



## Data Sheet

# Cisco ONS 15454 Multiservice Transport Platform

The Cisco® ONS 15454 Multiservice Transport Platform sets the industry benchmark for dense wavelength-division multiplexing (DWDM) solutions by using proven Cisco Multiservice Provisioning Platform networking technologies to deliver simple, fast, and intelligent DWDM capabilities and lower capital and operating expenditures.

## Transforming Metropolitan and Regional Networks

When Cisco Systems® introduced the Cisco ONS 15454 Multiservice Provisioning Platform (MSPP) for the metropolitan (metro) market 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 ranging from DS-1/E1 to OC-192/STM-64, as well as Ethernet and IP services. The platform was scalable and was the fraction of the size of traditional bit-rate-specific equipment. In addition to providing greater capability and scalability from a platform that used less space and power, the Cisco ONS 15454 MSPP proved to be cost-effective, and it uniquely met the requirements for the new market segment. The Cisco ONS 15454 MSPP quickly established itself as the market leader.

Continuing with its tradition of innovation and leadership in metro optical networking, Cisco has introduced the Cisco ONS 15454 Multiservice Transport Platform (MSTP), which is transforming metro and regional DWDM networks. The Cisco ONS 15454 MSTP (Figure 1) allows a metro or regional DWDM system to become as intelligent and flexible as the highly successful Cisco ONS 15454 MSPP, including wide service interface mix, service transparency, flexible topology, completely reconfigurable traffic pattern, and simplified operations.

### Figure 1

Cisco ONS 15454 Multiservice Transport Platform – ANSI Mechanics (left) and ETSI Mechanics (right)

## Wide Service Interface Mix

A metro network, being close to or on a customer's premises – unlike its long-haul counterpart – requires support for a great diversity of service interfaces. The service interfaces allow network providers to offer new tariffs and allow enterprise customers to natively transport a wide variety of services over a common transport network without unnecessary conversion stages and equipment. Additionally, a wide service mix simplifies the planning for services. The Cisco ONS 15454 MSTP, with its MSPP capabilities, supports a broad range of standards-based services in a single platform, including:

- Aggregated lower-rate TDM services from DS-1/E1 over 2.5-Gbps and 10-Gbps wavelengths
- SONET/SDH wavelength and aggregated services: OC-3/STM-1, OC-12/STM-4, OC-48/STM-16, and OC-192/STM-64
- Data services: private-line, switched and wavelength-based, including 10/100BASE-T, Gigabit Ethernet, 10 Gigabit Ethernet LAN physical layer, and 10 Gigabit Ethernet WAN physical layer
- Storage services: 1-Gbps, 2-Gbps and 4-Gbps Fibre Channel, 10-Gbps Fibre Channel, IBM Fiber Connection (FICON), and Enterprise Systems Connection (ESCON), ETR/CLO, ISC-1, ISC-3
- Video services: D1 and high-definition television (HDTV)

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 metro transport offerings.

## Service Transparency

Critical to offering a wide service mix is a DWDM system's ability 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 optimize network costs for any mix of service types. Using digital-wrapper technology (defined in ITU-T G.709) enables transparency while still allowing enhanced wavelength management and providing extended optical reach with integrated Forward Error Correction (FEC) and Enhanced Forward Error Correction (E-FEC).

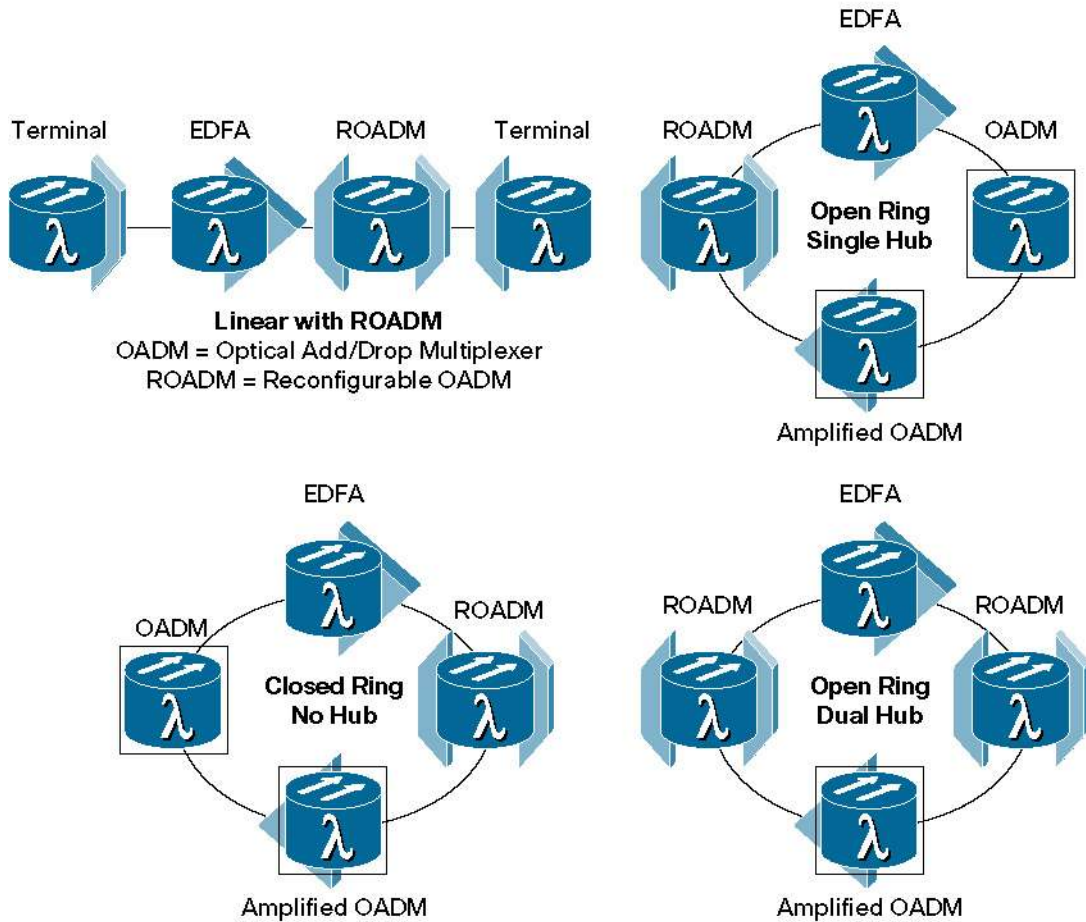
Unique to the market is also the possibility for the Cisco ONS 15454 MSTP to support direct interconnection with ITU interfaces from Layer 2, Layer 3, and storage area network (SAN) devices. All the intelligent optical transmission-related features and functions can be supported by the Cisco ONS 15454 MSTP with these types of wavelengths and services as well.

