

Nokia 1830 PSS-4, PSS-8, PSS-16II and PSS-32 Platforms

The 1830 Photonic Service Switch (PSS) portfolio consists of platforms optimized for varying optical network deployment environments ranging from interconnecting data centers to efficiently scaling large metro, regional and long-haul multi-layer, multiservice optical networks. Each platform leverages common software, hardware, management and control to offer seamless operations across the portfolio.

The 1830 PSS-4, PSS-8, PSS-16II and PSS-32 packet optical platforms support multiple transport network applications including: multiservice metro transport and aggregation, optical core/long-haul deployments and photonic switching configurations supporting colorless, directionless, contentionless with Flexgrid (CDC-F) wavelength routing. The platforms support next-generation dense wavelength division multiplexing (DWDM) multiservice transport from access to core and help optical network operators build agile and scalable networks that can accelerate the delivery of mobile, video, business, wavelength, Ethernet, data center interconnect (DCI) and cloud services.

An efficient evolution to scalable 100G services deployment is made possible with support for 100G to 500G transport wavelengths optimized for capacity and distance, industry-leading service port densities including 100G client interfaces, multi-layer switching agility and intelligence to dynamically reconfigure network resources, and compact and low-power platforms for maximum network operational efficiency. These capabilities enable continued revenue streams as customers demand more bandwidth and enterprises move towards 100G connectivity between their routers and data centers.



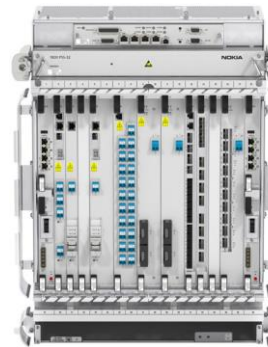
Nokia 1830 PSS-4



Nokia 1830 PSS-8



Nokia 1830 PSS-16II



Nokia 1830 PSS-32

Benefits

- Significantly and simultaneously scales network capacity, reach and density, making feasible the mass delivery of sub-10G, 10G, 40G and 100G services
- Extremely efficient DWDM transport wavelengths:
 - Flexible, rate-adaptive 100G to 500G coherent DWDM lines
 - Optimizes transport wavelength spectral efficiency for both capacity and distance, maximizing achievable fiber bandwidth without compromising wavelength availability
 - 200G wavelength distances of 2,000 km, supporting an evolution from 100G to 200G DWDM long haul
 - 100G wavelength distances of 3,000 km to 7,500 km, supporting ultra-long without costly regeneration
 - The first two-carrier 500G solution addressing both metro and regional distances providing a combination of leading spectral density
- Optimizes transport wavelength spectral efficiency for both capacity and distance, maximizing achievable fiber bandwidth without compromising wavelength availability
- Eliminates the need to regenerate at landing sites by simplifying the interconnection of sub-sea and terrestrial systems
- Delivers reliable, high-density, environmentally friendly multiservice transport:
 - Redundant control, power and timing for supporting high-availability networks
 - Multiservice packet/OTN switching
 - Large-scale 1G to 100G services transport
 - High-capacity, slot-to-slot interconnectivity, supporting “pay as you grow” packet/OTN networking or mate-to-mate interface card protection
 - High-density, small-footprint platforms with low power consumption
- Efficient and reliable multi-layer networking:
 - Efficient bandwidth management capabilities at the 100G and sub-100G levels
 - Carrier Ethernet and Multiprotocol Label Switching – Transport Profile (MPLS-TP) services and networking
 - Wavelength routing featuring colorless, directionless, contentionless with Flexgrid (CDC-F) add/drop
 - Ultra-Wideband C+L band CDC-F Wavelength Routing to maximize fiber capacity and wavelength agility
 - Fixed optical add/drop multiplexing (OADM) and highly integrated single-slot integrated reconfigurable optical add/drop multiplexer (iROADM) capability
 - IP/optical integration via Generalized Multiprotocol Label Switching (GMPLS) user-network interface (UNI)
 - Support for ITU-T G.8262 SyncE for frequency synchronization distribution and IEEE 1588v2 packet-based time/phase synchronization distribution
 - Advanced wavelength frequency and high-speed phase recovery capabilities enable 50-ms protection.
 - Ultra-fast wavelength multi-layer protection and restoration

