Facilities Access Service
Product Technical Specification

RELEASE ~~1~~2.0

NBNCo
Bringing broadband to life

This document forms part of NBN Co's Wholesale Broadband Agreement which is a Standard Form of Access Agreement for the purposes of Part XIC of the Competition and Consumer Act 2010.

NBN Co Limited

Facilities Access Service Product Technical Specification

~~04/04~~07307~~02~~6/08~~6~~/2012

Release: ~~1~~2.0

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Environment

NBN Co asks that you consider the environment before printing this document.

Contents

1 Scope and purpose

1.1 Purpose

The purpose of this document is to set out the technical specifications for NBN Co's Facilities Access Service.

1.2 Scope

This document relates to the Facilities Access Service only and may be updated by NBN Co from time to time in accordance with the Wholesale Broadband Agreement.

This document does not apply to NBN Co's interim facilities access solution for Temporary POIs.
Nor does it contain information regarding access to the buildings in which Aggregation Node Sites are located. For information regarding access to the buildings in which Aggregation Node Sites are located, please refer to the Product Description for the Facilities Access Service.

This document forms part of the Wholesale Broadband Agreement.

It should be read in conjunction with:

- the Product Description for the Facilities Access Service;
- the Service Levels Schedule which forms part of the WBA Product Catalogue;
- the Price List that forms part of the WBA Product Catalogue;
- the modules of the Wholesale Broadband Agreement; and
- the NBN Co Operations Manual.

1.3 Definitions

A capitalised term used in this document has the meaning given to that term in the Glossary for this document.

If a capitalised term is not defined in the Glossary for this document, it has the meaning given to that term in the Wholesale Broadband Agreement or the WBA Product Catalogue.

2 Introduction

The Facilities Access Service supports interconnection between the Customer Network and the NBN Co Network at each of the 121 Points of Interconnection. Each of the 121 Points of Interconnection are located within an Aggregation Node Site.

The Facilities Access Service comprises one or more of the following:

- Cross Connect;
- NBN Co Co-location; and
- NBN Co ODF Termination Point.

Each Aggregation Node Site is located within a building that is classified as either a Type 1 Facility or a Type 2 Facility. Please refer to the Product Description for the Facilities Access Service for more information describing the Facilities Access Service.

By way of example only, the diagram set out below shows the relationship between an Aggregation Node Site and the rest of the NBN Co Network.

The Facilities Access service is agnostic of end user access technology (Fibre, Wireless or Satellite).

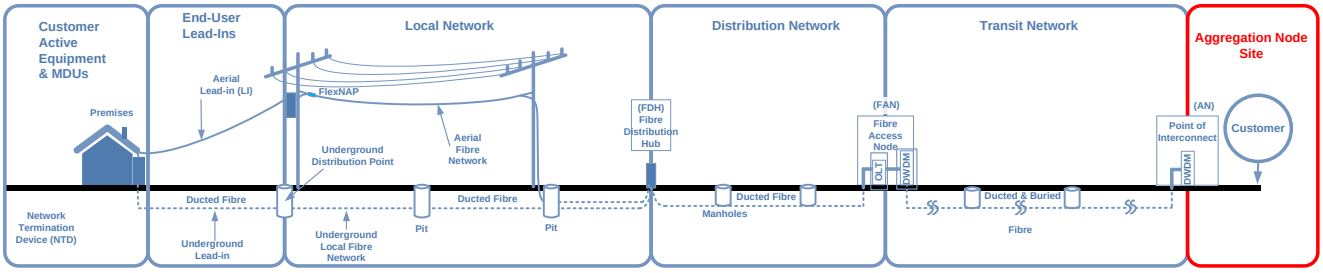


Figure 1: Relationship between an Aggregation Node Site and the rest of the NBN Co Network

In accordance with the terms of the Wholesale Broadband Agreement, Customer may acquire the type (or types) of the Facilities Access Service which suits Customer's interconnection requirements in respect of each Point of Interconnection.

Details about Building Entry Rights are also set out in the Product Description for the Facilities Access Service.

3 Product Description

3.1 Cross Connect

Please refer to section 2.1 of the Product Description for the Facilities Access Service for a description of Cross Connects.

3.2 NBN Co Co-location

Please refer to section 2.2 of the Product Description for the Facilities Access Service for a description of NBN Co Co-location.

3.3 NBN Co ODF Termination Point

Please refer to section 2.3 of the Product Description for the Facilities Access Service for a description of NBN Co ODF Termination Point.

3.4 Relationship between different types of the Facilities Access Service

By way of example only, Figure 2 below illustrates the relationship between the different types of the Facilities Access Service.