## Topology Flexibility

Traditional first-generation metro DWDM solutions were optimized for point-to-point transmission. Metro and regional DWDM networks require the possibility to support point-to-point as well as ring topologies with more complex traffic patterns, which may also extend across multiple networks. The Cisco ONS 15454 MSTP can be configured to support any metro or regional DWDM topology (Figure 2), allowing a single solution to be provisioned for the network.

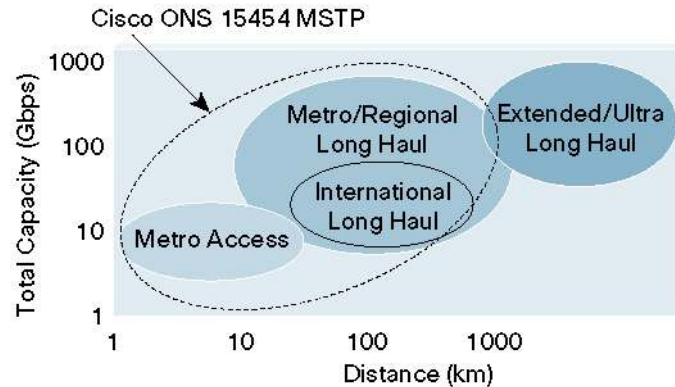
The ultimate topology flexibility is achieved through a fully reconfigurable optical add/drop multiplexer (ROADM). The Cisco ONS 15454 MSTP offers ROADM capability that allows zero to 32 channels of passthrough or add/drop, A–Z wavelength provisioning, and full real-time power monitoring of each individual wavelength.

**Figure 2**  
 Network Flexibility with Cisco ONS 15454 MSTP



In addition to flexibility in network topology, the Cisco ONS 15454 MSTP supports flexibility in reach to enable a common platform to meet requirements for metro access, metro core, and regional networking (Figure 3). Coupling Cisco MSPP and MSTP capabilities, the Cisco ONS 15454 helps simplify network deployments by reducing the proliferation of single-application network elements.

**Figure 3**  
Metropolitan and Regional Network Requirements



### Simplified, Cost-Effective Operation

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, a metro-optimized Cisco ONS 15454 MSTP introduces intelligence to metro DWDM transmission while addressing the continued need for increased bandwidth.

The Cisco ONS 15454 MSTP uses the operational simplicity introduced in the Cisco ONS 15454 MSPP with user features such as multilayer graphical network, node, and card visibility; A-to-Z network-based wavelength service provisioning; and graphical software wizards to simplify and speed user operations for such tasks as initial ring turn-up, service provisioning, and network node and bandwidth upgrades. The Cisco ONS 15454 MSTP uses this architecture to introduce a level of operational simplicity unheard of in metro DWDM networks. Using IP in the optical service channel and MSPP-like software, the Cisco ONS 15454 MSTP supports the following:

- Scalable wavelengths (1–64) for superior cost-versus-growth trade-off, with in-service growth to 128 wavelengths
- Transport of 150-Mbps to 40-Gbps wavelength services, as well as aggregated TDM and data services, for maximum service flexibility
- Flexible transmission capability up to 1240 miles (2000 kilometers) through the use of advanced amplification and FEC or E-FEC technologies to support a wide range of networking applications
- Ready-to-use card architecture for complete flexibility in configuring DWDM network elements: terminal nodes, optical add/drop nodes, line amplifiers, and dispersion compensation within amplified or unamplified networks
- High shelf density for high-bandwidth (10-Gbps) wavelength services
- Fully reconfigurable optical add/drop multiplexers (ROADMs) for superior network flexibility and reduced complexity
- Flexible add/drop capabilities, from 1- to full 128-channel granularity, supporting both band and channel optical add/drop multiplexers (OADMs)
- Software-provisionable, Small Form-Factor Pluggable (SFP) and 10 Gigabit Small Form-Factor Pluggable Module (XFP) client optics modules and full-band wavelength tunability for reduced inventory of spares

- Fully automatic node and network setup with the possibility to use the intuitive DWDM network design tool (Cisco MetroPlanner) to have a PC-aided design, installation, and commissioning for the network
- Multilevel service monitoring using SONET/SDH and digital-wrapper (G.709) technology with an integrated optical service channel for unparalleled service reliability
- Network topology autodiscovery
- Integrated Cisco Transport Controller for network-based, point-and-click setup and regulation for rapid node and network activation
- Software-controlled optical power management for fully automated network optical power control, especially during wavelength additions, site additions, and fast transient suppression in the case of a fiber cut
- Support by an advanced, cross-platform optical element management system, the Cisco Transport Manager, for unified network operations and interface to a network management system (NMS) and operations support system (OSS)

In addition to the integrated software features, the Cisco ONS 15454 MSTP is supported by a simple but powerful network design tool, the Cisco MetroPlanner. Cisco MetroPlanner is a user-friendly PC application for modeling Cisco DWDM networks; it optimizes the deployment based on the user's network parameters. In addition to network design, Cisco MetroPlanner also reduces operational expenditures by simplifying network deployments through the following:

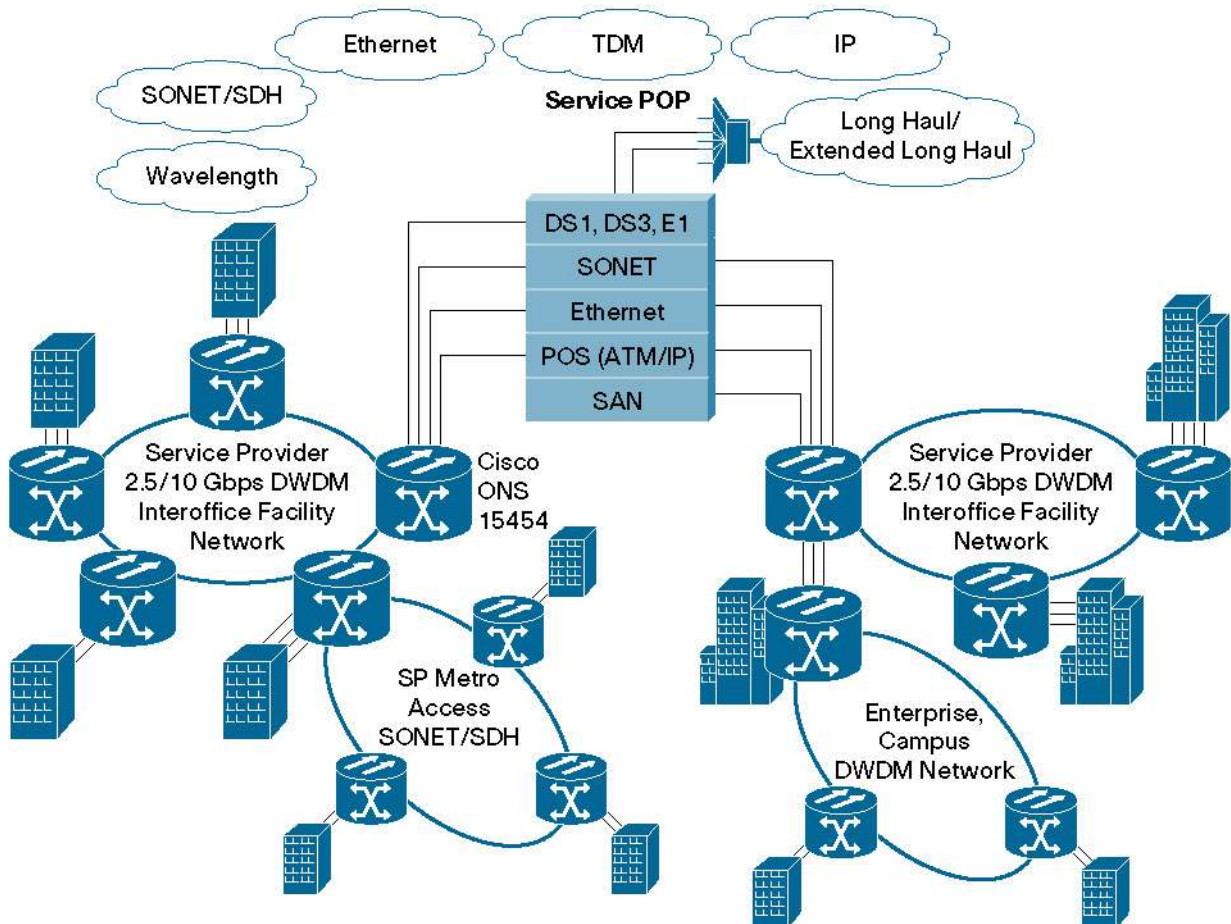
- Simple drag-and-drop user operation
- Optimized services and units deployment in case of topology or traffic matrix changes for a deployed network (delta planning)
- Fully flexible network design with the possibility to optimize the use of the flexibility provided by ROADM (in the optical domain) and by the multirate cards (in the service and application domain)
- Automatic equipment selection
- Layered graphical views of network, wavelength services, and node views
- Detailed port-to-port fiber-cabling table
- Bill-of-material output
- Exportable configuration files, which can be uploaded to the Cisco Transport Controller craft tool, for automated node-provisioning setup for quick network activations


## Cisco ONS 15454 MSTP Migration

With its multiservice capability, innovative optical technology, automatic optical power management, and MSPP-like ease of use, the Cisco ONS 15454 MSTP transforms how metro and regional DWDM networks are built and managed. Combining multiple services and intelligent DWDM, the Cisco ONS 15454 MSTP significantly reduces both capital expenditures and operational expenses for today's metro and regional networks (Figure 4).

**Figure 4**

Metro Network with Cisco ONS 15454 MSTP





The Cisco ONS 15454 MSTP includes the following features:

### **Node Configurations**

- Terminal
- Hub
- Line amplifier
- OADM
- ROADM

### **Network Configurations**

- Linear point-to-point
- Open ring, single hub
- Open ring, multiple-hub
- Closed ring, no hub
- Mesh and multiple-ring topologies

### **Advanced Intelligent Software Features**

- Network topology autodiscovery
- Point-and-click node and network setup and regulation
- Automatic network optical power management and monitoring
- Single management interface (single IP address) for all the shelves in a node
- Network-level alarm correlation for a quick and easy troubleshooting (G.798-based)

### **User Interface: Cisco Transport Controller**

- Integrated node and subnetwork craft GUI
- Layered graphical views: network, wavelength, node, shelf, card
- User-provisionable graphics and fonts
  - Background maps
  - Color schemes
- A-to-Z wavelength circuit routing and creation
- Network autodiscovery with provisionable subnetwork domain control
- System inventory
- PC-based client
- Familiar browser interface – Netscape Navigator or Microsoft Internet Explorer

