CHORUS

[Triallist name, address]

[Date]

Tēnā koe <name>

Chorus - <Trialist Name> (Trialist or You) – High Priority Access Trial Agreement

Introduction

Chorus New Zealand Limited (**Chorus**) is developing and wishes to trial an additional High Priority Access Service that uses a Single Port XGSPON ONT (**Trial**), prior to launching this service in <announced launch date>.

Why are we doing this?

The Trial will allow Chorus to test the new High Priority Access Service, including its compatibility with RSP hardware and network configuration. The Trial will also enable Service Providers to technically evaluate the High Priority Access Service and Single Port XGSPON ONT.

The Trial terms are set out in the Appendix to this letter.

Sign Up

To sign up for this Trial, sign and return this letter to your Chorus Account Manager.

Should you have any questions please contact your Chorus Account Manager.

Nāku noa, nā

<Trialist Name> agrees to the terms and conditions of this Trial Agreement

Authorised Signatory Name:

_____

Alexandru Tudor

Product Manager - Business Connectivity

Chorus New Zealand Limited

Authorised Signatory Position:

_____

Date:

_____

APPENDIX 1

Terms of the Trial

Term

1. The Trial is available for you to accept from 1 June 2023 until 31 July 2023.

    The Trial is effective from (**Commencement Date**) the later of:

    a. The date you sign this letter; or

    b. The completion of Chorus Technical Acceptance Testing of the High Priority Access network templates. This is targeted as of **29 June 2023**.

2. The Trial Agreement will terminate on the launch of the High Priority Access Service. This is targeted as of **31 July 2023**.

Field Trial

3. The key details of the Trial are:

	Field trial
Locations	Chorus UFB/UFB2/2+ locations
Connections	1 instance per Service Provider
Ordering	Manual conversion of a pre-existing commercial Business Hyperfibre connection using the Trial coordinators
Logging Faults	Faults cannot be logged through Assure and must be manually processed via the Trial Coordinator during standard business hours, which will be directed to a dedicated assure team.
Ancillary Service Levels	For the purposes of the expected restoration time for a fault, it will be within the following times after Chorus notifies the Service Provider of the expected restoration time: • 12 hours – AK/WN Metro • 24 hours – elsewhere For a fault that is not related to the High Priority Access service, e.g., a fibre cut, the standard Business Restore SLAs will apply.

4. The Trial will be limited to the following Connections:

    (a) One HPA 1000 Connection per Service Provider;

    (b) 10 connections in aggregate amongst all Service Providers.

    Chorus will allocate the connections amongst the Service Providers who indicate an interest in the trial. Where there are insufficient total connections to meet all Service Provider requests, the connections will be allocated based on the date that Service Providers sign the Trial letter.

Trial Details

5. We will agree with you the location of the Connection that will be involved in the Trial, including timing. We recommend this connection is in a location accessible to the Service Provider test equipment and personnel.

6. The parties will notify each other of their Trial coordinators, who will act as a point of escalation, establish joint meetings and coordinate any specific Trial activities.

Install

7. A Standard Install for the Trial Connection will require the conversion a pre-existing active Business Hyperfibre connection as follows.

    a. The Business Hyperfibre Connection must be installed and commissioned prior to converting to High Priority Access.

    b. Chorus will supply a Single Port XGSPON ONT to the Service Provider;

    c. A Service Provider technician will be required to unplug the fibre pigtail from the Standard Hyperfibre ONT and connect it to the fibre optic port on the supplied Single Port XGSPON ONT. This technician must be familiar with working with fibre optic-based CPE and equipment.

    d. Following confirmation of the connection, Chorus will update the network template to High Priority Access. This is a network only change and all Fulfil, Assure and Billing records will continue to record the service as Business Hyperfibre.

8. The location of the Single Port XGSPON ONT must be a suitable environment for electronic equipment being generally a dry, clean indoor area with adequate ventilation.

