# R&S®SITLINE ETH-L
ETHERNET ENCRYPTOR

Specifications

R&S®SITLine ETH-L is an Ethernet encryption device that secures the confidentiality and integrity of data that is exchanged over Ethernet services. Depending on the product variant, the high-quality, cutting-edge encryption uses the entire line bandwidth of up to 4 independent 10-Gbit/s or 1-Gbit/s lines in full-duplex mode regardless of the package 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.

General data

Installation		
Form factor	Rack	19", 1 RU
	W x H x D	435 mm x 44 mm x 505 mm
Mounting	Mounting brackets for the rack in two sizes, max. distance of the mounting rails	Mounting depth up to 580 mm, mounting depth up to 800 mm
Weight		8.7 kg
Power supply		
AC power supply units		2 modules, replaceable during operation
Input voltage		110 – 240 V AC, 50/60 Hz
Power consumption	On the AC power socket	Max. 130 VA
Battery	Type	ER14505, lithium
	Voltage	3.6 V
	Durability	5 years, replaceable during operation
Climatic and environmental conditions		
Ambient temperature	Storage	-20 °C to +70 °C
	Operating temperature	+5 °C to +50 °C
Humidity	Without condensation	Up to 90 % relative
Air pressure	Transport	Min. 566 hPa (corresponds to approx. 4,500 m above sea level)
	Operation	Min. 795 hPa (corresponds to approx. 2,000 m above sea level)
Heat loss	Maximum	Approx. 445 BTU/h
Ventilation	Air flow	From front to back (cold aisle compatible)
	Fans	2 cartridges, replaceable during operation
Reliability		
MTBF	In accordance with SN 29500 at 20 °C	98,000 h
Device without additional components	In accordance with SN 29500 at 45 °C	51,000 h
	In accordance with SN 29500 at 50 °C	43,500 h
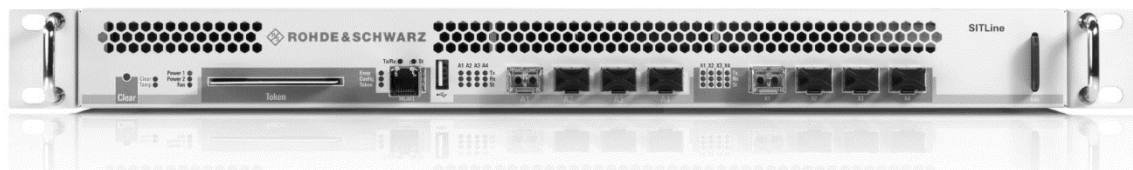
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Network

Data ports		
Number of ports	Data lines (2 ports per line)	8 SFP/SFP+ ports − "A1" ... "A4" private/unencrypted − "X1" ... "X4" public/encrypted
Data rates	Line rate	10 Gbit/s or from 10 Mbit/s to 1 Gbit/s
Frame type	Ethernet (IEEE frame, DIX Ethernet II)	IEEE802.3, Ethernet II
Ethernet MTU	IEEE frame	1,518/1,522 bytes
	DIX Ethernet II	9,216 bytes
Media types	10 Gbit/s	− 10GBASE-SR − 10GBASE-LR
	1 Gbit/s	− 1000BASE-SX − 1000BASE-LX − 10/100/1000BASE-T
VLAN support	VLAN, Q in Q	802.1Q, 802.1ad, 802.1ah
WAN services		
Port-based	In accordance with MEF	EPL, EP-LAN, dark fiber
VLAN-based	In accordance with MEF	EVPL, EVP-LAN
Frame processing		
Transfer mode		Store and forward
Maximum throughput on the X port for 64-bytes frames	Unencrypted	For 1 Gbit/s 1,488,095 frames/s
		For 10 Gbit/s 14,880,952 frames/s
	Encrypted with security header	For 1 Gbit/s 1,329,787 frames/s
		For 10 Gbit/s 13,297,872 frames/s
	Encrypted with security header and an integrity check sum of 8 bytes	For 1 Gbit/s 1,225,490 frames/s
		For 10 Gbit/s 12,254,901 frames/s
Latency	Frame size	Max. Line rate	
	64 bytes	1 Gbit/s	6.9 µs
		10 Gbit/s	3.5 µs
	256 bytes	1 Gbit/s	7.6 µs
		10 Gbit/s	4.1 µs
	512 bytes	1 Gbit/s	23.9 µs
		10 Gbit/s	4.8 µs
	1,518 bytes	1 Gbit/s	17.9 µs
		10 Gbit/s	7.7 µs
	9,198 bytes	1 Gbit/s	95.7 µs
		10 Gbit/s	30 µs
Frame filter	Configurable controlled bypass	IEEE Layer 2 Control Protocols Cisco Layer 2 Control Protocols Precision Time Protocol