- Complete Performance Monitoring support
  - 15-minute (32 entries) and 24-hour (two entries)
  - Optical layer
  - SONET/SDH layer
  - ITU-T G.709 layer (including FEC/E-FEC)
  - Client interface type-specific
  - Threshold-crossing alerts threshold setting

### **Alarm Monitoring and Reporting**

- Shelf LEDs – Critical, major, minor, remote
- Card LEDs – Card failure, active/standby state, signal fail
- Cisco Transport Controller craft interface
  - Layered graphical views with real-time alarm text and coloring: network, wavelength, node, shelf, card
  - Multiple technology views including DWDM and SONET/SDH with MSTP integration
- Environmental alarm contacts
  - 4-alarm output contact closures (standard): critical, major, minor, 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: superuser, provisioning, maintenance, retrieve
- Multiple user names and logged-in users

### **Maintenance Features**

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

### **Timing and Synchronization**

- Two external timing-source inputs (SONET, T1 and SDH E-1, 2 MHz)
- Line timing
- Two timing-source outputs (recovered from line optics)
- Internal Stratum 3 holdover
- 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 monitored DC power inputs

## Compliance and Certifications

- Network Equipment Building Standards (NEBS) Level 3 compliance
- Operations Systems Modification of Intelligent Network Elements (OSMINE) certifications
- Storage-vendor qualification and certifications
- ITU-T and CE Mark compliance

## Cisco ONS 15454 MSTP Technical Specifications

Tables 1–7 provide technical specifications and ordering information for Cisco ONS 15454 MSTP elements.

**Table 1.** Common Equipment

| Module  | Model Number                        |
|---|-------------------------------------|
| <b>Shelf assembly</b>   | SA-HD, SA-HD-DDR or SA-ETSI version |
| <b>Fan-tray assembly</b>  | FTA3-T (ANSI), FTA-48V (ETSI)       |
| <b>Timing, communications, and control card (TCC)</b>                   | TCC2 or TCC2P                       |
| <b>Alarm Interface Controller (AIC) and Alarm Expansion Panel (AEP)</b> | AIC-I (AEP option for ANSI)         |
| <b>Power, craft, alarm mechanical interface cards (ETSI)</b>            | CTP-MIC48V<br>AP-MIC48V             |
| <b>Air Ramp</b>   | AIR-RAMP                            |
| <b>Slot Filler Card</b>   |                                     |
| Interface and control   | BLANK                               |
| Front Mount Electrical Connection (FMEC) (ETSI)                         | BLANK-FMEC                          |
| <b>Multishelf Management cards</b>                                      |                                     |
| Integrated Multishelf switch  | MS-ISC-100T                         |
| Ethernet adapter panel mechanical frame                                 | EAP-MF                              |
| Ethernet adapter panel  | EAP                                 |
| <b>Multiple Ethernet cable</b>  | MEC                                 |
| <b>Fiber Management</b>   |                                     |
| Fiber patch panel shelf   | PP-64-LC or PP2-64-LC               |
| Fiber jumper storage shelf  | FBR-STRG                            |

**Table 2.** Wavelength Interfaces

| Modules  | Supported Service Interfaces   | Protection Supported   |
|--|--|--|
| <p><b>2.5-Gbps FEC multirate transponder cards</b></p> <p>8 modules, 4-channel tunable for 32-channel, 100-GHz plan, 50-GHz laser stability (C band)</p>   | <p>1-Gbps Fibre Channel/FICON</p> <p>2-Gbps Fibre Channel/FICON</p> <p>ISC-1</p> <p>ISC-3</p> <p>ESCON</p> <p>Fast Ethernet (FE)</p> <p>Gigabit Ethernet (GE)</p> <p>T3 (Optical)</p> <p>OC-3/STM-1</p> <p>OC-12/STM-4</p> <p>OC-48/STM-16</p> <p>D1-SDI Video</p> <p>HDTV</p> <p>C-Cor DV-6000 (2.38-Gbps)</p> <p>ETR/CLO</p> | <p>No protection</p> <p>Optical-path protection</p> <p>Optical-path and equipment protection</p> |
| <p><b>2.5-Gbps data muxponder cards</b></p> <p>8 modules, 4-channel tunable for 32-channel, 100-GHz plan, 50-GHz laser stability (C band)</p>  | <p>1-Gbps Fibre Channel/FICON</p> <p>2-Gbps Fibre Channel/FICON</p> <p>ESCON</p> <p>GE</p>   | <p>No protection</p> <p>Optical-path protection</p> <p>Optical-path and equipment protection</p> |
| <p><b>10-Gbps EFEC multirate transponder (4-channel tunable)</b></p> <p>8 modules, 4-channel tunable for 32-channel, 100-GHz plan, 50-GHz laser stability (C band)</p>   | <p>10 GE LAN</p> <p>10 GE WAN</p> <p>OC-192/STM-64</p> <p>10 Gigabit Fibre Channel</p>   | <p>No protection</p> <p>Optical-path and equipment protection</p>                                |
| <p><b>4x 2.5-Gbps/10-Gbps EFEC muxponder cards (4-channel tunable)</b></p> <p>8 modules, 4-channel tunable for 32-channel, 100-GHz plan, 50-GHz laser stability (C band)</p>   | <p>OC-48/STM-16</p>  | <p>No protection</p> <p>Optical-path and equipment protection</p>                                |
| <p><b>10-Gbps EFEC multirate transponder cards (full-band tunable)</b></p> <p>1 module, full-band tunable for 82-channel, 50-GHz plan and stability (C band)</p> <p>1 module, full-band tunable for 82-channel, 50-GHz plan and stability (L band)</p> | <p>10 GE LAN</p> <p>10 GE WAN</p> <p>OC-192/STM-64</p> <p>10 Gigabit Fibre Channel</p>   | <p>No protection</p> <p>Optical-path and equipment protection</p>                                |
| <p><b>4x 2.5-Gbps/10-Gbps EFEC muxponder cards (full-band tunable)</b></p> <p>1 module, full-band tunable for 82-channel, 50-GHz plan and stability (C band)</p> <p>1 module, full-band tunable for 82-channel, 50-GHz plan and stability (L band)</p> | <p>OC-48/STM-16</p>  | <p>No protection</p> <p>Optical-path and equipment protection</p>                                |

