Product Description

nbn® Ethernet Product Module

Wholesale Broadband Agreement

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Version	Description	Effective Date
5.0	First issued version of WBA 5	1 December 2023
5.1	Amendment to introduce NNI Diversity Upgrade	31 March 2024
5.x	Removed Maximum Sustained Information Rate for HFC Home Ultrafast	1 May 2024

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Environment

nbn asks that you consider the environment before printing this document.

Introduction

This **nbn**® Ethernet Product Description describes the **nbn**® Ethernet Product. It forms part of the **nbn**® Ethernet Product Module.

Roadmap

A roadmap describing the structure of this **nbn**® Ethernet Product Description follows for the assistance of RSP.

Part A: The **nbn**® Ethernet Product

Part A describes what the **nbn**® Ethernet Product is.

Part A: The **nbn**® Ethernet Product	Page
The **nbn**® Ethernet Product	5

Part B: Required Product Components

Part B describes the four core Product Components of **nbn**® Ethernet which RSP must order.

Part B: Required Product Components		Page
1	Network-Network Interface (NNI)	6
2	Connectivity Virtual Circuit (CVC)	7
3	Access Virtual Circuit (AVC)	10
4	User Network Interface (UNI)	16

Part C: Optional Product Features

Part C describes the optional Product Features of **nbn**® Ethernet which RSP may elect to order.

Part C: Optional Product Features		Page
5	Enhanced Fault Rectification Service	20
6	UNI-V and AVC TC-1 bundle	21
7	Satellite Test Service	21
8	Battery Backup Service	22
9	NNI Link	22

Part D: General conditions of supply

Part D sets out general conditions which apply to the supply of **nbn**® Ethernet to RSP.

Part D: General conditions of supply		Page
10	Downstream supply	24
11	Interconnection and network supply chain	24
12	**nbn**® Network architecture and **nbn**® Ethernet boundaries	26
13	Speeds, performance and availability	28

Part A: The **nbn**® Ethernet Product

The **nbn**® Ethernet Product:

- is an Ethernet-based Layer 2 virtual connection that carries traffic between a UNI used to serve a Premises and a POI;

- is supplied by means of the Fibre Network, FTTB Network, FTTN Network, FTTC Network, HFC Network, Wireless Network or Satellite Network;

- enables RSP or its Downstream Service Providers to supply a Carriage Service or Content Service to a Premises; and

- comprises 4 Product Components, which RSP must acquire as part of **nbn**® Ethernet, and a number of optional Product Features, which RSP may elect to acquire depending on the **nbn**® Network over which the **nbn**® Ethernet Product is supplied:

Type	Product Component / Product Feature	**nbn**® Network
Product Components (required)	NNI; CVC; AVC; UNI	Fibre, FTTB, FTTN, FTTC, HFC, Wireless and Satellite
Product Features (optional)	UNI-V and AVC TC-1 bundle; Battery Backup Service	Fibre
	Enhanced Fault Rectification Service	Fibre, FTTB, FTTN, FTTC and HFC
	NNI Link	Fibre, FTTB, FTTN, FTTC, HFC and Wireless

The AVC and UNI Product Components are supplied as a bundle. **nbn** supplies the AVC to RSP on condition that RSP also acquires a UNI in conjunction with that AVC.

Part B: Required Product Components

*Section 1 describes the NNI. RSP must order an NNI for each CSA where **nbn** supplies **nbn**® Ethernet to RSP. RSP connects its network to the **nbn**® Network at the POI where the NNI is located.*

1. Network-Network Interface (NNI)

1.1 NNI description

(a)   A **Network-Network Interface** or **NNI** is the interface at a POI where RSP traffic is handed over to the **nbn**® Network.

(b)   The NNI is the point of handover for all CVCs associated with that NNI.

(c)   The **NNI Bearer** is the physical interface between the RSP switch and the **nbn**® Network.

(d)   An NNI Bearer must be configured as a member of an **NNI Group** which is a logical interface comprising one or more NNI Bearers supplied by **nbn** to RSP.

(e)   A reference to a Network-Network interface or NNI includes a V-NNI when RSP has configured a V-NNI with an Upstream NNI Link, as applicable.

(f)   An NNI supplied in respect of:

(i)   **nbn**® Ethernet (Satellite) will not be made available in respect of **nbn**® Ethernet supplied by means of any other access technology; and

(ii)   **nbn**® Ethernet supplied by means of any access technology other than the Satellite Network will not be made available in respect of **nbn**® Ethernet (Satellite).

1.2 NNI Bearer

The physical interface options for the NNI Bearer are:

NNI Bearer profile	**nbn**® Network
1000BaseLX	Fibre, FTTB, FTTN, FTTC, HFC, Wireless and Satellite
10GBaseLR	Fibre, FTTB, FTTN, FTTC, HFC, Wireless and Satellite
100GBaseLR4	Fibre, FTTB, FTTN, FTTC, HFC and Wireless
1000BaseEX	Fibre, FTTB, FTTN, FTTC, HFC, Wireless and Satellite
10GBaseER	Fibre, FTTB, FTTN, FTTC, HFC, Wireless and Satellite
100GBaseER4	Fibre, FTTB, FTTN, FTTC, HFC and Wireless

1.3 NNI Group

(a)   An NNI Bearer can only be configured as a member of an NNI Group if its interface rate is the same as the interface rate of the NNI Group.

(b)   Each NNI Bearer must be configured with a logical single or diverse chassis redundancy mode, together forming an NNI Group.

(c)   Single chassis is the only redundancy mode available for an NNI Group comprised of a single NNI Bearer.

(d)   If RSP selects single chassis as the redundancy mode for an NNI Group:

    (i)   each NNI Bearer in that NNI Group will be connected to the same chassis; and

    (ii)   the NNI will operate as a single, unprotected interface.

(e)   Each NNI Bearer in an NNI Group where RSP selects diverse chassis as the redundancy mode will be connected across a pair of chassis.

(f)   Once an NNI Group is activated, the redundancy mode of that NNI Group can only be reconfigured if it satisfies the criteria for an NNI Diversity Upgrade in the WBA Operations Manual (including that the NNI Group is located at an Upgraded POI).

1.4   V-NNI

(a)   A V-NNI must be configured with an Upstream NNI Link.

(b)   The Upstream NNI Link Parameters will be applied to the V-NNI.

(c)   RSP must associate CVCs and AVC/UNIs with a V-NNI in the same way as an NNI.

*Section 2 describes the CVC. RSP must order a CVC for each CSA where **nbn** supplies **nbn**® Ethernet to RSP. The size of the CVC that RSP requires is at the discretion of RSP (subject to this section 2 and the **nbn**® Ethernet Fair Use Policy).*

2.   Connectivity Virtual Circuit (CVC)

2.1   CVC description

(a)   A **Connectivity Virtual Circuit** or **CVC** is Ethernet-based Layer 2 virtual capacity on the **nbn**® Network used to carry RSP traffic between multiple AVCs in a CSA on an aggregated basis and the NNI at the POI serving that CSA.

(b)   Subject to sections 2.2 to 2.4, **nbn** will make the CVC available in traffic class 1 (**CVC TC-1**), traffic class 2 (**CVC TC-2**) and traffic class 4 (**CVC TC-4**).

(c)   RSP may order a CVC TC-4, CVC TC-1 or CVC TC-2, or any combination of the three, in any of the bandwidth profiles set out in sections 2.2, 2.3 and 2.4, provided that the total combination of CVC bandwidth profiles is not zero.

(d)   A CVC supplied in respect of:

    (i)   **nbn**® Ethernet (Satellite) will not be made available in respect of **nbn**® Ethernet supplied by means of any other access technology; and

    (ii)   **nbn**® Ethernet supplied by means of any access technology other than the Satellite Network will not be made available in respect of **nbn**® Ethernet (Satellite).

2.2   CVC TC-4

(a)   RSP may order a CVC TC-4 in respect of **nbn**® Ethernet (Fibre), **nbn**® Ethernet (FTTB), **nbn**® Ethernet (FTTN), **nbn**® Ethernet (FTTC), **nbn**® Ethernet (HFC), **nbn**® Ethernet (Wireless) and **nbn**® Ethernet (Satellite).

