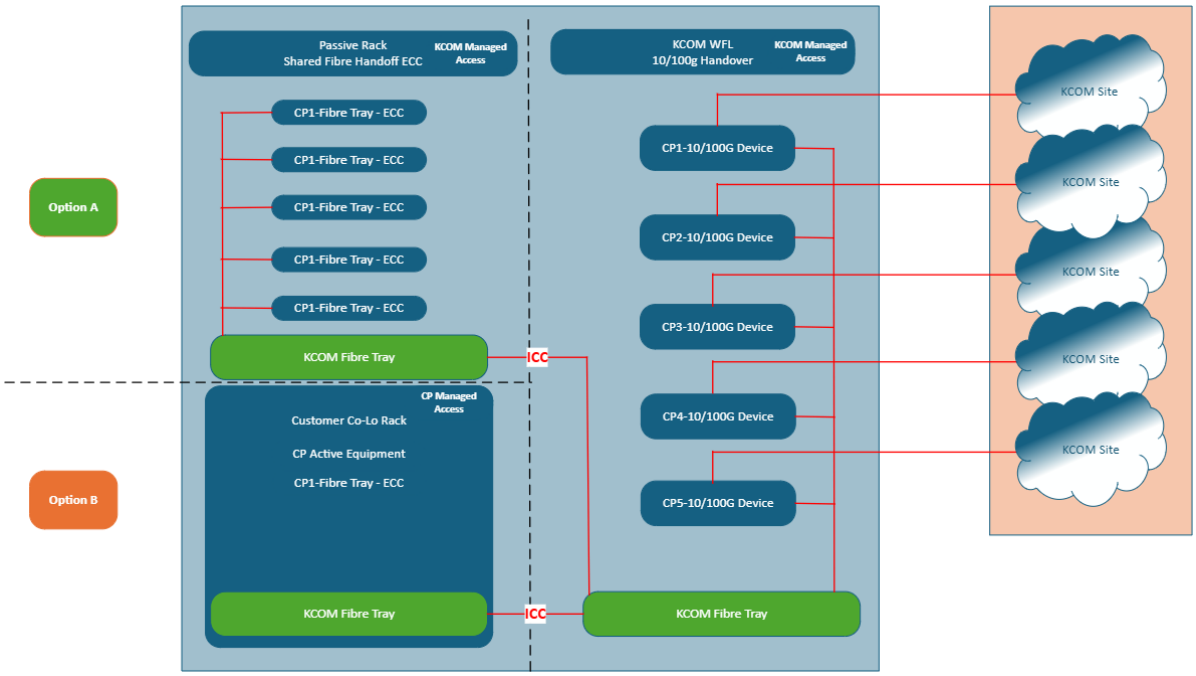

Figure 1 – Wholesale Fibre Options

Two CP Connectivity Options

Option A — Passive ECC Handoff

This is the simplest model.

- The CP provides passive fibre only (ECC).
- The fibre lands on a CP fibre tray in the KCOM exchange.
- KCOM picks up that fibre on the KCOM fibre tray.
- An ICC (Internal Cable Connect) links the passive tray to the KCOM active equipment.
- No CP active equipment is required inside the KCOM site.
- This is a purely passive handoff.

Option B — CP Active Equipment in Co-Lo

This option is used when the CP wants to install their own active kit inside the KCOM exchange.

- The CP rents a Co-Lo rack.
- They install active equipment (e.g., switches, routers).
- Their active equipment connects to the KCOM fibre tray via ECC/ICC.
- This gives the CP more control over optics, power, and monitoring.
- This is a managed access model with CP active presence.

KCOM Managed Access Section

This middle block shows:

- Where ECC lands
- Where ICC is used
- Where CP equipment may or may not be present

- How KCOM manages the physical hand-off

KCOM WFL 10/100G Handover Section

On the right-hand side, you see:

- CP1, CP2, CP3, CP4, CP5 10/100G devices
- Each connecting into the KCOM site / device
- These represent the NNI handoff interfaces (10Gb or 100Gb)

This is the logical service boundary where Wholesale Fibre services are delivered.