| Modules  | Supported Service Interfaces   | Protection Supported                                   |
|--|--|--|
| <b>10-Gbps EFEC data muxponder cards (full-band tunable)</b><br>1 module, full-band tunable for 82-channel, 50-GHz plan and stability (C band)<br>1 module, full-band tunable for 82-channel, 50-GHz plan and stability (L band) | 1-Gbps Fibre Channel/FICON<br>2-Gbps Fibre Channel/FICON<br>4-Gbps Fibre Channel<br>ISC-1<br>ISC-3<br>GE | No protection<br>Optical-path and equipment protection |

**Table 3.** Transmission Elements

| Module   | Unit name   |
|--|---|
| <b>Multiplexer and demultiplexer filters</b><br>32-wavelength multiplexer, 100-GHz, C band<br>32-wavelength demultiplexer, 100-GHz, C band<br>4-wavelength multiplexer/demultiplexer, 100-GHz, C band  | 32DMX-O<br>32MUX-O<br>4MD-xx.x                            |
| <b>Optical amplifier</b><br>Pre-amplifier, 50-GHz capable, C band<br>Booster amplifier, 50-GHz capable, C band<br>Enhanced Booster amplifier, 50-GHz capable, C band<br>Amplifier (can be used as Pre-amplifier or Booster), L band<br>Booster amplifier, 50-GHz capable, L band                             | OPT-PRE<br>OPT-BST<br>OPT-BST-E<br>OPT-AMP-L<br>OPT-BST-L |
| <b>Reconfigurable optical add/drop multiplexer</b><br>32-channel wavelength selective switch, 100-GHz, C band<br>32-channel demultiplexer 100-GHz (for use with 32-WSS), C band<br>32-channel wavelength selective switch, 100-GHz, L band<br>32-channel demultiplexer 100-GHz (for use with 32-WSS), L band | 32-WSS<br>32-DMX<br>32-WSS-L<br>32-DMX-L                  |
| <b>Mesh/multiring upgrade unit, C band and L band</b>  | MMU   |
| <b>Optical band add/drop multiplexer</b><br>1-band, 50-GHz capable, C band<br>4-band, 50-GHz capable, C band   | AD-1B-xx.x<br>AD-4B-xx.x                                  |
| <b>Optical channel add/drop multiplexer</b><br>1-channel, 100-GHz, C band<br>2-channel, 100-GHz, C band<br>4-channel, 100-GHz, C band  | AD-1C-xx.x<br>AD-2C-xx.x<br>AD-4C-xx.x                    |
| <b>Optical service channel</b><br>Integrated combiner and separator<br>Standard  | OSCM<br>OSC-CSM   |
| <b>Dispersion compensation</b><br>Dispersion-compensation unit shelf assembly (2-slot)<br>Dispersion-compensation units  | DCU-SA<br>DCU-<value>                                     |

| Module                                 | Unit name            |
|--|----------------------|
| <b>Y-cable protection modules</b>      |                      |
| 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 |

**Table 4.** Targeted Networks

| Module  | Description                             |
|---|---|
| <b>Nodes per network</b>                                      | 20                                      |
| <b>Wavelengths</b>  |   |
| L band  | 32 + 1 (OSC) (scalable to 64)           |
| C band  | 32 + 1 (OSC) (scalable to 64)           |
| <b>Wavelength spacing</b>                                     | 100 GHz (scalable to 50 GHz)            |
| <b>Optical reach, single span, point-to-point (amplified)</b> |   |
| 32 channels   | 106 miles (170 km)                      |
| 16 channels   | 122 miles (195 km)                      |
| <b>Number of spans</b>  | 20                                      |
| <b>Ring circumference</b>                                     | 1240 miles (2000 km)                    |
| <b>Fiber type</b>   | Single-mode fiber (G.652, G.655, G.653) |
| <b>Power requirements</b>                                     | Typical/maximum                         |
| Hub node  | 296W/388W                               |
| ROADM node  | 352W/446W                               |
| OADM node   | 368W/488W                               |
| Amplified   | 250W/334W                               |
| Passive   | 174W/212W                               |
| Line amplifier node   | 238W/366W                               |

**Table 5.** 32-Channel Wavelength Plan – C band

| $\lambda$ (nm) | $\lambda$ (nm) | $\lambda$ (nm) | $\lambda$ (nm) | $\lambda$ (nm) | $\lambda$ (nm) | $\lambda$ (nm) | $\lambda$ (nm) |
|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 1530.3         | 1534.2         | 1538.1         | 1542.1         | 1546.1         | 1550.1         | 1554.1         | 1558.1         |
| 1531.1         | 1535.0         | 1538.9         | 1542.9         | 1546.9         | 1550.9         | 1554.9         | 1558.9         |
| 1531.9         | 1535.8         | 1539.7         | 1543.7         | 1547.7         | 1551.7         | 1555.7         | 1559.7         |
| 1532.6         | 1536.6         | 1540.5         | 1544.5         | 1548.5         | 1552.5         | 1556.5         | 1560.6         |

**Table 6.** 32-Channel Wavelength Plan – L band

| $\lambda$ (nm) | $\lambda$ (nm) | $\lambda$ (nm) | $\lambda$ (nm) | $\lambda$ (nm) | $\lambda$ (nm) | $\lambda$ (nm) | $\lambda$ (nm) |
|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 1577.8         | 1581.1         | 1584.5         | 1587.8         | 1591.2         | 1594.6         | 1598.0         | 1601.4         |
| 1578.6         | 1582.0         | 1585.3         | 1588.7         | 1592.1         | 1595.4         | 1598.8         | 1602.3         |
| 1579.5         | 1582.8         | 1586.2         | 1589.5         | 1592.9         | 1596.3         | 1599.7         | 1603.1         |
| 1580.3         | 1583.6         | 1587.0         | 1590.4         | 1593.7         | 1597.1         | 1600.6         | 1604.0         |

