

Product Description

Wholesale Ethernet Interconnect Link (WEIL)

with

In-Span Handover (ISH) ,

In-Building Handover (IBH)

and

Edge Node Handover (ENH)

Version Control

Version	Date	Revised by	Revision details
1.1	16 th March 2011	eircom	Update doc for 10Gb/s WEIL
1.2	1 st June 2011	eircom	Updated power levels across all handover options. Updated for 10G WEIL ENH
1.3	20 th Jan 2012	eircom	Updated for 10G WEIL ENH with 1+1 Protection

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Glossary

AF	Assured Forwarding
CoS	Class of Service
CIR	Committed Information Rate
C-VLAN	Customer Virtual Local Area Network
EF	Expedited Forwarding
E-LAN	Ethernet Local Area Network
E-NNI	External Network to Network Interface
GUI	Graphical User Interface
NTU	Network Termination Unit
PIR	Peak Information Rate
PM	Process Manual
POH	Point of Handover
PSU	Power supply unit
802.1ad port	Operator's E-NNI port (fibre or copper)
SAB	Service Access Bandwidth
STD	Standard Forwarding
S-VLAN	Service - Virtual Local Area Network
UG	Unified Gateway
UNI	User Network Interface
WEIL	Wholesale Ethernet Interconnection Link
WSLAM	Wholesale SLA Manager
NGN Node	eircom NGN Node for Ethernet Traffic
SFP	1Gb Small Form-factor Pluggable optical transceiver
XFP	10Gb Small Form-factor Pluggable optical transceiver

1. Introduction

The purpose of this document is to provide a product description of the eircom Wholesale Ethernet Interconnect Link (WEIL), handover enhancements.

This document is subject to review and will be re-issued to reflect changes as new developments are introduced which shall be communicated in accordance with agreed practices. Any specific technology mentioned in this document is current as at date of issue and is for guidance purposes only. eircom reserves the right to adapt the technology used to deliver Wholesale Ethernet Interconnect Link.

This document is without prejudice to any future position that may be adopted by eircom in respect of Wholesale Ethernet Interconnect Link. It should be read in conjunction with the relevant associated eircom Wholesale documents (where appropriate, reference offer, process manual and SLA).

1.1. Wholesale Ethernet Interconnect Link Overview

Wholesale Ethernet Interconnect Link (WEIL) is an interconnect product that enables an Operator to aggregate their end-user Wholesale Symmetrical Ethernet Access circuits at a nominated Point Of Handover (POH). This product will also facilitate the handover of other NGN Wholesale Ethernet products from an Operator's end user site to an Operator's handover point. The WEIL can be provided to the nominated POH as Customer Sited Handover (CSH), In-Span Handover (ISH), In-Building Handover (IBH)¹, or Edge Node Handover (ENH)².

An Operator can divide the WEIL into smaller Service Access Bandwidth segments (SABs). This provides an Operator with the capability to define the management of their access circuits by grouping similar access circuit types and class of service parameters into dedicated SABs.

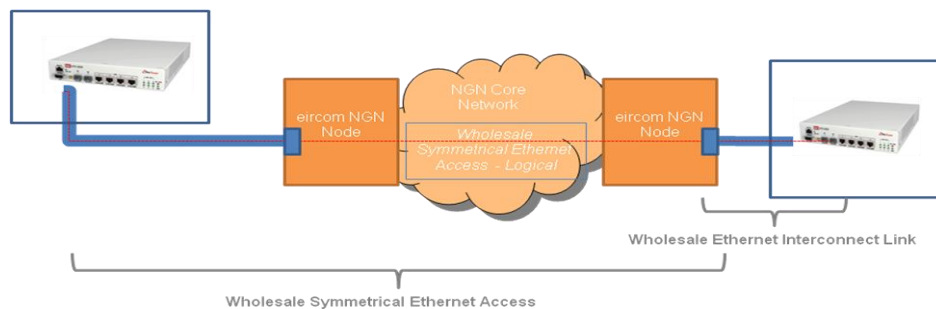


Figure 1 Wholesale Interconnect Link

¹ In-Building Handover is available to an Operator when availing of a Physical Co-location Service provided in an exchange which facilitates Local Loop Unbundling in accordance with the Local Loop Unbundling regulations currently in force.

² Edge Node Handover requires the installation and commissioning of infrastructure on the Operator's site.

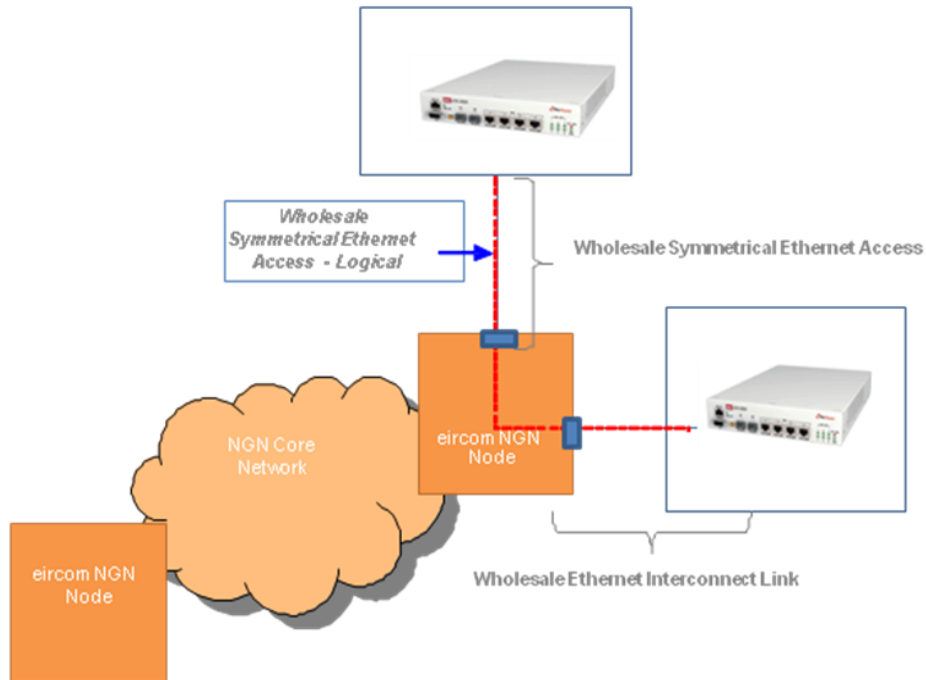


Figure 1a: WSEA and WEIL terminating on the same NGN Node.

In certain cases the Wholesale Symmetrical Ethernet Access and its associated Wholesale Ethernet Interconnect Link connection may be within the same serving exchange area and therefore may be connected to the same eircom NGN Node. Wholesale Symmetrical Ethernet Access / Wholesale Ethernet Interconnect Link connections served by the same eircom NGN Node provide the capability to configure the Wholesale Symmetrical Ethernet Access logical connection as an uncontended connection. The eircom NGN Node is a non-blocking device and therefore an Operator may inventory manage the Wholesale Ethernet Interconnect Link to ensure that it is not overbooked, i.e. that the sum of the Wholesale Symmetrical Ethernet Access bandwidths do not exceed the Service Access Bandwidth on the Wholesale Ethernet Interconnect Link (see Section 5.2. of the Technical Handbook for description of Service Access Bandwidths). In this scenario CoS is not required on the Wholesale Symmetrical Ethernet Access as the connection is uncontended and is not carried across the eircom core NGN network (Circuit based CoS *Option 5* as described in Section 6.1.1. of the Technical Handbook should be specified for these connections).

