

Cisco ONS 15454 Tunable Dispersion Compensation Unit

Product Overview and Applications

Tunability in DWDM has been a key requirement for the technology's maturity over the years from the introduction of tunable lasers, broadband receivers, and variable gain amplifiers. The Cisco[®] ONS 15454 MSTP now extends DWDM tunability to the dispersion compensator with its Tunable Dispersion Compensation Unit (see Figure 1). The Cisco ONS 15454 Tunable Dispersion Compensation line card uses fiber as the underlying technology to achieve tunability, which allows it to be unlocked from a specific 100/50 GHz grid like fiber bigrating and etalon technologies require. This helps service providers avoid future modifications to their DWDM networks to accommodate new wavelength modulation schemes that don't fit into fiber bigrating or etalon spectral widths.

Figure 1. Cisco ONS 15454 Tunable Dispersion Compensation Unit



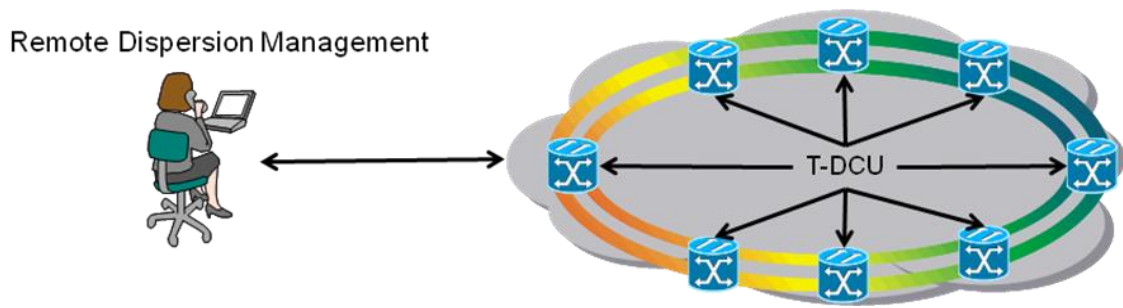
Manageability

Previous generations of dispersion compensators were passive units that sat outside of the chassis, making it very hard to know which unit type existed at each point in the network. With the Tunable Dispersion Compensation Unit as a plug-in module for the Cisco ONS 15454 chassis, operators will know exactly how much dispersion compensation exists throughout the entire network from a single remote location (see Figure 2).

Network Turn-Up

The Cisco ONS 15454 Tunable Dispersion Compensation Unit allows service providers to reduce their operational costs by providing flexible points in the network to cope with design uncertainties. As service providers may or may not know exact fiber data, the Cisco ONS 15454 Tunable Dispersion Compensation Unit helps ensure that the dispersion map can be adjusted without major modifications throughout the network (see Figure 2).

Figure 2. Remote Dispersion Management

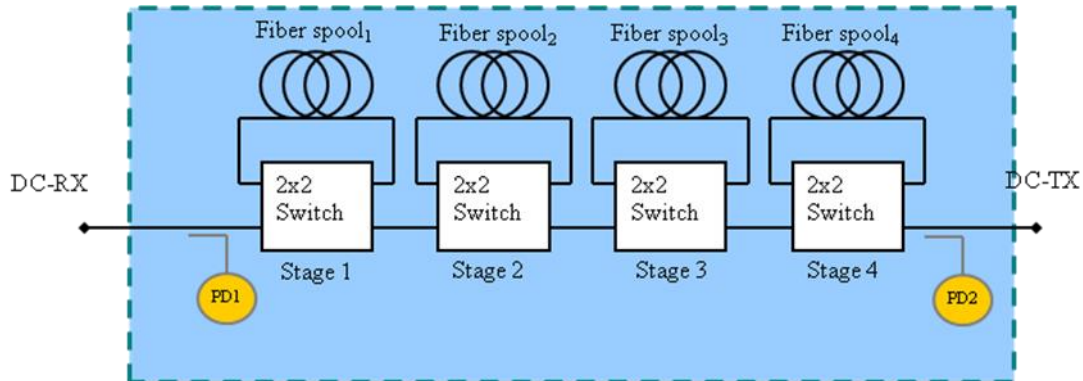


Features and Benefits

The Cisco ONS 15454 Tunable Dispersion Compensation Unit provides the following customer benefits:

- Automatic provisioning from the Cisco Transport Planner
- Remote monitoring and alarm correlation
- Network auditing: Provides the ability to validate dispersion maps remotely
- Fewer spare units: A single T-DCU replaces 10 fixed units
- Broadband compensation wavelength number- and speed-independent

Figure 3. Tunable Dispersion Compensation Block Diagram



Product Specifications

Tables 1 through 3 provide optical and mechanical specifications for the Cisco ONS 15454 Tunable Dispersion Compensation Unit. Table 4 provides regulatory compliance information, Table 5 lists system requirements, and Table 6 gives card specifications.