Technologies

- Nokia designed PSE-2 Super Coherent (PSE-2s) electro-optics:
 - Multiple modulation formats to support maximum wavelength scale over various geographic distances and qualities of fiber
 - 2 flexible-rate DWDM coherent interfaces with aggregate payload capacity ranging from 100G to 500G
 - Next-generation, latency-adjustable, soft decision forward error correction (SD-FEC)
 - Adaptable to a wide range of fiber impairments for operation over extreme distances and challenging fiber environments
 - Spectrally efficient 400G single-carrier wavelength
- Integrated Wavelength Tracker™ encoding supporting unique and powerful wavelength operations, administration and maintenance (OAM)
- OTN switching:
 - Card-based and multi-card distributed switching
 - Seamless single network element management and control with 1830 PSS-36, PSS-64, and PSS-24x high-capacity switching platforms
- Wavelength routing
 - Colorless, directionless, contentionless add/drop with Flexgrid (CDC-F)
 - Massively scalable 20-port twin-wavelength selective switch (WSS) ROADM for maximum flexibility and degree support
 - iROADM for compact metro deployments
- Embedded multi-layer capability
 - Multi-layer multi-region networking (MRN) support including coordinated multi-layer protection and restoration
 - GMPLS UNI support for IP/optical integration
- Integrated packet transport
 - MEF CE 2.0, SR OS-based packet interface cards
 - IEEE 1588v2 time/phase synchronization support
 - Enables a fully managed, end-to-end packet solution with a common service, operations and management model across the optical and Ethernet/IP/MPLS portfolio
- Management
 - Nokia Network Service Platform (NSP), Network Functions Manager for Transport (NFM-T) module
- Transport software-defined networking (T-SDN)
 - Centralized, multi-layer control via Nokia Network Services Platform (NSP)
- Network design and planning
 - Integrated network planning tools for optimized multi-layer network planning/deployment
 - Commissioning and power balancing tool

Applications

- Optical and packet transport and aggregation for:
 - Business services
 - Mobile and broadband backhaul
 - Multicast video
 - Secure data center interconnect (DCI)
 - Cloud services
 - Multiservice transport

Product descriptions

1830 PSS-4

The 1830 PSS-4 extends the 1830 PSS portfolio to the customer premises. Its cost-effective small footprint, low power consumption and extended temperature operation design give it the deployment flexibility for many applications including:

- Cost-effective multiplexing of any bit rate services and transport over OTU1, OTU2 and OTU4
- Terminal, fixed optical add/drop multiplexer (FOADM) or inline amplifier (ILA) applications
- Cost-effective, high-capacity, highly secure, multiprotocol-capable, low latency and resilient optical DCI for large enterprises and managed service providers (MSPs), both for private and community clouds.

1830 PSS-8 and PSS-16II

The 1830 PSS-8 and PSS-16II pack extensive multi-layer packet optical transport features into metro-optimized physical form factors including support for outside plant extended temperature operation. OTN and packet service grooming is achieved by using a pay-as-you-grow distributed switching fabric that scales as service take-up rates increase. Their support for extensive multi-layer packet optical transport features together with their compact and low-power architecture design allow for maximum network operational efficiency and deployment flexibility and high-capacity transport in metro environments.

1830 PSS-32 and PSS-16II

The 1830 PSS-32 supports maximum levels of multi-layer packet optical transport feature scale and multifunction capabilities. It is ideally suited for:

- Multiple degree CDC-F wavelength routing and photonic switching
- Large-scale wavelength 100G to 500G transponder/muxponder transport
- Ultra-long-haul transport wavelength regeneration and amplification.

