

# **Configure Controllers**

This chapter describes how to configure OTS and OTS OCH controllers.

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### Controllers

Controllers are represented in the Rack/Slot/Instance/Port format; for example, 0/1/0/1.

Rack	0
Slot	1 to 3. Slots for pluggable optical modules.
Instance	0
Port	Depends on the specific pluggable optical module.

### **Configure OTS Controller**

The Optical Transport Section (OTS) controller holds all the optical parameters for the OTS optical interfaces. The optical interface has different capabilities depending on its hardware components such as photodiode, VOA, amplifier, and OCM. Hence, the parameters enabled or disabled on the OTS controller depend on the actual hardware capability on the specific optical interface. Each parameter might refer to RX or TX section. For example, if a photodiode is present, the OTS controller can read the total optical power. When the controller is created, each hardware capability is enabled or disabled.

You can configure parameters such as low power threshold, VOA attenuation setpoint, amplifier gain range, amplifier tilt, and amplifier gain set point for the OTS controller. The description on OTS interfaces cannot be added as they are on the optical amplifier module. To configure the OTS controller, use the following commands.

configure

controller controllertype Rack/Slot/Instance/Port

rx enable

rx-low-threshold value

tx enable

tx-low-threshold value

rx-voa-attenuation value

tx-voa-attenuation value

ampli-control-mode {automatic | manual}

ampli-gain-range {normal | extended}

ampli-gain value

ampli-tilt value

ampli-channel-power value

channel-power-max-delta value

osri {on | off}

safety-control-mode {auto | disabled}

commit

end

### Example

The following is a sample in which the amplifier gain range is set to extended and amplifier gain set point is set to 29.0 dB.

```
configure
    controller ots 0/3/0/0
    ampli-gain-range extended
    ampli-gain 290
    commit
end
```

The following is a sample in which the safety control mode of the pre-amplifier is set to auto.

```
configure
    controller ots 0/3/0/0
    safety-control-mode auto
    commit
end
```

The following is a sample in which the safety control mode of the booster amplifier is set to disabled.

```
configure
    controller ots 0/3/0/1
    safety-control-mode disabled
    commit
end
```

### **OTS Controller Configuration Parameters**

### Table 1: OTS Controller Configuration Parameters

Parameter	Description	Hardware Capability	Range	Default	Notes
rx-low-threshold (0.1 dBm)	Low receive power threshold	Photodiode	-400 to +300	-40.0	
tx-low-threshold (0.1 dBm)	Low transmit power threshold	Photodiode	-400 to +300	-20.0	
rx-voa-attenuation (0.1 dBm)	RX VOA attenuation set point	VOA	0 to 200	0.0	
tx-voa-attenuation (0.1 dBm)	TX VOA attenuation set point	VOA	0 to 200	0.0	
ampli-control-mode	Amplifier control mode	Amplifier	automatic and manual	automatic	The Automatic value is compatible only when the grid is specified through the hw-module configuration.
ampli-gain-range	Amplifier gain range	Amplifier	normal and extended	normal	The amplifier gain range is configurable only when the controller is in shutdown state.
ampli-gain (0.1 dBm)	Amplifier gain set point	Amplifier	0 to 500	0.0	The actual range of amplifier gain set point depends on amplifier gain range.
ampli-tilt (0.1 dBm)	Amplifier tilt	Amplifier	-50 to +50	0.0	

Parameter	Description	Hardware Capability	Range	Default	Notes
channel-power-max-delta (0.1 dBm)	Maximum difference among all measured channel powers	Amplifier	0 to 200	3.0	
ampli-channel-power (0.1 dBm)	Amplifier per channel power set point	Amplifier	-400 to +300	0.0	
osri	Optical safety remote interlock	Amplifier	on and off	off	When osri is on, the laser is off and vice versa.
safety-control-mode	Safety control mode	Amplifier	auto and disabled	auto	If the safety control mode is disabled, the amplifier optical power is less than 20dB for safety.