9. A Service Provider may request a new Business Hyperfibre connection to be installed for the purpose of this trial. A Standard Install for the Business Hyperfibre service applies, as set in the Bitstream Operations Manual, and should be ordered sufficiently in advance to ensure it is available at the start of the trial.

What are the charges?

10. New Connection and Recurring Charges for the Trial Services will be waived for the duration of the trial through manual credits. This includes the New Connection and Recurring Charges for a new Business Hyperfibre connection, if applicable.

11. All other usual Charges will apply.

Service Description

12. The Service Description for the Trial is set out in Appendix 2. For the purposes of the Service Description, references to the Operations Manual will be overridden by the terms in this agreement, where applicable.

13. The parties acknowledge and agree the Single Port XGSPON ONT only has one Ethernet port and no ATA port and will only support a single Service as set out in the Service Description.

What happens at the end of the Trial?

14. At the end of the Trial the Service Provider can choose to:

    (a) Continue using the High Priority Access Service as a commercial instance under the standard High Priority Access terms of service. It may take up to a month for Chorus to update its records to reflect this change; or

    (b) Convert the trial connection to another commercial Bitstream service. Chorus will not charge any install charges for any such roll back; or

    (c) Relinquish the trial connection and return the Hyperfibre and Single Port XGSPON ONTs to Chorus.

Application of relevant terms

15. The Chorus UFB Service Agreement, as modified by this letter, will apply to any Bitstream Services ordered under this Trial.

16. Terms used but not defined in this letter shall have the meanings given in the Chorus UFB Service Agreement.

C H ● R U S

APPENDIX 2

Chorus UFB Services Agreement
Bitstream Services: Service Description for
<u>High Priority Access</u>

May 2023

Document Version History

Version	Date	Author	Description of Change
0.1	April 2023	Alexandru Tudor	Initial Draft Reference Offer Document
1.0	May 2023	Alexandru Tudor	Clarifications and ONT naming changes following feedback.

TABLE OF CONTENTS

1.   Interpretation

1.1.   References to clauses or sections are references to clauses or sections in this Service Description unless expressly provided otherwise. The definitions set out in the General Terms and the Operations Manual apply to this Service Description unless expressly provided otherwise.

1.2.   References to the Operations Manual are references to the Bitstream Services Operations Manual.

2.   The High Priority Access Service

2.1.   The High Priority Access (HPA) Service is a high-speed single class bitstream service suitable for Wireless Access Point backhaul and complex business grade applications, delivered over a point to multipoint fibre access.

2.2.   A diagram of the configuration for the High Priority Access Service is set out in Appendix A.

2.3.   High Priority Access provides an Ethernet bitstream service that connects a UNI in the End User premises to a single S-VLAN on a UFB Handover Connection service located at a local or, using optional Tail Extension service, a remote Point of Interconnect (POI), where the UFB Handover Connection enables a Service Provider to access and interconnect with the Chorus Network

2.4.   The High Priority Access Service is an input service which a Service Provider can combine with other Chorus services (or with the Service Provider's own network or wholesale services provided by other service providers) to provide telecommunications services to End Users.

2.5.   The High Priority Access Service has the following key characteristics:

2.5.1.   Includes a single Access-Ethernet Private Line (Access-EPL) bitstream service that allows up to 4093 VLANS to be passed transparently from the End User Premises, End User Tenancy or NBAP (as applicable) to the Service Provider.

2.5.2.   Supports a single class of service, High Traffic Class;

2.5.3.   Includes the provision of a High Priority Access compatible ONT. High Priority Access supports two ONT types as follows:

(a)   A stand-alone Single Port XGS ONT that includes a single 10G/ 5G/ 2.5G/ 1000M/ 100M Base-T RJ45 Ethernet UNI; or

(b)   A Small Form Pluggable (SFP) XGS ONT that is installed into a CPE device at the End User Premises, with the following characteristics:

(i)   Has a single PCB 10Gbps UNI that interfaces with the SFP+ electrical connector in the host CPE;

(ii)   Is powered by the host CPE; and

(iii)   While Host CPE compatibility and integration testing is solely the responsibility of the Service Provider, Chorus will provide testing facilities to support to such testing.