Device management

Management ports		
Number of ports		1 SFP port ("MGMT") for − Local management − Out-of-band management
Media types		− 1000BASE-SX − 10/100/1000BASE-T
Remote/ Online management		
VLAN support		IEEE 802.1Q
Supported IP versions		IPv4, IPv6
		Static IP address
Access	Out-of-band	Local management port ("MGMT")
	In-band	Red data ports ("A1"… "A4")
	Remote management via primary device	Black data ports ("X1"… "X4")
Local management		
Protocol		SSH for R&S®SITLine ETH NG console via SSH client, http for log export and firmware update
Access		Local management port ("MGMT")
Card reader		
Format	Contact smart card	ID-1 (ISO 7816-2)

Security management		
Managing and monitoring all security functions		
Protocol		Proprietary
Management station		R&S®Trusted Objects Manager
Security anchor		Smart card, secure configuration memory
Network management		
Managing and monitoring network parameters		
Protocol	SNMP	v2c, v3
Supported MIBs	Standard	SNMP MIB (RFC 3418), Interfaces Group MIB (RFC 2863), Ethernet-like Interfaces MIB (RFC 3635), MAU MIB (RFC 4836)
	Company-specific	SITLine-II MIB

Cryptography and security

Operational mode		
Standard	Full Ethernet payload including ET field encrypted	For all network services (P2P, P2MP, MP2MP)
Ethernet tunnel	New Ethernet frame, full original frame encrypted	Only for point-to-point services (P2P, P2MP)
Secured connections		
Number		Up to 4,000 session keys at the same time (1,000 per port)
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 bits
Mode		GCM
Integrity protection	Configurable (on/off/length of integrity check sum)	0 bytes (off), 8 bytes, 12 bytes, 16 bytes
Replay protection	Configurable (on/off)	− Replay protection per port/VLAN and per service class (PCP value) − Replay window of size 8
Key agreement		
Protocol		Authenticated Diffie-Hellman ECKAS-DH
Authentication		ECGDSA
Key lifetime		
Master key	Automatic key renewal without interrupting the connection	10 – 65,535 s (standard 36,000 s)
Session key	Automatic key renewal without interrupting the connection	1 – 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		ECC (ANSI X9.62, ECDSA/ECGDSA)
	Key length	− 384 bits ECC for authenticating security connections to partner devices − 512 bits ECC (brainpool) for authenticating TLS connections to the SMS
	Hash algorithm	− SHA-384 for authenticating security connections to partner devices − SHA-512 for authenticating TLS connections to the SMS

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
	Protection against manipulation (tamper resistance)	Tamper event prevents regular boot; emergency boot only to detamper the device
	"Clear"	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

Device variants

R&S® SITLine ETH-L 10G	Port line speed	10 Gbit/s
	Number of lines per device	1
R&S® SITLine ETH-L 40G	Port line speed	10 Gbit/s
	Number of lines per device	4
R&S® SITLine ETH-L 4G	Port line speed	10 Mbit/s to 1 Gbit/s
	Number of lines per device	4

Approvals and certificates

Safety		LVD 2014/35/EU: EN 62368-1:2014+AC:2015
EMV		EMCD 2014/30/EU: EN 55032:2012+AC:2013 (Class A), EN 55024:2010+A1:2015, EN 61000-3-2:2014 (Class A), EN 61000-3-3:2013
Security approvals	National	VS – NUR FÜR DEN DIENSTGEBRAUCH
	NATO	NATO RESTRICTED (NR)
	EU	RESTREINT UE/EU RESTRICTED (in approval)

Certified Quality Management
ISO 9001