



Specifications

This appendix describes the specifications for the chassis, line cards, and the carrier motherboard and modules used in the Cisco ONS 15530 system. This appendix includes the following sections:

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- [Channel to Wavelength Mapping, page A-3](#)
- [OADM Module Specifications, page A-4](#)
- [PSM Specifications, page A-5](#)
- [OSC Module Specifications, page A-5](#)
- [PB-OE and WB-VOA Module Specifications, page A-6](#)
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Note

Cisco recommends you to use the Cisco MetroPlanner tool to design your DWDM networks. For more information about optical power budgets and network planning, refer to the *Cisco ONS 15530 Planning Guide* and the *Cisco MetroPlanner DWDM Operations Guide*.

Chassis Specifications

Table A-1 lists the specifications for the Cisco ONS 15530.

Table A-1 Cisco ONS 15530 Specifications

Description	Specification
Environmental	
Temperature, ambient operating	32 to 104 F (0 to +40 C)
Humidity (RH ¹), ambient (non-condensing) operating	5 to 95%
Altitude, operating and non-operating	Minimum -197 ft (-60 m) Maximum 6500 ft (2000 m)
Cisco ONS 15530 CHAS-E	
Dimensions (H x W x D)	14.4 x 17.3 x 10.1 in. (365.9 x 439.4 x 256.5 mm)
Weight	Empty chassis: 27.5 lbs (12.25 kg) Fully loaded: 71 lbs (32.21 kg)
Cisco ONS 15530 CHAS-N	
Dimensions (H x W x D)	15.7 x 17.3 x 10.1 in. (398.8 x 439.4 x 256.5 mm)
Weight	Empty chassis: 27.0 lbs (12.25 kg) Fully loaded: 71 lbs (32.21 kg)
AC-Input Power	
AC-input voltage	100 to 240 VAC (nominal) 85 to 264 VAC (full range)
Power consumption maximum	600W
Heat dissipation	2048 BTU/hr
DC-Input Power	
DC-input voltage	-48 to -60 VDC (nominal) -40.5 to -72 VDC (full range)
Power consumption maximum	600W (fully configured system)
Heat dissipation	2048 BTU/hr

1. RH = relative humidity

Channel to Wavelength Mapping

Table A-2 lists the channels, wavelengths, and frequencies for each band.

Table A-2 Channel to Wavelength Mapping

Cisco ONS 15530 Band	Cisco ONS 15530 Channel	ITU ¹ Channel	ITU Wavelength ²	ITU Frequency ³
OSC ⁴		19	1562.23	191.9000
A	1	21	1560.61	192.100
	2	22	1559.79	192.200
	3	23	1558.98	192.300
	4	24	1558.17	192.400
B	5	26	1556.55	192.600
	6	27	1555.75	192.700
	7	28	1554.94	192.800
	8	29	1554.13	192.900
C	9	31	1552.52	193.100
	10	32	1551.72	193.200
	11	33	1550.92	193.300
	12	34	1550.12	193.400
D	13	36	1548.51	193.600
	14	37	1547.72	193.700
	15	38	1546.92	193.800
	16	39	1546.12	193.900
E	17	41	1544.53	194.100
	18	42	1543.73	194.200
	19	43	1542.94	194.300
	20	44	1542.14	194.400
F	21	46	1540.56	194.600
	22	47	1539.77	194.700
	23	48	1538.98	194.800
	24	49	1538.19	194.900

Table A-2 Channel to Wavelength Mapping (continued)

Cisco ONS 15530 Band	Cisco ONS 15530 Channel	ITU ¹ Channel	ITU Wavelength ²	ITU Frequency ³
G	25	51	1536.61	195.100
	26	52	1535.82	195.200
	27	53	1535.04	195.300
	28	54	1534.25	195.400
H	29	56	1532.68	195.600
	30	57	1531.90	195.700
	31	58	1531.12	195.800
	32	59	1530.33	195.900

1. ITU = International Telecommunication Union
2. Wavelengths in vacuum in nm
3. Frequency in THz, 100 GHz grid
4. OSC = optical supervisory channel

OADM Module Specifications

Table A-3 shows the maximum optical link loss for the data channels between the 4-channel OADM modules and the line cards, and between the pass-through add and drop connectors on the OADM modules.



Note

The optical specifications described in this section are only for the individual components and should not be used to characterize the entire network performance.

Table A-3 OADM Module Specifications

Type of OADM Modules	Trunk IN to Line Card (Data Drop)	Line Card to Trunk OUT (Data Add)	Trunk IN to Thru OUT (Pass-Through Drop)	Thru IN to Trunk OUT (Pass-Through Add)
4-channel with OSC	4.1 dB	4.1 dB	1.5 dB	1.5 dB
4-channel without OSC	4.1 dB	4.1 dB	1.0 dB	1.0 dB

PSM Specifications

Table A-4 and Table A-5 lists the PSM (protection switch module) card and optical specifications for the Cisco ONS 15530.



Note

The optical specifications described in this section are only for the individual components and should not be used to characterize the entire network performance.

