CHAPTER 14

Monitoring DWDM Properties

The following topics describe how you can view and monitor IP over dense wavelength division multiplexing (DWDM) properties configured on network elements by using Cisco ANA:

- User Roles Required to View DWDM Properties, page 14-1
- Viewing DWDM in Physical Inventory, page 14-2
- Viewing G.709 Properties, page 14-4
- Viewing Performance Monitoring Configuration, page 14-10

User Roles Required to View DWDM Properties

Table 14-1 identifies the roles that are required to view DWDM properties using Cisco ANA. Cisco ANA determines whether you are authorized to perform a task as follows:

- For GUI-based tasks (tasks that do not affect devices), authorization is based on the default permission that is assigned to your user account.
- For device-based tasks (tasks that do affect devices), authorization is based on the default permission that is assigned to your account. That is, whether the device is in one of your assigned scopes and whether you meet the minimum security level for that scope.

For more information on user authorization, see the *Cisco Active Network Abstraction 3.7.1 Administrator Guide*.

Table 14-1 Default Permission/Security Level Required for Viewing DWDM Properties

Task	Viewer	Operator	OperatorPlus	Configurator	Administrator
View DWDM properties	X	X	X	X	X
View G.709 properties	X	X	X	X	X
View performance monitoring configuration information	X	X	X	X	X

Viewing DWDM in Physical Inventory

Cisco ANA NetworkVision enables you to monitor a variety of DWDM properties in physical inventory, including forward error correction (FEC), G.709 status, and performance monitoring parameters.

To view DWDM properties in physical inventory:

Step 1 In the Cisco ANA NetworkVision right-click the device on which DWDM is configured, then choose **Inventory**.

Step 2 In the inventory window, choose **Physical Inventory > Chassis** and navigate to the interface configured for DWDM. DWDM details are displayed in the DWDM area in the content pane as shown in Figure 14-1.

Figure 14-1 DWDM Properties in Physical Inventory

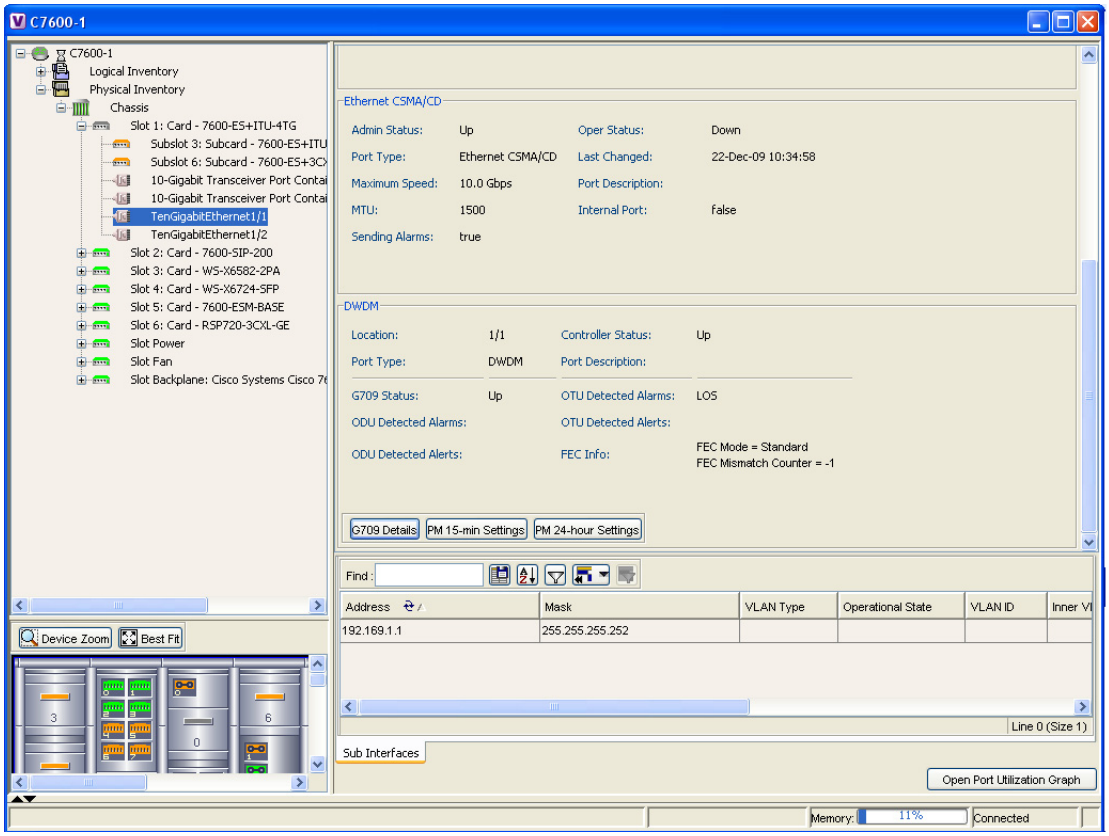

Table 14-2 describes the information displayed for DWDM.