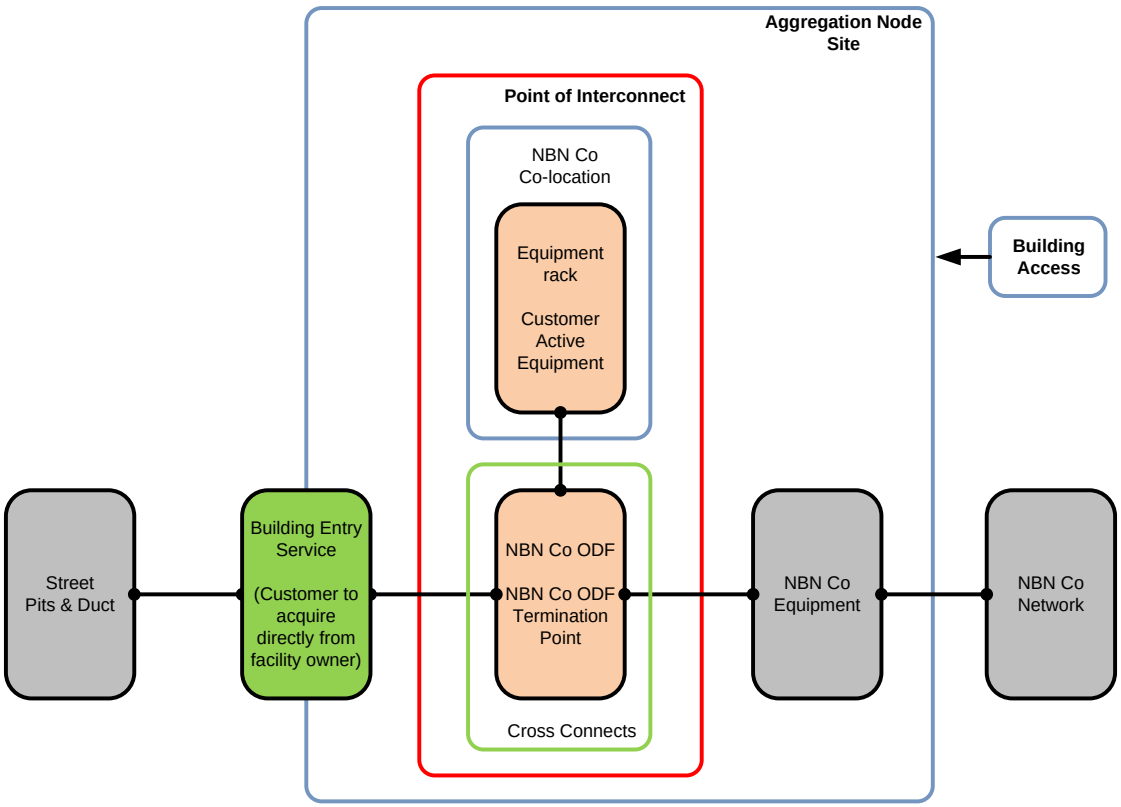


Figure 2: Relationship between different types of the Facilities Access Service

3.5 Examples of types of interconnection that can be achieved

This section sets out a number of examples of the types of cross connections and types of interconnection that can be achieved using various combinations of the three types of the Facilities Access Service. These examples are however not exhaustive.

3.5.1 Cross Connects

Table 1 sets out the types of connections that can be achieved between different points on the NBN Co ODF using Cross Connects.

To/From (Points of presentation on the NBN Co ODF)	Customer's lead-in or backhaul transmission cable	NNI	Equipment rack made available to Customer as part of NBN Co Co-location
Customer's lead-in or backhaul transmission cable	Y	Y	Y
NNI	Y	N*	Y
Equipment rack made available to Customer as part of NBN Co Co-location	Y	Y	Y

Table 1: Matrix of permissible interconnections that can be achieved using Cross Connects

*Direct NNI to NNI interconnection is not possible because traffic egressing the NNI at the Point of Interconnection is required to traverse an IP device prior to being injected back into the NBN Co Network. For more information, please refer to the NBN Co Fibre Access Service – Product Technical Specification.

In respect of Facilities Access, a Customer's lead-in or backhaul transmission cable is defined as either:

- a transmission cable brought in from the street into the Aggregation node and delivered to the NBN Co ODF; or
- a transmission cable brought in from elsewhere within the Aggregation Node facility and delivered to the NBN Co ODF.

3.5.2 Interconnection

Figure 3 illustrates a type of interconnection that can be achieved using a combination of NBN Co ODF Termination Point, Cross Connects and NBN Co Co-location in respect of the same Point of Interconnection.

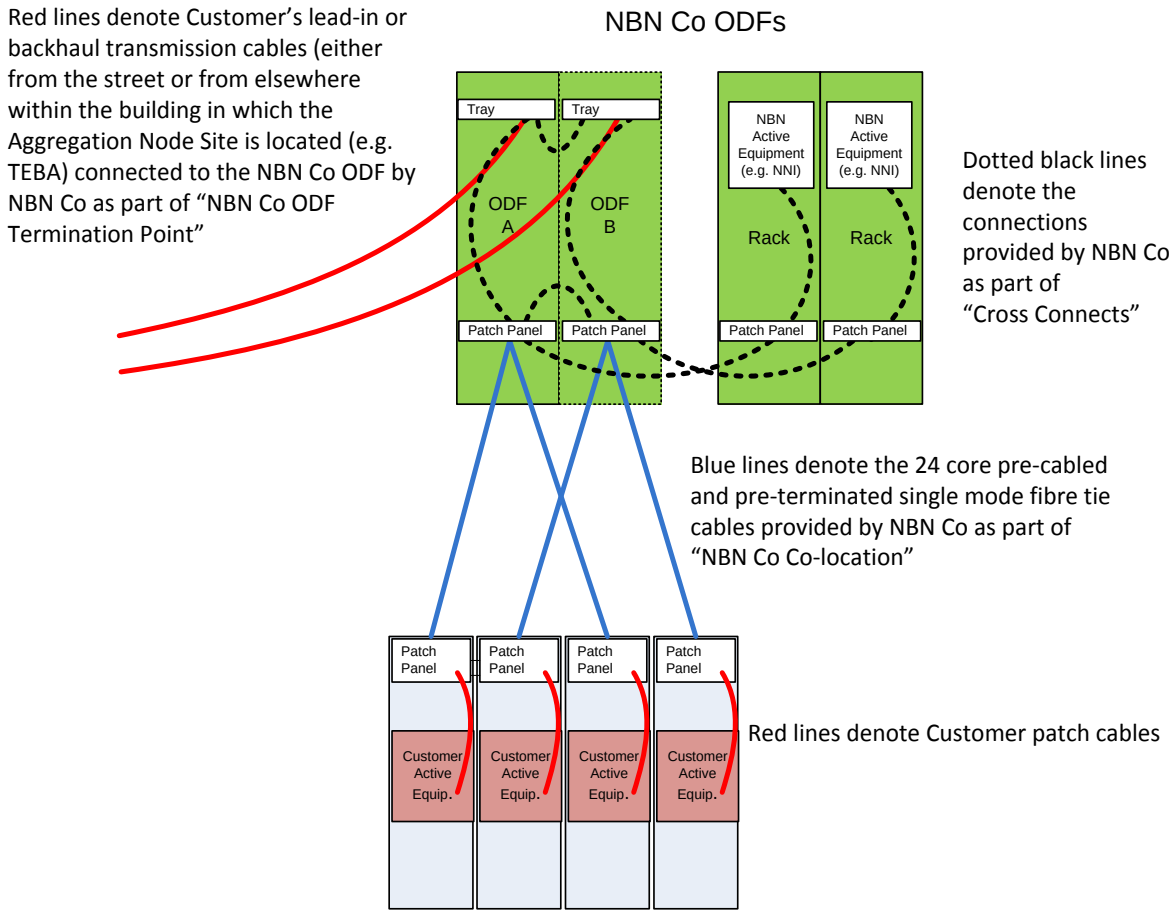


Figure 3: Type of interconnection that can be achieved using a combination of NBN Co ODF Termination Point, Cross Connects and NBN Co Co-location.

