



Downstream Power Tilt

The Downstream Power tilt feature is used to correct cable loss in the head-end to produce a flat power spectrum for all channels in the controller port.

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Hardware Compatibility Matrix for the Cisco cBR Series Routers



Note The hardware components that are introduced in a given Cisco IOS-XE Release are supported in all subsequent releases unless otherwise specified.

Table 1: Hardware Compatibility Matrix for the Cisco cBR Series Routers

Cisco CMTS Platform	Processor Engine	Interface Cards
Cisco cBR-8 Converged Broadband Router	<p>Cisco IOS-XE Release 16.5.1 and Later Releases</p> <p>Cisco cBR-8 Supervisor:</p> <ul style="list-style-type: none"> • PID—CBR-SUP-250G • PID—CBR-CCAP-SUP-160G 	<p>Cisco IOS-XE Release 16.5.1 and Later Releases</p> <p>Cisco cBR-8 CCAP Line Cards:</p> <ul style="list-style-type: none"> • PID—CBR-LC-8D30-16U30 • PID—CBR-LC-8D31-16U30 • PID—CBR-RF-PIC • PID—CBR-RF-PROT-PIC • PID—CBR-CCAP-LC-40G • PID—CBR-CCAP-LC-40G-R • PID—CBR-CCAP-LC-G2-R • PID—CBR-SUP-8X10G-PIC • PID—CBR-2X100G-PIC <p>Digital PICs:</p> <ul style="list-style-type: none"> • PID—CBR-DPIC-8X10G • PID—CBR-DPIC-2X100G <p>Cisco cBR-8 Downstream PHY Module:</p> <ul style="list-style-type: none"> • PID—CBR-D31-DS-MOD <p>Cisco cBR-8 Upstream PHY Modules:</p> <ul style="list-style-type: none"> • PID—CBR-D31-US-MOD

Information about Downstream Power Tilt

The downstream power tilt feature is used to correct cable loss in the head-end to produce a flat power spectrum for all channels on the controller port.



Note There may be noise floor degradation on the failover path (following linecard switchover) with this feature enabled.

Restrictions for Configuring Downstream Power Profile

The downstream power tilt feature and OFDM power profile feature are mutually exclusive. They cannot be configured at the same time.

How to Configure the Downstream Power Tilt

Configuring Downstream Power Tilt

Downstream power tilt applies to all the SCQAM or OFDM channels on the downstream. To configure downstream power tilt for a controller port, use the power-tilt configuration command under the downstream controller port.

```
enable
configure terminal
controller Integrated-Cable slot/subslot/port
max-ofdm-spectrum value
max-carrier value
base-channel-power value
power-tilt mode loss max-frequency freq-max
rf-chan start_id [end_id]
type value
rf-output value
power-adjust value
qam-profile id
docsis-channel-id id
ofdm channel-profile id start-frequency value width value [plc value]
```

Below is an example:

```
controller Integrated-Cable 3/0/0
max-ofdm-spectrum 192000000
max-carrier 32
base-channel-power 34
power-tilt linear 4.0 max-frequency 696000000
rf-chan 0 31
type DOCSIS
frequency 261000000
rf-output NORMAL
power-adjust -2.0
qam-profile 1
docsis-channel-id 1
rf-chan 158
power-adjust 0
docsis-channel-id 159
ofdm channel-profile 20 start-frequency 600000000 width 96000000 plc 645000000
```

In the above configuration steps, there is a command **power-tilt mode loss max-frequency freq-max**, where the *mode* represent a formula that calculates the loss of a coax cable at a frequency F, given the loss at *freq-max* is known. It provides two options to select:

- linear: $\text{loss}_F = \text{loss}_{\text{freq-max}} * (F / \text{freq-max})$
- cable-loss-approx: $\text{loss}_F = \text{loss}_{\text{freq-max}} * \text{SQRT}((\text{freq-max} - F) / \text{freq-max})$

loss is the measured cable loss at *freq-max*, specified in 1/10 dB.

