

Nokia 1830 GX RD66 and D2ILA - the Hyperscale OLS

Bandwidth growth is unprecedented. AI is driving significantly more capacity inside, outside, and between data centers. On top, digitalization drives ever more data into the cloud. Today, data centers are interconnected with multiple fiber pairs at full C+L band capacity along the same path, known as multi-rail deployment. These capacities and deployments necessitate a simpler optical line system to enable rapid network implementation.

Nokia's 1830 GX hyperscale OLS architecture streamlines deployment with a single sled featuring the integrated RD66 ROADM, removing the need for extra sleds and intra-system fibers. Complete ILA node use a single D2ILA a dual directional amplifier sled for C+L band, with optional Raman amplifier sleds for larger spans. This design delivers a high-performance optical layer compatible with multiple generations of coherent technology.

The 1830 GX hyperscale OLS consists of a single ROADM sled and a single In-Line Amplifier (ILA) sled

- **The ROADM-on-a-blade RD66** – with integrated C+L Band twin WSS, C+L band pre-amplifiers, C+L band booster amplifiers, C+L band ASE, OCM, OTDR, OSC supported in 600mm GX G32E chassis
- **The dual amplifier-on-a-blade D2ILA** – with integrated C+L Band amplifiers East direction, C+L Band amplifiers West direction, DGE, OTDR, OSC supported in 300mm GX G34c chassis

Applications

- Point to Point line system
- Multi degree line system
- Terrestrial applications
- Metro, Long-haul, DCI

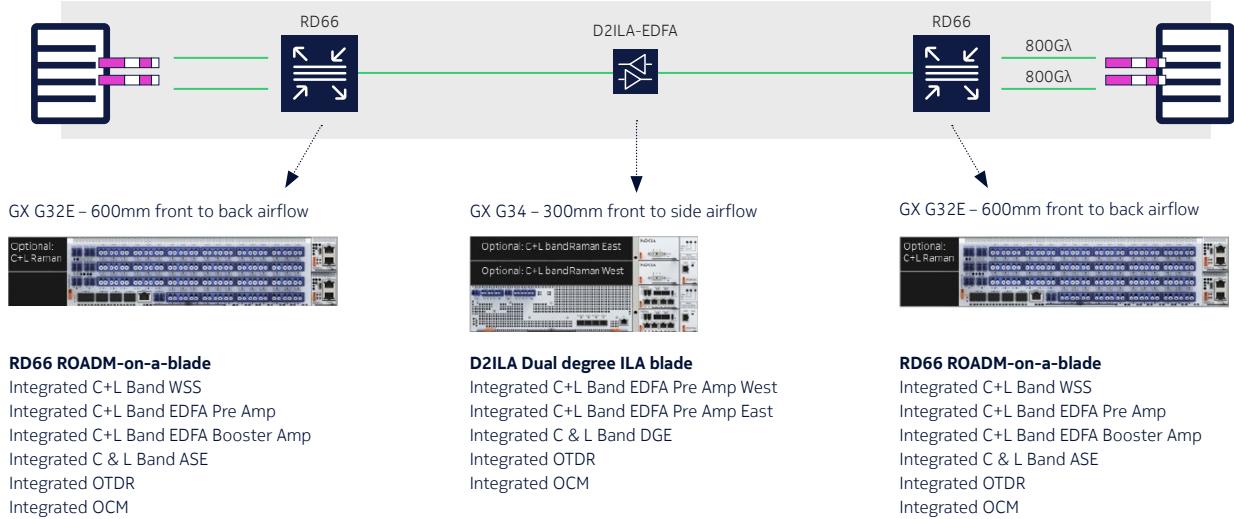
Features

- Integrated twin C+L Band WSS
- Integrated C+L Band pre-amp EDFA
- Integrated C+L band booster EDFA
- Integrated OTSC (ASE) C+L Band
- Integrated OCM
- Pluggable OSC

Benefits

- **Lower TCO** by deploying a fully integrated C+L band Open Line System
- **High density** with 2RU for C+L band with ASE and 66 Add/Drop ports
- **Operational simplicity** with an all-integrated solution
- **Simplify and Speed Up** optical line system deployments
- **Support** any coherent transceiver generation
- **Support** low transmit power coherent pluggables

Figure 1: GX Hyperscale OLS C+L system highly integrated



The enhanced ROADM-on-a-blade

The dual RU high three-slot wide RD66 is a 66-degree ROADM on a blade sled supported in the 1830 GX G32E chassis. RD66 supports up to 66 configurable universal add/drop ports for standard C-band or standard L-band operation with LC connectors. It supports flexi-grid spacing and 10 monitoring ports, for ASE, WSS and Line ports including C-band and for L-band. The RD66 also supports integrated C-band and L-band ASE idlers. Additionally, the sled has integrated pre-amplifiers for C-band and for L-band and has booster amplifiers for C-band and for L-band. The integrated OCM measures all flexi-grid input and output frequencies for C-band and L-band. The OSC is supported with a SFP pluggable operating at 1615 nm. Internal in-service OTDR supports both fibers of the DWDM line port. Any ITU-T compliant coherent transceiver technology is supported as a direct-connect to one of the 66 add/drop ports. The GX OLS dynamically optimizes the transmission line system for a maximum OSNR, automatically activates ASE noise, and equalizes the transmit power of the wavelengths across the entire path for maximum OSNR and highest performance transmission for realizing lowest TCO.

The RD66 is available in two variants: the RD66TM, which is designed for pt-to-pt applications, and the

RD66TH, which supports up to eight express ports and multi-degree applications. Additionally, the GX G32E chassis offers two extra available slots capable of accommodating C+L Raman modules.