4 Technical Specifications

4.1 Cross Connects

Figure 4 below illustrates the permissible interconnections that can be established within an Aggregation Node Site by Customer acquiring Cross Connects.

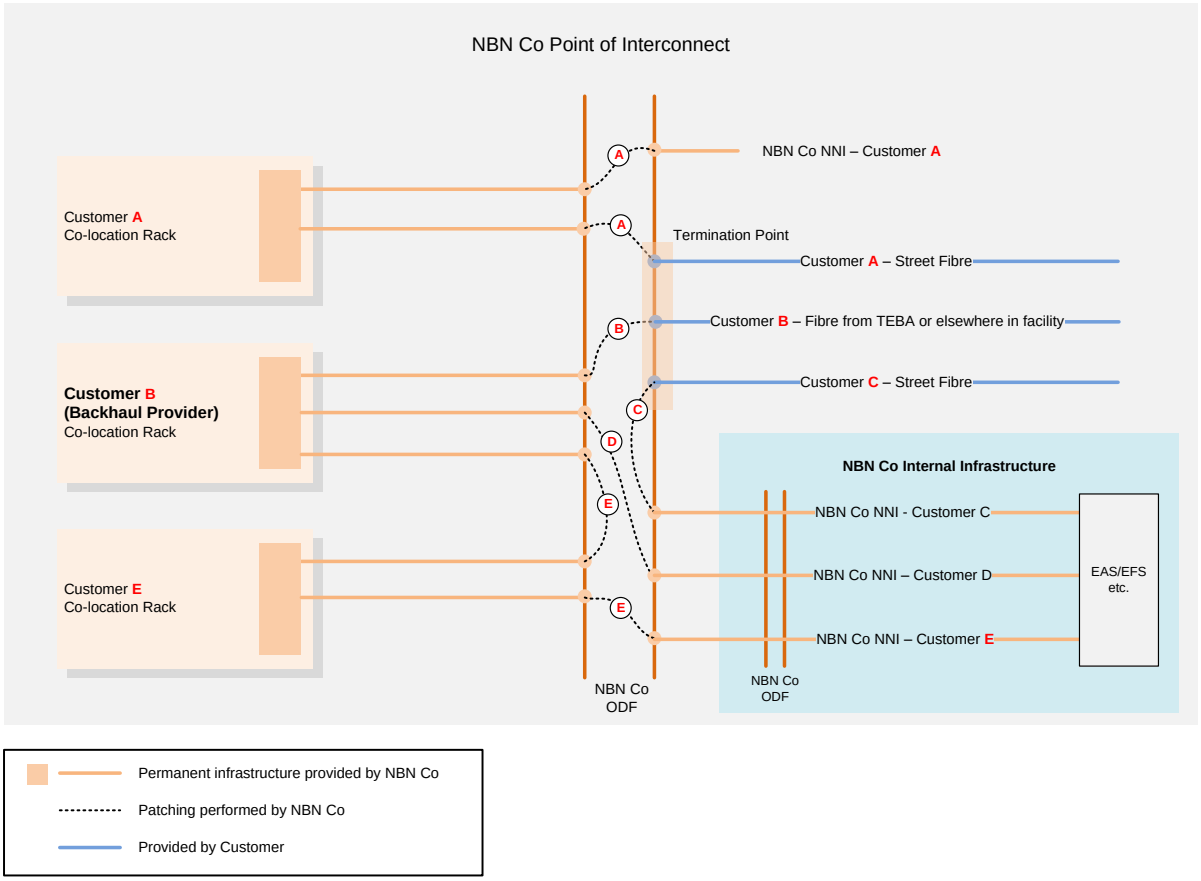


Figure 4: Logical connectivity diagram of permissible Cross Connects

Subject to the terms of the Product Description for the Facilities Access Service, NBN Co shall be responsible for the following in respect of Cross Connects:

- installing all Cross Connects within the NBN Co ODF;
- providing the materials used to install all Cross Connects within the NBN Co ODF; and
- ongoing maintenance of all Cross Connects.

Note that:

- the hardware and cabling between the equipment rack in which Customer Active Equipment is installed (as part of NBN Co Co-location) and the NBN Co ODF; and
- the pre-cabled and pre-terminated single mode optic fibres within the equipment rack in which Customer Active Equipment is installed (as part of NBN Co Co-location) and the NBN Co ODF,

are provided by NBN Co as part of NBN Co Co-location (and not as part of Cross Connects) as described in section 4.2.2.1 of this document.

4.1.1 Point of service handover between NBN Co Network and Customer Network

The point of service handover between the NBN Co Network and the Customer Network is dependent on the type of the Facilities Access Service acquired by Customer in respect of the relevant Point of Interconnection.