Table A-4 PSM Card Specifications

Description	Specification
Dimensions	3.7 x 9 in. (9.4 x 22.9 cm)
Weight	3.5 lbs (1.59 kg)
Connector	MU
Receive overload	17 dBm

Table A-5 PSM Optical Specifications

Port	Insertion Loss		
	Minimum (dB)	Maximum (dB)	Ripple (dB)
Rx_West to monitor	19	21	0.5
Rx_West to common out		1.7	0.4
Rx_East to monitor	19	21	0.5
Rx_East to common out		1.7	0.4
TX_Common to Tx_West	2.7	3.7	0.3
Tx_Common to Tx_East	2.7	3.7	0.3



Note

The accuracy of the power detector is 1.9 dB over the entire C band and temperature range.

OSC Module Specifications

Table A-6 lists the OSC module receiver and transmitter specifications.



Note

The optical specifications described in this section are only for the individual components and should not be used to characterize the entire network performance.

Table A-6 OSC Module Specifications

Description	Specification	
Fiber type	SM ¹ 9 micron	
Connector	MU	
Output wavelength	1562.23 ITU channel	
Receiver	Minimum	Maximum
Receive sensitivity	-19 dBm	
Receive overload		-1.5 dBm
Input wavelength	1249 nm	1600 nm
Transmitter	Minimum	Maximum
Transmitter power	5 dBm	10 dBm
Dispersion tolerance		3200 ps/nm

1. SM = single mode.

PB-OE and WB-VOA Module Specifications

[Table A-7](#) contains specifications for the Cisco ONS 15530 single-band PB-OE module. [Table A-8](#) contains specifications for the Cisco ONS 15530 single and dual WB-VOA modules.



Note

The optical specifications described in this section are only for the individual components and should not be used to characterize the entire network performance.

Table A-7 Cisco ONS 15530 Single-Band and Dual-Band PB-OE Module Specifications

Parameter	Specification
Maximum attenuation	30 dB
Attenuation resolution	0.1 dB
In-out isolation for drop/equalized band path	50 dB
In-out isolation for upgrade band path	50 dB
Input power range	-26 to 11 dBm

Table A-8 Cisco ONS 15530 Single and Dual WB-VOA Modules Specification

Parameter	Specification
Operating wavelength range	1530 to 1565 nm
Maximum attenuation	30 dB
Attenuation resolution	0.1 dB
Input power range	-28 to 21 dBm

Transponder Line Card Specifications

Table A-9 lists the transponder line card receiver and transmitter specifications for the client side lasers.



Note

The optical specifications described in this section are only for the individual components and should not be used to characterize the entire network performance.

Table A-9 *Client Side Optical Specifications*

Description	Specification			
Fiber type	SM ¹ 9 micron			
Connector	SC			
Receiver	SM Minimum	SM Maximum	MM ² Minimum	MM Maximum
Receive sensitivity	-19 dBm		-25 dBm	
Receive overload		-1.5 dBm		-8 dBm
Input wavelength	1249 to 1600 nm ³		1249 to 1600 nm	
Optical reflectance	-27 dB ⁴			
Receiver fiber pigtail	MM 50 micron		MM 62.5 micron	
Transmitter	SM Minimum	SM Maximum	MM ⁵ Minimum	MM Maximum
Output wavelength	1260 to 1360 nm		1260 to 1360 nm	
Transmitter power	-5 dBm	0 dBm	-5 dBm	0 dBm

1. SM = single mode
2. MM = multimode
3. nm = nanometers
4. dB = decibels
5. MM = multimode

Table A-10 lists the transponder line card receiver and transmitter specifications for the trunk side lasers.



Note

Optical loss due to splitter modules and connectors should be included in the optical budget calculation.

Table A-10 *Trunk Side Optical Specifications*

Description	Specification	
Fiber type	SM 9 micron	
Connector	MU	
Receiver	Minimum	Maximum
OSNR ^{1, 2}	19 dB	
Receive sensitivity ²	-28 dBm	
Receive overload		-8 dBm
Input wavelength	1260 nm	1580 nm

Table A-10 *Trunk Side Optical Specifications (continued)*

Description	Specification	
	Minimum	Maximum
Transmitter		
Transmitter power	5 dBm	10 dBm
Dispersion tolerance		3200 ps/nm ³

1. OSNR = optical signal-to-noise ratio.
2. Add the proper network-level penalty to the OSNR and/or receive power based on your actual network topology characteristics, such as dispersion.
3. ps/nm = picoseconds per nanometer.

ESCON Aggregation Card Specifications

[Table A-11](#) lists SFP optics supported by the 10-port ESCON aggregation card. The optical power characteristics of the supported SFP optics are listed in the [SFP Specifications](#) section.


Note

The optical specifications described in this section are only for the individual components and should not be used to characterize the entire network performance.

Table A-11 *SFPs Supported by ESCON Aggregation Cards*

SFP Part Number	Description
15500-XVRA-01A2	ESCON, OC-3/ STM-1 SR
15500-XVRA-10A1	Low-band 8 Mbps to 200 Mbps
15500-XVRA-10B1	Low-band 8 Mbps to 200 Mbps
15500-XVRA-11A1	Mid-band 200 Mbps to 622 Mbps
15500-XVRA-11B1	Mid-band 200 Mbps to 1.25 Gbps
15500-XVRA-12B1	High-band 1.062 Gbps to 2.488 Gbps

[Table A-12](#) lists the maximum added end-to-end latency is from the ESCON aggregation cards aggregating and separating the client signals.