2.5.4.   Supports multiple service templates, as detailed under clause 3.113.11, each consisting of a single Ethernet Access-EPL bitstream OVC with a predefined bandwidth option.

2.5.5.   Supports tagged or untagged frames at the UNI;

2.5.6.   Delivered using XGS-PON technology over Chorus's point-to-multipoint fibre;

2.5.7.   High Priority Access does not support:

(a)   Bundling with an ATA Voice service; or

(b)   Secondary UNIs or Bitstream services.

2.5.8.   High Priority Access is a variant of the Business service specified in the TCF UFB Ethernet Access Service Description v33, 11 May 2017.

3.   High Priority Access Service and implementation activities

Installation Services

3.1.   The High Priority Access Service includes a Standard Install, where applicable, as set out in the Operations Manual. Chorus will provide Non-Standard Installs as an ancillary service.

3.2.   In addition, the High Priority Access Service Standard Install may include a migration from GPON or Hyperfibre to High Priority Access, where applicable, which includes:

3.2.1.   Removal of the current ONT at the End User Premises;

3.2.2.   Supply of the Single Port XGS ONT or SFP XGS ONT and the connection of a fibre pigtail between the ITP and the ONT at the End User Premises;

3.2.3.   Association of the service to an XGS-PON port in the Chorus network; and

3.2.4.   Reconfiguration, if applicable, of the Point-to-Multipoint network to provide connectivity between the ONT and the associated XGSPON Port.

3.3.   The Chorus standard install of the SFP XGS ONT does not include plugging the SFP XGS ONT into the CPE device, or configuring the CPE to work with the SFP XGS ONT, however such activity may be provided as an additional service under 3.8.3.

Termination Point

3.4.   The High Priority Access Layer 1 and Layer 2 termination points are set out in the Operations Manual, except where detailed below.

3.5.   If the SFP XGS ONT is selected, then the High Priority Access termination points at the End User premises are.

3.5.1.   The Layer 1 termination point is the LCA connector on the SFP+ ONT; and

3.5.2.   The Layer 2 termination point is the SFP+ UNI on the SFP XGS ONT. This point is internal to the host CPE and is not externally accessible.

Testing

3.6.   Chorus will test the Fibre Lead-in from the Layer 1 termination point at the Premises, as referred to in the Operations Manual, to the Central Office where the access node is located to ensure the fibre is within the technical specification for fibre set out in Appendix B.

3.7.   Chorus will perform a basic test of the High Priority Access Service at the Layer 2 termination point at the Premises to confirm that the ONT is connected and visible to the OLT.

Additional Services

3.8.   If the Service Provider requires additional services such as:

    3.8.1.   a Non-Standard Install, i.e., the installation of the Fibre Lead-in where there is no existing fibre cabling, and the installation is outside the parameters set out in the Operations Manual;

    3.8.2.   any Premises wiring services; or

    3.8.3.   installation and testing of Service Provider equipment and services,

then Chorus may be able to provide the services in clauses 3.8.2 and 3.8.2 on request subject to terms to be agreed between Chorus and the Service Provider. Chorus will provide the Non-Standard Install referred to in clause 3.8.1 on terms as set out in this Service Description and the Operations Manual.

Core High Priority Access Service

3.9.   The core bitstream services provided as part of the High Priority Access Service are as follows:

    3.9.1.   One Access-EPL, consisting of:

        (c)   A transparent VLAN (CE-VLAN) terminating on the UNI on the Single Port XGS ONT or SFP+ UNI on the SFP XGS ONT at the End User Premises;

        (d)   A single 802.1ad VLAN (Service VLAN ID) terminating on the E-NNI at the POI.