Table 1. Cisco ONS 15454 Tunable Dispersion Compensation Optical Specifications

Optical Specification	Coarse Unit (15454-TDC-FC=)	Fine Unit (15454-TDC-FC=)
Wavelength Range	1529 nm – 1562.5 nm	1529 nm – 1562.5 nm
Optical Return Loss	45 dB	45 dB
Polarization Dependent Loss	0.3 dB	0.3 dB
Maximum Insertion Loss	12.5 dB	9.5 dB
Chromatic Dispersion Range	-110 ps/nm thru -1650 ps/nm	-45 ps/nm thru -675 ps/nm
Chromatic Dispersion Steps	-110 ps/nm	-45 ps/nm
Maximum Fiber Length	10.58 km	4.41 km

Optical Specification	Coarse Unit (15454-TDC-FC=)	Fine Unit (15454-TDC-FC=)
Maximum Polarization Mode Dispersion	0.85 ps	0.63 ps
Tuning Settling Time	5 ms	5 ms

Table 2. Coarse Tunable Dispersion Compensation Unit Permutation Table

Coarse Unit	Chromatic Dispersion (ps/nm)	Maximum Insertion Loss (dB)	Maximum PMD (ps)	Maximum Fiber Length (km)
	0	2.4	0.10	0.03
	-110	3.6	0.16	0.73
	-220	4.0	0.19	1.44
	-330	5.2	0.23	2.15
	-440	4.7	0.23	2.83
	-550	5.9	0.26	3.54
	-660	6.2	0.28	4.25
	-770	7.4	0.31	4.96
	-880	6.1	0.26	5.65
	-990	7.3	0.29	6.36
	-1100	7.7	0.31	7.07
	-1210	8.9	0.34	7.77
	-1320	8.4	0.33	8.46
	-1430	9.6	0.36	9.17
	-1540	9.9	0.37	9.87
	-1650	11.1	0.39	10.58

Table 3. Fine Tunable Dispersion Compensation Unit Permutation Table

Fine Unit	Chromatic Dispersion (ps/nm)	Maximum Insertion Loss (dB)	Maximum PMD (ps)	Maximum Fiber Length (km)
	0	2.4	0.10	0.02
	-45	3.5	0.13	0.32
	-90	3.6	0.15	0.61
	-135	4.7	0.18	0.90
	-180	3.8	0.18	1.19
	-225	4.9	0.20	1.49
	-270	5.0	0.21	1.78
	-315	6.1	0.23	2.08
	-360	4.4	0.22	2.35
	-405	5.5	0.24	2.65
	-450	5.6	0.25	2.94
	-495	6.7	0.26	3.24
	-540	5.8	0.26	3.53
	-585	6.9	0.28	3.82
	-630	7.0	0.29	4.11
	-675	8.1	0.30	4.41