Related Nokia products

- 1830 Photonic Service Switch (PSS)-36, PSS-64 and PSS-24x packet/OTN switching devices
- Network Services Platform (NSP) Network Functions Manager for Transport (NFM-T)
- 1390 Network Planning Tool (NPT)
- Network Service Platform (NSP) IP/Optical SDN controller
- IP/Optical Integration with 7750 Service Router (SR) and 7950 Extensible Routing System (XRS)
- 7210 Service Access Service (SAS) Carrier Ethernet access
- 9500 Microwave Packet Radio (MPR) Carrier Ethernet access
- 7705 Service Access Router (SAR) multiservice access over packet

Technical specifications

Overview

Specifications	1830 PSS-4	1830 PSS-8	1830 PSS-16II	1830 PSS-32
Capacity and performance	240 Gb/s	1.6Tb/s	3.2 Tb/s	6.4 Tb/s
Interface card slots (full/half height)	2/4	4/8	8/16	16/32
Dimensions (Height/Width/Depth)	88 mm (3.46 in)/ 440 mm (17.32 in)/ 289.75 mm (11.41 in)	133 mm (5.2 in)/ 438.9 mm (17.2 in)/ 325 mm (12.7 in)	DC version: 354.8 mm (13.9 in)/ 440 mm (17.3 in)/ 325 mm (12.7 in) AC version: 399.25 mm (15.64 in)/ 440 mm (17.3 in)/ 325 mm (12.7 in)	622 mm (24.5 in)/ 483 mm (19 in)/ 300 mm (12 in)
Weight	3.318 kg (7.3 lb), 4.366 kg (9.6 lb) with complete shelf kit	7.2 kg (15.9 lb)	DC version: 10.55 kg (23.25 lb) AC version: 13.10 kg (28.87 lb)	15.77 kg (34.77 lb)
Packet/OTN fabric options	Card based	Distributed fabric	Distributed fabric	Card based
Controller card slots	1 unprotected	2 protected	2 protected	2 protected
Network timing	SyncE (ITU-T G.8261/ G.8262/G.8264/G.781), IEEE 1588v2	SyncE (ITU-T G.8261/ G.8262/G.8264/G.781), IEEE 1588v2	SyncE (ITU-T G.8261/ G.8262/G.8264/G.781), IEEE 1588v2	SyncE (ITU-T G.8261/ G.8262/G.8264/G.781), IEEE 1588v2
Power modules	Redundant power modules	Redundant power modules	Redundant power modules	Redundant power modules
Power options	-48V DC or +24V DC 110/220V AC Mixed AC & DC power supply configuration	48V DC, 110/220V AC with integrated AC power filter	DC version: 48V DC, 110/220V AC with external converter AC version: 48V DC, 110/220V AC	48V DC, 115/240 V AC with external converter
Power requirements	Max. 347 W (up to 125 W/slot), Typical: 220 W	Max. 1200 W (up to 240 W/slot), Typical: 520 W	Max. 2400 W (up to 240 W/slot) Typical: 1350 W	Typical: 400 W – 1270 W
Operating temperature	-40 °C to +65 °C (-40 °F to +149 °F) for outside plant deployments	-5 °C to +55 °C (23 °F to 131 °F) -40 °C to +65 °C (-40 °F to +149 °F) for outside plant deployments	-5 °C to +55 °C (23 °F to 131 °F)	0 °C to +50 °C (32 °F to 122 °F)
Humidity	CO environment: • 85% long term • 95% short term Outside environment: • 100% long term	5% to 95% non-condensing	5% to 95% non-condensing	5% to 95% non-condensing
Multi-shelf management	Up to 8 1830 PSS shelves	Up to 24 1830 PSS shelves	Up to 24 1830 PSS shelves per single NE, 120 shelves per cluster	Up to 24 1830 PSS shelves per single NE, 120 shelves per cluster