## **Display Parameters of OTS Controllers**

Use this procedure to display the parameters of OTS controllers.

show controllers controllertype Rack/Slot/Instance/Port [summary]

- The **show controllers** command displays all the configuration parameters, PM thresholds and alarms when keywords are not provided.
- The **show controllers** command displays the rx/tx power value and minimal information to understand port status when **summary** keyword is provided.
- A \* wild card can be used to display all the controllers associated with a slot. For example, **show** controllers ots 0/1/0/\* summary

### Example

RP/0/RP0/CPU0:ios#show controllers ots 0/3/0/1

```
Wed Aug 23 09:08:27.962 UTC
Controller State: Up
Transport Admin State: In Service
Port Type: Line
Laser State: Off
```

L

Optics Status:: Alarm Status: \_\_\_\_\_ Detected Alarms: RX-LOC Alarm Statistics: -----LOW-RX-PWR = 0LOW-TX-PWR = 0RX-LOS-P = 0RX-LOC = 1AMPLI-GAIN-DEG-LOW = 0AMPLI-GAIN-DEG-HIGH = 0 AUTO-LASER-SHUT = 0AUTO-POW-RED = 89AUTO-AMPLI-CTRL-DISABLED = 0 AUTO-AMPLI-CFG-MISMATCH = 0 SWITCH-TO-PROTECT = 0AUTO-AMPLI-CTRL-RUNNING = 0 Parameter Statistics: \_\_\_\_\_ TX Power = -40.00 dBm RX Power = -40.00 dBm Ampli Gain = -1.00 dB Ampli Tilt = 0.00 Total TX Power = -40.00 dBm Total RX Power = -40.00 dBm Configured Parameters: -----Rx Low Threshold = -25.0 dBm Tx Low Threshold = -20.0 dBm Ampli Gain = 1.00 dB Ampli Tilt = 0.00 Ampli Channel power = 0.00 dBm Channel Power Max Delta = 3.00 dBm Ampli Control mode = Manual Ampli Gain Range = Normal Ampli Safety Control mode = auto Osri = OFF

### Example

RP/0/RP0/CPU0:ios#show controllers ots 0/1/0/1

Controller State: Down Transport Admin State: In Service Port Type: Line Laser State: Apr Optics Status::

Alarm Status:

Detected Alarms: AUTO-POW-RED Alarm Statistics: \_\_\_\_\_ LOW-RX-PWR = 0LOW-TX-PWR = 0RX-LOS-P = 0RX-LOC = 1AMPLI-GAIN-DEG-LOW = 0AMPLI-GAIN-DEG-HIGH = 0 AUTO-LASER-SHUT = 0AUTO-POW-RED = 1AUTO-AMPLI-CTRL-DISABLED = 0 AUTO-AMPLI-CFG-MISMATCH = 0SWITCH-TO-PROTECT = 0AUTO-AMPLI-CTRL-RUNNING = 0 Parameter Statistics: \_\_\_\_\_ TX Power = -40.00 dBm RX Power = -11.90 dBm Ampli Gain = -1.00 dB Ampli Tilt = -90.00Total TX Power = 7.99 dBm Total RX Power = -11.90 dBm Ampli Gain Range = Normal Ampli Safety Control mode = disabled Osri = OFF TX Enable = Enabled RX Enable = Enabled RX Span Loss = N/A TX Span Loss = N/A Rx Low Threshold Current = -25.0 dBm Back Reflection = -6.40 dBm Configured Parameters: Rx Low Threshold = -25.0 dBm Tx Low Threshold = -20.0 dBm Ampli Gain = 12.00 dB Ampli Tilt = 0.00 Ampli Channel power = 0.00 dBm Channel Power Max Delta = 3.00 dBm Ampli Channel Psd = 31.250 nW/MHz Rx Low Threshold Psd = 0.099 nW/MHz Ampli Control mode = Manual Ampli Safety Control mode = disabled Osri = OFF TX Enable = Enabled RX Enable = Enabled

The **Back Reflection** parameter in 0.1 dBm is raised only on port 1. This parameter is raised on the line TX port of the booster amplifier.

### **Span Loss Calculation**

The Span Loss Calculation is an automatic calculation of span losses between NCS 1001 systems. This feature applies to each topology such as protected or non-protected, linear with or without ILA nodes in the middle.

The Span Loss Calculation is a software functionality available for OTS controller and it can be statically enabled or disabled through hw-module configuration. Span Loss calculation is made using the TX and RX total power on EDFA ports.

For this feature 2 new parameters are managed in the show controller ots command for EDFA cards:

- RX Span Loss
- TX Span Loss

The Span Loss Calculation runs automatically every 5 minutes and when there is a configuration change. In the order of priority, the possible configurations are:

- Remote node.
- OSC through OSPF.

