CHORUS

Chorus UFB Services Agreement
Bitstream Services: Service Description for Bitstream 2/3/3a Accelerate SFP ONT Option

Reference Offer

December 2020

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 Operations Manual for the Bitstream Services.

2 The Bitstream SFP 2/3/3a Accelerate Service SFP ONT option

2.1 The Bitstream SFP 2/3/3a Accelerate Service SFP ONT option is a single class or multiclass bitstream service suitable for complex business grade applications delivered over a Point-to-Multipoint fibre access. Bitstream SFP 2/3/3a Accelerate Service SFP ONT is part of the UFB family of bitstream services:

Bitstream 2	Based on the TCF Mass Market service.
Bitstream 2 Accelerate	Based on the TCF Mass Market service with enhanced low priority options.
Small Business Fibre	Based on the TCF Mass Market service with enhanced low priority options and Enterprise assure service level.
Bitstream 3	Based on the TCF Business service.
Bitstream 3 Accelerate	Based on the TCF Business service.
Bitstream 3P2P	Based on the TCF Business service.
Bitstream 3a	Based on the TCF Business service with Low Priority options.
Bitstream 3aP2P	Based on the TCF Business service with Low Priority options.
Bitstream 3a Accelerate	Based on the TCF Business service with Low Priority options.
Bitstream 2/3/3a SFP	Based on the TCF Business service with an SFP ONT
Bitstream 4	Based on the TCF Business Premium service.
Enhanced Bitstream 4	Based on the TCF Business Premium service.
UFB Handover Connection	Based on the TCF E-NNI specification.
Multicast	Based on the TCF Ethernet Multicast Access (EMA) service.
ATA Voice	An analogue telephone access service.
UNI Voice (128/128)	Low speed Bitstream service for telephony access service.

2.2 A diagram of the configuration for the Bitstream 2/3/3a Accelerate Service SFP ONT option is set out in Appendix A. Noting

2.2.1 The Bitstream SFP 2 Accelerate Service SFP ONT option provides an Ethernet Access-EVPL bitstream service from the UNI at the End User Premises, Service Provider Premises or NBAP (as applicable) to the UFB Handover Connection Service located at the POI that enables a Service Provider to access and interconnect with the LFC Network.

2.2.2 The Bitstream SFP 3/3a Accelerate Service SFP ONT option provides an Ethernet Access-EPL bitstream service from the UNI at the End User Premises, Service Provider Premises or NBAP (as applicable) to the UFB Handover Connection Service located at the POI that enables a Service Provider to access and interconnect with the LFC Network.

2.3 The Bitstream SFP 2/3/3a Accelerate Service SFP ONT option is an input service which a Service Provider can combine with other LFC services (or with the Service Provider's own network or wholesale services provided by other service providers) to provide fibre-based telecommunications services to End Users.

2.4 The Bitstream SFP 2/3/3a Accelerate Service SFP ONT option has the key characteristics set out in clause 2.4 of the Bitstream 2, and Bitstream 3:and Bitstream 3a Accelerate Service Description, subject to the following:

2.4.1 It includes a Small Form Pluggable (SFP) ONT installed in an approved CPE device at the End User Premises, End User Tenancy or NBAP (as applicable), with the following characteristics:

(a) Has a single PCB UNI that interfaces with the SFP electrical connector in the host CPE; and

(b) Is powered by the host CPE; and

(c) Host CPE must be an approved device, as agreed between the Service Provider and the LFC.

2.4.2 In particular, the Bitstream SFP 2/3/3a Accelerate Service SFP ONT option does not support:

(a) An ATA Voice service;

(b) Secondary ATA, UNIs or Bitstream services; and

(c) An upstream ingress policer.

2.4.3 If the LFC receives a request for one of the services in clause 2.4.2 it will, if necessary, install a second ONT at the premises, subject to obtaining all the necessary permissions and approvals.

