



# Wideband Modem Resiliency

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The Wideband Modem Resiliency feature provides reliable service in the event of non-primary RF channel disruptions to ensure that a cable modem remains operational. With the implementation of this feature, the Cable Modem Termination System (CMTS) does not force a cable modem to perform a MAC reset if the cable modem loses connectivity to the CMTS on one or all of its non-primary RF channels.

## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the Feature Information Table at the end of this document.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to <http://tools.cisco.com/ITDIT/CFN/>. An account on <http://www.cisco.com/> is not required.

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## Prerequisites for Wideband Modem Resiliency

The table below shows the hardware compatibility prerequisites for the Wideband Modem Resiliency feature.

**Table 1: Cable Hardware Compatibility Matrix for Wideband Modem Resiliency**

<b>CMTS Platform</b>	<b>Processor Engine</b>	<b>Cable Interface Line Cards</b>
Cisco uBR10012 Universal Broadband Router	Cisco IOS Release 12.2(33)SCB and later releases <ul style="list-style-type: none"> <li>• PRE2</li> <li>• PRE4</li> </ul> Cisco IOS Release 12.2(33)SCH and later releases <ul style="list-style-type: none"> <li>• PRE5</li> </ul>	Cisco IOS Release 12.2(33)SCB and later releases <ul style="list-style-type: none"> <li>• Cisco uBR10-MC5X20S/U/H</li> </ul> Cisco IOS Release 12.2(33)SCC and later releases <ul style="list-style-type: none"> <li>• Cisco UBR-MC20X20V</li> </ul>
Cisco uBR7225VXR Universal Broadband Router	Cisco IOS Release 12.2(33)SCD and later releases <ul style="list-style-type: none"> <li>• NPE-G2</li> </ul>	Cisco IOS Release 12.2(33)SCD and later releases <ul style="list-style-type: none"> <li>• Cisco uBR-MC88V</li> </ul>
Cisco uBR7246VXR Universal Broadband Routers	Cisco IOS Release 12.2(33)SCD and later releases <ul style="list-style-type: none"> <li>• NPE-G2</li> </ul>	Cisco IOS Release 12.2(33)SCD and later releases <ul style="list-style-type: none"> <li>• Cisco uBR-MC88V</li> </ul>

## Restrictions for Wideband Modem Resiliency

- This feature provides resiliency support only for downstream RF channel disruptions in Cisco IOS Release 12.2(33)SCB and later releases. This feature does not support any upstream-related resiliency.
- The CMTS cannot move a w-online cable modem to a bonding group that contains an RF channel that is not a member of the original Receive Channel Configuration (RCC) for the wideband cable modem.

## Information About Wideband Modem Resiliency

The Wideband Modem Resiliency feature enables the Cisco uBR10012 or Cisco uBR7200 series router to interact with DOCSIS 3.0-compliant cable modems. This interaction helps provide reliable service in the event of non-primary channel disruptions of layer 1 and/or layer 2 connections, and loss of quadrature amplitude modulation (QAM) lock and/or MAC Domain Descriptor (MDD) timeout. If a cable modem loses connectivity with the CMTS on one or all of its non-primary RF channels, the CMTS does not force the cable modem to perform a MAC reset and enables the cable modem to remain operational.

A DOCSIS 3.0-qualified CMTS transmits data to one or more DOCSIS 3.0-compliant cable modems using multiple RF channels. For a cable modem, one of the RF channels is used as the primary RF channel, and the rest of the channels are considered non-primary channels. The primary RF channel is defined as the downstream (DS) RF channel on which the cable modem receives DOCSIS MAC messages needed for upstream timing and synchronization.

This feature enables the CMTS to collect and analyze data related to RF channel disruptions per cable modem to assist in identifying the impairment.

## CM-STATUS Messages

Cable modems use CM-STATUS messages to report events to the CMTS. A DOCSIS 3.0-compliant cable modem does not perform a MAC reset when reporting DS RF channel failures through CM-STATUS messages. The CMTS does not send an acknowledgement to the cable modem when it receives a CM-STATUS message. The CMTS might not receive a CM-STATUS message, if the message gets corrupted during transmission. To prevent this occurrence, the CMTS sends the following two parameters to the cable modem using the primary MDD message for each event type:

- Maximum reports
- Maximum hold-off time

The maximum reports parameter specifies how many reports should be sent each time a particular event occurs. The maximum hold-off time parameter defines the amount of time (in units of 20 milliseconds) a cable modem should wait between transmissions of the CM-STATUS messages when the maximum reports parameter is greater than one.