Conversely, the Operator may inventory manage the Wholesale Ethernet Interconnect Link which may result in the Wholesale Ethernet Interconnect Link being overbooked, i.e. that the sum of the Wholesale Symmetrical Ethernet Access bandwidths exceed the Service Access Bandwidth on the Wholesale Ethernet Interconnect Link (see Section 5.2. of the Technical Handbook for description of Service Access Bandwidths). In this scenario QoS may be required on the Wholesale Symmetrical

Ethernet Access and the required level of circuit based class of service should be specified by an Operator.

It should be noted that more than one eircom NGN Node may be installed in some serving exchange sites. These eircom NGN Nodes within the same serving exchange site will not be connected locally.

1.2. Key Features and Availability

- Single mode 1 Gb/s or 10 Gb/s fibre access connectivity, dependent on handover location
 - 1 Gb/s Access
 - Radial distance fibre reach of 4kms³ [1000Base-LX]
 - Radial distance fibre reach of 30kms⁴ [1000Base-ZX]
 - 10 Gb/s Access
 - Radial distance fibre reach of 4kms⁵ [10GBASE-LR]
 - Radial distance fibre reach of 15kms⁶ [10GBASE-ER]
 - Radial distance fibre reach of 30kms⁷ [10GBASE-ZR]
 - 10Gb/s WEIL ENH configured with 1+1 protection is available on request
- Standard fibre reach no greater than 100M for ISH Handover

³ 1000Base-LX – theoretical maximum distance of 10km – actual distances more likely to be 4km is subject to full survey and physical testing

⁴ 1000Base-ZX- theoretical maximum distance of 70km – actual distances more likely to be 30km is subject to full survey and physical testing

⁵ 10GBase-LR – theoretical maximum distance of 10km – actual distances more likely to be 4km is subject to full survey and physical testing

⁶ 10GBase-ER- theoretical maximum distance of 40km – actual distances more likely to be 15km is subject to full survey and physical testing

⁷ 10GBase-ZR- theoretical maximum distance of 80km – actual distances more likely to be 30km is subject to full survey and physical testing

- Standard fibre for IBH Handover
- One UNI port (802.1ad Trunk) per eircom NTU
- A maximum of ten (10) Service Access Bandwidths per 1Gb/s WEIL
- A maximum of twenty (20) Service Access Bandwidths per 10Gb/s WEIL
- Operator specified Aggregate Expedited and Assured Forwarding bandwidths
- S-VLAN ID handoff at Wholesale Ethernet Interconnect Link

The eircom NGN network is being rolled out on a phased basis. Wholesale Ethernet Interconnect Links are available from a number of nominated locations. Appendix 1 no longer outlines the locations where WEILs are currently available. Please refer to the roll-out schedule for up to date WEIL locations, if you do not have access to the current roll-out schedule please contact your eircom Wholesale account manager.

Operator requested locations other than those specified in the roll-out schedule will be individually assessed on a case by case basis.

2. Product Components

The eircom Wholesale Ethernet Interconnect Link product provides connectivity (both physical and logical) from the serving eircom NGN Node to an Operator's nominated Point of Handover (POH).

This product consists of two components:

- Wholesale Ethernet Interconnect Link (WEIL – physical): It provides single mode fibre connectivity from the nominated eircom POH to an Operator POH and for CSH includes the installation of an eircom NTU at the Operator premises.
- Service Access Bandwidth (SAB – logical): The WEIL can be divided into a number of Operator defined SABs, subject to a maximum number of ten per WEIL. It enables an Operator to configure the WEIL to meet their requirements by defining which end user traffic is carried on a particular SAB. An Operator can configure each SAB to support different end user traffic types. The SAB is configured to aggregate the end user traffic to the SAB bandwidth and also prioritise traffic within the SAB.

2.1. Wholesale Ethernet Interconnect Link: WEIL - Physical

The physical access is delivered on a single mode fibre from the eircom network to an Operator POH located at an Operator's handover site, which can be Customer Sited Handover (CSH), In Span Handover (ISH), In-Building Handover (IBH), or Edge Node Handover (ENH).

All Wholesale Ethernet Interconnect Link requests are subject to a full site survey.

The standard price applies where an Operator's premises is served by useable eircom owned duct⁸ and is within 500 metres of an available eircom access fibre which can connect to the serving eircom NGN Node. Operator's handover premises located beyond 4km⁹ of the eircom NGN Node will be assessed on a case by case basis to determine if a Wholesale Ethernet Interconnect Link may be provided. In the event that a Wholesale Ethernet Interconnect Link may be provided, the connection charge will be assessed on a case by case basis.

The same SFP type should be installed at both ends of the fibre pair, connectivity will not be established if there are different SFP installed in an Operator CE port.

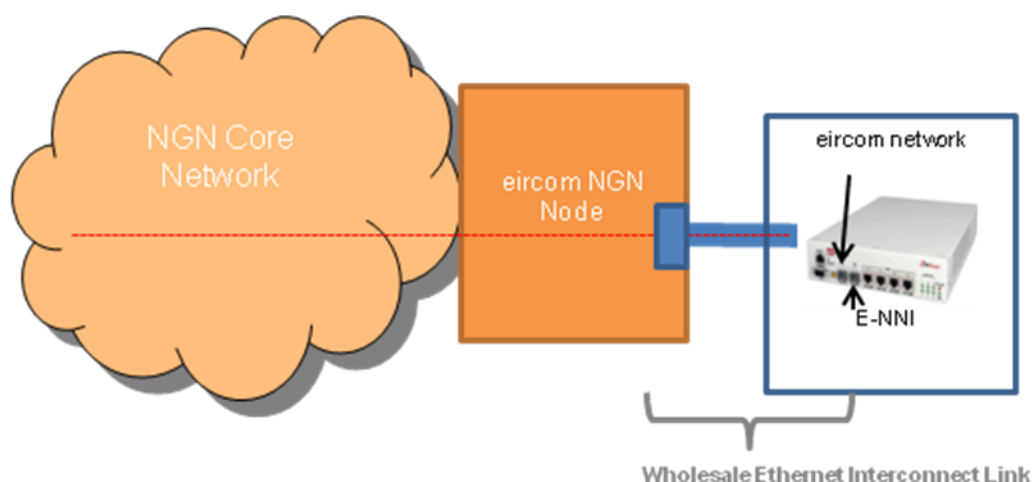


Figure 2 Wholesale Ethernet Interconnect Link

⁸ Useable duct for fibre assumes that there is sufficient space in the duct to draw in a subduct

⁹ 1000Base-ZX- theoretical maximum distance of 70km – actual distances more likely to be 30km is subject to full survey and physical testing

2.1.1 Customer Sited Handover (CSH): The eircom physical network termination point is the External Network-to-Network Interface (E-NNI) port on the eircom NTU located at an Operator's premises. One E-NNI port is provided per Wholesale Ethernet Interconnect Link.

The eircom NTU currently is a RAD ETX 202A (see figure 10). One port is reserved for eircom network connectivity and one port is available for an Operator's use.

An Operator, at point of order, will specify the port type required (fibre or copper). This port is referred to as the External Network-to-Network Interface (E-NNI) port. This port is configured as an 802.1ad port. An SFP (SX or LX) for 1Gb/s WEIL will be installed in the customer facing NTU port.

The physical access connection has an associated physical bandwidth of 1Gb/s.