2.4.4 Except as detailed in clauses 2.4.1 and 2.4.2, the Bitstream SFP 2 Accelerate Service SFP ONT option complies with the Mass Market service specified in the TCF Ethernet Access Service Description v32a, *March* 2017 and the Bitstream SFP 3/3a Accelerate Service SFP ONT option complies with the Business service specified in the TCF Ethernet Access Service Description v32a, *March* 2017.

3 Bitstream SFP 2/3/3a Accelerate Service SFP ONT option and Implementation Activities

Installation Services

3.1 The Bitstream SFP 2/3/3a Accelerate Service SFP ONT option includes an SFP ONT as part of Standard Install 1 as set out in the Operations Manual.

[1] Standard Install parameters may differ between LFCs.

Termination Point

3.2 The Bitstream SFP 2/3/3a Accelerate termination points are for;

3.2.1 Layer 1 the LCA connecter on the SFP ONT; and for

3.2.2 Layer 2 is the SFP UNI on the SFP ONT. This point is internal to the host CPE and is not externally accessible.

Testing

3.3 The LFC will test the Fibre Lead-in from the 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.

3.4 The LFC will perform a functional test of the Bitstream SFP 2/3/3a Accelerate Service SFP ONT option.

Additional Services

3.5 The additional services provided as part of the Bitstream SFP 2/3/3a Accelerate Service SFP ONT option are set out in clause 3.5 of the Bitstream 2, and Bitstream 3:and Bitstream 3a Accelerate Service Description.

Core Bitstream SFP 2/3/3a Accelerate Service SFP ONT option

3.6 The core bitstream services provided as part of the Bitstream SFP 2/3/3a Accelerate Service SFP ONT option are set out in clause 3.6 of the Bitstream 2, and Bitstream 3:and Bitstream 3a Accelerate Service Description, subject to the following:

3.6.1 The following initial Bitstream 2 Accelerate Service Templates are available, each consisting of one Ethernet bitstream service, using the following parameters:

(a) UNI tagging is set to untagged,

(b) Optionally inserts Circuit ID information in DHCP (Version 4) and PPPoE traffic., and

(c) Untagged frames sent from the End User are 802.1q tagged and marked as Low Priority; All frames are treated as Low Traffic Class, irrespective of p-bit markings (p-bit 0,1,2,3,4,5,6,7 are remarked to 0 and treated as Low Traffic Class, both upstream and downstream.

3.6.2 The following initial Bitstream 3/3a Accelerate Service Templates are available, each consisting of one Ethernet bitstream service, using the following parameters:

(d) Access Rate (300/300 or Max/Max);

(i) Business –SFP 100 (Access Rate 300/300), single class offer;

(ii) Business –SFP 200 (Access Rate 300/300), multiclass offer;

(iii) Business –SFP Max (Access Rate Max/Max), multiclass offer.

Where Access Rate is the maximum rate of the combined High and Low Priority bandwidth options available for that template.
Max/Max means that Low priority is set to 1000/1000 Mbps. The maximum throughput of the UNI is 1000 Mbps including Ethernet preamble, frame delimiters and inter-frame gaps. Thus the maximum throughput will be less than the UNI speed and vary according to frame size;

(e) High Priority service bandwidth (selected by Service Request, up to a maximum of 100/100 Mbps); and

(f) Low Priority service bandwidth (fixed per Access Rate),

3.6.3 These templates are set out in the table below and can be modified or combined with other services using the Product Development Process as described in clause 3.7.

