Technical specifications

OmniBER OTN

The following specification provides the details on the OmniBER OTN transmission test set, including all options. Where required contact your Agilent sales representative for information regarding availability of these enhanced testing products.

There are 4 main products. Each product can be upgraded to the equivalent functionality of any other product. There is therefore no limit to the upgrade possibilities of each product.

OmniBER OTN	Functional Testing	Jitter & Functional Testing
OC-48/STM-16 (2.5Gb/s)	J7232A	J7233A
OC-192/STM-64 (10Gb/s)	J7230B	J7231B

The 10Gb/s specifications in this document therefore refer to the J7230B and J7231B. The jitter specifications refer to the J7233A and J7231B. It is however possible to upgrade to jitter and/or 10Gb/s optical interfaces if these were not initially ordered.

Test interfaces (rates, wavelengths, connectors, line codes)

Optical	**Line Rates** Framed: OTU2 OC-1/3/12/48/192 STM-0/1/4/16/64 Unframed: 10.71/9.95/2.48 Gb/s 622/155/52 Mb/s
	Wavelength (≤ 2.5 Gb/s) Option 104 - 1310 nm Option 106 - 1310/1550 nm
	Wavelength (10 Gb/s) Option 108 - 1550 nm **Wavelength (10/10.71 Gb/s)** Option 112 - 1550 nm
	Connectors Option 609 - FC/ PC Option 610 - SC Option 611 - ST
SONET/SDH Electrical	**Line Rates** STS-1/3 (STM-0/1e)
	Connectors STS-1/3 (STM-0/1e) - BNC (75 Ω, unbalanced)
	Line Code STS-3/STM-1e - CMI STS-1/STM-0e - B3ZS
PDH/DSn Electrical	**Line Rates** DS1, DS3; 2/8/34/140 Mb/s
	Connectors DS1- Bantam (100 Ω, balanced) DS3 - BNC (75 Ω, unbalanced) 2 Mb/s - BNC (75 Ω, unbalanced); 3-pin Siemens (120 Ω, balanced) 8/34/140 Mb/s - BNC (75 Ω, unbalanced)
	Line Code DS1 - B8ZS, AMI DS3 - B3ZS 2/8/34 Mb/s - HDB3 140 Mb/s - CMI

Optical transmitters

	52Mb/s - 2.5Gb/s	10Gb/s | 10.71Gb/s
Line Code	NRZ	NRZ
Wavelength		
1310nm	1280-1335nm	-
1550nm	11500-1580nm	1530-1565nm
Output Power		
1310nm	-2.5 to +2.0dBm	-
1550nm	-2.5 to +2.0dBm	-1.0 to +2.0dBm
Spectral Width (-20dB)	<1.0nm	<1.0nm
Extinction Ratio	>8.2dB	>8.2dB
Pulse Mask	Meets ITU-T G.957 (6/1999) and Telcordia GR-253-CORE issue 3 (9/2000)	
Fiber Type	Single mode	Single mode
Laser Safety	See "Regulatory Standards" section for details	

Optical receivers

	52Mb/s - 2.5Gb/s	10Gb/s & 10.71Gb/s
Line Code	NRZ	NRZ
Wavelength (1)	1310nm/1550nm	1310nm/1550nm
Fiber Type	Single mode	Single mode
Damage Input Power	>0dBm	>+2dBm
Operating Range (2)	-28dBm to -9dBm	-16dBm to -8dBm

Notes:

1. Specification nominal however the receiver is a broadband device and operates over the 1290 - 1565nm range.

2. Typical specification.

Minimum sensitivity measured using:

52-2488 Mb/s: For BER = 1 x 10 -10 (input signal ER >= 8.2 dB). 10.71 Gb/s: For BER = 1 x 10 -12 (input signal ER >= 8.2 dB).

Optical transmitters

	52Mb/s - 2.5Gb/s	10Gb/s | 10.71Gb/s

Notes:

1. 52-2488 Mb/s: For BER = 1 x 10^{-10} (input signal extinction ratio >= 8.2 dB).
10.71 Gb/s: For BER = 1 x 10^{-12} (input signal extinction ratio >= 8.2 dB).