Interface cards

Transponder/Muxponder

Platform	Card ID	Card description	Half, full height	Notes
PSS-8, -16II, -32	D5X500, D5X500Q, D5X500L, D5X500 Subsea	500G Muxponder	2 full slots	Configurable 100G – 500G DWDM line with up to 5 x 100G clients <ul style="list-style-type: none"> • CFP4 and QSFP28 (D5X500Q) client options • C & L (D5X500L) band options • Subsea option (D5X500 Subsea)
All	12P120	12 x 10G Flexible Transponder/Client	full	Full-slot 6 x 10G transponder or 12 x 10G as programmable 10G ports
All	1UD200	1 x 100G/200G Line	full	Configurable 100G/200G line rate with distributed packet/OTN connectivity
All	20P200	20 x 10G Multiservice Client	full	High-density multiservice clients with distributed packet/OTN fabric
PSS-8,-16II,-32	S13X100R, S13X100E	100G Universal: transponder, muxponder, uplink, ADM	full	10G, 40G, and 100G clients: 100 GE/OTU4, 40GE/OTU3, 10GE, OTU2, OC-192/STM-64, CFP4, QSFP28/QSFP+, SFP+ <ul style="list-style-type: none"> • Low latency, 100G wire speed encryption (AES-256) (S13X100E)
All	11DPM12	11G Dual Port Multi-rate Transponder	full	<ul style="list-style-type: none"> • 2 x 10G XFP lines: OTU2 (CWDM, DWDM, B&W) • 12 x SFP clients: FE, GE, FC100/200/400, OC3/STM1 OC12/STM4 OC48/STM16, OTU1, SD-SDI, HD-SDI
All	11DPM8	8 x ANY Card	full	<ul style="list-style-type: none"> • 8 x SFP clients: OC-3/-12/STM-1/-4, OC-48/STM-16, 10/100 base T, GE • 2 x XFP lines: OTU2 (CWDM, DWDM, B&W)
All	11QPA4B	4 x Any 10G Transponder	full	<ul style="list-style-type: none"> • 4 x pluggable DWDM XFPs or CWDM XFPs • 10GE, OC-192/STM-64 (SONET/SDH), OTU2/OTM-0.2 [G.709] • FC800, FC1200 (ANSI INCITS 364-2003) • 5G DDR IB
PSS-4	11DPM4M	11G Dual Port Multi-rate Transponder	half	<ul style="list-style-type: none"> • 2 x XFP lines • 4 x SFP clients for FE, G1, OC3/STM1, OC12/STM4, OC48/STM16
PSS-4	11DPM4E	11G Dual Port Multi-rate Extension	half	<ul style="list-style-type: none"> • Backplane mated with 11DPM4M • 4 x SFP clients for FE, G1, OC3/STM1, OC12/STM4, OC48/STM16
PSS-4, 8, 16II	11QPA4B	4 x 10G Transponder	half	<ul style="list-style-type: none"> • 4 x 10G SFP+ (OTU2/2e) network ports • 4 x 10G SFP+ 10GE client ports
PSS-4, 8	8P20	10G Dual 8xAny Muxponder	half	<ul style="list-style-type: none"> • 2 x SFP+ lines • 8 x SFP clients for 1 GE, OC3/STM1, OC48/STM16
PSS-8, 16II, 32	S2AD200, S2AD200R, S2AD200H	200G Muxponder	half	<ul style="list-style-type: none"> • 1 x 100G QPSK/200G 16QAM line • 2 x QSFP28 clients for 100GE, OTU4 • Regional “R” and long Haul “H” variants

Note: Support for interface cards and related features depends on the software release. Please refer to release notes and user documentation for additional details. All supported cards may not be shown, modern cards with similar functionality may be shown in place of older cards.

Packet

Platform	Card ID	Card description	Half, full height	Notes
All	11OPE8	8 x 10G Carrier Ethernet Switching Muxponder	full	SR OS-enabled for fully managed, end-to-end packet solutions across Nokia Optical and IP/MPLS portfolios
All	11QCE12X	4 x 10G WDM, 12/22 x GE/FE Client Carrier Ethernet Switching Muxponder	full	<ul style="list-style-type: none"> SR OS-enabled for fully managed, end-to-end packet solutions across Nokia Optical and IP/MPLS portfolios Extended temperature operation
All	11QPE24	4 x 10G WDM, 24 x GE/FE Client Carrier Ethernet Switching Muxponder	2 full slots	<ul style="list-style-type: none"> SR OS-enabled for fully managed, end-to-end packet solutions across Nokia Optical and IP/MPLS portfolios Extended temperature operation
All	11DPE12A	11G Dual-Port GE Mux Transponder	full	12 pluggable client FE/GE interface and 2 CWDM/DWDM XFPs support OTU2e and 10GE LAN
PSS-8,-16II	1CE100, 12CE120, 12CE121	Carrier Ethernet Switch Cards <ul style="list-style-type: none"> 1 x 100GE (1CE100) 12 x 10GE, ODU2/2e/1e (12CE120) 12 x 10GE (12CE121) 	full	<ul style="list-style-type: none"> Up to 480 Gb/s switching capacity over a mix of Ethernet and/or OTN interfaces SR OS-enabled for fully managed, end-to-end packet solutions across Nokia Optical and IP/MPLS portfolios

