Leaflet

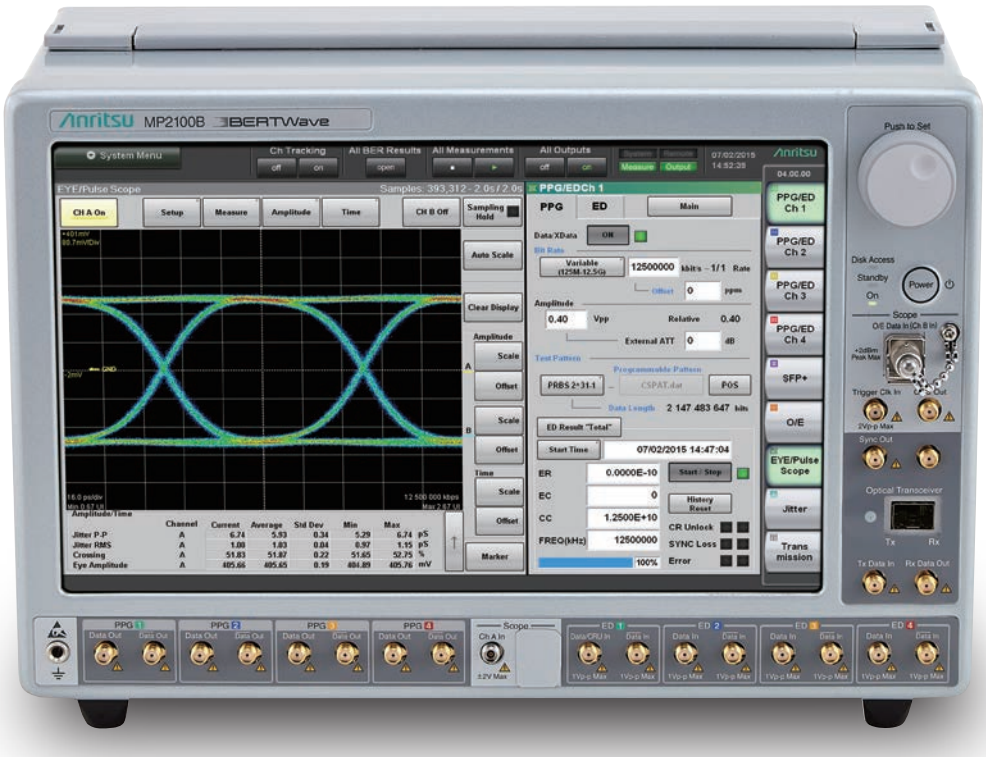
Anritsu envision : ensure

Multichannel Optical Module Evaluation Solution

All-in-one: 4ch BERT + Sampling Oscilloscope

BERTWave MP2100B

BERTWave

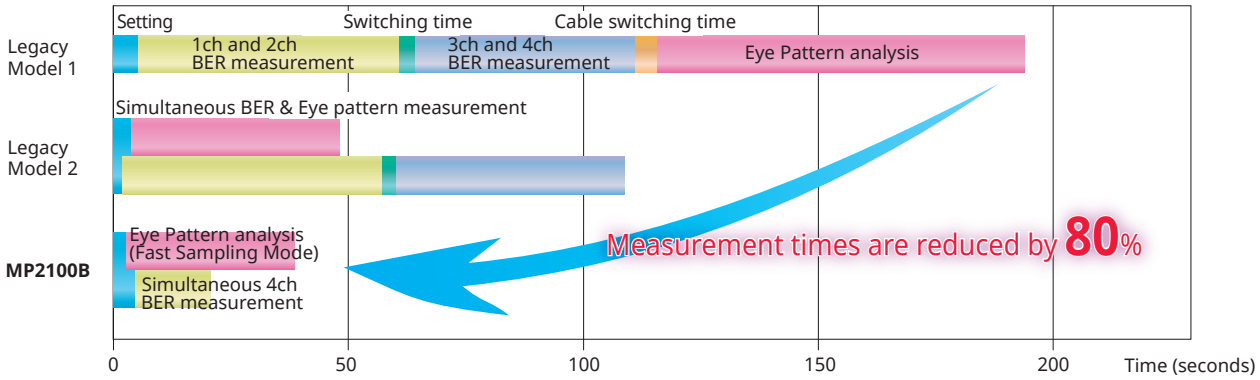


Data centers are using more optical modules as cloud computing becomes more widespread and demand for modules supporting 10 GbE SFP+ and 40 GbE (10 Gbit/s × 4) QSFP+ is especially high.
The all-in-one BERTWave MP2100B with both Bit Error Rate Tester (BERT) and sampling oscilloscope supports the simultaneous BER tests and Eye pattern analyses required for development and manufacturing of optical modules. It can be expanded to supports simultaneous BER measurements up to 4ch, while high-speed sampling reduces Eye pattern analysis times, offering even more efficient measurement of parallel optical modules, such as QSFP+.

