Cisco ONS 15216 4-Channel Optical Add/Drop Multiplexers

Contents

The Cisco ONS 15216 4 Channel Optical Add/Drop Multiplexers (OADMs) are a set of passive OADMs that allow the Cisco ONS 15454 Multiservice Transport Platform (MSTP) to address the edge of the optical network in a cost-effective manner without sacrificing operational ease of use. The Cisco ONS 15216 4 Channel OADMs are well suited to applications with minimal wavelength requirements and tight space and power constraints, such as cell site and customer premises terminations. Ten models are available, covering a 40-channel 100-GHz channel plan.

Figure 1.
The Cisco ONS 15216 4 Channel Optical Add/Drop Multiplexer

Applications

The Cisco ONS 15216 4 Channel OADM supports standard network topologies such as point-to-point and ring. With the introduction of omnidirectional and colorless Reconfigurable Optical Add-Drop Multiplexer (ROADM) functionality on the Cisco ONS 15454 MSTP, the combined products allow additional network topologies, such as the termination of a spur or rings, originating on a Cisco ONS 15216 4 Channel OADM, into the colorless ports of the ROADM node (Figure 2). This configuration does not consume a ROADM degree, allowing the node to scale beyond eight directions of connectivity in a mesh-ROADM application.

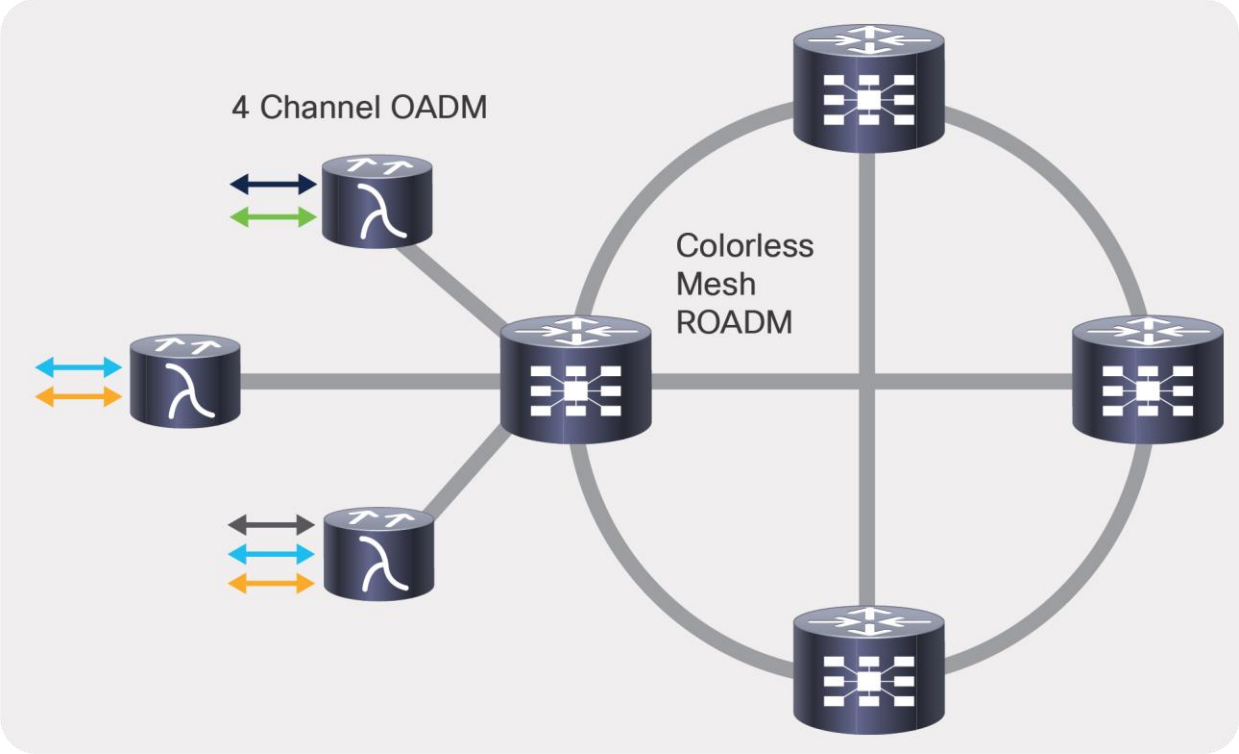

Figure 2.
OADM Nodes in a Spur Configuration Interconnecting with a Colorless Mesh ROADM Node

Another application for the Cisco ONS 15216 4-channel OADMs is as the add/drop stage of a single-module ROADM node. When only a small number of channels are required to add/drop at a ROADM node, using one or more 4-channel OADMs can save costs and space compared to the typical configuration using the Cisco ONS 15216 Mux/Demux 40 Channel Patch Panel. When the number of add/drop channels exceeds the deployed capacity of the OADMs, additional units can be added or replaced with a Cisco ONS 15216 Mux/Demux 40 Channel Patch Panel without affecting the service of existing pass-through channels.

