



## Nokia ISAM FGLT-D

### 16-port GPON line card

Nokia ISAM FGLT-D is the latest Gigabit Passive Optical Networks (GPON) line termination card, designed for massive Gigabit fiber deployments. Based on the Quillion chipset, it combines high capacity, high density, low power consumption and low latency, enabling operators to more efficiently deliver residential and business services.

The Nokia ISAM FGLT-D is available in the ISAM FX access nodes and supports a total non-blocking capacity of up to 40Gb/s. Each PON interface delivers 2.5Gb/s in downstream and 1.2Gb/s in upstream, and has a reach of up to 60km (37.3miles), which makes this card ideal for cost-effective delivery of high-bandwidth IP services to residential and business users.

### Features

- 16-port GPON line card
- Non-blocking architecture
- Available in Nokia FX access nodes (FX-16/FX-8/FX-4)
- Quillion based for high capacity, low latency, and low power consumption
- SDN-ready
- Multi service
- Supports IPTV and RF video
- Built-in troubleshooting mechanisms
- Class C++ optics (34 dB link loss budget) C+ optics (32 dB link loss budget) and B+ optics (28 dB link loss budget)
- Pluggable optics
- Supports 1:128 split; support for 30/60 km (18.6/37.3 miles) reach
- Type B PON protection
- Wide range of ONT management options
- Industrially hardened



## Benefits

- Efficient delivery of premium Gigabit services
- Enhanced deployment flexibility for:
  - indoor/outdoor
  - various shelf sizes
  - various pluggable optic types.
- Operational efficiency with:
  - low power consumption
  - troubleshooting mechanisms
  - long reach and high split ratio to enable network consolidation.

## Technical specifications

### External interfaces:

- 16-port GPON interfaces, using pluggable B+, C+ or C++ optics, allowing 28dB, 32dB or 34dB optical loss budget, respectively, based on:
  - G.984.1 – GPON service requirements
  - G.984.2 – GPON physical media dependent (PMD) layer
  - G.984.2 – GPON PMD layer, Amendment 1
  - G.984.3 – GPON transmission convergence (GTC) layer; GPON Encapsulation Method (GEM) based
  - G.984.3 – GTC layer, Amendments 1 and 2
  - G.988 – GPON OMCI, Appendixes I and II
  - TR-156
- Support for:
  - Advanced Encryption Standard (AES)
  - Forward error correction (FEC)
  - Dynamic bandwidth allocation (DBA)
  - Configurable delay tolerance

### Forwarding

- Layer 2 forwarding – Generic:
  - Ethernet packet types include Ethernet II Encapsulation and logical link control/ Subnetwork Access Protocol (LLC/SNAP)

- Any combination of untagged/priority/single tagged packets, selective Internet Protocol over Ethernet/Point-to-Point Protocol over Ethernet (IPoE/PPPoE) filtering
- Virtual LAN (VLAN) assignment for untagged/priority tagged packets based on port and protocol default VLAN, multi-VLAN support at UNI
- Layer 2 forwarding – CC mode:
  - VLAN stacking (S-VLAN CC and S-VLAN/C-VLAN CC)
- Layer 2 forwarding – RB mode:
  - VLAN stacking (S-iBridge), selective broadcast
- Layer 3 multicast:
  - High-performance Internet Group Management Protocol (IGMP) processing
  - IGMP proxy
  - Immediate leave
  - Source-specific multicast/any-source multicast (SSM/ASM)
- Active-Active load sharing for up to 4 x 10Gb/s bidirectional aggregate

### Protocols

- Management using Simple Network Management Protocol (SNMP), command-line interface (CLI) and TL1
- Provisioning and surveillance interface between optical line terminal (OLT) and optical network terminal (ONT) is assured using standard OMCI
- User access protocols: Address Resolution Protocol (ARP), IEEE 802.1X authentication, Dynamic Host Configuration Protocol (DHCP) Option 82 insertion, PPPoE relay tag

### Quality of service (QoS)

- QoS classification based on L2/L3/L4 multifield classification
- Priority bit (re)marking
- Connection admission control (CAC) at various levels of aggregation
- Policing

- Flexible traffic manager combining tail drop/weighted random early detection (TD/WRED) buffer admission, strict priority/weighted fair queueing (SP/WFQ) scheduling and shaping at various levels
- In-field, upgradeable, fully programmable packet processing
- Advanced traffic management capabilities for service level agreement (SLA) execution

### Security

- Protection against malicious media access control (MAC) move
- Assignment of virtual MAC address
- Proxies to avoid downstream multicast/broadcast (ARP)
- IPv4/IPv6 address antispoofing for user data packets/ARP/IGMP/DHCP
- Access control list (ACL) based on L2/L3/L4 multifield classification
- Rate control of control packets

## Standards 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 (packet, public transportation)
- ETS 300 019-1-3 stationary use – Class 3.1E (temperature-controlled locations), when used in configuration with up to 2 FX or 2 FD shelves

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- ETS 300 019-1-3 stationary use – Class 3.3 (not temperature-controlled locations), when used in standalone ISAM FX or ISAM FD shelf

### Protection

- ITU-T K.20/K.45

### Safety

- IEC/UL 62368-1
- EMC and ESD: ETSI EN 300 386 V1.6.1 (2012-09) for telecommunication network equipment
- EU Directive 2011/65/EU (RoHS2 Directive) as amended (including 2015/863/EU)
- EU Regulation 2006/1907/CE (REACH regulation)

### Operating environment

- Temperature, inlet/ambient:
  - -5°C to 45°C (23°F to 113°F), when used in configuration with up to 2 FX or 2 FD shelves
  - -40°C to 65°C (-40°F to 149°F), when used in standalone ISAM FX or FD shelf
- Over-temperature sensors and shutdown
- Humidity: 10% to 95% (non-condensing)

### Dimensions

- Height: 405mm (15.94in)
- Width
  - Top: 225mm (8.85in)
  - Bottom: 205mm (8.07in)
- Board-to-board pitch: 25mm (0.98in)ITU-T K.20 (Enhanced)