        (e)   A QOS bandwidth profile that describes how traffic is carried between the UNI and the E-NNI.

        (f)   All tagged and untagged Frames are classified as High Traffic Class.

    3.9.2.   The maximum bandwidths obtainable by an End User are limited by the physical connection speed that they connect to the Single Port XGS ONT as detailed below:

        (a)   CPE will connect to the Single Port XGS ONT Ethernet Port at 100Mbps, 1Gbps, 2.5Gbps, 5Gbps or 10Gbps using auto negotiation.

        (b)   CPE will connect to the 10 Gbps SFP+ Port at 10 Gbps;

        (c)   Peak TCP/IP throughput is typically 80-90% of the physical connect speed due to packet encapsulation, Ethernet preamble, frame delimiters and inter-frame gaps.

        (d)   This maximum bandwidth does not guarantee End Users will observe this speed for sustained periods as their experience is dependent on a number of external factors including, but not limited to, End User applications and local network, the Service Provider network, and the location of the content they are accessing.

    3.9.3.   High Traffic Class is processed as follows:

        (a)   Downstream: policed at ingress based on CIR/CBS and strictly prioritised across the Chorus network.

        (b)   Upstream: buffered in the ONT and forwarded to the Access Node using XGSPON DBA, which provides similar behaviour to a shaper. At the Access Node the High Traffic class is policed and strictly prioritised across the Chorus network.

3.10.   The High Priority Access Service includes the following options, exercised by Service Request:

    3.10.1.   Change Service Template, as per 3.113.11. Changing Service Template may require a site visit to replace the ONT or reconfigure the point-to-multipoint fibre network;

    3.10.2.   Change E-NNI or E-NNI SVID;

    3.10.3.   Add, change, or remove Tail Extension.

3.11.   The following initial Service Templates are available:

Template	ONT	Service Bandwidth[1]				
		Headline	EIR	EBS	CIR	CBS
		Gbps	Mbps	kB	Mbps	kB
High Priority Access 1000	Single Port XGS ONT	1	0	0	1000	1248
High Priority Access 2000[2]	Single Port XGS ONT	2	0	0	2000	1248[3]
High Priority Access 4000[2]	Single Port XGS ONT	4	0	0	4000	1248[3]
High Priority Access 1000 SFP	SFP XGS ONT	1	0	0	1000	1248
High Priority Access 2000 SFP [2]	SFP XGS ONT	2	0	0	2000	1248[3]
High Priority Access 4000 SFP [2]	SFP XGS ONT	4	0	0	4000	1248[3]

[1]   All bandwidth settings are symmetric, i.e., the values apply both upstream and downstream.
[2]   2 and 4 Gbps offers are not available at launch.
[3]   CBS to be confirmed prior to launch of these speed options.

3.12.   The High Priority Access Service has similar characteristics to the other services within the UFB family of Bitstream services as identified below:

Attribute	NGA Business	Business Hyperfibre	Business Premium	High Priority Access
Bitstream	Access-EPL	Access-EPL	Access-EPL	Access-EPL
No of VLANs	4093[1]	4093[1]	4093[1]	4093[1]
Technology	GPON	XGSPON	P2P	XGSPON
High Priority	Yes, up 100 Mbps	Yes, up 100 Mbps	Yes, up 10 Gbps	Yes, up to 4 Gbps
Low Priority	Yes, up to 1 Gbps	Yes, up to 8 Gbps	No	No
MTU	2000 Bytes at ENNI 1996 Bytes at UNI	2000 Bytes at ENNI 1996 Bytes at UNI	9100 Bytes at ENNI 9096 Bytes at UNI	9100 Bytes at ENNI 9096 Bytes at UNI
MAC addresses	16	64	Unlimited (16,384)	Unlimited (16,384)
Number of available Ports	4 x 1GigE standard 1 per Offer	1 x 10GigE	1 x 10Gbps Glass Only	1 x 10GigE; or 1 x SFP+
L2CP support	No	No	Limited	Limited[3]
Diversity	No	No	Yes	No
Service Levels	Enterprise	Enterprise	Enterprise	Enterprise
Availability	Nationwide	Nationwide[2]	Nationwide	Chorus UFB/UFB2/2+