4.1.1.1 NBN Co ODF Termination Point and Cross Connects

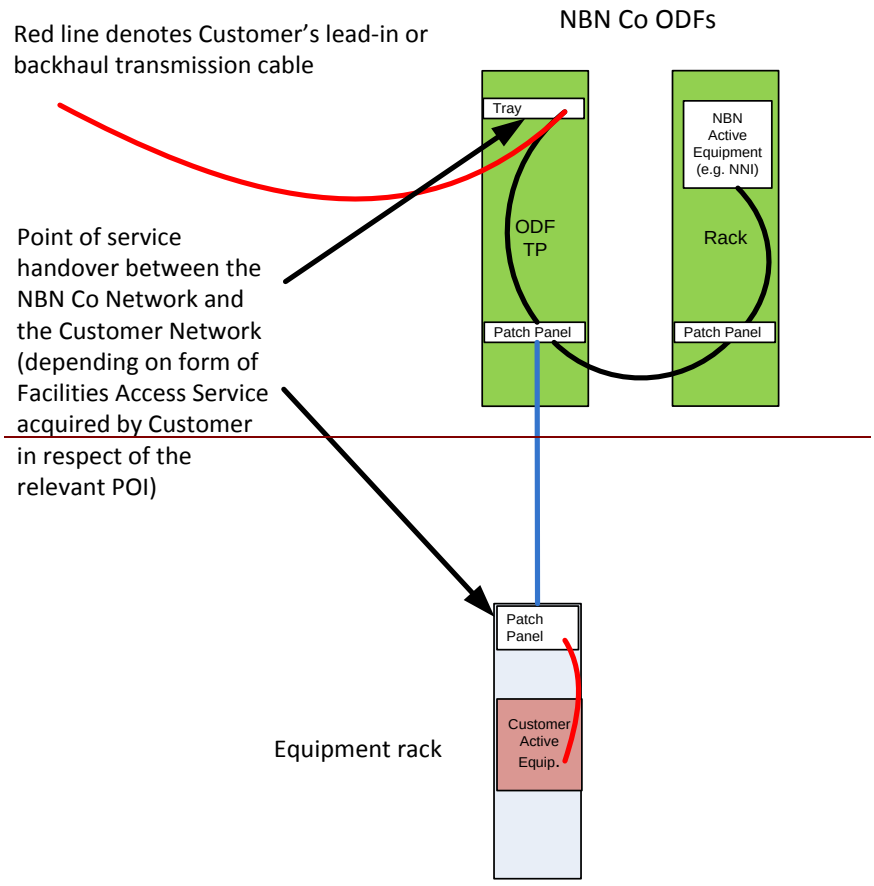
Where Customer acquires NBN Co ODF Termination Point and an associated Cross Connect (but not NBN Co Co-location), the point of service handover will be the optical port interface on the fibre tray within the NBN Co ODF on which Customer's lead-in or backhaul fibre transmission cable is terminated.

4.1.1.2 NBN Co Co-location

Where Customer acquires NBN Co Co-location and an associated NBN Co ODF Termination Point and/or Cross Connect, the point of service handover will be the optical interface on the fibre patch panel for that equipment rack.

The NNI, as described in the product description and product technical specification for each of the Ethernet Bitstream products supplied by NBN Co under the Wholesale Broadband Agreement (including the NFAS), is unaffected by the description of the point of service handover between the NBN Co Network and the Customer Network as described in this section.

~~The NNI, as described in the product description and product technical specification for each of the Ethernet access bitstream products supplied by NBN Co under the Wholesale Broadband Agreement (including the NFAS), is unaffected by the description of the point of service handover between the NBN Co Network and the Customer Network as described in this section.~~



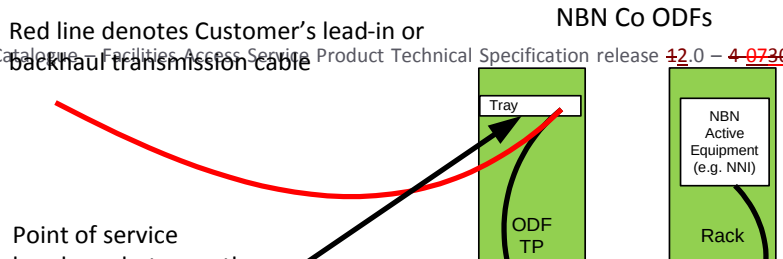


Figure 5: Point of service handover between the NBN Co Network and the Customer Network (depending on the type of Facilities Access Service acquired by Customer in respect of the relevant Point of Interconnection).

4.2 NBN Co Co-location

This section applies to the NBN Co Co-location type of the Facilities Access Service only.

4.2.1 Equipment rack specifications

4.2.1.1 Size and dimensions

As specified in the Product Description for the Facilities Access Service, equipment racks can be ordered by Customer as either 'lockable full height equipment racks' or 'lockable half height equipment racks'.

4.2.1.1.1 'Lockable full height equipment rack' specifications

NBN Co will ensure that all 'lockable full height equipment racks' that are supplied by NBN Co to Customer will have the following specifications:

- External rack dimensions of 2195mm high and 1000mm ~~external~~ depth including door handles as per ANSI/EIA RS-310C
- Minimum ~~i~~internal depth clearance between the front and rear door frames~~s~~ of ~~955mm~~900mm
- 40 usable rack units (ANSI)
- 19 inch ANSI rail spacing (a 21 inch ETSI retrofit kit can be ordered at any time)
- Four equipment mounting rails ~~posts~~ (the ~~front~~ rear two rails can be reconfigured for varying depths)
- Use of the four ~~posts~~ equipment rails can sustain up to 600 kilograms of static weight per rack
- Rack units shall be individually numbered
- A fixed cable tray mounted vertically inside the rack, with a minimum width of 150mm
- Rack space will be accessible by Customer from the front and rear of the racks, but not from the sides of the racks
- Side panels ~~, fibre management~~ and power distribution units will be fitted to all racks

4.2.1.1.2 'Lockable half height equipment rack' specifications

NBN Co will ensure that all 'lockable half height equipment racks' subdivisions that are supplied by NBN Co to Customer as part of NBN Co Co-location will have the following specifications:

- External rack dimensions of 2195mm high and 1000mm ~~external~~ depth including door handles as per ANSI/EIA RS-310C (Two Rack subdivisions)
- Minimum internal depth clearance between the front and rear door frames of 900mm
- A fixed, vented dividing shelf shall provide segregation between top and bottom rack divisions
- Cabling to the bottom subdivision is protected from top subdivision
- ~~Internal depth clearance between the front and rear doors of 955mm~~
- 16 usable rack units (ANSI)
- 19 inch ANSI rail spacing (a 21 inch ETSI retrofit kit can be ordered at any time)
- Four equipment mounting rails ~~posts~~ (the ~~front~~ rear two rails can be reconfigured for varying depths)
- Use of the four ~~posts~~ equipment rails can sustain up to 300 kilograms of static weight per rack
- Rack units shall be individually numbered
- A fixed cable tray mounted vertically inside the rack, with a minimum width of 150mm
- ~~A fixed, vented dividing shelf shall provide segregation between top and bottom rack divisions~~

- ~~Cabling to the bottom subdivision is protected from top subdivision~~
- Rack space will be accessible by Customer from the front and rear of the racks, but not from the sides of the racks
- Side panels ~~, fibre management~~ and power distribution units will be fitted to all racks

4.2.1.2 Equipment ~~R~~rack configuration

In respect of lockable full and lockable half height equipment racks, the~~a~~ default rack configuration is ~~presented as per~~shown in Figure 6.

