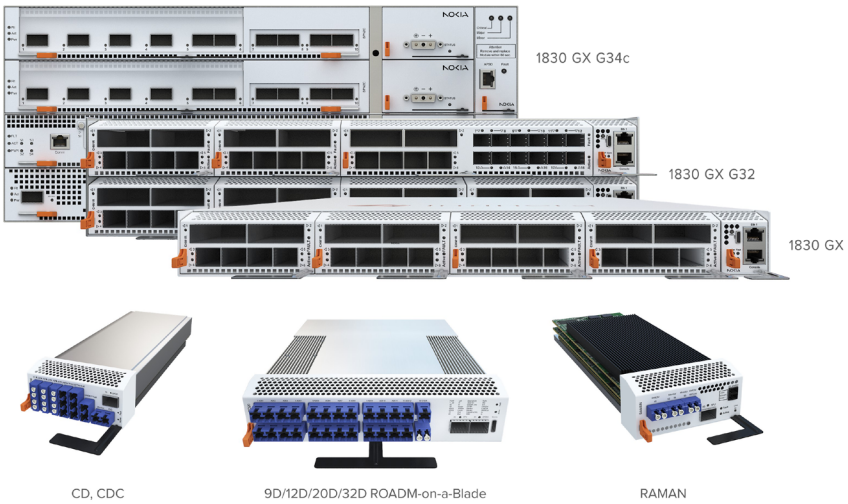
Nokia 1830 Global Express (GX) Open Line System

Flexible multi-haul open OLS for any transport application

Nokia's 1830 Global Express (GX) transport platform offers both Layer 1 and Layer 0 functions in a single or separate chassis, allowing for technology upgrades within the same platform. With the 1830 GX, operators have the choice to disaggregate or aggregate their networks. The 1830 GX OLS technology includes C-band, C+L band, and Super C + Super L band support, 600-mm and 300-mm chassis options, compact ROADM-on-a-blade modules, a wide range of amplifiers, add/drop modules, and advanced link control sPBAoftware, enabling network operators to address all transport network domains, from small to large and from metro and core to ultra-long-haul and subsea: The 1830 GX OLS delivers a holistic end-to-end OLS solution with a single multi-haul line system. This enables significant cost, space, and power savings. Further enhancements include highly integrated C+L band ROADM and amplifier modules for increased simplicity and faster network rollout in the era of AI and multi-rail deployments



Benefits of the GX OLS

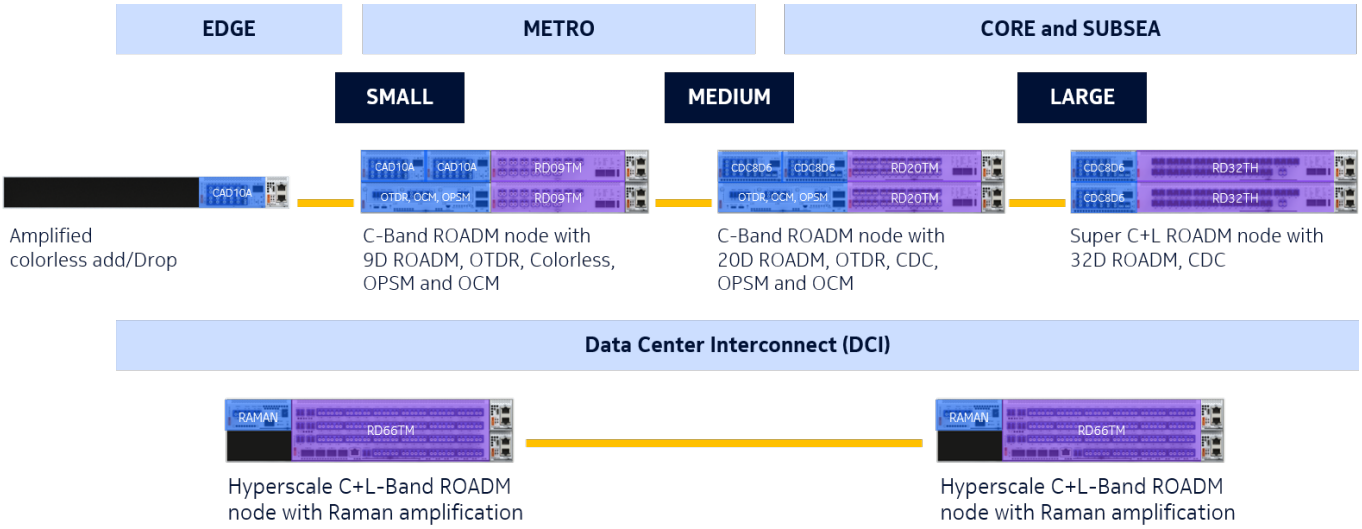
- Enable any transport network infrastructure with modular open line system functionalities
- Leverage flexibility, with a broad range of add/drop architectures supporting colorless, directionless, and contentionless architectures
- Reduce operational costs, improve analytics, and accelerate service delivery with YANG RESTCONF/ NETCONF open APIs and gNMI/gRPC streaming telemetry
- Optimize your line system with dynamic gain equalization (DGE) and Layer 0 analytics with OCM and OTDR
- Minimize footprint with two ROADM degrees in a single rack unit
- Maximize your fiber utilization with Super C and Super L band expanded spectrum
- Scale your nodes with multi-chassis management
- Hyperscale your network with highly integrated C+L band ROADM-on-a-blade
- Reduce power consumption and carbon footprint with ROADM technology and power-efficient optical layer components