### Limitation

• Span Loss calculation is done by considering the total power of the transmission end and receiver end on the EDFA ports. If the PSM card is connected to the span (for example, in case of Path Protection Topology), the span boundaries are assumed to be the closer EDFA ports.

### **Configure Span Loss Calculation**

#### **Table 2: Feature History**

Feature Name	Release Information	Description
IPv6 Support for Span Loss Calculation	Cisco IOS XR Release 7.10.1	You can now perform span loss calculations on IPv6 spans connecting two NCS 1001 nodes. As a result, the advantages of larger address space can be leveraged by configuring IPv6 addresses on the management interfaces used for communication between the two nodes.

From Release 7.10.1, in addition to IPv4, span loss calculation is performed using IPv6 addresses. The IPv6 addresses must be configured on the management interfaces of IPv6-enabled NCS 1001 nodes.

The feature uses DCN or OSC (OSPF) to allow the exchange of power measurement between the NCS systems (that are required to make calculation of span losses). In both cases, you must enable the feature and node type (TERM or ILA) on each of the systems.

### **Limitation of IPv6 Support:**

Span loss calculation with IPv6 is not supported on the OSC management interfaces of NCS 1001 nodes, because even with the OSPFv3 protocol, discovery of the neighbor returns the IPv4 router ID instead of the IPv6 router ID. This makes it difficult to automatically resolve the IPv6 addressing.

**Note** IPv4 and IPv6 must be configured in a mutually exclusive way.

To enable the feature for an EDFA equipped in the slot of a TERM node, use these commands:

**#configure terminal** 

```
(config)#hw-module location 0/RP0/CPU0 slot n ampli span-loss
```

(config)#hw-module location 0/RP0/CPU0 slot n ampli node-type TERM

(config)#commit

(config)#end

#### **Example:**

```
#configure terminal
(config) #hw-module location 0/RP0/CPU0 slot 1 ampli span-loss
(config) #hw-module location 0/RP0/CPU0 slot 1 ampli node-type TERM
(config) #commit
(config) #end
```

To enable the feature for an EDFA equipped in the slot of an ILA node, use these commands:

### **#configure terminal**

(config)#hw-module location 0/RP0/CPU0 slot n ampli span-loss

(config)#hw-module location 0/RP0/CPU0 slot n ampli node-type ILA

(config)#commit

(config)#end

#### **Example:**

```
#configure terminal
(config) #hw-module location 0/RP0/CPU0 slot 1 ampli span-loss
(config) #hw-module location 0/RP0/CPU0 slot 1 ampli node-type ILA
(config) #commit
(config) #end
```

For both OSC (OSPF) and DCN Span Loss Calculation, use the commands below to define the local node IP, remote node IP, and remote card slot coupled with the local node on each system involved:

The commands to perform span loss calculation using the IPv4 address:

#### **#configure terminal**

(config)# hw-module location 0/RP0/CPU0 slot n ampli remote-node local-ipv4 LocalIPv4 address remote-ipv4 RemoteIPv4 address remote-slot-id m

#### (config)#commit

(config)#end

where n is the slot number (1, 2 or 3) of the local EDFA involved.

*m* is the slot number (1, 2 or 3) of the EDFA equipped on the remote node.

localIPv4 is the IP address of local node.

remoteIPv4 is the IP address of remote node.

The commands to perform span loss calculation using the IPv6 address:

### #configure terminal

(config)# hw-module location 0/RP0/CPU0 slot n ampli remote-node local-ipv6 LocalIPv6 address remote-ipv6 RemoteIPv6 address remote-slot-id m

(config)#commit

### (config)#end

where n is the slot number (1, 2 or 3) of the local EDFA involved.

*m* is the slot number (1, 2 or 3) of the EDFA equipped on the remote node.

localIPv6 is the IP address of local node.

remoteIPv6 is the IP address of remote node.

You must wait for at least five minutes for the first automatic calculation to be triggered. To trigger the calculation, use this command:

### #hw-module slot *n* span-loss calculation

For the examples for span loss calculation using the IPv4 or IPv6 address, see the Span Loss Calculation Use Cases, on page 9.

