

Nokia Quad 10G Encryption Transponder

Data confidentiality and security are key requirements for any enterprise in industry verticals including finance, transportation, utilities, healthcare, public safety, defense and government. The Nokia Quad 10G encryption transponder belonging to the Nokia 1830 Photonic Service Switch (PSS) portfolio adds physical (Layer 1) encryption to optical data links, providing end-to-end protection against loss of confidentiality along the fiber. The module supports four independent multi-rate 10G channels with diverse types of data interfaces including 8G/10G Fibre Channel (FC), 10 Gigabit Ethernet (10GE), Optical Transport Unit 2 (OTU2), and 5G DDR InfiniBand. Software licenses are available for encryption of ports.

A 10G pluggable line port of the encryption transponder supports up to 88 DWDM channels when configured with a tunable XFP. The module provides Advanced Encryption Standard (AES) 256 encryption for up to four separate 8G/10G signals, and adds this functionality in the same footprint used for optical transponder functions without reducing shelf or system capacity. It is a key component of the 1830 PSS portfolio, enabling secure transport in support of mission-critical operations.

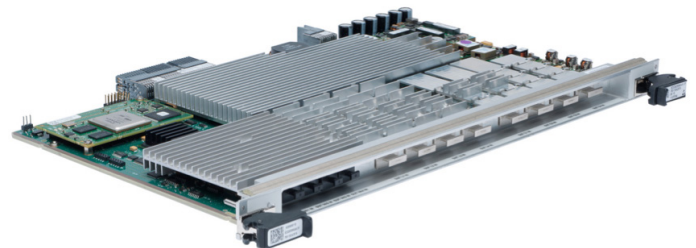
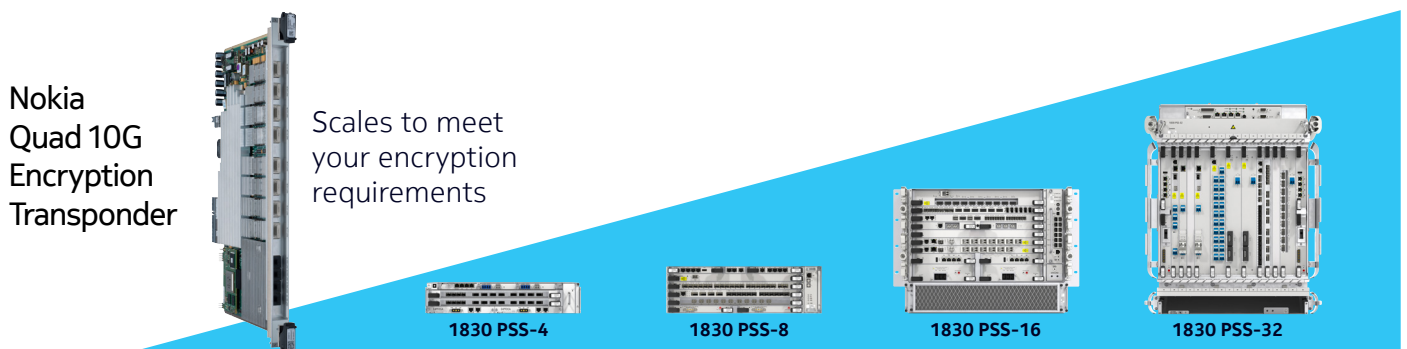


Figure 1. Nokia Quad 10G Encryption Transponder (11QPEN4) adds encryption to the 1830 PSS portfolio



Key features

- Delivers low latency, 10G wire-speed encryption
- AES-256 block cipher with counter mode encryption
- Encryption configurable per port for up to four 8G/10G signals
- Protocol-agnostic encryption supports multiple services (Fibre Channel, Ethernet, OTU2, InfiniBand)
- Adds encryption to the 1830 PSS
- Single-slot, full-height card
- Supports 1830 PSS-4, 1830 PSS-8, 1830 PSS-16, 1830 PSS-16II and 1830 PSS-32 chassis
- Offers four independent multi-rate 10G channels
 - 4 x XFP (tunable or B&W) line
 - 4 x XFP (B&W) client
 - 4 x variable optical attenuator (VOA) SFPs
- Provides optical intrusion detection with four Wavelength Tracker™-encoded SFP cages
- Single-slot, full-height card
- Field Programmable Gate Array (FPGA) per client/line path allows independent re-imaging of channels
- Offers 1+1 client and line protection

Key benefits

Versatility

- Transparently encrypts all client protocols
 - Encryption of payload and headers
 - Client protocol-agnostic (encrypts Fibre Channel, Ethernet, InfiniBand)
- Flexible encryption per client/line (on/off)
- Ideal for data center interconnection with low latency FEC disabled
- Provides encrypted transmission for Gigabit Ethernet, Fibre Channel 100/200/400 services when cascaded with the 11G Dual Port Pluggable Multirate ADM Transponder (11DPM12)

Reliability

- Delivers low-latency encrypted service, configurable per port
 - Provides certified cryptographic algorithms at DWDM line rate speeds (Layer 1)
 - Enables less than <15 µs latency end to end (less latency compared with encryption at higher layers)

Efficiency

- Provides encryption at aggregate rates
 - Results in faster and streamlined operation
 - Simplified management (one service to manage compared to thousands)

Robustness

- Provides AES-256 encryption
- Enables the Nokia Key Management Tool (KMT) to discover and recognize 100G cards when used with 11QPEN4 in cascaded configuration for alarm processing, circuit builder support, and display in User and Admin mode
- FPGA per client/line path allows independent re-imaging of channels
- Can encrypt OTU2 client signal
 - Useful for providing cascaded solution with low-speed clients