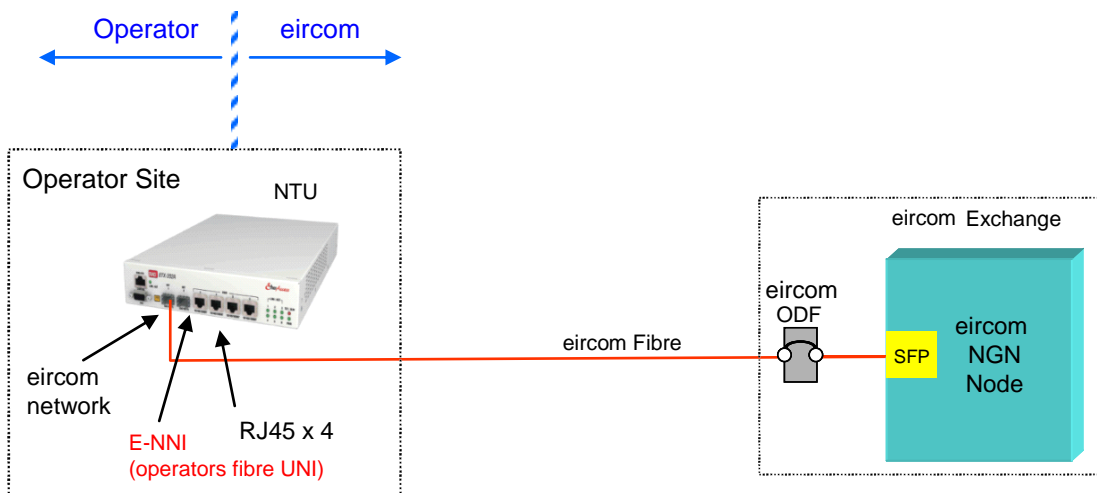
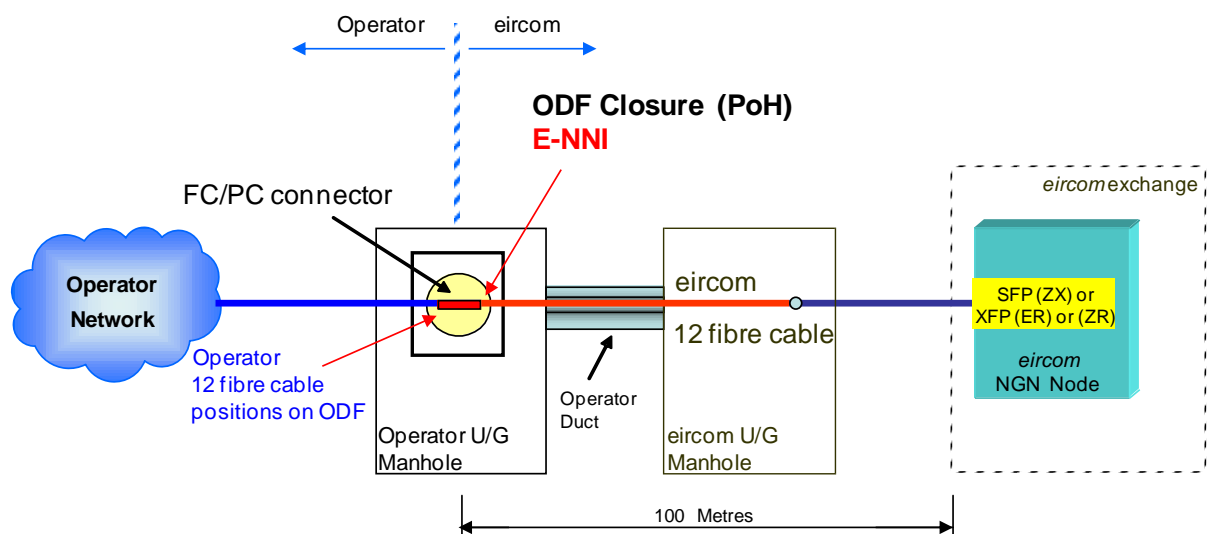


Figure 3 Customer Sited Handover

2.1.2 In Span Handover (ISH): For the Wholesale ISH option the eircom fibre will connect to the Operator fibre at a Point of Handover (POH) outside the same eircom exchange as the serving eircom NGN Node, see figure 4.

The eircom physical network termination point for a Wholesale Ethernet Interconnect Link (WEIL), In Span Handover is the External Network-to-Network Interface (E-NNI) at the point of handover to an Operator. An SFP (ZX only) for 1Gb/s or an XFP (ER or ZR) for 10Gb/s WEIL will be installed on the eircom network facing an Operator.

Figure 4 In Span Handover



The eircom fibre will connect to an Operator fibre at a Point of Handover (POH) located in an underground manhole where an Operator terminates 12 optical fibres on one side of an Optical Distribution Frame, (ODF) and eircom will terminate 12 optical fibres on the other side of the ODF. The Operator will be responsible for providing the POH closure which should be a Raychem FOSC400 Xcon ODF.

The POH closure will be housed in an Operator underground manhole located within 100 Metres outside the boundary of the eircom serving exchange. The maximum distance between the terminal ends of the ISH shall be determined by an Operator with reference to the available optical power budget and the performance of the SFP ZX or XFP ER or XFP ZR installed in the eircom NGN Node. The required minimum Receive Level at the POH shall be:

ZX SFP: -17 dBm at start of life, to ensure a minimum of -19 dBm to end of life, following subsequent repairs and the natural ageing of systems measured at the eircom optical distribution frame interface.

ER XFP: –11 dBm at start of life, to ensure a minimum of –13 dBm to end of life, following subsequent repairs and the natural ageing of systems measured at the eircom optical distribution frame interface.

ZR XFP: – 21 dBm at start of life, to ensure a minimum of -23 dBm to end of life, following subsequent repairs and the natural ageing of systems measured at the eircom optical distribution frame interface.

An Operator is responsible for obtaining any required way-leaves associated with the construction of the manhole and provision of the duct route (including the provision of sub duct). eircom will provide supervision of an Operator duct installation to access the eircom nominated underground manhole and eircom will provide the fibre cable from the eircom exchange to an Operator nominated manhole for delivery of a WEIL to the POH in an Operators underground manhole.

Where an Operator requests delivery of a WEIL to a Data Centre, processes and commercial terms will be defined by the service provider operating the Data Centre.

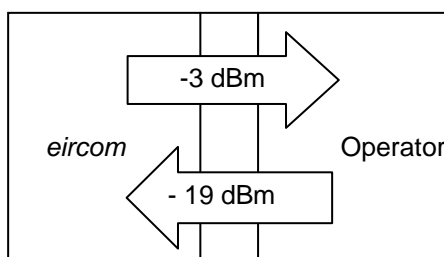


Figure 5 Minimum Power Levels - In Span Interface – ZX SFP

As shown in the diagram above, eircom will provide to an Operator with an In-Span Interface – ZX SFP an optical signal at -3 dBm minimum at an Operator Optical Distribution Frame interface. The Operator will provide, to eircom, an optical signal at -19dBm minimum at the eircom Optical Distribution Frame (ODF) interface.

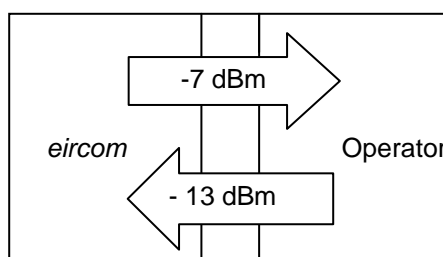


Figure 6 Minimum Power Levels - In Span Interface – ER XFP

As shown in the diagram above, eircom will provide to an Operator with an In-Span Interface – ER XFP an optical signal at -7 dBm minimum at an Operator Optical Distribution Frame

interface. The Operator will provide, to eircom, an optical signal at -13 dBm minimum at the eircom Optical Distribution Frame (ODF) interface.

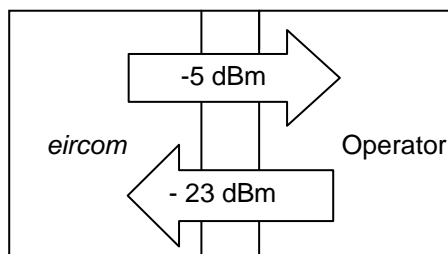


Figure 7 Minimum Power Levels - In Span Interface – ZR XFP

As shown in the diagram above, eircom will provide to an Operator with an In-Span Interface - ZR XFP an optical signal at -5 dBm minimum at an Operator Optical Distribution Frame interface. The Operator will provide, to eircom, an optical signal at -23 dBm minimum at the eircom Optical Distribution Frame (ODF) interface.