### **Span Loss Calculation Use Cases**

A span loss calculation configuration is done based on these use cases:

- Two terminal nodes connected to each other (Terminal to Terminal)
- Two terminal nodes connected through an ILA node (Terminal to ILA to Terminal)

Span Loss Calculation for local and remote nodes must be configured using either the IPv4 or IPv6 address. Both these addresses should not be used at the same time for the calculation.

Therefore, in the span loss calculation configuration examples below, even if the IPv4 and IPv6 addresses are used, these configurations are mutually exclusive.

### **Use Case 1: Terminal to Terminal**

Terminal node A (IP address: 192.0.2.144(IPv4) or 2001:DB8:4491:2000::229:144(IPv6)) with a EDFA in slot number 1 connected to the EDFA in slot number 1 of Terminal node B (IP address: 192.0.2.146(IPv4) or 2001:DB8:4491:2000::229:146(IPv6)).



For each EDFA module, it is necessary to configure remote node feature and the span loss using these CLI commands:

### Terminal A configurations using IPv4 and IPv6:

```
#configure terminal (IPv4)
(config) # hw-module location 0/RP0/CPU0 slot 1 ampli remote-node local-ipv4 192.0.2.144
remote-ipv4 192.0.2.146 remote-slot-id 1
config) #hw-module location 0/RP0/CPU0 slot 1 ampli span-loss
(config) #commit
(config) #end
#configure terminal (IPv6)
config) # hw-module location 0/RP0/CPU0 slot 1 ampli remote-node local-ipv6
2001:DB8:4491:2000::229:144 remote-ipv6 2001:DB8:4491:2000::229:146 remote-slot-id 1
config) #hw-module location 0/RP0/CPU0 slot 1 ampli span-loss
(config) #commit
(config) #commit
(config) #commit
```

#### **Terminal B Configurations using IPv4 and IPv6**:

```
#configure terminal (IPv4)
(config) # hw-module location 0/RP0/CPU0 slot 1 ampli remote-node local-ipv4 192.0.2.146
remote-ipv4 192.0.2.144 remote-slot-id 1
config) #hw-module location 0/RP0/CPU0 slot 1 ampli span-loss
(config) #commit
(config) #end
#configure terminal (IPv6)
(config) # hw-module location 0/RP0/CPU0 slot 1 ampli remote-node local-ipv6
2001:DB8:4491:2000::229:146 remote-ipv6 2001:DB8:4491:2000::229:144 remote-slot-id 1
config) #hw-module location 0/RP0/CPU0 slot 1 ampli span-loss
(config) #hw-module location 0/RP0/CPU0 slot 1 ampli span-loss
(config) #commit
(config) #commit
(config) #commit
(config) #end
```

### **Use Case 2: Terminal to ILA to Terminal**

Terminal A (IP address: 192.0.2.144(IPv4) or 2001:DB8:4491:2000::229:144(IPv6)) with a EDFA in slot number 1 with COM-TX port connected to LINE-RX EDFA in slot 1 ILA-C (IP address: 192.0.2.145(IPv4) or 2001:DB8:4491:2000::229:145(IPv6))

ILA C with a EDFA in slot number 1 with COM-TX port connected to LINE-RX EDFA in slot 1 of Terminal B (IP address: 192.0.2.146 (IPv4) or 2001:DB8:4491:2000::229:146)

ILA C with a EDFA in slot number 3 with COM-TX port connected to LINE-RX EDFA in slot 1 Terminal A

Terminal B with a EDFA in slot number 1 with COM-TX port connected to LINE-RX EDFA in slot 3 ILA.

Terminal A - Slot 1 ILA-C Terminal B - Slot 1 Line RX Com TX Line RX Line TX PRF PRE BST 0/1/0/1 0/3/0/0 0/3/0/1 0/1/0/1 COM-RX BST Slot-3 Line RX Line TX Line RX Com TX BST PRE PRE 0/1/0/1 0/1/0/1 0/1/0/0 0/1/0/1 сом-тх BST Slot-1

### Terminal A Configuration using IPv4 and IPv6:

```
#configure terminal (IPv4)
(config) # hw-module location 0/RP0/CPU0 slot 1 ampli remote-node local-ipv4 192.0.2.144
remote-ipv4 192.0.2.145 remote-slot-id 1
config) #hw-module location 0/RP0/CPU0 slot 1 ampli span-loss
(config) #commit
(config) #end
#configure terminal (IPv6)
```