Table 4. Regulatory Compliance

Countries Supported	
ANSI System	ETSI System
<ul style="list-style-type: none"> • Canada • United States • Korea • Japan • European Union 	<ul style="list-style-type: none"> • European Union • Africa • CSI • Australia • New Zealand • China • Korea • India • Saudi Arabia • South America
EMC (Class A)	
<ul style="list-style-type: none"> • ICES-003 (2004) • GR-1089-CORE Issue 4, NEBS EMC and Safety (June 2006) • FCC 47CFR15 (2006) 	<ul style="list-style-type: none"> • EN 300 386 Telecommunications Network Equipment (EMC): 2007 (Note: EMC-1) • CISPR22 (2008) and CISPR24: 2002/ EN55024:2007 : Immunity levels: see EN61000-4-xx • EN55022: 2007 Information Technology Equipment (Emissions)(2006) (EMC-2) • EN55024: 1998/a2: 2003 Information Technology Equipment (Immunity)
Safety	
<ul style="list-style-type: none"> • UL/CSA 60950-1, 2006 • GR-1089-CORE Issue 4, NEBS EMC and Safety (June 2006) 	<ul style="list-style-type: none"> • UL/CSA 60950-1, 2006 • IEC 60950-1(2005/12), 2nd Edition and National Differences as per CB Bulletin 112A
Laser	
<ul style="list-style-type: none"> • UL/CSA 60950-1, 2006 • IEC 60950-1(2005/12), 2nd Edition and National Differences as per CB Bulletin 112A • IEC-60825-2 Edition 3.1, 2007/01 	<ul style="list-style-type: none"> • CDRH (accession letter and report) • IEC 60825-1 Consol. Ed. 1.2 (incl. am1+am2) 2001-08
Environmental	
<ul style="list-style-type: none"> • GR-63-CORE Issue 3, NEBS Physical Protection (Mar 2006) • ETS 300-019-2-1 V2.1.2 (Storage, Class 1.1) 	<ul style="list-style-type: none"> • ETS 300-019-2-2 V2.1.2 (1999-09): Transportation, Class 2.3 • ETS 300-019-2-3 V2.2.2 (2003-04):Operational, Class 3.1E
Optical	
<ul style="list-style-type: none"> • G.709 • G.975 	
Miscellaneous	
<ul style="list-style-type: none"> • AT&T Network Equipment Development Standards (NEDS) Generic Requirements, AT&T 802-900-260 • SBC TP76200MP 	<ul style="list-style-type: none"> • Verizon SIT.NEBS.NPI.2002.010 • Worldcom ESD requirement

Table 5. System Requirements

Component	Coarse Unit (15454-TDC-FC=)	Fine Unit (15454-TDC-FC=)
Processor	TCC2P/TCC2	TCC2P/TCC2
Cross-connect	All (not required)	All (not required)
Shelf assembly	15454-SA-HD or 15454-SA-HD-DDR shelf assembly with CC-FTA or FTA3 version fan-tray assembly	15454-SA-ETSI shelf assembly with CC-FTA or SDH 48V fan-tray assembly
System software	Release 9.1.0 ANSI or later	Release 9.1.0 ETSI or later

Table 6. Tunable Dispersion Compensation Unit Specifications

Specification	Coarse Unit (15454-TDC-FC=)	Fine Unit (15454-TDC-FC=)
Management		
Card LEDs <ul style="list-style-type: none"> • Failure (FAIL) • Active/standby (ACT/STBY) • Signal fail (SF) 	Red Green/yellow Yellow	Red Green/yellow Yellow
Operating Environment		
Temperature <ul style="list-style-type: none"> • Normal • Short term¹ 	0°C to 40°C (32°F to 104°F) –5°C to 55°C (23°F to 131°F)	0°C to 40°C (32°F to 104°F) –5°C to 55°C (23°F to 131°F)
Relative humidity <ul style="list-style-type: none"> • Normal • Short term 	5% to 85%, non-condensing 5% to 90% RH but not to exceed 0.024 kg water/kg of dry air	5% to 85%, non-condensing 5% to 90% RH but not to exceed 0.024 kg water/kg of dry air
Storage Environment		
Temperature	–40°C to 70°C (–40°F to 158°F)	–40°C to 70°C (–40°F to 158°F)
Relative humidity	5% to 95% RH	5 to 95% RH
Connectors		
Connectors type	LC (All the ports)	LC (All the ports)
Power		
Card power draw <ul style="list-style-type: none"> • Typical • Maximum 	9W 11W	9W 11W
Physical		
Size	1 slot	1 slot
Supported shelf slots	1–6, 12–17	1–6, 12–17

1. Short-term refers to a period of not more than 96 consecutive hours and a total of not more than 15 days in 1 year. This refers to a total of 360 hours in any given year, but no more than 15 occurrences during that 1-year period.

Warranty Information

Find warranty information on Cisco.com at the Product Warranties page.

Ordering Information

To place an order, visit the [Cisco Ordering Home Page](#). To download software, visit the [Cisco Software Center](#). Table 7 provides ordering information for the Cisco ONS 15454 Tunable Dispersion Compensation Unit.

Table 7. Ordering Information

Product Name	Part Number
Tunable Dispersion Compensation Unit – C- Band – Fine	15454-TDC-FC=
Tunable Dispersion Compensation Unit – C- Band – Coarse	15454-TDC-CC=

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For More Information

For more information about the Cisco ONS 15454 platform, visit www.cisco.com/en/US/products/hw/optical/ps1996/index.html or contact your local account representative.



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