2.12 Wholesale Fibre architecture Schematic

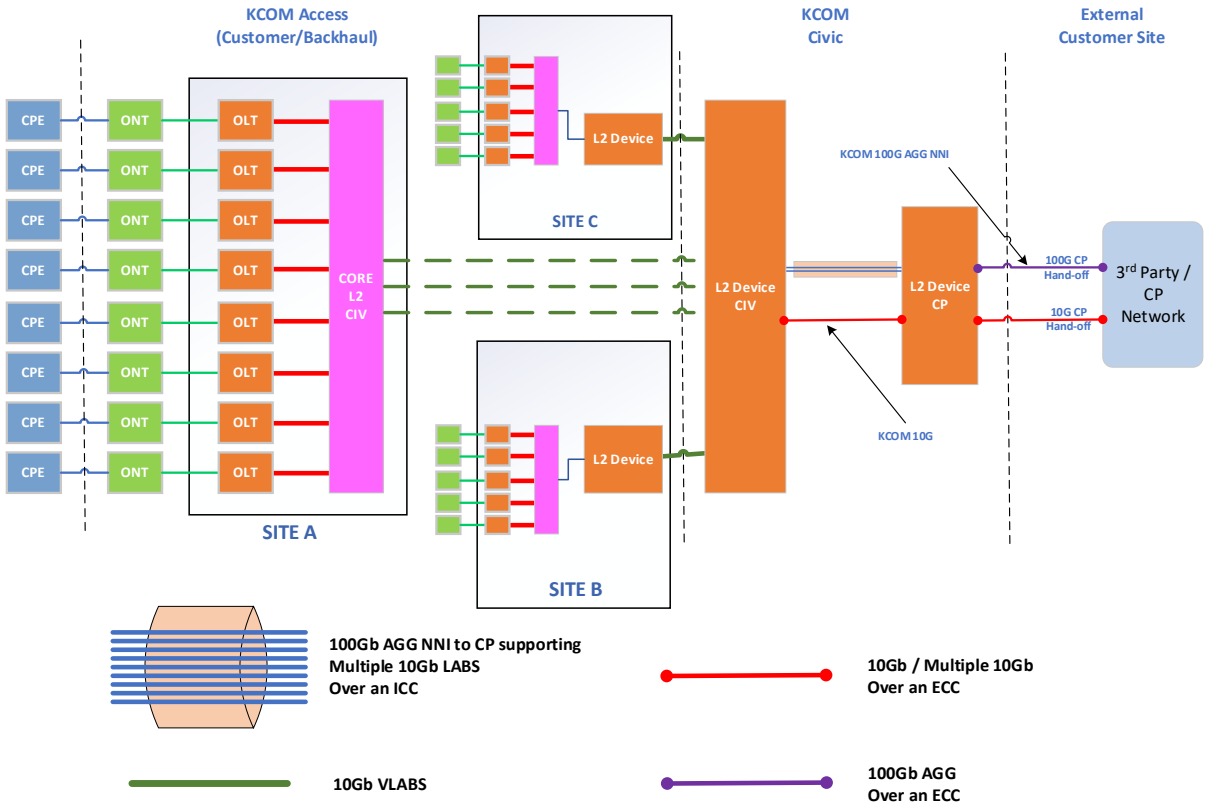

Figure 2 – Wholesale Fibre architecture

This diagram shows the end-to-end KCOM Wholesale Fibre architecture, from the customer premises on the left through to the Communications Provider (CP) network on the far right.

Customer / Access side (left)

At the far left you have multiple:

- CPE (Customer Premises Equipment)
- Connected to ONTs (Optical Network Terminals)

These ONTs terminate the fibre at the customer site and present Ethernet services into KCOM's access network.

The ONTs feed into:

- OLT (Optical Line Termination) equipment

These OLTs sit in Site A (and other access sites) and aggregate multiple end-user fibre connections.

KCOM Access & Aggregation layer

Traffic from multiple OLTs is:

- Aggregated into a Core L2 (Layer 2) CIV network
- Passed through Layer 2 devices (L2 switches/aggregation nodes) at different sites (example):
    - Site A
    - Site B
    - Site C

This layer is responsible for:

- VLAN separation (VCCs / V-Connects)
- Aggregating multiple end users
- Forwarding traffic towards the central aggregation core

Core aggregation and backhaul services

In the centre/right of the diagram:

- A central L2 Device (CIV) acts as the main aggregation point
    - This connects onward into higher-capacity transport links:

Key backhaul paths shown:

- 10Gb LABS (green)
    - Individual managed backhaul circuits from exchange sites
- A 100Gb aggregation connection capable of supporting multiple 10Gb LABS services over an ICC connection. (illustrated bundle)
    - Aggregated internal/exchange-based backhaul
- 100Gb Aggregation NNI (purple / blue paths)
    - Presented at the CP-facing NNI and capable of carrying aggregated Wholesale Fibre traffic
- ECC (Exterior Cable Connect paths)
    - Physical fibre connectivity into external CP environments

CP handoff layer (right side)

On the right-hand side:

- A KCOM CP facing L2 device
- Provides handoff into the 3rd Party / CP Network

Two main service interfaces are shown:

- 10Gb CP handoff (red link)
- 100Gb CP handoff (purple link)

These represent the Network-to-Network Interface (NNI), where KCOM hands traffic over to the Communications Provider.

Key architectural concepts illustrated

- Hierarchical Layer 2 design

- Access (ONT/OLT)
- Aggregation (L2 switching sites)
- Core CIV layer
- CP handoff

- Service separation, the diagram clearly separates:
  - Access services (GPON / ONT / OLT)
  - Backhaul transport (LABS / ECC)
  - NNI handoff (10G / 100G Ethernet interfaces)

- Multiple transport options. It shows three main delivery mechanisms:
  - 10Gb LABS circuits (managed backhaul)
  - ECC providing a passive physical fibre connectivity between KCOM and the CP environment and does not provide managed transport
  - 100Gb aggregation links (high-capacity CP handoff)

- Statistical aggregation model, Multiple customer services are:
  - Aggregated at OLT level
  - Carried across shared L2 infrastructure
  - Delivered into CP handoff interfaces (10G or 100G)

This is a **multi-layer fibre broadband network** where:

- Customers connect via fibre to ONTs
- Traffic is collected at OLTs
- Carried through a Layer 2 aggregation network across multiple sites
- Transported through the KCOM Layer 2 aggregation and backhaul infrastructure
- Finally handed off to a CP network at either 10Gb or 100Gb interfaces

This architecture illustrates how Wholesale Fibre services are delivered from End User ONTs through KCOM's GPON access network and Layer 2 aggregation infrastructure to Communications Provider handoff interfaces.

End User traffic is aggregated at OLTs, carried across the KCOM Layer 2 network, and presented to the Communications Provider via 10Gb or 100Gb Ethernet handoff interfaces.

LABS provides managed backhaul transport where required, while ECC provides separate passive physical connectivity and does not form part of the Wholesale Fibre transport service.

2.13 Service availability

The Service is designed as an ‘always-on’ in accordance with standard industry terminology.

A shared VLAN is designed to carry data communications traffic.

The Service is available subject to availability of ONT port capacity at the requested location and OLT provided that the capacity is not already in flight or not already allocated.

2.14 VLAN assignment and operation

2.14.1 FTTP Estate

This Wholesale Fibre Service provides a 1-1 Double tagged VLAN (Q-in-Q) architecture between the Optical Line Termination (OLT) platform and the Communications Provider (CP).

KCOM allocate a dedicated outer VLAN identifier (S-VLAN) for each Virtual Cable Connect (VCC) associated with a CP on a given OLT.