Default dimensions are as follows (+/- 15mm):

- Clearance between front and rear equipment rails of 715mm.
- Clearance between door frames of 910mm
- Clearance between front and rear door mesh of 955mm
- Clearance between front equipment rails and front door frame of 155mm
- Clearance between rear equipment rails and rear door frame of 40mm

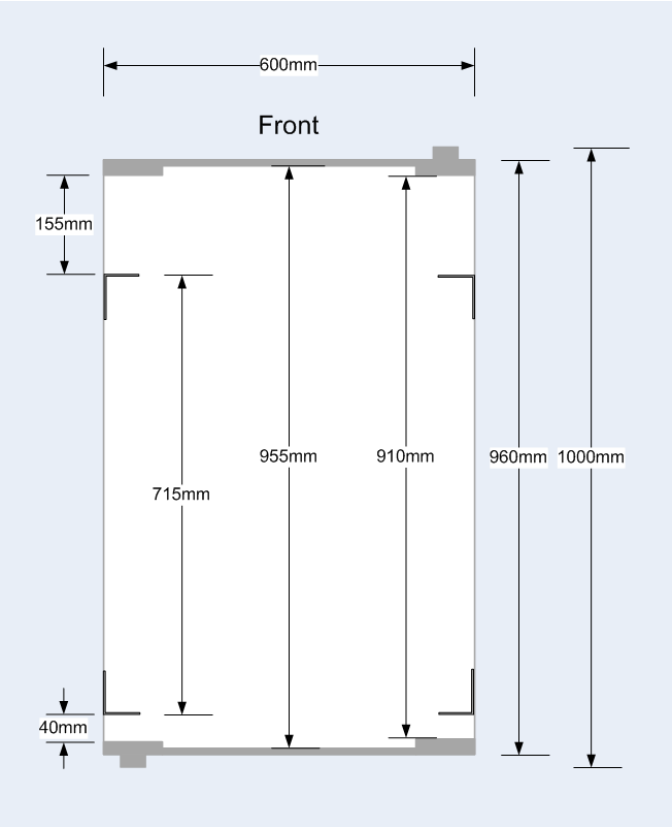


Figure 6: Plan view perspective of the default rack configuration with dimensions and clearances shown.

~~4.2.1.2~~4.2.1.3 Doors

NBN Co will ensure that front and rear lockable doors are provided in respect of each equipment rack.

NBN Co will ensure that these doors are ventilated by mesh and provide an equivalent open area of at least 63%.

~~4.2.1.3~~4.2.1.4 Panels

NBN Co will ensure that side and top panels are provided in respect of each equipment rack and are configured such that they cannot be removed (in the normal course of usage) whilst front and rear doors of the equipment rack are locked.

~~4.2.1.4~~4.2.1.5 Equipment rack security

~~4.2.1.4.1~~4.2.1.5.1 Locks

NBN Co shall:

- fit locks to the front and rear of the equipment rack doors;
- ensure each equipment rack door has a three point locking system;
- manage keys and access authorisation in respect of equipment racks;
- manage the issuance and revocation of keys and access authorisation in respect of equipment racks; and
- provide a method by which locks fitted by NBN Co can be rekeyed or reconfigured on request.

Please refer to the Product Description for the Facilities Access Service for further terms that apply in relation to the locks, keys and access cards.

~~4.2.1.4.2~~4.2.1.5.2 Cameras

Please refer to the Product Description for the Facilities Access Service for terms that apply in relation to the use of cameras within NBN Co Co-location space.

~~4.2.1.4.3~~4.2.1.5.3 Door alarms

NBN Co will ensure that equipment racks are fitted with pre-cabled door switches on the front and rear doors that are designed to enable Customer to monitor door state (i.e. open/closed). The door switches are cabled with 1.5 metre length, 0.5mm diameter solid conductor cable. If Customer wishes to monitor door state, Customer must provide its own monitoring equipment and connect the provided door switch cabling~~monitoring cabling, and connect that monitoring cabling to the door switches~~ in accordance with NBN Co's instructions (set out below and otherwise as notified by NBN Co to Customer from time to time). NBN Co is not responsible for monitoring any door switches, door alarms or door states (i.e. open/closed) in relation to equipment racks, or installing, operating or maintaining any such monitoring equipment and monitoring cabling.

If Customer wishes to connect its own monitoring equipment ~~and monitoring cabling to the~~ to the provided door switch cabling, ~~Customer may do so by terminating a cable of 0.4mm to 0.7mm cross section on the provided insulation displacement module.~~ Customer can ~~configure the~~use the switch ~~in either~~ Normally Open (NO) or Normally Closed (NC) and common outputs~~positions~~. ~~Only Krone punchdown tools (P/N 6417-2-055-01) may be used by Customer to terminate monitoring cables.~~

The maximum voltage and current that can be switched or interrupted by the door switch is 63V and 0.5A.

4.2.2 Cabling

4.2.2.1 Cable specifications

NBN Co will procure, install and maintain 24 core, pre-cabled and pre-terminated single mode fibre tie cables in respect of each 'lockable full height equipment rack' and each 'lockable half height equipment rack' subdivision.

These tie cables form part of fixed infrastructure and will be connected to (and run between) the NBN Co ODF Termination Point and the fibre patch panel within each equipment rack supplied as part of NBN Co Co-location.

In respect of each 'lockable full height equipment rack' and each 'lockable half height equipment rack' subdivision, the pre-cabled and pre-terminated single mode fibre tie cables will present the 24 terminated fibres on a 1 RU patch panel with SC/APC connectors.

