



Optical Power Level Troubleshooting for the Cisco ONS 15216-MD16-2-Red/Blue 100-GHz Mux/Demux Module

This document provides procedures for troubleshooting the most common power problems encountered with the Cisco ONS 15216-MD16-2-Red/Blue 100-GHz mux/demux optical filters. It contains the following sections:

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Caution

For a system carrying live traffic, the Common Out and Common In ports of the ONS 15216 Red Dense Wavelength Division Multiplexing (DWDM) Base Unit carry multiplexed aggregate signals. Also, the upgrade connections of the ONS 15216 Blue DWDM Upgrade Unit (To Base1, To Base 2, From Base 1, and From Base 2), when connected to the ONS 15216 Red DWDM Base Unit (From Upgrade 1, From Upgrade 2, To Upgrade 1, and To Upgrade 2, respectively) carry multiplexed aggregate signals. Major service interruptions occur if these connections are tampered with during troubleshooting. Any work on these connections should be undertaken during a maintenance window.



Note

The 100-GHz ONS 15216 Red DWDM Base Unit and Blue DWDM Upgrade Unit filters are passive devices that do not have any alarming. Any trouble notifications come from associated equipment in the system such as the ONS15216 EDFA2 or transport equipment loss of signal (LOS) alarms.



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1. Low Optical Power For Composite (Multiplexed) Optical Signal at Mux

Symptom Because of the typical use of the mux/demux product, low optical power for composite (multiplexed) optical signals is most easily identified from the far end of a particular link.

Possible Cause Many factors outside of the operation of the mux/demux device, such as faulty patch cords, faulty connectors on a patch panel, and atypically high loss across outside plant/network fiber, could easily result in the same symptom.

The vast majority of instances of this kind of problem are due to old/faulty patch cords and/or dirty connectors. Always check connectors, patch cords, and patch cord routing before beginning diagnosis.

Recommended Action Using an OSA connected to the monitor port of the mux device, verify total channel optical power uniformity.



Note

Troubleshooting problems with an optical power meter (OPM) but without an optical spectrum analyzer (OSA) requires you to take the ONS 15216 Red DWDM Base Unit and the ONS 15216 Blue DWDM Upgrade Unit out of service. All individual wavelength inputs to the unit must be removed. Use the OPM to measure the power of the first wavelength. Connect the first wavelength to the unit and verify the channel insertion loss is < 5.5 dB by measuring the power output from the Common Out port. Remove the first wavelength. Repeat procedure for all wavelengths to ensure insertion loss of all ports.

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- Step 1** If optical power is not seen to be uniform, determine which wavelengths are exhibiting below average optical power, and diagnose at the individual mux port.
 - Step 2** If overall optical power as seen at the monitor port is acceptably uniform, check to ensure that the connector for the composite signal output is clean and fully seated.
 - Step 3** If connector is clean and fully seated, verify that the patch cord is a single-mode patch cord, as multi-mode patch cords transmit light but incur high loss.
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2. Low Optical Power for an Individual Wavelength at Mux Common Port

Symptom Because of the typical use of the mux/demux product, low optical power for an individual wavelength at the mux Common port is most easily identified from the far end of a particular link.

Possible Cause Many different factors outside of the operation of the mux/demux device, such as faulty patch cords, faulty connectors on a patch panel, and atypically high loss across outside plant/network fiber, could easily result in the same symptom.

The vast majority of instances of this kind of problem are due to old/faulty patch cords and/or dirty connectors. Always check connectors, patch cords, and patch cord routing before beginning diagnosis.

Recommended Action Using an OSA connected to the monitor port of the mux device, determine which individual wavelength or wavelengths are exhibiting high insertion loss.



