Cisco Prisma II 1.2 GHz High Density Long Reach Multiwave Transmitter

The Cisco® Prisma® II 1.2 GHz High Density Long Reach Multiwave (HD-LRMW) Transmitter (Figure 1) is the CATV industry's first monolithic hybrid optical source module. Based on quaternary indium phosphide semiconductors, it separates the functions of light generation from RF modulation. The result is a smaller size, lower cost, narrow linewidth component providing performance more often associated with discrete external modulator technologies. Longer distance transmission without the linearity degradation of directly modulated sources is possible, expanding the capabilities of dense wavelength division multiplexed (DWDM) optical links to facilitate best-in-class architectures with unprecedented versatility and flexibility. Consistent with other Prisma II transmitters, the HD-LRMW offers 1.2 GHz of RF spectrum and transports a multiplex of analog, quadrature amplitude modulation (QAM), and orthogonal frequency division multiplexed (OFDM) channels with unmatched performance for node segmentation, fiber reclamation, and fiber deep architectures. The features, characteristics, and value position this transmitter to address the broadest range of applications in the fluid broadband access market.

Figure 1.   Cisco Prisma II 1.2 GHz High Density Long Reach Multiwave Transmitter (Two Shown in HOST Module)

Features

- 16 iWDM wavelengths supported

- Existing 100 GHz DWDM passives compatible

- Designed to operate in the Prisma II or the Prisma XD chassis

- Narrow optical linewidth for longer fiber links

- High linearity for robust carrier-to-noise ratio (CNR), modulation error ratio (MER), and bit error ratio (BER) performance

- Supports high symbol rate QAM and OFDM signals for greater data capacity

- 1.2 GHz RF bandwidth to support DOCSIS 3.1 implementations

- Small CO_2 footprint: lowest power consumption per transmitter in the industry

- Status LEDs indicate module condition and simplify troubleshooting

- Blind-mate (push-on) RF and DC connectors

- RF input test points

- Non-volatile storage of preset operating parameters simplifies installation procedures

- User selectable automatic gain control (AGC)

- Multiple setup and control options:
  - Local control via Local Craft Interface (LCI)
  - Local control via Intelligent Communications Interface Module (ICIM)
  - Remote monitoring via Transmission Network Control System (TNCS)
  - Simple Network Management Protocol (SNMP) remote monitoring

Product Specifications

Unless otherwise noted, specifications are based on measurements made in accordance with NCTA Practices for Measurements made on Cable Television Systems using standard frequency assignments, and are referenced to the ambient air temperature at the inlet to the Prisma II or Prisma XD chassis.

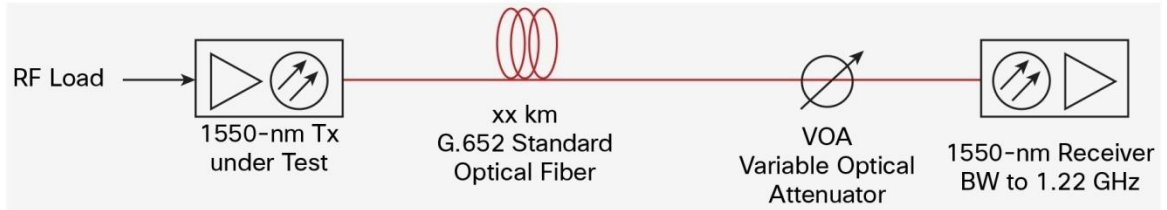**Table 1.**   Cisco Prisma II 1.2 GHz High Density Long Reach Multiwave Product Specifications

Optical	
Wavelength (see note 1)	21, 22, 24, 26, 28, 33, 36, 39 44, 48, 52, 54, 57, 60, 61, 62
Output Power	12.5 dBm
Modulation Type	Hybrid externally modulated
RF	
Operating Bandwidth	45 MHz to 1218 MHz
Nominal Channel Loading	78 NTSC CW carriers [54-547 MHz] plus 47 J.83 ITU-B, 256 QAM channels [552-834 MHz] plus 2 channels, 192 MHz OFDM [834-1218 MHz]