[1]   802.1ad supports 4096 VLAN IDs, but 0, 1 and 4095 are typically reserved for specific purposes.
[2]   8Gbps Hyperfibre has limited coverage, see Hyperfibre Service Description for more information.
[3]   May be amended by Chorus from time to time.

UNI – NNI characteristics

3.12.1.   High Priority Access requires a dedicated UNI.

3.12.2.   If upstream traffic exceeds the service bandwidth profile, then excess frames are buffered in the ONT and forwarded to the Access Node using XGSPON DBA, resulting in a behaviour similar to a shaper and Service Levels do not apply .

3.12.3.   The peak throughput downstream is the lower of:

   (a)   The purchased Service Template CIR; or

   (b)   80-90% of the physical speed of the UNI. This can be less than the CIR if the CPE auto-negotiates a lower connect speed.

   If there is insufficient peak throughput to deliver the downstream traffic then frames will be discarded, and Service Levels do not apply.

3.12.4.   The sum of High Traffic Class traffic profiles of all services delivered at a UFB Handover

Connection Service can exceed the UFB Handover Connection Service line rate. If there is insufficient line rate to deliver the traffic then frames will be randomly discarded, based on their Class of Service precedence, and Service Levels do not apply.

3.12.5.   It is therefore the Service Provider's responsibility to shape and queue traffic appropriately.

Operations, Administration and Maintenance

3.13.   The High Priority Access Service will support Service Provider remote access to the ONT via a service management gateway for appropriate management.

Service Requirements

3.14.   To use the High Priority Access Service the Service Provider must have the capability to access and interconnect with it, by one of the following:

3.14.1.   co-locating Service Provider equipment at the POI using the UFB Handover Connection Service and Central Office and POI Co-location Service;

3.14.2.   connecting to third party co-location space at the POI using the UFB Handover Connection Service, and with the third party taking the Central Office and POI Co-location Service;

3.14.3.   connecting to a backhaul service at the POI; or

3.14.4.   by using the Direct Fibre Access Service to connect to Service Provider equipment at a remote location within the Central Office area.

The location of the POIs is detailed in the Operations Manual appendices. High Priority Access may not be available in all locations

Additional Service Characteristics

3.15.   The technical specification of the High Priority Access Service is set out in Appendix B.

3.16.   Chorus will provide certain support and other assistance including:

3.16.1.   an electronic facility for submitting Service Requests;

3.16.2.   an electronic facility for fault notifications; and

3.16.3.   tools to assist the Service Provider in determining the location and availability of the High Priority Access Service (pre-qualification),

each as more particularly set out in the Operations Manual.

3.17.   The High Priority Access Service specifically excludes:

3.17.1.   the UFB Handover Connection Service;

3.17.2.   provision or maintenance of any cabling or connection or active device:

(c)   beyond the Service Demarcation Points described in clauses 4.1 and clause 5.1 and 5.2; and

(d)   between the jack terminating the Chorus provided Fibre Lead-in and the ONT where that cabling or connection is not provided by Chorus and Chorus has not agreed to take responsibility for that cabling or connection;

3.17.3.   configuration, monitoring, operation, on-going support or maintenance of Service Providers' or End User's applications, equipment, or networks.

3.17.4.   supply of AC mains & UPS power, accommodation space, heating, ventilating, and air conditioning and facilities at the POI or End User Premises or Service Provider Premises or NBAP (as applicable);

4.   Service Demarcation Point at End User Premises

4.1.   The Service Demarcation Point at the End User Premises (or Service Provider Premises or NBAP, as applicable) is the physical 10 GigE port on the Single Port XGS ONT or the SFP+ UNI on the SFP XGS ONT. The SFP+ UNI is internal to the host CPE, i.e., is not externally accessible.