(b)   RSP must select a bandwidth profile for the CVC TC-4.

(c)   The CVC TC-4 bandwidth profiles available in respect of:

    (i)   **nbn**® Ethernet (Fibre), **nbn**® Ethernet (FTTB), **nbn**® Ethernet (FTTN), **nbn**® Ethernet (FTTC), **nbn**® Ethernet (HFC) and **nbn**® Ethernet (Wireless) are:

CVC TC-4 symmetrical Mbps (PIR)	In symmetrical Mbps (PIR) increments of
0	0
100-300	50
300-10,000	100

(ii) **nbn**® Ethernet (Satellite), subject to sections 2.2(d) and 2.2(e), are:

CVC TC-4 symmetrical Mbps (CIR)	In symmetrical Mbps (CIR) increments of	For CVC Class
0	0	0, 1, 2
100-1,000	25	0, 1, 2

(d) In respect of **nbn**® Ethernet (Satellite), RSP must:

(i) specify a CVC Class for each CVC TC-4;

(ii) associate at least 1,600 AVCs with each CVC TC-4 before ordering any further CVC TC-4 in the same CVC Class; and

(iii) at all times, associate at least the following number of AVCs with each CVC TC-4:

CVC Class	Minimum number of AVCs that must be associated with each CVC TC-4		
	Initial 100 Mbps bandwidth profile	Initial 25 Mbps bandwidth profile increment above 100 Mbps	Each additional 25 Mbps bandwidth profile increment
0	0	202	71
1	0	166	65
2	0	151	58

Note: *If RSP orders more than one CVC in a CVC Class, each limitation in this section 2.2(d) applies to each such CVC.*

(e) If RSP fails to comply with section 2.2(d)(iii) in connection with a CVC TC-4 (without limiting any rights that **nbn** may have in relation to such failure under the Head Terms or the **nbn**® Ethernet Fair Use Policy), **nbn** may modify the bandwidth profile of that CVC TC-4 by following the process set out in the WBA Operations Manual.

2.3 CVC TC-1

(a) RSP may order a CVC TC-1 in respect of **nbn**® Ethernet (Fibre), **nbn**® Ethernet (FTTB), **nbn**® Ethernet (FTTN), **nbn**® Ethernet (FTTC), **nbn**® Ethernet (HFC), **nbn**® Ethernet (Wireless) and **nbn**® Ethernet (Satellite).

(b) RSP must select a bandwidth profile for the CVC TC-1. Subject to sections 2.3(c) and 2.3(d), the CVC TC-1 bandwidth profiles are:

CVC TC-1 symmetrical Mbps (CIR)	In symmetrical Mbps (CIR) increments of	**nbn**® Network
0-10	5	Fibre, FTTB, FTTN, FTTC, HFC, Wireless and Satellite

10-20	10	Fibre, FTTB, FTTN, FTTC, HFC and Wireless
20-30	5	Fibre, FTTB, FTTN, FTTC, HFC and Wireless
30-60	10	Fibre, FTTB, FTTN, FTTC, HFC and Wireless
60-120	20	Fibre, FTTB, FTTN, FTTC, HFC and Wireless
120-150	30	Fibre, FTTB, FTTN, FTTC, HFC and Wireless
150-300	50	Fibre, FTTB, FTTN, FTTC, HFC and Wireless
300-500	100	Fibre, FTTB, FTTN, FTTC, HFC and Wireless

(c)   RSP must, at all times, associate at least the following number of AVCs with each CVC TC-1 for **nbn**® Ethernet (Satellite):

CVC TC-1 symmetrical Mbps (CIR)	Minimum number of AVCs that must be associated with each CVC TC-1
0	0
5	0
10	333

(d)   If RSP fails to comply with section 2.3(c) (without limiting any rights that **nbn** may have in relation to such failure under the Head Terms or the **nbn**® Ethernet Fair Use Policy), **nbn** may modify the bandwidth profile of the CVC TC-1 by following the process set out in the WBA Operations Manual.

2.4   CVC TC-2

(a)   RSP may order a CVC TC-2 in respect of **nbn**® Ethernet (Fibre), **nbn**® Ethernet (FTTB), **nbn**® Ethernet (FTTN), **nbn**® Ethernet (FTTC) and **nbn**® Ethernet (HFC).

(b)   RSP must select a bandwidth profile for the CVC TC-2. The CVC TC-2 bandwidth profiles are:

CVC TC-2 symmetrical Mbps (CIR)
0
5
10
20
25
30
40
50
60
80
100

120
150
200
250
300-1000 (in increments of 100 Mbps)

*Section 3 describes the AVC. RSP must order an AVC for each Premises where **nbn** supplies **nbn**® Ethernet to RSP.*

3.   Access Virtual Circuit (AVC)

3.1   AVC description

(a)   An **Access Virtual Circuit** or **AVC** is an Ethernet-based Layer 2 virtual connection on the Fibre Network, FTTB Network, FTTN Network, FTTC Network, HFC Network, Wireless Network or Satellite Network that carries RSP traffic to and from a UNI used to serve a Premises.

(b)   RSP must order an AVC for each Premises to which **nbn**® Ethernet will be supplied.

(c)   Subject to sections 3.2 to 3.4, **nbn** will configure the AVC to carry data in traffic class 4 (**AVC TC-4**) and RSP may elect to partition the AVC to additionally carry data in traffic class 1 (**AVC TC-1**), traffic class 2 (**AVC TC-2**), or both.

(d)   RSP must order an AVC TC-4, and may additionally elect to order one AVC TC-1, one AVC TC-2, or both, in any of the bandwidth profiles set out in sections 3.2, 3.3 and 3.4 subject to section 4.1.3 of, and Appendix B to, the **nbn**® Ethernet Product Technical Specification.

(e)   For each AVC traffic class RSP orders in respect of a Premises in a CSA, RSP must order a CVC in the same traffic class in respect of that CSA.

(f)   **nbn** will map one AVC TC-4 to any UNI used to serve the relevant Premises and will not map more than one AVC TC-4 to the same UNI.

3.2   AVC TC-4

(a)   Subject to sections 3.2(b) to 3.2(d), the AVC TC-4 bandwidth profiles are:

AVC TC-4 downstream Mbps (PIR)[1]		AVC TC-4 upstream Mbps (PIR)[1]	**nbn**® Network
12		1	Fibre, FTTB, FTTN, FTTC, HFC, Wireless and Satellite
25		5	Fibre, FTTB, FTTN, FTTC, HFC, Wireless and Satellite
25		5 - 10[2]	FTTB and FTTN
25		10	Fibre, FTTC and HFC
25 - 50[2]		5 - 20[2]	FTTB and FTTN
50		20	Fibre, FTTC and HFC
Wireless Plus	(up to 75 Mbps)[3]	(up to 10 Mbps)[3]	Wireless

Home Fast	(25-100)[2]	(5-20)[2]	FTTB and FTTN
	(50-100)[2]	(20)[2]	FTTC
	(100)	(20)	Fibre and HFC
	25 - 100[2]	5 - 40[2]	FTTB and FTTN
	50 - 100[2]	20 - 40[2]	FTTC
	100	40	Fibre and HFC
Home Superfast	(250)	(25)	Fibre and HFC
	250	100	Fibre
	500	200	Fibre
Home Ultrafast	(500 to ~1000)[2, 4, 5]	(50)	Fibre and HFC
	1000[4]	400	Fibre

Notes:

[1] To be read subject to (1) the capacity management provisions for the Satellite Network in section 3.7 below; (2) the description of how the PIR for these bandwidth profiles is to be interpreted in section 13 below; and (3) section 4.1.3 of, and Appendix B to, the **nbn**® Ethernet Product Technical Specification. The Information Rate for Wireless Plus is not a PIR, it is a maximum Information Rate, as described in note 3 below.

[2] Where the bandwidth profile is expressed as a range, the range shows the maximum PIR which may be achieved at the **nbn**® Network Boundary for the relevant bandwidth profile. The PIR can fall anywhere in the range for the relevant bandwidth profile in respect of a particular AVC TC-4 used to serve a Premises (they are not minimum-maximum PIR ranges).