Note

Troubleshooting problems with an OPM but without an OSA (optical spectrum analyzer) require you to take the ONS 15216 Red DWDM Base Unit and the ONS 15216 Blue DWDM Upgrade Unit out of service. In order to determine which individual wavelength is exhibiting high insertion loss, all individual wavelength inputs to the unit must be removed. Use the OPM to measure the power of the first wavelength. Connect the first wavelength to the unit and verify the channel insertion loss is < 5.5 dB by measuring the power output from the Common Out port. Remove the first wavelength. Repeat the procedure for all wavelengths to ensure insertion loss of all ports.

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- Step 1** Verify that the optical transmitter is connected to the proper port on the mux device. If the wavelength of the transmitter does not match the wavelength for the individual add port, the optical signal will be drastically attenuated.
- Step 2** At the individual wavelength add port, verify that the optical patch cord used to connect the transmitter to the mux/demux device is free of defects, and that the connectors are clean, fully seated, and free of scratches.
- Step 3** Verify the optical power and wavelength coming from transmitter.
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3. Low Optical Power for All Individual Ports at Demux

Symptom Low optical power is exhibited for all individual ports at demux.

Possible Cause The vast majority of instances of low optical power for all individual ports at demux are due to old/faulty patch cords and/or dirty connectors. Always check connectors, patch cords, and patch cord routing before beginning diagnosis.

Many different factors outside of the operation of the mux/demux device, such as faulty patch cords, faulty connectors on a patch panel, and atypically high loss across outside plant/network fiber, could easily result in the same symptom.

Recommended Action Using an OSA connected to the monitor port of the demux device, verify total channel optical power uniformity.



Note

When troubleshooting problems with an OPM but without an OSA, use the OPM to measure the power of each individual wavelength at the demux output ports. Repeat this procedure for all wavelengths.

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- Step 1** If optical power is not seen to be uniform, determine which wavelengths are exhibiting below average optical power, and diagnose at the individual mux port at the far end.
- Step 2** If overall optical power as seen at the monitor port is acceptably uniform, check to ensure that the connector for the composite signal input is clean and fully seated.
- Step 3** If connector is clean and fully seated, verify that the patch cord is a single-mode patch cord, as multi-mode patch cords transmit light but incur high loss.
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4. Low Optical Power for Individual Port at Demux

Symptom Low optical power is exhibited for an individual port at demux.

Possible Cause The vast majority of instances of low optical power for an individual port at demux are due to old/faulty patch cords and/or dirty connectors. Always check connectors, patch cords, and patch cord routing before beginning diagnosis.

Many factors outside of the operation of the mux/demux device, such as faulty patch cords, faulty connectors on a patch panel, and atypically high loss across outside plant/network fiber, could easily result in the same symptom.

Recommended Action Using an OSA connected to the monitor port of the demux device, determine which individual wavelength or wavelengths are exhibiting high insertion loss.



Note

When troubleshooting problems with an OPM but without an OSA, use the OPM to measure the power of each individual wavelength at the demux output ports. Repeat this procedure for all wavelengths to determine which individual wavelength or wavelengths are exhibiting high insertion loss.

At the individual wavelength drop port, verify that the optical patch cord used to connect the receiver to the demux device is free of defects, and that the connectors are clean, fully seated, and free of scratches.

5. Low Optical Power for Blue (Upgrade) Wavelength at Mux

Symptom Because of the typical use of the mux/demux product, low power for a blue (upgrade) wavelength at mux is most easily identified from the far end of a particular link.

Possible Cause The vast majority of instances of low power for a blue (upgrade) wavelength at mux are due to old/faulty patch cords and/or dirty connectors. Always check connectors, patch cords, and patch cord routing before beginning diagnosis.

Many factors outside of the operation of the mux/demux device, such as faulty patch cords, faulty connectors on a patch panel, and atypically high loss across outside plant/network fiber, could easily result in the same symptom.

Recommended Action Using an OSA connected to the monitor port of the mux device, determine which individual wavelength or wavelengths are exhibiting high insertion loss.