(config) # hw-module location 0/RP0/CPU0 slot 1 ampli remote-node local-ipv6 2001:DB8:4491:2000::229:144 remote-ipv6 2001:DB8:4491:2000::229:145 remote-slot-id 1 config) #hw-module location 0/RP0/CPU0 slot 1 ampli span-loss (config) #commit (config) #end

### ILA Configuration using IPv4 and IPv6:

```
#configure terminal (IPv4)
(config) # hw-module location 0/RP0/CPU0 slot 1 ampli remote-node local-ipv4 192.0.2.145
remote-ipv4 192.0.2.146 remote-slot-id 1
config) #hw-module location 0/RP0/CPU0 slot 1 ampli span-loss
(config) #commit
(config) # hw-module location 0/RP0/CPU0 slot 1 ampli remote-node local-ipv6
2001:DB8:4491:2000::229:145 remote-ipv6 2001:DB8:4491:2000::229:146 remote-slot-id 1
config) #hw-module location 0/RP0/CPU0 slot 1 ampli span-loss
(config) #hw-module location 0/RP0/CPU0 slot 1 ampli remote-node local-ipv6
2001:DB8:4491:2000::229:145 remote-ipv6 2001:DB8:4491:2000::229:146 remote-slot-id 1
config) #hw-module location 0/RP0/CPU0 slot 1 ampli span-loss
(config) #hw-module location 0/RP0/CPU0 slot 1 ampli span-loss
```

```
#configure terminal (IPv4)
(config) # hw-module location 0/RP0/CPU0 slot 3 ampli remote-node local-ipv4 192.0.2.145
remote-ipv4 192.0.2.144 remote-slot-id 1
config) #hw-module location 0/RP0/CPU0 slot 1 ampli span-loss
(config) #commit
(config) #end
#configure terminal (IPv6)
(config) # hw-module location 0/RP0/CPU0 slot 3 ampli remote-node local-ipv6
2001:DB8:4491:2000::229:145 remote-ipv6 2001:DB8:4491:2000::229:144 remote-slot-id 1
config) #hw-module location 0/RP0/CPU0 slot 1 ampli span-loss
(config) #commit
(config) #commit
(config) #commit
(config) #end
```

#### **Terminal B Configuration using IPv4 and IPv6**:

```
#configure terminal (IPv4)
(config) # hw-module location 0/RP0/CPU0 slot 1 ampli remote-node local-ipv4 192.0.2.146
remote-ipv4 192.0.2.145 remote-slot-id 3
config) #hw-module location 0/RP0/CPU0 slot 1 ampli span-loss
(config) #commit
(config) # end
#configure terminal (IPv6)
(config) # hw-module location 0/RP0/CPU0 slot 3 ampli remote-node local-ipv6
2001:DB8:4491:2000::229:146 remote-ipv6 2001:DB8:4491:2000::229:145 remote-slot-id 3
config) #hw-module location 0/RP0/CPU0 slot 3 ampli span-loss
(config) #commit
(config) #commit
(config) #commit
```

### **Display Span Loss Calculation**

Once the feature is enabled and after the first span loss calculation, the loss calculated (for both IPv4 and IPv6) can be retrieved using the show controller ots command. In the output RX Span Loss and TX Span Loss are added. RX Span Loss and TX Span Loss are obtained as a result of difference between **TX Total Power** and **RX Total Power** read on the edge of the span.

In case of a TERM node, the command is applied to LINE port. For example, in case of EDFA in slot 1, the span loss calculated are shown in the output of the following command:

```
#show controllers ots 0/1/0/1
...
...
RX Span Loss = 15.20 dB
TX Span Loss = 14.80 dB
...
...
```

In case of an ILA node, the command is applied to LINE port (controller ots 0/slot/0/1) to obtain RX Span Loss of related span, and to COM port (controllers ots 0/slot/0/0) to obtain TX Span Loss of related span.

For example, in case of an EDFA of ILA site equipped in slot 3:

```
show controllers ots 0/3/0/1
...
RX Span Loss = 12.40 dB
show controllers ots 0/3/0/0
...
TX Span Loss = 11.90 dB
```

### **Dual IP Address**

Dual independent XR interfaces allows you to connect the two ethernet interfaces to two different switches of different subnet and also of the same subnet. From release 6.5.1, there are different ports from the ethernet switch MGMT RJ45, and Optical SFP MGMT to the CPU.