Table 14-2 DWDM Properties in Physical Inventory

Field	Description
Location	Physical interface using the format *rack*/*slot*/*module*/*port* where: • *rack* is the chassis number of the rack. • *slot* is the physical slot number of the line card. • *module* is the module number. A physical layer interface module (PLIM) is always 0. Shared port adapters (SPAs) are referenced by their subslot number. • *port* is the physical port number of the interface.
Controller Status	Status of the controller: Up or Down.
Loopback	Indicates whether or not the DWDM controller is configured for loopback mode.
Frequency	Frequency of the channel in terahertz.
Port Type	The port type. In this case, DWDM.
MSA ITU Channel	Multi Source Agreement (MSA) ITU channel number.
Rx Power	Actual optical power at the receiving port.
Tx Power	Value of the transmit power level.
Rx LOS Threshold	Number of optical channel transport unit (OTU) loss of signal (LOS) alarms. If the receive optical power is less than or equal to this defined threshold, the optical LOS alarm is raised.
Wavelength	Wavelength corresponding to the channel number in nanometers.
Wavelength Band	Indicates the wavelength band: C-band or L-band.
Optics Type	Indicates the optics type: GE or DWDM.
G709 Properties	
G709 Status	Indicates whether the G.709 wrapper is enabled or disabled: Up or Down.
OTU Detected Alarms	OTU overhead alarms.
ODU Detected Alarms	Optical channel data unit (ODU) alarms.
OTU Detected Alerts	OTU alerts.
ODU Detected Alerts	ODU alerts.
FEC Info	Indicates the: • FEC mode of the controller: Disabled, Enhanced, Standard, or Unknown. • FEC mode on the remote device: Disabled, Enhanced, Standard, or Unknown. • Number of sync word mismatches found during the tracking phase.
G709 Details	Click to view G709 properties. For more information, see Viewing G.709 Properties, page 14-4.

Table 14-2 DWDM Properties in Physical Inventory (continued)

Field	Description
PM 15-min Settings	Click to view 15-minute performance monitoring properties. For more information, see Viewing Performance Monitoring Configuration, page 14-10.
PM 24-hour Settings	Click to view 24-hour performance monitoring properties. For more information, see Viewing Performance Monitoring Configuration, page 14-10.

Viewing G.709 Properties

The Telecommunication Standardization Sector (ITU-T) Recommendation G.709 provides a standardized method for transparently transporting services over optical wavelengths end to end. A significant component of G.709 is the FEC code that improves performance and extends the distance that optical signals can span.

To view G.709 properties:

Step 1 In the Cisco ANA NetworkVision right-click the device on which DWDM is configured, then choose **Inventory**.

Step 2 In the inventory window, choose **Physical Inventory > Chassis** and navigate to the interface configured for DWDM.

Step 3 In the content pane, click **G709 Details**.

The G709 Info Properties window is displayed as shown in Figure 14-2 for all Cisco devices except the Cisco 7600 series devices.

