Cisco ONS 15454 Multiservice Transport Platform

Product Overview

The Cisco® ONS 15454 Multiservice Transport Platform (MSTP) sets the industry benchmark for dense wavelength-division multiplexing (DWDM) solutions delivering simple, fast, and intelligent DWDM capabilities and lowering capital expenditures (CapEx) and operating expenses (OpEx).

When Cisco introduced the Cisco ONS 15454 Multiservice Provisioning Platform (MSPP) in 1999, a clear demarcation was created between what is considered “traditional” optical transport equipment and what is now considered “next-generation”. With its significant leap in technology and product migration, the Cisco ONS 15454 MSPP offered traditional time-division multiplexing (TDM) and SONET/SDH services as well as Ethernet and IP services. The platform was scalable and was the fraction of the size of traditional bit-rate–specific equipment. The Cisco ONS 15454 MSPP proved to be cost-effective, it effectively met the requirements for the new market segment, and it quickly established itself as the market leader.

Continuing with our tradition of innovation and leadership, Cisco introduced the Cisco ONS 15454 Multiservice Transport Platform (MSTP). The Cisco ONS 15454 MSTP (Figure 1) allows a DWDM system to become as intelligent and flexible as the highly successful Cisco ONS 15454 MSPP, including a wide service interface mix, service transparency, flexible topology, completely reconfigurable traffic pattern, and simplified operations. The platform supports a variety of modules to enable wide deployment scenarios including access, metro, regional, and ultra-long-haul networks.

Figure 1. Cisco ONS 15454 Multiservice Transport Platform M12 (12 service slots), M6 (6 service slots, bottom right), and M2 (2 service slots, top right)

Major Features and Benefits

The Cisco ONS 15454 MSTP provides capital and operational efficiency by addressing the increasing demand for multiple services, greater transport capacity, networking flexibility, multiple distance options, and management simplicity in a single platform. With innovative technology, Cisco ONS 15454 MSTP introduces intelligence to DWDM transmission, thus allowing the optimization of next-generation networks across multiple layers and removing costly Optical-Electrical-Optical (OEO) devices for network segmentation or regeneration.

The Cisco ONS 15454 MSTP provides features such as multilayer graphical network, node, and card visibility; comprehensive network-based service provisioning; and graphical software wizards to simplify and speed user operations for such tasks as initial network turn-up; service provisioning; and network, node, and bandwidth upgrades. The Cisco ONS 15454 MSTP uses an embedded software architecture and control plane to introduce a level of operational simplicity exceptional in DWDM networks.

The Cisco ONS 15454 MSTP delivers a comprehensive set of features, allowing customers worldwide to support the requirements of next-generation transport networks:

- Scalable C-band wavelength count (40, 80, and 96) provides superior cost-growth trade-off.
- Transport of 100-Mbps to 100-Gbps wavelength services, as well as aggregated TDM, Ethernet, and storage data services, provides maximum service flexibility and bandwidth optimization.
- Multiple chassis options provide deployment flexibility and per-site customization. The 12-slot (17 slots total) M12 chassis is available with a –48 VDC power supply. The M6 chassis provides 6 available slots for traffic (8 slots total). Like the M12 chassis, it supports a multishelf configuration to extend the slot capacity of a network element. The M2 chassis provides 2 slots for traffic (3 slots total). The M2 and M6 chassis are available with modular AC and DC power supply options, and they support both ANSI and ETSI requirements.
- Industry-leading 100 Gigabit technology allows the Cisco ONS 15454 MSTP to transmit at distances up to 4500 km. The MSTP supports a single-slot 100 Gigabit CP-DQPSK transponder, enabling up to 42 x 100 Gigabit transponders in a single half-depth 42-rack-unit (42RU) rack. For 10 Gigabit services, the ONS 15454 enables density of 30 x 10 Gigabit services per M6 shelf, and up to 420 x 10 Gigabit services per rack in a back-to-back deployment.
- Efficient Gigabit Ethernet and 10 Gigabit Ethernet transport over DWDM with Ethernet Xponder service blades. The Xponder provides unprecedented flexibility to map Ethernet services directly onto a DWDM wavelength while performing a variety of Layer 1 or Layer 2 functions. This approach provides a more efficient use of available bandwidth and extraordinary Gigabit Ethernet–over-DWDM mapping and traffic policing flexibility. The capability to use G.709 encapsulation and forward error correction (FEC) on the 10 Gigabit Ethernet LAN-PHY wavelength helps ensure optimized performance and reach. Typical SONET/SDH-like operations, administration, maintenance, and provisioning (OAM&P) supports the management functions of previous SONET/SDH-type interfaces while interfacing directly to the DWDM layer. A patented protection scheme can react to failures in less than 50 ms.
- The Cisco ONS 15454 MSPP-on-a-Blade Card combines 10-Gbps add/drop multiplexer (ADM) and transport functions to consolidate many of the aggregation functions traditionally performed by the MSPP. With one blade, carriers can now aggregate OC-3/STM-1, OC-12/STM-4, OC-48/STM-16, OC-192/STM-64, and Gigabit Ethernet signals onto a single-wavelength trunk circuit. The capability to use G.709 encapsulation and FEC on the OC-192/STM-64 wavelength helps ensure optimized performances and reach, and complete OAM&P capabilities.
- The 40-Gbps Enhanced FEC Full Band Tunable CP-DQPSK Muxponder Card and 40-Gbps CP-DQPSK Full C-Band Tunable Transponder Card provide exceptional performance for 40 Gigabit transmission, allowing the Cisco ONS 15454 MSTP to transmit at distances up to 4000 km.
- Cisco ONS 15454 Any Rate Muxponder and Xponder Cards enable a wide variety of interfaces and protection capabilities in a single card. These capabilities enable a cost-effective architecture for aggregating a large variety of services over OTU-1 or OTU-2 DWDM wavelengths.

- Flexible transmission capability up to 4500 km through the use of advanced Erbium-Doped Fiber Amplifier (EDFA) amplification, joint Raman and EDFA amplification, and FEC or enhanced FEC (EFEC) technologies supports a wide range of networking applications.
- The Cisco ONS 15454 addresses low-latency deployment needs with low-latency transponder modes and low-latency Fiber Bragg Grating dispersion compensation units.
- Fully reconfigurable optical add/drop multiplexers (ROADMs) offer superior network flexibility and reduced complexity.
- Mesh and multiring topology support in the optical domain provides the ability to manage nodes facing up to 8 degrees. These capabilities allow Cisco ONS 15454 MSTP users to provide wavelength services and define virtual private DWDM networks, where a common transport infrastructure can be shared across multiple users or services.
- Single-module ROADM (SMR) solutions dramatically improve system density and flexibility. The 40-channel single-module ROADM-2 (SMR-2) includes the optical service channel (OSC) add/drop filter, pre- and booster amplifiers, and a 4 x 1 Wavelength Selective Switch WSS-based ROADM core. This unit provides a simple and effective way to support multidegree nodes of up to 4 degrees, allowing in-service upgrade from 2 to 4 degrees. A 2-degree optimized version, the SMR-1, is also available; it includes the OSC add/drop filter, a preamplifier, and a 2 x 1 WSS-based ROADM core.
- Omnidirectional and colorless support for ROADM nodes allows service creation and restoration in a fully automated way through software provisioning. This capability provides the foundation for control-plane interaction between upper layer client devices and the optical layer.
- Fully automatic node and network setup provides the capability to use the intuitive DWDM network design tool (Cisco Transport Planner) for PC-aided design, installation, commissioning, and evolution of the network.
- Multilevel service monitoring using SONET/SDH and digital-wrapper (G.709) technology provides complete monitoring and reporting of performance and quality parameters for Ethernet, storage area network (SAN), video, and TDM services.
- Network topology autodiscovery supported at the network element level allows Element Manager System (EMS)-like functions directly through the platform-embedded software, Cisco Transport Controller.
- Network- and node-level alarm correlation performed directly by the embedded network element software allows a simpler and faster reaction to fault situations by providing only the root cause of the problem to the management interface.
- The integrated Cisco Transport Controller provides for network-based, point-and-click system and services setup and management.
- Virtual transponder operation for routers (such as the Cisco CRS-3 Carrier Routing System) is equipped with a DWDM physical line interface module (PLIM), allowing end-to-end service provisioning between routers through the complete DWDM network directly from the Cisco Transport Controller.
- Software-controlled optical power management fully automates network optical power control, critical during wavelength additions, site additions, and fast transient suppression in case of a fiber cut.
- The network-level functional view gives Cisco ONS 15454 MSTP allows operators to manage and monitor optical circuits between source and destination nodes and collect all relevant data pertaining to optical power levels and performance monitoring.
- Cisco Prime™ Optical, an advanced cross-platform optical network management system (NMS), provides unified network operations and interfaces to an operations support system (OSS).

In addition to the integrated software features, the Cisco ONS 15454 MSTP is supported by an easy-to-use but powerful network design tool, Cisco Transport Planner. Cisco Transport Planner is a user-friendly, Java-based application for modeling and optimizing DWDM networks based on the user's network parameters. Cisco Transport Planner also reduces OpEx by simplifying network deployments through the following:

- Simple drag-and-drop user operation for network and services definition
- Optimized services and units allocation in case of network topology or traffic matrix changes for an already deployed network (delta planning)
- Support for linear, ring, multiring, and mesh network topologies
- Fully flexible network design with the ability to optimize the flexibility provided by the ROADMs (in the optical domain) and by the multirate cards (in the service and application domain)
- Alien wavelength optical interface definition to allow the design of optical networks that can reuse existing or third-party DWDM interfaces, simplifying the migration of services and reducing the initial cost of new systems
- Automatic equipment selection
- Layered graphical views of network, wavelength services, and node layout, with the option to select between a card or a functional view of the node
- Detailed port-to-port fiber-cabling table
- Bill-of-materials (BOM) output
- Network and node layout, with the option to collect and export data pertaining to power consumption, heat dissipation, and overall weight of the configuration
- Exportable configuration file, which can be used for automated node-provisioning and quick network activations
- Live network import, which allows the import of a network into Cisco Transport Planner to assist in performing network upgrades, capacity analysis, optical analysis, and troubleshooting and interface characterization
- Wavelength Utilization View, which enables users to have a pictorial view of wavelengths used and available in the network, thereby helping future planning and providing an easy view of links running out of wavelengths.

Wide Service Interface Mix

The Cisco ONS 15454 MSTP supports a wide variety of interface and service types, which can be transparently transported through complex mesh or very simple point-to-point networks. The service interfaces allow network providers to offer new services and allow enterprise customers to natively transport a wide variety of services over a common network without unnecessary conversion stages and equipment. Additionally, a wide service mix simplifies the planning for services. The Cisco ONS 15454 MSTP supports a broad range of standards-based services in a single platform, including:

- Optical Transport Network (OTN) wavelength and aggregated services: OTU-1, OTU-2, OTU-3, OTU-4
- Data services: Private line, switched and wavelength-based, including 10BASE-T, 100BASE-T, Gigabit Ethernet, 10 Gigabit Ethernet LAN PHY and WAN PHY, 40 Gigabit Ethernet, and 100 Gigabit Ethernet
- Storage services: 1-, 2-, 4-, 8-, and 10-Gbps Fibre Channel; IBM Fiber Connection (FICON) and Enterprise Systems Connection (ESCON); ETR/CLO; and ISC-1 and ISC-3
- Video services: D1, DV6000, and high-definition television (HDTV)
- SONET/SDH wavelength and aggregated services: OC-3/STM-1, OC-12/STM-4, OC-48/STM-16, OC-192/STM-64, and OC-768/STM-256

Service Transparency

Critical to offering a wide service mix is the ability of a DWDM system to offer the level of transparency required by the service. The Cisco ONS 15454 MSTP solution offers the choice of multiservice aggregation, wavelength aggregation, and wavelength transport, combined with integrated, intelligent DWDM transmission in a single platform to minimize network costs for any mix of service types. Using digital-wrapper and OTN technologies (defined in ITU-T G.709) provides transparency, allows enhanced wavelength management, and provides extended optical reach through the integrated FEC and EFEC.

Another innovation is the capacity of the Cisco ONS 15454 MSTP to support direct interconnection with DWDM interfaces from Layer 2, Layer 3, and SAN devices. This element integration eliminates the need for costly and complex OEO conversions at the boundaries of the network or where the traffic simply needs to pass through a site without having to terminate on an upper-layer device.

Protection Options

The Cisco ONS 15454 MSTP provides multiple provisionable interface protection options, which facilitate support for high availability as well as unprotected service delivery to meet the varied service-level agreements (SLAs) for DWDM transport offerings.

Both 1 + 1 and shared protection schemes based on the principles of ITU-T recommendations are supported. The following types of 1+1 protection schemes can be supported:

- Path protection: In this case it is possible to offer complete redundancy of the optical path at the network level, but no protection is offered for the unit that is originating the Working and Protect DWDM signals and is deciding between the two DWDM signals on the receive side.

