Nokia ISAM FWLT-B

XGS-PON/TWDM-PON line card

The Nokia Intelligent Services Access Manager (ISAM) FWLT-B is the next-generation fiber line termination card, supporting 10G symmetrical and asymmetrical PON (XGS-PON dual rate) and Time and Wavelength Division Multiplexing Passive Optical Network (TWDM-PON) technology. The card is deployed in the Nokia 7360 ISAM FX, the market-leading fiber access platform that allows coexistence of XGS-PON and TWDM-PON with GPON and EPON, making it easy for operators to evolve their networks. The FWLT-B has eight ports, each supporting up to 10 Gb/s bit rates, enabling operators to deliver greater speeds and capture new revenues.

The Nokia ISAM FWLT-B is a universal NG-PON (XGS-PON/TWDM-PON) line termination card. Universal NG-PON solution is a Nokia innovation that supports XGS-PON dual rate and TWDM-PON on a single platform or line card. The FWLT-B card simplifies and accelerates the fiber network evolution and lowers the entry cost of TWDM-PON. Additionally, the card is designed to support different wavelength constellations, which ensure cost-efficient network evolution.

Features

- 8-port universal NG-PON line termination card; each port provides 2 wavelengths (upstream and downstream)

- Supported in all 7360 ISAM FX variants (4/8/16)

- Universal NG-PON feature, which provides flexibility to choose a variety of optic interfaces:

  - XGS-PON: dual rate, 10G/10G and 10G/2.5G capable

  - TWDM-PON: either 10G/10G or 10G/2.5G capable

- Flexible wavelength movement

- Different wavelength constellations: same wavelength on each port or different wavelength on every port

- Parity with legacy GPON LT cards for all functionality above transport layer

- Per-subscriber per-service bandwidth control

- Support features for lean operations and remote troubleshooting: Received Signal Strength Indication (RSSI), rogue optical network unit (ONU) detection

- Managed by the Nokia 5520 Access Management System (AMS)

- Synchronization features for mobile backhaul application (IEEE 1588v2, SyncE)

Benefits

- Enables operators to capture new revenues with services that require 10 Gb/s symmetrical or asymmetrical

- Simplifies and accelerates the fiber network evolution, by supporting both XGS-PON dual rate and TWDM-PON on a single line card

- Supported on the same platform as GPON/EPON, allowing operators a cost-efficient evolution on the same passive and active plant

- Convergence of all services on one network: residential, business, mobile backhaul

- Co-existence with GPON

- PON protection for mission-critical services

- Internet Group Management Protocol (IGMP) proxy for monitoring the member's joining-and-leaving activities at the Ethernet port and then selectively delivering the multicast streams

Technical specifications

External Interfaces

- 8-port universal NG-PON interfaces, via pluggable N1, N2, E1, E2 optics, allowing 29dB, 31dB, 33dB resp. 35 dB optical loss budget, based on:

- ITU-T: G.9807.1: 10G symmetrical and asymmetrical PON (XGS-PON)

- ITU-T G.989.1: NG-PON2 service requirements

- ITU-T G.989.2: NG-PON2 Physical Media Dependent (PMD) layer

- ITU-T G.989.3: NG-PON2 Transmission Convergence (TC) layer

- ITU-T G.988: GPON ONT Management and Control Interface (OMCI)

- Support for:

- Advanced Encryption Standard (AES)

- Forward Error Correction (FEC)

- Dynamic Bandwidth Allocation (DBA)

- Configurable Delay Tolerance

Forwarding

- Bridged Encapsulation Ethernet Packet formats (IEEE 802.1d/p/q): Reception of any combination of untagged/priority/single-tagged packets; in addition to the previous list, dual-, triple-, quadruple-, etc. tagged packets can be received for 1:1 VLAN models

- Packet processing: Port-based default VLAN for untagged/priority-tagged (if applicable) packets, port- and protocol-based default VLAN for untagged/priority-tagged packets of the IP over Ethernet (IPoE) protocols, port- and protocol based default VLAN for untagged/priority-tagged packets of the Point-to-Point Protocol over Ethernet (PPPoE) protocols, priority bit remarking and mapping table for tagged/priority-tagged packets

- Multi-VLAN support at the user-network interface (UNI)

- L2 Forwarding – CC mode: Transparently pass all encapsulations (e.g., PPPoE and IPoE), protocol filter

- L2 Forwarding – RB mode: Protocol filter (set of Ethertypes) for upstream traffic in VLANs (PPPoE and IPoE), Ethernet packet types (Ethernet II Encapsulation on Ethernet and LLC/SNAP on Ethernet)

- L2 Forwarding: VLAN stacking (S-VLAN CC and S-VLAN/C-VLAN CC), protocol-aware VLAN CC

- L2 Forwarding user access protocols: Address Resolution Protocol (ARP) (RFC 826, enabling/disabling broadcast), Dynamic Host Configuration Protocol (DHCP) option 82 insertion, PPPoE relay tag, multicast services

- Malicious MAC-move protection

- Active/Active load sharing for up to 4 x 10Gb/s bidirectional aggregate

- QoS, CAC profile, association of QoS profiles to bridge ports, association of QoS profiles to VLAN ports

- Multicast, high-performance IGMP processing, IGMP proxy, immediate leave

- IP address anti-spoofing for user data packets/ARP/IGMP/DHCP

- Forwarded features internally implemented in a distributed manner between the line card and the ONUs where the provisioning and surveillance interface between the two is assured via standard OMC

Standard compliance

Environmental

- ETS 300 019-1-1 storage – Class 1.1 (weather-protected, partly temperature-controlled locations)

- ETS 300 019-1-2 transport – Class 2.3 (packed, public transportation)

- ETS 300 019-1-3 stationary use – Class 3.1E (temperature-controlled locations), when used in fully populated ISAM FX racks (with more than one shelf)

- ETS 300 019-1-3 stationary use – Class 3.3 (not temperature-controlled locations), when used in stand-alone ISAM FX shelves

Protection

- ITU-T K.20/K.45

Safety

- IEC 60950-1/EN60950-1

- EMC and ESD: ETS 300 386 V1.3.3 (2005-04) for telecommunications network equipment

- European directive 2002/95/EC on the restriction of the use of certain hazardous substances (RoHS) shutdown

Operation conditions

- -5°C to 45°C (23°F to 113°F) inlet/ambient temperature range, when used in fully populated ISAM FX rack.

- Ready to support I-temp optics for -40°C to 65°C (-40°F to 149°F) inlet/ambient temperature range, when used in stand-alone ISAM FX shelves without dust filter

- Over-temperature sensors and over-temperature shutdown

- Humidity: 10% to 95% (non-condensing)

Dimensions

- Height: 405 mm (15.94 in)

- Depth: 225 mm (8.85 in)