The enhanced dual EDFA C+L Band amplifier D2ILA

The dual RU high two-slot wide D2ILA is a dual direction amplifier for in-line amplification sites and is supported in the GX G34c 4RU. The inline amplifier supports switchable gain and tilt configurability with two standard C-band EDFA amplifiers and two standard L-band EDFA amplifiers for supporting both East and West direction on the same sled.

The sled includes an OTDR for testing all DWDM line fibers and includes integrated dynamic gain equalizer (DGE) in the interstage of all four EDFA amplifiers. D2ILA further supports an integrated OCMs for monitoring DWDM Line/Out ports. For each node direction, OSC insertion/extraction is supported via a band filter and the OSC signal is directed to an OSC SFP plugged into one SFP cage. The D2ILA sled supports per amplifier input and output monitoring ports (separate for C and L bands) for connections to external power meter or external OSA.

Technical specifications

H3RD66TM

Key specifications

- Supported in GX G32E chassis
- Fully integrated Route and Select Optical Add/Drop Multiplexer
- Twin 1x66 C+L WSS
- Flexible-grid operation
- Standard C-band: 4.8875 THz from 191.2625 to 196.15 THz
- Standard L-band: 4.85 THz from 186.05 to 190.90 THz
- Two switchable variable gain pre-amplifiers
 - 21.5dBm (C-Band)/21.5dBm (L-Band)
- Two variable gain Booster amplifiers
 - 21.8 dBm (C-Band)/20.3 dBm (L-Band)
- Direct connect add/drop operation
- Up to 66 ports for add/drop
- Add/Drop input range: -18.5dBm/12.5GHz to -5dBm/12.5GHz
- Optical Channel Monitor (OCM)
- Optical Time Domain Reflectometer (OTDR)
- C and L band ASE generator
- 1615nm OSC with pluggable OSC
- Power consumption: 185W typical; 250W maximum
- Operating temperature: 0°C to +45°C
- Storage temperature: -40°C to +85°C
- Connectors:
 - 66 duplex LC connectors for add/drop ports
 - 1 duplex LC connector for ‘DWDM Line’ port
 - 5 duplex LC connectors for ‘Monitor’ ports
 - 1 duplex LC connector for “OSC” port
 - SFP-DD cage for Optical Supervisory Channel SFP
 - 2 SFP-DD cages ‘SPU1’ and ‘SPU2’
 - 1 QSFP-DD for universal usage ‘DDU’

H3RD66TH

Key specifications

- Supported in GX G32E chassis
- Fully integrated Route and Select Optical Add/Drop Multiplexer
- Twin 1x66 C+L WSS
- Flexible-grid operation
- Standard C-band: 4.8875 THz from 191.2625 to 196.15 THz
- Standard L-band: 4.85 THz from 186.05 to 190.90 THz
- Two switchable variable gain pre-amplifiers
 - 25.0dBm (C-Band)/25.0dBm (L-Band)
- Two variable gain Booster amplifiers
 - 23.0 dBm (C-Band)/23.0 dBm (L-Band)
- Direct connect add/drop operation
- Up to 66 ports for add/drop
 - 8 ports that can be used as add/drop or express
- Add/Drop input range: -18.5dBm/12.5GHz to -5dBm/12.5GHz
- Optical Channel Monitor (OCM)
- Optical Time Domain Reflectometer (OTDR)
- C and L band ASE generator
- 1615nm OSC with pluggable OSC
- Power consumption: 185W typical; 250W maximum
- Operating temperature: 0°C to +45°C
- Storage temperature: -40°C to +85°C
- Connectors:
 - 66 duplex LC connectors for add/drop ports
 - 8 of the 66 duplex LC ports for add/drop/express ports
 - 1 duplex LC connector for ‘DWDM Line’ port
 - 5 duplex LC connectors for ‘Monitor’ ports
 - 1 duplex LC connector for “OSC” port
 - SFP-DD cage for Optical Supervisory Channel SFP
 - 2 SFP-DD cages ‘SPU1’ and ‘SPU2’
 - 1 QSFP-DD for universal usage ‘DDU’



D2ILASGM-Z0

Key specifications

- Supported in GX G34c
- Bi-directional EDFA amplifier with integrated Amplifiers, OSC, OTDR and DGE
- Standard C-band: 4.8875 THz from 191.2625 to 196.15 THz
- Standard L-band: 4.85 THz from 186.05 to 190.90 THz
- Switchable gain EDFA with
 - C-band small gain range of 5 to 18 dB flat gain
 - extended gain range from 5 to 23 dB
 - L-band small gain range of 5 to 16.5 dB flat gain
 - extended gain range from 5 to 21.5 dB
 - C-band large gain range of 11 to 27 dB flat gain
 - extended gain range from 11 to 33 dB
 - L-band large gain range of 9.5 to 24 dB flat gain
 - extended gain range from 9.5 to 30 dB
- Output power per operation band at DWDM Line<n>\Out up to
 - o 21.8dBm in C-band, 20.3dBm in L-band
- Integrated line padding VOAs separate for C and L-bands
- Optical Time Domain Reflectometer (OTDR)
- Dynamic Gain Equalizer (DGE)
- 1GE OSC support with pluggable
- Power consumption: 160W typical; 180W maximum
- Operating temperature: 0°C to +40°C
- Storage temperature: -40°C to +85°C

- Connectors:

- 2 duplex LC connectors for 'DWDM' Line 1 and Line 2 ports
- 4 duplex LC connectors for 'Monitor' ports
- 2 duplex LC connector for "OSC" port
- 2 SFP-DD cage for Optical Supervisory Channel SFP
- 2 SFP-DD cages 'SPU1' and 'SPU2'

*Product features and specifications are subject to change

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