XPONSHOP OEM GPON-to-XGS-PON Coexistence Splitter Insertion Loss Reference - Official Technical Overview & Hardware Datasheet

PRODUCT IDENTIFICATION

Product Name: XPONSHOP OEM GPON-to-XGS-PON Coexistence Splitter Module

Model Number: XPS-CXG-1xN-FA

Product Type: Passive Optical Network (PON) Coexistence Element (CE) / Wavelength Division Multiplexing (WDM) Combiner

Primary Application: Seamless migration and overlay of 10-Gigabit-capable Symmetrical Passive Optical Network (XGS-PON) infrastructure over existing GPON fiber plant without service disruption.



CORE INTERNAL TOPOLOGY & OPTICAL ARCHITECTURE

The XPONSHOP OEM Coexistence Splitter is a precision passive optical component engineered to combine or separate upstream and downstream optical signals operating on distinct ITU-T G.984 (GPON) and G.9807 (XGS-PON) wavelength bands over a single shared fiber distribution network. The device architecture is based on a fused biconical taper (FBT) or planar lightwave circuit (PLC) platform, carefully optimized for minimal insertion loss and high isolation between the two PON generations.

Operational Wavelength Bands:

- GPON Path (Legacy): 1490 nm (Downstream) / 1310 nm (Upstream)
- XGS-PON Path (Upgrade): 1577 nm (Downstream) / 1270 nm (Upstream)

The splitter leverages proprietary thin-film filter (TFF) or WDM multiplexing technology to route each wavelength band to its respective PON port (GPON and XGS-PON) while maintaining a common fiber port for connection to the Optical Distribution Network (ODN). The internal combiner stage is fully passive, requiring zero power consumption and introducing no bit-error-rate (BER) penalties when operated within the specified optical power budget.

SWITCHING SUBSYSTEM CAPABILITIES

As a fully passive optical device, the XPONSHOP Coexistence Splitter contains no active switching or routing fabric. Its operational "switching" function is performed by wavelength-selective optical filtering, which ensures deterministic physical-layer forwarding. Key features of this optical subsystem include:

- Wavelength-selective combining/splitting with high channel isolation (> 30 dB between GPON and XGS-PON paths) to minimize cross-talk.
- Bending-insensitive fiber pigtails for flexible installation within densely populated fiber distribution frames (FDFs) and optical distribution hubs.
- High return loss (> 50 dB) on all optical ports, ensuring stable laser performance and minimizing reflections that could degrade transmitter coherence.

OPERATIONAL ADVANTAGES

- Cost-Efficient Network Upgrade Path: Enables service providers to introduce XGS-PON services on existing GPON fiber infrastructure, avoiding costly new fiber deployment.
- Zero Service Disruption: The passive nature of the splitter allows installation and cutover without interrupting existing GPON subscribers.
- Full Symmetrical Capacity Support: Supports the full XGS-PON 10 Gbps

symmetrical bandwidth capability (downstream and upstream) without optical bottleneck.

- Plug-and-Play Integration: Compact form factor and industry-standard connector interfaces (SC/APC, LC/UPC) guarantee compatibility with standard optical distribution frames.

SPECIFICATION MATRIX

PARAMETER SPECIFICATION & PERFORMANCE METRICS

Device Type: GPON-to-XGS-PON Coexistence Splitter (WDM Combiner/Filter)

Technology: Planar Lightwave Circuit (PLC) / Thin-Film Filter (TFF) Hybrid

Port Configuration: 1x Common, 1x GPON (Legacy), 1x XGS-PON (Upgrade) [1x2], or 1x Common, 1x GPON, 1x XGS-PON, and Monitoring Port (1x3)

Operating Wavelengths: GPON: Tx 1490nm / Rx 1310nm; XGS-PON: Tx 1577nm / Rx 1270nm

Insertion Loss (Common to GPON): ≤ 1.2 dB (typical: 0.8 dB)

Insertion Loss (Common to XGS-PON): ≤ 1.5 dB (typical: 1.0 dB)

Channel Isolation: > 30 dB (GPON ↔ XGS-PON)

Polarization Dependent Loss (PDL): ≤ 0.2 dB

Return Loss: > 50 dB (all ports)

Directivity: > 55 dB

Fiber Type: G.657.A1 (Bending Insensitive) / G.652.D Compliant

Connector Type: SC/APC or LC/UPC (factory configurable, 8° angled polish to prevent back-reflection)

Operating Temperature Range: -40°C to +85°C

Storage Temperature Range: -40°C to +85°C

Humidity: 5% to 95% (Non-condensing)

