
Tunable SONET/SDH BERT for 2.488 Gb/s WDM

Product Note



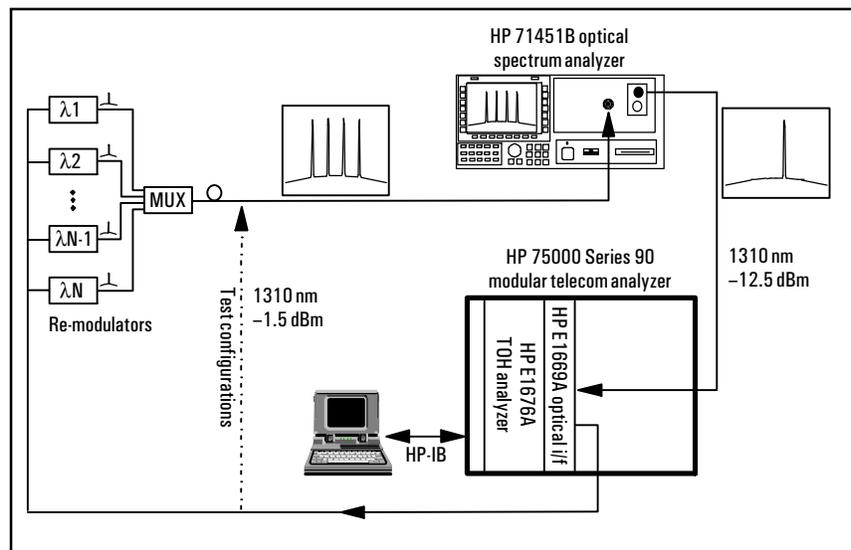
Used as a tunable, bandwidth-variable filter for the HP 75000 Series 90 modular telecom analyzer, the HP 71451B optical spectrum analyzer's monochromator allows access to individual channels of a WDM signal for BERT measurements.

Introduction

The potential capacity of a single optical fiber has been exploited through wavelength division multiplexing (WDM), where signals at different wavelengths are multiplexed onto a single fiber to increase the fiber's capacity and, therefore, efficiency. But the addition of WDM components, such as system amplifiers and wavelength division multiplexers, into the optical network can degrade system performance. To measure the effects of these components on signal integrity, it is desirable to measure the signals channel by channel prior to demultiplexing individual wavelengths.

Measurement configuration

For channel-by-channel analysis, the equipment is configured as shown below with the multi-mode output of the monochromator applied to the receiver of the multi-mode HP E1669A optical interface. The spectrum analyzer acts as a tunable optical preselector in this system.



The monochromator output on the HP 71451B optical spectrum analyzer allows the user access to the channel of interest, giving full control over the wavelength and resolution bandwidth while preserving the input signal's state of polarization.

Conventional SONET/SDH bit error rate test (BERT) measurements, together with overhead and payload analysis, can be performed on the selected wavelength using the Series 90 analyzer.

Loss budget

To determine the usefulness of this method in actual WDM networks, the output power of the Series 90 analyzer was reduced with an attenuator until BIP errors were detected. Over 20 dB of attenuation was added before errors occurred, corresponding to a receive power at the HP E1669A optical interface of approximately -33 dBm, well beyond the specified sensitivity. This implies a sensitivity at the input of the HP 71451B optical spectrum analyzer of approximately -20 dBm.

These results indicate that this method has useful sensitivity for BERT analysis in existing WDM systems provided signal levels are above -20 dBm.

If you intend transmitting at multiple wavelengths, the HP E1669A optical interface transmitter can be ordered with selected wavelengths. This allows multiple transmitters to be installed simultaneously in the HP 75000 Series 90 modular telecom analyzer for greater test versatility.

Product description

HP 75000 Series 90 modular telecom analyzer

Offers a flexible approach to the testing of telecommunications network elements conforming to SONET, SDH and ATM standards. Based on industry standard VXI hardware, the analyzer consists of a series of C-sized modules each addressing a specific aspect of SONET, SDH and ATM testing. Modules are easily added or removed to match current and changing test requirements. For further information refer to technical specifications 5964-9881E.

HP 71451B optical spectrum analyzer

Cuts measurement time in the laboratory and on production floor with fast spectral measurements of LEDs, Fabry-Perot lasers, DFB lasers and Erbium-doped fiber amplifiers. It offers high amplitude and wavelength accuracy (over the 600 to 1700 nm wavelength range) and is capable of sweeping the full frequency range in 500 ms. For further information refer to technical specifications 5963-7040E.

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