Figure 14-2 DWDM G709 Properties Window

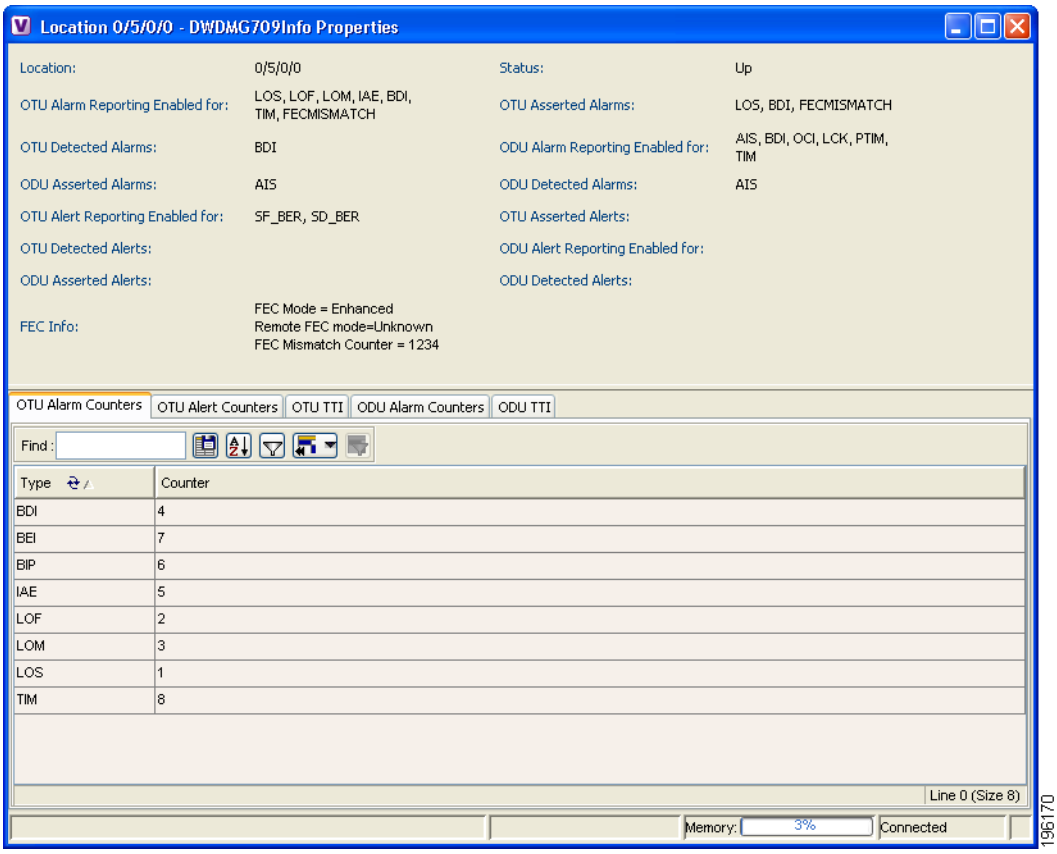

Figure 14-3 shows the tabs that are displayed in the G709 Info Properties window for Cisco 7600 series devices. For Cisco 7600 series devices:

- The ODU Alert Counters tab is displayed.
- The ODU TTI and OTU TTI tabs are not displayed.