Flexible Compact Modular Platform for multi-haul applications

Nokia's 1RU 1830 GX G31 and 2RU 1830 GX G32 compact modular chassis support installations in 19", 21", and 23" racks/cabinets with depth of 600 mm or greater. The 1830 GX G34c is a 4RU compact modular chassis that supports installation in 300-mm deep ETSI-compliant installation environments. All chassis options support redundant AC or DC power supplies, redundant fans, and field-replaceable controllers. The 1830 GX G32 and 1830 GX G34c chassis also support redundant field-replaceable controller cards.

The 1830 GX OLS supports a wide range of optical layer functions, including FOADMs; ROADMs; colorless, colorless-directionless, and colorless-directionless-contentionless add/drops; variable-gain EDFA amplifiers; Raman amplifiers; optical time-domain reflectometer (OTDR); optical protection switching (OPS); optical channel monitoring (OCM); optical supervisory channel (OSC); C+L Band, Super C+L

Band, and a variety of fixed mux/demux DWDM filters. Furthermore, the 1830 GX OLS operates GOSNR-based link control, enabling automated per-wavelength power balancing and high-performance optical transmission regardless of wavelength data rate, channel baud rate, and modulation, and seamlessly supports any wavelength, including third-party wavelengths.



Leverage the Same Platform for Transponder/Muxponder/Switchponder Functions

The 1830 GX supports a wide range of transponder/muxponder/switchponder sleds within the same or additional chassis and can be combined in a multi-chassis configuration. Refer to the GX transponder overview datasheet for more information.

Open Line System Sleds

1x9 WSS ROADM-on-a-blade sled

Supported in 600-mm deep 1830 GX G31/G32 chassis, the dual-slot RD09SM is a cost-effective and fully integrated nine-degree broadcast-and-select ROADM-on-a-sled with a single 1 x 9 wavelength-selective switch (WSS). In addition to the WSS, it includes a two-port OCM, OTDR and monitor ports, a 1510-nm OSC with pluggable SFP, a variable-gain pre-amplifier, and booster amplifiers. It supports fixed- and flexible-grid operation within the extended C-band. Supported add/drop structures are fixed DWDM filter and colorless-directionless add/drop, as well as direct transponder connect. All connectors are LC/PC respectively LC/UPC.

1x20 WSS ROADM-on-a-blade sled

Supported in 600-mm 1830 GX G31/G32 chassis, the dual-slot RD20TM is a fully integrated 20-port route-and-select ROADM-on-a-sled with a twin 1 x 20 WSS. In addition to the WSS, it includes a three-port OCM, OTDR and monitor ports, a 1510-nm OSC with pluggable SFP, a variable-gain pre-amplifier, and booster amplifiers, and it supports hardware cable ID to validate fiber connectivity. It supports fixed-grid and flexible-grid operation within the extended C-band. Supported add/drop structures are fixed DWDM filter, colorless, and colorless-directionless-contentionless, as well as direct transponder connect. All connectors are CS while the line connectors are LC.

1x12 WSS ROADM-on-a-blade sled

Supported in 300-mm 1830 GX G34c chassis, the dual-slot RD12TI is a fully integrated 12-port route-and-select ROADM-on-a-sled with a twin 1 x 12 WSS. In addition to the WSS, it includes mid-stage access, a three-port OCM, OTDR and monitor ports, a 1510-nm OSC with pluggable SFP, a variable-gain pre-amplifier, and booster amplifiers, and it supports hardware cable ID to validate fiber connectivity. Its supports fixed-grid and flexible-grid operation and Super C-band. Supported add/drop structures are fixed DWDM filter and colorless-directionless-contentionless, as well as direct transponder connect. All connectors are LC/PC respectively LC/UPC.

1x32 WSS ROADM-on-a-blade sled

Supported in 600-mm 1830 GX G32 chassis, the triple-slot RD32TH is a fully integrated 32-port route-and-select ROADM-on-a-sled with a twin 1 x 32 WSS. In addition to the WSS, it includes a three-port OCM, OTDR and monitor ports, a 1510-nm OSC with pluggable SFP, a variable-gain pre-amplifier, and booster amplifiers, and it supports hardware cable ID to validate fiber connectivity. It supports fixed-grid and flexible-grid operation within the Super C-band and is upgradeable to Super L-band while in service. Supported add/drop structures are fixed DWDM filter, colorless, and colorless-directionless-contentionless, as well as direct connect. All connectors are CS while the line connectors are LC.