Features

- Simultaneous BER & Eye pattern measurement
- Simultaneous 4ch BER measurements
- Wideband 125 Mbit/s to 12.5 Gbit/s BERT
  - · All-in-one support from OC-3/STM-1 to 40 GbE
  - · Variable in 1 kbit/s steps from 125 Mbit/s to 12.5 Gbit/s
- Fast Eye pattern analyses
  - · Fast Sampling Mode: 150 ksample/s max.
- High-quality PPG and high-sensitivity ED
  - · PPG Tr/Tf: 24 ps
  - · PPG Jitter: 1 ps rms typ.
  - · ED Sensitivity: 10 mVp-p typ.

Comparison of 40 Gbit/s (10 Gbit/s × 4ch) QSFP+ BER Measurement Times



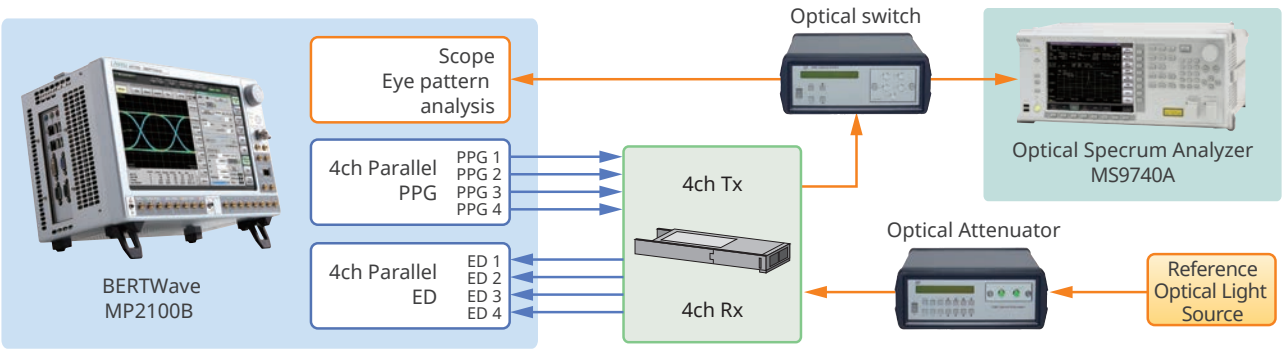
Legacy Model 1 is a combination of a 2ch BERT and sampling oscilloscope.
Legacy Model 2 integrates a 2ch BERT and sampling oscilloscope into one instrument (set).
The MP2100B integrates a 4ch BERT and sampling oscilloscope into one instrument (set).

Capture BER for 3 points for each of 1E-3, 1E-5, 1E-7, 1E-8, 1E-9, and 1E-10 for 4ch × 10 Gbit/s
Compare to the waveform of 1 Msample

Applications

- InfiniBand (SDR, DDR, QDR), Fibre Channel (1G, 2G, 4G, 8G, 10G, 10G FEC)
- 1 GbE, 2 GbE, 10 GbE (WAN, LAN), XAUI (3.125 Gbit/s), 40 GbE (10 Gbit/s × 4)
- CPRI (× 1, × 2, × 4, × 5, × 8, × 10), OBSAI (RP3, RP3 × 2, RP3 × 4, RP3 × 8)
- OC-3 to OC-192/STM-1 to STM-64, OC-192/STM-64 FEC (ITU-T G.975), OTU-1, OTU-2, OTU-1e, OTU-2e
- CFP, CXP, QSFP/QSFP+, SFP/SFP+, XFP, Active Optical Cable (AOC), TOSA/ROSA

QSFP+ Evaluation Solution



Contact our sales representative for more details and option configurations.
The specifications and other contents of this leaflet may be changed without prior notice.