The two different Management Ethernet interfaces in to XR are:

- MgmtEth 0/RP0/CPU0/0 (already existing) representing the RJ45 port.
- MgmtEth 0/RP0/CPU0/1 (new one) representing the SFP port.

iPXE is not supported at power-on over the new optical interface.

Upgrades from previous releases using only SFP loses MGMT connectivity. In this case, you must configure through Console port.

Before using the two different interfaces, you must upgrade the BIOS and reload the 0/RP0 location.

The following example shows the output of the show running-config command:

### Example

```
RP/0/RP0/CPU0:MYST-144#show running-config
interface MgmtEth0/RP0/CPU0/0
ipv4 address xxx.xxx.xxx yyy.yyy.yyy.yyy
!
interface MgmtEth0/RP0/CPU0/1
ipv6 address xxxx:xxxx:xxxx:xxxx:xxx/yy
ipv6 enable
1
interface MgmtEth0/RP0/OSC1/0
shutdown
interface MgmtEth0/RP0/OSC2/0
shutdown
1
interface MgmtEth0/RP0/OSC3/0
shutdown
!
```

### **Configure OTS OCH Controller**

The Optical Transport Section OCH (OTS OCH) controller represents the OCM device available on the OTS optical interface. This controller is created to have channel granularity over the OTS interface. The OTS OCH controller contains the wavelength information. The controller number starts from 1 and matches with the ITU channel identifier.

Several OTS OCH controllers are created for each OTS Controller depending on the grid configuration (ITU 100GHz or 50GHz Grid). 48 OTS OCH controllers are created for a 100GHz grid and 96 OTS OCH controllers are created for a 50GHz grid.

You can configure the parameters such as RX low power threshold and TX low power threshold for the OTS OCH controller. To configure the OTS OCH controller, use the following commands.

### configure

controller controllertype Rack/Slot/Instance/Port rx-low-threshold value tx-low-threshold value commit end

### Example

```
configure
    controller ots-och 0/1/0/0
    rx-low-threshold -30
    tx-low-threshold -35
    commit
end
```

#### **OTS OCH Controller Configuration Parameters**

**Table 3: OTS OCH Controller Configuration Parameters** 

Parameter	Description	Hardware Capability	Range	Default
rx-low-threshold (0.1 dBm)	Low receive power threshold	OCM	-500 to +300	-25.0
tx-low-threshold (0.1 dBm)	Low transmit power threshold	OCM	-500 to +300	-25.0

### **Display Parameters of OTS OCH Controllers**

Use this procedure to display the parameters of OTS OCH controllers.

show controllers controllertype Rack/Slot/Instance/Port/Channel-number [summary]

- The **show controllers** command displays all the configuration parameters, PM thresholds and alarms when keywords are not provided.
- The **show controllers** command displays the rx/tx power value and wavelength when **summary** keyword is provided.
- A \* wild card can be used to display all the OTS OCH controllers associated with a OTS controller. For example, show controllers ots-och 0/1/0/\* summary

### Example

RP/0/RP0/CPU0:ios#show controllers ots-och 0/3/0/1/1

Fri Feb 24 13:20:18.456 CET Controller State: Up Transport Admin State: Maintenance Port Type: Line Laser State: Unnown Optics Status:: Alarm Status: \_\_\_\_\_ Detected Alarms:None Alarm Statistics: \_\_\_\_\_ LOW-RX-PWR = 0LOW-TX-PWR = 0Parameter Statistics: \_\_\_\_\_ TX Power = -3.30 dBm RX Power = -21.10 dBm TX psd = 13.586 nW/MHzRX psd = 0.220 nW/MHzChannel Central Frequency = 196100.0 GHz Channel Width = 50.0 GHz Configured Parameters: \_\_\_\_\_ Rx Low Threshold = -25.0 dBm Tx Low Threshold = -25.0 dBm