Note

The ESCON latency values have been determined by simulation and are approximate.

Table A-12 Latency for ESCON Aggregation Cards

Traffic Mix on Transmitting Node	Maximum Added End-to-End Latency ¹			
	No GE	1518-Byte GE Packets	4470-Byte GE Packets	10,230-Byte GE Packets
ESCON only	8.5 s			
ESCON and FC/FICON on the same 10-Gbps ITU trunk card	8.5 s			
ESCON and GE only on the same 10-Gbps ITU trunk card		10 s	12.5 s	17 s

1. The latency values are based on configuration of correct transmit buffer sizes as described in the [Cisco ONS 15530 Configuration Guide](#).

4-Port 1-Gbps/2-Gbps FC Aggregation Card

The 4-port 1-Gbps/2-Gbps FC aggregation cards support the SFPs listed in [Table A-13](#). The optical power characteristics of the supported SFPs are listed in the [SFP Specifications](#) section. Only use Cisco-certified SFPs for the 4-port 1-Gbps/2-Gbps FC aggregation cards. If the specifications of the client equipment interfaces do not fall within these ranges, attenuators or amplifiers might be required.



Note

The optical specifications described in this section are only for the individual components and should not be used to characterize the entire network performance.

Table A-13 SFPs Supported by the 4-port 1-Gbps/2-Gbps FC Aggregation Card

Part Number	Protocols or Clock Rate Range Supported
15500-XVRA-02C1	Gigabit Ethernet ¹ , Fibre Channel (1 Gbps) ² , FICON (1 Gbps)
15500-XVRA-03B1	Gigabit Ethernet ³ , Fibre Channel (1 Gbps) ⁴ , FICON (1 Gbps), ISC-3 links compatibility mode
15500-XVRA-03B2	Fibre Channel (1 Gbps and 2 Gbps), FICON (1 Gbps and 2 Gbps)
15500-XVRA-11B1	Mid-band variable rate 200 Mbps to 1.25 Gbps
15500-XVRA-12B1	High-band variable rate 1.062 Gbps to 2.488 Gbps
15454-SFP-GEFC-SX	Fibre Channel (2 Gbps), Fibre Channel (1 Gbps), Gigabit Ethernet, FICON (1 Gbps and 2 Gbps)

- 1000BASE-SX
- FC-0-100-M5-SN-S and FC-0-100-M6-SN-S standards
- 1000BASE-LX
- FC-0-100-SM-LC-S standard

Table A-14 and Table A-15 show the latency value for the various configurations on the transmitting node.

FC and FICON traffic on interfaces with buffer credits enabled with the **flow control** command are not affected by latency.

Table A-14 1-Gbps FC and FICON Latency Values for 4-Port 1-Gbps/2-Gbps Aggregation Cards

Traffic Mix on Transmitting Node	Maximum Added End-to-End Latency			
	No GE	1518-Byte GE Packets	4470-Byte GE Packets	10,232-Byte GE Packets
FC/FICON only on the 2.5-Gbps aggregated signal carried over a 2.5-Gbps ITU trunk card (single port in the portgroup)	12.2 micro seconds			
FC/FICON only on the 2.5-Gbps aggregated signal carried over a 2.5-Gbps ITU trunk card (two ports in the portgroup)	12.7 micro seconds			
FC/FICON only on a 2.5-Gbps aggregated signal carried over a 10-Gbps ITU trunk card (single port in the portgroup)	11.6 micro seconds			
FC/FICON only on a 2.5-Gbps aggregated signal carried over a 10-Gbps ITU trunk card (two ports in the portgroup)	12.1 micro seconds			
FC/FICON only on a 2.5-Gbps aggregated signal mixed with GE on the same 10-Gbps ITU trunk card (single port in portgroup)		12.8 micro seconds	15.2 micro seconds	23.9 micro seconds
FC/FICON only on a 2.5-Gbps aggregated signal mixed with GE on the same 10-Gbps ITU trunk card (two ports in portgroup)		13.5 micro seconds	16.8 micro seconds	26.2 micro seconds

Table A-15 2-Gbps FC and FICON Latency Values for 4-Port 1-Gbps/2-Gbps Aggregation Cards

Traffic Mix on Transmitting Node	Maximum Added End-to-End Latency			
	No GE	1518-Byte GE Packets	4470-Byte GE Packets	10,232-Byte GE Packets
FC/FICON only on the 2.5-Gbps aggregated signal carried over a 2.5-Gbps ITU trunk card	10.6 s			
FC/FICON only on a 2.5-Gbps aggregated signal carried over a 10-Gbps ITU trunk card	9.9 s			
FC/FICON only on a 2.5-Gbps aggregated signal mixed with GE on the same 10-Gbps ITU trunk card		12.1 s	15.4 s	25.1 s

8-Port FC/GE Aggregation Card

The optical power characteristics of the SFP (small form-factor pluggable) optics for the 8-port Fibre Channel/Gigabit Ethernet aggregation cards are shown in Table A-16. The optical power characteristics of the supported SFP optics are listed in the [SFP Specifications](#) section. Only use Cisco-certified SFP optics for the 8-port FC/GE aggregation cards. If the specifications of the client equipment interfaces do not fall within these ranges, attenuators or amplifiers might be required.

