



Agilent N7782B PER Analyzer and N7783B Thermal Cycling Unit

Data Sheet



Key Benefits

- Accurate PER-measurement up to 50 dB
- Real-time display
- Easy-to-use: Reliable results independent of operator skill set
- Swept-wavelength and heating/stretching method available
- Measurement of the PER versus wavelength
- Fast/slow axis detection
- Instruments available for 850 nm up to 1640 nm
- Internal fixed wavelength sources at 850 nm/1310 nm/1550 nm available.

Introduction

Agilent's N7782B Series of polarization extinction ratio (PER) Analyzers has been designed for high speed and highly accurate testing of PER in PM fibers. The polarimetric measurement principle guarantees reliable measurements of PER values of up to 50 dB.

The real time measurement capability in combination with automation interfaces makes this unit ideally suited for integration in manufacturing systems, for example pig-tailing stations for laser diodes and planar wave guide components. Analog interfaces are provided for integration of the system in control loop applications.



Applications

Laser diode PMF pig-tailing

Alignment of the PM fiber during the pig-tailing process is supported by real-time display of the PER and the optical power.

PMF splicing

In order to support the alignment during the splicing process of PM fibers the Agilent N7782B provides real-time display of the optical power and of the angular misalignment of the two fibers.

PM component characterization

Measurement of the PER on PM components like fiber polarizers, PMF couplers, PMF splitters, etc.

Characterization of PMF cross-coupling

Polarization crosstalk in a PM fiber is measured and displayed as PER.

PM splice characterization

The angular misalignment of a PM splice can be measured in a non-destructive way. Even multiple splices in a chain can be characterized independently.

Using Agilent's tunable laser source 81600B Series in combination with the N7782B PER analyzer allows measuring the PER as a function of wavelength.

Agilent's software package includes drivers for most of the tunable laser sources commonly used in industry.

N7782B and N7783B Application Examples

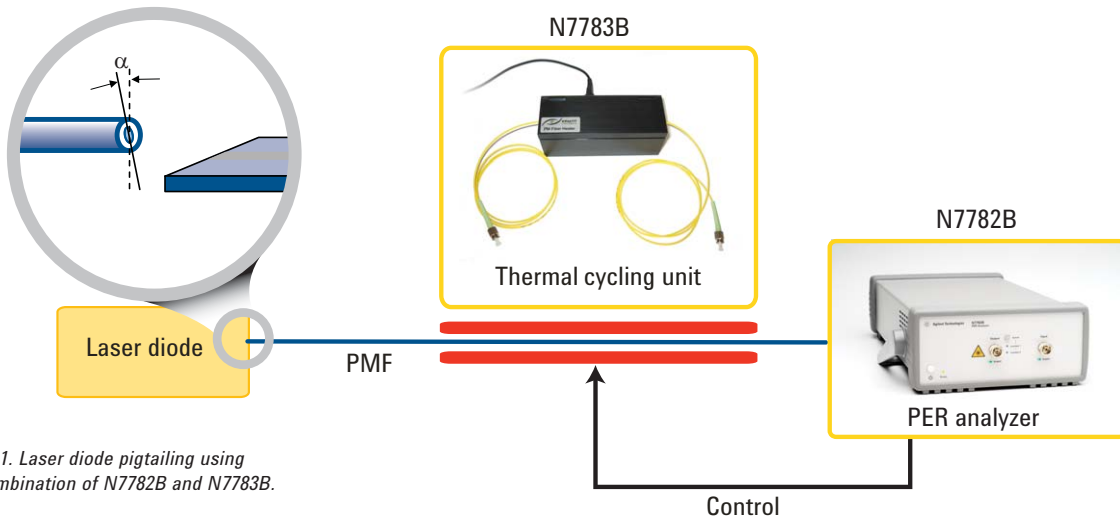


Figure 1. Laser diode pig-tailing using the combination of N7782B and N7783B.

The heating / stretching method

The heating / stretching method provides accurate measurements of the PER at a single wavelength.

This method supports in particular well the measurement using narrow-band laser sources.

An optional internal laser source allows stand-alone operation of the system.

Agilent's thermal cycling unit, N7783B, is fully controlled by the N7782B PER analyzer and allows accurate and repeatable cycling of the temperature of the fiber under test. The PER measurement system consisting of the N7782B and the N7783B shows excellent accuracy and repeatability. Ease of use and automation interfaces, such as analog output ports for active alignment, make it particularly useful for production environments.

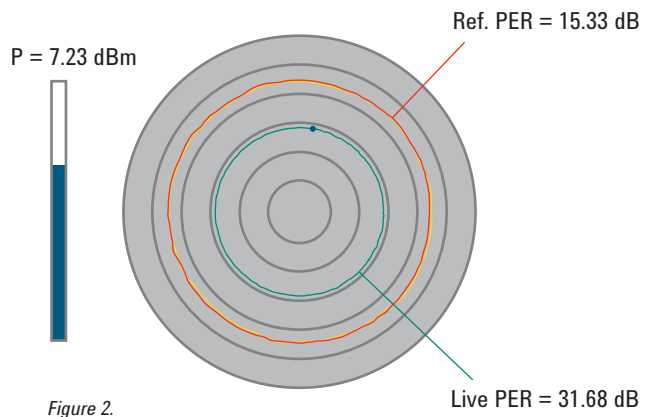


Figure 2.