A **Virtual Cable Connect (VCC)** is a logical Layer 2 connectivity used to interconnect network elements within the KCOM Wholesale Fibre architecture. It provides a controlled, service-aware path between:

- Optical Line Terminals (OLTs)
- Layer 2 aggregation nodes
- Associated service delivery platforms

It effectively acts as a virtual equivalent of a physical fibre jumper but implemented in a VLAN-based transport rather than physical cabling.

Individual End User (EU) services are identified using unique inner VLAN identifiers (C-VLANs) within the associated outer VLAN.

VLAN tags use Ethertype 0x8100 encapsulation.

KCOM allocates up to 4000 inner VLAN tags per outer VLAN instance, per CP. The remaining VLAN identifiers are reserved for operational, management and future service requirements.

The Service is built as a 1-1 Mapping across each OLT. For each EU an intermediate agent function is applied by the OLT for each flow.

Each flow will adopt the local chassis Agent Circuit Identifier (ACI) headers which are generated by the access node in accordance with applicable industry standards and KCOM operational requirements.

The CP may specify an alphanumerical Agent Remote Identifier (ARI) value which is ‘up to’ 16 characters / digits, this must be specified at the point of provisioning. Where configured, the ARI will be included within the subscriber identification information presented towards the Communications Provider.

Traffic from multiple End Users is aggregated by the OLT and forwarded towards the Layer 2 aggregation network via one or more Ethernet uplinks. Where multiple uplinks are deployed, they may be configured as a Link Aggregation Group (LAG) to provide additional capacity and resilience.

2.15 Downstream traffic management

2.15.1 FTTP Estate

Traffic management is applied within the Wholesale Fibre access network to ensure that

End User traffic remains within the contracted Product Rate.

A dual rate colour blind traffic manager is applied on the access platform to restrict Bandwidth limits consuming CP's EU to the Product Rate.

Traffic is policed to the contracted service bandwidth in accordance with the selected Wholesale Fibre product variant.

The traffic management will be applied on the Service access node within the EU s' feeding exchange, but KCOM may also enforce this on the ONT in conjunction with this. In this case the traffic management is applied on the UNI interface.

Traffic management is primarily applied at the access node serving the End User. KCOM may additionally apply traffic management at the Optical Network Terminal (ONT) where supported by the access platform.

A dual-rate colour-blind policer is applied at the access node (and where supported, at the ONT) to enforce the contracted Committed Information Rate (CIR) associated with the selected Wholesale Fibre product variant. Traffic above CIR may be subject to policing up to the configured Peak Information Rate (PIR), where applicable and as defined in the relevant product specification.

Traffic above CIR may be subject to burst handling and policing up to the configured Peak Information Rate (PIR) where applicable.].

Traffic is policed to the contracted Committed Information Rate (CIR) associated with the selected Wholesale Fibre product variant. The applicable CIR values are defined in the relevant product specification.

Traffic that conforms to the configured traffic profile is forwarded using a First-In-First-Out (FIFO) forwarding model.

Each End User service is policed independently, and traffic management is applied in both upstream and downstream directions.

It is KCOM's expectation that the consuming CP will manage the EU's D/S traffic before it enters the network's point of interconnect.

Each EU connection is policed on the Input interface in either direction.
In the downstream direction for each Peak rate speed a Committed Rate CIR and a Peak rate PIR are applied to each individual connection in line with Industry practise.

The burst size for each CIR (CBS) is a ratio of 1/1024 of the CIR.

Example: For a Product Rate of 100Mbps it has a CIR of 35Mbps and a PIR of 100Mbps. CBS would be 35000 bits and PBS 111000 bits.

Policers act on the full packet except for the IFG.

Communications Providers are expected to shape downstream traffic towards the contracted Product Rate before presenting traffic to the KCOM Point of Interconnect.

2.16 Upstream traffic management

2.16.1 FTTP Estate

KCOM applies upstream traffic management to ensure that traffic transmitted from the End User (EU) does not exceed the contracted Product Rate of the WSF Service.

Traffic management is applied as close to the EU Interface as practical and may be enforced at the User Network Interface (UNI) of the Optical Network Terminal (ONT), within the Optical Line Termination (OLT), or through bandwidth allocation mechanisms associated with the relevant PON technology.

For GPON services, Dynamic Bandwidth Allocation (DBA) is utilised to manage upstream transmission opportunities within the PON. Traffic management parameters are applied in conjunction with DBA to enforce the service bandwidth profile.

A dual-rate colour-blind policing mechanism is utilised to enforce the configured Committed Information Rate (CIR) and Peak Information Rate (PIR) associated with the selected Product Rate.

The applicable CIR and PIR values are defined within the relevant product specification and traffic profile.

Traffic exceeding the configured PIR may be discarded by the access network.

Traffic conforming to the service profile is forwarded using a First-In-First-Out (FIFO) forwarding model.

Communications Providers are expected to shape upstream traffic to the contracted Product Rate before presenting traffic to the Wholesale Fibre Service. Failure to do so may result in packet loss due to traffic policing within the access network.

KCOM will forward traffic towards the Network-to-Network Interface (NNI) on a FIFO basis. Traffic management and policing may be applied prior to transmission towards the ENNI in order to maintain compliance with the contracted service profile.

2.17 Maximum frame size

The maximum supported Ethernet frame size is 1530 bytes, including VLAN encapsulation or 1522 bytes excluding preamble and inter-frame gap.

2.18 Frame duplication

Standard Ethernet bridging behaviour applies throughout the Service.

Reflected traffic where the source MAC address remains unchanged must not be transmitted into the KCOM network in either direction.

2.19 Transparency of the Service.

The Service is designed to transport valid Ethernet frames transparently, with the exception of the following protocols and signalling mechanisms:

- Physical layer signaling that is not intended to be transported across the Service,

including Ethernet auto-negotiation.

- Slow Protocols (Ethernet protocol subtype 0x8809), as defined in IEEE 802.3.
- IEEE 802.3x PAUSE frames.
- IEEE 802.1X Port-Based Network Access Control.
- Link Loss Forwarding (LLF) and User Link Loss Forwarding (ULLF).