Key Specifications

PPG	Bit Rate	8.5 Gbit/s to 11.32 Gbit/s and 1/n Rate (n = 2, 4, 8, 16, 32, 64) 125 Mbit/s to 12.5 Gbit/s (Option 092)
	Data Output	Differential, 1/2/4 ch (depend on Option) Format: NRZ Amplitude: 0.1 Vp-p to 0.8 Vp-p (Variable), 10 mV steps Tr/Tf: 24 ps typ. (20 to 80%) Jitter: 1 ps rms typ. Offset: Vth = 0 V (AC-coupled) Cross Point: Fixed: 50% Termination: AC-coupled, 50Ω Connector: SMA
	Clock Output	Rate: sync. (1/2, 1/4, 1/8, 1/16, 1/64)
	Test Pattern	PRBS: 2^n – 1: n = 7, 9, 15, 23, 31 PRGM: 1.3 Mbits
ED	Bit Rate	8.5 Gbit/s to 11.32 Gbit/s and 1/n Rate (n = 2, 4, 8, 16, 32, 64) 125 Mbit/s to 12.5 Gbit/s (Option 092)
	Data Input	Format: NRZ Number of Channels: Differential, 1/2/4 ch (depend on Option) Input Amplitude Range: 0.05 Vp-p to 0.8 Vp-p Threshold Voltage Range: –0.085 V to +0.085 V, 1 mV steps Sensitivity: 10 mVp-p typ. Termination: DC-coupled, 50Ω Connector: SMA
	CDR Function	Internal
	Gating Resolution	10 ms (minimum)
SFP+ Slot (Option 051)	Tx Data Input	Single-end Input Level: 0.6 Vp-p to 0.8 Vp-p (using G0238A) 0.25 Vp-p to 0.35 Vp-p (using G0239A) Input Waveform: NRZ Connector: SMA Termination: 50Ω/GND
	Rx Data Output	Single-end Output Level: 0.1 Vp-p to 1.0 Vp-p (using G0238A and G0239A) Output Waveform: NRZ Connector: SMA Termination: 50Ω/GND
Clock Recovery (for Scope, Option 055)	CRU Input	Sensitivity: 10 mVp-p typ., 20 mVp-p (max.) (12.5 Gbit/s, PRBS31, Single-ended, Mark ratio: 1/2, +20° to +30°C, back to back) Maximum Amplitude: 0.05 V(p-p) to 0.8 V(p-p), DC Coupled to GND (125 Mbit/s to 12.5 Gbit/s, PRBS31, Single-ended, Mark ratio: 1/2, back to back, Option 092)
	CRU Output	Connector: SMA, 50Ω (AC-coupled) Amplitude: 2.7 GHz max.: 270 mVp-p to 540 mVp-p 8.5 GHz to 12.5 GHz: 500 mVp-p to 1500 mVp-p Clock Rates: 8.5 GHz to 12.5 GHz, 0.1 GHz to 2.7 GHz Jitter, RMS (additive) 8.5 GHz to 12.5 GHz band: 10 mUI typ., 20 mUI max. at 4 MHz loop BW 0.1 GHz to 2.7 GHz band: 5 mUI max. Loop Bandwidth (typ.) 8.5 GHz to 12.5 GHz Band: 1, 2, 4, or 8 MHz nominal 0.1 GHz to 2.7 GHz Band: 2488.32 MHz: 200 kHz nominal, 622 MHz: 50 kHz nominal, 156 MHz: 20 kHz nominal
Scope (Electrical)	Bandwidth (–3 dB)	DC to 25 GHz typ.
	Absolute Maximum Input	±2 V
	Input Range	Offset: ±500 mV min. Dynamic range: ±400 mV min.
	Flatness	±1 dB typ.
	RMS Noise	0.5 mV typ., 1.75 mV max.
	Interface	K connector, 50Ω