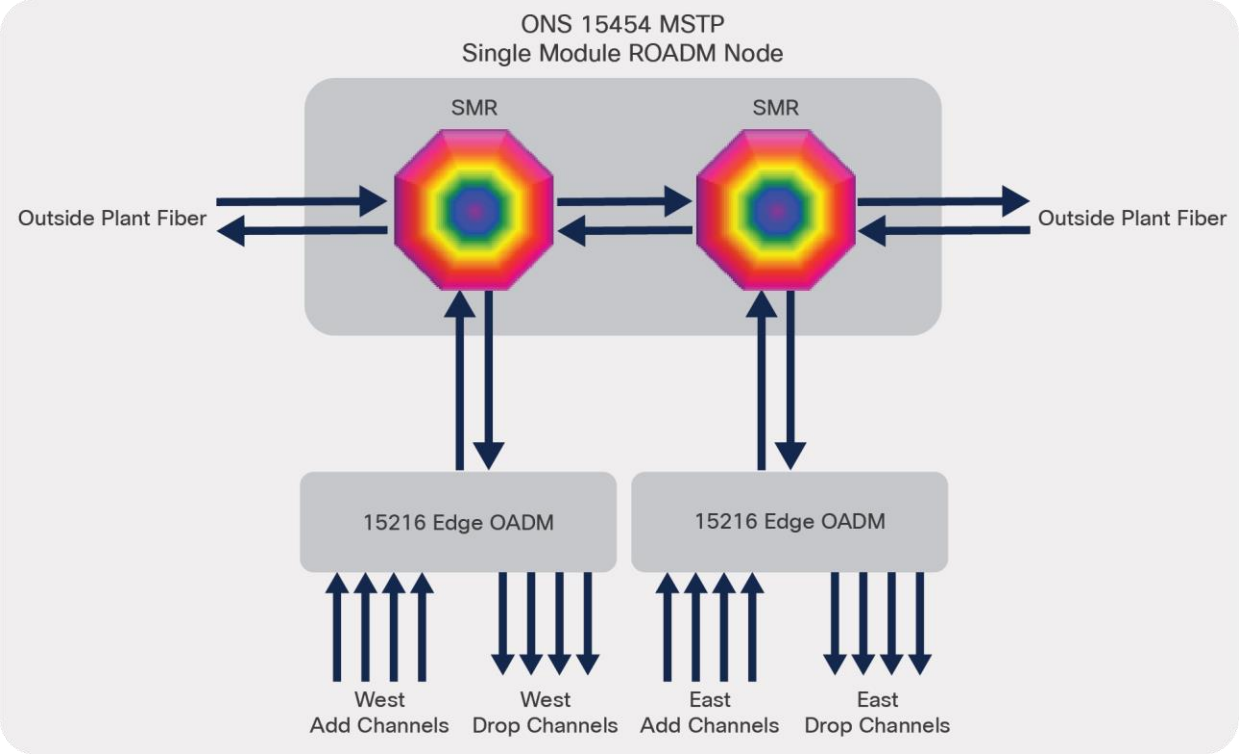

Figure 3.
An OADM Used as the Add/Drop Stage of a Single-Module ROADM

400G transmission with Cisco ONS 15216 4-channel OADMs

There has been a recent update to the technical specification of the Cisco ONS 15216 4-channel OADMs. Cisco released new 400G capable digital pluggable optics, namely the QSFP-DD 400G ZR/ ZR+ and the 400G-CFP2-DCO. A much sought after customer application is to use this OADM filters with these new 400G optics. The QSFP-DD and CFP2-DCO pluggable optical modules will be hosted on Cisco platforms like the NCS1000 and the NCS2000. The signal from these modules are fed to this Cisco ONS 15216 4-channel OADMs. The OADMs could be set in a linear or ring topology with 400G circuits in a point-to-point or hub-spoke overlay atop this physical topology.

