Keysight 81490A
Reference Transmitter

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81490A Reference Transmitter

The Keysight Technologies, Inc. 81490A Reference Transmitter is designed to offer excellent eye quality as a reference for testing 10GbE -LR/-ER, 10G Fibre Channel and short reach transceivers, such as 10GBase-SR, 40GBase-SR4, 100GBase-SR10 and according to 10 GFC Fibre Channel specifications. The modules are fully integrated into the industry standard Lightwave Measurement System (LMS) 816xB platform.

The Reference Transmitter is available for Multimode 850 nm and Singlemode 1310 nm/1550 nm applications. Offering both 1310 nm and 1550 nm in one module gives the fastest reconfiguration between these two transmission bands without reconnecting. The integration in the LMS mainframe offers an integration of the reference transmitter into the N4917A stressed eye software package. Of course a separate usage of the transmitter is also supported with SCPI language.

The separation of the signal source and the modulator is the only way to offer a zero-chirp modulation. This is essential for a clean and repeatable eye diagram when modulating with an appropriate clean external source to fulfill the requirements of the IEEE standard. Another advantage of this design compared to directly modulated transmitters is the wide extinction ratio range that can only be achieved with this design.

Benefits

- Repeatable and reproducible measurements permit lower production test margins and improved specifications of the characterized devices.
- Reliable measurements ensure comparability of the test results.
- Support for full compliance to IEEE 802.3 stressed eye test in combination with the N4917A Optical Receiver Stress Test solution.
- Wide extinction range offers highest test range coverage to ensure best quality of the tested devices under all target operating conditions.
- Rapid test reconfiguration with dual-wavelength to switch between 1310 nm and 1550 nm by remote control or manually without exchanging a module.
- Scalability with integration into industry-standard Keysight LMS platform extends your optical workbench capabilities.

Application

- Reference transmitter for stressed eye compliance test according to IEEE 802.3.
- Creation of arbitrary optical modulation signals in combination with waveform generators.
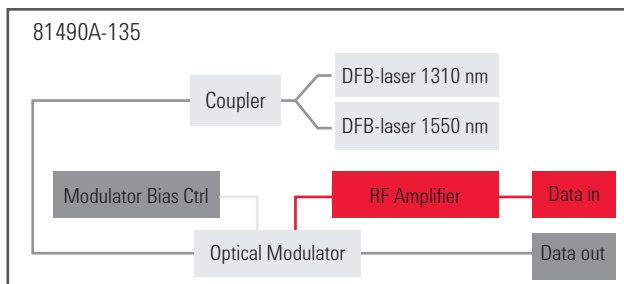- General transmission system test with special pulse patterns in combination with a pattern generator.

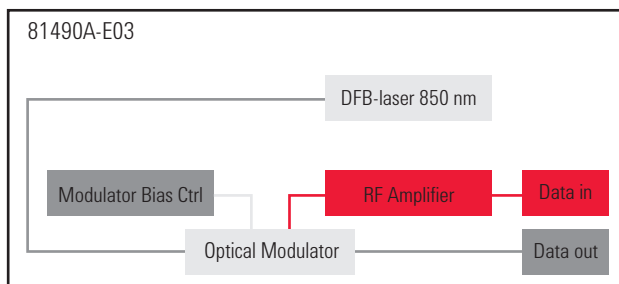Figure 1. 81490A-135 1310 nm/1550 nm reference transmitter

Figure 2. 81490A-E03 850 nm reference transmitter

Specifications

	81490A-135	81490A-E03
Data input (RF In)		
Operational data rate	622 Mb/s to 14.2 Gb/s	622 Mb/s to 14.2 Gb/s
Input voltage range for	Up to 0.9 Vpp (typical @ 1310 nm) Up to 1.1 Vpp (typical @ 1550 nm)	Up to 1.0 Vpp (typical)
Maximum input voltage	< 2 Vpp (from –2V to +2V)	
Input impedance (nominal)	50 Ω	
Data Output (Optical out)		
Fiber type	Standard single-mode 9/125 µm	Multimode fiber 50 µm
Laser type	CW DFB laser with built in isolator	
Optical wavelength	λ : (1310 ±10) nm λ : (1550 ±10) nm	λ : (850 ±10) nm
Average optical output power [1,2]	> 5 dBm	> 0.0 dBm
Attenuation range (nominal)	6 dB	
Electro-optical modulation bandwidth [3]	10 MHz to 33 GHz (typical)	10 MHz to 20 GHz (typical)
Electro-optical conversion ratio [2,5]	> 5 mW/V	> 1.0 mW/V
Relative intensity noise (RIN) [4,5]	< –136 dB/Hz	< –136 dB/Hz (typical)
Maximum extinction ratio (ER) [5]	> 10 dB (dependant on input voltage amplitude)	
Vertical eye closure penalty [5,6]	< 0.5 dB (typical)	< 0.7 dB (typical)
Rise and fall time (20% to 80%) [4,5]	< 25 ps 17 ps (typical)	20 ps (typical)
Jitter (peak-peak) [5,7]	< 18 ps < 12 ps (typical)	< 18 ps (typical)

1. After TX_Recal operation
2. At attenuation 0 dB
3. –6 dB decrease relative to maximum response
4. For 0.6 V_{pp} to 0.85 V_{pp} data at 1310 nm; for 0.6 V_{pp} to 1.0 V_{pp} data at 1550 nm; for 0.6 V_{pp} to 1.0 V_{pp} data at 850 nm
5. At data rates 10.3125 Gb/s, 10.51875 Gb/s; for whole operational data range typical; temperature change < ± 1 K and operation point adjusted to 50% eye crossing
6. At 1% center region
7. Jitter of input signal < 10 ps

General specifications

Optical connector interface	Keysight universal adapter SMF 28
RF connector interface	2.4 mm female
Module size (H x W x D)	75 mm x 64 mm x 335 mm (2.8" x 2.6" x 13.2")
Module weight	1.0 kg (2.2 lbs)
Warmup time	60 min
Operating temperature	+5 °C to +40 °C
Storage temperature	–40 °C to +70 °C
Humidity	5% to 95% relative humidity, non-condensing
816xA/B firmware revision	5.25 and higher
Recommended recalibration period	2 years

Ordering Information

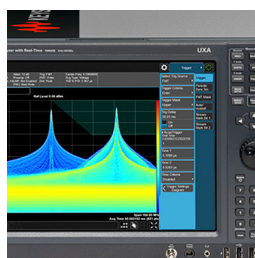| 81490A Reference Transmitter	
-135	1310 nm and 1550 nm
-E03	850 nm

Cal	
R 1280	Return-to-Keysight
R-51B-001-3A	3 month Return-to-Keysight
E-50C-011-3	Keysight Calibration Upfront
	Support plan 3 year coverage

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