The following table lists the E-NNI interface specification for ISH.

E-NNI Physical interface presentation	Single Mode Fibre FC/PC connector
Optical Wavelength	1550 nm
Optical Power Budget	1 Gb/s Access ZX SFP Input Power (dBm) Min: -19 Max: -3 Output Power (dBm) Min: -3 Max: +5 10 Gb/s Access – ER XFP Input Power (dBm) Min: -13 Max: -1 Output Power (dBm) Min: -7 Max: +4 10 Gb/s Access – ZR XFP Input Power (dBm)

	Min: -23 Max: -9 Output Power (dBm) Min: -5 Max: +2
Auto negotiation support	Yes
Full Duplex Support	Yes
Autosensing Enabled	Yes
E-NNI Port Setting Options	<ul style="list-style-type: none"> • Auto Negotiate (Default) • 1000M Full Duplex or 10000M Full Duplex
EtherType Support	S-VLAN <ul style="list-style-type: none"> • 0x88A8 C-VLAN <ul style="list-style-type: none"> • 0x8100 • 0x9100 • 0x88A8
Link Loss Forwarding (LLF) Support	The tunneling of Operator LLF L2CP traffic is supported on the eircom service. By default all L2CP traffic is marked as 802.1p 7 and will get mapped to the STD Forwarding Class on ingress to the eircom network.

Figure 8 ISH E-NNI Interface Specification

2.1.3 In-Building Handover (IBH): The eircom physical network termination point for a Wholesale Ethernet Interconnect Link, In-Building Handover is the External Network-to-Network Interface (E-NNI) at the point of handover to an Operator. For a Wholesale IBH, Ethernet Interconnect Link, a fibre cable is installed between an Operator footprint and an eircom Optical Distribution Frame (ODF) in the same eircom exchange as the serving eircom NGN Node.

In-Building Handover (IBH) is available to an Operator currently availing of the eircom Physical Co-location Service provided in an eircom exchange which facilitates Local Loop Unbundling in accordance with the Local Loop Unbundling regulations currently in force, published on eircom's website and agreed with the National Regulator.

The physical Co-location operational processes that support the interactions between eircom and an Operator for the delivery of serviced accommodation in an eircom exchange are outlined in the "Process Manual for eircom Physical Co-location Service".

The eircom NGN Node will be connected to an eircom ODF onto which an Operator 12 fibre cable will also be terminated. The 12 fibre cable will in turn be connected by eircom to an optical patch panel in an Operator Co-location rack.

eircom will connect an Operator directly from the Operator patch panel via the eircom ODF to the eircom network. An SFP (LX only) for 1Gb/s or an XFP (LR only) for 10Gb/s WEIL will be installed on the eircom network facing an Operator.

The ownership and responsibility belongs to an Operator to provide¹⁰ the optical patch panel, cable tray, SC connectors, CMS (cable management system) and 12 fibre cabling between the Co-location rack and the eircom ODF, see figure 7. eircom will present the active WEIL circuit to an Operator on a single mode fibre pair with SC connectors. An Operator is required to allocate 4 positions on the patch panel for each WEIL circuit - 2 positions for the fibre pair associated with the active WEIL circuit and 2 positions for a spare fibre pair which will be installed between the eircom equipment and an Operator rack.

A spare fibre pair is required for eircom service assurance purposes (i.e. in the event of a fault on the active fibre pair or to test the cable).

¹⁰ eircom will survey and provide costs for the installation of infrastructure to an Operator. On behalf of an Operator, providing the costs are accepted, eircom will install a patch panel, cable tray, SC connectors, CMS, and 12 fibre cabling between the Co-Location rack and the eircom ODF.

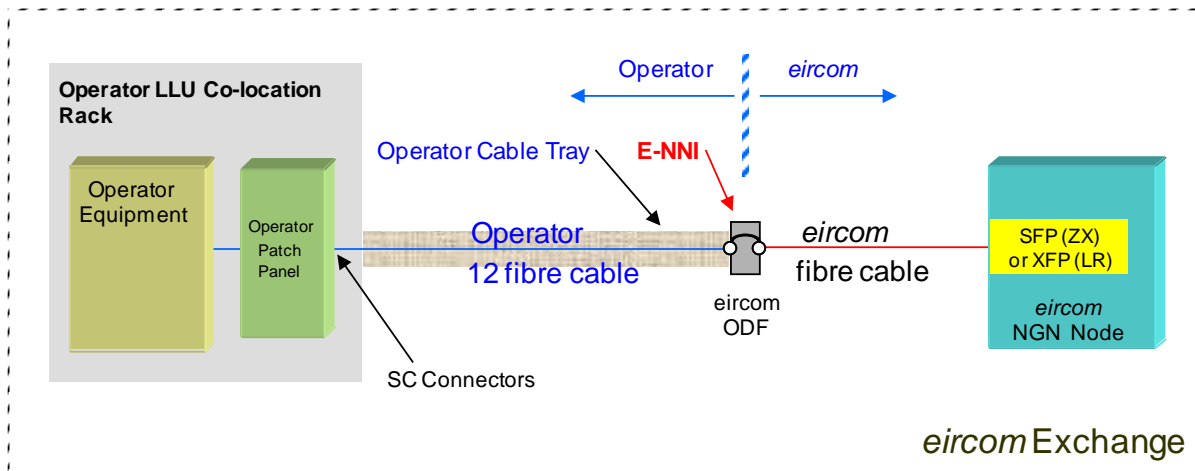


Figure 9 In-Building Handover

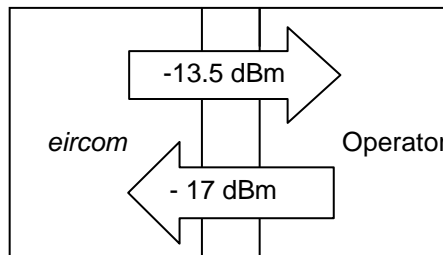


Figure 10 Minimum Power Levels - In-Building Interface – ZX SFP

As shown in the diagram above, eircom will provide to an Operator with an In-Building Interface – ZX SFP an optical signal at -13.5 dBm minimum at an Operator Optical Distribution Frame interface. The Operator will provide, to eircom, an optical signal at -17dBm minimum at the eircom Optical Distribution Frame (ODF) interface

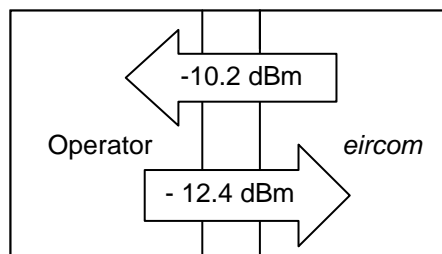


Figure 11 Minimum Power Levels - In-Building Interface – LR XFP

As shown in the diagram above, eircom will provide to an Operator with an In-Building Interface – LR XFP an optical signal at -10.2 dBm minimum at an Operator optical patch panel. The Operator will provide to eircom an optical signal at -12.4dBm minimum at an Operator optical patch panel.

The following table lists the E-NNI interface specification for IBH.

