



Upgrade C-Band to C+L Band Without Affecting Traffic Flow

This chapter describes how to upgrade a C-band only network to C+L band network for Cisco NCS 1010 without affecting the traffic in the existing network.

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Upgrade C-Band to C+L Band Without Affecting Traffic Flow

Table 1: Feature History

Feature Name	Release Information	Description
Nontraffic Affecting C+L Band Upgrade	Cisco IOS XR Release 7.10.1	Upgrading an existing C-band network to a C+L band network is now possible without impacting the traffic flow. Cisco Optical Network Planner (CONP) computes the values for relevant parameters in C+L network configuration. The upgrade benefits even those networks that were not planned for a future L-band upgrade. C+L band upgrade enables you to accommodate more bands to your network to boost network bandwidth.

Perform the following procedure to bring up the L-band node while upgrading a C-band only network to a C+L network.



Note Use the Cisco Optical Network Planner (CONP) to compute the following values for C-band and L-band devices in C+L network configuration:

1. Single band and Dual band target PSD values
2. Gain-range for amplifiers

Step 1 Configure proper gain and gain-range on all L-band nodes.

Note Gain-Estimator (GE) must be in `DISABLED` state.

The following is a sample configuration that disables Gain Estimator.

```
RP/0/RP0/CPU0:ios#configure terminal
RP/0/RP0/CPU0:ios(config)#optical-line-control
RP/0/RP0/CPU0:ios(config-olc)#controller ots 0/0/0/0
RP/0/RP0/CPU0:ios(config-olc-ots)#gain-estimator disable
RP/0/RP0/CPU0:ios(config-olc-ots)#commit
```

Step 2 Configure Single band PSD on all L-band nodes.

Note Link Tuner (LT) must be in `DISABLED` state.

The following is a sample configuration that disables Link Tuner.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#optical-line-control
RP/0/RP0/CPU0:ios(config-olc)#controller ots 0/0/0/0
RP/0/RP0/CPU0:ios(config-olc-ots)#link-tuner disable
RP/0/RP0/CPU0:ios(config-olc-ots)#commit
RP/0/RP0/CPU0:ios(config-olc-ots)#end
```

Step 3 Configure Dual band configuration (dual band PSD set points that are obtained from CONP and partner-band configuration) values on all L-band nodes. For more information on L-Band dual band PSD configuration, see [Modify L-Band Amplifier Properties](#).

Step 4 Configure proper gain and gain-range computed by gain-estimator application manually on all C-band nodes and then disable gain-estimator.

Note Disabling Gain estimator causes traffic impact if there is mismatch between the user-configured gain range and the gain-estimator configured gain-range.

Step 5 Configure single band PSD set points that are obtained from Link Tuner manually on all C-band nodes and disable Link Tuner.

Note Link tuner is in *Enabled* state in the C-band network. Configure the same PSD values that are obtained from Link Tuner and then disable Link Tuner. Any mismatch between the user-configured PSD and Link-Tuner configured PSD values leads to traffic impact.

Step 6 Configure dual band configuration (dual band PSD configuration set points that are obtained from CONP and partner-band configuration) values on all C-band nodes. For more information on C-Band dual band PSD configuration, see [Modify C-Band Amplifier Properties](#)

Note Ensure that dual band configurations are present (dual band PSD and partner-band) on all C- and L-band nodes during L-band device addition. If any one of these two configurations is not present, then BFR does not work properly, and the bands start in an uncontrolled manner which may impact traffic.

Step 7 Bring up the Interlink connectivity between C-band and L-band devices by enabling the management interfaces for partner-band communication between C-band and L-band nodes.

Step 8 Bring up the fiber connectivity between C-band and L-band devices and enable Gigabit Ethernet interfaces.

Note Fiber connectivity is the connection between the L-band port on the C-band nodes and the Line port on the L-band nodes.

Step 9 Verify that the connectivity is fine and there are no alarms present on OSC and OTS controller.

Step 10 After the connectivity is completed till the last terminal node, verify that the topology is *UP*, and APC cleared the *PARTIAL TOPOLOGY* alarm on all OLT C-band and L-band nodes.

The following sample is an output of `show olc apc` command.

```
RP/0/RP0/CPU0:OLT1#show olc apc
```

```
Controller      : Ots0/0/0/0
APC Status     : WORKING
```

Step 11

On the L-band bfr manager, band status remains *NA* until end-to-end connectivity is up. After end-to-end terminal (OLT-OLT) is discovered, band status populates all the agent nodes. BFR initiates the BRING UP (RECOVERY) procedure and recovers one node at a time.

The following example shows the output of the **show olc band-status** command where the L-Band recovery is not initiated and *BFR status* is *NA*.

