



# Optical Submarine Line Amplifier



Subphoton's new submarine repeater redefines both technology and business metrics for undersea fiber optics infrastructures. Leveraging the concepts of Open Wetplant and Space Division Multiplexing, Subphoton's solution offers unprecedented performance and efficiency to enable open, high fiber count, regional and transoceanic submarine cable systems ready for present and future capacity demands of hyperscalers, telecom service providers, and institutions – at the lowest cost per bit.



## Next Generation Open Wetplant

Designed from the ground up to be compatible with any submarine cable and any line terminal for open, seamless multivendor operations, Subphoton's Optical Submarine Line Amplifier (OSLA) is an innovative repeater optimized in design and efficiency to operate with very high fiber count cables, up to 96 fibers (48 fibers pairs).

Its C+ band amplifiers feature a large flat gain band, and best-in-class low noise figure.

The mechanical design is compact and compatible with existing deployment infrastructures and high voltage requirements. It does not require specific termination for the cable, and it is compatible with lightweight (LW), single-armored (SA), and double-armored (DA) submarine cables. Moreover, the repeater can be supplied with UJ qualified cable joints.

Subphoton's repeater is rated for applications at water depths of up to 8000m.

## Highest Fiber Count

Subphoton's OSLA repeater offers optical amplifier modularity in 4fp steps, with each module providing 8 EDFA amplifiers supporting 38nm optical bandwidth. The maximum number of amplifier modules that can be hosted in the repeater is 12, for a total of 96 amplifiers (48fp) when fully equipped. While the large number of supported fibers enables deployments of future-proof submarine cable systems, its high level of

modularity makes the OSLA economic even when the submarine link does not require full capacity.

## Reliable Design

The electronic and optical design of the amplifier is optimized to reduce the number of active components and provide suitable redundancy, avoiding unwanted points of failure. Its innovative optical pump sharing architecture ensures the highest redundancy and reliability of the system, while minimizing complexity and cost.

## Power Efficiency

The repeater is fed by Power Feeding Equipment (PFE) with 0.9A of line current and is bipolar, allowing fully reversible powering of the transmission line. A patented input power supply architecture offers best-in-class power consumption.

## Unique Mechanical Design and Housing Sealing

Subphoton's OSLA offers several innovations also from a mechanical perspective. Compact bending control devices replace conventional couplers. Two removable bulkheads close the vessel and house the cable interface, having the LW core of the cable entering straight into the repeater. The OSLA repeater is sealed from water penetration by a complete over molding of the pressure vessel, thus implementing a seamless cover between two submarine cable sheaths, and allowing for up to 15kV isolation voltage.



## Technical Specifications

|  | Min                           | Nom  | Max               | Unit |
|--|-------------------------------|------|-------------------|------|
| <b>Optical parameters</b>                                  |                               |      |                   |      |
| Total output power   |                               | 16.5 |                   | dBm  |
| Input power range  | 1                             | 3    | 4                 | dBm  |
| Small signal gain  |                               | 30   |                   | dB   |
| Gain flatness  |                               |      | 0.5               | dB   |
| Noise figure   |                               | 4    | 4.5               | dB   |
| Total wavelength range                                     | 1530                          |      | 1568              | nm   |
| Optical bandwidth  |                               | 38   |                   | nm   |
| <b>Electrical parameters</b>                               |                               |      |                   |      |
| Voltage drop (48 fp)                                       |                               |      | 120               | V    |
| Line current   |                               |      | 0.9 ± 2%          | A    |
| Insulation resistance                                      |                               |      | >10 <sup>10</sup> | Ω    |
| Wallplug efficiency  | >3.2% (110W electrical power) |      |                   |      |
| Isolation voltage  |                               |      | 15                | kV   |
| <b>Mechanical parameters</b>                               |                               |      |                   |      |
| Rigid axial length (external case)                         |                               |      | 1200              | mm   |
| Central diameter   |                               |      | 330               | mm   |
| Maximum external diameter                                  |                               |      | 330               | mm   |
| Weight (fully equipped)                                    |                               |      | 600               | kg   |
| <b>Reliability and Environmental</b>                       |                               |      |                   |      |
| Water depth  |                               |      | 8000              | m    |
| Water temperature  | 0                             |      | +35               | °C   |
| Storage temperature  | -20                           |      | +50               | °C   |
| FIT  |                               |      | <45               |      |
| (1 failure in 15 years over 100 repeater line with 90% CL) |                               |      |                   |      |

### About Subphoton

At Subphoton, we create the building blocks for open submarine cable architectures. We offer wet plant technology and turnkey solutions that maximize system capacity and enable seamless multivendor operations at the lowest cost per bit. We unlock our customers' potential to innovation and efficiency.

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Subphoton Srl  
Via Privata Oslavia, 28  
20134 Milan  
Italy

[www.subphoton.eu](http://www.subphoton.eu)

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