E-NNI Physical interface presentation	Single Mode Fibre SC connector
Optical Wavelength	1310 nm
Optical Power Budget	1 Gb/s Access – ZX SFP Input Power (dBm) Min: -17 Max: -3 Output Power (dBm) Min: -13.5 Max: -3 10 Gb/s Access – ER XFP Input Power (dBm) Min: -10.2 Max: + 0.5 Output Power (dBm) Min: - 12.4 Max: + 0.5
Auto negotiation support	Yes
Full Duplex Support	Yes
Autosensing Enabled	Yes
E-NNI Port Setting Options	<ul style="list-style-type: none"> • Auto Negotiate (Default) • 1000M Full Duplex or 10000M Full Duplex
EtherType Support	S-VLAN <ul style="list-style-type: none"> • 0x88A8 C-VLAN <ul style="list-style-type: none"> • 0x8100 • 0x9100 • 0x88A8
Link Loss Forwarding (LLF) Support	The tunneling of Operator LLF L2CP traffic is supported on the eircom service. By default all L2CP traffic is marked as 802.1p 7 and will get mapped to the STD Forwarding Class on ingress to the eircom network.

Figure 12 IBH E-NNI Interface Specification

2.1.4 Edge Node Handover (ENH). The eircom physical network termination point for a Wholesale Ethernet Interconnect Link Edge Node Handover is the External Network-to-Network Interface (E-NNI) on the eircom fibre patch panel located within an eircom cabinet located on the Operator's premises – this is the Point Of Handover to the Operator.

Wholesale Ethernet Interconnect Link Edge Node Handover requires the installation and commissioning of infrastructure on the Operator's site. This infrastructure will include two mandatory diverse fibre routes to eircom's core network.

An Operator is responsible for obtaining any required way-leaves associated with the construction of duct routes required for fibre routes.

For a Wholesale Ethernet Interconnect Link ENH, the Operator will present their fibre cable to eircom at the entry point to the eircom cabinet, and eircom will then connect the Operator via the fibre patch panel to the eircom network.

An XFP (LR only) optical transceiver for 10Gb/s WEIL will be installed on the eircom network facing an Operator.

Where an Operator requests delivery of a WEIL to a Data Centre, processes and commercial terms will be defined by the service provider operating the Data Centre.

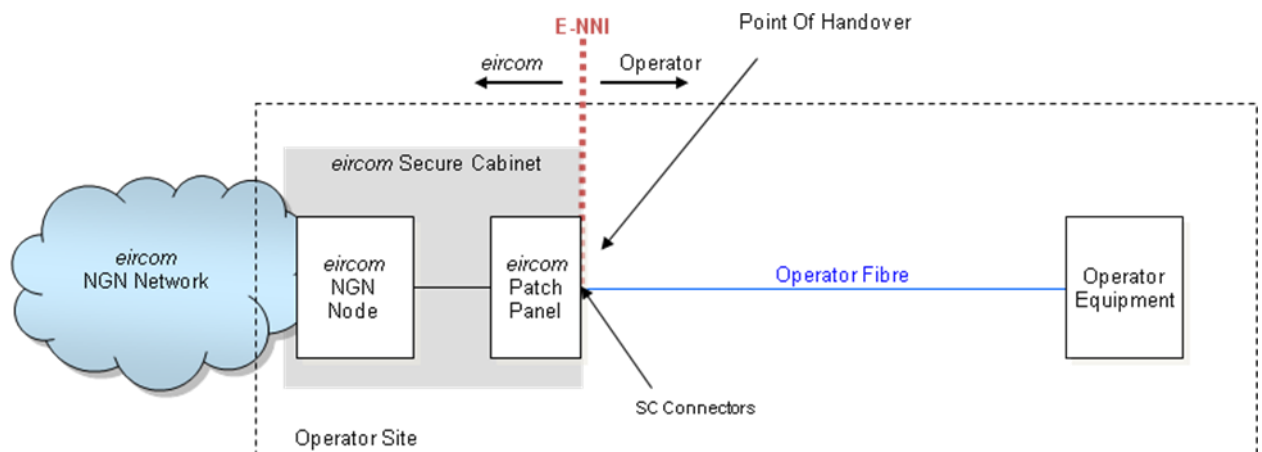


Figure 13 Edge Node Handover

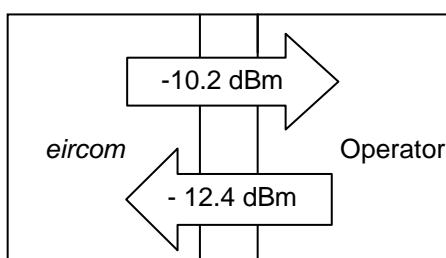


Figure 14: 10G ENH - Minimum Power Levels

As shown in the diagram above, for a 10G EIL *eircom* will provide, to an Operator, an optical signal at -10.2 dBm minimum at the *eircom* optical patch panel. The Operator will provide to *eircom* an optical signal at -12.4dBm minimum at the *eircom* optical patch panel.

Note that a 2dB margin is used in the above figures to account for losses associated with connectors, patch panel, etc, between the 7450ESS port and the E-NNI.

The following table lists the UNI interface specification for ENH and applies to both the Phase 1 and Phase 2 solutions:

E-NNI Physical interface presentation	Single Mode Fibre SC connector
Optical Wavelength	1310 nm
Optical Power Budget	10 Gbit/s Access – LR XFP Input Power (dBm) Min: -10.2 Max: + 0.5 Output Power (dBm) Min: - 12.4 Max: + 0.5
Auto negotiation support	Yes
Full Duplex Support	Yes
Autosensing Enabled	Yes
E-NNI Port Setting Options	10 Gbit/s Access Auto Negotiate (Default) 10000M Full Duplex
EtherType Support	S-VLAN

	<ul style="list-style-type: none"> • 0x88A8 (Default) • 0x8100 (Optional) <p>C-VLAN</p> <ul style="list-style-type: none"> • 0x8100 • 0x9100 (Not support for Traffic based COS) • 0x88A8 (Not support for Traffic based COS)
Link Loss Forwarding (LLF) Support	The tunnelling of an Operator's LLF L2CP traffic is supported on the <i>eircom</i> network. By default all L2CP traffic is marked as 802.1p 7 and will get mapped to the STD Forwarding Class on ingress to the <i>eircom</i> network.

Figure 15: ENH E-NNI Interface Specification

10Gb/s WEIL ENH with 1+1 protection

10Gb/s WEIL ENH can be requested with 1+1 protection to provide end users/Operators with additional protection on the NNI/WEIL interfaces. This will be achieved by grouping two 10Gb/s WEIL ENHs into a Link Aggregation Group (LAG). The 10Gb/s WEIL ENHs which are members of a LAG will be configured in active/active mode.

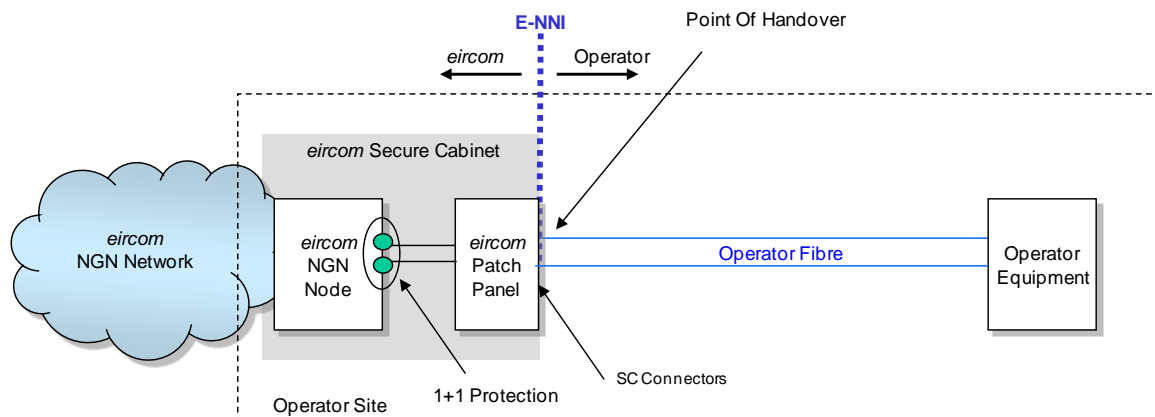


Figure 16: WEIL ENH with 1+1 protection

The maximum bandwidth supported by a 10Gb/s WEIL ENH with 1+1 protection will be 10 Gb/s. This will ensure that, in the event of a failure on one of the LAG ports, the remaining link will have sufficient capacity to carry all traffic. There will be minimal service interruption due to the switchover.