[3] These Information Rates are potential maximum Information Rates. They are not PIR or CIR commitments, and must be read subject to sections 3.8 and 13. In particular:

- Wireless Plus Ordered Products may never achieve the potential maximum Information Rates for Wireless Plus noted above, including due to the factors set out in sections 3.8 and 13; and

- the speeds achieved by a Wireless Plus Ordered Product will vary, and the actual downstream and upstream Information Rates may be significantly less than the maximum Information Rate that may be achieved at the Premises, particularly in busy periods.

[4] Inherent limitations of **nbn**® Ethernet in relation to service frame overhead means the effective Layer 2 Peak Information Rate will be limited to, depending on the Frame Size, up to a maximum of 970Mbps (at 2,000 Byte Frame Size). See section 2.2.2.1 of the **nbn**® Ethernet Product Technical Specification and section 13 of this **nbn**® Ethernet Product Description.

[5] For the Home Ultrafast bandwidth profile for **nbn**® Ethernet (HFC), the Layer 2 wholesale downstream service will be configured at the Layer 2 network management to a Maximum Sustained Information Rate of 750Mbps with the potential to burst up to a maximum of 970Mbps (depending on but not limited to, the Frame Size and line speed capability - see note 4 above) at potential burst durations between 1 to 50 seconds at least once a day (see section 2.2.2.5 of the **nbn**® Ethernet Product Technical Specification).

(b)   Subject to sections 3.2(c) and 3.2(d), **nbn** will comply with the PIR Objective.

(c)   Subject to section 3.2(d), if the PIR at the **nbn**® Downstream Network Boundary in respect of a Premises located in the footprint of the FTTB Network, FTTN Network or FTTC Network is not capable of achieving the PIR Objective, then:

    (i)   **nbn** will, in accordance with the WBA Operations Manual, designate that Network Activity or Interference Mitigation is required;

(ii) until Network Activity or Interference Mitigation is completed, the downstream PIR and upstream PIR at the **nbn**® Downstream Network Boundary in respect of the Premises may be significantly less than the PIR Objective in respect of the Premises; and

(iii) if **nbn** notifies RSP in accordance with the WBA Operations Manual that Interference Mitigation is unsuccessful, the downstream PIR and upstream PIR at the **nbn**® Downstream Network Boundary in respect of the Premises may be significantly less than the PIR Objective in respect of the Premises.

(d) While an **nbn**® Ethernet (FTTB) Ordered Product or **nbn**® Ethernet (FTTN) Ordered Product is in a Repair Profile in accordance with the WBA Operations Manual, the downstream PIR and upstream PIR at the **nbn**® Downstream Network Boundary may be significantly less than the downstream PIR and upstream PIR of the bandwidth profile ordered by RSP in respect of the Ordered Product.

3.3   AVC TC-1

(a) The AVC TC-1 bandwidth profiles are:

AVC TC-1 symmetrical Mbps (CIR)	**nbn**® Network
0	Fibre, FTTB, FTTN, FTTC, HFC, Wireless and Satellite
0.15	Fibre, FTTB, FTTN, FTTC, HFC, Wireless and Satellite
0.3	Fibre, FTTB, FTTN, FTTC, HFC and Wireless
0.5	Fibre, FTTB, FTTN, FTTC and HFC
1	Fibre, FTTB, FTTN, FTTC and HFC
2	Fibre, FTTB, FTTN, FTTC and HFC
5	Fibre, FTTB, FTTN, FTTC and HFC*

***Note: nbn**® Ethernet (HFC) AVC TC-1 bandwidth profiles above 2 Mbps are not available on the CM820B variant of the HFC-NTD.*

(b) The AVC TC-1 Data Transfer Rate will be included in the overall AVC TC-4 Data Transfer Rate except where the AVC TC-1 is mapped to the UNI-V in the case of **nbn**® Ethernet (Fibre) under section 6.

(c) Where available, RSP may acquire both an AVC TC-1 mapped to the UNI-D and an additional AVC TC-1 mapped to the UNI-V in the case of **nbn**® Ethernet (Fibre) under section 6.

(d) The maximum AVC TC-1 capacity that RSP may order in respect of each NTD used by **nbn** to supply **nbn**® Ethernet (Wireless) is 0.6 symmetrical Mbps.

(e) The maximum AVC TC-1 capacity that RSP may order in respect of any Home Fast, Home Superfast or Home Ultrafast AVC TC-4 bandwidth profile is 0.15 symmetrical Mbps.

3.4   AVC TC-2

(a) The AVC TC-2 bandwidth profiles are:

AVC TC-2 symmetrical Mbps (CIR)	nbn® Network
5	Fibre, FTTB, FTTN, FTTC and HFC
10	Fibre, FTTB, FTTN, FTTC and HFC
20	Fibre, FTTB, FTTN and FTTC
30	Fibre
40	Fibre
50	Fibre
60	Fibre
70	Fibre
80	Fibre
90	Fibre
100	Fibre

(b)   The AVC TC-2 Data Transfer Rate will be included in the overall AVC TC-4 Data Transfer Rate.

(c)   If the CIR at the **nbn**® Downstream Network Boundary in respect of a Premises is not capable of achieving an applicable CIR Objective, then:

   (i)   sections 3.2(b) to 3.2(d) and 3.5 will not prevent that failure from being a Service Fault or Performance Incident until **nbn** designates that a Network Activity or Interference Mitigation is required in accordance with the WBA Operations Manual;

   (ii)   if **nbn** designates that a Network Activity or Interference Mitigation is required, until that Network Activity or Interference Mitigation is completed, the downstream CIR and upstream CIR at the **nbn**® Downstream Network Boundary in respect of the Premises may be significantly less than the CIR Objective in respect of the Premises; and

   (iii)   if the relevant **nbn**® Ethernet Ordered Product is not supplied using a Transitioning Special Service Line and **nbn** designates that Interference Mitigation is required and then notifies RSP in accordance with the WBA Operations Manual that Interference Mitigation is unsuccessful, the downstream CIR and upstream CIR at the **nbn**® Downstream Network Boundary in respect of the Premises may be significantly less than the CIR Objective in respect of the Premises.

(d)   If:

   (i)   an **nbn**® Ethernet (FTTB) Ordered Product or **nbn**® Ethernet (FTTN) Ordered Product is supplied using a Transitioning Special Service Line;

   (ii)   the Designated Special Service that RSP intends to transition to the Ordered Product is still being supplied using a separate copper pair; and

   (iii)   that Designated Special Service is affecting the performance of that Ordered Product,

   then, for the period that the Designated Special Service continues to be supplied, the downstream CIR and upstream CIR of that Ordered Product at the UNI may be significantly less than the CIR Objective.

(e)   While an **nbn**® Ethernet (FTTB) Ordered Product or **nbn**® Ethernet (FTTN) Ordered Product is in a Repair Profile in accordance with the WBA Operations Manual, the downstream CIR and upstream CIR at the **nbn**® Downstream Network Boundary may be significantly less than the downstream CIR and upstream CIR of the bandwidth profile ordered by RSP in respect of that **nbn**® Ethernet (FTTB) Ordered Product or **nbn**® Ethernet (FTTN) Ordered Product.

(f)   RSP must not order any AVC TC-2 with any Home Fast, Home Superfast or Home Ultrafast AVC TC-4 bandwidth profile.

(g)   If:

    (i)   RSP has ordered an AVC TC-2 bandwidth profile for an **nbn**® Ethernet (FTTB) Ordered Product or **nbn**® Ethernet (FTTN) Ordered Product; and

    (ii)   either:

        (A)   before Activation, **nbn** has notified RSP that the relevant **nbn**® Copper Pair is not capable of supporting the AVC TC-2 bandwidth profile; or

        (B)   **nbn**, acting reasonably, determines that the relevant Service Class 13 **nbn**® Copper Pair was not capable of supporting the AVC TC-2 bandwidth profile before Activation and notifies RSP of the lack of capability after Activation,

then, from the time of Activation:

    (iii)   if **nbn** has committed to perform a Network Activity in respect of the Ordered Product, the downstream CIR and upstream CIR of that Ordered Product at the UNI may be significantly less than the CIR Objective until **nbn** has performed a Network Activity; and

    (iv)   if **nbn** has not committed to perform a Network Activity in respect of the Ordered Product, the downstream CIR and upstream CIR of that Ordered Product at the UNI may be significantly less than the CIR Objective.