  This type of protection can be supported on individual wavelengths.
- Path and equipment protection: In this case it is possible to offer complete redundancy of the optical path at the network level and of the units that are originating the Working and Protect DWDM signals and deciding between the two DWDM signals on the receive side.
- Multiplex section protection: In this case it is possible to use the Cisco ONS 15454 MSTP Protection Switch Module unit to provide protection for the aggregated signal.
- Shared Ethernet protection: This protection can be supported by the Gigabit Ethernet and 10 Gigabit Ethernet Xponder units using the innovative and patented Cisco G.709 Rapid Resilient Ring (GR3) Ethernet Protection mechanism when operating in Layer 2 mode. By integrating G.709 messaging with an Ethernet VLAN management mechanism, GR3 protection provides SONET/SDH-like switching times and reliability. A recovery time of less than 50 ms can be achieved mapping Ethernet directly over DWDM.
- Optical layer restoration: The Cisco Wavelength Switched Optical Networks (WSON) control-plane architecture enhances Generalized Multiprotocol Label Switching (GMPLS) capabilities with awareness of wavelength properties and optical impairments, offering dynamic service provisioning and 1 + R or 1 + 1 + R restoration on a flexible DWDM network.

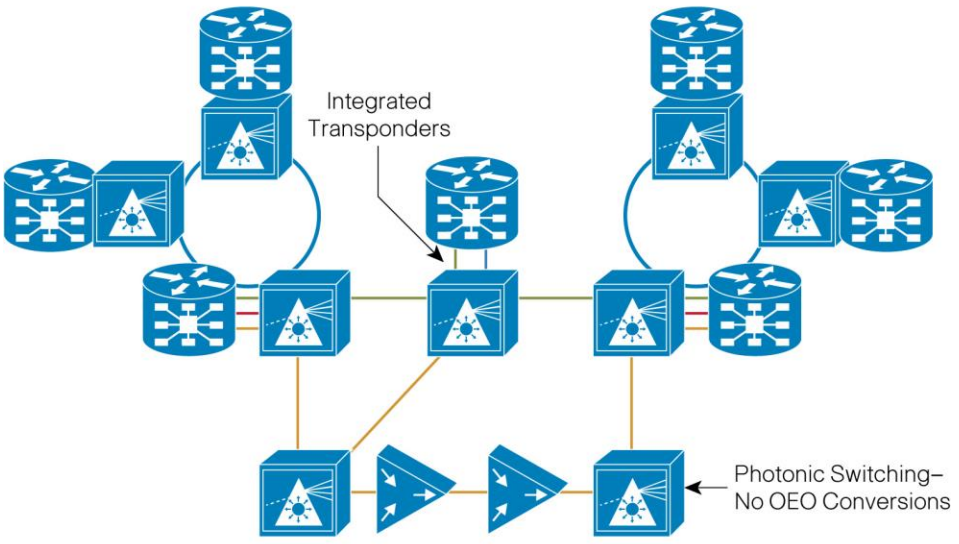
Different units can support different protection options and feature different capabilities, which are described in more detail in the unit data sheets.

Topology Flexibility

One recent core network trend is the consolidation of multiple Layer 2 and Layer 3 networks into a single IP/Multiprotocol Label Switching (IP/MPLS) infrastructure. Despite this Layer 2 and 3 convergence, the underlying transport layer (Layer 1) of many service provider core networks has continued to use SONET/SDH. This situation has remained in many service provider networks globally, creating OpEx and CapEx concerns for service providers as well as challenges to profitability and return on investment (ROI). Some network inefficiencies result from the way core transport networks are built out to support the IP or service layer over the SONET/SDH layer, supported by an underlying DWDM infrastructure. The OEO conversions and the associated electrical processing promoted by the layered network architecture result in an additional cost for space, because many racks of shelves may be required in a service provider point of presence (POP), as well as additional power and cooling that is necessary because of the active electronics components that they contain.

You can configure the Cisco ONS 15454 MSTP to support any metro, regional, or core DWDM topology, allowing a single solution to be used for the overall network, independent of the topology and reach. The ultimate topology flexibility is achieved through a set of fully reconfigurable ROADMs. Multidegree ROADMs (2 through 8 degrees of freedom) allow wavelengths to remain in the optical domain while being passed from one ring or network segment to another, further eliminating the need for OEO conversions and using the ability of core routers to initiate DWDM-compatible wavelengths (Figure 2).

Figure 2. Topology Flexibility, Integrated DWDM Optics, and Optical Bypass



The Cisco ONS 15454 MSTP offers ROADM capability that allows 0 to 80 channels of pass-through or add-drop, comprehensive wavelength provisioning, and full real-time power monitoring of each individual wavelength. Keeping traffic purely in the optical domain as much as possible has the added advantage of helping a transport network remain compatible with future technology. Pure optical transmission is inherently tolerant to bit-rate variations, and hence will potentially be more compatible with future transmission rates than electrical processing elements.

Product Specifications

With its multiservice capability, innovative optical technology, automatic optical power management, and MSPP-like ease of use, the Cisco ONS 15454 MSTP transforms the way DWDM networks can be built and managed. Combining multiple services and intelligent DWDM, the Cisco ONS 15454 MSTP significantly reduces both CapEx and OpEx for today's metro and regional networks.

Node Configurations

- Terminal
- Hub
- Line amplifier
- OADM
- Degree-2 ROADM
- Degree-2 Single-Module ROADM
- Multidegree ROADM
- Multidegree Single-Module ROADM
- Omnidirectional and colorless functions available on ROADMs

Network Configurations

- Linear point-to-point
- Ring (multiple-hub or no hub)
- Multiring
- Mesh

Advanced Intelligent Software Features

- Cisco WSON Control Plane extending GMPLS by introducing linear and nonlinear optical impairment awareness for DWDM network
- GMPSL User Network Interface (GMPLS-UNI) signaling interface to enable dynamic management by client devices
- Network topology autodiscovery
- Point-and-click node and network setup and regulation
- Automatic network-level optical power management and monitoring
- Single management interface (single IP address) for all the shelves in a node
- Network-level alarm correlation for quick and easy troubleshooting (G.798-based)
- Data communications network (DCN) extension to provide the capacity to use any available DCN access, including data communications channel (DCC) and generic communications channel (GCC) bytes, for management of nodes
- Automatic node turn-up for installation and deployment without the use of Cisco Transport Planner parameters
- Automatic network import into Network Planning tool for ease of performing network upgrades, capacity analysis, optical analysis, and troubleshooting and interface characterization

User Interface: Cisco Transport Controller

- Integrated node and subnetwork craft GUI
- Layered graphical views: Network, wavelength, node, shelf, and card
- Network- and node-level functional view, automatically generated and aligned with equipment status for the capability to manage and collect performance-monitoring data end to end through the network between the source and the destination nodes
- User-provisionable tab views, graphics, and fonts:
  - Background maps
  - Color schemes
- Comprehensive wavelength circuit routing and creation
- Network autodiscovery with provisionable subnetwork domain control
- System inventory
- PC-based Java client
- Familiar browser interface
- Complete performance-monitoring support:
  - 15-minute (32 entries) and 24-hour (2 entries)
  - Optical layer
  - SONET/SDH layer
  - Ethernet and SAN statistics
  - ITU-T G.709 layer (including FEC and EFEC)
  - Client interface type-specific
  - Threshold-crossing alerts threshold setting

Alarm Monitoring and Reporting

- Shelf LEDs: Critical, major, minor, and remote
- Card LEDs: Card failure, active/standby state, and signal fail
- Cisco Transport Controller craft interface:
  - Layered graphical views with real-time alarm text and coloring: Network, wavelength, node, shelf, and card
  - Multiple technology views including DWDM and SONET/SDH with MSTP integration
- Environmental alarm contacts:
  - 4-alarm output contact closures (standard): Critical, major, minor, and remote
  - Up to 48 provisionable alarm contacts in systems equipped with Alarm Interface Controller (AIC-I)

Network Security Features

- Four-level user control with provisionable timeout durations: Super-user, provisioning, maintenance, and retrieve
- Multiple usernames and logged-in users
- RADIUS-based authentication
- Secure Sockets Layer (SSL), Secure Shell (SSH) Protocol, and Secure HTTP (HTTPS)

Maintenance Features

- Remote software downloads and in-service, hitless activation
- Loopbacks
- Database backup and restore
- Lamp test

Timing and Synchronization

- Two external timing-source inputs (SONET/T1 and SDH/E-1)
- Line timing
- Two timing-source outputs
- Internal Stratum 3
- Synchronous status-messaging support

Additional Features

- 100-Mbps user data channel (Fast Ethernet) transported on the optical supervisory channel (OSC)
- Front only (ETSI) or front and rear access (ANSI) shelf assembly options
- A and B fully redundant and monitored DC power inputs

Carrier-Class Availability

- Delivery of better than 99,999-percent availability
- All cards hot-swappable
- Fully redundant network element processor and database

Compliance and Certifications

- Network Equipment Building Standards (NEBS) Level 3 compliance
- ITU-T and CE Mark compliance
- Operations Systems Modification of Intelligent Network Elements (OSMINE) certifications
- Storage-vendor qualification and certifications
- MEF 9 and MEF 14 certification for Gigabit Ethernet and 10 Gigabit Ethernet Xponder units

Technical Specifications

Table 1 lists the supported modules for the Cisco ONS 15454 MSTP.

Table 1. Supported Modules

Module	Unit Name
Common Equipment	
Shelf Assembly	
M12 ANSI and ETSI shelf assembly	SA-HD, SA-HD-DDR, or SA-ETSI version
M6 shelf assembly with brackets	M6-SA (AC and DC options available)
M6 chassis door (optional) and deep door version	M6-DR or M6-DDR
M2 shelf assembly with brackets	M2-SA (AC and DC options available)
M2 chassis door (optional) and deep door version	M2-DR or M2-DDR
Fan-Tray Assembly	
M12 fan-tray assembly	CC-FTA, FTA3-T (ANSI), or FTA-48V (ETSI)
M6 fan-tray assembly	M6-FTA or M6-FTA2
M2 fan-tray assembly with LCD status and backup memory	M2-FTA or M2-FTA2
M6 chassis air filter	M6-FTF
M2 chassis air filter	M2-FTF
Timing, Communications, and Control Card (TCC)	
M12	TCC2P or TCC3
M6	TNCE, TSCE, TNC, or TSC
M2	TNCE, TSCE, TNC, or TSC
M12 Shelf Alarm Interface Controller (AIC) and Alarm Expansion Panel (AEP)	AIC-I (AEP option for ANSI)
Power, Craft, Alarm Mechanical Interface Cards	
M12 (ETSI)	CTP-MIC48V AP-MIC48V
M6	M6-AC2, M6-AC or M6-DC, and M6-DC20 M6-PWRFLR M6-LCD M6-ECU, M6-ECU2, M6-ECU-60
M2	M2-AC or M2-DC or M2-DC-E
Brackets and Air Deflectors (Optional Spares)	
M6 19-, 21-, and 23-in. brackets	M6-BRKT
M6 21-in. air deflectors	M6-DEFL21
M6 23-in. air deflectors	M6-DEFL23
M2 19-, 21-, and 23-in. brackets	M2-BRKT
M2 21-in. air deflectors	M2-DEFL21
M2 23-in. air deflectors	M2-DEFL23
Air Ramp	AIR-RAMP
Slot Filler Card	
Interface and control (12, M6 and M2)	BLANK
Front Mount Electrical Connection (FMEC) (ETSI) – M12 only	BLANK-FMEC
Detectable control (M6 and M2)	M-T-FILLER
Detectable line (M6 and M2)	M-FILLER
M6 power module blank filler	M6-PWRFLR
Multishelf Management Cards (M12)	
Integrated multishelf switch	MS-ISC-100T
Ethernet adapter panel mechanical frame	EAP-MF
Ethernet adapter panel	EAP
Multiple Ethernet cables	MEC