2.1.5 Customer Sited Handover - NTU: RAD ETX 202A

One External Network-to-Network Interface (E-NNI) port is provided per Wholesale Ethernet Interconnect Link. See Appendix 2 for NTU specification.

Currently, the eircom NTU is a RAD ETX 202A (see figure 10). One port is reserved for eircom network connectivity and one for Operator use.

An Operator, at point of order, will specify the port type required (fibre or copper). This port is referred to as the External Network-to-Network Interface (E-NNI) port. This port is configured as an 802.1ad port.

The eircom NTU for WEIL CSH will have a dual power supply of 220V AC or -48V DC.

The current physical access CSH WEIL connection has an associated physical bandwidth of 1Gb/s,

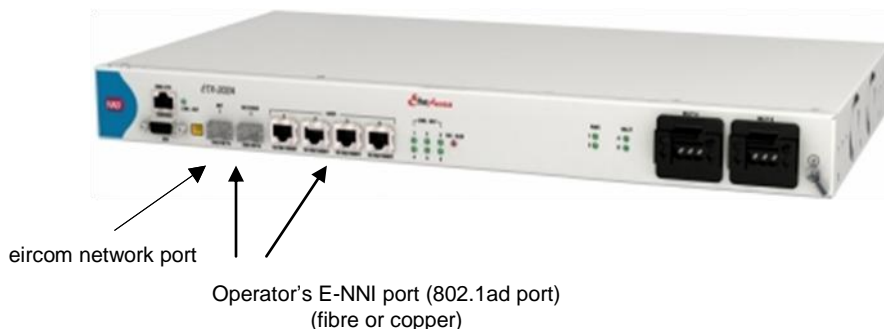


Figure 17: RAD ETX-202A

2.1.6 In Span and In Building and Edge Node Handover

One External Network-to-Network Interface (E-NNI) port is provided per Wholesale Ethernet Interconnect Link.

An Operator, at point of order, will specify the port type required (fibre only). The POH is referred to as the External Network-to-Network Interface (E-NNI). The port is configured as an 802.1ad port.

The ISH/IBH WEIL physical connection will have an associated bandwidth of 1Gb/s or 10Gb/s, the ENH WEIL physical connection will have an associated bandwidth of 10Gb/s.

2.2. Service Access Bandwidths: SAB – Logical

2.1.1. Wholesale Ethernet Interconnect Link availability

The eircom NGN network is being rolled out on a phased basis. Wholesale Ethernet Interconnect Links are available from a number of nominated locations. Appendix 1 no longer outlines the locations where WEILs are currently available. Please refer to the roll-out schedule for up to date WEIL locations, if you do not have access to the current roll-out schedule please contact your eircom Wholesale account manager.

Operator requested locations other than those specified in the roll-out schedule will be individually assessed on a case by case basis.

2.3. Wholesale Ethernet Interconnection Link – Logical

2.3.1. Service Access Bandwidths

WEIL Service Access Bandwidths (SABs) provide an Operator with the capability to divide the WEIL into a number of smaller service bandwidths to facilitate the grouping of similar end user access circuit types into particular SABs.

SABs are available in the following bandwidths:

1 Gb/s WEIL Service Access Bandwidths (Mb/s)	10 Gb/s WEIL Service Access Bandwidths (Mb/s)
10	10
20	20
30	30
40	40
50	50
75	75
100	100
250	250
500	500
750	750
1000	1000
	2000
	3000
	4000
	5000
	6000
	7000
	8000
	9000
	10000

Table 1: Bandwidth Options (Mb/s) for WEIL Service Access Bandwidth

A WEIL will support up to ten SABs for 1Gb/s and twenty SABs for 10Gb/s. The overall capacity of all SABs within a WEIL must not exceed the physical capacity of the WEIL.

An Operator will need to define which end user access circuits are mapped to which SAB and their associated WEIL.

2.3.2. Aggregate Bandwidths (Expedited, Assured and Standard)

An Operator's Wholesale Symmetrical Ethernet Access circuits will have had a Class of Service (CoS) applied to them. The Operator end user traffic can be tagged with CoS. This provides an Operator with the ability to manage and prioritise their access traffic.

Class of service effectively maps into the following three Class of Service queues:

- Expedited Forwarding (EF)
- Assured Forwarding (AF)
- Standard (Best Effort)

The Operator specifies the bandwidth and Class of Service for the individual Wholesale Symmetrical Ethernet Access end user connections. There will be a mixture of different Class of Service types available with each end user connection on the WEIL.

Having specified the SABs, an Operator will then specify the aggregate Expedited Forwarding and Assured Forwarding bandwidths for the SABs as outlined in Table 2. An Operator will be responsible for ensuring that the sum of the Committed Information Rate (CIR) values of their individual end user Wholesale Symmetrical Ethernet Access circuits associated with the SAB does not exceed the SAB specified parameters. The SAB parameters are the aggregated Expedited and Assured Forwarding bandwidths specified for that SAB.

	Aggregate Expedited Forwarding Bandwidth	Aggregate Assured Forwarding Bandwidth
Range	0 - 100%	0 - 100%

Table 2: Aggregate EF and AF Bandwidth options (% of WEIL Service Access Bandwidth)

If an Operator exceeds the physical capacity of the WEIL the excess traffic will be dropped and not delivered.

3. Commercial

3.1. Pricing

Prices for the WEIL product will be published in the RIO Network Price List and ARO published on www.eircomwholesale.ie.

3.2. Terms and Conditions

Terms and conditions are published on the eircom website at www.eircomwholesale.ie in the Leased Line Reference Offer.

An Operator must have signed a Leased Line Agreement, specifically Service Schedule 013.

Prior to availing of In-Building Handover (IBH) service an Operator must complete the relevant Service Establishment Testing detailed in the Process Manual for Physical Co-location Service and ULMP/LS.

In-Building Handover (IBH) is available to an Operator in accordance with the Physical Co-location Service and Unbundled Local metallic Path and Line Sharing as defined in the eircom Access Reference Offer, and Service Schedule 101, when provided from an eircom exchange which facilitates Local Loop Unbundling in accordance with the Local Loop Unbundling regulations currently in force.

An Operator must execute a Deed of Variation to the Licence for that site prior to order acceptance.

Prior to availing of In-Span Handover (ISH) service an Operator must complete the relevant site preparation as detailed in Section 4.3.1 before the SLA clock will 'start' upon placement of a WEIL order. eircom will 'park' the order with a status of Customer Delay until the infrastructure 'civils' are complete.

For the purpose of providing a WEIL ENH an Operator and eircom must agree access arrangements to the Operator's site by eircom staff.

3.3. Service Responsibility

3.3.1.eircom Responsibility

eircom has responsibility for the provision, repair and maintenance of the WEIL from the eircom NGN Node to the Point of Handover (POH) as defined in the product description for either CSH, ISH or IBH.

3.3.2.Operator Responsibility

An Operator is responsible for connectivity between the POH (Point of Handover) and their own equipment, and for any end-to-end testing of their service.

For the purpose of providing a WEIL IBH an Operator must request a Physical Change (as defined in the Licence Agreement) as per 5.2.1 of the process manual for eircom Physical Co-location Service. An Operator must follow the Access request process and supply Methods Statements.

