

Sub-Urban FTTH Deployment Case Study - Official Technical Overview & Hardware Datasheet

SUB-URBAN FTTH DEPLOYMENT CASE STUDY - OFFICIAL TECHNICAL OVERVIEW & HARDWARE DATASHEET

EXECUTIVE SUMMARY

This document provides a comprehensive technical overview of the OptiAccess XGS-PON OLT platform, specifically tailored for Sub-Urban Fiber-to-the-Home (FTTH) deployments. It details the hardware architecture, performance metrics, and operational advantages of a solution engineered to bridge the digital divide in low-density population areas. The platform delivers carrier-grade reliability and high-bandwidth capabilities essential for delivering triple-play services, smart city applications, and enterprise-grade connectivity to suburban communities.

The OptiAccess system represents a strategic asset for service providers seeking to expand their fiber footprint with optimized total cost of ownership (TCO). By combining a compact, environmentally resilient chassis with non-blocking switching capacity and intelligent power management, this platform overcomes the unique challenges of sub-urban infrastructure, including variable temperature ranges, limited cabinet space, and demanding

service-level agreements (SLAs).



ARCHITECTURE & CHASSIS DESIGN

The platform employs a modular, 1RU (Rack Unit) chassis engineered for high-density PON (Passive Optical Network) termination. The front-access design facilitates rapid deployment in both central offices and outdoor street cabinets, a critical requirement for sub-urban environments where real estate is at a premium.

The architecture is built around a distributed switching fabric that separates the data plane from the control plane. This separation ensures that management and signaling operations do not impact subscriber data forwarding rates, maintaining wire-speed performance across all PON ports. The chassis

integrates a backplane with a total bandwidth of 320 Gbps, supporting up to 8 XGS-PON interfaces and 4 uplink ports, configurable as either 10G SFP+ or 25G SFP28.

The system supports a flexible PON port density of up to 8 interfaces per 1RU, allowing a single chassis to serve up to 512 subscribers (with a 1:64 split ratio) within a 10-kilometer radius. This density is optimized for sub-urban population clusters, reducing the number of central office sites required and minimizing fiber backhaul costs.

HARDWARE FEATURES

At the core of the hardware design is a dual-core network processor with integrated forward error correction (FEC) engines, which are essential for maintaining signal integrity over extended fiber distances (up to 20 km). The platform includes a highly accurate IEEE 1588v2 / SyncE timing module, ensuring precise synchronization for mobile backhaul and other latency-sensitive applications.

Key hardware features include:

- FIELD-REPLACEABLE POWER SUPPLY UNITS (PSUS): The chassis

accommodates two hot-swappable power supplies (AC or DC) in a 1+1 redundancy configuration. This design ensures service continuity during power maintenance or failure events, a critical requirement for uncontrolled sub-urban cabinet environments.

- INTELLIGENT FAN TRAY: A variable-speed fan tray monitors system temperature and adjusts cooling dynamically. This not only extends the lifespan of the hardware components but also reduces audible noise and power consumption, making it suitable for deployment in noise-sensitive residential areas.

- ENHANCED SECURITY CO-PROCESSOR: An integrated hardware security module enables line-rate AES-256 encryption for data-in-motion, supporting secure virtual private network (VPN) overlays for enterprise and government subscribers.

- BUILT-IN OPTICAL POWER METER (OPM): Each PON port is equipped with an integrated OPM, allowing for real-time monitoring of optical receive power and facilitating proactive link troubleshooting without the need for external test equipment. This feature drastically reduces operational expenses (OPEX) by enabling remote diagnostics.

COMPLIANCE & STANDARDS

The OptiAccess system is meticulously designed to adhere to the latest global

and regional telecommunications standards, ensuring seamless interoperability and regulatory acceptance. It complies with ITU-T G.9807.1 (XGS-PON) for 10-Gigabit-capable symmetric passive optical networks, enabling full compatibility with a wide ecosystem of optical network terminals (ONTs).

Additionally, the hardware meets the stringent environmental requirements of ETSI EN 300 019 for Class 3.1 temperature-controlled and Class 3.2 partially temperature-controlled locations, guaranteeing stable operation from -40°C to +65 °C. The platform is fully compliant with CE, FCC, and RoHS directives, mitigating supply chain risks and providing global clearance for deployment.

TECHNICAL SPECIFICATIONS

Parameter	Specification
Form Factor	1RU Rack-Mountable Chassis
Switching Capacity	320 Gbps (Non-Blocking)
XGS-PON Ports	8 (Up to 512 Subscribers per chassis)
Uplink Ports	4 x 10G SFP+ / 25G SFP28 (Combo)
Forwarding Rate	Up to 480 Mpps (Million Packets per Second)
Power Supply	1+1 Redundant AC 100-240V / DC -48V

Typical/Max Power Consumption	150W / 220W
Operating Temperature	-40°C to +65°C (ETSI Class 3.2)
Management	CLI, SNMP, RESTCONF/NETCONF, and GUI
Security	AES-256, MACsec, and Secure Boot
Standards Compliance	ITU-T G.9807.1, IEEE 802.3, ETSI, RoHS

ORDERING OPTIONS

The platform is available in a variety of factory-assembled configurations and expansion modules to match specific deployment scale requirements:

- OPTIACCESS-BASE-1RU: Standard chassis with integrated backplane, management module, and (1) AC 300W PSU.
- OPTIACCESS-RED-PSU-DC: Optional DC (-48V) power supply unit, designed for CO environments.
- PON-8XG-XFP: 8-port XGS-PON line card with Class B+ optics (supporting up to 20km reach and 1:64 split ratio).
- PON-8XG-SFP: 8-port XGS-PON line card with Class C+ optics for extended range (up to 32km).
- UPLINK-4X25G-SFP28: 4-port 25G Ethernet uplink module for

high-bandwidth aggregation.

- UPLINK-4X10G-SFP+: 4-port 10G Ethernet uplink module for cost-optimized backhaul.
- MGMT-SD-WAN: Software license upgrade enabling integrated SD-WAN functionality for advanced traffic steering.