Data center interconnect

Platform	Card ID	Card description	Half, full height	Notes
All	11QPEN4	4 x 10G Encrypted Transponder	full	<ul style="list-style-type: none"> 4 x XFP tunable line, 4 x XFP clients AES-256 encryption per line/client

Amplifiers

Platform	Card ID	Card description	Half, full height	Notes
PSS-16II, -32	RA2P-96	Long Haul – 2 Pump Raman, no mid-stage access	full	LH Coherent Raman 10 dB for SSMF; 14 dB for LEAF; 16 dB for TWRS
PSS-16II, -32	AAR-8A	Amplifier Array – 8 Amps	full	CDC-F and fixed grid
PSS-4, 8, 16II	AA2DONWB	40ch Bi-directional amplifier	half	<ul style="list-style-type: none"> BA: 18dB fixed Gain, 13~23dB adjustable, +16dBm Max. PA: 18dB fixed Gain, 13~23dB adjustable, +16dBm Max.
PSS-16II, -32	ASWG	Switched Gain EDFA Amplifier	full	Selectable gain control for optimized network performance: 7 dB - 22 dB, 13 dB - 29 dB
PSS-32	AWBING	Ultra-Wideband EDFA Ingress Amp	2 full slots	Switched gain high/low setting, integrated C & L band support
PSS-32	AWBEGR	Ultra-Wideband EDFA Egress Amp	2 full slots	Switched gain high/low setting, integrated C & L band support
PSS-32	AWBILA	Ultra-Wideband ILA 2	full slots	Switched gain high/low setting, integrated C & L band support

Wavelength routing

Platform	Card ID	Card description	Half, full height	Notes
PSS-16II, -32	WR20-TFM	1 x 20 Twin Flex WSS, with MPO connectors	2 full slots	Enables 20-degree node configurations. Standard 50 GHz wavelength spacing and Flexgrid with MPO connector
PSS-16II, -32	MCS8-16	Multicast switch 8-degree & 16 port	full	CDC-F add/drop of 100G clients Supports up to 8 optical degrees Multicast switch supporting 8-degrees and 16 ports
PSS-16II, -32	MSH-FSM	Mesh fiber shuffle for 8-degrees	2U passive module	Enables CDC-F architecture with one centralized fibering shelf Supports up to 8 optical degrees Connects the WR20-TFM and AAR-8A
All	OTDR	Optical Time Domain Reflectometry	full	Detects fiber cut and localization to within 10 m of the failure Enables automatic Raman amplifier turn-up via integrated "wizard"
All	MONOTDR	OTDR Monitoring	half	Enables OTDR monitoring on DWDM lines that don't have amplifiers with OTDR filters and angled polished connectors (APCs)
All	IROADMF	Integrated iROADM Short Span	full	Single degree for 2D to 4D ROADMs Short-span FGOAM ingress amplifier, suitable for spans of up to ~50 km
All	iROADMV	Integrated iROADM Long Span	full	Single degree for 2D to 4D ROADMs Long-span VGOAM ingress amplifier, suitable for spans of up to 100 km
PSS-16II,-32	WR8-88AF	8-degrees, 88 channels, FlexGrid	2 full slots	<ul style="list-style-type: none"> Supports up to 8 degrees. Integrated WaveTracker for automatic power adjustment & optical monitoring
PSS-16II, -32	WR20-TF	Twin 1x20 WSS Flexgrid	2 full slots	Enabling 20-degree node configurations; standard 50 GHz wavelength spacing and Flexgrid support
All	WTOCM-F	Flexgrid OCM card	half	OCM solution for Flexgrid support. Supports both standard fixed grid & Flexgrid Monitors input signals on all 4 ports via separate optical taps
PSS-8,-16II,-32	iROADM9R	1x9 Integrated ROADM card	full	<ul style="list-style-type: none"> Integrated ROADM, 1x9 WSS Supports an optical degree per card, including the amplifier and WSS Supports terminal, classic mux/ demux ROADM and C-F ROADM architectures
PSS-8	SFDC8	8ch SFD	half	8ch SFD (DWDM FOADM) for access/metro applications
PSS-16II, 32	iROADM20	1x20 integrated ROADM card	full	<ul style="list-style-type: none"> Integrated ROADM, 1x20 WSS Supports an optical degree per card, including amplifier and WSS Ideal for CDC-F applications 96 channel capable Integrated test signal

