

32 Gbit/s Jitter Tolerance Test Solution

MP1800A Series Signal Quality Analyzer Software Version 7.9

Data centers are seeing explosive growth in traffic due to the rapid spread of cloud computing services. As a result, new high-speed communications standards, such as InfiniBand EDR, 32GFC, 100GBASE-SR4, KR4, CR4, etc., are being examined as solutions to increasing server and network processing speeds as well as communications speeds between equipment. Jitter Tolerance is a key index for evaluating the receiver characteristics of PHY devices, such as SERDES, etc., used by these high-speed serial communications. Jitter Tolerance demands rise in line with rising bit rates, requiring tests to ensure that the receiver Jitter Tolerance has sufficient accuracy and margin.

The MU181500B Jitter Modulation Source generates wide-amplitude SJ up to 1 UI at a Jitter Frequency of 250 MHz, ensuring sufficient margin for receiver Jitter Tolerance tests. Additionally, the Intrinsic Jitter of 275 fs rms (typ.) is extremely low, not only when Jitter modulation is OFF but also when 0 UI is set at Jitter ON, ensuring accurate measurements even at low Jitter amplitudes. Moreover, as well as supporting RJ, BUJ, SSC, and Dual Tone SJ, even the latest standards, such as CEI-28G, 100 GbE, etc., are supported too.

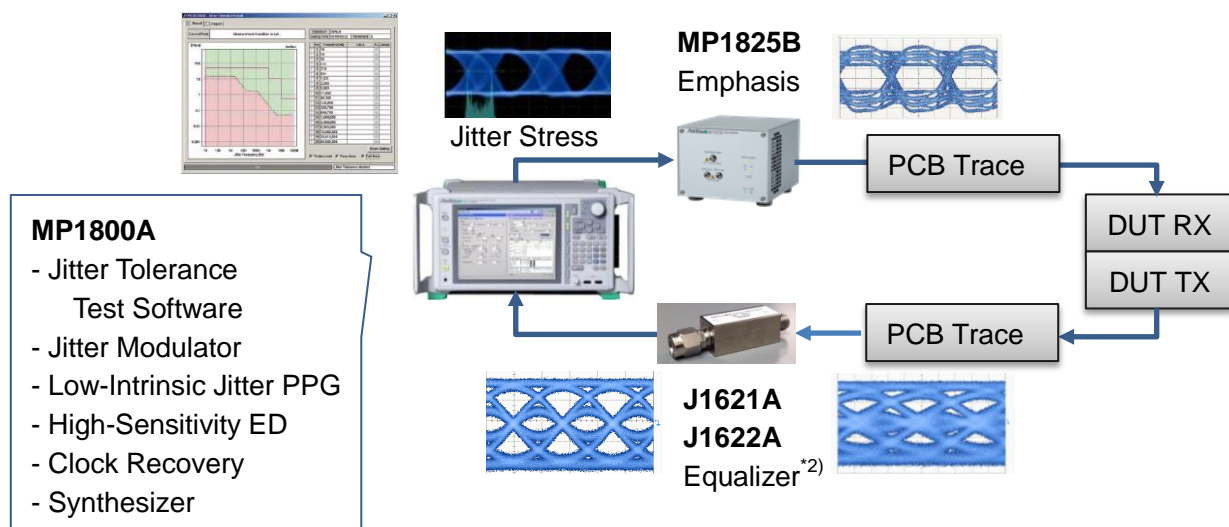
MP1800A Signal Quality Analyzer with Low-Intrinsic Jitter PPG, 4TAP Emphasis, High-Sensitivity ED, Equalizer for EYE Opening compensation, and automatic measurement software is the ideal total solution for Jitter Tolerance tests.

■ Target Applications

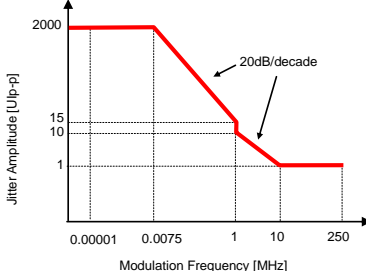
- ✓ High-Speed Backplanes and Cables: 100 GbE (100 GBASE-KR4, CR4)
- ✓ SERDES, CDR: CEI-25 G, CEI-28 G-VSR
- ✓ AOC (Active Optical Cables): InfiniBand™ FDR (14 G), EDR (26 G)
- ✓ Optical Transceiver Modules: CFP/CFP2/CFP4, QSFP+/QSFP28, CXP for 16 G/32 G Fibre Channel, 100 GbE (100 GBASE-SR4, LR4, ER4), OTU4 (28 G x 4)