Module	Unit Name
Fiber management	
Fiber patch panel shelf	PP-64-LC/PP2-64-LC or PP-80-LC
Fiber jumper storage shelf	FBR-STRG
Optical Transmission Elements	
Multiplexer and Demultiplexer Filters	
40-wavelength multiplexer, 100-GHz, C band	40-MUX-C
40-channel demultiplexer, 100-GHz, Odd, C band	40-DMX-C
40-channel demultiplexer, 100-GHz, Even, C band	40-DMX-CE
40-channel multiplexer/demultiplexer patch panel, 100-GHz, C band – Odd	MD 40 ODD
40-channel multiplexer/demultiplexer patch panel, 100-GHz, C band – Even	MD 40 EVEN
Multiplexer/demultiplexer plug-in interleaver module	MD ID 50
40-channel exposed faceplate multiplexer/demultiplexer patch panel, 100-GHz, C band – Odd	MD 40 ODD
40-channel exposed faceplate multiplexer/demultiplexer patch panel, 100-GHz, C band – Even.	MD 40 EVEN
48-channel exposed faceplate multiplexer/demultiplexer patch panel, 100-GHz, C band – Odd	MD 48 ODD
48-channel exposed faceplate multiplexer/demultiplexer patch panel, 100-GHz, C band – Even	MD 48 EVEN
48-channel 50-GHz de-interleaver with coupler plug-in module	MD 48 CM
32-wavelength multiplexer, 100-GHz, C band	32MUX-O
32-wavelength demultiplexer, 100-GHz, C band	32DMX-O
Edge Mounting Bracket	HD-EXT-PNL
Edge 4-channel bidirectional OADM module	FLD-4-xx.x
Edge 8-channel coarse wavelength-division multiplexing (CWDM) multiplexer/demultiplexer module	FLC-CWDM-8
Edge optical service channel add/drop	FLD-OSC
Optical Amplifier	
Preamplifier, 50-GHz capable, C band	OPT-PRE
Booster amplifier, 50-GHz capable, C band	OPT-BST
Optical amplifier, 17-dB gain, 50-GHz capable, C band	OPT-AMP-17C
Enhanced booster amplifier, 50-GHz capable, C band	OPT-BST-E
Enhanced optical amplifier, 20-dBm output power, 50-GHz capable, C band	OPT-AMP-C
Raman amplifier, embedded EDFA, C band	OPT-RAMP-C
Extended performance Raman amplifier, embedded EDFA, C band	OPT-RAMP-CE
True variable-gain booster amplifier, 17-dB gain, 96 channels, C band	OPT-EDFA-17
True variable-gain booster amplifier, 24-dB gain, 96channels, C band	OPT-EDFA-24
High-power counterpropagating Raman unit, C band	RAMAN-CTP
High-power co-propagating Raman unit, C band	RAMAN-COP
Reconfigurable Optical Add/Drop Multiplexer	
40-channel wavelength cross-connect, 100-GHz, odd, C band	40-WXC-C
80-channel wavelength cross-connect, 50-GHz, C band	80-WXC-C
Degree-4 mesh patch panel	PP-MESH-4
Degree-8 mesh patch panel	PP-MESH-8
40-channel wavelength selective switch, 100-GHz, odd, C band	40-WSS-C
40-channel wavelength selective switch, 100-GHz, even, C band	40-WSS-CE
40-channel single-module ROADM with integrated PRE amplifier, 100-GHz, C band	40-SMR1-C
40-channel single-module ROADM with integrated PRE and BST, 100-GHz, C band	40-SMR2-C
Degree-4 single-module ROADM mesh patch panel	PP-4-SMR
Protection Switching Module	PSM
Optical Channel Add/Drop Multiplexer	
4-channel, 100-GHz, C band	AD-4C-xx.x

Module	Unit Name
Optical Service Channel	
Standard	OSCM
Integrated combiner and separator	OSC-CSM
Dispersion Compensation	
Dispersion compensation unit shelf assembly (2-slot)	DCU-SA
Dispersion compensation units (DCUs)	DCU-<value>
SMF C-band Fiber Bragg Grating Dispersion compensation units (low-latency DCUs)	FBGDCU-<value>
Tunable DCU coarse granularity C band	TDC-CC
Tunable DCU fine granularity C band	TDC-FC
Y-Cable Protection Modules	
Shelf assembly	YCBL-LC or FL-SA
Y-cable protection module, single-mode	YCM-SM-LC or CS-SM-Y
Y-cable protection module, multimode	YCM-MM-LC or CS-MM-Y
Wavelength Interfaces	
100-Gbps Transponder/Muxponder Units	
100G I-4 CP-DQPSK full C band tunable LC metro edge	100G-ME-C
100G I-4 ITU-T CP-DQPSK full C band tunable LC	100G-LC-C
100G I-4 ITU-T CP-DQPSK full C band tunable LC, Licensed	100GC-LIC
Ten 10G multirate client line card	10X10G-LC
Ten 10G multirate client LC licensed with 1 license at 10GE	10X10-LIC
Two 100G CFP line card	CFP-LC
40-Gbps Transponder/Muxponder Units	
Four 10-Gbps DPSK muxponder – full C-band tunable	40G-MXP-C
40G CP-DQPSK muxponder, metro edge performance, C band	40ME-MXP-C
40G CP-DQPSK muxponder, extended performance, C band	40EX-MXP-C
40G CP-DQPSK transponder, metro edge performance, C band	40ME-TXP-C
40G CP-DQPSK transponder, extended performance, C band	40EX-TXP-C
10-Gbps Transponder/Muxponder Units	
10G multirate transponder, EFEC, full C-band tunable	10E-L1-C
10-Gbps EFEC multirate transponder, extended performance, full C-band tunable	10EX-L1-C
Four 2.5-Gbps EFEC muxponder, full C-band tunable	10ME-L1-y
Four 2.5-Gbps EFEC muxponder, extended performance, full C-band tunable	10MEX-L1-C
10-Gbps EFEC data muxponder, band tunable	10DME-C
10-Gbps EFEC data muxponder, extended performance, full C-band tunable	10DMEX-C
Xponder Units	
GE Xponder	GE-XP
GE Xponder, enhanced	GE-XPE
10GE Xponder	10GE-XP
10GE Xponder, enhanced	10GE-XPE
OTU2 Xponder	OTU2-XP
Any Rate Xponder, enhanced	AR-XPE
Any Rate Xponder	AR-XP
Any Rate Xponder, software license upgradable	AR-XP-LIC
Any Rate Muxponder	AR-MXP
Any Rate Muxponder, software license upgradable	AR-MXP-LIC
MSPP-on-a-Blade	ADM-10G

Module	Unit Name
Pluggable Modules	
SONET/SDH/OTN	
SFP – OC-3 SR1/STM-1 I-1.1 – SM	ONS-SE-Z1
SFP – OC-3 SR1/STM-1 – MM	ONS-SI-155-SR-MM
SFP – OC-3 IR1/STM-1 S-1.1 – SM	ONS-SI-155-I1/ONS-SI-622-I1/SFP3-1-IR/SFP-L.1.1
SFP – STM-1 electrical	ONS-SC-155-EL
SFP – OC-12 SR1/STM-4, I-4.1 – SM	ONS-SE-Z1
SFP – OC-12 IR1/STM-4 S-4.1 – SM	ONS-SI-622-I1/SFP12-4-IR/SFP-L.4.1
SFP – OC-3 LR2/STM-1 L-1.2 – SM	ONS-SI-155-L2
SFP – OC-48 SR1/STM-16 I-16.1 – SM	ONS-SI-2G-S1/ONS-SE-2G-S1
SFP – OC-48 IR1/STM-16 S-16.1 – SM	ONS-SI-2G-I1/ONS-SE-Z1/SFP-OC48-IR/SFP-L.16.1
SFP – OC-48 LR2/STM-16 L-16.2 – SM	ONS-SI-2G-L2/ONS-SE-2G-L2
XFP – OC-192 SR1/STM-64 I-64.1 – SM	ONS-XC-10G-S1
XFP – OC-192 IR2/STM-64 S-64.2 – SM	ONS-XC-10G-I2
XFP – OC-192 LR2/STM-64 L-64.2 – SM	ONS-XC-10G-L2
SFP-E1/DS-1 PDH over FE pseudowire, commercial temp	ONS-SC-E1-T1-PW
SFP-E3/DS-3 PDH over FE pseudowire, commercial temp	ONS-SC-E3-T3-PW
SFP OC3/STM1/FE OSC for RAMAN application 1518.0nm, SM	ONS-SC-OSC-18.0
CXP – 100GBASE-SR – commercial temp, MM	ONS-CXP-100G-SR10
100G multirate CFP, LR4, commercial temp	ONS-CC-100G-LR4
40G multirate CFP, LR4, commercial temp	ONS-CC-40G-LR4
SFP+ SR, commercial temp, MM	ONS-SC+-10G-SR
SFP+ LR, commercial temp, SM	ONS-SC+-10G-LR
SFP+ ER, commercial temp, SM	ONS-SC+-10G-ER
SFP+ ZR, commercial temp, SM	ONS-SC+-10G-ZR
40G multirate CFP, FR, commercial temp	ONS-CC-40G-FR
Ethernet	
SFP – FE 10BASE-T, electrical	ONS-SE-ZE-EL
SFP – FE 100BASE-T, electrical	ONS-SE-ZE-EL
SFP – FE 100BASE-LX, SM	SFP3-1-IR/SFP-L.1.1
SFP – FE 100BASE-FX, MM	ONS-SI-155-SR-MM
SFP – GE 1000BASE-T, electrical	ONS-SE-ZE-EL
SFP – GE 1000BASE-LX, SM	ONS-SE-G2F-LX/ONS-SE-Z1
SFP – GE 1000BASE-SX, MM	ONS-SE-G2F-SX
SFP – GE 1000BASE-ZX, SM	ONS-SE-GE-ZX/ONS-SI-GE-ZX
SFP – 1000BASE BX U, GE bidirectional upstream, SM	ONS-SE-GE-BXU
SFP – 1000BASE BX D, GE bidirectional downstream, SM	ONS-SE-GE-BXD
SFP-OC-3/STM-1/FE Optical Service Channel SFPs ULH, commercial temp	ONS-SC-OSC-ULH
XFP – 10GE BASE-LR, SM	ONS-XC-10G-S1
XFP – 10GE BASE-LW, SM	ONS-XC-10G-S1
XFP – 10GE BASE-ER, SM	ONS-XC-10G-I2
XFP – 10GE BASE-EW, SM	ONS-XC-10G-I2
XFP – 10GE BASE-ZR, SM	ONS-XC-10G-L2
XFP – 10GE BASE-SR, MM	ONS-XC-10G-SR-MM
XFP – 10GE BASE-SW, MM	ONS-XC-10G-SR-MM
SFP OC-3/STM-1/FE OSC for RAMAN application 1518.0 nm	ONS-SC-OSC-18.0
CXP – 100GBASE-SR, commercial temp, MM	ONS-CXP-100G-SR10
100G multirate CFP, LR4, commercial temp	ONS-CC-100G-LR4
40G multirate CFP, LR4, commercial temp	ONS-CC-40G-LR4
SFP+ SR, commercial temp, MM	ONS-SC+-10G-SR
SFP+ LR, commercial temp, SM	ONS-SC+-10G-LR
SFP+ ER, commercial temp, SM	ONS-SC+-10G-ER
SFP+ ZR, commercial temp, SM	ONS-SC+-10G-ZR
100GE Ethernet CFP, LR4, commercial temp	ONS-CC-100GE-LR4
40GE multirate CFP, FR, commercial temp	ONS-CC-40G-FR

Module	Unit Name
SAN	
SFP – ESCON 1310, MM	ONS-SE-200-MM
SFP – Sysplex CLO/ETR, 1310 nm, MM	ONS-SE-200-MM
SFP – Fibre Channel 1 G/FICON-1G 100-M5-SN-I	ONS-SE-G2F-SX
SFP – Fibre Channel 1G/FICON-1G 100-M6-SN-I	ONS-SE-G2F-SX
SFP – Fibre Channel 1G/FICON-1G 100-SM-LC-L	ONS-SE-G2F-LX
SFP – Fibre Channel 2G /FICON-2G 200-M5-SN-I	ONS-SE-G2F-SX
SFP – Fibre Channel 2G/FICON-2G 200-M6-SN-I	ONS-SE-G2F-SX
SFP – Fibre Channel 2G/FICON-2G 200-SM-LC-L	ONS-SE-G2F-LX
SFP – Fibre Channel 4G/FICON-4G 400-M5-SN-I	ONS-SE-4G-MM
SFP – Fibre Channel 4G/FICON-4G 400-M6-SN-I	ONS-SE-4G-MM
SFP – Fibre Channel 4G/FICON-4G 400-SM-LC-L	ONS-SE-4G-SM
SFP – ISC-Compat 100-SM-LC-L	ONS-SE-G2F-LX
SFP – ISC-Peer-1G 100-SM-LC-L	ONS-SE-G2F-LX
SFP – ISC-Peer-2G 200-SM-LC-L	ONS-SE-G2F-LX
SFP – Fibre Channel 4G/FICON-4G 100 GHz, LC	ONS-SC-4G-xx.x
XFP – Fibre Channel 10G 1200-SM-LL-L	ONS-XC-10G-S1
XFP – Fibre Channel 10G 1200-MX-SN-I	ONS-XC-10G-SR-MM
XFP – Fibre Channel 8G SM	ONS-XC-8G-SM
XFP – Fibre Channel 8G MM	ONS-XC-8G-MM
Video	
SFP – D1 Video 1310, SM	ONS-SI-622-I1/SFP12-4-IR/SFP-L.4.1
SFP – DVB-ASI 1310, SM	ONS-SI-622-I1/SFP12-4-IR/SFP-L.4.1
SFP – SDI 1310, SM	ONS-SI-622-I1/SFP12-4-IR/SFP-L.4.1
SFP – HDTV 1310, SM	ONS-SE-G2F-LX
SFP – DV6000 1310, SM	ONS-SI-2G-I1/SFP-OC48-IR/SFP-L.16.1
SFP – 3G HD Video Tx, SM	ONS-SC-HD3GV-TX
SFP – 3G HD Video Rx, SM	ONS-SC-HD3GV-RX
Data	
SFP – FDDI 1310, SM	ONS-SI-155-I1/SFP3-1-IR/SFP-L.1.1
SFP – T3 Optical 1310, SM	ONS-SI-155-I1/SFP3-1-IR
PDHoEthernet	
SFP – E1/DS1 PDH over FE pseudowire	SFP – E1/DS1 PDH over FE Pseudowire
SFP – FE over DS1/E1	SFP – FE over DS1/E1
SFP – FE over DS-3/E3	SFP – FE over DS3/E3
SFP – E3/DS-3 PDH over FE pseudowire	SFP – E3/DS-3 PDH over FE Pseudowire