Figure 14-3 DWDM G709 Properties Window for Cisco 7600 Series Devices

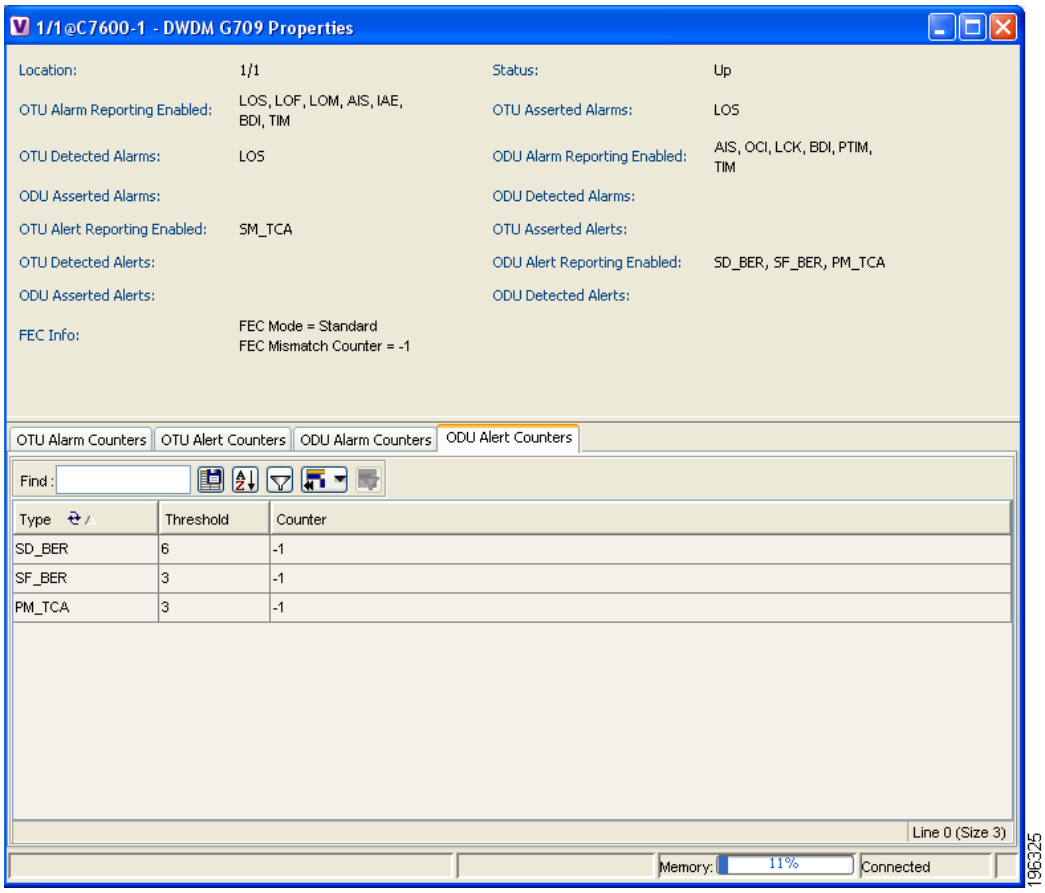

Table 14-3 describes the fields that are displayed above the tabs in the G709 Info Properties window.

Table 14-3 DWDM G709 Properties Window

Field	Description
Location	Physical interface using the format *rack*/*slot*/*module*/*port* where: • *rack* is the chassis number of the rack. • *slot* is the physical slot number of the line card. • *module* is the module number. A physical layer interface module (PLIM) is always 0. Shared port adapters (SPAs) are referenced by their subslot number. • *port* is the physical port number of the interface.

Table 14-3 DWDM G709 Properties Window (continued)

Field	Description
OTU Alarms	
OTU Alarm Reporting Enabled for	The types of alarms enabled for reporting: • AIS—Alarm indication signal (AIS) alarms. • BDI—Backward defect indication (BDI) alarms. • BEI—Backward error indication (BEI) alarms. • BIP—Bit interleaved parity (BIP) alarms. • FECMISMATCH—FEC mismatch alarms. • IAE—Incoming alignment error (IAE) alarms. • LOF—Loss of frame (LOF) alarms. • LOM—Loss of multiple frames (LOM) alarms. • LOS—Loss of signal (LOS) alarms. • TIM—Type identifier mismatch (TIM) alarms.
OTU Asserted Alarms	OTU alarms indicated to be reported by the user.
OTU Detected Alarms	OTU alarms detected by the hardware.
ODU Alarms	
ODU Alarm Reporting Enabled for	The types of ODU alarms enabled for reporting: • AIS—Incoming SONET AIS error status. • BDI—Path termination BDI error status. • BEI—Backward error indication (BEI) error status. • BIP—Bit interleaved parity (BIP) error status. • LCK—Upstream connection locked (LCK) error status. • OCI—Open connection indication (OCI) error status. • PTIM—Payload TIM error status. • TIM—Data stream TIM error status.
ODU Asserted Alarms	ODU alarms indicated to be reported by the user.
ODU Detected Alarms	ODU alarms detected by the hardware.
OTU Alerts	
OTU Alert Reporting Enabled for	The types of alerts enabled for reporting: • SD-BER—Section Monitoring (SM) bit error rate (BER) is in excess of the signal degradation (SD) BER threshold. • SF-BER—SM BER is in excess of the signal failure (SF) BER threshold. • PM-TCA—Performance monitoring (PM) threshold crossing alert (TCA). • SM-TCA—SM threshold crossing alert.
OTU Asserted Alerts	OTU alerts indicated to be reported by the user.

Table 14-3 DWDM G709 Properties Window (continued)

Field	Description
OTU Detected Alerts	OTU alerts detected by the hardware.
ODU Alerts	
ODU Alert Reporting Enabled for	The types of ODU alerts enabled for reporting: • SD-BER—SM BER is in excess of the SD BER threshold. • SF-BER—SM BER is in excess of the SF BER threshold. • PM-TCA—PM threshold crossing alert. • SM-TCA—SM threshold crossing alert.
ODU Asserted Alerts	ODU alerts indicated to be reported by the user.
ODU Detected Alerts	ODU alerts detected by the hardware.
Other	
FEC Info	FEC properties: • FEC mode for the controller—Disable, Enhanced, Standard, or Unknown. • Remote FEC mode—FEC mode on the remote device: Disabled, Enhanced, Standard, or Unknown. • FEC mismatch counter—Number of sync word mismatches found during the tracking phase.
Status	G.709 wrapper administrative status: Up or Down.