4.2.   The High Priority Access Service excludes the End User Premises wiring. If a fault reported by the Service Provider is found to be caused by the End User Premises or Service Provider Premises or NBAP (as applicable) equipment (CPE) or the wiring at the End User Premises or Service Provider Premises or NBAP (as applicable) beyond the Service Demarcation Point, then the Service Provider may be charged the "No fault found" Ancillary Charge in the Price List. Note the wiring should comply with, or exceed, the industry standard Premises wiring requirements which are available at www.tcf.org.nz.

5.   Service Demarcation Point at POI

5.1.   The High Priority Access Service is delivered as a single S-VLAN (the logical Service Demarcation Point) on the UFB Handover Connection located at the POI.

5.2.   The physical Service Demarcation Point is the MOFDF in the POI, which is part of the UFB Handover Connection Service.

5.3.   The UFB Handover Connection Service is a separate service and is a prerequisite to the supply of the High Priority Access Service i.e., Service Provider's must first purchase and then continue to maintain a UFB Handover Connection Service at all times while taking the High Priority Access Service.

6.   Chorus and Service Provider Responsibilities

6.1.   Other Chorus and Service Provider responsibilities are detailed in the General Terms and the Operations Manual.

7.   High Priority Access Service Levels

7.1.   Service Levels for both the Layer 1 and Layer 2 components of the High Priority Access Service are set out in the Bitstream Services Service Level Terms.

Appendix A – Diagram
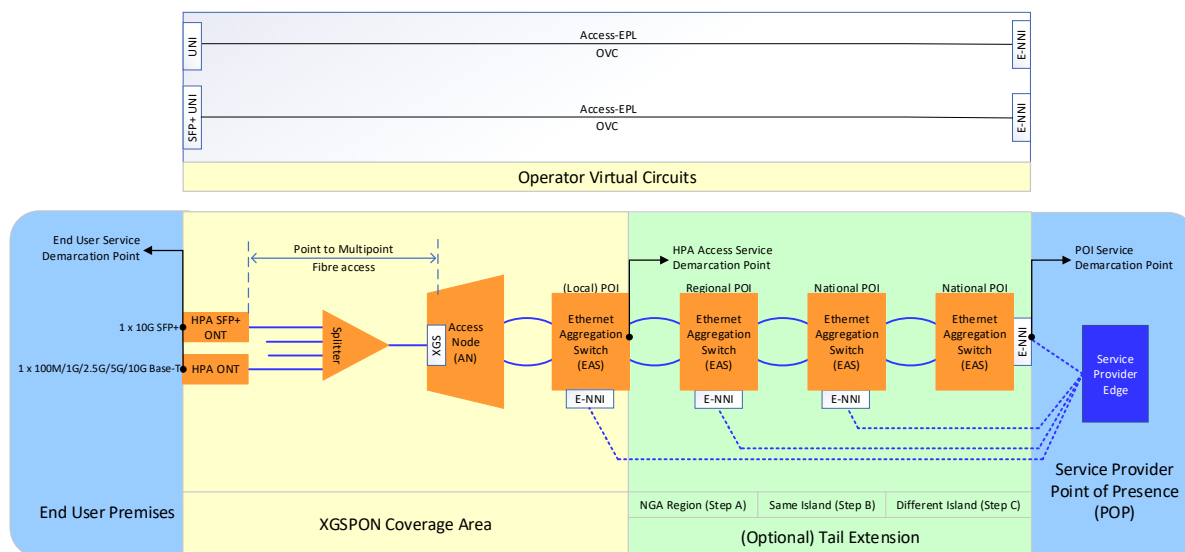
This is a generic diagram showing the standard configuration and Service Demarcation Points. It is not intended to represent every situation or detailed physical architecture.

