

Cisco CWDM SFP 10 Gigabit Ethernet Solution

Overview

The Cisco® CWDM SFP 10 Gigabit Ethernet solution allows enterprise companies and service providers to provide scalable and easy-to-deploy 10 Gigabit Ethernet. The product set enables the flexible design of highly available, multiservice networks.

The Cisco Coarse Wavelength-Division Multiplexing Small Form-Factor Pluggable Plus (Cisco CWDM SFP+) solution is a convenient and cost-effective solution for the adoption of 10 Gigabit Ethernet in campus, data-center, and metropolitan-area access networks (Figure 1).

Figure 1. Cisco CWDM 10 Gigabit Ethernet SFP Solution



Key Features and Benefits

Scalability

The Cisco CWDM SFP+ solution enables the transport of up to eight channels of 10 Gigabit Ethernet over single-mode fiber (SMF) strands.

High Availability

The Cisco CWDM SFP 10 Gigabit Ethernet solution takes advantage of a multichannel architecture and the inherent protection of ring architectures. The solution enables:

- Use of Layer 2 and Layer 3 redundancy and failover mechanisms at the channel endpoints (Cisco CWDM SFP+) to build highly available links
- Use of two-path link configurations in a ring architecture to provide protection from fiber cuts

Investment Protection

The Cisco CWDM SFP+ solution enables enterprises and service providers to increase the bandwidth of an existing 10 Gigabit Ethernet optical infrastructure without adding new fiber strands. The solution can be used in parallel with other Cisco SFP+ devices on the same platform.

Technical Specifications

Cisco CWDM 10 Gigabit Ethernet SFPs

A Cisco CWDM SFP 10 Gigabit Ethernet SFP is a hot-swappable input/output device that plugs into an SFP+ port or slot of a Cisco switch or router, linking the port with the fiber-optic network.

Performance

The CWDM 10 Gigabit Ethernet SFP SFP module supports the following bit rates:

- OC-192 9.95328 Gbps \pm 20 ppm No forward-error-correction (FEC) application (target bit error rate [BER] = 1E-12)
- 10 Gigabit Ethernet WAN 9.95328 Gbps \pm 20 ppm No FEC application (target) BER = 1E-12
- 10 Gigabit Ethernet LAN 10.3125 Gbps \pm 100 ppm No FEC application (target) BER = 1E-12
- OTU-2 10.709 Gbps \pm 20 ppm FEC application (pre-FEC target BER = 1E-6)
- OTU-1e with stuffed bits 11.0491 Gbps \pm 100 ppm FEC application (pre-FEC target BER = 1E-6)
- OTU-2e without stuffed bits 11.0957 Gbps \pm 100 ppm FEC application (pre-FEC target BER = 1E-6)

Platform Support

The Cisco CWDM 10 Gigabit Ethernet SFPs are supported across a variety of Cisco switches, routers, and optical transport devices. For more details, refer to the document “Cisco CWDM SFP+ Compatibility Matrix”.

Connectors and Cabling

- Equipment: Standard SFP+ interface
- Network: Dual LC/PC connector

Note: Only connections with patch cords with PC or UPC connectors are supported. Patch cords with APC connectors are not supported.

Environmental Conditions and Power Requirements

- Operating temperature range: 32 to 158°F (0 to 70°C)
- Storage temperature range: -40 to 185°F (-40 to 85°C)

Table 1 describes details about the electrical power interface, and Table 2 describes optical parameters.