**Note**

The optical specifications described in this section are only for the individual components and should not be used to characterize the entire network performance.

Table A-16 SFPs Supported by the 8-port FC/GE Aggregation Card

SFP Part Number	Description
15500-XVRA-02C1	Gigabit Ethernet ¹ , Fibre Channel (1 Gbps) ² , FICON (1 Gbps)
15500-XVRA-03B1	Gigabit Ethernet ³ , Fibre Channel (1 Gbps) ⁴ , FICON (1 Gbps), ISC-3 links compatibility mode
15500-XVRA-11B1	Mid-band variable rate 200 Mbps to 1.25 Gbps
15500-XVRA-12B1	High-band variable rate 1.062 Gbps to 2.488 Gbps

- 1000BASE-SX
- FC-0-100-M5-SN-S and FC-0-100-M6-SN-S standards
- 1000BASE-LX
- FC-0-100-SM-LC-S standard

**Note**

The MTU (maximum transmission unit) for the 8-port FC/GE aggregation card is 10,232 bytes.

The 8-port FC/GE aggregation card adds latency to FC traffic. [Table A-17](#) shows the FC latency values for different configurations of the 8-port FC/GE aggregation card.

Table A-17 FC and FICON Latency Values for 8-Port FC/GE Aggregation Cards

Traffic Mix on Transmitting Node	Maximum Added End-to-End Latency ¹ (Time and Distance)			
	No GE ²	1518-Byte GE Packets	4470-Byte GE Packets	10,232-Byte GE Packets
FC ³ /FICON ⁴ only on the 2.5-Gbps aggregated signal carried over a 2.5-Gbps ITU ⁵ trunk card	18.8 s (3.8km)			
FC/FICON only on a 2.5-Gbps aggregated signal carried over a 10-Gbps ITU trunk card	19.9 s (4.0km)			
FC/FICON only on a 2.5-Gbps aggregated signal mixed with GE on the same 10-Gbps ITU trunk card		22.2 s (4.4km)	24.8 s (5.0km)	36.3 s (7.3km)
FC/FICON and GE on the same 2.5-Gbps aggregated signal carried over a 2.5-Gbps ITU trunk card		27.9 s (5.6km)	47.1 s (9.4km)	83.6 s (16.7km)
FC/FICON and GE on the same 2.5-Gbps aggregated signal carried over a 10-Gbps ITU trunk card		39.2 s (7.8km)	77.1 s (15.4km)	151.1 s (30.2km)

- The latency values are based on configuration of correct transmit buffer sizes as described in the *Cisco ONS 15530 Configuration Guide*.
- GE = Gigabit Ethernet

3. FC = Fibre Channel
4. FICON = Fiber Connection
5. ITU = International Telecommunication Union

8-Port Multi-Service Muxponder Specifications

[Table A-18](#) lists the 8-port multi-service muxponder receiver and transmitter specifications. Optical loss because of splitter modules and connectors should be included in the optical budget calculation.



Note

The optical specifications described in this section are only for the individual components and should not be used to characterize the entire network performance.

Table A-18 8-Port Multi-Service Muxponder ITU Trunk Specifications

Description	Specification	
Fiber type	G.652 (SMF-25)	
Connector	MU-PC	
Receiver sensitivity	OSNR ^{1, 2}	Dispersion
-26 dBm	20 dB	1000 ps/nm ³
-24 dBm	21 dB	1000 to 2100 ps/nm
-23 dBm	2 dB	2100 to 3200 ps/nm
Receiver	Minimum	Maximum
Overload		-8 dBm
Wavelength	1260 nm	1580 nm
Transmitter	Minimum	Maximum
Transmitter power	5 dBm	10 dBm

1. OSNR = optical signal-to-noise ratio.
2. Add the proper network-level penalty to the OSNR and/or receive power based on your actual network topology characteristics, such as dispersion.
3. ps/nm = picoseconds per nanometer.

The SFPs supported on the 8-port multi-service muxponder are shown in [Table A-19](#). The optical power characteristics and other specifications of the supported SFPs are listed in the “[SFP Specifications](#)” section on [page A-16](#). Only use Cisco-certified SFPs for the 8-port multi-service muxponder.



Note

The optical specifications described in this section are only for the individual components and should not be used to characterize the entire network performance.