If Customer requires augmentation to the pre-cabled and pre-terminated single mode fibre tie cables beyond the original 24 fibres, Customer may request a quote directly from NBN Co. If NBN Co is able and elects to do so, it will provide such augmentation on the terms of a quote agreed between NBN Co and Customer.

Where Customer agrees to the quote provided by NBN Co, NBN Co will:

provide up to an additional 24 terminated fibres and fibre termination tray where Customer has started using the pre-cabled and pre-terminated single mode fibre tie cables and cannot disrupt the services running over these cables; or

replace the initial 24 port fibre patch panel with a 72 fibre tray and tie cables where Customer has not yet started using the pre-cabled and pre-terminated single mode fibre tie cables.

Customer is responsible for procuring, installing and maintaining its own single mode patch leads between the fibre patch panel within the relevant equipment rack and the Customer Active Equipment installed within that relevant equipment rack.

4.2.2.2 Cabling restrictions

Customer and its Personnel are permitted to perform cabling within equipment racks that have been made available as part of NBN Co Co-location, on the terms set out in the Product Description.

Customer and its Personnel must not perform any cabling works externally to equipment racks that have been made available as part of NBN Co Co-location.

If Customer requires "Rack to Rack" connectivity ~~(via the NBN Co ODF),~~ , Customer must only utilise the fibre cabling provided by NBN Co and which traverses the NBN Co ODFs. ~~.~~

4.2.2.2.1 Fibre strand attributes

The fibre strand attributes set out below only relate to fibre provided by NBN Co to Customer under the Facilities Access Service. The tables below exclude splice losses.

Individual strands:

- All strands shall be single mode optical fibre.
- All fibre strand attributes shall meet or exceed the recommendations as set out in ITU-T G.652 Standard, Characteristics of a Single Mode Optical Fibre and Cable, Table 4 G.652-G.652D attributes, Telcordia GR-20-CORE, IEC 60793, and IEC 60794.
- Point discontinuities shall have an optical loss no greater than 0.10dB.
- NBN Co specific optical insertion losses are listed in Table 2.
- NBN Co specific Dispersion values are listed in Table 3.
- ~~NBN Co specific Polarization Mode Dispersion (PMD) values are listed in Table 4.~~

Wavelength (nm)	Mean Insertion Loss (dB/km)	Standard Deviation (dB/km)	Maximum Insertion Loss (dB/km)
1310	0.31	0.0133	0.35
1383	0.31	0.0133	0.35
1490	0.22	0.0066	0.24
1550	0.20	0.0033	0.21
1625	0.22	0.0033	0.23

Table 2: Maximum Optical Values

Wavelength (nm)	Dispersion Value [ps/(nm.km)]
1550	≤ 18.0
1625	≤ 22.0

Table 3: Maximum Dispersion Values

~~Type~~	~~Value (ps/√km)~~
~~PMD Link Design Value~~	~~≤ 0.07~~
~~Maximum Individual Fibre~~	~~≤ 0.1~~

~~*Table 4: Maximum PMD Values*~~

~~When performing a PMD calculation, the fibre segment under consideration will be the unbroken passive fibre path linking adjacent active devices in the NBN Co Network.~~

~~Cabling restrictions~~

Patch leads provided by NBN Co shall meet or exceed the recommendations as set out in ITU-T G.657.~~Customer and its Personnel are permitted to perform cabling within equipment racks that have been made available as part of NBN Co Co-location, on the terms set out in the Product Description.~~

~~Customer and its Personnel must not perform any cabling works externally to equipment racks that have been made available as part of NBN Co Co-location.~~

~~If Customer requires "Rack to Rack" connectivity (via the NBN Co ODF), Customer must utilise the fibre cabling provided by NBN Co.~~

4.2.3 Power

4.2.3.1 Amount

Please refer to the Product Description for the Facilities Access Service for terms that apply in relation to power supply to equipment racks.

NBN Co will supply a feed of up to a maximum of 3kW at each 'lockable full height equipment rack' and a feed of up to a maximum of 1.5kW at each 'lockable half height equipment rack' subdivision. These are the standard power limitations.

If Customer requires more than 3kW and up to a maximum of 6kW of power in respect of a particular 'lockable full height equipment rack', Customer must acquire NBN Co Co-location (if available) in respect of a directly adjacent 'lockable full height equipment rack'. If Customer acquires NBN Co Co-location in respect of a directly adjacent 'lockable full height equipment rack' for this purpose, then it is acceptable for Customer to install its Customer Active Equipment such that the full 6kW is consumed in the footprint of one of the two 'lockable full height equipment racks' and 0kW is consumed in the adjacent 'lockable full height equipment rack'. If a directly adjacent 'lockable full height equipment rack' is not available, then the standard power limitations will apply.

With respect to Customer Active Equipment, the ratio of inrush current to maximum continuous input current shall not exceed the limits specified in clause 4.7.1 of ETSI ETS 300 132-2 when measured with test circuit in accordance with clause 4.7.2 of ETSI ETS 300 132-2. The maximum instantaneous value of inrush current for an equipment interface shall not exceed 500A.

Power utilisation may be monitored by NBN Co.

4.2.3.2 Specification

NBN Co will supply -48V DC telecommunications power.

The operating voltage range shall be in the range of -40.5V DC to -60V DC.

4.2.3.3 Presentation

NBN Co will provide a single DC power distribution unit (**DCD**) in respect of each 'lockable full height equipment rack' or 'lockable half height equipment rack' subdivision to enable Customer Active Equipment to be powered.~~.~~

Ten circuit breaker positions are available on the DCD – five positions for each power feed (A + B).

Customer is responsible for providing its own NBN Co approved pluggable circuit breakers.

~~in order to power Customer Active Equipment.~~

NBN Co-approved pluggable circuit breakers are:

- Eltek 165A Circuit breaker – Part Number C401203
- Eltek 100A Circuit Breaker – Part Number 289595
- Eltek 80A Circuit breaker – Part Number C401261
- Eltek 50A Circuit breaker – Part Number ~~C401257~~288474
- Eltek 40A Circuit Breaker – Part Number C401260
- Eltek 20A Circuit Breaker – Part Number ~~C401033~~C401295
- Eltek 5A Circuit Breaker – Part Number 289155
- Eltek 2A Circuit Breaker – Part Number C401258

4.2.3.4 DC Distribution unit

Customer is responsible for providing its own DC cabling between the DCD and Customer Active Equipment.