3.5   CIR

Without limiting section 13.1 and subject to section 3.4(c), if the Line Rate of an **nbn**® Ethernet Ordered Product is not capable of supporting the provision of all AVC TC-1 and AVC TC-2 bandwidth profiles ordered by RSP in respect of that Ordered Product (including as set out in sections 3.2.2 and 3.3.2 of the **nbn**® Ethernet Product Technical Specification), then, for both AVC TC-1 and AVC TC-2:

(a)   the Information Rate experienced by RSP, Downstream Service Provider and End Users may each be significantly less than the downstream CIR and upstream CIR of the bandwidth profile ordered by RSP in respect of the relevant Ordered Product; and

(b)   the Frame Delay, Frame Delay Variation and Frame Loss of the relevant Ordered Product may each be significantly worse than the Traffic Class performance specified in section 7.1 of the **nbn**® Ethernet Product Technical Specification.

3.6   Third party interference - FTTB Network, FTTN Network and FTTC Network

(a)   An Interference Event caused by the equipment or network of a third party may prejudice the integrity, or cause a deterioration of the operation or performance of, an **nbn**® Ethernet (FTTB) Ordered Product, **nbn**® Ethernet (FTTN) Ordered Product or **nbn**® Ethernet (FTTC) Ordered Product.

(b)   If an Interference Event caused by the equipment or network of a third party occurs, **nbn** will undertake Interference Mitigation as soon as reasonably practicable in the circumstances.

(c)   Until **nbn** can mitigate the effects of an Interference Event caused by the equipment or network of a third party, the affected Ordered Product may not operate in accordance with this **nbn**® Ethernet Product Description or the **nbn**® Ethernet Product Technical Specification.

3.7   Satellite Network capacity management

In respect of **nbn**® Ethernet (Satellite):

(a)   RSP must not place, and **nbn** may decline, an AVC order in respect of a Premises if the supply of the ordered AVC would result in **nbn** supplying more than one AVC TC-4 and one associated AVC TC-1 to all **nbn**'s retail service providers in respect of that Premises;

(b)   RSP must suspend or terminate any RSP Product that RSP becomes aware is being used by a Downstream Service Provider or End User in connection with the bonding of two or more UNIs (even if **nbn** is only supplying one of the UNIs to RSP and the other UNI(s) to an Other RSP);

(c)   **nbn** may decline an AVC order or AVC modification which would require additional Beam capacity to be supplied during any period in which a Beam is at or near maximum capacity; and

(d)   **nbn** may deprioritise data transfers or reduce the maximum data transfer rate of any AVC contributing disproportionately to Beam capacity utilisation.

*Note: Sections 3.7(a) and 3.7(b) do not apply in respect of a Public Interest Premises to the extent that **nbn** waives RSP's obligations in respect of that Public Interest Premises under section 39 of the **nbn**® Ethernet Product Terms.*

3.8   Wireless Plus Information Rate

(a)   No PIR or CIR applies in respect of Wireless Plus.

(b)   A reference to the potential maximum Information Rate of Wireless Plus:

    (i)   is a reference to the maximum Information Rate that may be achieved by means of Wireless Plus; and

    (ii)   is a potential maximum in optimal conditions and is not a reference to the maximum Information Rate that may be achieved by every, or any, Wireless Plus Ordered Product (and speeds achievable may be significantly lower).

(c)   Each Wireless Plus Ordered Product may reach no more than an Information Rate of at least 25 Mbps downstream and 5 Mbps upstream at least once during a 24 hour period.

(d)   In respect of a particular Wireless Plus Ordered Product:

    (i)   the maximum downstream and upstream Information Rates that may be achieved at the Premises will be affected by a number of factors including those described in section 13.2(f), and may be significantly less than the potential maximum Information Rate; and

    (ii)   the downstream and upstream Information Rates actually achieved by the Wireless Plus Ordered Product will vary and may be significantly less than the maximum Information Rate that may be achieved at the Premises, particularly in busy

periods, depending upon a number of factors including those factors described in section 13.1(b).

Note: *By way of example only, a Premises situated on the edge of a Wireless Network cell may not be capable of achieving a maximum Information Rate of 75/10 Mbps, even in optimal conditions and during periods of limited/no contention. The maximum Information Rate achievable at that premises may be no more than 25/5 Mbps at least once during a 24 hour period.*

Section 4 describes the UNI which must be ordered in conjunction with the AVC for each Premises where **nbn** *supplies* **nbn**® *Ethernet to RSP.*

4. User Network Interface (UNI)

4.1 UNI description

(a) The **User Network Interface** or **UNI** is a physical port to which **nbn** supplies **nbn**® Ethernet in respect of a Premises.

(b) Access to and use of a UNI used to serve a Premises is subject to any availability rules set out in the WBA Operations Manual.

(c) **nbn** will make one or more of the following types of UNI available in respect of a Premises, in accordance with section 4.1(d):

   (i) the UNI-D;

   (ii) the UNI-V; and

   (iii) the UNI-DSL.

(d) The type of UNI which **nbn** makes available in respect of a Premises depends on the **nbn**® Network used to serve the Premises, the functionality requested by RSP and the type of Premises:

nbn® Network	Type of Premises	Type of UNI	Port	Number of available ports on NTD or FTTC-NCD (if any)	Location of UNI port	**nbn**® Downstream Network Boundary
Fibre	All Premises[1]	UNI-V	Analogue	2	NTD	UNI
Fibre, Wireless and Satellite	All Premises[1]	UNI-D	Ethernet	4	NTD	UNI
HFC	All Premises[1]	UNI-D	Ethernet	1[2]	NTD	UNI
FTTC	Premises not at an MDU Site	UNI-D[3]	Ethernet	1	FTTC-NCD[4]	Telecommunications Outlet or, if present, Passive NTD[5]
FTTC	Premises at an MDU Site[6]	UNI-D[3]	Ethernet	1	FTTC-NCD[4]	Customer Side MDF
FTTB	All Premises	UNI-DSL	xDSL	N/A[7]	Jumper Cable termination on the	UNI

					Customer Side MDF	
FTTN	Premises not at an MDU Site	UNI-DSL	xDSL	N/A[7]	Telecommunications Outlet or, if present, Passive NTD[5]	UNI
FTTN	Premises at an MDU Site[6]	UNI-DSL	xDSL	N/A[7]	Jumper Cable termination on the Customer Side MDF	UNI

Notes:

[1] *In a Multi-Premises Site served by the Fibre Network or HFC Network, **nbn** will be responsible for the installation, supply and repair of **nbn**® Ethernet up to and including the UNI on the NTD in the same way as for any other Premises served by the Fibre Network or HFC Network (as applicable), including where the UNI is located on an NTD installed at a Centralised Deployment location associated with a Non-Addressable Object.*

[2] *Although the CM8200B variant of the HFC-NTD is physically equipped with two UNI-D ports (UNI-D1 and UNI-D2), only UNI-D1 is available for use. Typically, UNI-D2 will be covered with a sticker.*

[3] *For the FTTC Network, the **nbn**® Downstream Network Boundary is separate to, and located before, the UNI-D. See section 4.6 for further details.*

[4] *The FTTC-NCD is not a Network Termination Device - see definition of Network Termination Device and section 4.6.*

[5] *Where a Passive NTD is installed, **nbn** will be responsible for the installation, supply and repair of **nbn**® Ethernet up to, and including, the Passive NTD. In those cases, **nbn** will not be responsible for reconfiguring wiring beyond the Passive NTD to the Telecommunications Outlet.*

[6] *Refer to the Dictionary definition of an MDU Site, as this may include single premises with an MDF.*

[7] *There is no NTD or FTTC-NCD used in connection with the supply of **nbn**® Ethernet (FTTB) or **nbn**® Ethernet (FTTN).*

4.2   UNI-D

(a)   The number of UNI-Ds available at a Premises served by the Fibre Network, FTTC Network, HFC Network, Wireless Network or Satellite Network depends on:

(i)   whether a Premises is located in the footprint of the Fibre Network, FTTC Network, HFC Network, Wireless Network or Satellite Network; and

(ii)   the number and type of NTDs or FTTC-NCDs which are installed at that Premises.