Bitstream	Access Rate	No Classes	Headline [1]		Low Priority PIR[2] (Mbps)		Low Priority Downstream				Low Priority Upstream[3]				High Priority Downstream				High Priority Upstream[3]			
			Low Priority (Mbps) DS/US	High Priority (Mbps) DS/US			EIR	EBS	CIR	CBS	EIR	EBS	CIR	CBS	EIR	EBS	CIR	CBS	EIR	EBS	CIR	CBS
					Down	Up	Mbps	kB	Mbps	kB	Mbps	kB	Mbps	kB	Mbps	kB	Mbps	kB	Mbps	kB	Mbps	kB
2	50/50	Single	50/50	0/0	55	57.5	52.5	162	2.5	32	55	172	2.5	32	0	0	0	0	0	0	0	0
3	300/300	Single	100/100	2.5/2.5			0	0	0	0	0	0	0	0	0	0	2.5	32	0	0	2.5	32
				10/10			0	0	0	0	0	0	0	0	0	0	10	32	0	0	10	32
				20/20			0	0	0	0	0	0	0	0	0	0	20	32	0	0	20	32
				30/30			0	0	0	0	0	0	0	0	0	0	30	32	0	0	30	32
				40/40			0	0	0	0	0	0	0	0	0	0	40	32	0	0	40	32
				50/50			0	0	0	0	0	0	0	0	0	0	50	32	0	0	50	32
				60/60			0	0	0	0	0	0	0	0	0	0	60	38	0	0	60	38
				70/70			0	0	0	0	0	0	0	0	0	0	70	44	0	0	70	44
				80/80			0	0	0	0	0	0	0	0	0	0	80	50	0	0	80	50
				90/90			0	0	0	0	0	0	0	0	0	0	90	57	0	0	90	57
				100/100			0	0	0	0	0	0	0	0	0	0	100	63	0	0	100	63
3a	300/300	Multiclass	200/200	2.5/2.5	217	230	214.5	230	2.5	32	227.5	180	2.5	32	0	0	2.5	32	0	0	2.5	32
				5/5			214.5	230	2.5	32	227.5	180	2.5	32	0	0	5	32	0	0	5	32
				10/10			214.5	230	2.5	32	227.5	180	2.5	32	0	0	10	32	0	0	10	32
				20/20			214.5	230	2.5	32	227.5	180	2.5	32	0	0	20	32	0	0	20	32
				30/30			214.5	230	2.5	32	227.5	180	2.5	32	0	0	30	32	0	0	30	32
				40/40			214.5	230	2.5	32	227.5	180	2.5	32	0	0	40	32	0	0	40	32
				50/50			214.5	230	2.5	32	227.5	180	2.5	32	0	0	50	32	0	0	50	32
				60/60			214.5	230	2.5	32	227.5	180	2.5	32	0	0	60	38	0	0	60	38
				70/70			214.5	230	2.5	32	227.5	180	2.5	32	0	0	70	44	0	0	70	44
				80/80			214.5	230	2.5	32	227.5	180	2.5	32	0	0	80	50	0	0	80	50
				90/90			214.5	230	2.5	32	227.5	180	2.5	32	0	0	90	57	0	0	90	57
				100/100			214.5	230	2.5	32	227.5	180	2.5	32	0	0	100	63	0	0	100	63

Bitstream	Access Rate	No Classes	Headline [1]		Low Priority PIR[2] (Mbps)		Low Priority Downstream				Low Priority Upstream[3]				High Priority Downstream				High Priority Upstream[3]			
			Low Priority (Mbps) DS/US	High Priority (Mbps) DS/US			EIR	EBS	CIR	CBS	EIR	EBS	CIR	CBS	EIR	EBS	CIR	CBS	EIR	EBS	CIR	CBS
					Down	Up	Mbps	kB	Mbps	kB	Mbps	kB	Mbps	kB	Mbps	kB	Mbps	kB	Mbps	kB	Mbps	kB
3a	Max/Max	Multiclass	Max/Max	2.5/2.5	1000	1000	997.5	250	2.5	32	997.5	180	2.5	32	0	0	2.5	32	0	0	2.5	32
				10/10			997.5	250	2.5	32	997.5	180	2.5	32	0	0	10	32	0	0	10	32
				20/20			997.5	250	2.5	32	997.5	180	2.5	32	0	0	20	32	0	0	20	32
				30/30			997.5	250	2.5	32	997.5	180	2.5	32	0	0	30	32	0	0	30	32
				40/40			997.5	250	2.5	32	997.5	180	2.5	32	0	0	40	32	0	0	40	32
				50/50			997.5	250	2.5	32	997.5	180	2.5	32	0	0	50	32	0	0	50	32
				60/60			997.5	250	2.5	32	997.5	180	2.5	32	0	0	60	38	0	0	60	38
				70/70			997.5	250	2.5	32	997.5	180	2.5	32	0	0	70	44	0	0	70	44
				80/80			997.5	250	2.5	32	997.5	180	2.5	32	0	0	80	50	0	0	80	50
				90/90			997.5	250	2.5	32	997.5	180	2.5	32	0	0	90	57	0	0	90	57
				100/100			997.5	250	2.5	32	997.5	180	2.5	32	0	0	100	63	0	0	100	63