Table A-19 SFPs Supported by the 8-Port Multi-Service Muxponder

Part Number	Protocols or Clock Rate Range Supported
15500-XVRA-10A2	Low band 8 Mbps to 200 Mbps
15500-XVRA-10B2	Low band 8 Mbps to 200 Mbps
15500-XVRA-11A2	Mid-band 200 Mbps to 622 Mbps
15500-XVRA-11B2	Mid-band 200 Mbps to 1.25 Gbps
15500-XVRA-12B1	High-band 1.062 Gbps to 2.488 Gbps
15500-XVRA-08D1	T1 ¹ 1.544 Mbps
15500-XVRA-09D1	E1 2.044 Mbps
15500-XVRA-10E1	SDI and DVB-ASI video ^{2, 3}
15500-XVRA-11D1	GE 1.25 Gbps, FE 1.25 Mbps ⁴
ONS-SE-GEFC-SX	Fibre Channel (2.125 Gbps), Fibre Channel (1 Gbps), Gigabit Ethernet

1. DSX-1 interface
2. In a normal operating environment, the maximum digital video application connection length using a Belden 1694A cable is 200 m (218 yd). If the chassis ambient operating temperature is above 45°C (113°F) and ports 0 and 1 are used for video applications with this SFP, the maximum cable connection length supported may be less than the specified 200 m (218 yd), depending on the operating environment.
3. DVB-ASI = Digital Video Broadcast Asynchronous Serial Interface.
4. To ensure proper operation of the 15500-XVRA-11D1 SFP, the ambient operating temperature should not exceed 45°C (113°F).

Table A-20 lists the typical latencies for the 8-port multi-service muxponder.

Table A-20 Latency Values for the 8-Port Multi-Service Muxponder

Protocol	Unidirectional End-to-End Latency with 0 km Fiber	
	Typical	Maximum
ESCON	10 s	13 s
Fibre Channel	4 s	6 s
Gigabit Ethernet optical	6 s	8 s
Gigabit Ethernet copper	9 s	11 s
Fast Ethernet optical	14 s	17 s
Fast Ethernet copper	18 s	20 s
SDI	17 s	20 s
DVB-ASI	9 s	11 s

SDI Jitter Performance

SDI video signal is compliant to the ANSI/SMPTE 259M-1997 standard. [Table A-21](#) lists the SDI jitter performance values for the 8-port multi-service muxponder.

Table A-21 SDI Jitter Performance Values for the 8-Port Multi-Service Muxponder

Hp Filter	10 Hz	1 kHz	10 kHz	100 kHz
Jitter Generation (p-p)	0.5 UI ¹	0.06 UI	0.06 UI	0.06 UI
UI / Time	1.85 ns	220 ps	220 ps	220 ps

1. Maximum jitter generation is below SMPTE 259 M specification of 0.2 UI (0.74 ns) with the exception of low-frequency timing jitter. However, a purely digital system will operate correctly with significant amounts of low-frequency jitter as also indicated in Annex B of SMPTE 259M of the Timing Jitter Specification.

If your configuration uses an on-board system clock for trunk multiplexing, the client OC-3 wander generation may exceed the GR-253 specification of less than 60 ns MTIE (maximum time interval error) on greater than 10-second intervals and 20 ns MTIE on less than 1-second intervals. Because the MTIE can reach 100 ns across all observation intervals with this configuration, we do not recommend using the OC-3 transport for deriving the network clock. Other applications operate normally. If needed, the trunk multiplex clock can be configured to use one of the client OC-3 receive clocks. In this configuration, the OC-3 wander generation is fully compliant to GR-253 specification.

2.5-Gbps ITU Trunk Card Specifications

[Table A-22](#) lists the 2.5-Gbps ITU trunk card receiver and transmitter specifications. Optical loss due to splitter modules and connectors should be included in the optical budget calculation.



Note

The optical specifications described in this section are only for the individual components and should not be used to characterize the entire network performance.

Table A-22 2.5-Gbps ITU Trunk Card Optical Specifications

Description	Specification	
	Fiber type	SM ¹ 9 micron
Connector	MU	
Receiver	Minimum	Maximum
OSNR ^{2, 3}	19 dB	
Receive sensitivity ³	-28 dBm	
Receive overload		-8 dBm
Input wavelength	1260 nm	1580 nm
Transmitter	Minimum	Maximum
Transmitter power	5 dBm	10 dBm
Dispersion tolerance		3200 ps/nm ⁴

1. SM = single mode.

2. OSNR = optical signal-to-noise ratio.
3. Add the proper network-level penalty to the OSNR and/or receive power based on your actual network topology characteristics, such as dispersion.
4. ps/nm = picoseconds per nanometer.

10-Gbps ITU Tunable and Non tunable Trunk Card Specifications

Table A-23 lists the specifications for tunable and non tunable 10-Gbps ITU trunk card for the client side lasers. Optical loss due to splitter modules and connectors should be included in the optical budget calculation.



Note

The optical specifications described in this section are only for the individual components and should not be used to characterize the entire network performance.

Table A-23 10-Gbps ITU Tunable and Non tunable Trunk Card Specifications

Description	Specification	
	Fiber type	ITU-T G.652
Connector	MU	
Receiver	Minimum	Maximum
OSNR ^{1, 2}	26 dB	
Receive sensitivity ²	-22 dBm	
Receive overload		-8 dBm
Input wavelength	1430 nm	1580 nm
Transmitter	Minimum	Maximum
Output power	1 dBm	6 dBm
Dispersion tolerance		1000 ps/nm ³

1. OSNR = optical signal-to-ratio.
2. Add the proper network level penalty to the OSNR and/or receive power based on your actual network topology characteristics, such as dispersion.
3. ps/nm = picosecond per nanometer.