DC and earthing cabling provided by Customer must comply with AS/NZS 3015:2004 and as such, the cable sheath colours must be provided as follows:

- Positive (Also called 0V, return or Positive earth) is red in colour
- Negative (Also called -48V or active) is blue in colour
- Earth is green/yellow in colour

Customer side DC cabling must be of a dimension, at, or between 2.5mm and 25mm cross sectional area and may be terminated to each individual circuit breaker output lug. Customer must ensure that the circuit breaker output terminal cable lug nuts are not exposed to torque exceeding 4.5 Newton metres.

When populated with approved Eltek circuit breakers, the DCD provides for circuit breaker trip alarm output via a voltage free relay. Customer may connect to the relay base for the purpose of monitoring circuit breaker trip alarms. Upon circuit breaker trip, all relay contacts transition simultaneously. Figure 7 below shows the mapping of the contact outputs on the relay base.

8NO	7NO	6NO	5NO
4NC	3NC	2NC	1NC
-			+
12COM	11COM	10COM	9COM

Figure 7: Relay base output.

The voltage free dry contact relay is rated to 60V, 0.5A.

The DCD provides LED indicators on the front panel. The green LED represents that DC power is present and there are no circuit breakers in a tripped state. The red LED represents that DC power is active, but a circuit breaker has tripped and is in the OFF position.

Other than for the purposes of connecting Customer side DC cabling and alarm output cabling, Customer must not tamper with, modify, move or remove the DCD, DCD power supply feed cabling, or power monitoring system.

~~4.2.3.4~~4.2.3.5 Diverse feeds / redundancy

Where available, NBN Co will provide two -48 V DC feeds (A and B) to each equipment rack.

Where available, NBN Co will provide the A and B feeds within a single DCD allowing up to five breakers on each feed. In certain circumstances, the A and B feeds may be fed from a single source.

~~4.2.3.5~~4.2.3.6 AC in equipment racks

NBN Co is not responsible for providing an AC power supply in respect of equipment racks.

Customer must not generate or attempt to generate an AC power supply within equipment racks.

~~for NBN Co Co-location NBN Co. For the purposes of section 5.13(a) of the Product Description for the Facilities Access Service, NBN Co consents to the installation of the Customer Active Equipment lists in the "Permitted equipment" column of the table below.~~

4.2.4 Earthing

NBN Co will ensure that equipment racks shall be:

- earthed in accordance with AS/NZS 3015:2004 "*ELVDC Power Supplies for Telecommunications*" as updated from time to time;
- wired and configured for 3-wire earthing practices in respect of NBN Co Co-location space located within Type 1 Facilities and 2-wire earthing in respect of NBN Co Co-location space located within Type 2 Facilities; and
- configured with two earth connection points – one at the top and one at the base of the equipment rack.

Customer must not remove or tamper with rack earthing.

4.2.5 Electromagnetic interference

Equipment installed by or on behalf of Customer within equipment racks must not radiate or conduct electromagnetic interference in excess of the limits defined in the following standards:

- EN55024 (Class A) – Immunity
- CISPR22 (Class A or Class B depending upon the environment) – Emissions
- EN61000-3 – Electromagnetic compatibility
- AS/NZS 60950.1:2010 (SELV) - Safety

4.2.6 Test switched sockets

Where available, NBN Co will make available to Customer 230V 10A switched sockets (which meet AS 60038:~~-~~2000) in pendant form hanging in the aisle from the ceiling or mounted to the bottom of the superstructure or in equipment rack aisles at periodic intervals. Subject to prior arrangements with NBN Co, the test switched sockets may only be used by Customer for incidental and temporary power connection only, such as to power a laptop or test equipment. NBN Co may, without notice, disconnect any connections made to the switched sockets.

As these switched sockets may not be protected by safety switches or residual current devices, it is recommended that 230V AC connected equipment be protected by a portable Residual Current Device that meets AS/NZS 3760:2010 and is certified as being suitable for use connection to a Residual Current Device.

4.2.7 Environmental

4.2.7.1 Climate control

As described in the Product Description for the Facilities Access Service, NBN Co will use reasonable endeavours to maintain the ambient temperature of the area in which NBN Co Co-location is made available by NBN Co to Customer. NBN Co will use reasonable endeavours to provide climate control up to a maximum ambient temperature of 45ºC with a maximum rate of change of temperature of 1.33ºC/minute.

4.2.7.2 Air handling

NBN Co will ensure that air handling is provided within the NBN Co Co-location space to facilitate hot aisle/cold aisle, with the cold aisle provided at the front of the equipment rack.

Customer must ensure that all Customer Active Equipment used or installed within the NBN Co Co-location space maintains front-to-back air handling.

4.2.7.3 Fire suppression

NBN Co will ensure that fire suppression is provided in accordance with the Building Code of Australia in respect of NBN Co Co-location space that is located within Type 1 Facilities.

4.2.7.4 Lighting

NBN Co will ensure that general lighting is supplied within the area in which NBN Co Co-location is made available and that such lighting meets AS/NZS 1680.1:2006*, Interior and workplace lighting – General principles and recommendations.*

4.2.7.5 Static suppression

NBN Co may, but is not obliged to provide, grounded antistatic flooring and static discharge points within NBN Co Co-location space.

4.2.7.6 Cardboard eradication

Customer must ensure that:

- any equipment that is delivered on behalf of Customer to the building in which NBN Co Co-location space is located is unpacked outside of the NBN Co Co-location space to prevent airborne contaminants; and
- all packaging and waste materials for equipment that is delivered on behalf of Customer to the building in which NBN Co Co-location space is located is immediately removed and disposed of by Customer Personnel.

4.2.7.7 Metalwork

Customer must not use or install any equipment within equipment racks or the NBN Co Co-location space that has a surface or plating finish which may produce conducting flakes or particles.

This includes hot dip galvanizing which may produce zinc whiskers or burrs.