(b)   The UNI-D has an electrical interface and will not be made available with an optical interface.

(c)   It is a condition of supply of an AVC TC-4 Product Component of **nbn**® Ethernet (Fibre), **nbn**® Ethernet (FTTC), **nbn**® Ethernet (HFC), **nbn**® Ethernet (Wireless) and **nbn**® Ethernet (Satellite) that RSP also acquire a UNI-D in conjunction with that AVC TC-4 for each Premises at which **nbn**® Ethernet will be supplied.

4.3   UNI-V

(a)   The number of UNI-Vs available at a Premises served by the Fibre Network depends on the number of NTDs which **nbn** has installed at that Premises.

(b)   The UNI-V is an optional Product Feature of **nbn**® Ethernet (Fibre) and incorporates an analogue telephone adaptor for the supply of telephony services to a Premises.

Note: See section 6 for more information.

4.4 UNI-DSL

(a) The number of UNI-DSLs available at a Premises served by the FTTB Network or FTTN Network depends on:

    (i) the number of distinct **nbn**® Copper Pairs installed at the Premises which terminate at an accessible xDSL port; and

    (ii) the allocation and installation by **nbn** of a single xDSL port to each distinct **nbn**® Copper Pair.

(b) It is a condition of supply of an AVC TC-4 Product Component of **nbn**® Ethernet (FTTB) and **nbn**® Ethernet (FTTN) that RSP also acquires a UNI-DSL in conjunction with that AVC TC-4 for each Premises at which **nbn**® Ethernet will be supplied.

4.5 UNI mappings and AVC bandwidth profiles

The UNI mappings and AVC bandwidth profiles available for those UNI mappings are:

nbn® Network	AVC	UNI mapping	Available bandwidth profiles described in
Fibre	AVC TC-4	UNI-D	Section 3.2(a)
	AVC TC-1	UNI-D (default)	Section 3.3(a)
		UNI-V (optional)	Section 6
	AVC TC-2	UNI-D	Section 3.4
FTTB and FTTN	AVC TC-4	UNI-DSL	Section 3.2(a)
	AVC TC-1	UNI-DSL	Section 3.3(a)
	AVC TC-2	UNI-DSL	Section 3.4
FTTC	AVC TC-4	UNI-D	Section 3.2(a)
	AVC TC-1	UNI-D	Section 3.3(a)
	AVC TC-2	UNI-D	Section 3.4
HFC	AVC TC-4	UNI-D	Section 3.2(a)
	AVC TC-1	UNI-D	Section 3.3(a)
	AVC TC-2	UNI-D	Section 3.4
Wireless	AVC TC-4	UNI-D	Section 3.2(a)
	AVC TC-1	UNI-D	Section 3.3(a)
Satellite	AVC TC-4	UNI-D	Section 3.2(a)
	AVC TC-1	UNI-D	Section 3.3(a)

4.6 FTTC Network – UNI-D and **nbn**® Downstream Network Boundary

(a) The UNI-D at a Premises served by the FTTC Network:

    (i) is located on the FTTC-NCD; and

(ii)   provides physical and electromagnetic termination of the AVC mapped to that UNI-D,

but is not the **nbn**® Downstream Network Boundary for the FTTC Network.

(b)   For a Premises served by the FTTC Network, the **nbn**® Downstream Network Boundary is:

(i)   if that Premises is at an MDU Site - the Customer Side MDF; and

(ii)   if that Premises is not at an MDU Site - the first Telecommunications Outlet or, if present, Passive NTD.

(c)   The FTTC-NCD is not a Network Termination Device.

Part C: Optional Product Features

*Section 5 describes the optional Enhanced Fault Rectification Service available for **nbn**® Ethernet (Fibre), **nbn**® Ethernet (FTTB), **nbn**® Ethernet (FTTN), **nbn**® Ethernet (FTTC) and **nbn**® Ethernet (HFC).*

5.   Enhanced Fault Rectification Service

(a)   The **Enhanced Fault Rectification Service** is an optional Product Feature of **nbn**® Ethernet (Fibre), **nbn**® Ethernet (FTTB), **nbn**® Ethernet (FTTN), **nbn**® Ethernet (FTTC) and **nbn**® Ethernet (HFC) which provides RSP with enhanced Service Levels for the rectification of End User Faults which affect an **nbn**® Ethernet (Fibre) Ordered Product, **nbn**® Ethernet (FTTB) Ordered Product, **nbn**® Ethernet (FTTN) Ordered Product, **nbn**® Ethernet (FTTC) Ordered Product or **nbn**® Ethernet (HFC) Ordered Product (as the case may be).

(b)   **nbn** offers the following Enhanced Fault Rectification Service options:

Option
Enhanced-12
Enhanced-12 (24/7)
Enhanced-8
Enhanced-8 (24/7)
Enhanced-6
Enhanced-6 (24/7)
Enhanced-4
Enhanced-4 (24/7)
Enhanced (90 Day)–12 (24/7)

(c)   The Enhanced Fault Rectification Service options include the following:

(i)   for each Enhanced Fault Rectification Service option, activities performed in accordance with the relevant commitments in section 9 of the **nbn**® Ethernet Service Levels Schedule;

(ii)   for the Enhanced-12 (24/7), Enhanced-4 (24/7) and Enhanced (90 Day)-12 (24/7) options only, After Hours Installation (without any separate Charge), where an Installation is required for the relevant Ordered Product; and

(iii)   for the Enhanced-12 (24/7) and Enhanced-4 (24/7) options only, from the date notified by **nbn**, review of the performance of the relevant Ordered Product following the resolution by **nbn** of each Enhanced Fault, in accordance with the WBA Operations Manual.

(d)   Enhanced-12, Enhanced-8, Enhanced-8 (24/7), Enhanced-6, Enhanced-6 (24/7) and Enhanced-4 are not available with Home Fast, Home Superfast and Home Ultrafast AVC TC-4 bandwidth profiles.

(e)   Enhanced (90 Day) – 12 (24/7) is a 90 day Enhanced Fault Rectification Service that is available for 90 days from the date that **nbn** sends a Completed Notification to RSP and is

automatically removed at the end of the 90 day period unless RSP orders Enhanced (90 Day) – 12 (24/7) again from the expiry of the relevant 90 day period.

(f)   The Enhanced Fault Rectification Service is not available in respect of Premises in an Isolated Area or Limited Access Area.

*Section 6 describes the optional UNI-V and AVC TC-1 bundle which is a feature of **nbn**® Ethernet designed for voice services over **nbn**® Ethernet. The UNI-V and AVC TC-1 bundle is only available for **nbn**® Ethernet (Fibre) and where RSP has also acquired an AVC TC-4 and UNI-D bundle.*

6.   UNI-V and AVC TC-1 bundle

(a)   The UNI-V is an optional Product Feature of **nbn**® Ethernet (Fibre) which provides RSP with access to an analogue telephony interface on the NTD (where available) for the purpose of migrating legacy telephone services.

(b)   RSP may elect to order a 0.15 Mbps AVC TC-1 which is mapped to the UNI-V (where available) in the case of **nbn**® Ethernet (Fibre). If RSP so elects, RSP must acquire a UNI-V in conjunction with that AVC TC-1.

(c)   Where the AVC TC-1 is mapped to the UNI-V, the 0.15 Mbps AVC TC-1 will be supplied through a separate AVC and not included in the overall AVC TC-4 Data Transfer Rate.

(d)   RSP may only use the UNI-V to transmit voice and data traffic in the voice band.