[1] The headline rate is the Layer 2 bandwidth prior to the addition of the overhead described in section 3.6.2.

[2] Low Priority 'Peak Information Rate', which is the headline rate plus the bandwidth overhead described in clause 3.6.2, is the sum Low Priority EIR and Low Priority CIR.

[3] Upstream profiles are GPON rate-limited and policed at Access Node based on CBS/EBS

3.6.4 The Bitstream SFP 2/3/3a Accelerate Service SFP ONT option has similar characteristics to the other services within the UFB family of Bitstream Services as identified below:

Attribute	**Bitstream 2** **Bitstream 2 Accelerate** **Small Business Fibre**	**Bitstream SFP 2 Accelerate**	**Bitstream 3** **Bitstream 3 Accelerate**	**Bitstream 3a** **Bitstream 3a Accelerate**	**Bitstream SFP 3/3a Accelerate**	**Bitstream 4**	**Enhanced Bitstream 4**
Bitstream	Access-EVPL	Access-EVPL	Access-EPL	Access-EPL	Access-EPL	Access-EPL	Access-EPL
High Priority	Yes	No	Yes	Yes	Yes	Yes	Yes
Low Priority	Yes	Optional	No	Yes	Optional	No	Yes
Service Bandwidths (reference offer) *	Low Priority from 30/10 Mbps up to 100/50 Mbps Low Priority + High Priority up to 110/52.5 Mbps	N/A	From 2.5/2.5 Mbps to 100/100 Mbps	High Priority from 2.5/2,5 Mbps to 90/90 Mbps Low Priority + High Priority = 100/100 Mbps	N/A	From 100 Mbps up to 10 GigE	Low up to 1000/1000 Mbps High from 10/10 Mbps to 1000/1000** Mbps
Service Bandwidths (Accelerate)*	Low Priority from 30/10 Mbps up to 1000/500 Mbps Low Priority + High Priority CIR up to 100/50 Mbps	Low Priority at 50/50 Mbps	From 2.5/2.5 Mbps to 100/100 Mbps	Low Priority from 100/100 Mbps up to 1000/1000 Mbps with High Priority from 2.5/2.5 Mbps up to 100/100 Mbps	Low Priority from 100/100 Mbps up to 1000/1000 Mbps with High Priority from 2.5/2.5 Mbps up to 100/100 Mbps	N/A	N/A
OAM CFM	No	No	No	No	No	No	Yes
Birth Certificate	No	No	No	No	No	No	Yes
MTU	2000 Bytes	2000 Bytes	2000 Bytes	2000 Bytes	2000 Bytes	9100	9100 Bytes
MAC addresses	16	16	64	64	64	Unlimited	Unlimited
Number of available UNIs	4 standard	1 SFP UNI	4 standard	4 standard	1 SFP UNI	1 with a second UNI available on request	2 1000/100 Base-T + 2 SFP Sockets standard
L2CP support	No	No	No	No	No	Limited	Limited
Diversity	On request with limited availability	On request with limited availability	On request with limited availability	On request with limited availability	On request with limited availability	Available to Priority Users in selected areas	Available to Priority Users in selected areas

** Bandwidth options for each Bitstream Service are detailed in each Bitstream Service Description and further options can be developed using the Product Development Process.*

UNI – NNI characteristics

3.6.5 The Bitstream SFP 2/3/3a Accelerate Service SFP ONT option requires a dedicated SFP UNI.

New Service Template Options

3.7 A Service Provider may request that the LFC creates additional Service Templates by following the process in the Operations Manual.

