# DOCSIS3.1 Downstream Resiliency for OFDM channel

This document describes how to configure the DOCSIS3.1 Downstream Resiliency for OFDM channel on the Cisco cBR Series Converged Broadband Router.

**Finding Feature Information**

Your software release may not support all the features that are documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. The Feature Information Table at the end of this document provides information about the documented features and lists the releases in which each feature is supported.

# 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 | **Cisco IOS-XE Release 16.5.1 and Later Releases**<br><br>Cisco cBR-8   Supervisor :<br><br>• PID—CBR-SUP-250G<br><br>• PID—CBR-CCAP-SUP-160G<br><br>• PID—CBR-CCAP-SUP-60G<br><br>• PID—CBR-SUP-8X10G-PIC | **Cisco IOS-XE Release 16.5.1 and Later Releases**<br><br>Cisco cBR-8 CCAP Line Cards:<br><br>• PID—CBR-LC-8D30-16U30<br><br>• PID—CBR-LC-8D31-16U30<br><br>• PID—CBR-RF-PIC<br><br>• PID—CBR-RF-PROT-PIC<br><br>• PID—CBR-CCAP-LC-40G<br><br>• PID—CBR-CCAP-LC-40G-R<br><br>Cisco cBR-8 Downstream PHY Modules:<br><br>• PID—CBR-D30-DS-MOD<br><br>• PID—CBR-D31-DS-MOD<br><br>Cisco cBR-8 Upstream PHY Modules:<br><br>• PID—CBR-D30-US-MOD<br><br>• PID—CBR-D31-US-MOD |

# Information about DOCSIS3.1 Downstream Resiliency for OFDM Channel

When DOCSIS3.1 CM reports non-primary RF channel failure for SCQAM or OFDM channel, actions performed by downstream resiliency is the same as DOCSIS3.0 CM. In other words, if RF channel impairment is below the resiliency threshold, CMs service flows are moved to Resiliency Bonding Group (RBG) or Narrow Band (NB) interface. If RF channel impairment is above the resiliency threshold, the impaired RF channel is temporarily removed from the bonding group.

The following table summarizes the CM-STATUS events for OFDM channel, and the action to be taken by the downstream resiliency module:

*Table 2: CM-STATUS events for OFDM channel*

| Event Type Code | Event Description | DS Resiliency Action |
|---|---|---|
| 1 | MDD timeout | Move CM's service flows to RBG/NB or suspend RF from BG. |

| Event Type Code | Event Description | DS Resiliency Action |
|---|---|---|
| 2 | FEC lock failure | Move CM's service flows to RBG/NB or suspend RF from BG. |
| 4 | MDD recovery | Move CM's service flows back to original BG. |
| 5 | FEC lock recovery | Move CM's service flows back to original BG. |
| 16 | DS OFDM profile failure. A loss of FEC lock on one of the assigned downstream OFDM profiles of a channel. | DS OFDM Profile Manager will handle this event and take action. |
| 20 | NCP profile failure. Loss of FEC lock on NCP. | Move CM's service flows to RBG/NB or suspend RF from BG. |
| 21 | Loss of FEC lock on the PLC. | Move CM's service flows to RBG/NB or suspend RF from BG. |
| 22 | NCP profile recovery. | Move CM's service flows back to original BG. |
| 23 | FEC recovery on PLC channel. | Move CM's service flows back to original BG. |
| 24 | FEC recovery on OFDM profile. | Recovery of impairment reported by event 16. DS OFDM Profile Manager will handle this event and take action. |

# How to Configure DOCSIS3.1 Downstream Resiliency for OFDM Channel

## Configuring DOCSIS3.1 Downstream Resiliency for OFDM Channel

User must configure the command **cable rf-change-trigger percent** *value* **count** *number* to enable the downstream resiliency functionality.

To configure the trigger thresholds specific to OFDM RF impairment, follow the steps below:

```
enable
configure terminal
cable ofdm-rf-change-trigger percent value counter number [no-ncp-plc]
```

Starting from Cisco IOS XE Fuji 16.10.1d release, you can exclude NCP and PLC reports separately by following these steps:

```
enable
configure terminal
cable ofdm-rf-change-trigger percent value counter number [no-ncp] [no-plc]
```

Trigger thresholds *value* and *number* apply globally to the non-primary OFDM RF channels. If this command is not configured, the trigger thresholds configured by the command **cable rf-change-trigger percent** *value* **count** *number* will be used for the non-primary OFDM channels.

With **no-ncp-plc** configured in the command, this feature will not take any action when CM reports CM-STATUS-EVENT 20 or 21.

**Note** The **cable rf-change-trigger percent** *value* **count** *number* command is optional and the configured trigger thresholds apply to non-primary OFDM channels only.

# Displaying OFDM Specific CM-STATUS Events

To display the statistics of the OFDM specific CM-STATUS events, use the **show cable modem wideband rcs-status** command as shown in the example below:

```
router#show cable modem 4800.33ea.7072 wideband rcs-status verbose
CM  : 4800.33ea.7072
RF  : 3/0/0 0
  Status               : UP
  FEC/QAM Failure      : 0
  Dup FEC/QAM Failure  : 0
  FEC/QAM Recovery     : 0
  Dup FEC/QAM Recovery : 0
  MDD Failure          : 0
  Dup MDD Failure      : 0
  MDD Recovery         : 0
  Dup MDD Recovery     : 0
  Flaps                : 0
  Flap Duration        : 00:00
RF  : 3/0/0 1
  Status               : UP
  FEC/QAM Failure      : 0
  Dup FEC/QAM Failure  : 0
  FEC/QAM Recovery     : 0
  Dup FEC/QAM Recovery : 0
  MDD Failure          : 0
  Dup MDD Failure      : 0
  MDD Recovery         : 0
  Dup MDD Recovery     : 0
  Flaps                : 0
  Flap Duration        : 00:00
RF  : 3/0/0 159
  Status               : UP
  FEC/QAM Failure      : 0
  Dup FEC/QAM Failure  : 0
  FEC/QAM Recovery     : 0
  Dup FEC/QAM Recovery : 0
  MDD Failure          : 0
  Dup MDD Failure      : 0
  MDD Recovery         : 0
  Dup MDD Recovery     : 0
  NCP PROF Failure     : 2          May 8  15:14:24
```

```
Dup NCP PROF Failure     : 0
NCP PROF Recovery        : 1        May 8  15:15:18
Dup NCP PROF Recovery    : 0
PLC Lock Failure         : 1        May 8  15:14:47
Dup PLC Lock Failure     : 0
PLC Lock Recovery        : 1        May 8  15:15:46
Dup PLC Lock Recovery    : 0
Flaps                    : 0
Flap Duration            : 00:00
OFDM Profile Id : 2
Status                   : UP
Profile Failure          : 1        May 8  15:16:18
DUP Profile Failure      : 0
Profile Recovery         : 1        May 8  15:16:44
DUP Profile Recovery     : 0
```

# Feature Information for DOCSIS3.1 Downstream Resiliency for OFDM Channel

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 www.cisco.com/go/cfn 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 3: Feature Information for DOCSIS3.1 Downstream Resiliency for OFDM Channel*

| Feature Name | Releases | Feature Information |
|---|---|---|
| DOCSIS3.1 Downstream Resiliency for OFDM Channel | Cisco IOS XE Everest 16.7.1 | This feature was integrated on the Cisco cBR Series Converged Broadband Routers. |

**Feature Information for DOCSIS3.1 Downstream Resiliency for OFDM Channel**