Module	Unit Name
xWDM	
SFP – OC-48 CWDM, SFP – OC-48 DWDM, 100 GHz	ONS-SC-Z3-xxxx
SFP – STM-16 CWDM	ONS-SC-2G-xx.x
SFP – STM-16 DWDM, 100 GHz	ONS-SC-Z3-xxxx
SFP – GE CWDM	ONS-SC-2G-xx.x
SFP – GE DWDM, 100 GHz	ONS-SC-Z3-xxxx
SFP – Fibre Channel 1G/FICON-1G CWDM	ONS-SC-2G-xx.x
SFP – Fibre Channel 1G/FICON-1G DWDM, 100GHz	ONS-SC-Z3-xxxx
SFP – Fibre Channel 2G/FICON-2G CWDM	ONS-SC-2G-xx.x
SFP – Fibre Channel 2G/FICON-2G DWDM, 100 GHz, 15xx.x nm SFP – Fibre Channel 4G/FICON-4G 100 GHz, LC	ONS-SC-Z3-xxxx ONS-SC-2G-xx.x ONS-SC-4G-xx.x
XFP – OC-192 DWDM, 100 GHz	ONS-XC-10G-xx.x, ONS-XC-10g-EPxx.x
XFP – STM-64 DWDM, 100 GHz	ONS-XC-10G-xx.x, ONS-XC-10g-EPxx.x
XFP – 10GE LAN PHY DWDM, 100 GHz	ONS-XC-10G-xx.x, ONS-XC-10g-EPxx.x
XFP – 10GE FC DWDM, 100 GHz	ONS-XC-10G-xx.x, ONS-XC-10g-EPxx.x
XFP – 10GE multirate full C-band tunable DWDM, 50 GHz	ONS-XC-10G-C
XFP – OC-192/10GE/I2, CWDMC-temp, 40-km range	ONS-XC-10G-xxxx
10GE MR, SFP+ 15xx.x nm, 100 GHz, LC, SM	ONS-SC+-10G-xx.x
10GE MR, edge performance SFP+ 100 GHz, LC, SM	ONS-SC+-10GEPxx.x
X–P – 10GE 96-channel full C-band tunable DWDM XFP, 50 GHz, LC, SM	ONS-XC-10G-96C

Table 2 provides details about supported interfaces and protection types for the different wavelength interface modules supported by the Cisco ONS 15454 MSTP.

Table 2. Wavelength Interfaces Details

Modules	Supported Service Interfaces	Protection Supported
2.5-Gbps FEC Multirate Transponder Cards 8 modules, 4-channel tunable for 32-channel, 100-GHz plan, 50-GHz laser stability (C band)	1-Gbps Fibre Channel/FICON 2-Gbps Fibre Channel/FICON ISC-1 ISC-3 ESCON Fast Ethernet (FE) Gigabit Ethernet (GE) T3 (optical) OC-3/STM-1 OC-12/STM-4 OC-48/STM-16 D1-SDI video HDTV C-Cor DV-6000 (2.38-Gbps) ETR/CLO	No protection Optical-path protection Optical-path and equipment protection
2.5-Gbps Data Muxponder Cards 8 modules, 4-channel tunable for 32-channel, 100-GHz plan, 50-GHz laser stability (C band)	1-Gbps Fibre Channel/FICON 2-Gbps Fibre Channel/FICON ESCON GE	No protection Optical-path protection Optical-path and equipment protection

Modules	Supported Service Interfaces	Protection Supported
10-Gbps EFEC Multirate Transponder Cards (4-channel tunable) 8 modules, 4-channel tunable for 32-channel, 100-GHz plan, 50-GHz laser stability (C band)	10GE LAN 10GE WAN OC-192/STM-64 10 Gigabit Fibre Channel	No protection Optical-path and equipment protection
Four 2.5-Gbps EFEC Muxponder Cards (4-channel tunable) 8 modules, 4-channel tunable for 32-channel, 100-GHz plan, 50-GHz laser stability (C band)	OC-48/STM-16	No protection Optical-path and equipment protection
10-Gbps EFEC Multirate Transponder Cards (full-band tunable) 1 module, full-band tunable for 82-channel, 50-GHz plan and stability (C band) 1 module, full-band tunable for 82-channel, MLSE, 50-GHz plan and stability (C band)	10GE LAN 10GE WAN OC-192/STM-64 10 Gigabit Fibre Channel/FICON	No protection Optical-path and equipment protection
4-Port 2.5-Gbps Full-Band Tunable Enhanced Muxponder Cards (full-band tunable) 1 module, full-band tunable for 82-channel, 50-GHz plan and stability (C band) 1 module, full-band tunable for 82-channel, MLSE, 50-GHz plan and stability (C band)	OC-48/STM-16	No protection Optical-path and equipment protection
10-Gbps EFEC Data Muxponder Cards (full-band tunable) 1 module, full-band tunable for 82-channel, 50-GHz plan and stability (C band) 1 module, full-band tunable for 82-channel, MLSE, 50-GHz plan and stability (C band)	1-Gbps Fibre Channel/FICON 2-Gbps Fibre Channel/FICON 4-Gbps Fibre Channel/FICON ISC-1 ISC-3 GE	No protection Optical-path and equipment protection
GE Xponder Units 1 module, Standard version, two DWDM XFP-based trunks 1 module, Enhanced version, two DWDM XFP-based trunks	E1/T1/DS1 (Enhanced version) E3/T3/DS3 (Enhanced version) FE (Enhanced version) GE 10GE LAN	No protection Optical-path protection Layer 2 Ethernet protection (GR3)
10GE Xponder Units 1 module, Standard version, two DWDM XFP-based trunks 1 module, Enhanced version, two DWDM XFP-based trunks **OTU2 Xponder** 1 module, DWDM XFP-based trunk	10GE LAN 10GE LAN 10GE WAN OC-192/STM-64 10 Gigabit Fibre Channel/ION OTU2	No protection Optical-path protection Layer 2 Ethernet protection (GR3) No protection Optical-path protection Optical-path and equipment protection
4-Port 10-Gbps Full-Band Tunable DQPSK Muxponder Card (full-band tunable) 1 module, full-band tunable for 82-channel, 50-GHz plan and stability (C band)	8 Gigabit Fibre Channel OC-192/STM-64/10GE WAN-PHY 10GE LAN-PHY OTU2 (OC-192/STM-64/10GE WAN-PHY) 10GE-FC OTU2e (10GE LAN-PHY)	No protection Optical-path and equipment protection

Modules	Supported Service Interfaces	Protection Supported
40-Gbps CP-DQPSK Muxponder Card 1 module, Metro Edge Performance version, full-band tunable for 82-channel, 50-GHz plan and stability (C band) 1 module, Extended Performance version, full-band tunable for 82-channel, 50-GHz plan and stability (C band)	8 Gigabit Fibre Channel OC-192/STM-64/10GE WAN-PHY 10GE LAN-PHY OTU2 (OC-192/STM-64/10GE WAN-PHY) 10GE-FC OTU2e (10GE LAN-PHY)	No protection Optical-path and equipment protection
40-Gbps CP-DQPSK Transponder Card 1 module, Metro Edge Performance version, full-band tunable for 82-channel, 50-GHz plan and stability (C band) 1 module, Extended Performance version, full-band tunable for 82-channel, 50-GHz plan and stability (C band)	OTU3 OC-768/STM256 40GE CBR	No protection Optical-path and equipment protection
Any Rate Xponder and Muxponder Cards 3 modules, DWDM XFP-based trunk	STM-1/OC-3 STM-4/OC-12 STM-16/OC-48 OTU-1 OTU-2 Fast Ethernet (FE) Gigabit Ethernet (GE) Enterprise Systems Connection (ESCON) 1 Gigabit Fibre Channel or fiber connectivity (FICON) 2 Gigabit Fibre Channel or FICON 4 Gigabit Fibre Channel or FICON 8 Gigabit Fibre Channel or FICON SD-SDI (270 Mbps) HD-SDI (1.485 Gbps) Third-generation SDI (3G-SDI) (2.970 Gbps)	No protection Optical-path and equipment protection
100-Gbps CP-DQPSK Transponder Card 1 module, Metro Edge Performance version, full-band tunable for 96-channel, 50-GHz plan and stability (C band) 1 module, Extended Performance version, full-band tunable for 96-channel, 50-GHz plan and stability (C band) 1 module, Extended Performance version, full-band tunable for 96-channel, 50-GHz plan and stability (C band), software license upgradable	100GE	No protection
Ten 10GE Transponder/Muxponder Card 1 module, ten 10GE client card with 100-Gbps CP-DQPSK transponder card as peer, and configurable as five 10GE transponder cards with SFP+ based trunk 1 module, ten 10GE client card with 100-Gbps CP-DQPSK transponder card as peer, software license upgradable	10GE LAN-PHY 10GE WAN-PHY OTU-2 STM-64/OC-192 8 Gigabit Fibre Channel or FICON 10 Gigabit Fibre Channel or FICON	No protection
Two CFP Transponder/Muxponder Client Card 1 module, two 40GE/100GE client cards with 100-Gbps CP-DQPSK transponder card as peer	OTU4 100GE OTU3 40GE	No protection

Table 3 provides details about wavelengths supported for the different wavelength plans in C band, and Table 4 provides product specifications for the Cisco ONS 15454 MSTP.

Table 3. C-Band Wavelength Plan

Wavelength	32 Channels		40 Channels		48 Channels		64 Channels	80 Channels	96 Channels
(nm)	Odd	Even	Odd	Even	Odd	Even	50 GHz	50 GHz	
1528.7					x				x
1529.1						x			x
1529.5					x				x
1529.9						x			x
1530.3	x		x		x		x	x	x
1530.7		x		x		x	x	x	x
1531.1	x		x		x		x	x	x
1531.5		x		x		x	x	x	x
1531.9	x		x		x		x	x	x
1532.2		x		x		x	x	x	x
1532.6	x		x		x		x	x	x
1533.0		x		x		x	x	x	x
1533.4			x		x			x	x
1533.8				x		x		x	x
1534.2	x		x		x		x	x	x
1534.6		x		x		x	x	x	x
1535.0	x		x		x		x	x	x
1535.4		x		x		x	x	x	x
1535.8	x		x		x		x	x	x
1536.2		x		x		x	x	x	x
1536.6	x		x		x		x	x	x
1537.0		x		x		x	x	x	x
1537.4			x		x			x	x
1537.7				x		x		x	x
1538.1	x		x		x		x	x	x
1538.5		x		x		x	x	x	x
1538.9	x		x		x		x	x	x
1539.3		x		x		x	x	x	x
1539.7	x		x		x		x	x	x
1540.1		x		x		x	x	x	x
1540.5	x		x		x		x	x	x
1540.9		x		x		x	x	x	x
1541.3			x		x			x	x
1541.7				x		x		x	x
1542.1	x		x		x		x	x	x
1542.5		x		x		x	x	x	x
1542.9	x		x		x		x	x	x
1543.3		x		x		x	x	x	x
1543.7	x		x		x		x	x	x

Wavelength	32 Channels		40 Channels		48 Channels		64 Channels	80 Channels	96 Channels
(nm)	Odd	Even	Odd	Even	Odd	Even	50 GHz	50 GHz	
1544.1		x		x		x	x	x	x
1544.5	x		x		x		x	x	x
1544.9		x		x		x	x	x	x
1545.3			x		x			x	x
1545.7				x		x		x	x
1546.1	x		x		x		x	x	x
1546.5		x		x		x	x	x	x
1546.9	x		x		x		x	x	x
1547.3		x		x		x	x	x	x
1547.7	x		x		x		x	x	x
1548.1		x		x		x	x	x	x
1548.5	x		x		x		x	x	x
1548.9		x		x		x	x	x	x
1549.3			x		x			x	x
1549.7				x		x		x	x
1550.1	x		x		x		x	x	x
1550.5		x		x		x	x	x	x
1550.9	x		x		x		x	x	x
1551.3		x		x		x	x	x	x
1551.7	x		x		x		x	x	x
1552.1		x		x		x	x	x	x
1552.5	x		x		x		x	x	x
1552.9		x		x		x	x	x	x
1553.3			x		x			x	x
1553.7				x		x		x	x
1554.1	x		x		x		x	x	x
1554.5		x		x		x	x	x	x
1554.9	x		x		x		x	x	x
1555.3		x		x		x	x	x	x
1555.7	x		x		x		x	x	x
1556.1		x		x		x	x	x	x
1556.5	x		x		x		x	x	x
1556.9		x		x		x	x	x	x
1557.3			x		x			x	x
1557.7				x		x		x	x
1558.1	x		x		x		x	x	x
1558.5		x		x		x	x	x	x
1558.9	x		x		x		x	x	x
1559.3		x		x		x	x	x	x
1559.7	x		x		x		x	x	x
1560.2		x		x		x	x	x	x
1560.6	x		x		x		x	x	x
1561.0		x		x		x	x	x	x