The High Priority Access service supports a single Access-EPL OVC that connects a UNI on the Single Port XGS ONT or an SFP+ UNI on the SFP XGS ONT with a VLAN located at the E-NNI. The following points should be noted:

- The High Priority Access Service and pricing applies between:

  o the UNI on the Single Port XGS ONT or the SFP+ Interface on the SFP XGS ONT located at the End User Premises; and

  o The logical interface (VLAN) on the E-NNI at the local POI or, if Tail Extension is selected, a logical demarcation at the Ethernet Aggregation Switch (EAS) located at the local POI.

- If Tail Extension is requested, then Tail Extension Service and pricing applies between the logical demarcation at the Ethernet Aggregation Switch (EAS) located at the local POI and the logical interface (VLAN) on the E-NNI at the remote POI.

- Service Levels (availability, network performance) apply from the physical interfaces on the Single Port XGS ONT or the SFP+ Interface on the SFP XGS ONT located at the End User Premises to the E-NNI at the local POI.

- Access node and aggregation interconnection may use redundant links to meet Service Level requirements.

Appendix B – Technical Specification

Technical Specification	
Ethernet	Ethernet II or 802.3 untagged interface 802.1q tagged interface ARP = maximum 10 packets per second for each direction DHCP = 10 packets per second for each direction
Single Port XGS ONT UNI Port	• 1 x 100M/ 1G/ 2.5G/ 5G/ 10G Base-T RJ-45 port;
SFP XGS ONT	• 1 x 10G SFP+ UNI;
UFB Handover Connection (E-NNI)	Ethernet: • 802.1ad VLAN (SVID, CVID = CE-VLAN ID); or • Double tagged QnQ.
VLAN	Point-to-Point (Access-EPL) MTU 9100 Bytes Unicast Frame Delivery = passed within service CIR/EIR Multicast Frame Delivery = passed within service CIR/EIR Broadcast Frame Delivery = passed within service CIR/EIR Layer 2 Control Protocols Processing = Limited but may be amended by Chorus from time to time.
Fibre	External fibre must comply with ITU-T specification G.652D or 657A. Internal building fibre cables must meet appropriate fire regulations i.e., be Flame-Retardant, Non-Corrosive, Low Smoke, Zero Halogen (FRNC/LSZH).
Connector Type	Fibre terminations must be SC/APC type connectors (complying with the IEC 61754-4 standard) or alternatively LC/APC also known as LCA type connectors (complying with the IEC 61754-20 standard) as appropriate.
Optic Path	Laser types and path characteristics are expected to be designed to a minimum standard which are contained in either IEEE 802.3 Section 5 standard or ITU-T G.984 standards.
Fibre Testing Layer 1	All commissioning Layer 1 network testing (Chorus site OFDF to end of Communal Network) is by OTDR at two wavelengths, 1310nm and 1550nm using Bi-Directional method in accordance with Chorus standard described in ND0556. The methodology used will be based on bi-directionally testing all fibres in the Communal Network required to complete the service. Network test results are provided by agreement verifying performance features. Refer to the Direct Fibre Services Operations Manual for details. All Layer 1 network restoration testing will be Chorus site OFDF to Premises termination point. Testing for power loss will be at either 1310 or 1550 nm and for the XGS-PON at 1277nm and 1578nm. In the event of a fault restoration testing will be to the standard in Optical Performance table below. The wavelengths of 1625 nm and 1650nm are reserved for network maintenance testing purposes, compliant with ITU-T L.41.