Operations, Administration and Maintenance

3.8 The Bitstream SFP 2/3/3a Accelerate Service SFP ONT option will support Service Provider remote access to the ONT via a service management gateway for appropriate management. A Service Provider may request particular management attributes via the Product Development Process.

3.9 The Bitstream SFP 2/3/3a Accelerate Service SFP ONT option will support Ethernet Service Operations and Maintenance (OAM) for service integrity testing, fault diagnostics and performance measurement using ITU Y.1731, provided the host CPE has an appropriately configured MEP or MIP2. OAM capability will be phased in as the functionality is developed and deployed in scale and may be updated or amended by the LFC from time to time.

Service Requirements

3.10 The service requirements of the Bitstream SFP 2/3/3a Accelerate Service SFP ONT option are set out in clause 3.14 of the Bitstream 2 Accelerate, and Bitstream 3:and bitstream 3a Service Description.

Additional Service Characteristics

3.11 The technical specification of the Bitstream SFP 2/3/3a Accelerate Service SFP ONT option is set out in Appendix B.

3.12 The additional service characteristics of the Bitstream SFP 2/3/3a Accelerate Service SFP ONT option are set out in clauses 3.15 and 3.16 of the Bitstream 2, and Bitstream 3:and bitstream 3a Service Description:

3.13 Bitstream SFP 2 Accelerate Service SFP ONT option is only available at specified NBAP locations excluding aggregation points i.e. Cell Sites and Cell On Wheel locations.

4 Service Demarcation Point at POI, End User Premises, Service Provider Premises or NBAP (as applicable)

4.1 The service demarcation points of the Bitstream SFP 2/3/3a Accelerate Service SFP ONT option are set out in clauses 4 and 5 of the Bitstream 2, and Bitstream 3:and bitstream 3a Service Description, with the following exception. The Service Demarcation Point at the End User Premises, Service Provider Premises or NBAP (as applicable) is the SFP UNI on the SFP ONT. This point is internal to the host CPE, i.e. is not externally accessible.

5 LFC and Service Provider Responsibilities

5.1 Other LFC and Service Provider responsibilities are detailed in the General Terms and the Operations Manual.

[2] MEPs are Maintenance Entity Group (MEG) End Points. MEPs are maintenance functional entities that generate and receive OAM frames. MIPs are MEG Intermediate Points. MIPs are maintenance functional entities that react and respond to OAM frames.

6 Fibre Diversity

6.1 The Bitstream SFP 2/3/3a Accelerate Service SFP ONT option provides a single fibre path between the Central Office and the ONT located at the End User Premises, Service Providers Premises or NBAP (as applicable).

6.2 Diversity for Bitstream SFP 2/3/3a Accelerate Service SFP ONT option is limited to a second or subsequent instance of the Bitstream SFP 2/3/3a Accelerate Service SFP ONT option. A diverse lead-in between the Fibre Access Point and the Premises may be available as an option for some but not all Premises. Standard Installation Charges and Service Levels do not apply to the provision of the diverse products that involve diverse access to the End User Premises or Service Provider Premises or NBAP (as applicable). Each instance of the Bitstream SFP 2/3/3a Accelerate Service SFP ONT option, primary and diverse, will be treated as an individual line for the purpose of availability Service Levels.