Wavelength	32 Channels		40 Channels		48 Channels		64 Channels	80 Channels	96 Channels
(nm)	Odd	Even	Odd	Even	Odd	Even	50 GHz	50 GHz	
1561.4			x		x			x	x
1561.8				x		x		x	x
1562.2					x				x
1562.6						x			x
1563.0					x				x
1563.4						x			x
1563.8					x				x
1564.2						x			x
1564.6					x				x
1565.0						x			x
1565.5					x				x
1565.9						x			x
1566.3					x				x
1566.7									x

Table 4. Product Specifications

Item	Specification
Wavelengths	
C band	96 + 1 (OSC) (with 50-GHz channels spacing)
Wavelength spacing	100 or 50 GHz
Optical Reach, Single Span, Point-to-Point (amplified)	
80 channels	222 km
40 channels	236 km
20 channels	250 km
Number of spans	40
Ring circumference	> 4000 km
Fiber type	Single-mode fiber (G.652, G.653 G.655, and G.656)
Power Requirements	**Maximum**
M12 fan-tray assembly	55W
M12 DC power	1152W
M6 fan-tray assembly, FTA2	120W, 130W
M6 AC2 power module	1500W
M6 AC power module	900W
M6 DC power module	1350W
M6 DC20 power module	960W
M2 fan-tray assembly	40W
M2 AC power module	350W
M2 DC power module	450W

Item	Specification
Physical Dimensions	
M12 ANSI shelf assembly	
Rack mounting	19- or 23-in. (483- or 584-mm) EIA rack-mounting
Shelf assembly (H x W x D)	18.5 x 17.6 x 12.0 in. (469.9 x 447.04 x 304.8 mm)
M12 ETSI shelf assembly (H x W x D)	
Rack mounting	23-in. (600 mm) or 19-in. (483-mm) rack-mounting[1]
Shelf assembly (H x W x D)	24.3 x 17.5 x 11.02 in. (616.5 x 445 x 280 mm)
M6	
Rack mounting	19- or 23-in. (483- or 584-mm) EIA rack mounting 19-in. (483-mm) rack mounting or 21-in. (533-mm) cabinet mounting
M6 shelf assembly (H x W x D)	10.45 x 17.45 x 11.02 in. (265.4 x 443.3 x 280 mm)
M2	
Rack mounting	19- or 23-in. (483- or 584-mm, respectively) EIA rack-mounting 19-in. (83-mm) rack-mounting or 21-in. (533-mm) cabinet mounting
M2 shelf assembly (H x W x D)	3.46 x 17.18 x 11.02 in. (87.9 x 436.4 x 280 mm)
Environmental Conditions	
Storage temperature	–40 to 158ºF (–40 to 70ºC)
Operating temperature	
Normal	32 to 131ºF (0 to 55ºC)
Short-term[2]	23 to 131ºF (–5 to 55ºC)
Relative humidity	
Normal	5 to 85%, noncondensing
Short-term[2]	5 to 90% but not to exceed 0.024 kg water/kg of dry air

1. 19-inch mounting brackets must be ordered separately.

2. 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 timeframe refers to a total of 360 hours in any given year, but no more than 15 occurrences during that 1-year period.)

Regulatory Standards Compliance

Table 5 summarizes regulatory standard compliance and agency approvals, and Table 6 provides a list of standards that are applicable to Cisco ONS 15454 MSTP but for which compliance may be applicable to selected sections only.

Table 5. Regulatory Standard Compliance and Agency Approvals

ANSI (15454) System	ETSI (15454E) System
Supported Countries	
• Canada • United States • Korea	• Europe • Latin America • Japan • Asia Pacific • Middle East and Africa
EMC (Class A)	
• ICES-003 Issue 4 (2004) • GR-1089-CORE, Issue 4 (Type 2 and Type 4 equipment) • GR-1089-CORE – Issue 03 (Oct 2002) (Objective O3-2 – Section 3.2.1 – Radiated Emissions requirements with all doors open) • FCC 47CFR15, Class A subpart B (2006)	• EN 300 386 v1.3.3 (2005) and v1.4.1 (2007) • CISPR 22 – Fifth edition (2005-04) Class A and the amendment 1 (2005-07) • CISPR 24 – First edition (1997-09) and amendment 1 (2001-07) and amendment 2 (2002-10). • EN 55022:1998 Class A – CENELEC Amendment A2:2003 • EN 55024:1998 – CENELEC Amendment A1:2001 and Amendment A2:2003 • Resolution 237 (Brazil) • VCCI V-3/2006.04 • EN 61000-6-1:2001 • EN 61000-6-2:1999

ANSI (15454) System	ETSI (15454E) System
Safety	
• UL/CSA 60950 -1 First Edition (2003) • GR-1089-CORE, Issue 4 (Type 2 and Type 4 equipment)	• UL/CSA 60950 -1 First Edition (2003) • IEC 60950-1 (2001/10)/Amendment 11:2004 to EN 60950-1:2001, 1st Edition (with all country deviations)
Environmental	
• GR-63-CORE, Issue 3 (2006)	• ETS 300-019-2-1 V2.1.2 (Storage, Class 1.1) • ETS 300-019-2-2 V2.1.2 (Transportation, Class 2.3) • ETS 300-019-2-3 V2.1.2 (Operational, Class 3.1E) • EU WEEE regulation • EU RoHS regulation
Power and Grounding	
• GR-1089-CORE, Issue 4	• ETS 300 132-2
Optical Safety	
• EN or IEC-60825-2 Third edition (2004-06) • EN or IEC 60825-1 Consol. Ed. 1.2 – incl. am1+am2 (2001-08) • 21CFR1040 (2004/04) (Accession Letter and CDRH Report) • IEC-60825-2 Third edition (2004-06) • ITU-T G.664 (2006)	
Miscellaneous	
• Acoustic noise ◦ GR-63-CORE, Issue 3 (2006) ◦ ETS 300 753 ed.1 (1997-10) • Rain, sand, dust and moisture proofing ◦ AS 1939-1990, 4.2, IP 53 • Mechanical shock and bumps ◦ AS1099- 2.27 • Customer specific requirements ◦ AT&T Network Equipment Development Standards (NEDS) Generic Requirements, AT&T 802-900-260 ◦ SBC TP76200MP ◦ Verizon SIT.NEBS.NPI.2002.010	

Table 6. Standards Applicable to Cisco ONS 15454 MSTP

Standard	Title
Optical Fiber	
ITU-T G.652 (A, B, C, D)	Characteristics of a single-mode optical fiber and cable
ITU-T G.653	Characteristics of a dispersion-shifted single-mode optical fiber and cable
ITU-T G.654	Characteristics of a cut-off shifted single-mode optical fiber and cable
ITU-T G.655	Characteristics of a nonzero dispersion-shifted single-mode optical fiber and cable
ITU-T G.656	Characteristics of a fiber and cable with nonzero dispersion for wideband optical transport
Optical Systems	
ITU-T G.691	Optical interfaces for single-channel STM-64 and other SDH systems with optical amplifiers
ITU-T G.692	Optical interfaces for multichannel systems with optical amplifiers
ITU-T G.693	Optical interfaces for intraoffice systems
ITU-T G.694.1	Spectral grids for WDM applications: DWDM frequency grid
ITU-T G.694.2	Spectral grids for WDM applications: CWDM wavelength grid
ITU-T G.695	Optical interfaces for coarse wavelength division multiplexing applications
ITU-T G.697	Optical monitoring for DWDM systems
Telcordia GR-253-CORE – Issue 04	SONET Transport Systems: Common Generic Criteria

Standard	Title
Optical Amplifiers	
ITU-T G.661	Definition and test methods for the relevant generic parameters of optical amplifier devices and subsystems
ITU-T G.662	Generic characteristics of optical amplifier devices and subsystems
ITU-T G.663	Application-related aspects of optical amplifier devices and subsystems
ITU-T G.665	Generic characteristics of Raman amplifiers and Raman amplified subsystems
Performance Monitoring and Management Interface	
ITU-T G.826	End-to-end error performance parameters and objectives for international, constant bit-rate digital paths and connections
ITU-T G.829	Error performance events for SDH multiplex and regenerator sections
ITU-T G.874	Management aspects of the optical transport network element
Telcordia GR-253-CORE – Issue 04	Synchronous Optical Network (SONET) Transport Systems: Common Generic Criteria
Telcordia GR-474-CORE	Alarm and Control for Network Elements
Telcordia GR-2998-CORE	Generic Requirements for WDM EMSs
Ethernet	
IEEE 802.1D	IEEE Standard for local and metropolitan area networks – Media access control (MAC) Bridges
IEEE 802.1Q	IEEE Standard for Local and Metropolitan Area Networks – Virtual Bridged Local Area Networks
IEEE 802.1ad	Amendment to IEEE 802.1Q-2005. IEEE Standard for Local and Metropolitan Area Networks — Virtual Bridged Local Area Networks
IEEE 802.3ab	1000BASE-T Gbps Ethernet over twisted pair at 1 Gbps (125 MBps)
IEEE 802.3ae	10 Gbps (1,250 MBps) Ethernet over fiber; 10GBASE-SR, 10GBASE-LR, 10GBASE-ER, 10GBASE-SW, 10GBASE-LW, 10GBASE-EW
MEF 9	Abstract Test Suite for Ethernet Services at the UNI
MEF 14	Abstract Test Suite for Traffic Management Phase 1
ITU-T Y.1731	OAM functions and mechanisms for Ethernet based networks
SONET, SDH and OTN	
ITU-T G.707	Network node interface for the synchronous digital hierarchy (SDH)
ITU-T G.709	Interfaces for the Optical Transport Network (OTN)
ITU-T G.781	Synchronization layer functions
ITU-T G.783	Characteristics of SDH equipment functional blocks
ITU-T G.784	SDH management
ITU-T G.798	Characteristics of optical transport network hierarchy equipment functional blocks
ITU-T G.805	Generic functional architecture of transport networks
ITU-T G.811	Timing characteristics of primary reference clocks
ITU-T G.812	Timing requirements of slave clocks suitable for use as node clocks in synchronization networks
ITU-T G.813	Timing characteristics of SDH equipment slave clocks (SEC)
ITU-T G.823	Control of jitter and wander within digital networks which are based on the 2048 Kbps hierarchy
ITU-T G.824	Control of jitter and wander within digital networks which are based on the 1544 Kbps hierarchy
ITU-T G.825	Control of jitter and wander within digital networks which are based on the SDH
ITU-T G.8251	Control of jitter and wander within the OTN
ITU-T G.841	Types and characteristics of SDH network protection architectures
ITU-T G.872	Architecture of optical transport networks
ITU-T G.957	Optical interfaces for equipment and systems relating to the synchronous digital hierarchy
ITU-T G.959.1	Optical transport network physical layer interfaces
ITU-T G.Sup43	Transport of IEEE 10GBASE-R in OTNs
ITU-T G.7041	Generic framing procedure (GFP)
ANSI T1.105	SONET – Basic Description including Multiplex Structure, Rates, and Formats

Ordering Information

To place an order, visit the Cisco Ordering homepage. To download software, visit the Cisco Software Center.

Table 7 provides ordering information.

Table 7. Ordering Information

Product ID	Description
Common Equipment – M12	
15454-SA-HD= 15454-SA-HD-DDR3= 15454E-SA-ETSI=	Shelf assembly, Cisco ONS 15454 Shelf assembly, Cisco ONS 15454 with Deep Door Shelf assembly, Cisco ONS 15454E for ETSI applications
15454-TCC2P-K9= 15454E-TCC2P-K9=	Timing, Communications, and Control Card, Version 2 Plus (TCC2P), 15454 chassis Timing, Communications, and Control Card, Version 2 Plus (TCC2P), 15454E chassis
15454-TCC3-K9= 15454E-TCC3-K9=	Timing, Communications, and Control Card, Version 3 (TCC3), I-Temp, 15454 chassis Timing, Communications, and Control Card, Version 3 (TCC3), I-Temp, 15454E chassis
15454-CC-FTA= 15454E-CC-FTA=	Controlled cooling fan-tray assembly, includes fan-tray filter
15454E-CTP-MIC48V=	Mechanical interface card, craft, timing, and power inputs, ETSI
15454E-AP-MIC48V=	Mechanical interface card, alarm, and power inputs, ETSI
15454-AIR-RAMP= 15454E-AIR-RAMP=	Air ramp (ships with ANSI 19-in. and 23-in. and ETSI 600mm mounting brackets
15454-AIC-I= 15454E-AIC-I=	Alarm Interface Controller, international card
15454-BLANK= 15454E-BLANK=	Shelf slot-filler panel, fits any slot in Cisco ONS 15454 ANSI shelf assembly Shelf slot-filler panel, fits any slot in Cisco ONS 15454 ETSI shelf assembly
15454E-BLANK-FMEC=	Shelf FMEC slot-filler panel, fits Cisco ONS 15454 ETSI shelf assembly
15454-MS-ISC-100T=	Integrated 100T Ethernet switch for multishelf management
15454-EAP-MF=	Mechanical frame for Ethernet adapter panel (ships with ANSI 19-in. and 23-in. and ETSI 600mm mounting brackets). Ships with 2x RJ-45/RJ-45 cables (0.15m) to connect MS-ISC units with the TCC2P units and with 1x RJ-45/RJ-45 cable (0.5m) to connect the MS-ISC units among themselves.
15454-EAP=	Ethernet adapter panel (to be used with MS-ISC-100T to allow proper cable management)
15454-MEC=	Multiple Ethernet cable to replicate the MS-ISC-100T Ethernet ports on the EAP unit
Common Equipment – M6	
15454-M6-SA=	6-service-slot MSTP shelf, includes M-SHIPKIT, M6-FTF and brackets for 19”, 21” and 23”
15454-M6-FTA= 15454-M6-FTA2=	6-service-slot MSTP chassis fan tray 6-service-slot MSTP chassis 2nd gen fan tray
15454-M6-LCD=	6-service-slot MSTP chassis LCD with backup memory
15454-M6-ECU=	6-service-slot MSTP chassis external cable connections
15454-M6-ECU2=	6 service slot MSTP external connection unit with TOD/PPS
15454-M6-ECU-60=	6 slot MSTP external connection unit with TOD/PPS with -60V rating
15454-M6-DC= 15454-M6-DC20=	6-service-slot MSTP chassis 40A DC power filter 6-service-slot MSTP chassis 20A DC power filter
15454-M6-AC=	6-service-slot MSTP chassis AC power supply
15454-M6-AC2=	6 service slot MSTP chassis 2nd gen AC power supply
15454-M6-DEFL21=	Air Deflectors for 21” ETSI cabinet installations
15454-M6-DEFL23=	Air Deflectors for 23” rack installations
15454-M6-BRKT=	Spare brackets for 19”, 21” and 23”
15454-M6-PWRFLR=	6-service-slot MSTP power filter filler card