RF Input Levels for Nominal Channel Loading • Broadcast port, Analog channels • Broadcast port, QAM channels • Broadcast port, OFDM signal • Narrowcast port, QAM channels • Narrowcast port, OFDM signal	 18 dBmV/ch 12 dBmV/ch 27 dBmV total power (matches QAM level-see note 2) 12 dBmV/ch (see note 3) 27 dBmV total power (matches QAM level-see note 2)
Total Composite RF Input	38.25 dBmV (nominal channel loading)
RF Input Return Loss	16 dB
Mixed Analog plus Digital Link Performance @ 65 km fiber 　**78 analog plus** 　**47 QAM plus** 　**2 x 192 MHz OFDM [384 MHz]**	CNR: 51.5 CSO: -62 CTB: -62 MER: ≥ 39 dB BER: < 1.0 x 10-7 Pre-FEC 　　< 1.0 x 10-12 Post-FEC
Digital Link Performance @ 70 km fiber 　**130 SC-QAM plus** 　**2 x 192 OFDM [384 MHz]** (see note 7)	MER: >= 38 dB BER: < 1.0 x 10-8 Pre-FEC 　　< 1.0 x 10-12 Post-FEC
Electrical/Mechanical/Environmental	
Power Consumption	8 W
Connector Type	SC/APC
Management & Control	Web Interface SNMP
Dimensions	Height: 3.48 in, 8.84 mm Width: 1.03 in, 2.62 mm Depth: 8.80 in, 22.35 mm
Weight	< 0.90 lbs, < 0.41 kg
Operational Temperature	0 to 50 degrees Celsius
Humidity	5 to 95% Non-Condensing

NOTES

1. These ITU channels constitute the iWDM plan. See table 2 for the part numbers associated with the particular wavelengths.

2. Level shown represents the total power of a 192 MHz wide OFDM signal. This is equivalent to the power per 6 MHz CEA (Consumer Electronics Association) channel + 10*log10 (Number of occupied CEA channels); that is [12dBmV + 10*log10(32)] = 27 dBmV

3. Specifications are based on a single transmitter.

4. Input level to read 0 dB in the GUI or CLI parameter table.

5. The test link setup is shown in figure 2. The receiver has an efficiency of 0.95 A/W and a noise equivalent power of 3.9 pA/√Hz.

6. Test loading may substitute SC-QAM for OFDM signals.

7. Received power is -5 dBm for all digital load and 0 dBm for mixed analog and digital load.

Figure 2.   Transmitter Module Test Link Configuration

Ordering Information

Part numbers for the Cisco Prisma II 1.2 GHz High Density Long Reach Multiwave transmitters are shown in Table 2. Please consult with your Cisco account representative, customer service representative, or system engineer to determine the best configuration for your particular application.

Table 2.   Cisco Prisma II 1.2 GHz High Density Long Reach Multiwave Transmitter Part Numbers

Description	Cisco Part Number
1.2 GHZ HD-LRMW, ITU21 iWDM	P2HD1.2G15TXM21i=
1.2 GHZ HD-LRMW, ITU22 iWDM	P2HD1.2G15TXM22i=
1.2 GHZ HD-LRMW, ITU24 iWDM	P2HD1.2G15TXM24i=
1.2 GHZ HD-LRMW, ITU26 iWDM	P2HD1.2G15TXM26i=
1.2 GHZ HD-LRMW, ITU28 iWDM	P2HD1.2G15TXM28i=
1.2 GHZ HD-LRMW, ITU33 iWDM	P2HD1.2G15TXM33i=
1.2 GHZ HD-LRMW, ITU36 iWDM	P2HD1.2G15TXM36i=
1.2 GHZ HD-LRMW, ITU39 iWDM	P2HD1.2G15TXM39i=
1.2 GHZ HD-LRMW, ITU44 iWDM	P2HD1.2G15TXM44i=
1.2 GHZ HD-LRMW, ITU48 iWDM	P2HD1.2G15TXM48i=
1.2 GHZ HD-LRMW, ITU52 iWDM	P2HD1.2G15TXM52i=
1.2 GHZ HD-LRMW, ITU54 iWDM	P2HD1.2G15TXM54i=
1.2 GHZ HD-LRMW, ITU57 iWDM	P2HD1.2G15TXM57i=
1.2 GHZ HD-LRMW, ITU60 iWDM	P2HD1.2G15TXM60i=
1.2 GHZ HD-LRMW, ITU61 iWDM	P2HD1.2G15TXM61i=
1.2 GHZ HD-LRMW, ITU62 iWDM	P2HD1.2G15TXM62i=

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