### RP/0/RP0/CPU0:ios#show controllers ots-och 0/2/0/0/\* summary

Fri Oct 9 10:37:50.109 CEST

Port	Type S	tatus	TX Power	RX Power	TX psd	RX psd
Central Frequency	<sup>r</sup> Channel W	idth	(dBm)	(dBm)	nW/MHz)	(nW/MHz)
(GHz)	(GHz)		(GDiii)	(CLDiii)	1100/11112/	(1117) (1112)
Ots-Och0_2_0_0_1 196100.0	Com 75.0	N/A	-18.30	-19.30	0.392	0.333
Ots-Och0_2_0_0_2 196025.0	Com 75.0	N/A	-19.10	-19.80	0.094	0.068
Ots-Och0_2_0_0_3 195950.0	Com 75.0	N/A	-18.00	-18.90	0.450	0.392
Ots-Och0_2_0_0_4 195875.0	Com 75.0	N/A	-16.90	-17.60	0.318	0.290
Ots-Och0_2_0_0_5 195800.0	Com 75.0	N/A	-18.10	-19.20	0.326	0.290
Ots-Och0_2_0_0_6 195725.0	Com 75.0	N/A	-19.50	-19.90	0.059	0.041
Ots-Och0_2_0_0_7 195650.0	Com 75.0	N/A	-18.60	-19.00	0.471	0.450
Ots-Och0_2_0_0_8 195575.0	Com 75.0	N/A	-17.00	-17.60	0.304	0.318
Ots-Och0_2_0_0_9 195500.0	Com 75.0	N/A	-18.50	-19.20	0.318	0.297
Ots-Och0_2_0_0_10 195425.0	Com 75.0	N/A	-17.60	-18.00	0.318	0.297
Ots-Och0_2_0_0_11	Com	N/A	-18.50	-19.00	0.401	0.374

I

195350.0	75.0					
Ots-Och0_2_0_0_12 195275.0	Com 75.0	N/A	-17.70	-18.00	0.188	0.253
Ots-Och0_2_0_0_13	Com 75 0	N/A	-18.90	-19.70	0.304	0.271
Ots-Och0_2_0_0_14	Com 75 0	N/A	-20.50	-20.90	0.242	0.236
Ots-Och0_2_0_0_15	Com 75 0	N/A	-24.00	-27.40	0.031	0.011
Ots-Och0_2_0_0_16	Com 75 0	N/A	-17.80	-18.40	0.215	0.242
Ots-Och0_2_0_0_17	Com 75.0	N/A	-18.50	-19.10	0.318	0.290
Ots-Och0_2_0_0_18	Com 75.0	N/A	-16.90	-17.30	0.333	0.297
Ots-Och0_2_0_0_19	Com 75.0	N/A	-18.10	-18.90	0.410	0.366
Ots-Och0_2_0_0_20	Com 75.0	N/A	-17.00	-17.50	0.357	0.366
Ots-Och0_2_0_0_21	Com 75.0	N/A	-18.50	-19.30	0.326	0.290
Ots-Och0_2_0_0_22	Com 75.0	N/A	-17.20	-17.70	0.259	0.265
Ots-Och0_2_0_0_23	Com 75.0	N/A	-18.40	-19.10	0.410	0.392
Ots-Och0_2_0_0_24	Com	N/A	-16.50	-16.90	0.450	0.430
Ots-Och0_2_0_0_25	Com 75.0	N/A	-24.30	-28.90	0.040	0.000
Ots-Och0_2_0_0_26	Com 75.0	N/A	-16.60	-16.90	0.326	0.297
Ots-Och0_2_0_0_27	Com 75.0	N/A	-18.10	-18.70	0.420	0.410
0ts-Och0_2_0_0_28	Com 75.0	N/A	-16.80	-16.90	0.383	0.392
Ots-Och0_2_0_0_29	Com 75.0	N/A	-19.10	-19.80	0.333	0.311
Ots-Och0_2_0_0_30	Com 75.0	N/A	-16.90	-17.10	0.284	0.311
Ots-Och0_2_0_0_31	Com 75.0	N/A	-18.70	-19.20	0.374	0.383
Ots-Och0_2_0_0_32	Com 75.0	N/A	-17.20	-17.40	0.374	0.392
Ots-Och0_2_0_0_33	Com 75.0	N/A	-18.60	-19.10	0.410	0.410
Ots-Och0_2_0_0_34	Com 75.0	N/A	-17.30	-17.60	0.311	0.311
Ots-Och0_2_0_0_35	Com 75.0	N/A	-18.90	-19.10	0.392	0.401
Ots-Och0_2_0_0_36	Com 75.0	N/A	-18.00	-18.20	0.265	0.265
Ots-Och0_2_0_0_37	Com 75.0	N/A	-19.50	-20.00	0.304	0.318
Ots-Och0_2_0_0_38	Com 75.0	N/A	-17.80	-17.90	0.265	0.311
Ots-Och0_2_0_0_39	Com 75.0	N/A	-18.60	-19.00	0.383	0.392
Ots-Och0_2_0_0_40	Com 75.0	N/A	-16.80	-17.00	0.383	0.392
Ots-Och0_2_0_0_41	Com 75.0	N/A	-18.70	-19.10	0.440	0.450
Ots-Och0_2_0_0_42	Com 75.0	N/A	-16.80	-17.10	0.374	0.349
Ots-Och0 2 0 0 43	Com	N/A	-18.90	-19.40	0.401	0.420