10-Gbps Uplink Card

Table A-24 lists the specifications for the 10-Gbps uplink cards supported by the Cisco ONS 15530 in the transmit and receive directions.


Note

The optical specifications described in this section are only for the individual components and should not be used to characterize the entire network performance.

Table A-24 10-Gbps Uplink Card Specifications

Description	Specification	
Fiber type	SM ¹ 1310 nm	
Connector	SC	
Dimensions	10.4 x 1.105 x 8.797 in. (264.2 x 28.1 x 223.4 mm)	
Bit rate	10 GE LAN-PHY	
Receiver	Minimum	Maximum
Receive sensitivity	-13.23 dBm	
Receive overload		0.5 dBm
Stressed receive sensitivity		-10.3 dBm
Transmitter	Minimum	Maximum
Transmit power	-5.2 dBm	0.5 dBm
Wavelength range	1260 nm	1355 nm

1. SM = single mode

SFP Specifications

Table A-25 lists the specifications for the Cisco ONS 15530 fixed rate SFP optics.


Note

Only use Cisco-certified SFP optics for the 8-port FC/GE and ESCON aggregation cards.

Table A-25 Fixed Rate SFP Optics Specifications

Description	Specification
Part number	15500-XVRA-01A2
ESCON, OC-3/STM-1 MM	
Dimensions (H x W x D)	0.486 x 0.522 x 2.24 in. (1.23 x 1325.9 x 5.69 cm)
Data rate	155 Mbps, 200 Mbps
Wavelength	1310 nm
Fiber type	MM, 50 m, 62.5 m

Table A-25 Fixed Rate SFP Optics Specifications (continued)

Description	Specification	
Connector type	MT-RJ	
Cladding diameter	125 m	
Receiver	Minimum	Maximum
Receive sensitivity	-33 dBm	-14 dBm
Input wavelength	1280 nm	1380 nm
Transmitter	Minimum	Maximum
Transmitter power	-19.5 dBm	-15 dBm
Output wavelength	1280 nm	1380 nm
Part number	15500-XVRA-02C1	
Gigabit Ethernet, Fibre Channel (1 Gbps), and FICON (1 Gbps) MM, ISC-1 (1-Gbps)		
Dimensions	0.486 x 0.522 x 2.24 in (1.23 x 1325.9 x 5.69 cm)	
Data rate	1.0625 Gbps, 1.25 Gbps	
Wavelength	850 nm	
Fiber type	MM, 50 micron, 62.5 micron	
Connector type	LC	
Cladding diameter	125 m	
	Minimum	Maximum
Receive sensitivity	-18 dBm	
Stressed receive sensitivity		-13.5 dBm
Input wavelength	770 nm	860 nm
Transmitter power	-9.5 dBm	-4 dBm
Output wavelength	830 nm	860 nm
Part number	15500-XVRA-03B1	
GE, FC (1 Gbps), and FICON (1 Gbps) SM		
Dimensions	0.486 x 0.522 x 2.24 in. (1.23 x 1325.9 x 5.69 cm)	
Data rate	1.0625 Gbps, 1.25 Gbps	
Wavelength	1310 nm	
Fiber type	MM, 50 m, 62.5 m	
Connector type	LC	
Cladding diameter	125 m	
Receiver	Minimum	Maximum
Receive sensitivity	-18 dBm	
Stressed receive sensitivity	-13.5 dBm	
Input wavelength	770 nm	860 nm
Transmitter	Minimum	Maximum

Table A-25 Fixed Rate SFP Optics Specifications (continued)

Description	Specification	
Transmitter power	-9.5 dBm	-4 dBm
Part number	15500-XVRA-03B1	
Gigabit Ethernet, Fibre Channel (1 Gbps), FICON (1 Gbps) SM		
Dimensions	0.486 x 0.522 x 2.24 in. (1.23 x 1325.9 x 5.69 cm)	
Data rate	1.0625 Gbps, 1.25 Gbps	
Wavelength	1310 nm	
Fiber type	SM, 9/125 m	
Connector type	LC	
Receiver	Minimum	Maximum
Input power	-20.5 dBm	-3 dBm
Input wavelength	1270 nm	1600 nm
Transmitter	Minimum	Maximum
Transmitter power	-9.5 dBm	-3 dBm
Output wavelength	1275 nm	1350 nm
Part number	15500-XVRA-03B2	
Fibre Channel (1 Gbps and 2 Gbps) and FICON (1 Gbps and 2 Gbps) SM		
Dimensions	0.486 x 0.522 x 2.24 in. (1.23 x 1325.9 x 5.69 cm)	
Data rate	1.0625 Gbps, 2.125 Gbps	
Wavelength	1310 nm	
Fiber type	SM, 9/125 m	
Connector type	LC	
Receiver	Minimum	Maximum
Receive sensitivity	-20.5 dBm	
Input wavelength	1270 nm	1600 nm
Transmitter	Minimum	Maximum
Transmitter power	-9.5 dBm	-3 dBm
Output wavelength	1275 nm	1350 nm

Table A-26 lists the specifications for the Cisco ONS 15530 variable rate SFP optics.