1x66 WSS ROADM-on-a-blade sled

Supported in 600-mm 1830 GX G32E chassis, the triple-slot double height RD66TM and RD66TH are fully integrated 66-port route-and-select ROADM-on-a-sled with a twin 1 x 66 C+L band WSS. In addition to the WSS, it includes OCM, OTDR, ASE, and monitor ports, a 1510-nm OSC with pluggable SFP, a C+L band variable-gain pre-amplifiers, and C+L band booster amplifiers. It supports fixed-grid and flexible-grid operation within the C and L-band. Any add/drop port can be C or L band wavelength and wavelengths can be directly connected. The RD66TM is for terminal application and the RD66TH supports up to 8-fiber degree applications. All connectors are LC/PC respectively LC/UPC.

Raman Amplifier Sled

Supported in 600-mm 1830 GX G31/G32 chassis, the single-slot RPBM is a fully integrated Raman amplifier sled. It comes in two variants – the Raman Super C-band with four pumps and the Raman Super C+L-band with five pumps. Both support spans of up to 48 dB in combination with ROADM sleds.

Supported in 300-mm 1830 GX G34c chassis, the dual-slot RPBM is a fully integrated Raman amplifier sled. It comes in two variants – the Raman Super C-band with two pumps, supporting spans of up to 35 dB, and the Raman Super C+L-band with six pumps, supporting spans of up to 48 dB in combination with ROADM sleds and Amplifier sleds.

Integrated Booster and Pre-amplifier EDFA Sled

Supported in 600-mm 1830 GX G31/G32 chassis, the dual-slot PBAL is a fully integrated pre and booster amplifiers with integrated OTDR, OSC and OCM designed for amplified fixed OADM terminal sites. The PBAL supports C-band and deployments with passive fixed mux/demux add/drop such as OMD32.

Bidirectional Super C-band EDFA Sled

Supported in 300-mm 1830 GX G34c chassis, the dual-slot ILASGH is a fully integrated dual EDFA amplifier designed for both fiber degrees at an intermediate line amplifier (ILA) site. The ILASGH supports Super C-band and provides an upgrade port for seamless Super L-band EDFA upgrade and insertion. It supports dedicated OCM monitoring, OTDR, pluggable OSC, and DGE ports.

Bidirectional C+L band EDFA Sled

Supported in 300-mm 1830 GX G34c chassis, the dual-slot double height D2ILASGM is a fully integrated EDFA amplifier designed for both fiber degrees at an intermediate line amplifier (ILA) site. D2ILASGM supports C and L -band for east and west fiber direction. A dynamic gain equalizer (DGE) is integrated for performance-optimized wavelength equalization. Integrated OCM, OTDR, and a pluggable OSC makes the D2ILASGM a very compact and comprehensive amplification module.

Colorless Add/Drop Sled

Supported in 600-mm 1830 GX G31/G32 chassis, the single-slot CAD10A is a fully integrated colorless add/drop sled with 10 ports for wavelength interfaces. In addition to the colorless splitter/combiner, it includes a pre-amplifier and a booster amplifier. The CAD10A supports a wide range of embedded and pluggable coherent engines including low TX power pluggables. It supports Super C-band spectrum with up to 6.1 THz of total capacity, and it provides optical power monitoring on TX, RX, and common line ports. The CAD10A can also be configured as an amplified 10 channel terminal node.

Colorless-Directionless-Contentionless Add/Drop Sled

Supported in 600-mm 1830 GX G31/G32 chassis, the single-slot CDC8D6 is a fully integrated colorless-directionless-contentionless add/drop sled with eight-degree ports and six add/drop ports. The CDC8D6 supports Super C-band and Super L-band channels with input power of +7 dBm to -2 dBm, and it provides optical power monitoring on TX, RX, and common line ports.

OCC2 OFP2 Carrier Card Sleds

The dual-slot OCC2T is an optical carrier card sled for up to three OFP2 optical layer pluggables for the 1830 GX G31 and G32 chassis variants, which also supports BITS input/output and PPS/TOD connectors for future synchronization applications. The dual-slot OCC2E is an optical carrier card sled for up to four OFP2 optical layer pluggables for the 1830 GX G34c chassis variant.

OFP2 Pluggables for the OCC2 Carrier Card Sleds

The OCC2s support a wide range of compact optical layer pluggables based on the CFP2-like form factor called OFP2, which has a height of 19.5 mm, a width of 50.5 mm, and a depth of 154.4 mm.

OFP2 Variable-gain Amplifiers

Available options include three pre-amplifiers with OSC (O2PAOHIR, O2PAOHLR, O2PAOHER) and one booster amplifier (O2BAX) optimized for different span losses and channel counts. These amplifiers support a wide range of applications, including point-to-point, chain, ring, and mesh ROADM topologies and can be utilized for terminal, add/drop, and intermediate line amplifier sites. The OFP2 amplifiers have a maximum power consumption of between 5 and 11 W.

OFP2 Optical Time-domain Reflectometer (OTDR8)

The O2OTDR8E OFP2 supports both in-service and out-of-service OTDR on up to eight fibers (i.e., four bidirectional degrees). It supports measurements with resolution down to as little as 1 meter and maximum distances of approximately 100 km. In order to support in-service operation, it operates at 1625 nm. It supports C+L networks.