The G709 Info Properties window contains the following tabs, depending on the selected network element:

- OTU Alarm Counters Tab, page 14-8
- OTU Alert Counters Tab, page 14-9
- ODU Alarm Counters Tab, page 14-9
- OTU TTI Tab, page 14-9
- ODU TTI Tab, page 14-9
- ODU Alert Counters Tab, page 14-9

Step 4 To view additional G.709 properties, click the required tab. Table 14-4 describes the information displayed in each tab.

Table 14-4 G709 Properties Window Tabs

Field	Description
OTU Alarm Counters Tab	
Type	Type of OTU alarm, such as BDI or BEI.
Counter	Number of alarms reported for each alarm type.

Table 14-4 G709 Properties Window Tabs (continued)

Field	Description
OTU Alert Counters Tab	
Type	Type of OTU alert, such as SD-BER or SF-BER.
Threshold	Threshold set for the type of alert.
Counter	Number of alerts reported for each alert type. A value of -1 indicates that no value has been set up.
ODU Alarm Counters Tab	
Type	Type of ODU alarm, such as AIS or BDI.
Counter	Number of alarms reported for each alarm type.
OTU TTI Tab	
This tab is not displayed for Cisco 7600 series devices.	
Type	Type of OTU Trail Trace Identifier (TTI) configured: • Expected • Received • Sent
String Type	For each TTI type, the type of string: • ASCII • Hexadecimal
TTI String	For each TTI type, the specific TTI string configured.
ODU TTI Tab	
This tab is not displayed for Cisco 7600 series devices.	
Type	Type of ODU TTI configured: • Expected • Received • Sent
String Type	For each TTI type, the type of string: • ASCII • Hexadecimal
TTI String	For each TTI type, the specific TTI string configured.
ODU Alert Counters Tab	
This tab is displayed only for Cisco 7600 series devices.	
Type	Type of OTU alert, such as SD-BER or SF-BER.
Threshold	Threshold set for the type of alert.
Counter	Number of alerts reported for each alert type. A value of -1 indicates that no value has been set up.

Step 5 To close the G709 Info Properties window, click the upper right corner.

Viewing Performance Monitoring Configuration

Performance monitoring parameters are used to gather, store, set thresholds for, and report performance data for early detection of problems. Thresholds are used to set error levels for each performance monitoring parameter. During the accumulation cycle, if the current value of a performance monitoring parameter reaches or exceeds its corresponding threshold value, a threshold crossing alert (TCA) can be generated. The TCAs provide early detection of performance degradation.

Cisco ANA enables you to view the configuration settings for performance monitoring. Performance monitoring statistics are accumulated on a 15-minute basis, synchronized to the start of each quarter-hour. They are also accumulated on a daily basis starting at midnight. Historical counts are maintained for thirty-three 15-minute intervals and two daily intervals.

To view performance monitoring configuration settings:

Step 1 In the Cisco ANA NetworkVision right-click the device on which DWDM is configured, then choose **Inventory**.

Step 2 In the inventory window, choose **Physical Inventory > Chassis** and navigate to the interface configured for DWDM.

Step 3 In the content pane, select the performance monitoring configuration settings you want to view:

- To view the performance monitoring 15-minute configuration settings, click **PM 15-min Settings**.
- To view the performance monitoring 24-hour configuration settings, click **PM 24-hour Settings**.

The Client DWDM PM Settings Properties window is displayed as shown in Figure 14-4.