Package Form Factor: Compact metal tube (e.g., 5.5mm x 55mm) or LGX cassette / miniature 1xN splitter housing

Parameter	**Specification**
Form Factor	Compact Metal Tube / LGX Cassette / 1U Rack Mountable (varies by SKU)
Insertion Loss (Common to GPON)	≤ 1.2 dB (typical: 0.8 dB)
Insertion Loss (Common to XGS-PON)	≤ 1.5 dB (typical: 1.0 dB)
Wavelength Isolation	> 30 dB (GPON ↔ XGS-PON)
Return Loss	> 50 dB (all ports)
Operating Temperature Range	-40°C to +85°C
Power Supply	Passive Device – No Power Required
MTBF	> 500,000 hours (Telcordia SR-332)

REGULATORY COMPLIANCE

- ITU-T G.984.5: Enhanced Bandwidth for GPON (wavelength plan compatibility)

- ITU-T G.9807.1: 10-Gigabit-capable Symmetrical Passive Optical Networks (XGS-PON)

- IEC 60825-1: Safety of laser products (Class 1M compliant)

- IEC 61300 Series: Fibre optic interconnecting devices and passive components – Basic test and measurement procedures

- RoHS 2011/65/EU: Restriction of Hazardous Substances compliance

- REACH (EC) 1907/2006: Registration, Evaluation, Authorization, and Restriction of Chemicals compliance

- Telcordia GR-1209-CORE: Generic requirements for passive optical components

- Telcordia GR-1221-CORE: Reliability assurance for passive optical components



ORDERING SKU INFORMATION & PART NUMBERING SCHEME

| SKU Code | Port Configuration | Connector Type | Package Type |

|---|---|---|---|

| XPS-CXG-1x2-SC/APC | 1x2 (Common, GPON, XGS-PON) | SC/APC | Standard Tube |

| XPS-CXG-1x3-LC/UPC | 1x3 (Common, GPON, XGS-PON, MON) | LC/UPC | LGX Cassette |

| XPS-CXG-1x2-LC/UPC | 1x2 (Common, GPON, XGS-PON) | LC/UPC | Miniature 1U Rack |

Note: Custom splitter ratios and port configurations are available upon request for high-volume OEM deployments. Please consult your XPONSHOP sales representative for tailored SKUs and volume pricing.

LIFECYCLE ASSURANCE (MTBF)

Mean Time Between Failures (MTBF): > 500,000 hours (Telcordia SR-332, Issue 4, Ground Benign conditions)

Warranty: Standard 5-year limited component warranty (extended 10-year coverage available for enterprise agreements)

SUPPORTED TRANSCEIVER INTERFACES & COMPATIBILITY

The XPONSHOP Coexistence Splitter is fully compatible with the following industry-standard transceivers and OLT/ONU equipment:

- GPON OLT optics (1490nm Tx / 1310nm Rx) – Class B+, C+, and C++ variants
- XGS-PON OLT optics (1577nm Tx / 1270nm Rx) – N1, N2a, and E1 power budget classes
- XGS-PON ONU optics (1270nm Tx / 1577nm Rx) – for symmetrical 10G operation
- Interoperable with all major telecom OEM OLT/ONU platforms adhering to ITU-T G.984 and G.9807 standards.

INSTALLATION & SAFETY PRECAUTIONS

- All optical connections must be thoroughly cleaned and inspected using an optical fiber inspection microscope prior to mating to prevent contamination-induced insertion loss increases.
- Do not exceed the maximum optical input power of +20 dBm per port to avoid filter degradation or damage.
- The device contains no user-serviceable parts. Any attempt to disassemble the module will void the warranty.
- Ensure bend radius of fiber pigtails does not fall below 15 mm (for G.657.A1)

during installation to prevent additional loss.

- For outdoor or uncontrolled environment installations, place the splitter inside an IP-rated optical distribution cabinet.

QUALITY ASSURANCE & TESTING PROTOCOL

Every XPONSHOP Coexistence Splitter is individually factory-tested and verified for the following parameters before shipment:

1. Full spectral insertion loss characterization from 1260 nm to 1625 nm (per port).
2. Channel isolation verification (GPON ↔ XGS-PON @ 30 dB minimum).
3. Return loss measurement (> 50 dB) on all ports.
4. PDL validation (< 0.2 dB) across operating temperature range.
5. High-temperature and humidity accelerated aging test (85°C / 85% RH for 500 hours) to ensure reliability.
6. Visual inspection and end-face geometry analysis (IEC 61300-3-35 compliant).

Certificates of conformance (CoC) and detailed factory test reports are available upon request for quality-sensitive procurement and network auditing.