An Operator must ensure that a suitable environment is provided, at the Operator's expense, to ensure that adequate space, power, environmental conditions and general facilities are available to allow eircom to deliver a WEIL service. When required, an Operator must enable access to the handover location for eircom to install and support the service. An Operator is responsible for any Operator services that use the WEIL product. An Operator must review and manage their bandwidth requirements, and request additional WEILs in a timely manner. In particular, Operators must ensure that sufficient WEIL capacity is available in the relevant locations to support their requirements for end user access connections.

4. Service Management

There are a number of processes that support this product from the initial forecasting and quotation through to billing as outlined in figure 4.

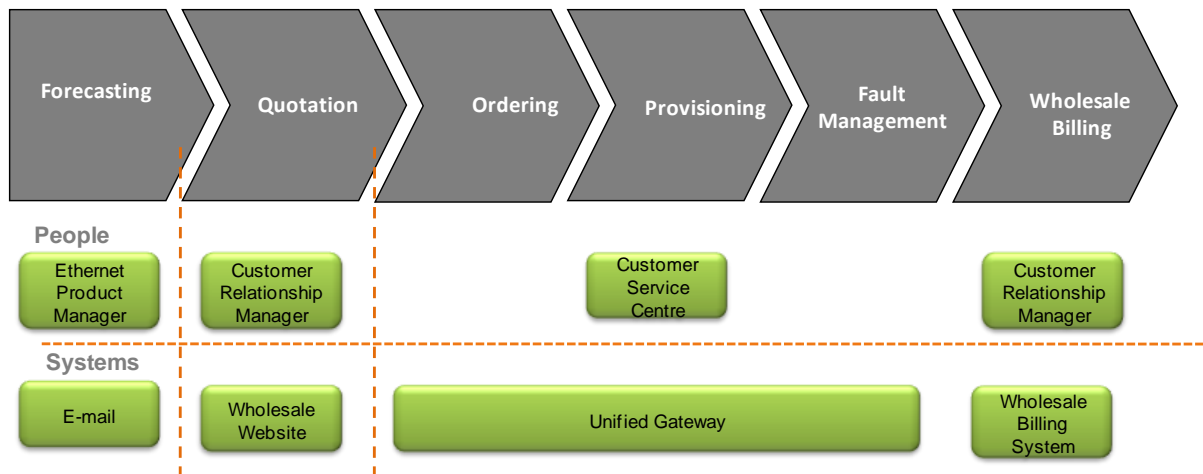


Figure 18: Process, people and systems overview

Prior to requesting the service an Operator may find product information on the eircom Wholesale website, www.eircomwholesale.ie or discuss their requirements with their Customer Relationship Manager.

Ordering, Provisioning and Maintenance processes are supported by the Unified Gateway and the eircom Wholesale Customer Contact Centre. After provision of the WEIL any queries regarding billing should be directed to an Operator's Customer Relationship Manager.

Each of these processes are outlined in further detail below.

4.1. Forecasting

Operators are requested to provide forecasts on a rolling 12 months basis via the standard eircom forecasting form. These forecasts should be verified by an Operator on a rolling quarterly basis and provided to the Ethernet Product Manager.

Please see section 2 Forecast of the WEIL Process Manual for an explanation of the forecasting process.

4.2. Quotation process

An Operator may request a quotation for a Wholesale Ethernet Interconnect Link via the quotation tool (web GUI), identifying the nominated Point of Handover for the WEIL product.

eircom will provide a quote with an indicative price, subject to a full site survey, for the requested WEIL.

eircom shall issue a quotation for infrastructure build (QIB) for ENH WEIL. This is a non-chargeable event.

4.3. Ordering, Provisioning and Fault Management

The Ordering, Provisioning and Maintenance processes will be supported by the Unified Gateway (UG) which will be used to log orders and report faults for the product via the UG web GUI.

The UG is an order management and fault handling system designed to be the primary interface between eircom and an Operator.

Operators' will be able to enter all the necessary data via structured GUI screens for both ordering and fault reporting. Once all the data has been entered the order or fault can be submitted. The UG will process and validate the relevant orders and faults and will provide appropriate notifications in response. Order status updates through to completion will be provided from the Wholesale SLA Manager (WSLAM).

Any notifications from WSLAM, that include connection or rental charges are estimates, and are not contractually binding on eircom or an Operator. eircom will assess an order at Order Validation and categorise the order as either Standard or Non-Standard. If an order is categorised as Non-Standard, eircom may issue a quotation subject to a full site survey.

Fault status updates will be provided back to an Operator and can be viewed via the UG order and fault tracking screens.

Service assurance on a fibre provided for an Operator on an WEIL IBH, will be provided by eircom, it is the responsibility of an Operator to prove any fault from an Operator network into the fibre cable. If the fibre cable needs to be replaced, it will be funded by an Operator.

4.3.1. Ordering the Service

An Operator can place an order for the product via the Unified Gateway, once a quotation has been obtained and any site preparation has been adhered to. The following product rules will apply to each WEIL order:

- Minimum of one Service Access Bandwidth is required per WEIL order
- Operator is responsible to ensure that they do not breach the WEIL capacity
- Operator is responsible to ensure that the Service Access Bandwidth is configured to meet their end user requirements

A WEIL **CSH** order will provide connectivity from the eircom network to an Operator's nominated handover location. The physical connectivity order will require the installation of fibre and an eircom NTU. Once the physical connectivity is completed the logical Service Access Bandwidth (SAB) shall be delivered. This element of the order enables an Operator to configure the handover to support the traffic profile (aggregate Expedited Forwarding and Assured Forwarding bandwidth) of an Operator's end users and references the WEIL on which it is provided.

Please refer to section 4 of the WEIL Process Manual for further detail on order placement via the UG.

A WEIL **ISH** order will provide connectivity from the eircom network to an Operator's In-Span Handover location in an Operator underground manhole. The physical connectivity will require the installation of eircom fibre and equipment.

On placement of the order on the UG, an Operator will request eircom to nominate an eircom underground manhole adjacent to the eircom exchange. An Operator and eircom shall agree on a site visit to identify which side of the eircom nominated manhole will be accessed. An Operator will proceed with provision of wayleaves for an Operator underground manhole and provision of the ODF to allow eircom to terminate the eircom fibre cable for the WEIL ISH. eircom will provide a Clerk of Works to supervise access when an Operator is ready to break through (civils) to the eircom nominated manhole. eircom will complete physical connectivity of the WEIL to the POH in an Operator underground manhole.

Once the WEIL ISH physical connectivity is completed the logical Service Access Bandwidth (SAB) shall be delivered. This element of the order enables an Operator to configure the handover to support the traffic profile (aggregate Expedited Forwarding and Assured Forwarding bandwidth) of an Operator's end users and references the WEIL on which it is provided.

A WEIL **IBH** order will provide connectivity from the eircom network to an Operator's nominated In-Building Handover located within an eircom exchange. The WEIL physical connectivity will require preparation and installation of eircom fibre and equipment, and an Operator fibre and equipment installed by eircom between an Operator Co-location rack and the eircom ODF, within the same eircom exchange as the eircom NGN Node.

Before placing the order on the UG an Operator must have a Licence for Co-location footprint for the purposes of LLU. . On request, (QIB Order Type) eircom will undertake to assess the work that is required to prepare the eircom exchange facility for an In-Building Handover and provide a quotation for an Operator from the Customer Relationship Manager for the WEIL.

An Operator will provide¹¹ eircom with the optical switch panel, SC connectors, CMS (cable management system), 12 fibre cable, and cable tray to connect an Operator physically from the Co-location rack to the ODF. eircom will install (PIB Order Type) the physical connectivity of the WEIL from the POH to an Operator Co-location rack within the same eircom exchange as the eircom NGN Node. Once this infrastructure is in place an Operator may place a provide data circuit order (PDC Order Type) via the UG for the WEIL.