Frames associated with the above protocols may be filtered, terminated, or discarded by the Service infrastructure

3 Access Network

The access network is based on carrier-grade ECI (Ribbon) and Nokia Optical Line Termination systems supporting GPON services.

3.1 Service Model

There are two service-facing interfaces within the Wholesale Fibre architecture:

- The End User (EU) Interface
- The Network-to-Network Interface (NNI)

The Wholesale Fibre platform supports multiple NNI delivery models to accommodate differing capacity and resilience requirements.

The supported NNI models are:

- Model A –10Gb Aggregated Interface (delivered as an N × 10Gb LAG)
- Model B – 100Gb Aggregation Interface

Further details of each architecture model are provided in Section 2.8.

3.2 End User interface

Each End User is assigned a logical service instance mapped to:

- GPON port
- GEM port / service flow
- VLAN or QinQ encapsulation towards aggregation

Traffic from multiple End Users is statistically multiplexed at the PON layer. No dedicated bandwidth is reserved per End User.

The interface port will be configured for auto negotiation as default. If it is a requirement to change this for any reason, this must be specified at the point of order.

Where 10Gb interfaces are utilised, KCOM may present:

- Standalone or multiple 10Gb interface.
- Multiple aggregated interfaces.

All interface models provide equivalent access to Wholesale Fibre services and Virtual Cable Connects (V-Connects).

3.3 OLT Uplink Behaviour

OLT uplinks connect to the aggregation network using 10Gb SFP+ LR interfaces

Uplinks may be configured as Link Aggregation Groups (LAGs) using the Link Aggregation Control Protocol (LACP).

The OLT performs VLAN classification and service encapsulation only. It does not provide deterministic per-service bandwidth guarantees and traffic is subject to statistical multiplexing within the aggregation network.

3.3.1 Fibre delivered Service

The interface is located on the KCOM ONT sited on the EU premises. The Network Termination Point (NTP) demarcation is the port interface on the KCOM equipment.

3.3.2 Fibre Service EU

The EU connection 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. The Wholesale Fibre Services will be delivered over a single ethernet port on the KCOM ONT. This port can support multiple Services on a FIFO basis as OTT Services. The ONT has a combined maximum capability of 1Gbps throughput.

As 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 EU premises.

The NTP is the designated customer port on the user side of the ONT for a given CP.

Where required in multi-dwelling unit (MDU) environments, any internal in-building wiring or distribution is the responsibility of the customer or building owner and is outside the KCOM Wholesale Fibre service boundary. The service is delivered only to the ONT demarcation point at the End User premises.

The ONT port assigned to an CP may not be the same port on each ONT requested.

3.3.3 Fibre Service active ONT

The Optical Network Terminal (ONT) and associated Power Supply Unit (PSU) shall be installed on a suitable vertical surface, such as a wall, within an environment consistent with normal residential or office conditions.

A customer-provided 230/240V AC mains power outlet shall be available within 2 metres of the proposed ONT location. A suitable power lead or plug-top PSU will be provided as part of the installation, depending on the ONT type deployed.

A minimum clearance of 100mm should be maintained around the power outlet to facilitate installation and maintenance activities.

Connection between the End User Ethernet port and the End User's equipment is the responsibility of the End User. The designated handoff port will be identified within the End User handover documentation.

The physical Ethernet connector shall utilise an RJ45 (8P8C) interface and conform to the applicable requirements of ETS 300 001 §8.2 (GB) where relevant.

3.4 CP Equipment interface

KCOM supports multiple Network-to-Network Interface (NNI) presentation models to accommodate varying Communications Provider capacity, resilience and operational requirements.

The Wholesale Fibre platform supports both dedicated and shared capacity delivery models.

Depending on the service selected, traffic may be delivered via:

- Aggregated 10Gb interfaces.
- Aggregation 100Gb interfaces.

All NNI interfaces are delivered from the KCOM Layer 2 Aggregation platform and may be extended to the Communications Provider via Internal Cable Connect (ICC), Exterior Cable Connect (ECC), Ethernet Connect Access Service (ECAS), or Distant Wholesale Fibre arrangements where applicable.

All NNI models terminate at the CP-facing Ethernet interface; no LABS or ECAS element forms part of the NNI service domain.

3.4.1 Aggregated 10Gb Interface Model

Under the Aggregated 10Gb model, multiple Wholesale Fibre services are mapped onto one or more 10Gb Ethernet interfaces presented as a single logical Link Aggregation Group (LAG) interface.

A dedicated 10Gb Network-to-Network Interface (NNI) is provisioned for exclusive use by a single Communications Provider.

While the NNI is dedicated, individual services do not reserve fixed bandwidth. Instead, all services share the available capacity of the aggregated interface, with traffic delivered using **statistical multiplexing** across the LAG.

Traffic is delivered using statistical multiplexing principles.

- Single or multiple 10Gb Ethernet interfaces presented as a single logical LAG
- Shared bandwidth model
- Statistical multiplexing across the aggregated capacity
- SFP+ LR optics
- Single Mode Fibre
- LC connectors

3.4.2 100G Aggregation Hand-off

The 100Gb Aggregation Handoff provides a high-capacity Ethernet NNI for Communications Providers with significant aggregate traffic requirements.

The interface is presented as a single 100Gb Ethernet connection and supports the delivery of multiple Wholesale Fibre services using VLAN-based multiplexing.

Although physically dedicated, the interface supports multiple Wholesale Fibre services may be delivered across the same 100Gbps handoff.

Optical Parameters

- 100GBASE-LR4
- QSFP28 LR4 optics
- Single Mode Fibre
- LC Duplex Connector
- 10km optical reach

3.5 Capacity Ownership

The Wholesale Fibre aggregation platform operates under a KCOM-managed capacity model in which KCOM is responsible for the design, monitoring, and augmentation of shared network capacity.