7 Bitstream SFP 2/3/3a Accelerate Service SFP ONT option Service Levels

7.1 Service Levels for both provisioning and restoration of the Bitstream SFP 2/3/3a Accelerate Service SFP ONT option are the Enterprise service levels set out in the Service Level Terms for the Bitstream Services, with the following exceptions.

7.2 As the SFP ONT is integrated with a host CPE device, with upstream traffic policy enforcement functions Point-to-Multipoint between these devices, the Upstream Service Performance SLAs only apply if only in-profile traffic is submitted upstream to the SFP ONT.

7.3 Per-service Service Performance compliance testing, if requested, will use in-profile frames submitted to an SFP ONT installed in a benchmarked CPE device.

7.3.1 This will be service-disrupting and must be agreed with the End User prior to testing;

7.3.2 Out of profile frames will not be tested as these should be discarded by the benchmarked CPE before being submitted to the SFP ONT interface, but this cannot be distinguished from service discards in the test results.

8 Bitstream SFP 2/3/3a Accelerate Service SFP ONT option Pricing

8.1 The new connection, reoccurring and ancillary charges for the Bitstream SFP 2/3/3a Accelerate Service SFP ONT option are the rates set out in the Price List for the appropriate Bitstream 2 Accelerate, Bitstream 3 Accelerate and Bitstream 3a Accelerate Services.

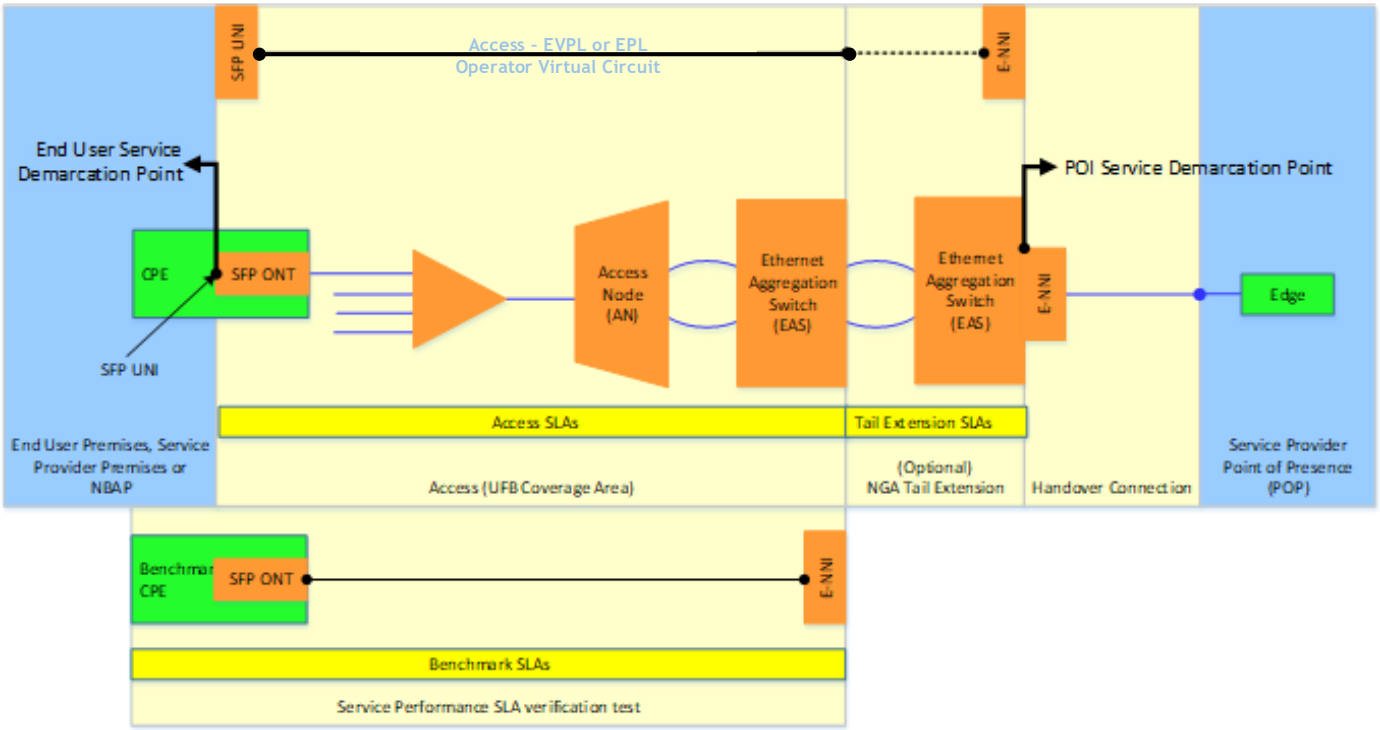
9 Bitstream SFP 2 Accelerate Service SFP ONT availability