Product ID	Description				
15454-M6-FTF=	6-service-slot MSTP chassis fan tray filter				
15454-M6-DR= 15454-M6-DDR=	6-service-slot MSTP chassis door 6-service-slot MSTP chassis deep door				
Common Equipment – M2					
15454-M2-SA=	2-service-slot MSTP shelf, includes M-SHIPKIT, M2-FTF and brackets for 19”, 21” and 23”				
15454-M2-FTA= 15454-M2-FTA2=	2-service-slot MSTP chassis fan tray 2-service-slot MSTP chassis 2nd gen fan tray				
15454-M2-DC=	2-service-slot MSTP chassis DC ANSI filter with memory				
15454-M2-DC-E=	2-service-slot MSTP chassis DC ETSI filter with memory				
15454-M2-AC=	2-service-slot MSTP chassis AC power supply with memory				
15454-M2-DEFL21=	Air Deflectors for 21” ETSI cabinet installations				
15454-M2-DEFL23=	Air Deflectors for 23” rack installations				
15454-M2-BRKT=	Spare brackets for 19”, 21” and 23”				
15454-M2-WM=	2-service-slot MSTP chassis wall mount bracket				
15454-M2-FTF=	2-service-slot MSTP chassis air filter				
15454-M2-DR= 15454-M2-DDR=	2-service-slot MSTP chassis door 2-service-slot MSTP chassis deep door				
Common Equipment – M6 and M2					
15454-M-TNC-K9=	Transport Node Controller for M2 and M6 chassis				
15454-M-TSC-K9=	Transport Shelf Controller for M2 and M6 chassis				
15454-M-TNCE-K9=	Transport Node Controller Ethernet PTP for M2, M6 Chassis				
15454-M-TSCE-K9=	Transport Shelf Controller Ethernet PTP for M2, M6 Chassis				
15454-M-T-FILLER=	Detectable control slot filler card				
15454-M-FILLER=	Detectable line slot filler card				
15454-M-SHIPKIT=	Shipkit, Cisco ONS 15454 M6 and Cisco ONS 15454 M2				
Cables – M6 and M2	**Description**	**Length**	**Gauge**	**Connector 1**	**Connector 2**
15454-M-120TMGCBL(=)	BITS IN/OUT cable for ANSI	0.6 m	COAX 23 AWG	DIN 1.0/2.3	2 WIRE WRAP PINS
15454-M2-DCCBL-LE(=)	DC power cable for ETSI left exit	10 m	12 AWG	Power D-Sub 2 poles	none
15454-M6-DCCBL-LE(=)	DC power cable for ETSI left exit	10 m	8 AWG	Power D-Sub 3 poles	none
15454-M6-DCCBL-RE(=)	DC power cable for ETSI right exit	10 m	8 AWG	Power D-Sub 3 poles	none
15454-M-ACCBL-L(=)	AC power cable ANSI 110 Vac left exit	3 m	15A – 125V	C13	NEMA 5-15P
15454-M-ACCBL-L2(=)	AC power cable ANSI 220 Vac left exit	3 m	15A – 250V	C13	NEMA 6-15P
15454-M-ACCBL-R(=)	AC power cable ANSI 110 Vac right exit	3 m	15A – 125V	C13	NEMA 5-15P
15454-M-ACCBL-R2(=)	AC power cable ANSI 220 Vac right exit	3 m	15A – 250V	C13	NEMA 6-15P
15454-M-ACL6-L(=)	AC power cable for Data Center	3 m	15A – 250V	C13	NEMA WD 6 L6-20P
15454-M-ACL6-R(=)	AC power cable for Data Center	3 m	15A – 250V	C13	NEMA WD 6 L6-20P
15454-M-ALMCBL(=) 15454-M-ALMCBL2(=)	SCSI Alarm cable SCSI Alarm cable limited to 8 inputs	20 m 20 m	28 AWG 24 AWG	Mini SCSI Mini SCSI	None None
15454-M-CBL-LARG(=)	AC power cable – ARG left exit	3 m	10A – 250V	C13	IRAM 2073 – IEC 60884-1
15454-M-CBL-LAUS(=)	AC power cable – AUS left exit	3 m	10A – 250V	C13	AS/NZS 3112: 2000

Product ID	Description				
15454-M-CBL-L-CHI(=)	AC power cable – China left exit	3 m	10A – 250V	C13	GB2099.1/GB1002
15454-M-CBL-L-EU(=)	AC power cable – EU left exit	3 m	10A – 250V	C13	CEE 7 STANDARD SHEET VII
15454-M-CBL-L-IND(=)	AC power cable – India left exit	3 m	10A – 250V	C13	IS 1293
15454-M-CBL-L-JPN(=)	AC power cable – Japan left exit	3 m	15A – 125V	C13	JIS C8303 & JIS C8306
15454-M-CBL-LKOR(=)	AC power cable – KOR left exit	3 m	10A – 250V	C13	K60884-01
15454-M-CBL-L-UK(=)	AC power cable – UK left exit	3 m	10A – 250V	C13	BS 1363/A & SS145/A
15454-M-CBL-RARG(=)	AC power cable – ARG right exit	3 m	10A – 250V	C13	IRAM 2073 – IEC 60884-1
15454-M-CBL-RAUS(=)	AC power cable – AUS right exit	3 m	10A – 250V	C13	AS/NZS 3112: 2000
15454-M-CBL-R-CHI(=)	AC power cable – China right exit	3 m	10A – 250V	C13	GB2099.1/GB1002
15454-M-CBL-R-EU(=)	AC power cable – EU right exit	3 m	10A – 250V	C13	CEE 7 STANDARD SHEET VII
15454-M-CBL-R-IND(=)	AC power cable – India right exit	3 m	10A – 250V	C13	IS 1293
15454-M-CBL-R-JPN(=)	AC power cable – Japan right exit	3 m	15A – 125V	C13	JIS C8303 & JIS C8306
15454-M-CBL-RKOR(=)	AC power cable – KOR right exit	3 m	10A – 250V	C13	K60884-01
15454-M-CBL-R-UK(=)	AC power cable – UK right exit	3 m	10A – 250V	C13	BS 1363/A & SS145/A
15454-M-TMGCBL(=)	BITS IN/OUT cable for ETSI	20 m	COAX 23 AWG	DIN 1.0/2.3	none
15454-M-USBCBL(=)	USB cable for passive devices	3 m	28#/1P + 24#/2C + AEB	USB “A” MALE	USB “A” MALE
Common Equipment					
15454-PP-64-LC=	64-port fiber patch-panel shelf, 1 rack unit (1RU) high, LC-to-LC connectors, 32 duplex LC adapters, supports up to 8 multifiber cable assemblies (1 MPO to 8x LC), includes 2 MPO to 8x LC 2.3-meter cable assemblies (uninstalled). Ships with ANSI 19-in. and 23-in. and ETSI 600mm mounting brackets.				
15454-PP-80-LC=	80-port fiber patch-panel shelf, 2RU high, LC-to-LC connectors, 40 duplex LC adapters, includes 10 MPO to 8x LC 2.3-meter cable assemblies (pre-cabled). Ships with ANSI 19-in. and 23-in. and ETSI 600 mm mounting brackets.				
15454-PP-MESH-4=	Degree-4 mesh patch panel, 2RU high, 1x LC and 1x MPO adapter per direction. Ships with ANSI 19-in. and 23-in. and ETSI 600 mm mounting brackets.				
15454-PP-MESH-8=	Degree-8 mesh patch panel, 2RU high, 1x LC and 1x MPO adapter per direction. Ships with ANSI 19-in. and 23-in. and ETSI 600 mm mounting brackets.				
15454-PP-4-SMR=	Degree-4 mesh patch panel for single-mode ROADM, 1RU high, 1x MPO adapter per direction. Ships with ANSI 19-in. and 23-in. and ETSI 600 mm mounting brackets.				
15454-FBR-STRG=	Fiber-storage shelf, supports eight 2-meter ribbon cables (8-fiber) plus 40 2-meter 2-mm fiber cables. Ships with ANSI 19-in. and 23-in. and ETSI 600 mm mounting brackets.				
15216-FL-SA=	FlexLayer shelf assembly, 4 module slots, 1 RU high, Cisco FlexLayer platform. Ships with ANSI 19-in. and 23-in. mounting brackets.				
15216-CS-SM-Y=	Y-cable splitter/combiner module for 2 wavelengths protection, single-mode fiber, single-width module, installs in Cisco FlexLayer (15216-FL-SA=) shelf assembly				
15216-CS-MM-Y=	Y-cable splitter/combiner module for 2 wavelengths protection, multimode fiber, single-width module, installs in Cisco FlexLayer (15216-FL-SA=) shelf assembly				
15454-YCBL-LC=	Y-cable storage shelf, 2 RUs high, supports up to 8 Y-cable splitter/combiner modules. Ships with ANSI 19-in. and 23-in. and ETSI 600 mm mounting brackets.				
15454-YCM-SM-LC=	Y-cable splitter/combiner module for 1 wavelength protection, single-mode fiber, LC adapters, installs in Cisco Y-cable storage (15454-YCBL-LC=) shelf assembly				
15454-YCM-MM-LC=	Y-cable splitter/combiner module for 1 wavelength protection, multimode fiber, LC adapters, installs in Cisco Y-cable storage (15454-YCBL-LC=) shelf assembly				

Product ID	Description
Service Interfaces[1]	
15454-10DME-C=	10-Gbps E-FEC data muxponder card, 8x SFP-based client interfaces, full C-band tunable on 50-GHz ITU wavelengths (Odd and Even), DWDM line with LC connectors
15454-10DMEX-C=	10-Gbps E-FEC data muxponder card, 8x SFP-based client interfaces, full C-band tunable on 50-GHz ITU wavelengths (Odd and Even), DWDM line with LC connectors. Extended version of 15454-10DME-C= leveraging on 2nd Generation Maximum Likelihood Sequence Estimation (MLSE)
15454-10E-L1-C=	10-Gbps E-FEC multirate transponder card, 1x XFP-based client interface, full C-band tunable on 50-GHz ITU wavelengths (Odd and Even), DWDM line with LC connectors
15454-10EX-L1-C=	10-Gbps E-FEC multirate transponder card, 1x XFP-based client interface, full C-band tunable on 50-GHz ITU wavelengths (Odd and Even), DWDM line with LC connectors. Extended version of 15454-10E-L1-C= leveraging on 2nd Generation MLSE
15454-10GE-XP=	10GE E-FEC Ethernet Crossponder, 2x XFP-based client interfaces, 2x XFP-based trunk interfaces
15454-10GE-XPE=	10GE E-FEC Ethernet Enhanced Crossponder, 2x XFP-based client interfaces, 2x XFP-based trunk interfaces
15454-10ME-L1-C=	4x OC-48/STM-16 E-FEC muxponder card, 4x SFP-based client interfaces, full C-band tunable on 50-GHz ITU wavelengths (Odd and Even), DWDM line with LC connectors
15454-10MEX-L1-C=	4x OC-48/STM-16 E-FEC muxponder card, 4x SFP-based client interfaces, full C-band tunable on 50-GHz ITU wavelengths (Odd and Even), DWDM line with LC connectors. Extended version of 15454-10ME-L1-C= leveraging on 2nd Generation MLSE
15454-ADM-10G=	10Gbps E-FEC ADM-On-A-Blade, 16x SFP-based client interfaces, 1x XFP-based interconnection interface, 2x XFP-based trunk interfaces
15454-GE-XP=	GE E-FEC Ethernet Crossponder, 20x SFP-based client interfaces, 2x XFP-based trunk interfaces
15454-GE-XPE=	GE E-FEC Ethernet Enhanced Crossponder, 20x SFP-based client interfaces, 2x XFP-based trunk interfaces
15454-OTU2-XP=	4x OTN E-FEC Multirate Xponder, 2x XFP-based trunk/client FEC interfaces, 2x XFP-based trunk/client E-FEC interfaces
15454-40G-MXP-C=	4x 10-Gbps DPSK 40-Gbps muxponder card, 4x XFP-based client interfaces, full C-band tunable on 50-GHz ITU wavelengths (Odd and Even), DWDM line with LC connectors
15454-40E-MXP-C=	4x10GE/OC192/STM64/OTU2 Muxponder CP-DQPSK Extended Performance
15454-40ME-MXP-C=	4x10GE/OC192/STM64/OTU2 Muxponder CP-DQPSK Metro Edge Performance
15454-40E-TXP-C=	OC-768/STM-256/40GE Transponder CP-DQPSK Extended Performance
15454-40ME-TXP-C=	OC-768/STM-256/40GE Transponder CP-DQPSK Metro Edge Performance
15454-AR-XP=	ONS 15454 Any-Rate Xponder
15454-AR-XP-LIC=	ONS 15454 Any-Rate Xponder – Software license upgradable
15454-AR-XPE=	ONS 15454 Any rate Xponder Enhanced version
15454-AR-MXP=	ONS 15454 Any-Rate Muxponder
15454-AR-MXP-LIC=	ONS 15454 Any-Rate Muxponder – Software license upgradable
15454-M-100G-ME-C=	100G OTU-4 CP-DQPSK Full C Band Tuneable LC Metro Edge
15454-M-100G-LC-C=	100G OTU-4 ITU-T CP-DQPSK Full C Band Tuneable LC
15454-M-100GC-LIC=	100G OTU-4 ITU-T CP-DQPSK Full C Band Tuneable LC – Licensed
15454-M-10X10G-LC=	10x10G Multi rate Client Line Card
15454-M-10X10-LIC=	10x10G Multi rate Client LC Licensed w/ 1 License at 10G
15454-M-LIC-10G=	One Port 10G License for 100G Muxponder
15454-M-LIC-100G=	100G TXP/Reg License for 100G Trunk Line card
15454-M-CFP-LC=	2 x 100G CFP Line Card
Optical Transmission Elements	
15454-32-DMX=	32-channel demultiplexer 100-GHz (for use with 32-WSS), C-band, MPO connectors for drop path, LC connector for interconnection, includes one 2m LC/LC fiber-optic cables