Technical specifications

Optical protection

- Y-cable protection is supported on the 11QPEN4 encryption transponder
- Up to two protection groups can be created on the 11QPEN4 encryption transponder (protection group consists of two line ports and one client port)
- Each protection group operates independently of the other group

End-to-end latency

Including encryption is $<10 \mu\text{s}$ (with line forward error correction (FEC) off for lowest latency)

Security certifications

- FIPS 140-2, Level 2*
- Common Criteria EAL2+*
- Common Criteria EAL3+/ANSSI QS (in progress)
- Defense Information Systems Agency (DISA) approved
- Interop certification (IOC) from the JITC

* FIPS and CC EAL2+ certification for PSS-4, PSS-16 and PSS-32

Other certifications

- IBM Geographically Dispersed Parallel Sysplex™ (IBM GDPS®)
- EMC storage arrays
- Brocade Fibre Channel/SAN switches

Power dissipation

- 150 watts max

Security features

- NIST-certified AES-256 encryption solution for data encryption
- RADIUS support
- SNMPv3 support

Nokia Key Management Tool

- Centralized key management
- Access control to partition the network into security areas for multiple enterprise customers
- End users control key security parameters on assigned circuits
- Network-wide view of security alarm and encryption services

Figure 2. Nokia Quad 10G Encryption Transponder (11QPEN4) in support of encryption between sites

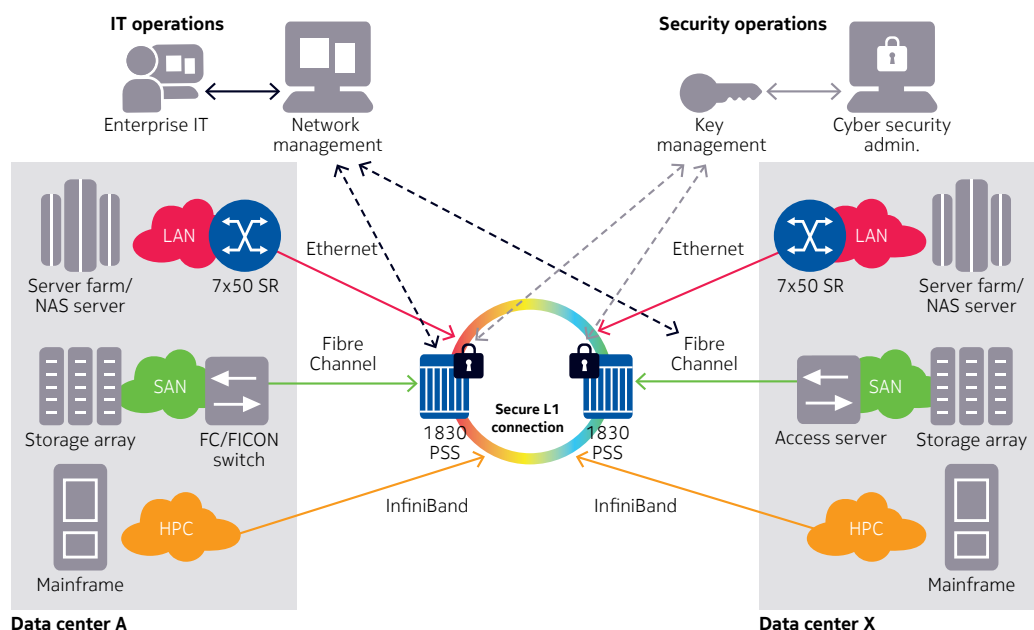


Table 1. Nokia Quad 10G Encryption Transponder (11QPEN4) client ports per line and card

	Client port	Per WDM line	Per card	Description
LAN	10GE	1	4	10GBASE-SR XFP – Client XFP short reach, 850 nm, 10GE
SAN	8G FC	1	4	X8FCLC-L XFP – XFP I-64.1/8.5GFCIT (8G FC XFP SM) X8FCSN-I XFP – 8G FC XFPMM
	10G FC	1	4	XI-64.1 XFP – 10G FC – OTM-0.2/e/f (P1i1-2D1), SMF 1310 nm 10 km
HPC	5G DDR IB	1	4	IB SDR/DDR -5/+85

Table 2. Nokia Quad 10G Encryption Transponder (11QPEN4) ordering information

Description	APN
Encryption card SAN ENC Kit (11QPEN4 + SWL for 1-port)	8DG61458AA
10GBASE-SR XFP Client XFP short reach, 850 nm, 10GE	1AB375380001
X8FCLC-L XFP XFP I-64.1/8.5GFC IT (8G FC XFP SM)	1AB375380009
X8FCSN-I XFP 8G FC XFPMM	1AB375380011
XI-64.1 XFP 10G FC – OTM-0.2/e/f (P1i1-2D1), SMF 1310 nm, 10 km	1AB375380007
XL-64TU XFP DWDM Tunable CT (50 GHz 10G XFP)	1AB375650047
eVOA_P SFP Fast electronic Variable Optical Attenuator (Fast eVOA)	1AB396080001

Table 3. Nokia Quad 10G Encryption Transponder (11QPEN4) chassis compatibility

Product	# of encryption cards/shelf	Slot position
1830 PSS-4	1	7
1830 PSS-8	4	2-5
1830 PSS-16	3	7-9
1830 PSS-16II	8	3-10
1830 PSS-32	16	2-17

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Product code: PR1602017987EN (March)

Figure 3. 1830 PSS – Detail with Nokia Quad 10G Encryption Transponder (11QPEN4) schematics