Figure 14-4 Client DWDM PM Settings Properties Window

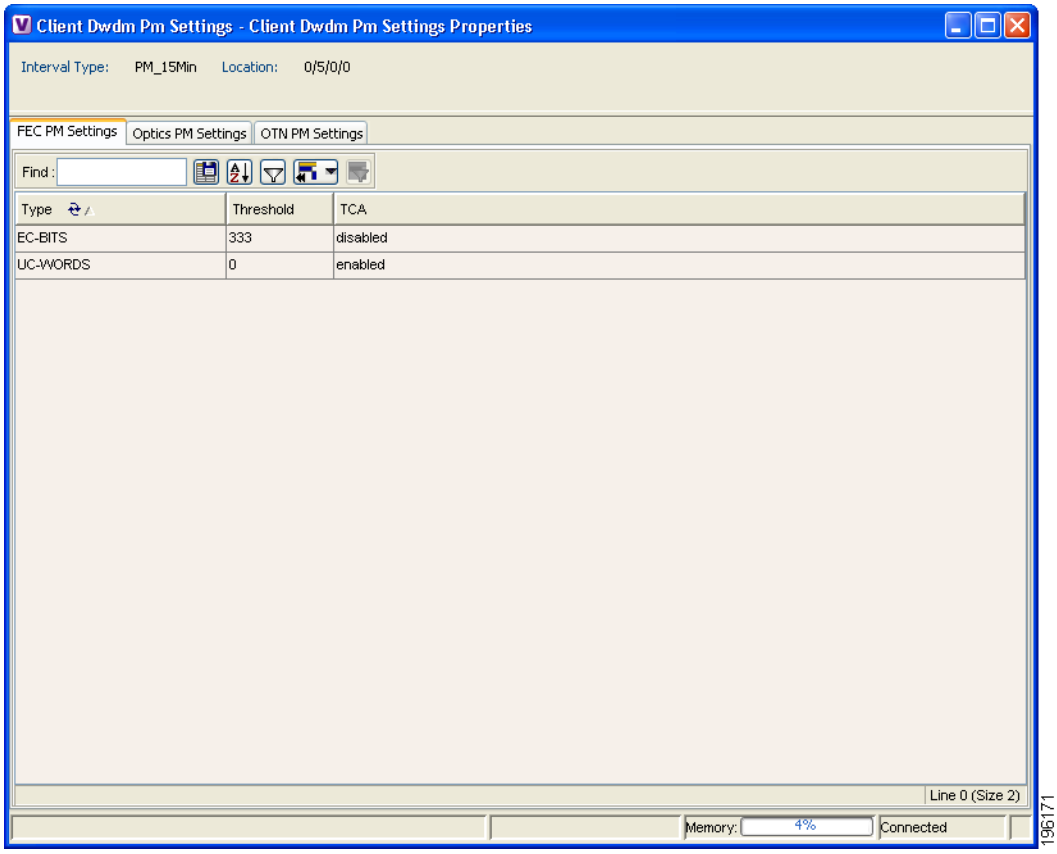

Table 14-5 describes the information displayed above the tabs in the Client DWDM PM Settings Properties window and in each of the tabs.

Table 14-5 Client DWDM PM Settings Properties Window and Tabs

Field	Description
Interval Type	The performance monitoring interval, either 15 minutes or 24 hours.
Location	Physical interface using the format *rack*/*slot*/*module*/*port* where: • *rack* is the chassis number of the rack. • *slot* is the physical slot number of the line card. • *module* is the module number. A physical layer interface module (PLIM) is always 0. Shared port adapters (SPAs) are referenced by their subslot number. • *port* is the physical port number of the interface.

Table 14-5 Client DWDM PM Settings Properties Window and Tabs (continued)

Field	Description
FEC PM Settings Tab	
Type	FEC performance monitoring parameter being tracked: • EC-BITS—The number of bit errors corrected (EC-BITS) in the DWDM trunk line during the performance monitoring time interval. • UC-WORDS—The number of uncorrectable words (UC-WORDS) detected in the DWDM trunk line during the performance monitoring time interval.
Threshold	Threshold for the performance monitoring parameter.
TCA	Indicates whether TCA generation for the specified parameter on the DWDM controller is enabled or disabled.
Optics PM Settings Tab	
Type	Optics performance monitoring parameter being tracked: • LBC—Laser bias current. • OPR—Optical power on the unidirectional port. • OPT—Transmit optical power in dBm.
Max Threshold	Maximum threshold configured for the parameter.
Max TCA	If enabled, indicates a TCA is generated if the value of the parameter exceeds the maximum threshold during the performance monitoring period. If disabled, TCAs are not generated if the maximum threshold is exceeded.
Min Threshold	Minimum threshold configured for the parameter.
Min TCA	If enabled, indicates a TCA is generated if the value of the parameter drops below the minimum threshold during the performance monitoring period. If disabled, TCAs are not generated if the value drops below the minimum threshold.
OTN PM Settings Tab	
Type	OTN performance monitoring parameter being tracked: • bbe-pm-fe—Far-end path monitoring background block errors (BBE-PM). Indicates the number of background block errors recorded in the optical transport network (OTN) path during the performance monitoring time interval. • bbe-pm-ne—Near-end path monitoring background block errors (BBE-PM). • bbe-sm-fe—Far-end section monitoring background block errors (BBE-SM). Indicates the number of background block errors recorded in the OTN section during the performance monitoring time interval. • bbe-sm-ne—Near-end section monitoring background block errors (BBE-SM).