**Table 7.** ANSI/ETSI Ordering Information<sup>1</sup>

| Product ID   | Description   |
|--|---|
| <b>Common Equipment</b>  |   |
| 15454-SA-HD=<br>15454-SA-HD-DDR=<br>15454E-SA-ETSI=                | Shelf assembly, Cisco ONS 15454   |
| 15454-TCC2=<br>15454E-TCC2=<br>15454-TCC2P-K9=<br>15454E-TCC2P-K9= | Timing, Communications, and Control Card, Version 2 (TCC2)<br><br>Timing, Communications, and Control Card, Version 2 Plus (TCC2P)  |
| 15454-FTA3-T=<br>15454E-FTA-48V=                                   | 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=<br>15454E-AIR-RAMP=                                | Air ramp  |
| 15454-AIC-I=<br>15454E-AIC-I=                                      | Alarm Interface Controller, international card  |
| 15454-BLANK=<br>15454E-BLANK=<br>15454E-BLANK-FMEC=                | Shelf slot-filler panel, fits any slot in Cisco ONS 15454 ANSI shelf assembly<br>Shelf slot-filler panel, fits any slot in Cisco ONS 15454 ETSI shelf assembly<br>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   |
| 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   |
| 15454-PP-64-LC=<br>15454-PP2-64-LC=                                | 64-port fiber patch-panel shelf, 1 rack unit (RU) high, LC-to-LC connectors, 32 duplex LC adapters, supports up to 8 multi-fiber cable assemblies (1 MPO to 8 LC), includes 2 MPO to 8x LC 2.3-meter cable assemblies (uninstalled)<br>64-port fiber patch-panel shelf, 2 RUs high, LC-to-LC connectors, 32 duplex LC adapters, includes 8 MPO to 8x LC 2.3-meter cable assemblies (pre-cabled) |
| 15454-FBR-STRG=  | Fiber-storage shelf, supports eight 2-meter ribbon cables (8-fiber) plus 40 2-meter 2-mm fiber cables   |
| 15216-FL-SA=   | FlexLayer shelf assembly, 4 module slots, 1 RU high, Cisco FlexLayer platform   |

<sup>1</sup> Product names with an "E" (15454E, for example) are for ETSI network elements.

| Product ID                            | Description  |
|---------------------------------------|--|
| 15216-CS-SM-Y=                        | Y-cable splitter/combiner module for 2 wavelengths protection, single-mode fiber, single-width module, installs in Cisco FlexLayer shelf assembly (15216-FL-SA)  |
| 15216-CS-MM-Y=                        | Y-cable splitter/combiner module for 2 wavelengths protection, multimode fiber, single-width module, installs in Cisco FlexLayer shelf assembly (15216-FL-SA)  |
| 15454-YCBL-LC=                        | Y-cable storage shelf, supports up to 8 Y-cable modules  |
| 15454-YCM-SM-LC=                      | Y-cable splitter/combiner module for 1 wavelength protection, single-mode fiber, LC adapters   |
| 15454-YCM-MM-LC=                      | Y-cable splitter/combiner module for 1 wavelength protection, multimode fiber, LC adapters   |
| <b>Service Interfaces<sup>2</sup></b> |  |
| 15454-MR-L1-xx.x=                     | 100-Mbps to 2.5-Gbps FEC multirate transponder card, SFP-based client interface, 4-channel tunable on 100-GHz ITU wavelengths (50-GHz stability), unprotected DWDM line with LC connectors – C band  |
| 15454-MRP-L1-xx.x=                    | 100-Mbps to 2.5-Gbps FEC multirate transponder card, SFP-based client interface, 4-channel tunable on 100-GHz ITU wavelengths (50-GHz stability), protected DWDM line with LC connectors – C band  |
| 15454-DM-L1-xx.x=                     | 2.5-Gbps data muxponder card, 8 SFP-based client interfaces, 4-channel tunable on 100-GHz ITU wavelengths (50-GHz stability), unprotected DWDM line with LC connectors – C band  |
| 15454-DMP-L1-xx.x=                    | 2.5-Gbps data muxponder card, 8 SFP-based client interfaces, 4-channel tunable on 100-GHz ITU wavelengths (50-GHz stability), protected DWDM line with LC connectors – C band  |
| 15454-G1K-4<br>15454E-G1K-4           | GE card, 4 gigabit interface converter (GBIC) slots, GBICs supported: SX, LX, ZX, and DWDM, transponder-mode operation only in Release 4.6.0 or later  |
| 15454-10E-L1-xx.x=                    | 10-Gbps E-FEC multirate transponder card, XFP-based client interface, 4-channel tunable on 100-GHz ITU wavelengths (50-GHz stability), DWDM line with LC connectors – C band   |
| 15454-10ME-xx.x=                      | 4x OC-48/STM-16 E-FEC muxponder, 4 SFP-based client interfaces, 4-channel tunable on 100-GHz ITU wavelengths (50-GHz stability), DWDM line with LC connectors – C band   |
| 15454-10E-L1-C=                       | 10-Gbps E-FEC multirate transponder card, XFP-based client interface, full C-band tunable on 50-GHz ITU wavelengths, DWDM line with LC connectors  |
| 15454-10ME-L1-C=                      | 4x OC-48/STM-16 E-FEC muxponder card, 4 SFP-based client interfaces, full C-band tunable on 50-GHz ITU wavelengths, DWDM line with LC connectors   |
| 15454-10DME-C=                        | 10-Gbps E-FEC data muxponder card, 8 SFP-based client interfaces, full C-band tunable on 50-GHz ITU wavelengths, DWDM line with LC connectors  |
| 15454-10E-L1-L=                       | 10-Gbps E-FEC multirate transponder card, XFP-based client interface, full L-band tunable on 50-GHz ITU wavelengths, DWDM line with LC connectors  |
| 15454-10ME-L1-L=                      | 4x OC-48/STM-16 E-FEC muxponder card, 4 SFP-based client interfaces, full L-band tunable on 50-GHz ITU wavelengths, DWDM line with LC connectors   |
| 15454-10DME-L=                        | 10-Gbps E-FEC data muxponder card, 8 SFP-based client interfaces, full L-band tunable on 50-GHz ITU wavelengths, DWDM line with LC connectors  |
| <b>Optical Transmission Elements</b>  |  |
| 15454-OSCM=                           | Optical service channel card, 1510-nm, LC connectors, includes two 2-meter LC/LC fiber-optic cables  |
| 15454-OSC-CSM=                        | Optical service channel card, integrated combiner/separator, 1510-nm, LC connectors, includes two 2-meter LC/LC fiber-optic cables   |
| 15454-OPT-PRE=                        | Optical preamplifier, C-band, 64 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-AMP-L=                      | Optical amplifier, can be configured as preamplifier or booster, L-band, 64 channel, 50-GHz compatible, LC connectors, midstage access, includes one 4-dB LC/LC attenuated loopback (to be used if DCU is not required) and two 2-meter LC/LC fiber-optic cables |
| 15454-OPT-BST=                        | Optical booster amplifier, C-band, 64 channel, 50-GHz compatible, LC connectors, includes two 2-meter LC/LC fiber-optic cables   |