KCOM will:

- Monitor aggregate utilisation, across the Aggregation platform and NNI groups
- Maintain aggregation platform performance.
- Plan and implement platform capacity upgrades where needed and agreed.
- Notify the Communications Provider where additional interface capacity is required.

KCOM may notify the Communications Provider where monitored utilisation indicates additional handoff capacity should be considered.

The Communications Provider remains responsible for:

- Forecasting service growth.
- Ordering additional handoff capacity in advance of requirement.
- Managing traffic engineering at and beyond the NNI.

Where available aggregation capacity has been exhausted, KCOM reserves the right to defer or reject new service orders until additional capacity has been provisioned.

Communications Providers are responsible for ordering additional interface capacity in advance of reaching utilisation thresholds.

The Wholesale Fibre service operates using a utilisation-based capacity management model. Capacity planning is based upon monitored and forecast traffic demand rather than the aggregate sum of provisioned service bandwidth.

3.6 KCOM Ancillary Services

These Services are provided through KCOM's Reference Offer for the Provision of Ancillary Services.

Internal Cable Connect (ICC) provides physical connectivity within KCOM exchange and co-location environments and supports connection to the following handoff models::

- Single 10Gb handoffs.
- Aggregation 100Gbps handoffs.

3.6.1 Ancillary Services Co-location

The KCOM Ancillary Services Co-location Service provided the CP accommodation within the KCOM Exchange to support a specified Handover Point A to the associated CP equipment.

This product consists of a 600x600 rack space/footprint with non-resilient 240V AC power. Tis service includes an environmental cooling and associated connectivity within the exchange environment. Full details are in the Ancillary Service Price List.

The CP shall refer to the KCOM Reference Offer for the Provision of Ancillary Services for the equipment that can be fitted in the space.

3.6.2 Ancillary Services Internal Cable Connect

When ordering Internal Cable Connect (ICC) services, the Communications Provider shall provide the required location details and interface specifications, including interface type and termination requirements.

The interface presented on the KCOM ICC is the physical connector used to establish connectivity between KCOM equipment and Communications Provider equipment. The Communications Provider may provide either an interface panel specification or an equipment interface identifier to support service delivery.

A KCOM patch panel will be installed within the Communications Provider's Ancillary Services rack to support the agreed delivery type (Fibre or Copper). The Communications Provider is responsible for ensuring sufficient rack space is available for installation of the patch panel.

LC connectors are used as the standard optical interface, although alternative connector types may be available subject to agreement.

Access to the co-location rack is required for installation, patching, and testing activities. Additional interface types may be supported subject to technical and commercial agreement.

The service supports IP transport in accordance with relevant IETF standards, including:

- RFC 791 – Internet Protocol (IP)
- RFC 826 – Address Resolution Protocol (ARP)
- RFC 1042 – Transmission of IP Datagrams over IEEE 802 Networks

3.6.3 Ancillary Services Backhaul Options

Backhaul connectivity is required to extend service delivery from the KCOM Exchange to the Communications Provider's nominated Point of Handover.

Two backhaul options are available:

- KCOM Exterior Cable Connect (ECC)
- KCOM Ethernet Connect Access Service (ECAS)

3.6.4 KCOM Exterior Cable Connect

ECC provides passive fibre connectivity between KCOM infrastructure and a Communications Provider network.

KCOM will provide a costed option to connect between the CP's KCOM Ancillary Services Co-location Hostel and a passive footway box in the public domain.

The CP will provide a length of cable at the Point of Handover sufficient to be pulled through to, and spliced within, KCOM's cable chamber in the KCOM Exchange.

ECC may be used to transport:

- Individual 10Gb interfaces.
- Aggregation 100Gbps handoffs.

3.6.5 KCOM Ethernet Connect Access Service (ECAS)

ECAS is a managed Ethernet backhaul service that extends connectivity from the KCOM Exchange to the Communications Provider's nominated Point of Handover within the Hull Area. It provides an alternative to self-provided fibre infrastructure and enables delivery of backhaul as a managed service.

Both options provide backhaul connectivity between the KCOM Exchange and the Communications Provider network, with selection dependent on the CP's network design, resilience requirements, and operational preference.

The ethernet interface characteristics are in accordance with the KCOM Customer Interface Publication KCH CIP 016 [2](available from:

https://www.kcom.com/wholesale/products/service-information/technical-interface-information/.

3.6.6 ECAS service

Ethernet Connect Access Service (ECAS) may be used as a backhaul extension to support the following NNI delivery models:

- Aggregated 10Gb Interface
- Dedicated 100Gbps Hand-offs

The selected ECAS service must support the required bandwidth and resilience characteristics.

ECAS may be used to extend both 10Gb and 100Gb Aggregation handoff interfaces where suitable network infrastructure is available. Availability is subject to network design and service qualification and commercial agreement.

3.7 Local Access Backhaul Service (LABS) – Distant Wholesale Fibre

Distant Wholesale Fibre (Local Access Backhaul Service – LABS) provides a managed Fibre-based backhaul circuit connecting KCOM Exchange infrastructure to the Communications Provider (CP) Site or nominated Point of Interconnect (POI).

The service is presented via Fibre Leased Line Network Termination Equipment (NTE) installed at CP premises or POI.

The Optical Network Terminal (ONT) is defined as the port interface on the KCOM-provided equipment.

Distant Wholesale Fibre may be delivered as either:

- 10Gb circuits

LABS is a managed Fibre-based backhaul service delivered as 10Gb circuits only. It does not provide 100Gb service variants.

The service utilises single-mode Fibre with LC duplex connectors and is provided in accordance with the relevant CIP specifications for the selected interface type.

The NTE requires a 19-inch rack mounting position compliant with manufacturer environmental specifications (available on request).

A customer-supplied 240V AC power supply (nominal 5A) must be available within 3 meters of the NTE location. A standard IEC 13A power lead will be supplied.

Responsibility for connectivity between the NTP and Communications Provider equipment rests with the CP.