```
RP/0/RP0/CPU0:#show olc band-status
```

```
Thu Dec 15 13:54:25.703 UTC
```

```
Controller      : Ots0/0/0/0
Self-Band      : None
BFR status     : NA
```

The following example shows the output of the **show olc band-status** command where the L-Band recovery is in progress and *BFR status* is *Running*.

```
RP/0/RP0/CPU0:#show olc band-status
```

```
Thu Dec 15 13:54:25.703 UTC
```

```
Controller      : Ots0/0/0/0
Self-Band      : None
BFR status     : Running
```

```
Node RID       : 10.1.1.1
Self IP address : 10.9.1.2
Self Controller : Ots0/0/0/0
Partner IP address : 10.9.1.1
Partner Controller : Ots0/0/0/0
Partner link status : UP
C-Band status  : ACTIVE
C-Band PSD     : Dual Band
L-Band status  : ACTIVE
L-Band PSD     : Dual Band
```

```
Node RID       : 10.2.1.2
Self IP address : 10.9.2.2
Self Controller : Ots0/0/0/0
Partner IP address : 10.9.2.1
Partner Controller : Ots0/0/0/2
Partner link status : UP
C-Band status  : RECOVERING
C-Band PSD     : NA
L-Band status  : RECOVERING
L-Band PSD     : NA
```

```
Node RID       : 10.2.1.3
Self IP address : 10.9.3.2
Self Controller : Ots0/0/0/0
Partner IP address : 10.9.3.1
Partner Controller : Ots0/0/0/2
Partner link status : UP
C-Band status  : RECOVERING
C-Band PSD     : NA
L-Band status  : RECOVERING
L-Band PSD     : NA
```

```

Node RID           : 10.2.1.4
Self IP address    : 10.9.4.2
Self Controller    : Ots0/0/0/0
Partner IP address : 10.9.4.1
Partner Controller : Ots0/0/0/0
Partner link status : UP
C-Band status    : RECOVERING
C-Band PSD      : NA
L-Band status    : RECOVERING
L-Band PSD      : NA

```

```

Node RID           : 10.2.1.5
Self IP address    : 10.9.5.2
Self Controller    : Ots0/0/0/0
Partner IP address : 10.9.5.1
Partner Controller : Ots0/0/0/0
Partner link status : UP
C-Band status    : RECOVERING
L-Band status    : RECOVERING

```

Step 12 Wait for the recovery to complete on all nodes. When recovery completes, check the PSD status of the C-band and partner L-band nodes, and verify that the PSD profile is *DUAL BAND PSD*.

Step 13 Verify that BFR converged on all nodes and the state on the agent nodes are *ACTIVE* with *DUAL BAND PSD*.

The following example shows the output of the **show olc band-status** command where the L-Band bring up is complete, PSD profile is *DUAL BAND PSD*, and band status of all agent nodes is *Active*.

```

RP/0/RP0/CPU0:#show olc band-status

Thu Dec 15 13:54:25.703 UTC

Controller         : Ots0/0/0/0
Self-Band          : None
BFR status       : Running

Node RID           : 10.2.1.1
Self IP address    : 10.9.1.2
Self Controller    : Ots0/0/0/0
Partner IP address : 10.9.1.1
Partner Controller : Ots0/0/0/0
Partner link status : UP
C-Band status    : ACTIVE
C-Band PSD      : Dual Band
L-Band status    : ACTIVE
L-Band PSD      : Dual Band

Node RID           : 10.2.1.2
Self IP address    : 10.9.2.2
Self Controller    : Ots0/0/0/0
Partner IP address : 10.9.2.1
Partner Controller : Ots0/0/0/2
Partner link status : UP
C-Band status    : ACTIVE
C-Band PSD      : Dual Band
L-Band status    : ACTIVE
L-Band PSD      : Dual Band

Node RID           : 10.2.1.3
Self IP address    : 10.9.3.2
Self Controller    : Ots0/0/0/0
Partner IP address : 10.9.1.1
Partner Controller : Ots0/0/0/2
Partner link status : UP

```

```
C-Band status      : ACTIVE
C-Band PSD        : Dual Band
L-Band status     : ACTIVE
L-Band PSD       : Dual Band
```

```
Node RID          : 10.2.1.4
Self IP address   : 10.9.4.2
Self Controller   : Ots0/0/0/0
Partner IP address : 10.9.4.1
Partner Controller : Ots0/0/0/0
Partner link status : UP
C-Band status     : ACTIVE
C-Band PSD       : Dual Band
L-Band status     : ACTIVE
L-Band PSD       : Dual Band
```

```
Node RID          : 10.2.1.5
Self IP address   : 10.9.5.2
Self Controller   : Ots0/0/0/0
Partner IP address : 10.9.5.1
Partner Controller : Ots0/0/0/0
Partner link status : UP
C-Band status     : ACTIVE
L-Band status     : ACTIVE
```

Step 14

Check the traffic status on C-band nodes and verify that traffic was not impacted during L-band addition.