OFP2 Optical Channel Monitor (OCM)

The O2OCMH8 is a high resolution OCM and provides per-channel power monitoring on four ports (i.e., two degrees in two directions) and can be used to provide optical layer visibility, enabling proactive troubleshooting.

OFP2 Dynamic Gain Equalizer (DGE)

The O2DGE provides cost-effective dynamic optical power channel equalization, performs balancing of all wavelengths with 6.25 GHz resolution, and supports Super C-band. It maximizes end-to-end performance and wavelength reach at intermediate line amplifiers. The O2DGE supports simultaneously power balancing for two directions (east and west).

OFP2 Optical Protection Switches (OPSM)

The O2OPS OFP2 provides a cost-effective option for supporting a variety of protection schemes, including 1+1 OTS, 1+1 OMS, 1+1 OCh, and 1+1 client. It includes a single protection switch in an OFP2 form factor with protection switching triggered by loss of signal (LOS). The O2OPS1PT adds a pilot tone, enabling it to be used for 1+1 OCh protection with colorless add/drop, where loss of signal cannot be used as a reliable indicator that the channel has failed.

OFP2 Optical Transient Suppression Card (OTSC)

OFP2 OTSCS provides ASE for insertion in subsea deployments, encompassing both subsea and subsea backhaul facing applications. When used with the RD20TM, it preserves a fully loaded spectrum to ensure optimal subsea repeater performance, delivering stable signals and consistent power. Additionally, in the event of a user signal failure, it substitutes the failed spectrum segment with ASE. OTSCS can be used on all chassis types including 1830 GX G31, 1830 GX G32, and 1830 GX G34c (in future), and the OCC2T or OCC2E (in future) is required to use together with an OFP2 OTSCS module.

OFP2 Colorless Add/Drop (CAD16A)

The OFP2 form factor CAD16A is an integrated colorless add/drop sled supporting 16 add/drop wavelengths. In addition to the colorless splitter/combiner, it includes a pre-amplifier and a booster amplifier. The CAD16A supports operation within the extended C-band with up to 4.8 THz of total capacity and provides two ports for optical channel monitoring.

OFP2 Wavelength-selective Switch (WS04S)

The O2W04S provides a 1 x 4 broadcast-and-select WSS. It includes two OCM ports, enabling bidirectional per-channel power monitoring. It supports both fixed-grid and flexible-grid operation. A 1610-nm OSC loopback is provided for port-side laser safety. It enables colorless-directionless add/drop applications.

OFP2 Colorless-Directionless-Contentionless Switch (CDC4D4)

Supported in 300-mm 1830 GX G34c chassis, the OFP2 form factor CDC4D4 is a fully integrated colorless-directionless-contentionless add/drop with four-degree ports and four add/drop ports. The CDC4D4 supports Super C-band and Super L-band channels with input power of +7 dBm to -2 dBm, and it provides optical power monitoring on TX, RX, and common line ports.

External Passive Equipment

DWDM Mux/Demux Units

The OMD64 is a 2RU external unit with 64 LC ports for mux/demux, LC ports for the DWDM line, and LC ports for optical power monitoring. It provides a mux/demux filter for 64 x 75 GHz channels, ideal for high-baud-rate wavelengths such as coherent 400G ZR+/XR wavelengths and supports the extended C-band (4,800 GHz).

The OMD64S is a 2RU external unit with 64 LC ports for mux/demux, LC ports for the DWDM line, and LC ports for optical power monitoring. It provides a mux/demux filter for 64 x 75 GHz channels compliant with the ITU-T grid, designed for 400ZR-OIF standard-grid support and supports the extended C-band (4,800 GHz).

The OMD48E is a 2RU external unit with 48 LC ports for mux/demux, LC ports for the DWDM line, and LC ports for optical power monitoring. It provides a mux/demux filter for 48 x 100 GHz channels, ideal for optical engines with very high baud rates, and supports the extended C-band (4,800 GHz).

The OMD48S is a 1RU external unit with 48 LC ports for mux/demux, LC ports for the DWDM line, and LC ports for optical power monitoring. It provides a mux/demux filter for 48 x 75 GHz channels, ideal for optical engines with high baud rates, such as 400G XR/ZR+ and 600 Gb/s and supports the extended C-band (4800GHz).

The OMD40E is a 2RU external unit with 40 LC ports for mux/demux and LC ports for the DWDM line with the support of Super C-band (6,100 GHz). It provides a mux/demux filter for 40 x 150 GHz channels, ideal for optical engines with ultra-high baud rates, such as Nokia's 800 Gb/s Infinite Capacity Engine 6 (ICE6) and 1.2T Infinite Capacity Engine 7 (ICE7) high-performance coherent optics and 800G coherent pluggables.

The OMD32 is a 1RU external unit with 32 LC ports for mux/demux and LC ports for the DWDM line with the support of C-band (4,800 GHz). It provides a mux/demux filter for 32 x 150 GHz channels, ideal for optical engines with ultra-high baud rates, such as Nokia's 800 Gb/s per wave Infinite Capacity Engine 6 (ICE6) and 1.2T per wave Infinite Capacity Engine 7 (ICE7) high-performance coherent optics and 800G coherent pluggables. It supports OCM ports for external spectrum monitoring.

