Optical Signal-to-Noise Ratio (OSNR) Measurement with MAP-300 Platform

VIAVI Solutions

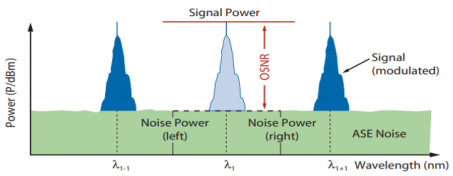
The fiber optic MAP system from VIAVI Solutions is a powerful family of modules, software, and peripherals for characterizing fiber optic components, modules and systems.

- **Full Capability OSNR Conditioning in a Single Platform**
- **Modular Reconfigurable and Scalable**
- **Low Cost of Ownership**
- **Flexible Calibration Paths**

MAP300 Platform

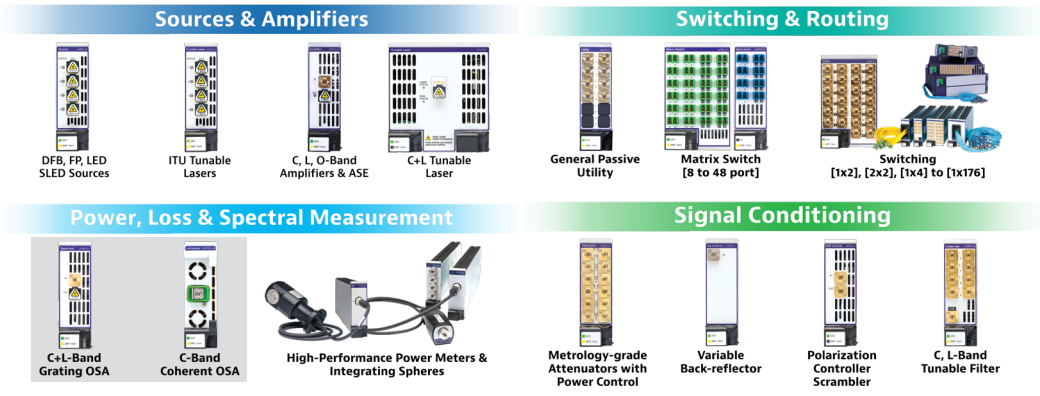
Built on the award-winning VIAVI MAP-300 Optical Test platform, the MAP delivers a scalable test system that can be configured for R&D, production, or qualification test applications to optimize quality, productivity, and capital utilization.

OSNR Measurement Waveform Illustration



$$OSNR = \frac{P_{Signal}}{\frac{P_{Noise\ (L)} + P_{Noise\ (R)}}{2}}$$

MAP LightDirect Portfolio

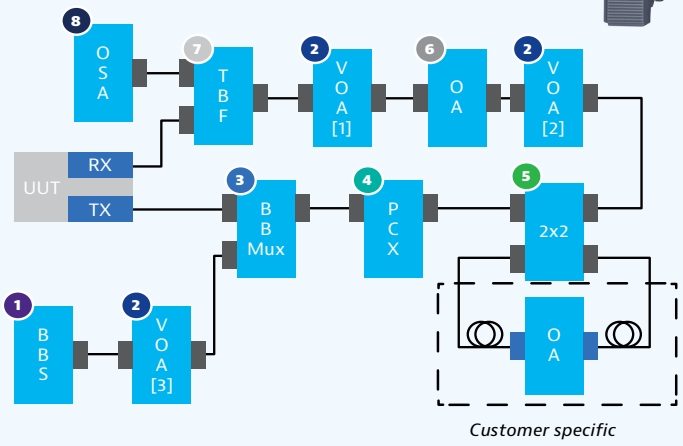


OSNR Introduction

- OSNR is a key performance parameter in optical networks that predicts the bit error rate (BER) of the system
- Measuring the total Signal Power in the channel passband and the amplified spontaneous emission (ASE) noise in the gaps between the optical channels (normalized to a 0.1nm bandwidth)
- Noise power is average from the ASE noise, which is present to the left and to the right of the optical channel

Coherent Test Bed

Varying power levels of OSNR inside a DWDM channel



1	2	3	4	5	6	7	8
mBBS-C1 C-band noise source	mVOA-C1 Quad VOA with out-put power monitor	mUTL-C1 Quad 50/50 coupler	mPCX-C1 Pol Scramber/ controller	mOSW-C1 2x2 cross bar switch	mEDFA-C1 C-band amplifier with Gain and Power Control	mTFX-C2 C-band Tuneable Filter Switch	mOSA-C1 CL-Band OSA

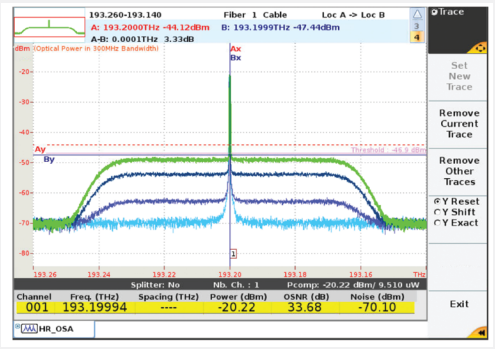
Block Function Description

Slot 1: C-band BBS for noise loading
Slot 2: Quad VOA
- D1: Control Final RX power
- D2: Manage power into final OA
- D3: Control ASE injection Level

Slot 3: Utility cassette with 50/50 coupler
Slot 4: Polarization scrambler (optional) for emulation of fiber SOP dynamics
Slot 5: 2x2 Switch for fiber span insertion
Slot 6: Optical amplifier
Slot 7: DWDM/ROADM filter shape emulation and interated switch OSA

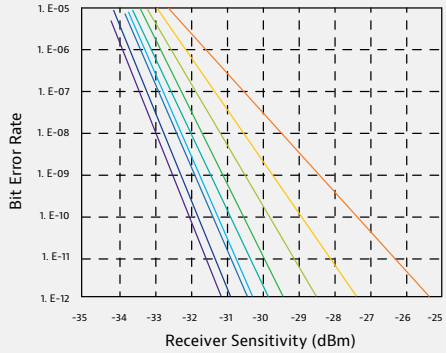
Coherent Signal Conditioning Types

i) OSNR Penalty



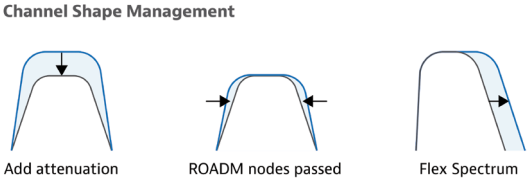
Varying power levels of OSNR inside a DWDM channel

ii) RX Sensitivity



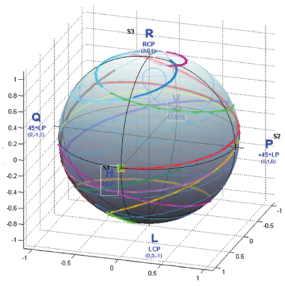
BER measured as a function of power delivered to the RX

iii) DWDM Filter Emulation



Emulates the DWDM Network Filter & ensures only In-Band OSNR reaches the RX

iv) Dynamic SOP Emulation



Emulate changes to the state of the polarization as it interacts with small changes in the optical fiber

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