



Link Tuner

This chapter describes the link tuner optical application for Cisco .

- [Link tuner parameters and operational status, on page 1](#)

Link tuner parameters and operational status

This section describes the link tuner, the parameters it uses, and its operational status states.

Link tuner computes the target Power Spectral Densities (PSD) for APC by calculating the optimal PSDs for a span. PSD represents the power for each 12.5 GHz segment of the spectrum. Link tuner is enabled if automatic link bring up is enabled. It is specific to the span and computes the target PSDs for channels entering the span.

Parameters used by link tuner

Link tuner uses these parameters to compute the target PSD:

- Fiber type
- Span loss measurement
- Spectral density
- Connector losses
- Span length, and
- Raman gain (only on Raman spans).

Link tuner status

This table describes the different link tuner status values.

Status	Description
Operational	The link tuner is active and operational.
Blocked	The link tuner is active but unable to com
Disabled	The link tuner is disabled.

Operational considerations

The link tuner application finds the target PSD for the best performance for channels entering a span. You have to manually configure **drop-psd**. The **drop-psd** is the target PSD for OLT drop ports.

Link tuner monitors the span loss and total noise in the link. When the link tuner detects changes in span loss, span length, or connector loss, it recomputes the target PSDs. However, it applies the new target PSDs only if it detects a change of 0.1 dB or more in the total noise value.

Link tuner computes the target PSDs and total noise whenever a link goes down and comes back up. Any action that impacts traffic triggers the link tuner.

Enable or disable link tuner

Use this task to control whether the link tuner application on the optical line controller is activated or deactivated.

Procedure

Use the **link-tuner enable** command to enable the link tuner.

Example:

```
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 enable
RP/0/RP0/CPU0:ios(config-olc-ots)#commit
RP/0/RP0/CPU0:ios(config-olc-ots)#end
```

Use the **link tuner disable** command to disable the link tuner.

Configure link parameters

Use this task to set the necessary parameters for accurate link tuning in the link tuner application.

Use the **fiber-type** command to configure the fiber type. SMF is the default fiber type.

You can configure these fiber types using the **fiber-type** command:

- E-LEAF
- FREE-LIGHT
- METRO-CORE
- SMF
- SMF-28E
- TERA-LIGHT
- TW-RS

- TW-Reach
- TW-minus
- TW-plus
- ULL-SMF28

Use the **link-tuner spectrum-density** command to configure the spectrum density. You can configure a spectrum density as a percentage value from 1 to 100. The default value is 81.

Use the **connector-loss** command to configure the connector loss for both the Tx and Rx ports. The supported range for each port is 0 to 20 dB.

The default connector loss is

- 0.25 dB for ports without Raman module.
- 0.3 dB for ports with Raman module.

Use the **span-length** command to configure the span length. You can specify a value from 0.1 km to 200 km in increments of 0.1 km. If you do not configure the span length, the link tuner calculates the span length based on span loss.

Procedure

Use these commands to configure the link tuner parameters.

Example:

```
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)#fiber-type SMF
RP/0/RP0/CPU0:ios(config-olc-ots)#link-tuner spectrum-density 80
RP/0/RP0/CPU0:ios(config-olc-ots)#connector-loss rx 1
RP/0/RP0/CPU0:ios(config-olc-ots)#connector-loss tx 1
RP/0/RP0/CPU0:ios(config-olc-ots)#span-length 100
RP/0/RP0/CPU0:ios(config-olc-ots)#commit
RP/0/RP0/CPU0:ios(config-olc-ots)#end
```

When you configure the fiber type, spectrum density, connector losses, and span length, the link tuner calculates the target PSDs for the span. This calculation helps optimize channel performance by selecting the best PSD values based on your settings.

View link tuner information

Use this task to view the link tuner status, PSD computation information, computed total noise, and target PSDs configured for all the setpoints.

Procedure

Step 1 Use the **show olc link-tuner** command to view the link tuner status and PSD computation information.