Connection between the NTP and the EU 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.kcom.com/wholesale/products/service-information/technical-interface-information/).

LABS is a backhaul transport service and is not part of the NNI handoff interface

Architecture Options

Distant Wholesale Fibre may be delivered using the following models:

- Single 10Gb LABS circuit

Note: 100Gbps handoff interfaces are available only as Aggregation Interfaces at designated aggregation locations.

LABS is currently available in 10Gb capacity only.

3.8 Ethernet configuration

3.8.1 Frame sizes

The KCOM Wholesale Fibre Service supports Ethernet frame sizes in accordance with standard Ethernet encapsulation, including VLAN tagging overhead.

The maximum supported Ethernet frame size is 1530 bytes, including VLAN encapsulation or 1522 bytes excluding preamble and inter-frame gap.

3.8.2 Transparency

The Service is transparent to all valid Ethernet frames except for the following control and management protocols:

- IEEE 802.3ah OAM
- 802.1X authentication
- Any physical layer signalling including link negotiation and link failure detection functions.
- 803.2x PAUSE Frames

3.8.3 Multicast

No multicast replication optimisation, or IGMP-aware handling is provided within the Wholesale Fibre Service.

Multicast traffic is transported transparently in-band. The Communications Provider is responsible for multicast control, replication, and addressing within their own network..

3.8.4 Frame replication.

The Communications Provider shall ensure Ethernet bridging and forwarding rules are correctly implemented within their network to prevent loops, duplication, or unintended reflection of traffic.

Frames originating from the KCOM network shall not be re-injected into the KCOM network in a manner that would create forwarding loops or duplicate traffic.

This requirement applies in both upstream and downstream directions.

3.9 Quality and class of Service.

The KCOM Wholesale Fibre Service operates using a strict best-effort, First-In First-Out (FIFO) forwarding model within the boundaries of the ordered service profile.
No per-service Quality of Service (QoS) classification, prioritisation, or traffic differentiation is provided as part of the Wholesale Fibre Service.

The Communications Provider is responsible for implementing all traffic management, queuing, prioritisation, and service control mechanisms within their own network at both ends of the service.

Traffic presented to the KCOM network is subject to policing at the Network-to-Network Interface (NNI) to ensure compliance with the ordered service profile. Traffic exceeding the defined service parameters may be subject to packet discard.

Any internal network management or operational control traffic used by KCOM for platform operation is managed independently of customer service traffic and does not form part of the Wholesale Fibre service offering.

4 SERVICE DATA RATES

The Wholesale Fibre Service is delivered to the End User (EU) using GPON access technology and conforms to the relevant interface characteristics defined within KCOM Customer Interface Publications.

The Service data rate is determined by the product variant selected by the Communication Provider during the ordering process.

The Wholesale Fibre platform operates using a shared bandwidth architecture. As a result traffic may be subject to contention depending upon aggregate demand and the capacity model.

Actual throughput may vary due to factors including:

- Access technology limitations.
- End User equipment performance.
- Network loading conditions.
- Service profile configuration.
- Network failures or abnormal operating conditions.

KCOM operates the platform to minimise the impact of such conditions under normal operating circumstances.

The Ethernet interface characteristics described within this publication apply equally to:

- Standalone 10Gb interfaces.
- Aggregated 10Gb interfaces.
- Aggregation 100Gb interfaces.

4.1 Ancillary Service Support

The following ancillary services may be used to support Wholesale Fibre handoff and Network-to-Network Interface (NNI) arrangements.

4.1.1 Internal Cable Connect (ICC)

Internal Cable Connect (ICC) provides physical connectivity within a KCOM exchange environment between KCOM network equipment and Communications Provider equipment.

ICC provides connectivity within a KCOM exchange environment and may support:

- Standalone 10Gb interfaces.
- Dedicated 100Gbps handoffs.

4.1.2 Exterior Cable Connect (ECC)

Exterior Cable Connect (ECC) provides passive fibre connectivity between KCOM infrastructure and Communications Provider equipment located outside the exchange environment.

Exterior Cable Connect (ECC) enables physical connectivity supporting Wholesale Fibre handoff arrangements, including:

- Standalone 10Gb interfaces.
- Aggregation 100Gbps handoffs.

ECC is a passive connectivity service and does not provide bandwidth, switching, aggregation or transport functionality.

4.1.3 Ethernet Connect Access Service (ECAS)

ECAS provides an active Ethernet backhaul service used to extend Wholesale Fibre handoff connectivity between KCOM infrastructure and Communications Provider nominated handoff locations.

ECAS may support:

- Standalone 10Gb interfaces
- Dedicated 100Gbps handoffs

ECAS provides managed Ethernet transport and may include active network functions such as switching and aggregation depending on the service configuration.

5 Quality of Service

The Wholesale Fibre Service operates using a shared bandwidth model.

Under the Aggregated delivery models, service performance is subject to aggregate traffic demand. KCOM engineers the platform to minimise sustained congestion under normal operating conditions.

Traffic is forwarded on a First-In-First-Out (FIFO) basis. No traffic prioritisation or differentiated Quality of Service (QoS) classes are provided as part of the standard Wholesale Fibre Service.

Traffic exceeding the applicable service profile may be subject to traffic policing and packet discard.

- FIFO behaviour
- Traffic aggregation principles
- Hashing behaviour
- No guarantee of equal flow distribution

The Wholesale Fibre Service is delivered across a shared aggregation infrastructure and no dedicated bandwidth is reserved for individual End User services or V-Connects.

6 KCOM ONT

The FTTP access service consists of an active Optical Network Terminal unit (ONT) supplied, installed and operated by KCOM. The ONT is a mains powered, 230V 50–60Hz unit that terminates the fibre connection at the customer premises.

6.1 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 wire RJ11 interfaces (4GE+2VR).
- Ethernet interfaces supporting standard Layer 2 service delivery
- Up to 4 10/100/1000 Base-T Ethernet Data Interfaces.

The voice services are not described within this document.

