

R&S®SITLine ETH-XL

ETHERNET ENCRYPTION DEVICE

Specifications

R&S®SITLine ETH-XL is an Ethernet encryption device that secures the confidentiality and integrity of data that is exchanged over Ethernet services. Depending on the model, the high-quality, cutting-edge encryption uses the entire line bandwidth of up to two independent 100 Gbit/s lines in full-duplex mode, regardless of packet size being transferred. In combination with the low latency, the device is integrated into the data network without any significant compromise to the network functionalities and performance.

Models

R&S®SITLine ETH-XL, 100G	port line speed	100 Gbit/s
	number of lines	1
	number of data ports	2
R&S®SITLine ETH-XL, 2 × 100G	port line speed	100 Gbit/s
	number of lines	2
	number of data ports	4
R&S®SITLine ETH-XL, 4 × 10G	port line speed	≤ 10 Gbit/s
	number of lines	4
	number of data ports	8
R&S®SITLine ETH-XL, 8 × 10G	port line speed	≤ 10 Gbit/s
	number of lines	8
	number of data ports	16

Network

Data ports		
Ports	data lines, 2 ports per line: A private/unencrypted, X1 public/encrypted	
	R&S®SITLine ETH-XL, 100G	1 port pair
	R&S®SITLine ETH-XL, 2 × 100G	2 port pairs
	R&S®SITLine ETH-XL, 4 × 10G	4 port pairs
	R&S®SITLine ETH-XL, 8 × 10G	8 port pairs
Data rates	line rate	100 Gbit/s, full duplex per QSFP28 port pair 10 Gbit/s, full duplex per SFP+ port pair 1 Gbit/s, full duplex per SFP port pair
Frame type	Ethernet (IEEE frame, DIX Ethernet II)	IEEE 802.3, Ethernet II
Ethernet MTU	IEEE frame	1518 byte/1522 byte
	DIX Ethernet II	16 383 byte
Media types	transceiver QSFP28	100GBASE-SR4 100GBASE-LR4 100GBASE-IR4 additional types on request
	transceiver SFP+	10GBASE-SR 10GBASE-LR additional types on request
	transceiver SFP	1000BASE-SX 1000BASE-LX 10/100/1000BASE-T additional types on request

Specifications | Version 03.00

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Make ideas real



FEC support		yes
VLAN support	VLAN, Q in Q	- IEEE 802.1Q - IEEE 802.1ad - IEEE 802.1ah
WAN services		
Port based	in line with metro Ethernet forum (MEF)	EPL, EPLAN, dark fiber
VLAN based	in line with MEF	EVPL, EVPLAN, dark fiber
Frame processing		
Architecture		FPGA based cut through
Latency	frame size	
	64 byte	max. 3 µs
	at 100 Gbit/s, 136 M frames/s	max. 3 µs
	at 10 Gbit/s, 14 M frames/s	max. 4 µs
	at 1 Gbit/s 1.4 M frames/s	max. 4.4 µs
	1518 byte	
	at 100 Gbit/s, 8 M frames/s	max. 3 µs
	at 10 Gbit/s, 800 k frames/s	max. 9.5 µs
	at 1 Gbit/s, 80 k frames/s	max. 17 µs
	9198 byte	
	at 100 Gbit/s, 1.4 M frames /s	max. 4 µs
	at 10 Gbit/s, 135 k frames /s	max. 36 µs
	at 1 Gbit/s, 14 k frames /s	max. 86 µs
Frame filter	configurable controlled bypass	- IEEE layer 2 control protocols - Cisco layer 2 control protocols - precision time protocol

Cryptography and security

Operational mode		
Standard	full Ethernet payload including ether type (ET) data field, encrypted	for all network services: - point-to-point (P2P)/EPL/EVPL - point-to-multipoint (P2MP) - multipoint-to-multipoint (MP2MP)/EPLAN/EVPLAN
Ethernet tunnel	new Ethernet frame, full original frame, encrypted	only for P2P services: - P2P/EPL/EVPL - P2MP
Secured connections		
Number of secure connections		up to 1000 session keys at the same time
Connection establishment		automatic
Key assignment	configurable	port or first VLAN tag
Encryption offset	configurable	up to 3 VLAN tags
Symmetric cryptography		
Algorithm		AES
Key length		256 bit
Mode		GCM
Integrity protection	configurable	0 byte (off), 8 byte, 12 byte, 16 byte
Replay protection	configurable	- replay protection per port/VLAN and per service (PCP value) - replay window of size 8
Key agreement		
Protocol		authenticated Diffie-Hellman ECKAS-DH
Authentication		ECGDSA
Key lifetime		
Main key	automatic key renewal without interrupting the connection	10 s to 65 535 s, standard: 36 000 s
Session key	automatic key renewal without interrupting the connection	1 s to 32 767 s, standard: 180 s
Authentication/signatures		
Device certificate		X.509
	certificate storage	secure on smart card
	certificate change	- online, without interruption - offline/manually, with interruption

Asymmetric cryptography	ANSI X9.62, ECDSA/ECGDSA key length	ECC • 384 bit ECC, for authenticating security connections to partner devices • 512 bit ECC (brainpool), for authenticating TLS connections to the management server
	hash algorithm	• SHA-384, for authenticating security connections to partner devices • SHA-512, for authenticating TLS connections to the management server