Example:

```
RP/0/RP0/CPU0:ios#show olc link-tuner
Controller      : Ots0/0/0/0
Link Tuner Status : OPERATIONAL
Last PSD computation: 2022-05-06 10:59:51
```

```
-----
Setpoint          : Computed PSD
                   (dBm/12.5 GHz)
-----s-----
```

```
01                -5.7
02                -5.6
03                -5.6
04                -5.5
05                -5.5
06                -5.4
07                -5.4
08                -5.3
09                -5.3
10                -5.2
11                -5.2
12                -5.1
13                -5.1
14                -5.0
15                -5.0
16                -4.9
17                -4.9
18                -4.8
19                -4.8
20                -4.7
21                -4.7
22                -4.6
23                -4.6
24                -4.5
25                -4.4
26                -4.4
27                -4.3
28                -4.3
29                -4.2
30                -4.2
31                -4.1
32                -4.1
33                -4.0
```

Note

When an NCS 1020 network is not fully up and the complete topology is not discovered, the **show olc link tuner** command displays the default PSD value (-4.1dB) because the link tuner is blocked by partial topology discovery. APC uses the configured value to perform power correction. After the topology is fully discovered, the link tuner performs the PSD computation. When all nodes are operational and the topology state updates, APC uses the PSD values computed by the link tuner. The **show olc link tuner** command displays the values computed by the link tuner.

Step 2 Use the **show olc link-tuner detail** command to view the link tuner status, PSD computation information, and computed total noise.

Example:

```
RP/0/RP0/CPU0:ios#show olc link-tuner detail
Controller      : Ots0/0/0/0
Link Tuner Status : OPERATIONAL
Last PSD computation: 2022-05-06 10:59:51
Computed Total Noise: -35.4 dB
```

```
-----
Setpoint        : Computed PSD
                  (dBm/12.5 GHz)
-----
```

```
01      -5.7
02      -5.6
03      -5.6
04      -5.5
05      -5.5
06      -5.4
07      -5.4
08      -5.3
09      -5.3
10      -5.2
11      -5.2
12      -5.1
13      -5.1
14      -5.0
15      -5.0
16      -4.9
17      -4.9
18      -4.8
19      -4.8
20      -4.7
21      -4.7
22      -4.6
23      -4.6
24      -4.5
25      -4.4
26      -4.4
27      -4.3
28      -4.3
29      -4.2
30      -4.2
31      -4.1
32      -4.1
33      -4.0
```

Step 3 Use the **show olc apc-local target-psd-profile** command to view the target PSDs configured for all the setpoints. The output also shows the source of the PSD configuration. The target PSD source can be link tuner or configuration.

```
RP/0/RP0/CPU0:ios#show olc apc-local target-psd-profile
Mon Jun 20 06:40:32.779 UTC
Controller      : Ots0/0/0/0
Target PSD source : Link Tuner
```

```
-----
Setpoint        Frequency          Target PSD
                  (THz)              (dBm/12.5 GHz)
-----
01      191.337494      -6.3
02      191.488495      -6.3
03      191.639496      -6.2
04      191.790497      -6.2
05      191.941498      -6.2
06      192.092499      -6.1
07      192.243500      -6.1
08      192.394501      -6.1
```

09	192.545502	-6.0
10	192.696503	-6.0
11	192.847504	-5.9
12	192.998505	-5.9
13	193.149506	-5.8
14	193.300507	-5.8
15	193.451508	-5.8
16	193.602493	-5.7
17	193.753494	-5.7
18	193.904495	-5.7
19	194.055496	-5.6
20	194.206497	-5.6
21	194.357498	-5.5
22	194.508499	-5.5
23	194.659500	-5.5
24	194.810501	-5.4
25	194.961502	-5.4
26	195.112503	-5.3
27	195.263504	-5.3
28	195.414505	-5.3
29	195.565506	-5.2
30	195.716507	-5.2
31	195.867493	-5.1
32	196.018494	-5.1
33	196.169495	-5.1