Other

Platform	Card ID	Card description	Half, full height	Notes
All	MVAC	Multiple Variable Attenuation Card (8 ports)	half	Inserts Wavelength Tracker OAM on alien optics transmission
All	OPSA	Optical Protection Switch Card	half	Provides 1+1 OCh, OMSP or OLP protection over DWDM lines
All	OPSB	Optical Protection Switch Card	half	Provides 1+1 protection with shelf diversity
All	OPS-Flex	Optical Protection Switch Card	half	Provides 1+1 protection for C-F and CDC-F configurations

Carrier Ethernet

Specifications	1830 PSS-4	1830 PSS-8	1830 PSS-16II	1830 PSS-32
Layer 2 switching compliant with IEEE 802.1ad PB	X	X	X	X
MEF services: E-Line, E-LAN, E-Tree, E-Access	X	X	X	X
IGMPv2 snooping	X	X	X	X
Sophisticated quality of service (QoS): classification, policing, queuing, scheduling, shaping	X	X	X	X
Ethernet OAM (IEEE 802.3ah, IEEE 802.1ag, ITU-T Y.1731)	X	X	X	X
IEEE 802.1ax Link Aggregation (LAG)	X	X	X	X
ITU-T G.8032 (v2) ERP (UNI/NNI)	X	X	X	X
MPLS-TP	X	X	X	X

SDN

Capabilities	1830 PSS-4	1830 PSS-8	1830 PSS-16II	1830 PSS-32
Controllable via Nokia Network Services Platform (NSP) SDN controller	X	X	X	X

Management

Capabilities	1830 PSS-4	1830 PSS-8	1830 PSS-16II	1830 PSS-32
Web GUI & CLI	X	X	X	X
SNMPv3 (AES-256)	X	X	X	X
TL1	X	X	X	X
CFM framework (MD, MEL, MEG, up/down MEP, MIP configuration)	X	X	X	X
Fault propagation/LPT	X	X	X	X
Ethernet port for local access	X	X	X	X
Integrated remote management via GCC/OSC Selectable rates for OSC: 100 Mb/s, 155 Mb/s	X	X	X	X
Network Services Platform (NSP) Network Functions Manager for Transport (NFM-T)	X	X	X	X
YANG 1.0	X	X	X	X
NETCONF	X	X	X	X

Certifications

Certifications	1830 PSS-4	1830 PSS-8	1830 PSS-16II	1830 PSS-32
MEF CE 2.0	X	X	X	X
Brocade SAN and security	X	X	X	X
EMC SAN and security	X	X	X	X