Scope (Optical)	Bandwidth (–3 dB)	DC to 9 GHz
	Wavelength	750 nm to 1650 nm
	Input Sensitivity	–15 dBm typ. without LPF –15 dBm typ. with Option 086 and bitrate 9.9 Gbit/s to ≤10.5 Gbit/s –14.4 dBm typ. with Option 086 and bitrate >10.5 Gbit/s to 11.3 Gbit/s –12 dBm typ. for other than Option 086 filter
	Maximum Input Power	Average power: –1 dBm Peak power: +2 dBm
	Absolute Maximum Power	Peak power: +5 dBm
	Optical Power Measurement	Range: –18 to 0 dBm Accuracy: ±0.35 dB (≥–12 dBm), ±0.6 dB (<–12 dBm)
	Return Loss	–30 dB
	Filter	Filter Bank Set Filter bank and filter set options: Option 087: 622M/1.2G/2.5G/4.2G/6.2G/10 Gbit/s to 11 Gbit/s Option 088: 4.2G/5.0G/6.2G/10 Gbit/s to 11 Gbit/s Option 089: 156M/622M/1.2G/2.5 Gbit/s Select any of the following filter banks and filters: Filter Bank Option 063: High Rate Filter Bank (Select max. 4 High filter) Option 065: Low Rate Filter Bank (Select max. 4 Low filter) Option 069: Multi Rate Filter Bank (Select max. 3 High filter and 3 Low filter) Filter 156M, 622M, 1.0G, 1.2G, 2.1G, 2.5G, 2.6G, 3.1G, 4.2G, 5.0G, 6.2G, 8.5 Gbit/s to 11.3 Gbit/s (Option 070 to 086)
	Connector	Select one of the following options only when Option 023 is installed. Option 037: FC Connector Option 040: SC Connector
	Sampling Speed	100 ksample/s (typ.), 150 ksample/s (Fast sampling mode, max.)
General	Inputs	Rotary encoder, touch panel, power switch
	LCD	12.1 inch WXGA (1280 × 800)
	Remote Interface	Ethernet, GPIB (Option 030)
	Peripherals	VGA Out (SXGA), Digital Video Interface, USB (4 Ports, Rev. 2.0), Ethernet (2 ports, 10/100/1000BASE-T)
	OS	Windows embedded standard 2009
	Internal Storage Media	Flash Memory Drive, 8 GB min.
	Power	100 V(ac) to 120 V(ac), 200 V(ac) to 240 V(ac) (100 V/200 V system auto-switching), 50 Hz/60 Hz
	Power Consumption	300 VA max.
	Ambient Temperature	Operating: +5° to +40°C Storage: –20° to +60°C
	Dimensions	341 (W) × 221.5 (H) × 180 mm (D) (excl. projections)
	Mass	7 kg max. (with MP2100B-012 and 021 options but excluding other options)
	EMC	EN61326-1, EN61000-3-2
	LVD	EN61010-1

Ordering Information

Please specify the model/order number, name and quantity when ordering.
The names listed in the chart below are Order Names. The actual name of the item may differ from the Order Name.

Model/Order No.	Name
MP2100B	BERTWave
MP2100B-011	1CH BERT
MP2100B-012	2CH BERT
MP2100B-014	4CH BERT
MP2100B-021	Dual Electrical Scope
MP2100B-023	Optical and Single-ended Electrical Scope
MP2100B-030	GPIB
MP2100B-037	FC Connector
MP2100B-040	SC Connector
MP2100B-051	SFP+ Slot
MP2100B-053	Clock Recovery (External Input)
MP2100B-054	Clock Recovery (Optical Data)
MP2100B-055	Clock Recovery (with BER Measurement)
MP2100B-063	High Rate Filter Bank
MP2100B-065	Low Rate Filter Bank
MP2100B-069	Multi Rate Filter Bank

Model/Order No.	Name
MP2100B-070	LPF for 156M (L)
MP2100B-071	LPF for 622M (L)
MP2100B-072	LPF for 1.0G (L)
MP2100B-073	LPF for 1.2G (L)
MP2100B-075	LPF for 2.5G (L)
MP2100B-076	LPF for 2.1G (H)
MP2100B-078	LPF for 2.6G (H)
MP2100B-079	LPF for 3.1G (H)
MP2100B-080	LPF for 4.2G (H)
MP2100B-081	LPF for 5.0G (H)
MP2100B-082	LPF for 6.2G (H)
MP2100B-086	LPF for Multi 10G (8.5G to 11.3G) (H)
MP2100B-087	Filter Bank Set (622M/1.2G/2.5G/4.2G/6.2G/Multi 10G)
MP2100B-088	Filter Bank Set (4.2G/5.0G/6.2G/ Multi 10G)
MP2100B-089	Filter Bank Set (156M/622M/1.2G/2.5G)
MP2100B-092	PPG/ED Bit Rate Extension for 125M to 12.5G