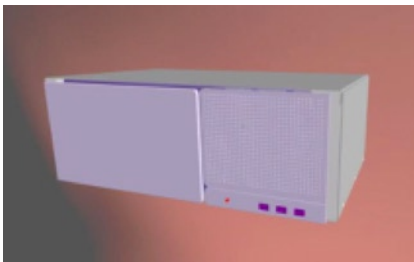


Nu-Wave ES

Long Haul



Nu-Wave ES

- Improves first cost for lower capacity networks
- Modular line system for 30 to 60 to 150 optical channels
- All-Raman amplification facilitates growth beyond 80 channels and 4000 km transmission.

Nu-Wave ES optical line system

Nu-Wave ES is a next generation optical line system that is designed to significantly lower the start-up cost of a highly scalable optical network. The unique architecture makes it ideal for next generation communication providers that will start out with lower capacities, but require the ultimate support of today's emerging bandwidth-intensive applications. The design of the optical line system enables next generation network evolution through the introduction of the latest technologies supporting multi-degree nodes, optical protection, tunable lasers, and higher bit-rate (40 Gb/s and 100 Gb/s) services.

Next generation Pay-As-You-Grow

The acceptance rate for next generation services is often unpredictable. This creates a financial risk for communication network owners that want to be prepared for the inevitable introduction of emerging next generation services. Nu-Wave ES reduces this risk by lowering the start-up costs of next generation networks and redefining the pay-as-you-grow paradigm to include the optical line system.

Prior to the introduction of Nu-Wave ES, pay-as-you-grow was limited to the terminal section of a DWDM transport system. The network owner was forced to invest in the ultimate capacity of the line system, even though he only required a fraction of its capacity.

Nu-Wave ES significantly lowers the initial investment by providing a 63% reduction in the starting optical line system capacity. The optical line system and the terminal system are both expanded as demand for network services increase. The extended scalability of the system also supports higher revenue generation by supporting 87% more capacity than the optical line systems currently deployed in today's network. With Nu-Wave ES, communication providers can profitably deploy new services.

Scalable optical line system

Nu-Wave ES takes advantage of all-Raman amplification to become the world's first truly scalable line system. All-Raman amplification results in superior noise performance when compared to EDFA based systems. Superior noise performance provides networking flexibility that can be used to establish longer amplifier spans and longer all-optical transmission paths. For network operators, this means fewer network elements and in many cases, the complete elimination of intermediate regeneration sites. Nu-Wave ES exploits all-Raman features that allow customization of the optical power profile. The customized profile lowers launch power while using remote pumps to provide gain within the line fiber. This customization keeps the signal level above the system noise floor and below levels that lead to non-linear impairments. The performance gains provided by this method are used to support closer channel spacing and evolution to higher (40 Gb/s and 100 Gb/s) bit rates.

The wide spectral range of all-Raman amplification also provides a benefit that maximizes the operators' use of existing fiber. It enables a flexible channel wavelength allocation that dramatically improves the high-capacity operation of old fibers whose design was not optimized for DWDM systems.

Finally all-Raman amplification, with no transient behavior when large count of optical channels are suddenly added or dropped, is conducive to dynamically reconfigurable optical networks. In addition to cost-effective capacity scalability, Nu-Wave ES offers transmission power scalability by using span extender modules. These modules are used during the initial network design to provide just the right amount of optical gain for each span. This additional degree of scalability eliminates the over engineering of moderate length spans that often occurs when deploying high gain EDFA amplifiers.



Specifications

Optical bandwidth

- 1531.51 nm to 1592.10 nm on 50 GHz ITU-T grid.

Configurations

- 30 channels
- 60 channels
- 150 channels.

Scalability

- 60 to 150 channels (in service).

Reach

- Up to 4000 km @ 6 Tb/s.

Fiber type support

- ITU-T G.652, G.653, G.654, G.655, and G.656.

OSC

- 100 Mb/s @ 1625 nm.

EMS

- Client-server architecture, Netcool ®.

NMS

- End-to-end path management and performance monitoring.

NM interface

- TL1, CORBA.

Craft interface

- Java based GUI with both local and remote access.

Performance monitoring

- B1 and J0 SDH/SONET, etherStats, PCS layer statistics, FEC statistics, optical power and spectrum measurement.

Office alarms and controls

- 16 inputs and 8 outputs.

Transmitter

- 60 channel tunable.

Receiver

- Automatic threshold adjustment, tunable chromatic dispersion compensation @ 40 Gb/s.

Multi-protocol interface cards

- GbE
- 10G: STM-64/OC-192
10 GbE WAN and LAN PHY
OTU2, OTU2e, clear channel,
STM-16/OC-48 (4:1 Transparent Mux),
- 40G: STM-256/OC-768
OTU3
STM-64/OC-192 (4:1 Transparent Mux)
10 GbE; WAN and LAN PHY (4:1 Transparent Mux)
OTU2 (4:1 Transparent Mux).

ROADM/multi-degree node

- Tailored OADMs 2 to 8 degrees per channel reconfigurability.

Dimensions

- 7"(H) X 26"(W) X 11"(D)
- 2200mm(H) x 600mm(W) x 300mm(D).

Footprint

- Terminal: 1 to 3 bays
- ILA:1/3 bay (3 NEs per bay).

Input voltage

- -40 to -72 VDC.

Power consumption

- Terminal Bay 1: 2300 W (typ)
- Terminal Bay 2: 2000 W (typ)

Nu-Wave ES

Long Haul

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- Terminal Bay 3: 1000 W (typ)
- ILA: 270 W (typ).

Compliance

- GR-63-CORE (NEBS), GR-1089
- Zone 4 Seismic
- ETS 3 0-019-1 ROHS.

Laser safety classification

- Class 1M.

EMI/EMC

- FCC Part 15, Class A
- EN50082-1, EN61000-4.

Optical safety

- 21CFR1040.10, 21CFR1040.11
- IEC60825-1, IEC60825-2.