Other ONT types may be introduced as part of the service evolution, KCOM reserves the right to update any of the ONT specifications at any time, subject to reasonable notice.

The ONT contains optical laser components compliant to appropriate standard Class 1 laser safety standards for installation in a domestic and light commercial environments.

6.1.1 ONT size

The dimensions of the unit currently fitted are (H x W x D) as fitted vertically on a wall are as follows for the 4GE+2VA:

- up to 200mm x 160mm x 36mm.

ONT form factors may vary depending on the model and service variant deployed.

6.1.2 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 residential indoor main power socket.

The KCOM installation engineer will have the final decision as to the suitability of the customer location.

Where the existing PSTN copper Master socket is not co located then the KCOM engineer will, where reasonable and technically possible, extend wiring to the master socket.

6.1.3 Power supply

The ONT is powered via a low voltage DC 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 standard UK indoor domestic 230V (AC) supply.

The ONTs shall 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

6.1.4 Battery Backup Unit

The Wholesale Fibre Service does not include a Battery Backup Unit.

Where the Communications Provider requires power resilience, this capability shall be provided by the Communications Provider.

6.1.5 Ethernet ports

The ONT provides the following Ethernet interface capabilities:

- Four 100/1000 Base-T Ethernet data ports.
- Data transfer at wire speed up to the maximum 1Gb interface capacity.
- Interface ports are configured using standard service templates and operate with auto-negotiation enabled. Alternative interface settings are not supported.
- MDI/MDIX auto-sensing

6.1.6 Electrical safety

The ONTs supplied are compliant with BS EN 62368-1 (Audio/Video, Information and Communication Technology Equipment Safety Requirements).

7 END USER (EU) TERMINAL EQUIPMENT OPTIONS

7.1 Fibre to the premises (FTTP) option

Communications Providers are responsible for selecting suitable terminal equipment that interoperates with the Ethernet presentation of the ONT and supports the required service features.

Terminal equipment should support the ordered Wholesale Fibre service profile to ensure stable and compliant service delivery.

An example of typical EU terminal equipment is an Ethernet-capable router or customer premises equipment connected to the KCOM ONT.

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

8 SECURITY CONSIDERATIONS

The Wholesale Fibre Service provides Layer 2 Ethernet connectivity between KCOM and the Communications Provider (CP). Responsibility for securing the service is shared between KCOM and the CP according to the service demarcation and applicable regulatory obligations.

KCOM operates and maintains the Wholesale Fibre infrastructure in accordance with its security policies and applicable legislation, including the requirements of the Telecommunications (Security) Act 2021 and associated Ofcom security regulations.

Security within the KCOM network domain applies up to the Network-to-Network Interface (NNI), beyond which responsibility transfers to the Communications Provider.

8.1 KCOM Responsibilities

KCOM is responsible for the security and operation of the Wholesale Fibre network infrastructure up to the defined service handoff point (Network-to-Network Interface).

This includes:

- Physical security of KCOM network facilities and equipment.
- Security of the access, aggregation and transport infrastructure.
- Logical separation of Communications Provider traffic within the Wholesale Fibre platform.
- Access control and management of KCOM network infrastructure.
- Monitoring and management of network security risks affecting the Wholesale Fibre platform.
- Security patching and maintenance of KCOM-owned network equipment.
- Incident management and response relating to KCOM-operated infrastructure.

KCOM implements appropriate measures to maintain the confidentiality, integrity and availability of the Wholesale Fibre platform in accordance with applicable legal and regulatory requirements.

8.2 Communications Provider Responsibilities

The Communications Provider is responsible for the security of all systems, services and traffic beyond the KCOM handoff Network-to-Network interface.

This includes:

- Security of Communications Provider networks and equipment.
- Customer and subscriber authentication mechanisms.
- Encryption of data where confidentiality is required.
- Firewalling and traffic filtering.
- Protection against Distributed Denial of Service (DDoS) attacks.
- Security monitoring and threat detection within the Communications Provider network.
- Customer-facing security controls and services.
- Compliance with the Communications Provider's own regulatory and security obligations.

The Wholesale Fibre Service does not provide encryption of customer traffic as part of the standard service.

8.3 Service Separation

Traffic associated with different Communications Providers is logically separated using VLAN-based service constructs and network controls implemented within the Wholesale Fibre aggregation platform.

Logical separation provides traffic segregation between Communications Providers but does not constitute a substitute for encryption where protection of sensitive information is required.

8.4 Customer Data Protection

Communications Providers are responsible for ensuring that any customer, operational or business-critical data transmitted over the Wholesale Fibre Service is protected appropriately.

Where confidentiality, integrity or authenticity of data is required, the Communications Provider may implement suitable security controls, which may include:

- IPsec.
- MACsec.
- TLS-based encryption.
- Virtual Private Network (VPN) technologies.
- Application-layer security controls.

8.5 Security Incidents

KCOM will manage security incidents affecting KCOM-operated infrastructure in accordance with internal, established security and incident management procedures.

Communications Providers remain responsible for managing security incidents affecting their own networks, services, customers and applications beyond the Network-to-Network Interface (NNI) demarcation point.

Incident and fault coordination between KCOM and Communications Providers will be undertaken in accordance with agreed operational processes.

9 SAFETY & EMC INFORMATION

9.1 Safety

Where the CP 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].

All optical interfaces are considered inherently safe under normal operating conditions when installed and operated in accordance with manufacturer instructions.

The optical safety requirements described within this section apply equally to:

- 10G SFP+ LR optics.
- 100G QSFP28 LR4 optics.

9.2 Electromagnetic Compatibility (EMC)

The network equipment and network terminating equipment used to provision the WSF service comply with the current and applicable EMC regulations.

The equipment is primarily intended to be installed in commercial and light industrial environments; this does not preclude the Customer Interface or EU NTEs being installed in other environments e.g. industrial, subject to compliance with applicable regulatory requirements.