4.2.8 Facilities

4.2.8.1 Parking spaces

Where there are parking spaces available for NBN Co's use at the building in which NBN Co Co-location space is located, Customer may access those parking spaces for maintenance and operational purposes, provided they are not already in use by NBN Co or Other NBN Co Customers, subject to reasonable conditions that may be notified by NBN Co to Customer from time to time.

On request by NBN Co, Customer must move any vehicle parked by or on behalf of Customer in a parking space that is available for NBN Co's use at the building in which NBN Co Co-location space.

4.2.8.2 Loading dock

Where there is a loading dock available for NBN Co's use at the building in which NBN Co Co-location space is located, Customer may access it for maintenance and operational purposes, provided it is not already in use by NBN Co or Other NBN Co Customers, subject to reasonable conditions that may be notified by NBN Co to Customer from time to time.

4.2.8.3 Lifts

Where goods lifts, cranes, mechanical lifting devices, slings and chains are present within the building in which NBN Co Co-location space is located, subject to Customer obtaining and maintaining the necessary accreditations, Customer may use those facilities with NBN Co's consent, subject to reasonable conditions that may be notified by NBN Co to Customer from time to time.

If Customer wishes to use an uncertified mechanical lift device that is available at the building in which NBN Co Co-location space is located, Customer is responsible for organising and paying for the certification of that device prior to using that device.

Customer must not use, or permit or authorise the use of, any uncertified mechanical lift device that is available at the building in which NBN Co Co-location space is located.

4.2.8.4 Ladders

Customer may use approved non-conducting ladders within the NBN Co Co-location space. Customer must not use any non-approved or conducting ladders within the NBN Co Co-location space. Customer must ensure that all ladders used by Customer Personnel comply with the occupational health and safety requirements of the building in which NBN Co Co-location space is located and any other requirements provided by NBN Co to Customer from time to time.

4.3 NBN Co ODF Termination Point

4.3.1 Building Entry Rights

Please refer to section 1.4 of the Product Description for the Facilities Access Service for a description of Building Entry Rights, an explanation of the relevance of Building Entry Rights and the terms that apply in respect of Building Entry Rights.

4.3.2 Cabling

Only NBN Co and its authorised contractors are permitted to introduce external cabling to NBN Co Equipment, including to the NBN Co ODF. Customer must not introduce or attempt to introduce any external cabling to NBN Co Equipment, including to the NBN Co ODF.

Where Customer, after being duly authorised by:

- NBN Co in Type 1 Facilities; and
- the Underlying Facility Provider in Type 2 Facilities,

to do so, has hauled their cable into the building in which the Aggregation Node Site is located and wishes to terminate their lead-in or backhaul transmission cable (whether it is from the street or elsewhere within the building) at the NBN Co ODF, Customer must ensure that at least 15 metres of slack cable is left beside the NBN Co ODF. Customer must ensure that the slack cable is rolled up neatly and safely next to the NBN Co ODF. The cable must also be clearly labelled with the Customer's name and circuit details, using a securely adhered label at the end of the cable length. ~~and labelled clearly along its length with the Customer's name and detail~~ The label should be ~~s.~~printed using a size 12 font such as the example in Figure 8 below.

CUSTOMER NAME
CIRCUIT ABCD123456789

Figure 8: Example of a cable label.

Provided that Customer has complied with the above requirements, NBN Co will then prepare and terminate (fusion splice) the Customer's lead-in or backhaul transmission cabling into a fibre termination tray within the NBN Co ODF.

At the time of ordering NBN Co ODF T~~t~~ermination P~~p~~oint, Customer can specify which fibres of their lead-in or backhaul cable require splicing and whether transposition of fibres is required. If no transposition is specified, it will be assumed that the standard colour code applies as specified in AS/CA S008:2010, Table B7 (Optical Fibre Colour Code).

Subsequent to NBN Co terminating the Customer cable within the NBN Co ODF, Customer may request inspection of the terminated cable. During this inspection, Customer may temporarily connect their test equipment and test the terminations.

4.3.3 Fibre Termination Trays

Customer may use up to two NBN Co-provided fibre termination trays for the purposes of terminating Customer's lead-in or backhaul transmission cabling. At the time of ordering, Customer may choose fibre termination trays in either 24 or 72 fibre counts and in either loose tube or ribbon fibre type.

4.3.3.1 24 fibre termination tray

Where Customer orders a 24 fibre termination tray, NBN Co will provide a 1 RU fibre termination tray with 24 single mode pigtails, in 12 colours, pre-terminated with SC/APC connectors, 24 pre-mounted SC/APC adaptors and 2 splice trays.

4.3.3.2 72 fibre termination tray

Where Customer orders a 72 fibre termination tray, NBN Co will provide a 2 RU fibre termination tray is provided with 72 single mode pigtails, in 12 colours, pre-terminated with SC/APC connectors, 72 pre-mounted SC/APC adaptors and 6 splice trays.

4.3.3.3 Port nomenclature

Where Customer orders NBN Co ODF Termination ~~p~~Point or Cross Connects for the purposes of connecting to the NBN Co NNI,

- odd port numbers represent TX (light out) from NBN Co Equipment towards Customer's equipment; and
- even port numbers represent RX (light in) towards NBN Co Equipment.

5 Glossary

AAA	Authentication, Authorisation, Accounting
AC	Alternating Current
ACS	Automatic Configuration Server
DC	Direct Current
DCD	DC Distribution Unit
DHCP	Dynamic Host Configuration Protocol
EACS	Electronic Access Card System
EAS	Ethernet Aggregation Switch
EFS	Ethernet Fanout Switch
~~MM~~mm	Millimetres
~~NM~~nm	Nanometres
NNI	Network to Network Interface
ODF	Optical Distribution Frame
ODF TP	Optical Distribution Frame Termination Point
POI	Point of Interconnect
P/N	Part Number
RADIUS	Remote Authentication Dial In User Service
RU	Rack Unit
RX~~P/N~~	Receive~~Part Number~~
~~RU~~	~~Rack Unit~~
SC/APC	Subscriber Connector Angled Polished Connector
~~ODF~~	~~Optical Distribution Frame~~
~~ODF TP~~	~~Optical Distribution Frame Termination Point~~
~~POI~~	~~Point of Interconnect~~
TX	Transmit