192950.0	75.0					
Ots-Och0_2_0_0_44 192875.0	Com 75.0	N/A	-17.00	-17.40	0.450	0.440
Ots-Och0_2_0_0_45 192800.0	Com 75.0	N/A	-18.50	-18.80	0.392	0.392
Ots-Och0_2_0_0_46 192725.0	Com 75.0	N/A	-17.40	-17.60	0.284	0.271
Ots-Och0_2_0_0_47 192650.0	Com 75.0	N/A	-24.40	-31.50	0.064	0.000
Ots-Och0_2_0_0_48 192575.0	Com 75.0	N/A	-19.20	-19.60	0.410	0.430
Ots-Och0_2_0_0_49 192500.0	Com 75.0	N/A	-18.70	-19.40	0.392	0.383
Ots-Och0_2_0_0_50 192425.0	Com 75.0	N/A	-17.10	-17.60	0.374	0.326
Ots-Och0_2_0_0_51 192350.0	Com 75.0	N/A	-19.10	-19.50	0.401	0.401
Ots-Och0_2_0_0_52 192275.0	Com 75.0	N/A	-20.40	-20.50	0.357	0.311
Ots-Och0_2_0_0_53 192200.0	Com 75.0	N/A	-24.70	-34.20	0.042	0.000
Ots-Och0_2_0_0_54 192125.0	Com 75.0	N/A	-17.60	-18.10	0.201	0.236
Ots-Och0_2_0_0_55 192050.0	Com 75.0	N/A	-18.50	-19.10	0.401	0.392
Ots-Och0_2_0_0_56 191975.0	Com 75.0	N/A	-17.20	-17.80	0.341	0.284
Ots-Och0_2_0_0_57 191900.0	Com 75.0	N/A	-25.60	-30.40	0.050	0.000
Ots-Och0_2_0_0_58 191825.0	Com 75.0	N/A	-17.40	-17.90	0.220	0.188
Ots-Och0_2_0_0_59 191750.0	Com 75.0	N/A	-19.40	-20.40	0.333	0.290
Ots-Och0_2_0_0_60 191675.0	Com 75.0	N/A	-27.10	-38.90	0.023	0.000
Ots-Och0_2_0_0_61 191600.0	Com 75.0	N/A	-26.00	-38.90	0.031	0.000
Ots-Och0_2_0_0_62 191525.0	Com 75.0	N/A	-19.50	-20.10	0.133	0.045
Ots-Och0_2_0_0_63 191450.0	Com 75.0	N/A	-19.20	-19.90	0.401	0.392
Ots-Och0_2_0_0_64 191375.0	Com 75.0	N/A	-17.30	-17.60	0.333	0.333

From R7.3.1, a decimal place is introduced for Central Frequency and Channel Width columns.

# LLDP over OSC

Feature Name	Release	Description
LLDP over OSC	Cisco IOS XR Release 7.3.1	LLDP is supported on the OSC management interface for point-to-point local link discovery through OSC channel. This helps you to gather information about the neighboring devices in the network.

The output of show lldp neighbors command, when you enable LLDP on a OSC interface is as follows:

RP/0/RP0/CPU0:MYS-130#show lldp neighbors Mon Feb 22 08:29:20.189 UTC Capability codes: (R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device (W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other Device ID Local Intf Hold-time Capability Port ID MYS-131 MgmtEth0/RP0/OSC3/1 120 R MgmtEth0/RP0/OSC1/0