<sup>2</sup> Wavelength plan is outlined later in this document. Cisco online lead-time tool is available for selection of orderable wavelengths.

| Product ID                                | Description  |
|---|--|
| 15454-OPT-BST-E=                          | Optical enhanced booster amplifier, C-band, 64 channel, 50-GHz compatible, LC connectors, includes two 2-meter LC/LC fiber-optic cables  |
| 15454-OPT-BST-L=                          | Optical booster amplifier, L-band, 64 channel, 50-GHz compatible, LC connectors, includes two 2-meter LC/LC fiber-optic cables   |
| 15454-32-WSS=                             | 32-channel wavelength selective switch, C-band, MPO connectors for add path, LC connectors for interconnection, includes two 2-meter LC/LC fiber-optic cables                  |
| 15454-32-WSS-L=                           | 32-channel wavelength selective switch, L-band, MPO connectors for add path, LC connectors for interconnection, includes two 2-meter LC/LC fiber-optic cables                  |
| 15454-32-DMX=                             | 32-channel demultiplexer 100-GHz (for use with 32-WSS), C-band, MPO connectors for drop path, LC connectors for interconnection, includes one 2-meter LC/LC fiber-optic cables |
| 15454-32-DMX-L=                           | 32-channel demultiplexer 100-GHz (for use with 32-WSS), L-band, MPO connectors for drop path, LC connectors for interconnection, includes one 2-meter LC/LC fiber-optic cables |
| 15454-MMU=                                | Mesh/multiring upgrade unit, C band and L band (for use with 32-WSS/32-DMX or 32-WSS-L/32-DMX-L), LC connectors, includes one 2-meter LC/LC fiber-optic cables                 |
| 15454-32MUX-O=                            | 32-channel multiplexer card, C-band, 100-GHz, MPO connectors for add path, LC connector for interconnection  |
| 15454-32DMX-O=                            | 32-channel demultiplexer card, C-band, 100-GHz, MPO connectors for drop path, LC connectors for interconnection, includes one 2-meter LC/LC fiber-optic cables                 |
| 15454-4MD-xx.x=                           | 4-channel multiplexer and demultiplexer card, C-band, 100-GHz, LC connectors, includes two 2-meter LC/LC fiber-optic cables  |
| 15454-AD-1C-xx.x=                         | 1-channel OADM, C-band, 100-GHz, LC connectors, includes two 2-meter LC/LC fiber-optic cables  |
| 15454-AD-2C-xx.x=                         | 2-channel OADM, C-band, 100-GHz, LC connectors, includes two 2-meter LC/LC fiber-optic cables  |
| 15454-AD-4C-xx.x=                         | 4-channel OADM, C-band, 100-GHz, LC connectors, includes two 2-meter LC/LC fiber-optic cables  |
| 15454-AD-1B-xx=                           | 1-band OADM, C-band, 100-GHz, LC connectors, includes two 2-meter LC/LC fiber-optic cables   |
| 15454-AD-4B-xx=                           | 4-band OADM, C-band, 100-GHz, LC connectors, includes two 2-meter LC/LC fiber-optic cables   |
| 15216-DCU-SA=                             | Dispersion-compensation unit shelf, two module slots, 1 RU high  |
| 15216-DCM-<value>                         | Dispersion-compensation module, LC connectors, different fiber types and lengths supported for both C-band and L-band as part of the Cisco ONS 15216 product family            |
| <b>Pluggable Optics Modules</b>           |  |
| 15454E-SFP3-1-IR=<br>15454-SFP3-1-IR=     | OC-3/STM-1/D1-SDI SFP, intermediate-reach, 1310-nm, single-mode, LC connectors   |
| 15454-SFP12-4-IR=<br>15454E-SFP12-4-IR=   | OC-12/STM-4 SFP, intermediate-reach, 1310-nm, single-mode, LC connectors   |
| 15454-SFP-OC48-IR=<br>15454E-SFP-OC48-IR= | OC-48/STM-16 SFP, intermediate-reach, 1550-nm, single-mode, LC connectors  |
| ONS-SE-2G-S1=                             | OC-48/STM-16 SFP optics module, short-reach/intra-office, 1310-nm, single-mode, LC connectors  |
| ONS-SE-2G-L2=                             | OC-48/STM-16 SFP optics module, long-reach/long-haul, 1550-nm, single-mode, EXT temperature range, LC connectors   |
| ONS-XC-10G-S1=                            | 10 Gigabit SFP OC-192/STM-64/10 GE/10-Gbps Fibre Channel, 1310-nm short-reach, single-mode, LC connectors  |
| ONS-XC-10G-L2=                            | 10 Gigabit SFP OC-192/STM-64, 1550-nm, long-reach, single-mode, LC connectors (supported on ETSI platform only)  |
| 15454-SFP-200=<br>15454E-SFP-200=         | ESCON SFP, short-reach, 1310-nm, multimode, LC connectors (not supported on 2.5-Gbps data muxponder cards)   |
| ONS-SE-200-MM=                            | ESCON SFP, short-reach, 1310-nm, multimode, LC connectors  |