Regulatory and standards compliance

ANSI

Specifications	1830 PSS-4	1830 PSS-8	1830 PSS-16II	1830 PSS-32
EMC level: Class A <ul style="list-style-type: none"> ICES-003, Issue 4, February 2004, Class A (Canada) Telcordia GR-1089-CORE, Issue 6, May 2011 (NEBS Level 3) Telcordia Special Report SR-3580, Issue 3, January 2007 FCC 47 CFR15, Class A Part B (2006) 	X	X	X	X
Supported countries <ul style="list-style-type: none"> Canada United States 	X	X	X	X
Safety <ul style="list-style-type: none"> UL/CSA 60950 - 1 Telcordia GR-1089-CORE, Issue 6 Telcordia GR-63-CORE (NEBS Requirements: Physical Protection) FDA 21 CFR 1040, Laser Notice No. 50 to CDRH ITU-T G.664 (2006) - G.783 (ALS/APR) 	X	X	X	X
Environmental <ul style="list-style-type: none"> Telcordia GR-63-CORE, Issue 4 Telcordia GR-3108-CORE (Equipment, Class 2) (-40C~+65C) 	X	X	X	X
Power and grounding <ul style="list-style-type: none"> Telcordia GR-1089-CORE, Issue 6, section 10 (DC) ANSI T1-315 [DC module] (PSI) 	X	X	X	X
Acoustic noise <ul style="list-style-type: none"> Telcordia GR-63-CORE (78 dB at 27C ambient temperature) Telcordia GR-3108-CORE (acoustic refers to GR-63) 	X	X	X	X
Miscellaneous <ul style="list-style-type: none"> Mechanical Shock & Bumps <ul style="list-style-type: none"> Telcordia GR-63 Zone-4 (earthquake) YD-5083 Country-specific requirements: <ul style="list-style-type: none"> AS/NZS 60950.1:2003: Information technology equipment - Safety - General requirements 	X	X	X	X

ETSI

Specifications	1830 PSS-4	1830 PSS-8	1830 PSS-16II	1830 PSS-32
EMC level: Class A	X	X	X	X
<ul style="list-style-type: none"> • EN 300 386 v1.6.1 (2012-4) (CE) • CISPR 32 – (2008) Class A (1G ~ 6 GHz) • CISPR 24 – First edition (1997-09), Amendment 1 (2001-07) and Amendment 2 (2002-10) • EN 55032: Ed2006 + A1:2007: Class A (Class B is objective) • EN 55024:1998 – CENELEC Amendment A1:2001 and Amendment A2:2003 • VCCI V-3/2006.04 (Japan) • EU Directive 2014/30/EU • EC Directive 93/465/EEC • ES 201468 (1.3.1), ITC (Class A) 				
Supported countries	X	X	X	X
<ul style="list-style-type: none"> • Europe • Latin America • Asia Pacific • Middle East and Africa 				
Safety	X	X	X	X
<ul style="list-style-type: none"> • IEC 60950-1:2005 (2nd Edition); Am 1:2009 • EN 60950-1-1:2006 + A11:2009 • EN 60825-1, Edition 2.0, 2007-03 • EN 60825-2, Third Edition, 2010-09 				
Environmental	X	X	X	X
<ul style="list-style-type: none"> • EN 300 019-1-1 (Storage, Class 1.2) • EN 300 019-1-2 (Transportation, Class 2.3) • EN 300 019-1-3 (Operational, Class 3.2) - 5C~+45C • EU WEEE directive 2002/96/EC • EU RoHS6: RoHS2.0 Directive 2011/65 EC • China RoHS regulation 				
Power and grounding	X	X	X	X
<ul style="list-style-type: none"> • ETS 300 132-2 (DC) • ETS 300 132-1 (AC) 				
Acoustic noise	X	X	X	X
<ul style="list-style-type: none"> • EN 300 753, Environmental Class 3.2 • YDT 1816-2008 				
Miscellaneous	X	X	X	X
<ul style="list-style-type: none"> • Mechanical Shock & Bumps <ul style="list-style-type: none"> – Telcordia GR-63 Zone-4 (earthquake) – YD-5083 • Country-specific requirements: <ul style="list-style-type: none"> – AS/NZS 60950.1:2003: Information technology equipment - Safety - General requirements 				



Specifications	1830 PSS-4	1830 PSS-8	1830 PSS-16II	1830 PSS-32
Railway		X		
<ul style="list-style-type: none">• EN 50121-4: Railway applications – Electromagnetic compatibility – Part 4• IEC 62236-4 (2008-12): Railway applications – Electromagnetic compatibility – Part 4				
Power substation		X		
<ul style="list-style-type: none">• IEEE 1613• IEC 61850-3: Communication networks and systems in substations – Part 3• IEC 61000-6-5 (2001-7,HV): Electromagnetic compatibility (EMC) - Part 6-5				

“X” in tables above indicates support for.

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