9.1 The supply of the Bitstream SFP 2 Accelerate Service SFP ONT option can only be supplied to the following services or locations: Alarm, ATM CCTV, Comms Room, Lift Phone, Portacom, Pumping Station, Wi-Fi, Kiosk (including a self-service terminal), Shed, Bus Stop, Lamp Post, Payphone, Pedestrian Crossing, Traffic Light, Train Station, Visual Messaging Service, Weigh In Motion, Electronic Billboard, Gate (security gate), Payment Terminal, and Traffic Counter

9.2 It cannot be used for Cellsites, Cellsite on Wheels (CoW) or other mobile arrogation due to bandwidth limitations.

9.3 The SFP 50 plan can be upgraded to the BS3/3a SFP option, however changing to any other BS2 plans will require installation of a standard ONT.

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 following points should be noted:

- The Bitstream SFP 2/3/3a Accelerate Service SFP ONT option and pricing applies from the SFP UNI to the E-NNI at the Local POI.
- If Tail Extension is selected then the OVC will be extended from the local POI to the remote Handover POI, i.e. there is no break in the OVC at the local POI.
- Access Service Levels (availability, network performance) only apply between the SFP UNI and the E-NNI at the local POI. These can be benchmarked by plugging the SFP ONT into a benchmarked CPE and using in-profile frames. . Tail Extension SLAs apply between the local POI and the remote handover POI.
- Access node and aggregation interconnection may use redundant links to meet Service Level requirements.
- The Bitstream SFP 2/3/3a Accelerate Service SFP ONT option only supports one Service Template per SFP ONT.

Appendix B – Technical Specification

Technical Specification	
UNI Ethernet	Bitstream 2 SFP • All to One Bundling Disabled Ethernet II or IEEE 802.3 – 2011 Bitstream SFP 3/3a • All to One Bundling Enabled Ethernet II or IEEE 802.3 – 2011 • 802.1q supporting 4093 VLANs
UNI	ONT supports: • 1 x SFP UNI Per SFP UNI: • 1 Gbit/s SFP PCB
UFB Handover Connection (E-NNI)	Ethernet: • 802.1ad VLAN (SVID, CVID); or • Double tagged QnQ. VLAN IDs: • Bitstream SFP 2: SVID, CVID • Bitstream SFP 3/3aL SVID (CVID transparent)
VLAN	Point-to-Point (Access-EPL) MTU 2000 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 = Initially none (but may be amended by the LFC 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). Testing for power loss will be at either 1310 or 1550 nm. The wavelengths of 1625 nm and 1650nm are reserved for network maintenance testing purposes, compliant with ITU-T L.41.
Connector Type	Fibre terminations must be SC/APC type connectors (complying with the IEC 61754-4 standard) or as an alternative LC/APC also known as LCA type connectors (complying with the IEC 61754-20 standard) as appropriate.
Optic Types	Laser types and path characteristics expected to be designed to a minimum standard which are contained either IEEE 802.3 Section 5 standard or ITU-T G.984 (GPON) standards.