Splice angle characterization

For characterizing an optical connection between two polarization maintaining fibers (PMFs), such as an optical splice, two thermal cycling units (N7783B) can be used. This eliminates the influence of input polarization or subsequent fibers at the output and isolates the angular misalignment of the connection located between the two thermal cycling units.

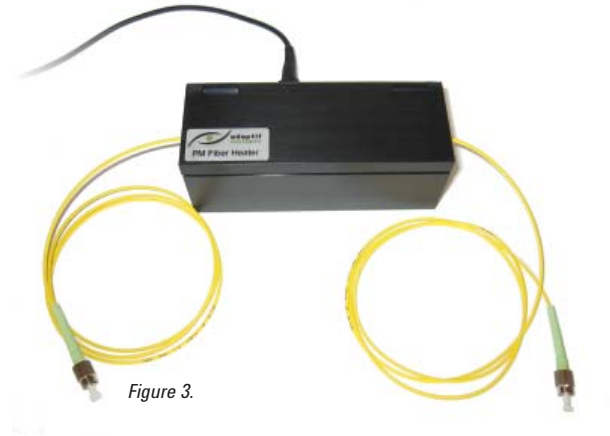


Figure 3.

Table 1: Specifications^{a)} N7782B PER Analyzer

Wavelength		
Specification Wavelength Range	1270 nm ... 1375 nm (Opt 300, O-Band) 1270 nm ... 1375 nm, 1460 nm ... 1620 nm (Opt 400, O/C/L-Band) 1460 nm ... 1620 nm (Opt 500, C/L-Band)	
Operating wavelength range ^{b)}	1260 nm ... 1640 nm	
PER Analysis		
PER Range ^[c,d]	0 ... 50 dB	
PER Uncertainty, Single-TCU Method ^[c,d] (typical)	PER= 0 dB ... 30 dB:	0.30 dB
	PER= 30 dB ... 50 dB:	0.60 dB
Splice Angle Analysis		
Splice Angle Uncertainty, Dual-TCU Method ^[c,d] (typical)	$\pm(0.1^\circ + 4\% \cdot \text{Angle})$	
Optical Power		
Input Power Range	-50 dBm ... +7 dBm	
Internal Laser Source		
Wavelength	O-Band (Opt. 401):	1290 nm ... 1360 nm, 1310 nm typ.
	C-Band (Opt. 501, 401):	1510 nm ... 1580 nm, 1550 nm typ.
Output Power ^[e] (typical)	O-Band (Opt. 401):	-12 dBm
	C-Band (Opt. 501, 401):	-10 dBm

[a] Ambient temperature change max. $\pm 0.5^\circ\text{C}$ since normalization. Specification valid on day of calibration.

[b] PER measurements are possible outside the specification wavelength range if the user performs a manual calibration. Note that a fully polarized light source is needed for calibration.

[c] Input power > -30 dBm

[d] Narrow-band light source with DOP > 95% needed.

[e] At room temperature.

Table 2: Specifications^{a)} N7782B-101 PER Analyzer

Wavelength		
Specification Wavelength ^[e]	850 nm nominal	
Operating Wavelength Range ²⁾	830 nm ... 1000 nm	
PER Analysis		
PER Range ^[c,d]	0 ... 40 dB	
PER Uncertainty, Single-TCU Method ^[c,d] (typical)	PER= 0 dB ... 30 dB:	0.30 dB
	PER= 30 dB ... 40 dB:	0.60 dB
Splice Angle Analysis		
Splice Angle Uncertainty, Dual-TCU Method ^[c,d] (typical)	$\pm(0.1^\circ + 5\% \square \text{ Angle})$	
Optical Power		
Input Power Range	-35 dBm ... +10 dBm	
Internal Laser Source		
Wavelength	830 nm ... 880 nm, 850 nm typ.	
Output Power ^[f] (typical)	- 11 dBm	

- [a] Ambient temperature change max. $\pm 0.5^\circ\text{C}$ since normalization. Specification valid on day of calibration.
- [b] PER measurements are possible outside the specification wavelength range if the user performs a manual calibration
Note that a fully polarized light source is needed for calibration.
- [c] Input power > -20 dBm
- [d] Narrow-band light source with DOP > 95% needed.
- [e] The specification wavelength matches the wavelength of the internal laser source.
- [f] At room temperature.

Table 3: Specifications^{a)} N7783B Thermal Cycling Unit

Temperature	
Minimum Peak-to-Peak Temperature Tuning Range ^[b]	50 K
Ambient Temperature Range	20°C ... 30°C

- [a] Ambient temperature change max. $\pm 0.5^\circ\text{C}$ since normalization. Specification valid on day of calibration.
- [b] Measured on the surface of the TEC elements.

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Product specifications and descriptions in this document subject to change without notice.

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