But the existing technical specification (specifically the operating wavelength bandwidth) of the Cisco ONS 15216 4-channel OADMs, did not allow the transmission of 400G signals. To meet this end, the specification of these Cisco ONS 15216 4-channel OADMs underwent a minor update to support the wideband required for 400G transmission. It is critical to note that, while the product itself has undergone a version-up for the improved specifications, the Cisco PID (product ID) for these OADM modules continue to be the same as before; as what's mentioned in this datasheet below as well. Lastly, the newer versions of the OADM are also backward compatible to the older versions.

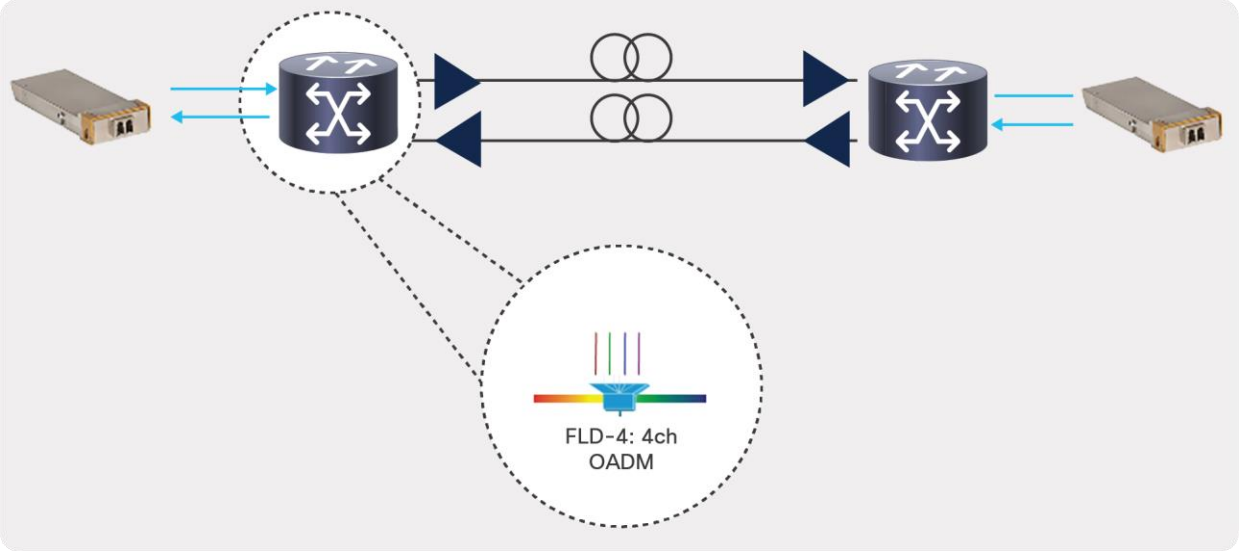

Figure 4.
Typical point-to-point application with Cisco 4-channel OADM and 400G-CFP2-DCO

Update to the Cisco ONS 15216 4-Channel OADM specification

The OWB: Operating wavelength bandwidth, is the channel bandwidth centered on a 100 GHz-spaced ITU grid. The erstwhile OADMs had an OWB (of +/- 15 GHz) to support legacy applications alone. With the new version of the Cisco ONS 15216 4-Channel OADM, the following technical specification updates were done to facilitate the 400G transmission:

The OWB was extended (to that of +/- 26 GHz) to support 400G transmission.

The minimum bandwidth specification was increased.

The detailed specifications are mentioned in table 2, below.

Edge Mounting Bracket

A Cisco ONS 15216 4 Channel OADM occupies a single position in the Cisco ONS 15216 Edge Mounting Bracket. The mounting bracket occupies one Rack Unit (1RU) and mounts into a standard-19-inch rack. It has four positions for mounting OADMs.

Figure 5.
Up to Four OADMs Mount into a 1RU Edge Mounting Bracket

Features and benefits

The Cisco ONS 15216 4 Channel OADM provides the following customer benefits:

- Cost-effective DWDM add/drop capability
- Best-in-class operational efficiency, with zero electrical power requirements
- High port density: four OADMs can be mounted in a 1RU bracket
- Low optical insertion loss for improved distance and performance
- USB port for passive inventory management
- Cisco Transport Controller (CTC) manageability for advanced fault isolation
- CTP support for efficient network design verification

Product specifications

Tables 1 through 4 provide optical, mechanical, and compliance specifications for the Cisco ONS 15216 4 Channel OADMs.