Note: *Further detail of the UNI-V is outlined in section 4.*

*Section 7 describes the optional supply of a Satellite Test Service which is available to RSP on request, at **nbn**'s discretion, if RSP is acquiring or considering acquiring **nbn**® Ethernet (Satellite).*

7.   Satellite Test Service

(a)   The Satellite Test Service is an **nbn**® Ethernet (Satellite) Ordered Product which allows RSP to conduct testing of applications, RSP Products, the RSP Network and the RSP Platform in connection with the Satellite Network.

(b)   The supply of the Satellite Test Service comprises:

(i)   an AVC TC-4 and an associated UNI;

(ii)   an optional AVC TC-1 associated with the same UNI; and

(iii)   the Installation of Connecting Equipment.

(c)   RSP may request:

(i)   up to a maximum of five Satellite Test Services in total; and

(ii)   in respect of any given Beam, up to a maximum of one Satellite Test Service.

(d)   **nbn** will only supply the Satellite Test Service in response to a request from RSP if:

(i)   RSP has successfully On-boarded, or is in the process of On-boarding, for **nbn**® Ethernet (Satellite); and

(ii)   **nbn** determines, acting reasonably, that RSP requires the Satellite Test Service to successfully supply RSP Products to which **nbn**® Ethernet (Satellite) is an input.

(e)   **nbn** may, at its discretion:

(i) supply a Satellite Test Service to a Premises which is served by the Fibre Network, FTTB Network, FTTN Network, FTTC Network, HFC Network or Wireless Network; and

(ii) require RSP to select an alternative location if RSP requests the supply of a Satellite Test Service at a location:

(A) at which it would be difficult for **nbn** to Install the Connecting Equipment;

(B) which is served by a Beam which **nbn** determines is, or is likely to become, subject to capacity constraints; or

(C) which would require **nbn** to supply more than one Satellite Test Service to RSP using a given Beam.

(f) **nbn** will not conduct, or assist RSP to conduct, any testing in connection with the Satellite Test Service except to the extent of supplying the Satellite Test Service and installing the Connecting Equipment for the Satellite Test Service under this section 7.

Note: *See the nbn® Ethernet Product Terms for details of the Charges, Service Levels and related rules which apply in respect of Satellite Test Services.*

*Section 8 describes the Battery Backup Service which is an optional feature available for **nbn**® Ethernet (Fibre).*

8. Battery Backup Service

(a) The Battery Backup Service provides battery backup functionality for a UNI port at a Premises in the event of mains power failure which affects the NTD.

(b) **nbn** will make the Battery Backup Service available for each UNI port in the case of **nbn**® Ethernet (Fibre).

*Section 9 describes the NNI Link which is an optional feature available for **nbn**® Ethernet (Fibre), **nbn**® Ethernet (FTTB), **nbn**® Ethernet (FTTN), **nbn**® Ethernet (FTTC), **nbn**® Ethernet (HFC) and **nbn**® Ethernet (Wireless).*

9. NNI Link

(a) Each NNI Link must be configured with:

(i) an NNI (excluding a V-NNI) that RSP has designated as one which it is acquiring for itself and as agent for one or more Other RSPs; and

(ii) a Downstream V-NNI.

(b) One or more NNI Links may be acquired in respect of the same Linked NNI.

(c) Only one Downstream V-NNI can be associated with an NNI Link.

(d) The bandwidth profiles available in respect of an NNI Link are available in increments of:

(i) 100Mbps for NNI Link bandwidths up to and including 10Gbps; and

(ii) 1Gbps for NNI Link bandwidths above 10Gbps.

(e) When ordering an NNI Link, RSP must select the S-TAG pool allocated to that NNI Link.

(f)   The selected bandwidth capacity of, and the S-TAG pool allocated to, that NNI Link (**NNI Link Parameters**) must not exceed the available bandwidth capacity of, and available S-TAG pool allocated to, the Linked NNI.

(g)   On and from Activation of an NNI Link, the available bandwidth capacity of, and S-TAG pool allocated to, the Linked NNI will be reduced by the bandwidth capacity of, and S-TAG pool allocated to, that NNI Link.

(h)   An NNI supplied in respect of **nbn**® Ethernet (Satellite) cannot be designated as a Linked NNI.

Part D: General conditions of supply

*Section 10 sets out obligations of RSP in relation to downstream supply of services to which **nbn**® Ethernet is an input.*

10. Downstream supply

10.1 Priority Assistance

(a)   RSP may use **nbn**® Ethernet as an input into the supply of a Downstream Priority Assistance Service only where **nbn**® Ethernet is supplied by means of the networks specified below:

Downstream service	Fibre Network FTTB Network FTTN Network FTTC Network HFC Network	Wireless Network Satellite Network
Downstream Priority Assistance Service	✓	✖

(b)   RSP must use a minimum of one AVC TC-1 of 0.15 Mbps symmetrical as an input to each Downstream Priority Assistance Service.

10.2 End User Equipment and installation activities

(a)   RSP is responsible for supplying and installing all End User Equipment required for the supply of **nbn**® Ethernet.

(b)   The **nbn**® Ethernet Product Terms sets out the terms on which **nbn** will perform any Professional Wiring Service or install Voiceband Continuity requested by RSP in respect of a Premises served by the FTTB Network, FTTN Network or FTTC Network (as the case may be). Professional Wiring Service and Voiceband Continuity are not Product Components or Product Features of any Product.

*Section 11 sets out some general obligations of **nbn** and RSP which apply in relation to the end-to-end supply of services to which **nbn**® Ethernet is an input.*

11. Interconnection and network supply chain

11.1 Interconnection and network supply chain

(a)   The diagram below depicts an example of **nbn**® Ethernet as one part of the overall network supply chain:
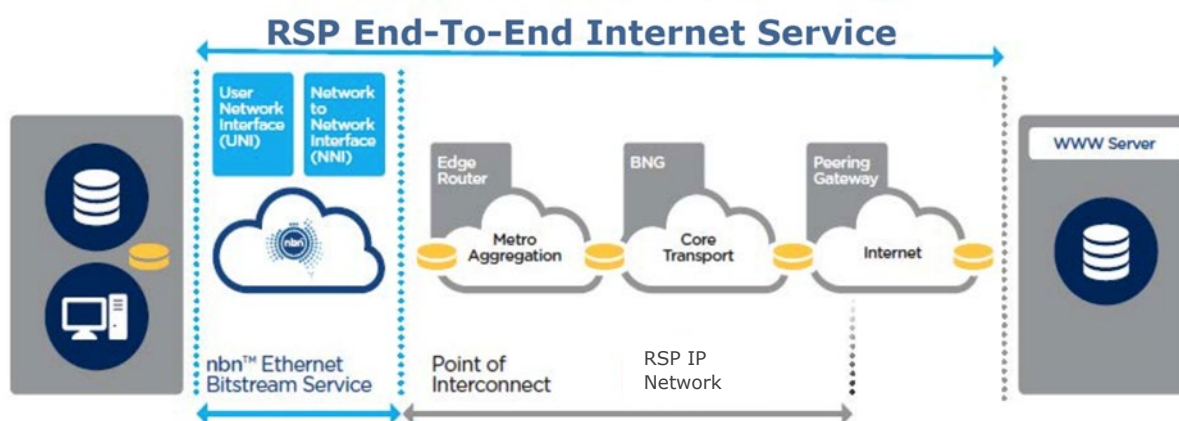
(b)   RSP is responsible for:

    (i)   ordering sufficient capacity across the relevant Product Components and Product Features of **nbn**® Ethernet to meet its own capacity requirements in respect of the supply of RSP Products to its Downstream Service Providers and Contracted End Users; and

    (ii)   separately acquiring, operating and maintaining all connections made to the RSP-side of the NNI.