1 Wavelength plan is outlined in Tables 3 and 4 in this document. Cisco online lead-time tool is available for determining the lead time of individual wavelengths, if different.

Product ID	Description
15454-32-WSS=	32-channel wavelength selective switch 100-GHz, C-band, MPO connectors for add path, LC connectors for interconnection, includes two 2m LC/LC fiber-optic cables
15454-40-DMX-C=	40-channel demultiplexer 100-GHz (for use with 40-WSS-C, 40-MUX-C or 40-WXC-C), C-band, Odd grid, MPO connectors for drop path, LC connector for interconnection, includes one 2m LC/LC fiber-optic cables
15454-40-DMX-CE=	40-channel demultiplexer 100-GHz (for use with 40-WSS-CE), C-band, Even grid, MPO connectors for drop path, LC connector for interconnection, includes one 2m LC/LC fiber-optic cables
15454-40-MUX-C=	40-channel multiplexer 100-GHz (for use with 40-DMX-C or 40-WXC-C), C-band, Odd grid, MPO connectors for add path, LC connector for interconnection, includes one 2m LC/LC fiber-optic cables
15454-40-WSS-C=	40-channel wavelength selective switch 100GHz, C-band, Odd grid, MPO connectors for add path, LC connectors for interconnection, includes two 2m LC/LC fiber-optic cables
15454-40-WSS-CE=	40-channel wavelength selective switch 100-GHz, C-band, Even grid, MPO connectors for add path, LC connectors for interconnection, includes two 2m LC/LC fiber-optic cables
15454-40-WXC-C=	40-channel wavelength cross connect 100-GHz, C-band, Odd grid, MPO connector for interconnection with Mesh Patch Panel, LC connectors for interconnection, includes one 2m LC/LC fiber-optic cable
15454-80-WXC-C=	80-channel wavelength cross connect 50-GHz, C-band, Odd and Even grid, LC connectors
15454-WXC-LIC=	80-channel wavelength cross connect 50-GHz, C-band, Odd and Even grid, LC connectors – 10ch Licensed Restricted
15454-40-SMR1-C=	40-channel single-module ROADM, 100-GHz, C-band, LC connectors for interconnection and add path, includes one 2-meter LC/LC fiber-optic cable and one 0-dB LC/LC loopback (to be used if DCU is not required). Combines the OSC add/drop filter, a preamplifier and a 2x1 WSS-based ROADM core into a single slot unit.
15454-SMR1-LIC=	40-channel single-module ROADM, 100-GHz, C-band, LC connectors for interconnection and add path, includes one 2-meter LC/LC fiber-optic cable and one 0-dB LC/LC loopback (to be used if DCU is not required). Combines the OSC add/drop filter, a preamplifier and a 2x1 WSS-based ROADM core into a single slot unit, 10-channel license restricted
15454-40-SMR2-C=	40-channel single-module ROADM, 100-GHz, C-band, LC connectors for interconnection, MPO connector for interconnection with Mesh Patch Panel, includes one 0-dB LC/LC loopback (to be used if DCU is not required). Combines the OSC add/drop filter, PRE and BST amplifiers and a 4x1 WSS-based ROADM core.
15454-SMR2-LIC=	40-channel single-module ROADM, 100-GHz, C-band, LC connectors for interconnection, MPO connector for interconnection with Mesh Patch Panel, includes one 0-dB LC/LC loopback (to be used if DCU is not required). Combines the OSC add/drop filter, PRE and BST amplifiers and a 4x1 WSS-based ROADM core. 10-channel license restricted.
15216-MD-40-ODD=	40-Channel Multiplexer and Demultiplexer Passive Patch Panel, 100-GHz, C-band – Odd, 2RU high, 40 duplex LC add and drop ports, 3 duplex LC ports for internal and monitor connections, USB port for passive inventory. Ships with ANSI 19-in. and 23-in. and ETSI 600mm mounting brackets.
15216-MD-40-EVEN=	40-Channel Multiplexer and Demultiplexer Passive Patch Panel, 100-GHz, C-band – Even, 2RU high, 40 duplex LC add and drop ports, 3 duplex LC ports for internal and monitor connections, USB port for passive inventory. Ships with ANSI 19-in. and 23-in. and ETSI 600mm mounting brackets.
15216-EF-40-ODD=	40-Channel Exposed Faceplate Multiplexer and Demultiplexer Passive Patch Panel, 100-GHz, C-band – Odd, 2RU high, 40 duplex LC add and drop ports, 3 duplex LC ports for internal and monitor connections, USB port for passive inventory. Ships with ANSI 19-in. and 23-in. and ETSI 600mm mounting brackets.
15216-EF-40-EVEN=	40-Channel Exposed Faceplate Multiplexer and Demultiplexer Passive Patch Panel, 100-GHz, C-band – Even, 2RU high, 40 duplex LC add and drop ports, 3 duplex LC ports for internal and monitor connections, USB port for passive inventory. Ships with ANSI 19-in. and 23-in. and ETSI 600mm mounting brackets.
15216-MD-48-ODD=	48-Channel Exposed Faceplate Multiplexer and Demultiplexer Passive Patch Panel, 100-GHz, C-band – Odd, 2RU high, 40 duplex LC add and drop ports, 3 duplex LC ports for internal and monitor connections, USB port for passive inventory. Ships with ANSI 19-in. and 23-in. and ETSI 600mm mounting brackets.
15216-MD-48-EVEN=	48-Channel Exposed Faceplate Multiplexer and Demultiplexer Passive Patch Panel, 100-GHz, C-band – Even, 2RU high, 40 duplex LC add and drop ports, 3 duplex LC ports for internal and monitor connections, USB port for passive inventory. Ships with ANSI 19-in. and 23-in. and ETSI 600mm mounting brackets.
15454-AD-4C-xx.x=	4-channel OADM, C-band, 100-GHz, LC connectors, includes two 2-meter LC/LC fiber-optic cables
15216-HD-EXT-PNL=	Edge Mounting Bracket
15216-FLD-4-xx.x=	Edge 4-Channel Bidirectional OADM Module 15xx.xx to 15xx.xx
15216-FLC-CWDM-8=	Edge 8-Channel CWDM Multiplexer/Demultiplexer Module
15216-FLD-OSC=	Edge Optical Service Channel Add/Drop
15454-OPT-AMP-17C=	Optical amplifier, 17dBm output power, 17dB gain, can be configured as preamplifier or booster, C-band, 80-channel, 50-GHz compatible, LC connectors, includes two 2-meter LC/LC fiber-optic cables

Product ID	Description
15454-OPT-AMP-C=	Enhanced optical amplifier, 20dBm output power, can be configured as preamplifier or booster, C-band, 80-channel, 50-GHz compatible, LC connectors, midstage access, includes one LC/LC loopback (to be used if DCU is not required) and two 2m LC/LC fiber-optic cables
15454-OPT-BST=	Optical booster amplifier, 17dBm output power, C-band, 80-channel, 50-GHz compatible, LC connectors, includes two 2m LC/LC fiber-optic cables
15454-OPT-BST-E=	Optical enhanced booster amplifier, 20dBm output power, C-band, 80-channel, 50-GHz compatible, LC connectors, includes two 2m LC/LC fiber-optic cables
15454-OPT-PRE=	Optical preamplifier, 17dBm output power, C-band, 80-channel, 50-GHz compatible, LC connectors, midstage access, includes one 4-dB LC/LC attenuated loopback (to be used if DCU is not required)
15454-OPT-RAMP-C=	Optical Raman amplifier with embedded EDFA, 500mW total counter-propagating Raman pump power, 17dBm EDFA output power, C-band, 80-channel, 50-GHz compatible, LC connectors, midstage access, includes one LC/LC loopback (to be used if DCU is not required) and two 2m LC/LC fiber-optic cables
15454-OPT-RAMP-CE=	Extended Performance Optical Raman amplifier with embedded EDFA, 500mW total counter-propagating Raman pump power, 2 pump wavelengths, 20dBm EDFA output power, C-band, 80-channel, 50-GHz compatible, LC connectors, midstage access, includes one LC/LC loopback (to be used if DCU is not required) and two 2m LC/LC fiber-optic cables
15454-M-RAMAN-CTP=	High Power Counter-Propagating, 1W optical pump output power, C-band, 96 channel 50GHz Raman unit with 2 LC-LC 2m cables and 2 ES 2000 PS LC 2m cables.
15454-M-RAMAN-COP=	High Power Co-Propagating, 1W optical pump output power, C-band, 96 channel 50GHz Raman unit with 2 ES 2000 PS PC 2m cables.
15454-OPT-EDFA-17=	Enhanced C-band 96 channel low cost amplifier 17 dB max gain, 50 GHz compatible, LC connector, , includes two 2m LC/LC fiber-optic cables
15454-OPT-EDFA-24=	Enhanced C-band 96 channel low cost amplifier 24 dB max gain, 50 GHz compatible, LC connector, , includes two 2m LC/LC fiber-optic cables
15454-OSC-CSM=	Optical service channel card, integrated combiner/separator, 1510nm, LC connectors, includes two 2m LC/LC fiber-optic cables
15454-OSCM=	Optical service channel card, 1510-nm, LC connectors, includes two 2m LC/LC fiber-optic cables
15454-PSM=	Protection Switching Module, LC connectors
15216-DCU-SA=	Dispersion-compensation unit shelf, two module slots, 1RU high. Ships with ANSI 19-in. and 23-in. and ETSI 600 mm mounting brackets.
15216-FBGDCU-<value>=	Low Latency Fiber Bragg Grating Dispersion-compensation module, LC connectors, SMF Fiber, different lengths for C-band as part of the Cisco ONS 15216 Series.
15216-DCU-<value>=	Dispersion-compensation module, LC connectors, different fiber types and lengths for C-band as part of the Cisco ONS 15216 Series. Individual values and parts are captured in the datasheet – Cisco ONS 15216 Dispersion Compensator Unit
15454-TDC-CC=	Tunable Dispersion Compensation Unit Coarse Granularity, tunable from 110ps/nm to 1,650ps/nm with steps of 110ps/nm, C band, LC connectors, includes two 2m LC/LC fiber-optic cables
15454-TDC-FC=	Tunable Dispersion Compensation Unit Fine Granularity, tunable from 45ps/nm to 675ps/nm with steps of 45ps/nm, C Band, LC connectors, includes two 2m LC/LC fiber-optic cables
15216-ID-50=	50 GHz/100GHz Optical Interleaver and De-interleaver Module, single-width module, installs in Cisco FlexLayer shelf assembly (15216-FL-SA)
15216-MD-ID-50=	50-GHz/100-GHz Optical Interleaver and De-interleaver Module, installs in Cisco 15216-MD-40 units
15216-MD-48-CM=	48 channel 50-GHz/100-GHz Optical De-interleaver with Coupler Module, installs in Cisco 15216-EF-40 and 15216-MD-48 units
Pluggable Optics Modules	
ONS-SI-155-SR-MM=	OC-3/STM-1 SFP optics module, intermediate-reach, 1310 nm, multimode, industrial temperature, LC connector
ONS-SI-155-I1=	OC-3/STM-1 SFP optics module, intermediate-reach, 1310 nm, single-mode, industrial temperature, LC connector
ONS-SI-155-L2=	OC-3/STM-1 SFP optics module, long-reach, 1550 nm, single-mode, industrial temperature, LC connector
ONS-SC-155-EL=	SFP – STM-1 Electrical, standard coaxial (75 ohm) connector
15454E-SFP-L.4.1=	OC-12/STM-4 SFP optics module, intermediate-reach, 1310 nm, single-mode, LC connector
ONS-SI-622-I1=	OC-12/STM-4/OC-3/STM-1 SFP optics module, intermediate-reach, 1310 nm, single-mode, industrial temperature, LC connector
15454E-SFP-L.16.1=	OC-48/STM-16 SFP optics module, intermediate-reach, 1550 nm, single-mode, LC connector