All these OMD variants have low insertion loss of less than 6 dB and provide an RJ45 port for one-wire inventory management.

Additional Passive Equipment

The 1830 GX OLS can optionally leverage a wide range of passive equipment from the Nokia Pluggable Optical Layer portfolio. This portfolio includes an eight-slot, 1RU passive shelf with single- and dual-slot cartridges for a wide range of passive functions, including eight-channel and four-channel DWDM filters, a DWDM band mux, eight-channel and four-channel CWDM filters, an OTDR filter, and dispersion compensation modules.

Optical Timing Channel (OTC2.0)

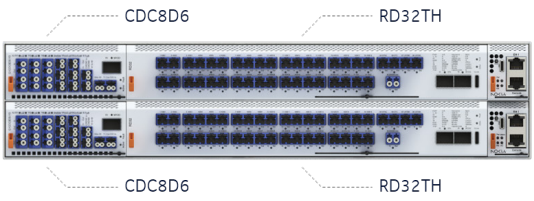
OTC2.0 is an add-on solution that delivers high-performance synchronization and timing distribution over any optical transport network. When combined with the 1830 GX OLS, OTC2.0 provides a dedicated disaggregated optical timing channel over a single fiber infrastructure. OTC2.0 enables network operators to enhance the resiliency of their synchronization and timing networks and decouple timing strategies from total reliance on GNSS-based timing at every network node. OTC2.0 enables network operators to build virtual PRTC (vPRTC) timing cloud architectures with sub-100-ns performance to every network node.

Automation Enabled with Open APIs and Streaming Telemetry

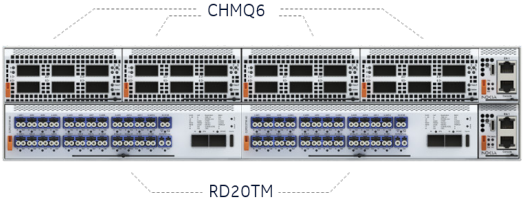
The 1830 GX OLS supports management, automation, and streaming telemetry via open APIs. It supports WebGUI, CLI, SNMP, RADIUS, declarative config, gNOI, SSH, SFTP. SCP, TLS, TACACS+, syslog, and OpenConfig YANG-modeled NETCONF and RESTCONF APIs, as well as gNMI/gRPC streaming telemetry. An OSPF-based DCN is supported with in-band management via OSC or GCC0 with 1830 GX G30 Series muxponders and out-of-band management via Ethernet interfaces. Additional manageability features include zero-touch commissioning (ZTC) and the management of multiple 1830 GX G30 units as a single entity. The 1830 GX G30 Series is managed under Nokia Transcend Network Automation Suite.

Example Configurations

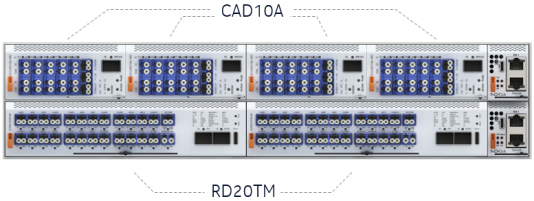
The following are a few examples of configurations. All these configurations can be expanded in service to support more chassis, more fiber degrees, and more add/drop ports.



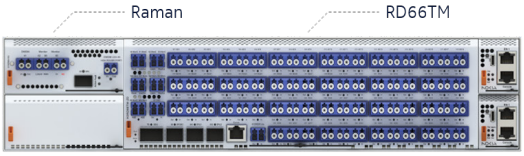
2x 32D ROADM Super C+L Band
12 port CDC Add/drop



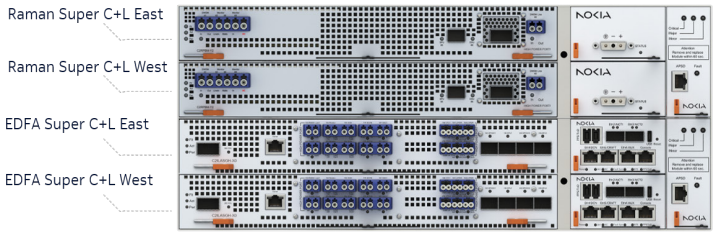
2x 20D ROADM C-Band
12 x 800G ZR+ Thin Transponder



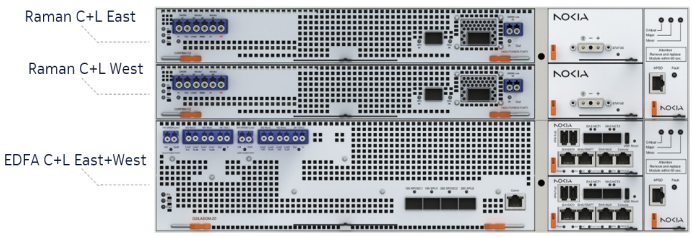
2x 20D ROADM C-Band
40 port colorless add/drop