**Note**

Only use Cisco-certified SFP optics for the 4-port 1-Gbps/2-Gbps FC aggregation cards, 8-port FC/GE aggregation cards, 8-port multi-service muxponders, and ESCON aggregation cards.

Table A-26 Variable Rate SFP Optics Specifications

Description	Specification	
Part number	15500-XVRA-10A1	
Supported protocol encapsulations	ESCON (MM)	
Dimensions	0.486 x 0.522 x 2.24 in. (1.23 x 1325.9 x 5.69 cm)	
Data rate	8 to 200 Mbps	
Wavelength	1310 nm	
Fiber type	MM 50/125 m MM 62.5/125 m	
Connector type	LC	
Receiver	Minimum	Maximum
Receive sensitivity @ 10^{-12} BER ¹	-32 dBm	
Receive sensitivity @ 10^{-15} BER	-29 dBm	
Receive overload @ 10^{-12} BER		-14 dBm
Input wavelength	1100 nm	1600 nm
Transmitter	Minimum	Maximum
Transmitter power	-19 dBm	-14 dBm
Output wavelength	1280 nm	1380 nm
Part number	15500-XVRA-10A2	
Supported protocol encapsulations	ESCON (MM)	
Dimensions	0.486 x 0.522 x 2.24 in. (1.23 x 1325.9 x 5.69 cm)	
Data rate	8 to 200 Mbps	
Wavelength	1310 nm	
Fiber type	MM 50/125 m MM 62.5/125 m	
Connector type	LC	
Receiver	Minimum	Maximum
Receive sensitivity @ 10^{-12} BER ²	-32 dBm	
Receive sensitivity @ 10^{-15} BER	-29 dBm	
Receive overload @ 10^{-12} BER		-14 dBm
Input wavelength	1100 nm	1600 nm
Transmitter	Minimum	Maximum
Transmitter power	-19 dBm	-14 dBm
Output wavelength	1280 nm	1380 nm
Part number	15500-XVRA-10B1	
Supported protocol encapsulations	ESCON (SM)	
Dimensions	0.486 x 0.522 x 2.24 in. (1.23 x 1325.9 x 5.69 cm)	
Data rate range	8 Mbps to 200 Mbps	

Table A-26 Variable Rate SFP Optics Specifications (continued)

Description	Specification	
Wavelength	1310 nm	
Fiber type	SM, 9/125 m	
Connector type	LC	
Receiver	Minimum	Maximum
Receive sensitivity @10 ⁻¹² BER	-32 dBm	
Receive overload @10 ⁻¹² BER		-3 dBm
Input wavelength	1100 nm	1600 nm
Transmitter	Minimum	Maximum
Transmitter power	-8 dBm	-4 dBm
Output wavelength	1260 nm	1360 nm
Part number	15500-XVRA-10B2	
Supported protocol encapsulations	ESCON (SM)	
Dimensions	0.486 x 0.522 x 2.24 in. (1.23 x 1325.9 x 5.69 cm)	
Data rate range	8 Mbps to 200 Mbps	
Wavelength	1310 nm	
Fiber type	SM, 9/125 m	
Connector type	LC	
Receiver	Minimum	Maximum
Receive sensitivity @10 ⁻¹² BER	-32 dBm	
Receive overload @10 ⁻¹² BER		-3 dBm
Input wavelength	1100 nm	1600 nm
Transmitter	Minimum	Maximum
Transmitter power	-8 dBm	-4 dBm
Output wavelength	1260 nm	1360 nm
Part number	15500-XVRA-11A1	
Supported protocol encapsulations	ESCON, OC-12/STM-4	
Dimensions	0.486 x 0.522 x 2.24 in. (1.23 x 1325.9 x 5.69 cm)	
Data rate range	200 Mbps to 622 Mbps	
Wavelength	1310 nm	
Fiber type	MM 62.5/125 m	
Connector type	LC	
Receiver	Minimum	Maximum
Receive sensitivity @10 ⁻¹⁰ BER	-26 dBm	
Receive sensitivity @10 ⁻¹² BER	-25 dBm	
Maximum receive power @10 ⁻¹⁰ BER		-14
Input wavelength	1100 nm	1600 nm

Table A-26 Variable Rate SFP Optics Specifications (continued)