Note

Troubleshooting problems with an OPM but without an OSA requires you to take the ONS 15216 Red DWDM Base Unit and the ONS 15216 Blue DWDM Upgrade Unit out of service. All individual wavelength inputs to the unit must be removed. Use the OPM to measure the power of the first wavelength. Connect the first wavelength to the unit and verify the channel insertion loss is < 5.5 dB by measuring the power output from the Common Out port. Remove the first wavelength. Repeat this procedure for all wavelengths to ensure insertion loss of all ports.

- Step 1** If only blue (upgrade) wavelengths are exhibiting high insertion loss, verify that the optical patch cords used to connect the base module to the upgrade module are free of defects, and that the connectors are clean, fully seated, and free of scratches.
- Step 2** If the connectors are clean and fully seated, verify that patch cords are single-mode fiber, as multi-mode patch cords transmit light but incur high loss.
- Step 3** After you verify the fiber type and the connectors of the patch cords used to connect the base module to the upgrade module, ensure that the bottom connector in the far left column (Port 5: From upgrade 2) of the base module is connected to the bottom connector in the far left column (Port 5: To base 2) of the upgrade module. Also verify that the second-from-the-bottom connector in the far left column (Port 4: From upgrade 1) of the base module is connected to the second-from-the-bottom connector in the far left column (Port four: To base 1) of the upgrade module. See [Figure 1](#) and [Figure 2](#).

Figure 1 Front Panel of the ONS 15216 Red DWDM Base Unit

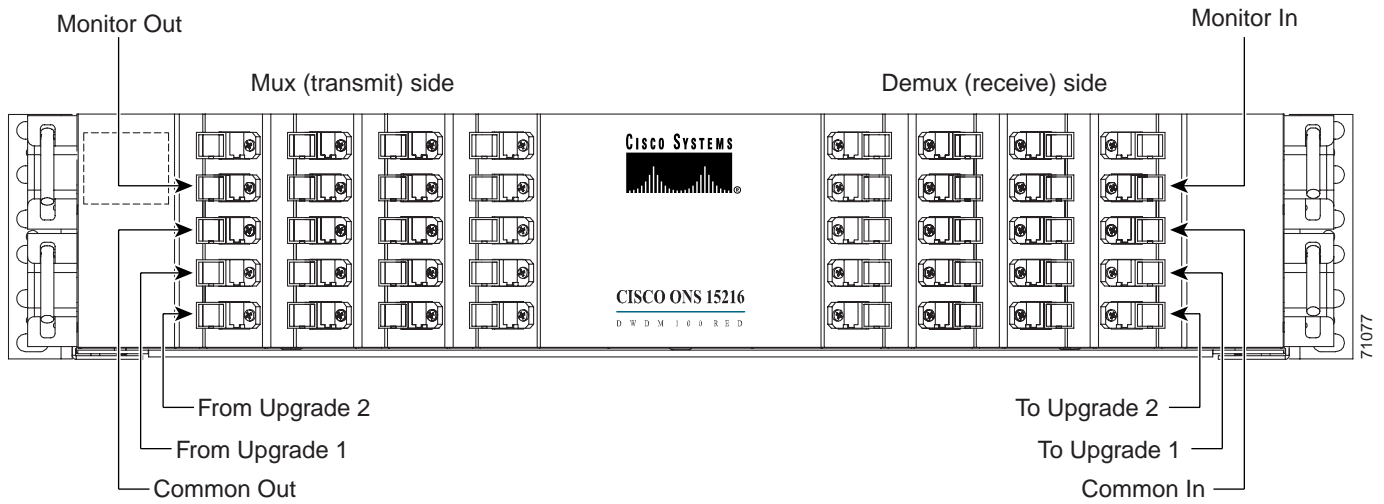
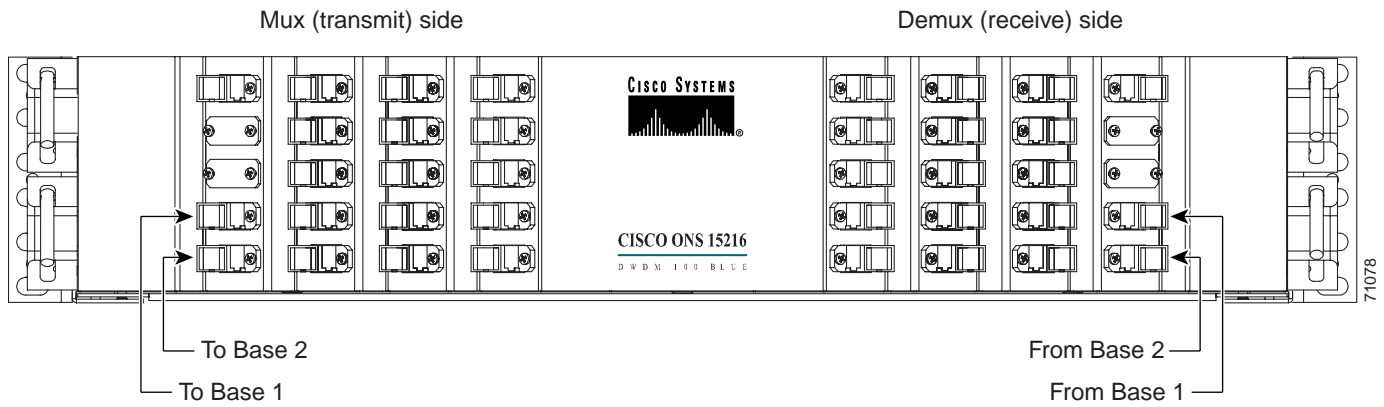