11.2   **nbn**® Ethernet Exclusions

nbn® Ethernet does not include:

(a)   facilities access;

(b)   any backhaul transmission, Cross Connections or cabling from the RSP-side of the NNI;

(c)   a Pre-existing Carrier Side MDF or Customer Side MDF or any remediation work required to a Pre-existing Carrier Side MDF or Customer Side MDF;

(d)   any Common MDU Site Equipment or In-building Wiring;

(e)   any content or applications, including IP transit, Internet gateway connection, any other RSP equipment, BGP routing, soft switching infrastructure and all international connectivity associated with the supply of **nbn**® Ethernet;

(f)   RSP Equipment, End User Equipment (including cabling) and Common MDU Site Equipment between a UNI and a Non-Addressable Object at a Multi-Premises Site;

(g)   any other end user equipment, such as modems, personal computers, network attached storage solutions, central splitters, and in-line splitters;

(h)   Voiceband Continuity;

(i)   any network fault or performance monitoring probe or device supplied by **nbn** in relation to the Satellite Network; or

(j)   in the case of **nbn**® Ethernet (FTTC), any end user equipment (including any Lines) beyond the Telecommunications Outlet, excluding any **nbn**® Equipment.

*Section 12 describes the structure of the Fibre Network, FTTB Network, FTTN Network, FTTC Network, HFC Network, Wireless Network and Satellite Network and the boundaries of **nbn**® Ethernet.*

12. **nbn**® Network architecture and **nbn**® Ethernet boundaries

12.1 **nbn**® Network architecture

(a)   In the Fibre Network, FTTB Network, FTTN Network, FTTC Network and HFC Network, each:

   (i)   Premises at which **nbn**® Ethernet is available is located within an Access Distribution Area (or ADA);

   (ii)   ADA is located within a Serving Area Module (or SAM);

   (iii)   SAM is located in a Fixed-Line Serving Area (or FSA); and

   (iv)   FSA is located within a Connectivity Serving Area (or CSA).

(b)   In the Wireless Network, each:

   (i)   Premises at which **nbn**® Ethernet is available is located within a Wireless Serving Area (or WSA); and

   (ii)   WSA is located within a Connectivity Serving Area (or CSA).

(c)   In the Satellite Network:

   (i)   each Premises at which **nbn**® Ethernet is available is located within a Beam;

   (ii)   all Premises and Beams are located within a single Connectivity Serving Area (or CSA); and

   (iii)   that single CSA geographically overlaps with the other CSAs that contain Premises served by other access technologies.

(d)   In the **nbn**® Network, each:

   (i)   CSA is served by one POI; and

   (ii)   POI may serve one or more CSAs.

(e)   Details of the FSA or WSA, CSA and POI serving a Premises are available to RSP on request.

12.2 **nbn**® Ethernet boundaries

nbn® Ethernet carries traffic in respect of a Premises over the Fibre Network, FTTB Network, FTTN Network, FTTC Network, HFC Network, Wireless Network or Satellite Network between the following boundaries:

(a)   the UNI used to serve that Premises; and

(b)   the NNI that serves the Premises.

12.3 Power Outages - FTTB Network and FTTN Network

(a)   **nbn** may not be able to supply an **nbn**® Ethernet (FTTB) Ordered Product or **nbn**® Ethernet (FTTN) Ordered Product in the event of a Power Outage:

(i)   at an MDU Site or affecting any **nbn**® Equipment located at that MDU Site; or

(ii)   affecting an **nbn**® Node or any other active equipment that forms part of the FTTN Network and is not located within a Type 1 Facility or a Type 2 Facility.

(b)   **nbn**'s Power Resiliency Policy describes the power resiliency system (if any) which **nbn** utilises in respect of the FTTB Network and the FTTN Network.

12.4   Power Outages - Fibre, HFC, Wireless and Satellite networks

nbn may not be able to supply an **nbn**® Ethernet Ordered Product in the event of a Power Outage affecting an:

(a)   NTD or any other **nbn**® Equipment located at a Premises served by the Fibre Network, HFC Network, Wireless Network or Satellite Network; or

(b)   Optical Node or any other active equipment that forms part of the HFC Network and is not located within a Type 1 Facility or a Type 2 Facility.

12.5   Power Outages - FTTC Network

nbn may not be able to supply an **nbn**® Ethernet (FTTC) Ordered Product in the event of a Power Outage affecting:

(a)   an MDU Site or any **nbn**® Equipment located at that MDU Site served by the FTTC Network;

(b)   an FTTC-NCD or any other **nbn**® Equipment located at a Premises served by the FTTC Network; or

(c)   an **nbn**® DPU or any other active equipment that forms part of the FTTC Network and is not located within a Type 1 Facility or a Type 2 Facility.

12.6   Co-existence Period

(a)   During the Co-existence Period in respect of any **nbn**® Node, the supply of **nbn**® Ethernet (FTTB), **nbn**® Ethernet (FTTN) or **nbn**® Ethernet (FTTC) using that **nbn**® Node may be adversely affected, including by:

(i)   cross talk from Co-existing Services;

(ii)   spectral masking (including Downstream Power Back-off) applied by **nbn**; and

(iii) any other temporary measures taken by **nbn** to manage interactions between the performance of Ordered Products and Co-existing Services.

(b)   **nbn** will, as soon as reasonably practicable:

(i)   after **nbn** becomes aware that Co-existing Services have stopped being supplied in connection with a part of the FTTB Network, FTTN Network or FTTC Network (as applicable), make an assessment of whether **nbn** can disable any measure listed in section 12.6(a) which **nbn** has taken in respect of any relevant **nbn**® Node; and

(ii)   after making a determination that the measures listed in section 12.6(a) are no longer required in connection with a relevant **nbn**® Node, disable such measures and notify RSP.

(c)   The Co-existence Period in respect of an **nbn**® Node will end on the date of **nbn**'s notice under section 12.6(b)(ii).

*Section 13 describes factors that are relevant to the speed, performance and availability of **nbn**®
Ethernet.*

13. Speeds, performance and availability

13.1 Speeds and performance of Ordered Products

(a)   References to download and upload speeds (PIR, CIR and Information Rate) in this **nbn**®
Ethernet Product Description are to Layer 2 speeds, including where those speeds are
expressed as a range, and (subject to section 3.8) are references to the maximum data
throughput that the **nbn**® Network is designed to make available to RSP at the **nbn**®
Downstream Network Boundary in respect of the relevant Premises, not the minimum data
throughput. For example, where the PIR is expressed as a range for a particular bandwidth
profile:

   (i)   the maximum data throughput at the **nbn**® Downstream Network Boundary in
respect of the relevant Premises may peak anywhere in that range; and

   (ii)   may reach a PIR within that range only once during a 24 hour period.

(b)   The speeds and performance (including stability) of Ordered Products actually experienced
by RSP, Downstream Service Providers, Contracted End Users and other End Users will
vary and depend upon a number of factors including:

   (i)   the contention ratios that are determined by RSP;

   (ii)   the equipment that is used by RSP, Downstream Service Providers, Contracted End
Users and other End Users (which can also affect the speeds experienced at the
nbn® Downstream Network Boundary in respect of the relevant Premises in
respect of products supplied to End Users and end users of Other RSPs);

   (iii)   the nature and quality of the RSP Product or Downstream Product acquired by
Downstream Service Providers and Contracted End Users;

   (iv)   in the case of PIR and Wireless Plus only, the number of simultaneous end users
being served by the **nbn**® Network;

   (v)   interference caused by the equipment or network of any third party;

   (vi)   any service interference during a Co-Existence Period in respect of an **nbn**® Node
or any external electrical noise from a source that is not under the control of **nbn**;

   (vii)   the quality of any existing Line, bridge taps, Pre-Existing Carrier Side MDF,
Customer Side MDF, In-building Wiring and in-building cabling used to serve the
relevant Premises;

   (viii)   whether an **nbn**® Ethernet (FTTB) Ordered Product or **nbn**® Ethernet (FTTN)
Ordered Product has been placed into a Repair Profile;

   (ix)   the location of the relevant Premises relative to the Wireless Network cell used to
serve that Premises; and

   (x)   the nature, quality and length of the connection to, and signal reception (including
any interference with In-building Wiring, in building cabling, line-of-sight
interference, weather, wireless signals, Satellite Limitations or prevailing radio
conditions) at or affecting, the relevant Premises.