Verifying Downstream Power Tilt Configuration

To display the downstream power tilt details, use the **show cable controller integrated-cable** command as given in the following example. This command will display the actual SCQAM and OFDM channel power levels as set by the DS Power Tilt command. For OFDM channels, the power level displayed represents the center frequency 6-MHz band power level.

```
Router# show controller Integrated-Cable 1/0/1 rf-chan 0-162
Chan State Admin Frequency Type Annex Mod srate Interleaver dcid power output
0 UP UP 261000000 DOCSIS B 256 5361 I32-J4 1 29.9 NORMAL
1 UP UP 267000000 DOCSIS B 256 5361 I32-J4 2 30.0 NORMAL
2 UP UP 273000000 DOCSIS B 256 5361 I32-J4 3 30.0 NORMAL
3 UP UP 279000000 DOCSIS B 256 5361 I32-J4 4 30.0 NORMAL
4 UP UP 285000000 DOCSIS B 256 5361 I32-J4 5 30.1 NORMAL
5 UP UP 291000000 DOCSIS B 256 5361 I32-J4 6 30.1 NORMAL
6 UP UP 297000000 DOCSIS B 256 5361 I32-J4 7 30.2 NORMAL
7 UP UP 303000000 DOCSIS B 256 5361 I32-J4 8 30.2 NORMAL
8 UP UP 309000000 DOCSIS B 256 5361 I32-J4 9 30.2 NORMAL
9 UP UP 315000000 DOCSIS B 256 5361 I32-J4 10 30.3 NORMAL
10 UP UP 321000000 DOCSIS B 256 5361 I32-J4 11 30.3 NORMAL
11 UP UP 327000000 DOCSIS B 256 5361 I32-J4 12 30.3 NORMAL
12 UP UP 333000000 DOCSIS B 256 5361 I32-J4 13 30.4 NORMAL
13 UP UP 339000000 DOCSIS B 256 5361 I32-J4 14 30.4 NORMAL
14 UP UP 345000000 DOCSIS B 256 5361 I32-J4 15 30.4 NORMAL
15 UP UP 351000000 DOCSIS B 256 5361 I32-J4 16 30.5 NORMAL
16 UP UP 357000000 DOCSIS B 256 5361 I32-J4 17 30.5 NORMAL
17 UP UP 363000000 DOCSIS B 256 5361 I32-J4 18 30.5 NORMAL
18 UP UP 369000000 DOCSIS B 256 5361 I32-J4 19 30.6 NORMAL
19 UP UP 375000000 DOCSIS B 256 5361 I32-J4 20 30.6 NORMAL
20 UP UP 381000000 DOCSIS B 256 5361 I32-J4 21 30.6 NORMAL
21 UP UP 387000000 DOCSIS B 256 5361 I32-J4 22 30.7 NORMAL
22 UP UP 393000000 DOCSIS B 256 5361 I32-J4 23 30.7 NORMAL
23 UP UP 399000000 DOCSIS B 256 5361 I32-J4 24 30.7 NORMAL
24 UP UP 405000000 DOCSIS B 256 5361 I32-J4 25 30.8 NORMAL
25 UP UP 411000000 DOCSIS B 256 5361 I32-J4 26 30.8 NORMAL
26 UP UP 417000000 DOCSIS B 256 5361 I32-J4 27 30.8 NORMAL
27 UP UP 423000000 DOCSIS B 256 5361 I32-J4 28 30.9 NORMAL
28 UP UP 429000000 DOCSIS B 256 5361 I32-J4 29 30.9 NORMAL
29 UP UP 435000000 DOCSIS B 256 5361 I32-J4 30 30.9 NORMAL
30 UP UP 441000000 DOCSIS B 256 5361 I32-J4 31 30.9 NORMAL
31 UP UP 447000000 DOCSIS B 256 5361 I32-J4 32 31.0 NORMAL

Chan State Admin Mod-Type Start Width PLC Profile-ID dcid power output Frequency
158 UP UP OFDM 600000000 96000000 645000000 22 159 33.9 NORMAL
```

Feature Information for Downstream Power Tilt

Use Cisco Feature Navigator to find information about the platform support and software image support. Cisco Feature Navigator enables you to determine which software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to the <https://cfnng.cisco.com/> link. An account on the Cisco.com page is not required.



Note The following table lists the software release in which a given feature is introduced. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Table 2: Feature Information for Downstream Power Tilt

Feature Name	Releases	Feature Information
Downstream Power Tilt	Cisco IOS XE Fuji 16.7.1	This feature was introduced on Cisco IOS XE Fuji 16.7.1 on the Cisco cBR Series Converged Broadband Routers.