1x 66D ROADM C+L-Band
Raman C+L



Super C+L BiDi EDFA + Raman Super C+L East and West



C+L BiDi EDFA + Raman C+L East and West

Technical Specifications

Environmental

- Operating temperature: 5° to 40° C/41° to 104° F
- Transport and storage: -40° to +70° C/-40° to +158° F/40° C +93% RH
- Humidity: 5% to 90% non-condensing

Management Options

- Management and control platforms:
  - Nokia Transcend Network Automation Suite
- Command line interface (CLI)
- Zero-touch commissioning (ZTC)
- IPv4 and IPv6
- Syslog
- TACACS+/RADIUS
- WebGUI
- NETCONF
- RESTCONF
- Native YANG models
- OpenConfig
- gNMI/gRPC/gNOI
- SNMP fault and performance management
- OSPF-based DCN
- Multiple 1830 GX chassis can be managed as a single entity

OLS Service Modules/Sleds G31/G32 platform

- Dual-slot ROADM (G2RD09SM) sled
  - 2.27 kg/5 lb
  - 80 watts
  - Fully integrated nine-degree broadcast-and-select ROADM-on-a-sled
  - Single 1 x 9 WSS
  - Integrated OCM
  - OTDR and monitoring ports
  - 1510-nm OSC with pluggable SFP
  - Variable-gain pre-amplifier and booster amplifiers
  - Supports spans from 0 to 30 dB
  - Fixed-grid and flexible-grid operation
  - Extended C-band
  - Direct connect, fixed, and colorless-directionless add/drop
- Dual-slot ROADM (G2RD20TM) sled
  - 3.16 kg/6.97 lb
  - 64 watts
  - Fully integrated 20-degree route-and-select ROADM-on-a-sled
  - Twin 1 x 20 WSS
  - Integrated OCM
  - OTDR and monitoring ports
  - 1510-nm OSC with pluggable SFP
  - Variable-gain pre-amplifier and booster amplifiers
  - Supports spans from 0 to 32 dB
  - Cable ID in and out ports
  - Fixed-grid and flexible-grid operation
  - Extended C-band
  - Direct connect, fixed, colorless-directional, colorless-directionless, and CDC add/drop
- Triple-slot ROADM (G3RD32TH) sled
  - 3.8 kg/ 8.38 lb
  - 93 watts
  - Fully integrated 32-degree route-and-select ROADM-on-a-sled
  - Twin 1 x 32 WSS
  - Integrated OCM
  - OTDR and monitoring ports
  - 615-nm OSC with pluggable SFP
  - Variable-gain pre-amplifier and booster amplifiers
  - Supports spans from 0 to 33 dB
  - Cable ID in and out ports
  - Fixed-grid and flexible-grid operation
  - Super C-band with 6.1 THz total spectrum
  - Upgrade port for Super L-band in-service expansion
  - Direct connect, fixed, colorless-directionless, and CDC add/drop
- Triple-slot dual height ROADM (G3RD66TM) sled
  - 6.36 kg / 14.0 lb
  - 185 watts
  - Fully integrated 66-port route-and-select ROADM-on-a-sled
  - Twin 1 x 66 WSS C+L band and 1 express line port
  - 1 degree application support
  - Integrated OCM
  - Integrated OTDR
  - Integrated ASE C and L band
  - Monitoring ports
  - 1510-nm or 1625-nm OSC with pluggable SFP
  - Variable-gain pre-amplifier and booster amplifiers
  - Supports spans from 0 to 32 dB
  - Cable ID in and out ports
  - Fixed-grid and flexible-grid operation
  - Direct connect of coherent wavelengths
- Triple-slot dual height ROADM (G3RD66TH) sled
  - 6.36 kg / 14.0 lb
  - 185 watts
  - Fully integrated 66-port route-and-select ROADM-on-a-sled
  - Twin 1 x 66 WSS C+L band and 1 express line port
  - Up to 8-degree application support
  - Integrated OCM
  - Integrated OTDR
  - Integrated ASE C and L band
  - Cable-ID support
  - Monitoring ports
  - 1510-nm or 1615-nm OSC with pluggable SFP
  - Variable-gain pre-amplifier and booster amplifiers
  - Supports spans from 0 to 32 dB
  - Cable ID in and out ports
  - Fixed-grid and flexible-grid operation
  - Direct connect of coherent wavelengths
- Single-slot pre and booster amplifier EDFA sled (PBAL)
  - <90 watts
  - Integrated pre-amplifier and booster amplifier
  - C-band spectrum
  - Integrated OTDR
  - 1510nm OSC with pluggable SFP
  - Monitoring ports
- Single-slot colorless add/drop (G1CAD10A) sled
  - 1 kg/2.2 lb
  - 24 watts
  - Fully integrated colorless add/drop sled
  - Supports Super C-band
  - Supported with RD09SM, RD20TM, and RD32TH or standalone
  - Integrated pre-amplifier and booster amplifier
  - Monitoring ports
  - Cable ID in and out ports
  - SFP cage for cable ID SFP
- Single-slot colorless-directionless-