Technical Specification	
Optical Path performance	Communal Network performance
	Total PON Insertion Loss (ITU-T G984) = ≤ 28.5db
	Network Return Loss = ≥32db
	Chorus PON system margin (lifetime ageing factor) = 1.5db
	Total PON insertion Loss OLT to ONT design target is = ≤ 27.0db (28.5db – 1.5db)
	Optical Fibre Attenuation Co-Efficient (L) (ITU-T G.652. & G657.A) = ≤ 0.4db/km
	Splice Loss (S) = ≤ 0.15db
	Mated Connector loss (C) = ≤ 0.3db
	Mated Connector Reflection = ≥55db
	Total Insertion Loss of network (IL) is calculated from IL = 0.4L + 0.15S + 0.3C (excluding PON splitter)
	Splitter performance 1:32 = ≤ 17db 1:16 = ≤ 14db 1:8 = ≤ 11db 1:4 = ≤ 7.3db 1:2 = ≤ 4.0db
	High Priority Access components Co-existence module = ≤1.1db

Appendix C – Migrating HSNS Premium to High Priority Access

This section outlines the key technical characteristic considerations when migrating from HSNS Premium to High Priority Access.

This section is not part of the service description but is included for context and will subsequently be added to the *High Priority Access User Guide* and the *Chorus Bitstream Performance Whitepaper* on the Chorus website.

	HSNS Premium	High Priority Access	Migration considerations
Electrical Interface	10BaseT RJ45 100BaseTX RJ45 1000BaseT RJ45	100M/1G/2.5G/5G/10GBase-T RJ45 auto-negotiation	CPE should be set to auto-negotiation if possible. If customers are using CPE with a physical speed that is less than or equal to the purchased bandwidth, then the egress downstream PIR should be set to ≤ ~92% of the CPE physical rate to ensure that frames are not discarded at the UNI due to physical line rate limitations.
Glass-Only Interface	1000Base-BX	SFP+ Cage	HSNS CPE is unlikely to support a 10Gbps SFP+ interface. Two options are recommended: 1. Use an RJ45 SFP module in the HSNS CPE and request a High Priority Access Electrical Interface, which will auto-negotiate to 1 Gbps. This option requires the installation of a Single Port XGS ONT at the premises, including space and power; or 2. Upgrade CPE to a compatible device with an SFP+ cage.
Upstream Bitstream handling	Uses an ingress shaper and queues at the UNI per bitstream service, with a Maximum Burst Size (MBS) set to 10ms of the service rate and with a minimum MBS of 64kB	Dynamic Bandwidth Allocation (DBA) allocates upstream bandwidth between the ONT and the Access Node. Frames are buffered in the ONT until bandwidth is allocated, resulting in a similar behaviour to an upstream scheduler. While an upstream policer is configured per bitstream at the Aggregation ingress with information Rate and Burst Size, the use of DBA means that the upstream technical specifications (EIR, EBS, CIR, CBS) are not directly applicable to upstream traffic flows. The DBA rate is set close to the service information rate, smoothing bursty traffic that might otherwise exceed the per-service ingress policer.	The use of DBA means that High Priority Access frame processing is similar to HSNS Premium, i.e., is tolerant to small bursts of traffic without causing frame loss and is thus reasonably compatible with CPE with limited upstream shaping capability. Note, however, that this tolerance comes at the expense of Frame Delay and Frame Delay Variation and the High Priority Access performance SLAs only apply when all frames are submitted within specification. Due to the complex interaction between CPE egress scheduling, ONT buffer, DBA and aggregation ingress policer, Chorus recommends Service Providers test their solutions prior to production deployment.

	HSNS Premium	High Priority Access	Migration considerations
Downstream Bitstream handling	Uses an ingress shaper and queues at the E-NNI per bitstream service, with a Maximum Burst Size (MBS) set to 10ms of the service rate and with a minimum MBS of 64kB	An ingress policer at the E-NNI is created per bitstream service, with Information Rate and Burst Size as specified in the Offer template specification.	Requires changes downstream in the Service Provider edge to move from an ingress shaper to a policer. The downstream scheduler should be designed for ≤ 50% CBS to avoid window overlap.