Figure 2 Front Panel of the ONS 15216 Blue DWDM Upgrade Unit



6. Low Optical Power for Blue (Upgrade) Wavelengths at Demux

Symptom Optical power is low for blue (upgrade) wavelengths at demux.

Possible Cause The vast majority of instances of low optical power for blue wavelengths at demux are due to old/faulty patch cords and/or dirty connectors. Always check connectors, patch cords, and patch cord routing before beginning diagnosis.

Many factors outside of the operation of the mux/demux device, such as faulty patch cords, faulty connectors on a patch panel, and atypically high loss across outside plant/network fiber, could easily result in the same symptom.

Recommended Action Using an OSA connected to the monitor port of the demux device, determine which individual wavelength or wavelengths are exhibiting high insertion loss.



Note

When troubleshooting problems with an OPM but without an OSA, use the OPM to measure the power of each individual wavelength at the demux output ports. Repeat this procedure for all wavelengths, and determine which individual wavelength or wavelengths are exhibiting high insertion loss.

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- Step 1** If only blue (upgrade) wavelengths are exhibiting high insertion loss, verify that the optical patch cords used to connect the base module to the upgrade module are free of defects, and that the connectors are clean, fully seated, and free of scratches.
- Step 2** If connectors are clean and fully seated, verify that the patch cords are single-mode fiber, as multi-mode patch cords transmit light but incur high loss.
- Step 3** After you verify the fiber type and the connectors of the patch cords used to connect the base module to the upgrade module, ensure that the bottom connector in the far right column (Port 40: To upgrade 2) of the base module is connected to the bottom connector in the far right column (Port 40: From base 2) of the upgrade module. Also verify that the second-from-the-bottom connector in the far right column of the base module (Port 39: To upgrade 1) is connected to the second-from-the-bottom connector in the far right column (Port 39: From base 1) of the upgrade module. See [Figure 1](#) and [Figure 2](#).
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Obtaining Documentation

Cisco provides several ways to obtain documentation, technical assistance, and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation on the World Wide Web at this URL:

<http://www.cisco.com/univercd/home/home.htm>

You can access the Cisco website at this URL:

<http://www.cisco.com>

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http://www.cisco.com/public/countries_languages.shtml

Documentation CD-ROM

Cisco documentation and additional literature are available in a Cisco Documentation CD-ROM package, which may have shipped with your product. The Documentation CD-ROM is updated regularly and may be more current than printed documentation. The CD-ROM package is available as a single unit or through an annual or quarterly subscription.