Description	Specification	
Transmitter	Minimum	Maximum
Transmitter power	-20 dBm	-14 dBm
Output wavelength	1270 nm	1380 nm
Part number	15500-XVRA-11A2	
Supported protocol encapsulations	ESCON, OC-12/STM-4	
Dimensions	0.486 x 0.522 x 2.24 in. (1.23 x 1325.9 x 5.69 cm)	
Data rate range	200 Mbps to 622 Mbps	
Wavelength	1310 nm	
Fiber type	MM 62.5/125 m	
Connector type	LC	
Receiver	Minimum	Maximum
Receive sensitivity @ 10^{-10} BER	-26 dBm	
Receive sensitivity @ 10^{-12} BER	-25 dBm	
Maximum receive power @ 10^{-10} BER		-14
Input wavelength	1100 nm	1600 nm
Transmitter	Minimum	Maximum
Transmitter power	-20 dBm	-14 dBm
Output wavelength	1270 nm	1380 nm
Part number	15500-XVRA-11B1	
Supported protocol encapsulations	FC, FICON, GE, ISC-1	
Dimensions	0.486 x 0.522 x 2.24 in. (1.23 x 1325.9 x 5.69 cm)	
Data rate range	200 Mbps to 1.25 Gbps	
Wavelength	1310 nm	
Fiber type	SM, 9/125 m	
Connector type	LC	
Receiver	Minimum	Maximum
Receive sensitivity @ 10^{-12} BER	-19 dBm	
Maximum receive power @ 10^{-12} BER		-3 dBm
Input wavelength	1100 nm	1600 nm
Transmitter	Minimum	Maximum
Transmitter power	-11 dBm	-3 dBm
Output wavelength	1285 nm	1345 nm
Part number	15500-XVRA-11B2	
Supported protocol encapsulations	FC, FICON, GE, ISC-1	
Dimensions	0.486 x 0.522 x 2.24 in. (1.23 x 1325.9 x 5.69 cm)	

Table A-26 Variable Rate SFP Optics Specifications (continued)

Description	Specification	
Data rate range	200 Mbps to 1.25 Gbps	
Wavelength	1310 nm	
Fiber type	SM, 9/125 m	
Connector type	LC	
Receiver	Minimum	Maximum
Receive sensitivity @10 ⁻¹² BER	-19 dBm	
Maximum receive power @10 ⁻¹² BER		-3 dBm
Input wavelength	1100 nm	1600 nm
Transmitter	Minimum	Maximum
Transmitter power	-11 dBm	-3 dBm
Output wavelength	1285 nm	1345 nm
Part number	15500-XVRA-12B1	
Supported protocol encapsulations	FC, FICON, GE, ISC-1, ISC-3	
Dimensions	0.486 x 0.522 x 2.24 in (1.23 x 1325.9 x 5.69 cm)	
Data rate range	1.062 Mbps to 2.488 Gbps	
Wavelength	1310 nm	
Fiber type	SM, 9/125 m	
Connector type	LC	
Receiver	Minimum	Maximum
Receive sensitivity @10 ⁻¹⁰ BER	-18 dBm	
Maximum receive power @10 ⁻¹⁰ BER		-3 dBm
Input wavelength	1100 nm	1600 nm
Transmitter	Minimum	Maximum
Transmitter power	-10 dBm	-3 dBm
Output wavelength	1266 nm	1360 nm
Part number	15454-SFP-GEFC-SX	
Supported protocol encapsulations	Fibre Channel (2.125 Gbps), Fibre Channel (1 Gbps), Gigabit Ethernet	
Dimensions	0.486 x 0.522 x 2.24 in (1.23 x 1325.9 x 5.69 cm)	
Data rate range	1.062 Gbps, 1.25 Gbps, 2.125 Gbps	
Wavelength	830 to 860 nm	
Fiber type	MM 50/125 m, MM 62.5/125 m	
Connector type	Duplex LC	
Receiver		
Receive sensitivity @2.125 Gbps	-18 mW	

Table A-26 Variable Rate SFP Optics Specifications (continued)

Description	Specification	
Receive sensitivity @1.25 Gbps	-20 dBm	
Receive sensitivity @1.06 Gbps	-20 mW	
Maximum receive power	0 dBm	
Receiver	Minimum	Maximum
Input wavelength	770 nm	860 nm
Transmitter	Minimum	Maximum
Transmitter power	-9 dBm	-3.5 dBm
Output wavelength	830 nm	860 nm

1. BER = bit error rate
2. BER = bit error rate

Table A-27 lists the specifications for the copper SFPs supported on the 8-port multi-service muxponder.

Table A-27 *Copper SFP Specifications*

Description	Specification
Part number	15500-XVRA-08D1
T1 1.544 Mbps	
Dimensions	0.486 x 0.522 x 2.24 in. (1.23 x 1325.9 x 5.69 cm)
Data rate	1.544 Mbps
Fiber type	Copper T1
Connector type	RJ-45
CAT5K cable	600 ft (182.9 m)
Part number	15500-XVRA-09D1
E1 2.044 Mbps	
Dimensions	0.486 x 0.522 x 2.24 in. (1.23 x 1325.9 x 5.69 cm)
Data rate	2.044 Mbps
Fiber type	Copper E1
Connector type	RJ-45
CAT5K cable	450 ft (137 m)
Part number	15500-XVRA-10E1
SDI and DVB-ASI Video 270Mbps	
Dimensions	0.486 x 0.522 x 2.24 in. (1.23 x 1325.9 x 5.69 cm)
Data rate	270Mbps
Fiber type	Copper digital video
Connector type	SMB/BNC
Balden 1694A cable	656 ft (200 m)
Part number	15500-XVRA-11D1
GE 1.25 Gbps, FE 1.25 Mbps	
Dimensions	0.486 x 0.522 x 2.24 in. (1.23 x 1325.9 x 5.69 cm)
Data rate	GE 1.25 Gbps, FE 1.25 Mbps
Fiber type	Copper GE/FE
Connector type	RJ-45
CAT5K cable	Cu GE and FE is 100 m (328.08 ft)