Table 1. Cisco ONS 15216 4 Channel OADM Channel Plan

Product ID	Channel ID	Frequency (THz)	Wavelength (nm)
15216-FLD-4-30.3=	1	195.9	1530.33
15216-FLD-4-30.3=	2	195.8	1531.12
15216-FLD-4-30.3=	3	195.7	1531.90
15216-FLD-4-30.3=	4	195.6	1532.68
15216-FLD-4-33.4=	5	195.5	1533.47
15216-FLD-4-33.4=	6	195.4	1534.25
15216-FLD-4-33.4=	7	195.3	1535.04
15216-FLD-4-33.4=	8	195.2	1535.82
15216-FLD-4-36.6=	9	195.1	1536.61
15216-FLD-4-36.6=	10	195.0	1537.40
15216-FLD-4-36.6=	11	194.9	1538.19
15216-FLD-4-36.6=	12	194.8	1538.98
15216-FLD-4-39.7=	13	194.7	1539.77
15216-FLD-4-39.7=	14	194.6	1540.56
15216-FLD-4-39.7=	15	194.5	1541.35

Product ID	Channel ID	Frequency (THz)	Wavelength (nm)
15216-FLD-4-39.7=	16	194.4	1542.14
15216-FLD-4-42.9=	17	194.3	1542.94
15216-FLD-4-42.9=	18	194.2	1543.73
15216-FLD-4-42.9=	19	194.1	1544.53
15216-FLD-4-42.9=	20	194.0	1545.32
15216-FLD-4-46.1=	21	193.9	1546.12
15216-FLD-4-46.1=	22	193.8	1546.92
15216-FLD-4-46.1=	23	193.7	1547.72
15216-FLD-4-46.1=	24	193.6	1548.51
15216-FLD-4-49.3=	25	193.5	1549.32
15216-FLD-4-49.3=	26	193.4	1550.12
15216-FLD-4-49.3=	27	193.3	1550.92
15216-FLD-4-49.3=	28	193.2	1551.72
15216-FLD-4-52.5=	29	193.1	1552.52
15216-FLD-4-52.5=	30	193.0	1553.33
15216-FLD-4-52.5=	31	192.9	1554.13
15216-FLD-4-52.5=	32	192.8	1554.94
15216-FLD-4-55.7=	33	192.7	1555.75
15216-FLD-4-55.7=	34	192.6	1556.55
15216-FLD-4-55.7=	35	192.5	1557.36
15216-FLD-4-55.7=	36	192.4	1558.17
15216-FLD-4-58.9=	37	192.3	1558.98
15216-FLD-4-58.9=	38	192.2	1559.79
15216-FLD-4-58.9=	39	192.1	1560.61
15216-FLD-4-58.9=	40	192.0	1561.42

Table 2. Cisco ONS 15216 4-Channel OADM Optical Specifications

Parameters	Minimum	Maximum	Minimum	Maximum	Unit	Note
	Standard OWB		Extended OWB			
Operating Bandwidth	± 15		± 26		Ghz	The OWB has been extended to now support a wider passband that allows 400G transmission
Insertion Loss ADD / DROP path	1.0	2.5	1.0	4.0	dB	Including 2 LC-LC connections COM-RX to Ch_i TX Ch_i RX to COM-TX (i = 1, 2, 3, 4)
Insertion Loss EXPRESS path within C-Band	0.5	1.7	0.5	2.7	dB	Including 2 LC-LC connections COM-RX to EXP- TX EXP- RX to COM-TX
Insertion Loss EXPRESS path within OSC-Band	0.5	1.7	0.5	1.7	dB	
Reflection (EXP path) passband ripple		0.4		1.4	dB	COM to EXP path
Isolation ADD / DROP path	25		25		dB	Adj. Channel
Isolation ADD / DROP path	40		40		dB	non Adj. Channel
Isolation EXPRESS path	15		10		dB	
PDL		0.2		1.0	dB	
PMD		0.1		0.9	ps	
Chromatic Dispersion ADD/DROP path		± 40		± 70	ps/nm	COM to Ch_i path (i = 1, 2, 3, 4)
Chromatic Dispersion EXP path		± 20		± 70	ps/nm	COM to EXP path
Group Delay Ripple		10		10	ps	peak to peak ripple

Note: Standard OWB: Legacy applications (old spec). Extended OWB: 400G applications (source over filter)

Table 3. Cisco ONS 15216 4-Channel OADM Optical Specifications for 400G-DCO applications, true values

