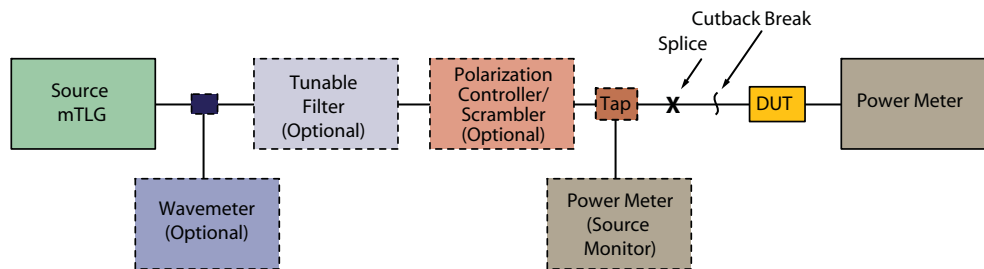


Insertion Loss - Fixed Wavelength

Introduction

Insertion loss is the most fundamental of all the measurements required for passive fiber optic components. It relates the coupled input power to the output power through the device under test. It will vary as a function of wavelength and state of input polarization, and should be quoted with knowledge of both of these parameters. Like most measurements, the complexity will vary depending on the accuracy required.



Measurement Method

In general, the simplest implementation requires only an optical source and broadband power meter. By adding the above optional blocks, the measurement can be made more accurate and with more accurately stated input conditions. The measurement is a two-step process. In the first step, the DUT is spliced into place as shown above. The power is measured on the both the power meter and the source monitor. The second step requires the device be cut from the input fiber and measured directly. It is important to ensure that the original splice is included in the measurement so that its loss may be recorded. If connectors are used then their connection uncertainty must be included in the reported accuracy.

$$IL = (P[\text{dBm}] - P_{\text{SourceMonitor}}[\text{dBm}])_{\text{DUT}} - (P[\text{dBm}] - P_{\text{SourceMonitor}}[\text{dBm}])_{\text{CutBack}}$$

The use of a tunable filter will remove background ASE noise from the source and is necessary for measurement of devices such as channel drops or rejection filters. The polarization controller or scrambler can be used to depolarize or control the state of polarization (SOP). For scrambling it is important to make sure that the averaging time of the power meter is set much greater than the time it takes for the scrambler to cover all SOP. It is important to remember that the measurement represents an average over the bandwidth of the optical source.

DUT

WDMs, DWDMs, isolators, circulators, switches, taps, splitters, GFF

Standards

TIA/EIA 455-180-A Measurement of Optical Transfer Coefficients of a Passive Branching Device (Coupler)

IEC 61300-3-4: Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 3-4: Examinations and measurements - Attenuation

Product References

This test can be built by several components or from meters, which incorporate several of the blocks (JDSU Multichannel Backreflection Meter). The parts required for a modular approach are shown below.

Tunable DFB Laser	mTLG
Tunable Filter	mTBF
Polarization Controller	mPCS
Optical Power Meter	mOPM
Wavemeter	External vendor

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