Table 1. Electrical Power Interface Data

Parameter	Symbol	Minimum	Typical	Maximum	Units
Supply current	I _s		220	300	mA
Surge current	I _{Surge}			+30	mA
Input voltage	V _{max}	3.1	3.3	3.46	V

Table 2. Optical Parameters

Parameter	Symbol	Minimum	Typical	Maximum	Units	Notes and Conditions
Transmitter center wavelength	wavelength _c	(x - 6.5)		(x + 6.5)	nm	Available center wavelengths: 1471, 1491, 1511, 1531, 1551, 1571, 1591, and 1611 nm
Side-mode suppression ratio	SMSR	30			dB	Average power coupled into SMF

Parameter	Symbol	Minimum	Typical	Maximum	Units	Notes and Conditions
Transmitter optical output power	P _{out}	0		5.0	dBm	
Receiver optical input power (BER <10 ⁻¹² with Pseudo-Random Bit Sequence (PRBS) 2 ³¹ - 1 or OC-192, 10 GE LAN, or 10 GE WAN frame)	P _{in}	-16.0		-1.0	dBm	Back to back, No FEC applications (10 GE LAN and WAN, OC-192 rates)
Receiver optical input power (Pre-FEC BER <10 ⁻⁶ with PRBS 2 ³¹ - 1 or OTU-2, OTU-1e, or OTU-2e frame)	P _{in}	-16.0		-1.0	dBm	Back to back, FEC applications (OTU-2, OTU-1e, and OTU-2e rates)
Receiver optical input power (BER <10 ⁻¹² with PRBS 2 ³¹ - 1 or OC-192, 10 GE LAN, or 10 GE WAN frame)	P _{in}	-14.0		-1.0	dBm	With ITU-T G.652 maximum dispersion over 40-km SMF No FEC applications (10 GE LAN and WAN, OC-192 rates)
Receiver optical input power (Pre-FEC BER <10 ⁻⁶ with PRBS 2 ³¹ - 1 or OTU-2, OTU-1e, or OTU-2e frame)	P _{in}	-14.0		-1.0	dBm	With ITU-T G.652 maximum dispersion over 40-km SMF FEC applications (OTU-2, OTU-1e, and OTU-2e rates)
Receiver optical input wavelength	wavelength _{in}	1450		1620	nm	
Transmitter extinction ratio	OMI	8.2			dB	
DGD penalty				1	dB	@ 30 ps DGD

Note: Parameters are specified over temperature and at end of life unless otherwise noted.

Note: When shorter distances of SMF are used, it may be necessary to insert an inline optical attenuator in the link to avoid overloading the receiver.

Warranty

- Standard warranty: 1 year
- Extended warranty (option): Available under a Cisco SMARTnet™ support contract for the Cisco switch or router chassis

Ordering Information

To place an order, visit the [Cisco Ordering Home Page](#) and refer to Table 3.

Table 3. Cisco CWDM SFP Product Information

Product Number	Description	Color
CWDM-SFP10G-1470=	Cisco CWDM 1470-nm SFP+; 10 Gigabit Ethernet	Red
CWDM-SFP10G-1490=	Cisco CWDM 1490-nm SFP+; 10 Gigabit Ethernet	Red
CWDM-SFP10G-1510=	Cisco CWDM 1510-nm SFP+; 10 Gigabit Ethernet	Red
CWDM-SFP10G-1530=	Cisco CWDM 1530-nm SFP+; 10 Gigabit Ethernet	Red
CWDM-SFP10G-1550=	Cisco CWDM 1550-nm SFP+; 10 Gigabit Ethernet	Red
CWDM-SFP10G-1570=	Cisco CWDM 1570-nm SFP+; 10 Gigabit Ethernet	Red
CWDM-SFP10G-1590=	Cisco CWDM 1590-nm SFP+; 10 Gigabit Ethernet	Red
CWDM-SFP10G-1610=	Cisco CWDM 1610-nm SFP+; 10 Gigabit Ethernet	Red

Regulatory and Standards Compliance

- Compliant with the ITU-T G.694.2 CWDM grid
- Safety: Laser Class I 21CFR1040

Service and Support

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco Services help you protect your network investment, optimize network operations, and prepare your network for new applications to extend network intelligence and the power of your business. For more information about Cisco Services, refer to [Cisco Technical Support Services](#) or [Cisco Advanced Services](#).

For More Information

For more information about the Cisco CWDM products, please visit:

http://www.cisco.com/en/US/products/hw/modules/ps4999/products_data_sheet09186a00801a557c.html or contact your local Cisco account representative.



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