Parameters	Minimum	Maximum	Unit	Note
	Extended OWB			
Insertion Loss ADD / DROP path	1.0	3.2	dB	Including 2 LC-LC connections COM-RX to Ch_i TX Ch_i RX to COM-TX (i = 1, 2, 3, 4)
Insertion Loss EXPRESS path within C-Band	0.5	2.1	dB	Including 2 LC-LC connections COM-RX to EXP- TX EXP- RX to COM-TX

Table 4. Cisco ONS 15216 4-Channel OADM General Specifications

Parameter	Minimum	Typical	Maximum	Unit	Note
Operating Temperature Range	-5		70	°C	
Storage Temperature Range	-40		85	°C	non condensing
Operating Humidity Range	5		95	%RH	
Power Handling	500			mW	Any port
Wavelength Range COM-EXP paths	1500		1565	nm	
OSC Wavelength Range	1500		1520	nm	
C-Band Wavelength Range	1528		1565	nm	
Channel spacing	100		100	GHz	Without skip channels
Channel Net Pass band @ -0.5dB	± 17	± 18		Ghz	
Channel Net Pass band @ -1.5dB	± 26	VTP		Ghz	
Channel Net Pass band @ -3.0dB	± 33	VTP		Ghz	
Return Loss	45			dB	Any port
Directivity	50			dB	Any path
Power Handling			500	mW	

Parameter	Minimum	Typical	Maximum	Unit	Note
Monitor RX relative attenuation	17.5	20	21.5	dB	COM-RX to MON-RX path attenuation
Monitor TX relative attenuation	17.5	20	21.5	dB	COM-TX / MON-TX relative attenuation

Table 5. Environmental and Mechanical Specifications for Cisco ONS 15216 4 Channel OADM and Edge Mounting Bracket

Device	Parameters	Minimum	Maximum
15216-HD-EXT-PNL= **15216-FLD-4-xx.x=**	Operating temperature range	32° F (0° C)	158° F (+70° C)
15216-HD-EXT-PNL= **15216-FLD-4-xx.x=**	Storage temperature range	-40° F (-40° C)	185° F (+85° C)
15216-HD-EXT-PNL=	Height		1.744 in. (44.298 mm)
	Width		19 in. (482.6 mm)
	Depth		0.394 in. (10.018 mm)
	Weight		0.5 lb (0.22679618 kg)
	Humidity	5% noncondensing	95% noncondensing
15216-FLD-4-xx.x=	Height		0.669 in. (16.993 mm)
	Width		7.047 in (178.994 mm)
	Depth		6.496 in. (164.998 mm)
	Weight		2 lb (0.91 kg)
	Humidity	5% noncondensing	95% noncondensing
	USB port power	400 mW	600 mW
Connector type	LC UPC II		
USB	Type A		

Table 6. Regulatory compliance

Description	Specification
Safety	GR-1089 UL60950/CSA 22.2 No. 60950-00 IEC 60950
Environmental	GR-63-CORE

Table 7 provides ordering information for the Cisco OSC OADM and Edge Mounting Bracket.

Table 7. Ordering information

Part Number	Product Name
15216-HD-EXT-PNL=	Edge Mounting Bracket
15216-FLD-4-30.3=	Edge 4-Ch Bi-Directional OADM Mod1530.33 to 1532.68
15216-FLD-4-33.4=	Edge 4-Ch Bi-Directional OADM Mod1533.47 to 1535.82
15216-FLD-4-36.6=	Edge 4-Ch Bi-Directional OADM Mod1536.61 to 1538.98
15216-FLD-4-39.7=	Edge 4-Ch Bi-Directional OADM Mod1539.77 to 1542.14
15216-FLD-4-42.9=	Edge 4-Ch Bi-Directional OADM Mod1542.94 to 1545.32
15216-FLD-4-46.1=	Edge 4-Ch Bi-Directional OADM Mod1546.12 to 1548.51
15216-FLD-4-49.3=	Edge 4-Ch Bi-Directional OADM Mod1549.32 to 1551.72
15216-FLD-4-52.5=	Edge 4-Ch Bi-Directional OADM Mod1552.52 to 1554.94
15216-FLD-4-55.7=	Edge 4-Ch Bi-Directional OADM Mod1555.75 to 1558.17
15216-FLD-4-58.9=	Edge 4-Ch Bi-Directional OADM Mod1558.98 to 1561.42

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Document history

New or Revised Topic	Described In	Date
Added a new table of specifications for 400G-DCO applications	Table 3	20 July, 2022
Updated specification of the FLD-4 to support 400G applications	Page 8 and in Table 2	May 24, 2021

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
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