Once the WEIL IBH physical connectivity is completed the logical Service Access Bandwidth (SAB) shall be delivered. This element of the order enables an Operator to configure the handover to support the traffic profile (aggregate Expedited Forwarding and Assured Forwarding bandwidth) of an Operator's end users and references the WEIL on which it is provided.

A WEIL ENH order will provide connectivity from the eircom network to an Operator's nominated Edge Node Handover located within the eircom secure cabinet in the Operator's site. The WEIL physical connectivity will require the installation of eircom infrastructure.

The Operator will present their fibre cable to eircom at the entry point to the eircom cabinet, and eircom will then connect the Operator to the eircom network

There are three stages in the provision of WEIL-ENH:

- Quotation for Infrastructure survey
- Infrastructure Build
- WEIL ENH delivery

When an Operator places a 'Quotation for Infrastructure Build' (QIB-ENH) Order via the UG eircom will undertake to carry out a survey and assess the infrastructure that is required to deliver Edge Node Handover, and will provide a quotation for an Operator.

When the Operator accepts the quotation supplied, the Operator will then place a 'provide infrastructure Build' (PIB-ENH) Order via the UG. Note that before a PIB-ENH order may be placed the Operator and eircom must have agreed and documented the access arrangements to the Operator's site by eircom staff. Work on the required infrastructure will commence after payment in full of the connection fee has been received by eircom. eircom will then order, install and commission the infrastructure in the Operator's site.

¹¹ eircom will survey and provide costs for the installation of infrastructure to an Operator. On behalf of an Operator, providing the costs are accepted, eircom will install a patch panel, cable tray, SC connectors, CMS, and 12 fibre cabling between the Co-Location rack and the eircom ODF.

Once this infrastructure is commissioned an Operator may place a provide data circuit order (PDC Order Type) via the UG for the WEIL ENH circuit. The 10Gb/s WEIL ENH can also be requested via the eircom Wholesale Account Manager with 1+1 protection.

Once the WEIL ENH physical connectivity is completed the logical Service Access Bandwidth (SAB) shall be delivered. This element of the order enables an Operator to configure the handover to support the traffic profile (aggregate Expedited Forwarding and Assured Forwarding bandwidth) of an Operator's end users and references the WEIL on which it is provided.

4.3.1.1. Delivery Timelines

Wholesale Ethernet Interconnect Link (WEIL) orders are delivered using fibre which is subject to survey and availability. The lead-time associated with these orders may be classified in some cases as Standard or Non-Standard with a defined lead-time.

In cases where the fibre delivery will be treated as Non-Standard then eircom will assess this order and provide a forecasted due delivery date. The forecast due date is based on the time to provide each element of the service.

Please refer to section 2 of the WEIL SLA for further detail on the delivery lead-times, including definition of Standard and Non-Standard orders.

4.3.1.2. Confirmation of Delivery

An order is deemed to be complete on provision of the Wholesale Ethernet Interconnect Link order which establishes the service between the nominated handover location and the eircom core network. On completion of the order an Operator shall receive a Delivery Notification.

This order status throughout the life of the order will also be available for an Operator to track on the UG.

4.3.2. Other orders – change, move, cease and cancel

Following the delivery of the Wholesale Ethernet Interconnect Link and associated logical circuit an Operator can request changes to the service, move the service or cease the service. The changes that can be requested for the service are:

- Change bandwidth on Service Access Bandwidth

- Change Aggregate Bandwidth (Expedited Forwarding and Assured Forwarding %) on Service Access Bandwidth

An Operator may also request a cease on a Service Access Bandwidth providing all associated end customer traffic has either been moved or ceased prior to this. Please refer to the Process Manual for further detail on change order process, move order and cease process.

If an Operator wishes to cancel a Wholesale Ethernet Interconnect Link order before it is delivered, this order must be placed prior to installation of the service commencing. See Cancel Process within Section 4.5 of the WEIL Process Manual.

Where a Site Survey and fibre cabling is undertaken on request of an Operator for IBH, eircom will charge associated labour rates and costs incurred under Service Schedule 101 of the eircom Access Reference Offer. These charges will apply as part of the site preparation and will apply should the WEIL be cancelled.

Please refer to section 4 of the WEIL Process Manual for further detail on change order, move order, cancel and cease processes.

4.3.3. Fault Management

Please refer to section 5 of the WEIL Process Manual for further details on fault handling.

4.3.3.1. Logging a fault

A valid fault for this service is logged via the Unified Gateway after an Operator has proven the fault out of their network. The Operator should log the fault against the WEIL physical reference number only.

For WEIL IBH, an Operator must prove the fault out of their network and beyond the Co-location optical patch panel to the eircom POH, the ODF, before logging a fault on the UG.

4.3.3.2. Fault handling process

Please refer to section 5 of the WEIL Process Manual for the fault handling process for this service. The status of a fault can be tracked throughout its lifecycle via the

UG web GUI by an Operator. Only those faults relating to an Operator will be visible to them.

Service shall be deemed to have been restored when the fault condition is resolved on the eircom network and service availability restored, notification will be provided to eircom via an Operator.

4.4. Billing

There are connection and rental charges associated with the Wholesale Ethernet Interconnect Link. Once the order is completed and the WEIL is commissioned billing shall commence in the next billing cycle. Billing shall be carried out on a monthly basis in advance and the service shall be identified on the bill.

Some charges for WEIL IBH Co-location services such as additional power, labour and site surveys will be billed on an Operator LLU bill, monthly, with all services identified on the bill.

Charges for WEIL ENH will also include the following elements

- WEIL ENH Infrastructure connection and rental charges

In the event that an Operator has a query regarding their bill they should contact their Wholesale Customer Relationship Manager.

4.5. Equipment

Each party retains title to its own equipment, including any equipment that may be required on the premises of the other party. Each party shall have the right to recover its equipment following cessation of the service. The parties will co-operate with each other in respect of requests to recover equipment.

5. Supporting Documentation

Further information on eircom Wholesale, processes and supporting information may be found at www.eircomwholesale.ie. The WEIL product description needs to be read in conjunction with the following documents:

- WEIL Process Manual
- WEIL Service Level Agreement
- Wholesale Symmetrical Ethernet Access (via the eircom NGN Node) Product Description
- Process Manual for eircom Physical Co-location Service
- eircom Access Reference Offer
 - Service Schedule 101

Appendix 1 – WEIL Locations

Please refer to the roll-out schedule for up to date WEIL locations, if you do not have access to the current roll-out schedule please contact your account manager.

Appendix 2 – NTU Specification

An Operator must ensure that adequate space, power and correct environmental conditions are available for the installation of the NTU if necessary as outlined in Table 3.

Space		Height	Width	Depth
	Dual PSU	43.7mm	440mm	240mm
Power	Power		Power Consumption	
	AC or DC		18.5W (max)	
Operating Temperature	0 – 50°C			

Table 3: NTU space and power requirements

Table 4 outlines the specification and number of the Operator interface ports that are available.

Port type and number	GBIC	Connector	Fibre type
1x fibre base User interface port	mini-GBIC, SFP, 1000BaseSX (<500m)	LC	MMF
	Or Mini-GBIC, SFP, 1000BaseLX (<10km)	LC	SMF
4 x copper based User interface port	1000Base-T	RJ-45	Cat5

Table 4: Operator interface ports specification

Key NTU Features:

- Dual PSU unit supplied with 19" rack mounting kit
 - o AC or DC power option is available
- Default port interface presentation is electrical RJ45 (on port3)
 - o Port duplex mode: Auto negotiation (default) or 10M / 100M full duplex
- Port interface presentation can be changed to optical LC (on port 2):
 - o Options are 1000Base-SX (default) or 1000Base-LX
 - o Port duplex mode: Auto negotiation (default) or 1000M full duplex