13.2   Line Rate and Information Rate

RSP must consider, and acknowledges, the following matters in connection with **nbn**'s supply of each **nbn**® Ethernet Ordered Product:

(a)   if:

   (i)   RSP configures a UNI-D or UNI-DSL; or

   (ii)   a UNI-D or UNI-DSL negotiates with any attached device upstream of the NNI or downstream of the UNI-D or UNI-DSL,

   to operate over a Line Rate which is insufficient to deliver the ordered AVC capacity, traffic loss may occur at the UNI;

(b)   degraded copper wiring (including bridge taps) beyond the **nbn**® Network Boundary for **nbn**® Ethernet (FTTB) and **nbn**® Ethernet (FTTN) may degrade the Line Rate usable by a UNI-DSL and result in traffic loss at that UNI-DSL;

(c)   degraded copper wiring (including bridge taps) beyond the **nbn**® Network Boundary for **nbn**® Ethernet (FTTC) may degrade the Line Rate usable by a UNI-D and result in traffic loss at that UNI-D;

(d)   degraded In-building Wiring beyond the **nbn**® Network Boundary for **nbn**® Ethernet (FTTC) may degrade the Line Rate usable by a UNI-D and result in traffic loss at that UNI-D;

(e)   **nbn**'s ability to deliver AVC bandwidth profiles selected by RSP (including in all relevant traffic classes, and in respect of both PIR and CIR) will be affected by actual Line Rates achieved in operation and, in respect of **nbn**® Ethernet (FTTB), **nbn**® Ethernet (FTTN) and **nbn**® Ethernet (FTTC), predicted Line Rates, as indicated in Site Qualification Information; and

(f)   whether or not a particular Wireless Plus Ordered Product is capable of achieving the potential maximum Information Rate set out in section 3.2(d) will vary and depend upon a number of factors including:

   (i)   the location of the Premises to which that Ordered Product is supplied relative to the Wireless Network cell used to serve that Premises;

   (ii)   the nature and quality of signal reception (including any line-of-sight interference, weather, other wireless signals, and prevailing radio conditions) at, or affecting, that Premises; and

   (iii)   the maximum aggregate throughput of the W-NTD using which that Ordered Product is supplied, as set out in section 13.3(c).

13.3   NTD Throughput Limits

(a)   This section 13.3 applies to each of **nbn**® Ethernet (Fibre), **nbn**® Ethernet (HFC), **nbn**® Ethernet (Wireless) and **nbn**® Ethernet (Satellite).

(b)   If the aggregate PIR bandwidth profiles of ordered products supplied to the same NTD exceed the NTD maximum aggregate throughput set out in section 13.3(c), the ordered products supplied to that NTD may not achieve maximum peak data throughput simultaneously.

(c)   The maximum aggregate throughput for an NTD in respect of all UNIs on that NTD are:

nbn® Network	Downstream (Mbps)	Upstream (Mbps)
Fibre	1000	1000
HFC	1000	400
Wireless	80 for W-NTD version 1*	8.62 for W-NTD version 1*
	108 for W-NTD version 2*	8.89 for W-NTD version 2*
	98 for W-NTD version 3*	25 for W-NTD version 3*
Satellite	120	20

* *Notes*:

- *Details regarding different W-NTD versions are set out in the Network Interface Specification – Premises Network Devices.*

- *If a Premises has a W-NTD version 1 or W-NTD version 2 installed, then the maximum upstream Information Rate that can be achieved by a Wireless Plus Ordered Product at that Premises using the current Wireless Network configuration will be the relevant maximum aggregate upstream throughput specified in the table above, until the W-NTD is replaced with a W-NTD version 3 or any later version.*

- *RSP may request that **nbn** replace a W-NTD version 1 or W-NTD version 2 in accordance with the process set out in the [WBA Operations Manual](#).*

(d)   RSP must ensure that End Users are aware of the potential for the maximum aggregate throughput of NTDs to affect the ability of multiple ordered products supplied using the same NTD to achieve maximum peak data throughput simultaneously.

*Note: The maximum aggregate NTD throughputs set out in this section 13.3 apply in respect of all ordered products supplied by **nbn** to RSP and all Other RSPs. Limitations apply to the number of **nbn**® Ethernet (Satellite) ordered products which **nbn** makes available in respect of a Premises as set out in section 3.7(a) and the **nbn**® Ethernet Fair Use Policy.*

13.4   FTTC-NCD Throughput Limits

(a)   This section 13.4 applies to **nbn**® Ethernet (FTTC).

(b)   If the aggregate PIR bandwidth profiles of ordered products supplied to the same FTTC-NCD exceed the FTTC-NCD maximum aggregate throughput set out in section 13.4(c), the ordered products supplied to that FTTC-NCD may not achieve maximum peak data throughput simultaneously.

(c)   The maximum aggregate throughput for an FTTC-NCD in respect of the UNI on that FTTC-NCD is:

nbn® Network	Downstream (Mbps)	Upstream (Mbps)
FTTC	1000	400

*Note: The maximum aggregate FTTC-NCD throughputs set out in this section 13.4 apply in respect of all **nbn**® Ethernet (FTTC) ordered products supplied by **nbn** to RSP and all Other RSPs.*

13.5   Interference Mitigation

On and from the implementation of Interference Mitigation, RSP, Downstream Service Providers and Contracted End Users may experience speeds and/or performance significantly less than prior to the relevant Interference Event occurring.

13.6   Availability of supply of Product

Notwithstanding anything else in this **nbn**® Ethernet Product Description, the supply of **nbn**® Ethernet by **nbn** to RSP is subject to the availability of each of the **nbn**® Ethernet Product Components and Product Features at the time at which RSP places an order.

13.7   Temporary interruption of **nbn**® Ethernet (HFC)

(a)   The supply of an **nbn**® Ethernet (HFC) Ordered Product to a Premises may experience a temporary interruption during the performance of any work required in relation to installation, activation, relocation of, and any activities reasonably incidental to installation, activation and relocation of:

    (i)   another Ordered Product including any HFC Installation Activities or any associated activities (such as the installation of HFC Premises Amplifiers) by **nbn** (or any of its Personnel or other persons authorised by **nbn**); or

    (ii)   another Carriage Service or Content Service supplied by RSP or any third party (such as a cable pay TV service) including any associated activities (such as the installation of HFC Premises Amplifiers),

supplied using the same PCD or HFC Lead-in Cable at the Premises as the Ordered Product.

(b)   RSP acknowledges that the activities contemplated in section 13.7(a) may involve **nbn** (or any of its Personnel or other persons authorised by **nbn**):

    (i)   adding, removing or relocating **nbn**® Equipment; or

    (ii)   relocating End User Equipment, RSP Equipment or Downstream Service Provider Equipment.

(c)   **nbn** will use reasonable endeavours where practicable to minimise any interruption to the supply of **nbn**® Ethernet (HFC) caused by the activities contemplated in section 13.7(a).

13.8   Temporary interruption of **nbn**® Ethernet (FTTC)

(a)   The supply of an **nbn**® Ethernet (FTTC) Ordered Product to a Premises may experience a temporary interruption during the performance of any work required in relation to installation, activation, relocation of, and any activities reasonably incidental to installation, activation and relocation of:

    (i)   another Ordered Product including any FTTC Installation Activities or any associated activities (such as a port swap of Lead-In Cable connected to an **nbn**® DPU, or the replacement of an **nbn**® DPU) by **nbn** (or any of its Personnel or other persons authorised by **nbn**); or

    (ii)   another Carriage Service or Content Service supplied by RSP or any third party including any associated activities (such as a port swap of Lead-In Cable connected to an **nbn**® DPU or the replacement of an **nbn**® DPU),

supplied using the same **nbn**® DPU that supplies the Premises as the Ordered Product.

(b)   RSP acknowledges that the activities contemplated in section 13.8(a) may involve **nbn** (or any of its Personnel or other persons authorised by **nbn**) adding, removing or relocating **nbn**® Equipment.

(c)   **nbn** will use reasonable endeavours where practicable to:

(i) minimise any interruption to the supply of **nbn**® Ethernet (FTTC) caused by the activities contemplated in section 13.8(a); and

(ii) provide reasonable notice to RSP of any interruption to the supply of **nbn**® Ethernet (FTTC) caused by the activities contemplated in section 13.8(a).