Device management

Management port		
Port		1 × SFP port MGMT, for out-of-band management
Media types		• 1000BASE-SX • 10/100/1000BASE-T
AUX port		
Port		1 × RJ-45 port AUX, constructional preparation for QKD
Media types		10/100/1000BASE-T
Remote/online management		
VLAN support		IEEE 802.1Q
Supported IP versions		• IPv4, IPv6 • static IP address
Access	online out-of-band	MGMT port
	online in-band	one of the A ports
	remote in-band via primary device	one of the X ports
Local management		
Port		1 × RJ-45 port CONSOLE for: • SSH • HTTP, for log export and local firmware update
Media types		10/100/1000BASE-T
Card reader		
Format	contact smart card	ID-1: ISO 7816-2
Security management		
Managing and monitoring all security features		
Protocol		proprietary
Management station		R&S®Trusted Objects Manager NE
Security anchor		smart card, secure configuration memory
Network management		
Managing and monitoring network parameters		
Protocol	SNMP	v2c, v3
Supported management information base (MIB)	standard	• SNMP MIB (RFC 3418) • interfaces group MIB (RFC 2863) • Ethernet-like interfaces MIB (RFC 3635) • MAU MIB (RFC 4836)
	company-specific	R&S®SITLine-II MIB
Connections to the security management		
Management connection	protocol	TLS 1.2
Remote management connection	protocol	TLS 1.2 and management transport channel, secured connection between primary and secondary device
Additional functions		
Device security	secure boot	only firmware signed by the manufacturer tamper security module
	protection against manipulation, tamper resistance	
	clear button	button on the front of the device, resets it to the delivery state
Device monitoring	hardware monitoring	built-in test during booting and operation, temperature, fan operation

Approvals and certificates

Electromagnetic compatibility	EU: in line with EMC Directive 2014/30/EU	applied harmonized standards: • EN 55032 (class A) • EN 55035 • EN61000-3-2 • EN61000-3-3
Electrical safety	EU: in line with Low Voltage Directive 2014/35/EU	applied harmonized standard: EN 62368-1
Security approvals	national, German security classification	Verschlussache – nur für den Dienstgebrauch (VS-NfD)
	NATO	NATO RESTRICTED (NR)
	EU	RESTREINT UE/EU RESTRICTED
EU legislation	EU: in line with Data Act – Regulation (EU) 2023/2854	for details, see user documentation

General data

Power supply		
AC power supply units		2 modules, hot-swappable
Input voltage	AC	110 V to 240 V, 50 Hz/60 Hz
Power consumption	on the ac power socket	
	R&S®SITLine ETH-XL, 100G	max. 100 W
	R&S®SITLine ETH-XL, 2 × 100G	max. 150 W
	R&S®SITLine ETH-XL, 4 × 10G	max. 110 W
	R&S®SITLine ETH-XL, 8 × 10G	max. 170 W
Battery	type	ER14505, lithium
	voltage	3.6 V
	durability	5 years, replaceable during operation
Climatic and environmental conditions		
Ambient temperature	storage temperature	–20 °C to +70 °C
	operating temperature	+5 °C to +40 °C
Humidity	without condensation	up to 90 % relative
Air pressure	transport	min. 566 hPa, corresponds to approx. 4500 m above sea level
	operation	min. 795 hPa, corresponds to approx. 2000 m above sea level
Heat loss	maximum	
	R&S®SITLine ETH-XL, 100G	approx. 342 British thermal units (BTU)/h
	R&S®SITLine ETH-XL, 2 × 100G	approx. 512 BTU/h
	R&S®SITLine ETH-XL, 4 × 10G	approx. 380 BTU/h
	R&S®SITLine ETH-XL, 8 × 10G	approx. 580 BTU/h
Ventilation	air flow	from front to back, cold aisle compatible
	fans	2 cartridges, replaceable during operation
Reliability		
MTBF, device without additional components	+25 °C, in line with SN 29500	
	R&S®SITLine ETH-XL, 100G	78 000 h
	R&S®SITLine ETH-XL, 2 × 100G	68 000 h
	R&S®SITLine ETH-XL, 4 × 10G	85 000 h
	R&S®SITLine ETH-XL, 8 × 10G	79 000 h
Installation		
Dimensions	rack	19", 1 RU
	W × H × D	435 mm × 44 mm × 540 mm (17.13 in × 1.73 in × 21.26 in)
Mounting depth	mounting brackets for the rack in two sizes	600 mm to 820 mm
	maximum distance of the mounting rails	360 mm to 600 mm (optional)
Weight	R&S®SITLine ETH-XL, 100G	9.7 kg (21.38 lb)
	R&S®SITLine ETH-XL, 2 × 100G	10.0 kg (22.05 lb)
	R&S®SITLine ETH-XL, 4 × 10G	8.7 kg (19.18 lb)
	R&S®SITLine ETH-XL, 8 × 10G	9.5 kg (20.94 lb)

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Certified Quality Management

ISO 9001

Certified Information Security Management

ISO 27001

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