| Product ID                              | Description   |
|---|---|
| 15454-SFP-GE+-LX=                       | GE, Fibre Channel (1- and 2-Gbps) and HDTV SFP, 1310-nm, single-mode, LC connectors             |
| ONS-SE-G2F-LX=                          | GE, Fibre Channel (1- and 2-Gbps) and HDTV SFP, long-reach, 1310-nm, single-mode, LC connectors |
| 15454-SFP-GEFC-SX=                      | GE and Fibre Channel (1- and 2-Gbps) SFP, 850-nm, multimode, LC connectors                      |
| ONS-SE-G2F-SX=                          | GE and Fibre Channel (1- and 2-Gbps) SFP, short-reach, 850-nm, multimode, LC connectors         |
| ONS-SE-4G-SM=                           | 4-Gbps Fibre Channel SFP, 1310-nm, single-mode, LC connectors                                   |
| ONS-SE-4G-MM=                           | 4-Gbps Fibre Channel SFP, 850-nm, multimode, LC connectors                                      |
| <b>Cable Assemblies</b>                 |   |
| 15454-MPO-8LC-2=                        | Cable assembly, MPO 8-fiber ribbon to 8x LC/PC, single-mode, 2.3 meters (m)                     |
| 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, 2-mm jacket                                  |
| 15216-LC-LC-10=                         | Cable assembly, LC/PC-to-LC/PC, single-mode, 6.0m, 2-mm jacket                                  |
| 15216-LC-LC-20=                         | Cable assembly, LC/PC-to-LC/PC, single-mode, 8.0m, 2-mm jacket                                  |
| 15216-LC-SC-5=                          | Cable assembly, LC/PC-to-SC/UPC, single-mode, 4.0m, 2-mm jacket                                 |
| 15216-LC-SC-10=                         | Cable assembly, LC/PC-to-SC/UPC, single-mode, 6.0m, 2-mm jacket                                 |
| 15216-LC-SC-20=                         | Cable assembly, LC/PC-to-SC/UPC, single-mode, 8.0m, 2-mm jacket                                 |
| <b>Software and User Documentation</b>  |   |
| 15454-R7.0.0SWK9=<br>15454E-R7.0.0SWK9= | System software, Release 7.0.0, Cisco ONS 15454, CD-ROM   |
| 15454-LIC-7.0.0K9<br>15454E-LIC-7.0.0K9 | System software, Upgrade License for R7.0.0, Right To Use License                               |
| SF15454-R7.0.0K9<br>SF15454E-R7.0.0K9   | System software, Release 7.0.0, Cisco ONS 15454, ordered with TCC2 / TCC2P cards (preloaded)    |
| 15454-DOC7.0.0PP<br>15454E-DOC7.0.0PP   | User document, Cisco ONS 15454, Release 7.0.0, Cisco ONS 15454, paper version                   |
| 15454-DOC7.0.0CD<br>15454E-DOC7.0.0CD   | User document, Cisco ONS 15454, Release 7.0.0, Cisco ONS 15454, CD version                      |



**Corporate Headquarters**

Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA  
www.cisco.com  
Tel: 408 526-4000  
800 553-NETS (6387)  
Fax: 408 526-4100

**European Headquarters**

Cisco Systems International BV  
Haarlerbergpark  
Haarlerbergweg 13-19  
1101 CH Amsterdam  
The Netherlands  
www-europe.cisco.com  
Tel: 31 0 20 357 1000  
Fax: 31 0 20 357 1100

**Americas Headquarters**

Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA  
www.cisco.com  
Tel: 408 526-7660  
Fax: 408 527-0883

**Asia Pacific Headquarters**

Cisco Systems, Inc.  
168 Robinson Road  
#28-01 Capital Tower  
Singapore 068912  
www.cisco.com  
Tel: +65 6317 7777  
Fax: +65 6317 7799

Cisco Systems has more than 200 offices in the following countries and regions. Addresses, phone numbers, and fax numbers are listed on **the Cisco Website at [www.cisco.com/go/offices](http://www.cisco.com/go/offices).**

Argentina • Australia • Austria • Belgium • Brazil • Bulgaria • Canada • Chile • China PRC • Colombia • Costa Rica  
Croatia • Cyprus • Czech Republic • Denmark • Dubai, UAE • Finland • France • Germany • Greece • Hong Kong SAR  
Hungary • India • Indonesia • Ireland • Israel • Italy • Japan • Korea • Luxembourg • Malaysia • Mexico  
The Netherlands • New Zealand • Norway • Peru • Philippines • Poland • Portugal • Puerto Rico • Romania • Russia  
Saudi Arabia • Scotland • Singapore • Slovakia • Slovenia • South Africa • Spain • Sweden • Switzerland • Taiwan  
Thailand • Turkey • Ukraine • United Kingdom • United States • Venezuela • Vietnam • Zimbabwe

All contents are Copyright © 1992–2006 Cisco Systems, Inc. All rights reserved. Cisco, Cisco Systems, and the Cisco Systems logo are registered trademarks or trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

All other trademarks mentioned in this document or Website are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0502R)  
Pa/LW9883 01/06

