Keysight Technologies N7782B PER Analyzer and N7783B Thermal Cycling Unit

Data Sheet

KEYSIGHT TECHNOLOGIES

Introduction

Keysight Technologies 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.

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 1260 nm up to 1640 nm.
- Internal fixed wavelength sources available at 1310 nm and 1550 nm.

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 Keysight 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.

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

N7782B and N7783B application examples

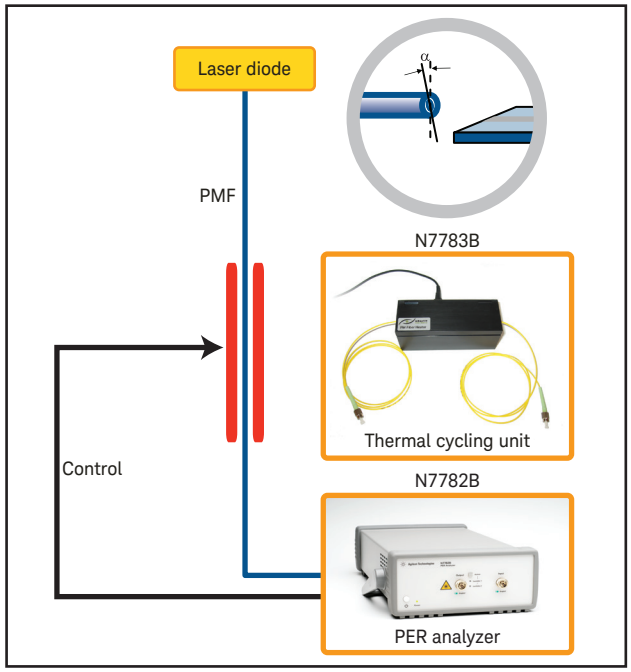

Figure 1. Laser diode pigtailing using the combination of N7782B and N7783B.

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.

Keysight'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.

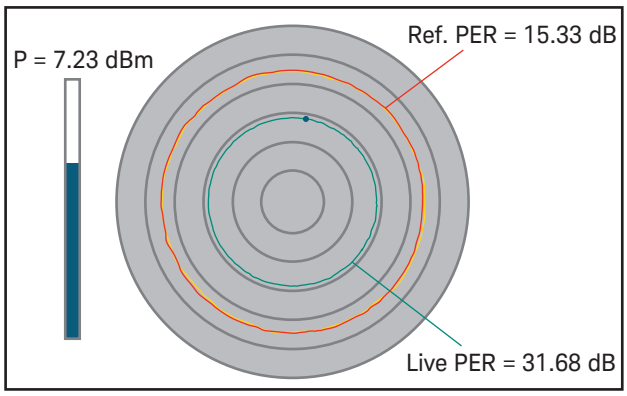

Figure 2.

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.

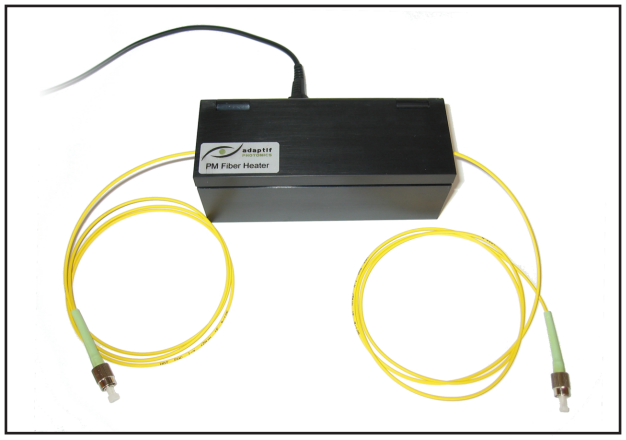

Figure 3.

Specifications [1] N7782B PER Analyzer		
Wavelength		
Specification wavelength range	O-Band (Opt. 300)	1270 nm to 1375 nm
	O/C/L-Band (Opt. 400)	1270 nm to 1375 nm
		1460 nm to 1620 nm
	C/L-Band (Opt. 500)	1460 nm to 1620 nm
Operating wavelength range [2]	1260 nm to 1640 nm	
PER analysis		
PER range [3, 4]	0 dB to 50 dB	
PER uncertainty, single-TCU method (typical) [3, 4]	PER= 0 dB to 30 dB	0.30 dB
	PER= 30 dB to 50 dB	0.60 dB
Splice angle analysis		
Splice angle uncertainty, dual-TCU method (typical) [3, 4]	± (0.1° + 4% x Angle)	
Optical power		
Input power range	-50 dBm to +7 dBm	
Internal laser source		
Wavelength	O-Band (Opt. 401)	1290 nm to 1360 nm
		1310 nm typical
	C-Band (Opt. 501, 401)	1510 nm to 1580 nm
		1550 nm typical
Output power (typical) [5]	O-Band (Opt. 401)	–12 dBm
	C-Band (Opt. 501, 401)	–10 dBm

1. Ambient temperature change max. ± 0.5 °C since normalization. Specification valid on day of calibration.
2. 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.
3. Input power > -30 dBm.
4. Narrow-band light source with DOP > 95% needed.
5. At room temperature.

Specifications [1] N7783B Thermal Cycling Unit	
Temperature	
Minimum peak-to-peak temperature tuning range (typical) [2]	50 K
Ambient temperature range	20 °C to 30 °C
Ordering instructions	
Optical connector options	
N7782B-021	Straight contact connectors
N7782B-022	Angled contact connectors
Wavelength and source options	
N7782B-400	1270 to 1375 nm and 1460 to 1620 nm
N7782B-401	1270 to 1375 nm and 1460 to 1620 nm with 1300/1550 nm dual VCSEL source
N7782B-500	1460 to 1620 nm
N7782B-501	1460 to 1620 nm with 1550 nm VCSEL source
Connector interface	
The N7782B should usually be ordered with one or two 81000xI connector interfaces, depending on desired connector type and on whether a source option is selected (not included).	
Accessories	
5063-9240	Rack mount kit for 1 unit with filler panel
5063-9212 + 5061-9694	Rack mount parts for 2 units side-by-side
Warranty	
Select coverage	
Included	3-year warranty (return to Keysight), standard
R-51B-001-5Z	5-year warranty assurance plan (return to Agilent): Priority warranty service includes one-time coverage for an EOS/ESD failure.
Calibration	
Select Agilent calibration plan	
R-50C-011-3	3-year calibration assurance plan (return to Keysight): Priority calibration service covering all calibration costs for 3 years; 15% cheaper than buying stand-alone calibrations.
R-50C-011-5	5-year calibration assurance plan (return to Keysight): Priority calibration service covering all calibration costs for 5 years; 20% cheaper than buying stand-alone calibrations.
General characteristics	
Dimensions (D x W x H)	380 mm x 213 mm x 88 mm (excluding front and back rubber cushions and handle)
For N7783B	160 mm x 57 mm x 62 mm
Weight	Approx. 4 kg
Recommended recalibration period	24 month
Operating temperature	+5 °C to +40 °C
Operating humidity	0% to 80%, non-condensing
Altitude	The maximum operating altitude is 2000 m.
Pollution protection	Pollution degree 2.
Warm-up time	20 minutes
Interfaces	The instruments can be controlled via USB or GPIB interfaces
Power consumption	Line power: AC 100 to 240 V ± 10%, 50/60 Hz, 60 VA max.
For N7783B	Line power: AC 100 to 240 V ± 10%, 47 to 63 Hz, 1.0 A max.

1. Ambient temperature change max. ± 0.5 °C since normalization. Specification valid on day of calibration.
2. Measured on the surface of the TEC elements.

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