■ Features

- ✓ Supports SJ, RJ, BUJ, SSC, Dual Tone SJ
- ✓ Wide-amplitude SJ generation: 1 UI @ fm 250 MHz
- ✓ Low-Intrinsic Jitter PPG/Emphasis: RJ = 275 fs rms (typ.) ^{*1)} @ Jitter = ON, 0 UI
- ✓ High-Sensitivity ED: 10 mV (typ., single-end, EYE Height)
- ✓ Built-in clock recovery: Supports TRx asynchronous SERDES Jitter tolerance tests



■ Typical Specifications

Model	Item	Specification
MU181500B Jitter Modulation Source	Jitter Injection ³⁾	Range/Step @ Jitter Modulation Frequency
	SJ Updated	0 to 2000 Ulp-p/0.002 UI @ fm 10 Hz to 100 kHz 0 to 200 Ulp-p/0.002 UI @ fm 100.1 kHz to 1 MHz 0 to 16 Ulp-p/0.002 UI @ fm 1.001 MHz to 10 MHz 0 to 1 Ulp-p/0.002 UI @ fm 10.01 MHz to 250 MHz
	RJ	0 to 0.5 Ulp-p/0.002 UI @ fm 10 kHz to 1 GHz Built-in HPF: 10 MHz, 20 MHz, Thru Built-in LPF: 100 MHz, Thru
	BUJ	0 to 0.5 Ulp-p/0.002 UI @ BUJ Rate 12.5 Gbps max. Built-in LPF: 50, 100, 200, 300, 500 MHz, Thru
	SSC Updated	0 to 5300 ppm/ppm @ fm 28 to 37 kHz/1 Hz Down-Spread, Center-Spread or Up-Spread
	SJ2 ⁴⁾ (for Dual Tone SJ)	0 to 50 Ulp-p/0.002 UI @ fm 10 Hz to 1 MHz 0 to 10 Ulp-p/0.002 UI @ fm 100.1 MHz to 10 MHz 0 to 0.55 Ulp-p/0.002 UI @ fm 10.01 MHz to 250 MHz
	External	Jitter Frequency Range: 10 kHz to 1 GHz
MU183020A/21A 28G/32G bit/s PPG	Data Output	
	Number of Channels	1ch (MU183020A-012/013), 2ch (MU183020A-022/023) 4ch (MU183021A)
	Amplitude	0.5 to 2 Vp-p (MU183020A-012/022, MU183021A-012) 0.5 to 3.5 Vp-p (MU183020A-013/023, MU183021A-013)
	Intrinsic Jitter ^{*1)}	275 fs rms (typ.) with Jitter = ON/0 UI setting
MU183020A/21A 28G/32G bit/s PPG + MU183040A/41A 28G/32G bit/s ED	System Jitter Tolerance Updated	 <p>Typical values at 28 Gbit/s</p>

Updated The Jitter amounts described above are supported by Software Version 7.9 and newer.

- *1) Phase noise measurement with using Spectrum Analyzer and 1010...repetition signal.
- *2) Please see Equalizer Leaflet MP1800A_28GEQ-Leaflet-E-L-1.
- *3) The Jitter generation range/step differs with the set bit rate and clock frequency. This example describes the case for a bit rate of 28 Gbit/s (14 GHz clock frequency). The BERT system Jitter Tolerance is limited by the PPG and ED.
- *4) The MU181000A/B-001 Jitter Option is required.

■ Ordering Information

Model Number	Model Name
MP1800A	Signal Quality Analyzer
MU183020A	28G/32G bit/s PPG
MU183021A	28G/32G bit/s 4ch PPG
MU183040B	28G/32G bit/s High Sensitivity ED
MU183041B	28G/32G bit/s 4ch High Sensitivity ED
MU181500B	Jitter Modulation Source
MU181000A	12.5GHz Synthesizer
MP1825B	4TAP Emphasis
MX181500A	Jitter/Noise Tolerance Test Software
J1621A ^{*2)}	Passive Equalizer 3dB
J1622A ^{*2)}	Passive Equalizer 6dB

Please refer to the product brochure, MP1800A Series 32 Gbit/s Signal Integrity Test Solution.
(MP1800A_32G-E-A-1)