Registered Cisco.com users can order a single Documentation CD-ROM (product number DOC-CONDOCCD=) through the Cisco Ordering tool:

http://www.cisco.com/en/US/partner/ordering/ordering_place_order_ordering_tool_launch.html

All users can order annual or quarterly subscriptions through the online Subscription Store:

<http://www.cisco.com/go/subscription>

Ordering Documentation

You can find instructions for ordering documentation at this URL:

http://www.cisco.com/univercd/cc/td/doc/es_inpk/pdi.htm

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Networking Products MarketPlace:
<http://www.cisco.com/en/US/partner/ordering/index.shtml>
- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

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San Jose, CA 95134-9883

We appreciate your comments.

Obtaining Technical Assistance

For all customers, partners, resellers, and distributors who hold valid Cisco service contracts, the Cisco Technical Assistance Center (TAC) provides 24-hour, award-winning technical support services, online and over the phone. Cisco.com features the Cisco TAC website as an online starting point for technical assistance.

Cisco TAC Website

The Cisco TAC website (<http://www.cisco.com/tac>) provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The Cisco TAC website is available 24 hours a day, 365 days a year.

Accessing all the tools on the Cisco TAC website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a login ID or password, register at this URL:

<http://tools.cisco.com/RPF/register/register.do>

Opening a TAC Case

The online TAC Case Open Tool (<http://www.cisco.com/tac/caseopen>) is the fastest way to open P3 and P4 cases. (Your network is minimally impaired or you require product information). After you describe your situation, the TAC Case Open Tool automatically recommends resources for an immediate solution. If your issue is not resolved using these recommendations, your case will be assigned to a Cisco TAC engineer.

For P1 or P2 cases (your production network is down or severely degraded) or if you do not have Internet access, contact Cisco TAC by telephone. Cisco TAC engineers are assigned immediately to P1 and P2 cases to help keep your business operations running smoothly.

To open a case by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)

EMEA: +32 2 704 55 55

USA: 1 800 553-2447

For a complete listing of Cisco TAC contacts, go to this URL:

<http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

TAC Case Priority Definitions

To ensure that all cases are reported in a standard format, Cisco has established case priority definitions.

Priority 1 (P1)—Your network is “down” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Priority 2 (P2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Priority 3 (P3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Priority 4 (P4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- The Cisco Product Catalog describes the networking products offered by Cisco Systems, as well as ordering and customer support services. Access the Cisco Product Catalog at this URL:

http://www.cisco.com/en/US/products/products_catalog_links_launch.html

- Cisco Press publishes a wide range of networking publications. Cisco suggests these titles for new and experienced users: Internetworking Terms and Acronyms Dictionary, Internetworking Technology Handbook, Internetworking Troubleshooting Guide, and the Internetworking Design Guide. For current Cisco Press titles and other information, go to Cisco Press online at this URL:

<http://www.ciscopress.com>

- Packet magazine is the Cisco quarterly publication that provides the latest networking trends, technology breakthroughs, and Cisco products and solutions to help industry professionals get the most from their networking investment. Included are networking deployment and troubleshooting tips, configuration examples, customer case studies, tutorials and training, certification information, and links to numerous in-depth online resources. You can access Packet magazine at this URL:

<http://www.cisco.com/go/packet>

- iQ Magazine is the Cisco bimonthly publication that delivers the latest information about Internet business strategies for executives. You can access iQ Magazine at this URL:

<http://www.cisco.com/go/iqmagazine>

- Internet Protocol Journal is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:

http://www.cisco.com/en/US/about/ac123/ac147/about_cisco_the_internet_protocol_journal.html

- Training—Cisco offers world-class networking training. Current offerings in network training are listed at this URL:

<http://www.cisco.com/en/US/learning/index.html>

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