Technical Specifications

contentionless add/drop (G1CDC8D6) sled
- 1 kg/2.2 lb
- 9 watts
- Fully integrated colorless-directionless-contentionless add/drop sled
- Supports Super C-band and Super L-band
- Supported with RD20TM and RD32TH
- Monitoring ports
- Cable ID in and out ports
- SFP cage for cable ID SFP

• Single-slot colorless-directionless-contentionless add/drop (G1CDC8D6) sled
- 1 kg/2.2 lb
- 9 watts
- Fully integrated colorless-directionless-contentionless add/drop sled
- Supports Super C-band and Super L-band
- Supported with RD20TM and RD32TH
- Monitoring ports
- Cable ID in and out ports
- SFP cage for cable ID SFP

• Single-slot RAMAN amplifier (G1RPBM-W) sled
- 1.2 kg/2.6 lb
- 35 watts
- Counter propagating
- Super C-band variant with 6.1THz spectrum
- 1W total Raman pump power from 4 Raman pumps
- DWDM monitoring ports
- Raman pump spectrum monitoring

• Single-slot RAMAN amplifier (G1RPBM-Y) sled
- 1.2 kg/2.6 lb
- 35 watts
- Counter propagating
- Super C+L Band variant with 12.5GHz spectrum
- 1W total Raman pump power from 5 Raman pumps
- DWDM monitoring ports
- Raman pump spectrum monitoring

• Dual-slot optical carrier card (OCC2T) sled
- 199.78 x 41.62 x 337.82 mm / 7.87 x 1.64 x 13.3 in (WxHx D)
- 1.77 kg/3.9 lb
- 53 watts with 3x OFP2
- Three OFP2 pluggable interfaces
- Two SFP pluggable interfaces for optical timing channel (OTC)
- BITS USB type C connector for T1/E1 input/outputs
- PPS/TOD USB type C connector for local time input (1PPS+ToD)
- Typical power consumption is 20 W for the OCC2T without any interfaces equipped; the total power consumption will depend on the type and quantity of inserted SFP/OFP2 modules

OLS Service Modules/Sleds G34C platform

• Dual-slot ROADM (C2RD12TI) sled
- 3.35 kg / 4.85 lb
- 85 Watt
- Fully integrated 12-degree route-and-select ROADM-on-a-sled
- Twin 1 x 12 WSS
- Integrated OCM
- OTDR and monitoring ports
- 1510-nm OSC with pluggable SFP
- Variable-gain pre-amplifier and booster amplifiers
- Supports spans from 0 to 29 dB
- Cable ID in and out ports
- Fixed-grid and flexible-grid operation
- Super C-band with 6.1 THz total spectrum
- Direct connect, fixed, colorless-directionless, and CDC add/drop

• Dual-slot bidirectional Super C-band EDFA (C2ILASGH)
- 2.4 kg/5.29 lb
- 57 watts
- Fully integrated dual EDFA Super C-Band
- Dynamic gain range from 0 to 30 dB
- Monitoring ports
- DGE ports
- OCM ports
- 1510-nm OSC with pluggable SFP
- OTDR ports

• Dual-slot bidirectional C+L EDFA (D2ILASGM)
- 4.4 kg/ 9.67 lb
- 160 watts
- Fully integrated dual EDFA C and L band
- Integrated line padding VOAs separate for C and L-bands
- Integrated Optical Time Domain Reflectometer (OTDR)
- Integrated Dynamic Gain Equalizer (DGE)
- 1615-nm OSC with pluggable SFP
- Switchable gain EDFA

• Dual-slot RAMAN amplifier (C2RPBL-W) sled
- 1.96 kg/ 4.3 lb
- 37 watts
- Counter propagating
- Super C-band variant with 6.1THz spectrum
- 0.7W total Raman pump power from 2 Raman pumps
- DWDM monitoring ports
- Raman pump spectrum monitoring

• Dual-slot RAMAN amplifier (C2RPBM-Y) sled
- 1.96 kg / 4.3 lb
- 54 watts
- Counter propagating
- Super C+L Band variant with 12.5GHz spectrum
- 1W total Raman pump power from 6 Raman pumps
- DWDM monitoring ports
- Raman pump spectrum monitoring

• Dual-slot optical carrier card (OCC2E) sled
- 307 x 40 x 269 mm / 12.1 x 1.57 x 10.6 in (WxHxD)
- 1.4 kg/3.1 lb
- 20 watts without any OFP2 equipped
- Four OFP2 pluggable interfaces

EDFA OFP2 Pluggable Common Specifications G31/G32/G34C

• Equipped in OCC2T or OCC2E in the OFP2 slots
• 19.5 x 50.5 x 154.4 mm/0.77 x 1.99 x 6.08 in (W x H x D)
• Weight: 0.19 kg / 0.42 lb

Technical Specifications

- Regulatory compliance: GR-468-CORE Generic Reliability Assurance Requirements for Optoelectronic Equipment Devices Used in Telecommunications Equipment
- MBTF: 25 years per SR-332 (40° C, 50% electrical stress, 90% confidence interval)
- RoHS: 6/6 compliant assembly