Product ID	Description
ONS-SE-2G-S1=	OC-48/STM-16 SFP optics module, short-reach/intra-office, 1310 nm, single-mode, LC connector
ONS-SI-2G-S1=	OC-48/STM-16 SFP optics module, short-reach/intra-office, 1310 nm, single-mode, Industrial Temp, LC connector
ONS-SE-2G-L2=	OC-48/STM-16 SFP optics module, long-reach/long-haul, 1550 nm, single-mode, LC connector
ONS-SI-2G-L2=	OC-48/STM-16 SFP optics module, long-reach/long-haul, 1550 nm, single-mode, Industrial Temp, LC connector
ONS-SE-Z1=	OC-48/STM-16/OC-12/STM-4/OC-3/STM-1 SFP optics module, 1310 nm, single-mode, LC connector
ONS-SC-Z3-XXXX=	OC-48/STM-16/GE SFP optics module, CWDM, XXXX-nm, single-mode, Commercial Temp, LC connector
ONS-SE-200-MM=	ESCON SFP optics module, short-reach, 1310 nm, multimode, LC connector
ONS-SE-G2F-LX=	GE, Fibre Channel (1- and 2-Gbps) and HDTV SFP optics module, long-reach, 1310nm, single-mode, LC connector
ONS-SE-G2F-SX=	GE and Fibre Channel (1- and 2-Gbps) SFP optics module, short-reach, 850 nm, multimode, LC connector
ONS-SE-GE-ZX=	GE SFP optics module, 1000BASE-ZX interface, 1550 nm, single-mode, LC connector
ONS-SI-GE-ZX=	GE SFP optics module, 1000BASE-ZX interface, 1550 nm, single-mode, Industrial Temp, LC connector
ONS-SE-ZE-EL=	10/100/1000 Ethernet SFP electrical module, BASE-T interface, RJ-45 connector
ONS-SE-4G-SM=	4-Gbps Fibre Channel SFP optics module, 1310 nm, single-mode, LC connector
ONS-SE-GE-BXU=	GE SFP optics module, 1000BASE BX U, single fiber application – upstream, Extended Temp, 1310 nm TX and 1490 nm RX, single-mode, single LC connector
ONS-SE-GE-BXD=	GE SFP optics module, 1000BASE BX D, single fiber application – downstream, Extended Temp, 1490 nm TX and 1310 nm RX, single-mode, single LC connector
ONS-SE-4G-MM=	4-Gbps Fibre Channel SFP optics module, 850 nm, multimode, LC connector
ONS-SC-4G-xx.x=	4-Gbps Fibre Channel SFP optics module, DWDM, 15xx.x, 100 GHz, LC connector – Commercial Temp
ONS-SC-2G-xx.x=	OC-48/STM-16 SFP optics module, DWDM, 15xx.x-nm, single mode, LC connector
ONS-XC-10G-SR-MM=	10 GE/10-Gbps Fibre Channel XFP optics module, short-reach, 850 nm, multimode, LC connector
ONS-XC-10G-S1=	OC-192/STM-64/10 GE/10-Gbps Fibre Channel XFP optics module, short-reach, 1310 nm, single-mode, LC connector
ONS-XC-10G-L2=	OC-192/STM-64 XFP optics module, long-reach, 1550 nm, single-mode, LC connector
ONS-XC-10G-I2=	OC-192/STM-64 IR2/10 GE XFP optics module, intermediate-reach, 1550nm, single-mode, LC connector
ONS-XC-10G-xx.x=	OC-192/STM-64/10 GE XFP optics module, DWDM, 15xx.x- nm, single-mode, LC connector
ONS-XC-10G-C=	OC-192/STM-64/10 GE XFP optics module, DWDM, Full C-band Tunable, 50 GHz, single-mode, LC connector
ONS-XC-10G-xxxx=	OC-192/10GE/OTU2, CWDM, xxxx nm, XFP Commercial Temp, 40 km range
ONS-SC-E1-T1-PW=	SFP – E1/DS1 PDH over FE Pseudowire – Commercial Temp
ONS-SC-EoP1=	SFP – FE over DS1/E1 – Commercial Temp
ONS-SC-EOP3=	SFP – FE over DS3/E3 – Commercial Temp
ONS-SC-E3-T3-PW=	SFP-E3/DS-3 PDH over FE Pseudowire – Commercial Temp
ONS-XC-8G-SM=	8-Gbps Fibre Channel XFP SM
ONS-XC-8G-MM=	8-Gbps Fibre Channel XFP MM
ONS-SC-OSC-ULH=	SFP-OC3/STM1/FE Optical Service Channel SFPs ULH–Commercial Temp
ONS-SC-OSC-18.0=	SFP FE/OC3/STM1 OSC for RAMAN application 1518.0nm
ONS-SC-HD3GV-TX=	SFP – 3G HD Video Tx
ONS-SC-HD3GV-RX=	SFP – 3G HD Video Rx
ONS-CC-100GE-LR4=	100GE Basd-CFP – LR4 – Commercial temp
ONS-CC-100G-LR4=	100G Multirate CFP – LR4 – Commercial temp
ONS-CC-40G-LR4=	40G Multirate CFP- LR4 – Commercial Temp
ONS-CC-40G-FR=	40G Multirate CFP- FR – Commercial Temp
CFP-40G-SR4=	40GBASE-SR4 CFP Module with MPO connector
ONS-CXP-100G-SR10=	CXP – 100GBASE-SR – Commercial temp

Product ID	Description
ONS-XC-10G-96C=	XFP – 10G 96 ch Full C Band Tuneable DWDM XFP, 50 Ghz, LC
ONS-SC+-10G-SR=	SFP+ SR – Commercial Temp – MM
ONS-SC+-10G-LR=	SFP+ LR – Commercial Temp – SM
ONS-SC+-10G-ER=	SFP+ ER – Commercial Temp – SM
ONS-SC+-10G-ZR=	SFP+ ZR – Commercial Temp – SM
ONS-SC-+-10G-C=	SFP+ -10G MR, Full C Band Tuneable DWDM SFP+, 50 Ghz, LC
ONS-SC+-10G-xx.x=	10G MR, SFP+ 15xx.xnm, 100 GHz, LC – SM
ONS-SC+-10GEPxx.x=	10G MR, Edge Performance SFP+ 15xx.x, 100 GHz, LC – SM
ONS-SC+-10G-CUx=	10GBASE-CU SFP+ Active Cable 1m, 3m, 5m and 7m lengths
Cable Assemblies	
15454-MPO-MPO-2=	Multi-fiber patchcord – MPO 8-fiber ribbon to MPO 8-fiber ribbon, single mode, 2.0 mm
15454-MPO-XMPO-2=	Multi-fiber patchcord – MPO 8-fiber ribbon to MPO 8-fiber ribbon crossed, single mode, 2.0m, for use with SMR-2 units for Degree-2 ROADM Node configurations (no PP-4-SMR required)
15454-MPO-MPO-4=	Multi-fiber patchcord – MPO 8-fiber ribbon to MPO 8-fiber ribbon, single mode, 4.0m
15454-MPO-MPO-6=	Multi-fiber patchcord – MPO 8-fiber ribbon to MPO 8-fiber ribbon, single mode, 6.0m
15454-MPO-MPO-8=	Multi-fiber patchcord – MPO 8-fiber ribbon to MPO 8-fiber ribbon, single mode, 8.0m
15454-MPO-8LC-2=	Cable assembly, MPO 8-fiber ribbon to 8x LC/PC, single mode, 2.3m
15454-LC-LC-2=	Cable assembly, LC/PC-to-LC/PC, single-mode, 2.0m, 2 mm jacket
15216-LC-LC-5=	Cable assembly, LC/PC-to-LC/PC, single-mode, 4.0m, 2mm jacket
15216-LC-LC-10=	Cable assembly, LC/PC-to-LC/PC, single-mode, 6.0m, 2mm jacket
15216-LC-LC-20=	Cable assembly, LC/PC-to-LC/PC, single-mode, 8.0m, 2mm jacket
15216-LC-LC-MM-2=	Cable assembly, LC/PC-to-LC/PC, multimode, 2.0m, 2mm jacket
15216-LC-LC-MM-5=	Cable assembly, LC/PC-to-LC/PC, multimode, 5.0m, 2mm jacket
15216-LC-SC-5=	Cable assembly, LC/PC-to-SC/UPC, single-mode, 4.0m, 2mm jacket
15216-LC-SC-10=	Cable assembly, LC/PC-to-SC/UPC, single-mode, 6.0m, 2mm jacket
15216-LC-SC-20=	Cable assembly, LC/PC-to-SC/UPC, single-mode, 8.0m, 2mm jacket
15454-MPO-8LC-4=	Multi-fiber patchcord – MPO to 8xLC – 4m
15454-MPO-8LC-6=	Multi-fiber patchcord – MPO to 8xLC – 6m
15454-MPO-8LC-8=	Multi-fiber patchcord – MPO to 8xLC – 8m
ONS-CCC-100G-5=	CXP-CFP MPO cable, 5m long
ONS-CCC-100G-10=	CXP-CFP MPO cable, 10m long
ONS-CCC-100G-20=	CXP-CFP MPO cable, 20m long
Software and User Documentation	
SF15454W-R9.6.0K9	15454 ANSI MSTP Rel. 9.6.0 SW, Pre-loaded on TCC2P or TCC3
SF15454M-R9.6.0K9	15454 ANSI MSTP R9.6.0 SW, Pre-loaded on TCC3, TNC/E, TSC/E
15454-LIC-9.6.0K9	15454 ANSI ETSI MSTP Upgrade License for 9.6.0, Right To Use
15454-R9.6.0SWK9	15454 ANSI ETSI MSTP Rel. 9.6.0 Pkgs., DVD, RTU License
15454-R9.6.0SWK9=	15454 ANSI ETSI MSTP Rel. 9.6.0 Pkgs., DVD, RTU License
SF15454WC-R9.6.0K9	15454 ANSI MSTP Rel. 9.6.0 SW-WSON, Pre-loaded on TCC2P-TCC3
SF15454MC-R9.6.0K9	15454 ANSI MSTP R9.6.0SW-WSON,Preload TCC3,TNC,TNCE,TSC,TSCE
15454C-LIC-9.6.0K9	15454 ANSI ETSI MSTP-WSON Upgrade Lic 9.6.0, Right To Use
15454C-R9.6.0SWK9	15454 ANSI ETSI MSTP-WSON Rel. 9.6.0 Pkgs,DVD,RTU License
15454C-R9.6.0SWK9=	15454 ANSI ETSI MSTP-WSON Rel 9.6.0 Pkgs,DVD, RTU License
15454-DOC9.6.0CD=	15454 ANSI ETSI MSTP Sys. Doc. Rel. 9.6.0 English, CD
SF15454WE-R9.6.0K9	15454 ETSI MSTP Rel. 9.6.0 SW, Pre-loaded on TCC2P or TCC3
SF15454ME-R9.6.0K9	15454 ETSI MSTP R9.6.0 SW, Pre-loaded on TCC3, TNC/E, TSC/E

Product ID	Description
SF15454WECR9.6.0K9	15454 ETSI MSTP Rel. 9.6.0 SW-WSON, Preload on TCC2P,TCC3
SF15454MECR9.6.0K9	15454 ETSI MSTP R9.6.0SW-WSON,Preload TCC3,TNC,TNCE,TSC,TSCE

Warranty

The following are warranty terms that apply to Cisco ONS 15454 MSTP as well as services you may use during the warranty period. Your formal Warranty Statement appears in the Cisco Information Packet that accompanies your Cisco product.

- Hardware warranty duration: Five (5) years
- Software warranty duration: One (1) year
- Hardware replacement, repair, or refund procedure: Cisco or our service center will use commercially reasonable efforts to ship a replacement part for delivery within fifteen (15) working days after receipt of the defective product at the Cisco site. Actual delivery times of replacement products may vary depending on customer location.

Product warranty terms and other information applicable to Cisco products are available at: http://www.cisco.com/go/warranty.

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 to 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 ONS 15454 Multiservice Transport Platform, contact your local account representative or visit Cisco at: www.cisco.com/go/optical or www.cisco.com/go/IPoDWDM.

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

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

Europe Headquarters
Cisco Systems International BV Amsterdam,
The Netherlands

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