9.3 Environmental

The Service and associated equipment are designed for installation in controlled indoor environments, including communications rooms, exchange facilities, and customer premises where environmental conditions are maintained within manufacturer specifications.

Equipment must be protected from environmental conditions outside of the specified operating limits.

10 RESILIENCE

The resilience characteristics of the Wholesale Fibre Service depend upon the handoff model selected by the Communications Provider (CP).

10.1 10Gb Interface (Model A)

A Single 10Gb Interface provides a single physical connection between the KCOM aggregation platform and the CP.

Characteristics:

- 10Gb interface.
- Single optical path.
- No handoff resilience.

Failure of the interface, optical module or associated aggregation equipment may result in loss of service.

Additional 10Gb interfaces may be provided where supported by the aggregation platform, subject to technical feasibility, available infrastructure, and commercial agreement between KCOM and the Communications Provider.

10.2 Aggregation 100Gb Interface (Model B)

An Aggregation 100Gb NNI Interface provides a single high-capacity Ethernet handoff.

Characteristics:

- Single 100Gb interface.
- Dedicated handoff.
- No inherent interface resilience.

Failure of the interface, optical module or associated aggregation equipment may result in loss of service.

10.3 Future Dual 100Gb Interface

Where technically and commercially agreed between KCOM and the Communications Provider (CP), dual 100Gbps handoff arrangements may be provided to deliver enhanced resilience and capacity.

Characteristics:

- Dual 100Gb interfaces.
- Resilient handoff architecture.
- Improved service and capacity availability.

Further details will be provided as part of future service development.

This model is subject to commercial and technical agreement and will be defined in a future service specification.

Communications Providers should select the handoff model appropriate to their resilience and capacity requirements.

11 AVAILABILITY

The Service is available only within the KCOM Operational Licence Area (OLA), commonly referred to as the Hull Area.

Service availability is subject to network design constraints and may vary by location within the OLA.

FTTP is the default access technology for service delivery.

Where FTTP deployment is not reasonably practicable due to external constraints, such as wayleave issues, third-party restrictions, legal or landlord issues, or limitations imposed by protected structures or environments, an alternative approach may be required.

Where FTTP deployment is not technically feasible due to physical or engineering constraints, including insufficient duct capacity, inaccessible routing, structural limitations, or network topology restrictions, an alternative existing access technology may be used where available.

The selection of an alternative technology is subject to engineering assessment and confirmation that the network can support the required service performance and capacity.

12 CP Aggregation Equipment Environmental Requirements

The Wholesale Fibre CP aggregation platform is deployed using carrier-grade Ethernet aggregation equipment within KCOM exchange facilities.

The following environmental requirements apply to the installation and operation of aggregation equipment, including the Adtran XG404, Adtran XG418 and future equivalent aggregation platforms.

Parameter	Requirement
Rack Space	Standard 19-inch equipment rack
Power	Dual AC or DC power feeds, subject to deployment design
Cooling	Forced-air cooling in accordance with Adtran specifications
Operating Temperature	0°C to 40°C
Storage Temperature	-40°C to 70°C
Relative Humidity	5% to 95% non-condensing

The aggregation platform is installed within controlled KCOM exchange environments designed to maintain operating conditions within the limits specified by the equipment manufacturer.

Applicable Platforms include:

- Adtran XG404
- Adtran XG418
- Future equivalent Adtran aggregation platforms

KCOM

13 GLOSSARY

ACI	Agent Circuit Identifier
ARI	Agent Remote Identifier
CIR	Committed Information Rate
CP	Communications Provider
EU	End User
EMC	Electromagnetic Compatibility
ENNI	Ethernet Network to Network Interface
IETF	Internet Engineering Task Force
FEUP	Fibre End User Port
FIFO	First In First Out
FTTP	Fibre To The Premise
GPON	Gigabit Passive Optical Network
IFG	Inter-Frame Gap
IP	Internet Protocol
ITU-T	International Telecommunications Union – Telecom Standardisation
KCH	KCOM Group Limited, formerly KCOM Group PLC & previously Kingston Communications (HULL) PLC
KCOM	KCOM Group Ltd
LACP	Link Aggregation Control Protocol
LAG	Link Aggregation Group
LC	Lucent Connector
LLF	Link Loss Forwarding
MAC	Media Access Control
MDI / MDIX	Medium-dependent interface / Medium-dependent Interface crossover
NNI	Network-to-Network Interface
NTE	Network Terminating Equipment
NTP	Network Termination Point
OLA	Operational Licence Area - The area defined as the 'Licensed Area' in the licence granted on 30 November 1987 under section 7 of the Telecommunications Act 1984 to Kingston upon Hull City Council and
OLT	Optical Line Terminator
ONT	Optical Network Termination
PBS	Peak Burst Size
PC	Personal Computer
PECN	Public Electronic Communications Network
PIR	Peak Information Rate
POI	Point of Interconnect
PPP	Point to Point Protocol
Product Rate	Contracted Download / Upload Speed as specified in the Price Manual

Price Manual	As specified in the Wholesale Fibre Price Manual (to be published on the KCOM Wholesale portal in due course)
PSU	Power Supply Unit
RJ45	Registered Jack Type 45
Service	Service means the provision of Wholesale Fibre, including Virtual Cable Connects (V-Connects), Local Access Backhaul Services, and associated Ethernet handoff and ancillary services
SLA	Service Level Agreement
UNI	(ATM) User Network interface
VCC	Virtual Cable Connect. A logical Layer 2 connectivity construct used to interconnect the OLT, aggregation network and associated service delivery platforms using VLAN-based service separation.
V-Connect	Alternative naming used within WSF for a Virtual Cable Connect (VCC)
WSF	Wholesale Fibre

KCOM

14 REFERENCES

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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/

Wholesale Fibre Price Manual – to be published on the KCOM Wholesale portal in due course

15 HISTORY

Date	Issue	Comments	Author
16/06/2026	V01	Initial publication	D&A TEAM KCOM GROUP Limited