Amplifiers OFP2 Pluggable

- The O2BAX extended gain booster amplifier has a gain range of 10 to 22 dB
- The O2PAOIR intermediate range pre-amplifier has a gain range of 0 to 18 dB
- The O2PAOLR long-range pre-amplifier has a gain range of 14 to 26 dB
- The O2PAOER extended-range pre-amplifier has a gain range of 25 to 35 dB

OTSC OFP2 Pluggable

- Supports ASE-in, ASE-out and Monitoring ports

OCM OFP2 Pluggable

- high-resolution OCM scan measurements
- Super C-Band frequency range
- 8 RX-only monitoring ports
- granularity of up to 312.5MHz

OTDR OFP2 Pluggable

- Supports eight OTDR ports
- Each port can be used for one-direction OTDR testing
- Can be used for four degrees with eight fibers for OTDR application
- In-service monitoring and out-of-service diagnostics
- Resolution of 1 meter and distances of approximately 100 km
- Operates at 1625 nm, supporting C+L networks

OPS/OPS1PT OFP2 Pluggables

- 1+1 OTS protection: single span and multi span (OSC presence)
- 1+1 OMS protection
- 1+1 OCh protection for both colored (OPS) and colorless add/drop (OPS1PT)
- 1+1 client protection

CAD16 OFP2 Pluggable

- 16-channel coherent colorless add/drop
- Amplified
- Supports Super C-band and Super L-band

DGE OFP2 Pluggable

- Dynamic gain equalization
- Up to two directions of equalization
- Two OCMs
- ILA, FOADM, and DCO point-to-point applications
- Supports fixed grid and flexible grid
- Supports Super C-band
- Automated balancing

WSS OFP2 Pluggable

- Up to four-degree ROADM, with additional one degree for add/drop
- Broadcast-and-select architecture with single 1 x 4 WSS
- Supports fixed grid and flexible grid
- Two OCM monitoring ports
- 1610-nm OSC loopback for port-side laser safety

OMD64 2RU External Unit

- Height: 2RU; 482.6 x 88 x 166 mm/19.1 x 3.48 x 6.56 in (W x H x D)
- 2.0 kg/4.44 lb
- Channel number: 64
- Channel spacing: 75 GHz
- Max passband channel (3 dB): 74 GHz
- Operating wavelengths: 191.3625 THz (Channel 1) to 196.0875 THz (Channel 64)
- Insertion loss: ~6 dB
- Connectors: 66 dual LC connectors
- One-wire connector for inventory management

OMD64S 2RU External Unit

- Height: 2RU; 482.6 x 88 x 166 mm/19.1 x 3.48 x 6.56 in (W x H x D)
- 2.0 kg/4.44 lb
- Channel number: 64
- Channel spacing: 75 GHz (ITU-T)
- Max passband channel (3 dB): 74 GHz
- Operating wavelengths: 191.3750 THz (Channel 1) to 196.100 THz (Channel 64)
- Insertion loss: ~7 dB
- Connectors: 66 dual LC connectors
- One-wire connector for inventory management

OMD48E 2RU External Unit

- Height: 2RU; 482.6 x 88 x 166 mm/19.1 x 3.48 x 6.56 in (W x H x D)
- 3.8 kg/8.38 lb
- Channel number: 48
- Channel spacing: 100 GHz
- Max passband per channel (3 dB): 110 GHz
- Operating wavelengths: ITU C-band 191.4 THz (Channel 1) to 196.1 THz (Channel 48)
- Insertion loss: ~6 dB
- Connectors: 50 dual LC connectors
- One-wire connector for inventory management

OMD48S 1RU External Unit

- Height: 1RU; 166 x 44 x 482.6 mm/6.56 x 1.74 x 19.1 in (W x H x D)
- 2.0 kg/4.4 lb
- Channel number: 48
- Channel spacing: 100 GHz
- Max passband per channel (3 dB): 75 GHz
- Operating wavelengths: ITU C-band 191.4 THz (Channel 1) to 196.1 THz (Channel 48)
- Insertion loss: max. 5.7 dB
- Connectors: 50 dual LC connectors
- One-wire connector for inventory management

OMD40E 2RU External unit

- Height: 2RU; 482.6 x 88 x 166 mm/19.1 x 3.48 x 6.56 in (W x H x D)
- Channel number: 40
- Channel spacing: 150 GHz

Technical Specifications

- Max passband per channel (3 dB): 160GHz
- Operating wavelengths: 190.625 THz (Channel 1) to 196.725 THz (Channel 40)
- Insertion loss: <6 dB
- Connectors: 41 dual LC connectors

OMD32E 1RU External unit

- Height: 1RU; 166 x 44 x 482.6 mm/6.56 x 1.74 x 19.1 in (W x H x D)
- 2.0 kg/4.4 lb
- Channel number: 32
- Channel spacing: 150 GHz
- Max passband per channel (3 dB): 160GHz
- Operating wavelengths: 191.375 THz (Channel 1) to 196.025 THz (Channel 32)
- Insertion loss: <6 dB
- Connectors: 34 dual LC connectors

About Nokia

Nokia is a global leader in connectivity for the AI era. With expertise across fixed, mobile, and transport networks, powered by the innovation of Nokia Bell Labs, we're advancing connectivity to secure a brighter world.

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