Table 14-5 Client DWDM PM Settings Properties Window and Tabs (continued)

Field	Description
Type (cont.)	• bber-pm-fe—Far-end path monitoring background block errors ratio (BBER-PM). Indicates the background block errors ratio recorded in the OTN path during the performance monitoring time interval. • bber-pm-ne—Near-end path monitoring background block errors ratio (BBER-PM). • bber-sm-fe—Far-end section monitoring background block errors ratio (BBER-SM). Indicates the background block errors ratio recorded in the OTN section during the performance monitoring time interval. • bber-sm-ne—Near-end section monitoring background block errors ratio (BBER-SM) • es-pm-fe—Far-end path monitoring errored seconds (ES-PM). Indicates the errored seconds recorded in the OTN path during the performance monitoring time interval. • es-pm-ne—Near-end path monitoring errored seconds (ES-PM). • es-sm-fe—Far-end section monitoring errored seconds (ES-SM). Indicates the errored seconds recorded in the OTN section during the performance monitoring time interval. • es-sm-ne—Near-end section monitoring errored seconds (ES-SM). • esr-pm-fe—Far-end path monitoring errored seconds ratio (ESR-PM). Indicates the errored seconds ratio recorded in the OTN path during the performance monitoring time interval. • esr-pm-ne—Near-end path monitoring errored seconds ratio (ESR-PM). • esr-sm-fe—Far-end section monitoring errored seconds ratio (ESR-SM). Indicates the errored seconds ratio recorded in the OTN section during the performance monitoring time interval. • esr-sm-ne—Near-end section monitoring errored seconds ratio (ESR-SM). • fc-pm-fe—Far-end path monitoring failure counts (FC-PM). Indicates the failure counts recorded in the OTN path during the performance monitoring time interval. • fc-pm-ne—Near-end path monitoring failure counts (FC-PM). • fc-sm-fe—Far-end section monitoring failure counts (FC-SM). Indicates the failure counts recorded in the OTN section during the performance monitoring time interval. • fc-sm-ne—Near-end section monitoring failure counts (FC-SM). • ses-pm-fe—Far-end path monitoring severely errored seconds (SES-PM). Indicates the severely errored seconds recorded in the OTN path during the performance monitoring time interval.

Table 14-5 Client DWDM PM Settings Properties Window and Tabs (continued)

Field	Description
Type (cont.)	• ses-pm-ne—Far-end path monitoring severely errored seconds (SES-PM). • ses-sm-fe—Far-end section monitoring severely errored seconds (SES-SM). Indicates the severely errored seconds recorded in the OTN section during the performance monitoring time interval. • ses-sm-ne—Near-end section monitoring severely errored seconds (SES-SM). • sesr-pm-fe—Far-end path monitoring severely errored seconds ratio (SESR-PM). Indicates the severely errored seconds ratio recorded in the OTN path during the performance monitoring time interval. • sesr-pm-ne—Near-end path monitoring severely errored seconds ratio (SESR-PM). • sesr-sm-fe—Far-end section monitoring severely errored seconds ratio (SESR-SM). Indicates the severely errored seconds ratio recorded in the OTN section during the performance monitoring time interval. • sesr-sm-ne—Near-end section monitoring severely errored seconds ratio (SESR-SM). • uas-pm-fe—Far-end path monitoring unavailable seconds (UAS-PM). Indicates the unavailable seconds recorded in the OTN path during the performance monitoring time interval. • uas-pm-ne—Near-end path monitoring unavailable seconds (UAS-PM). • uas-sm-fe—Far-end section monitoring unavailable seconds (UAS-SM). Indicates the unavailable seconds recorded in the OTN section during the performance monitoring time interval. • uas-sm-ne—Near-end section monitoring unavailable seconds (UAS-SM).
Threshold	Threshold configured for the parameter.
TCA	If enabled, indicates a TCA is generated if the value of the parameter crosses the threshold during the performance monitoring period. If disabled, TCAs are not generated if the value crosses the threshold.

Step 4 To close the Client DWDM PM Settings Properties window, click the upper right corner.