2. Specification nominal however the receiver is a broadband device and operates over the 1290 - 1565nm range.

3. Typical specification.

SONET/SDH Electrical interfaces (supplied with options 104 and 106)

STS-1/3 and STM-0/1e

Transmitter	Meets Telcordia GR-253-CORE Issue 3 and ITU-T G.703 for level and pulse shape. **Level:** STS-1: STS-1 (HI), STSX-1 (450 ft), STS-1 (900 ft), STM-0e: ± 1.1 Vpk, ± 10%.STS-3/STM-1e: ± 0.5 Vpk, ± 10%.
Receiver	**Input mode:** terminated or monitor. **Monitor gain:** 20 dB or 26 dB. **Equalization:** STS-1/STM-0e: Selectable off/on. When enabled, automatic equalization provided for 450 to 900 ft of cable loss. STS-3/STM-1e: Automatic for cable loss to 12 dB at half the bit rate. **Jitter tolerance:** Meets Telcordia GR-253-CORE Issue 3 and ITU-T G.825.

DSn/PDH Electrical interfaces (requires option 012)

DS1/3

Transmitter	Meets ANSI T1.102-1993. **Level:** DS1: DSX-1, DS1-LO. DS3: DS3-HI, DSX-3, DS3-900'.
Receiver	Meets ANSI T1.102-1993. **Input mode:** terminated or monitor. **Monitor gain:** DS1: 20 dB, 26 dB, 30 dB. DS3: 20 dB, 26 dB. **Equalization:** DS1: Automatic equalizes for DS1-HI, DSX-1, and DS1-LO levels in both terminated and monitor modes. DS3: Selectable off/on. When enabled, automatically equalizes for DS3-HI, DSX-3, and DS3-900' levels in both terminated and monitor modes. **Jitter tolerance:** Meets Telcordia GR-499 Category II and ITU-T G.824.

2/8/34/140 Mb/s

Transmitter	Meets ITU-T G.703. **Level:** Meets ITU-T G.703 for all rates.
Receiver	Meets ITU-T G.703 and G.772. **Input mode:** terminated or monitor. **Monitor gain:** 2/8 Mb/s: 20 dB, 26 dB, 30 dB. 34/140 Mb/s: 20 dB, 26 dB. **Equalization:** Meets ITU-T G.703. **Jitter tolerance:** Meets ITU-T G.823.

Clock synchronization (inputs, outputs, line frequency offset)

Clock references	**Internal:** ± 4.5 ppm Includes setting accuracy, stability over temperature and aging. **External Clock Inputs:** BITS (1.5 Mb/s): Bantam (100Ω balanced). MTS (2 MHz and 2 Mb/s): BNC (75Ω unbalanced) and Bantam (120Ω balanced) **Loop-timed:** Transmitter timed by a clock recovered from the receiver.
Frequency offset	Offsets the transmitted line signal relative to the selected clock reference. **Offset:** ± 100 ppm in 0.1 ppm step. **Offset accuracy:** 0.02 ppm Note: For 10Gb/s and 10.71Gb/s operation the total of external clock reference offset and transmitter line rate offset must not exceed ± 90 ppm. For all other rates the combined offsets must not exceed ±120 ppm.
Clock outputs	Output clocks generated relative to the selected transmit reference clock. BITS (1.5Mb/s): Bantam (100Ω balanced). MTS (2 MHz): BNC (75Ω unbalanced).
Eye clock outputs	Clock outputs that are frequency locked to the transmitted optical line signal. **Rate:** 52/155/622 Mb/s and 2.5 Gb/s: Output line rate divided by four. 10 Gb/s: Output line rate divided by sixteen (622 MHz nominal). 10.71 Gb/s: Output line rate divided by sixteen (669 MHz nominal) **Level:** Nominal ECL, ac coupled. **Impedance:** Drives nominal 50Ω inputs. **Connector:** SMA.