## RF Channel Event Dampening Time

The Wideband Modem Resiliency feature enables the CMTS to reduce the occurrence of a particular RF channel event by using the **cable rf-change-dampen-time** command. This command can also be used to prevent premature cable modem reconfiguration in the event of a prolonged outage. For example, the failover time of a remote edge-QAM device (EQAM) may be 10 seconds. Using the **cable rf-change-dampen-time** command, you can specify the dampening time such that an EQAM failover does not inadvertently trigger a mass reconfiguration of wideband cable modems.

## Response of CMTS to RF Impairment Recovery

When cable modems report the recovery from downstream RF channel failures and their default downstream service flow has been moved to their primary downstream channel, the response of the CMTS is different between the following two Cisco IOS releases:

- Cisco IOS Release 12.2(33)SCB and later releases—If a cable modem reports that full service has been restored after downstream RF channel failures, the CMTS forces the cable modem to perform a MAC reset.
- Cisco IOS Release 12.2(33)SCC and later releases—If a cable modem reports that full service has been restored, the CMTS does not force the cable modem to perform a MAC reset, and the cable modem is kept w-online (the wideband downstream service is restored by the original wideband interface without a MAC reset).

## Trigger Thresholds for Downstream Events

When a cable modem reports a downstream channel impairment via a CM-STATUS message, the cable modem can no longer reliably receive data on that channel. The Cisco CMTS must not use that channel to transmit data to the cable modem. The Cisco CMTS uses the following three options to prevent the use of the impaired channel(s):

- Option 1—Suspend the RF channel(s) from the wideband interface used by that cable modem.
- Option 2—Move the default downstream service flow from its wideband interface to its primary channel interface (modular or cable).
- Option 3—Move all the downstream service flows (primary and unicast secondary service flows) from its wideband interface to its primary channel interface (modular or cable).

Choosing option 1 retains all the remaining operational DS channels active, option 2 retains only a single DS channel, and option 3 retains all DS channels. Option 1 affects all cable modems that are receiving service via the affected wideband interface, while options 2 and 3 only affect the cable modem reporting the impairment.

To control which option the Cisco CMTS uses when an RF impairment is reported, use the **cable rf-change-trigger** command. This command enables you to configure thresholds (percent and count) for an event before the event triggers an action for the cable modem. This command also enables you to configure a secondary keyword to move all the secondary downstream service flows of a cable modem to the primary channel interface.

Because the CM-STATUS messages are received sequentially, the decision to use options 1, 2, or 3 is made based on whether the trigger threshold is reached or not, and if the secondary keyword is configured. The table below lists the **cable rf-change-trigger** command conditions and the corresponding options selected by the Cisco CMTS.

**Table 2: Conditions for Selecting RF Impairment Handling Options**

<b>rf-change-trigger Threshold Reached</b>	<b>secondary Keyword Configured</b>	<b>RF Impairment Handling Option Selected by the Cisco CMTS</b>
YES	NA	Option 1
NO	NO	Option 2
NO	YES	Option 3



### Note

Before the rf-change-trigger count has reached, FrwdIF moves to the NB primary interface and only after the rf-change-trigger count has reached, FrwdIF moves to the WB interface. Do not move the previous FrwdIF from NB primary interface to WB Interface.

If the trigger thresholds for an event are not configured, the state of the non-primary RF channels always remains up, and the cable modems that report RF failures are reset after the dampening time specified in the **cable rf-change-dampen-time** command expires. If both thresholds are configured, then both the thresholds must be reached before changing the RF channel state to down.

In addition to not meeting the configured rf-change-trigger, a cable modem that reports impairments has its downstream service flows modified in option 2 or option 3, to provide reliable service in the following conditions:

- If the count exceeds the specified number of cable modems but the percent threshold is not reached.
- If the percent threshold is reached but the count does not reach the specified number of cable modems.
- If all non-primary channels of the cable modem are reported down.

Additionally with option 3, only those unicast secondary service flows (static or dynamic) which share the same wideband interface as the primary service flow, are moved to the primary channel interface (modular or cable). Any new dynamic service flows are created on the primary channel interface.

A suspended RF channel is restored for all affected wideband interfaces when a specified number of cable modems report (via CM-STATUS) that the channel connectivity is restored. The Wideband Modem Resiliency feature defines the specified number of cable modems as half of the configured count or percentage of rf-change-trigger, or both. For example, if the count is 20 and the percent is 10, then the number of cable modems reporting recovery should reduce the count to 10 and the percent to 5 for the suspended RF channel to be restored.

When either option 2 or option 3 is chosen by the Cisco CMTS, the service flows are not moved back to the original wideband interface until all the impaired RF channels are restored. However, with option 3 the *existing* dynamic secondary service flows, which are transitory in nature, are not moved back to the wideband interface even when all RF channels are restored.

The table below lists the various RF channel impairment handling options that the cable modem chooses and their applicable Cisco IOS releases.

**Table 3: Release Specific Behavior for RF Impairment Handling options**

RF Impairment Handling Options	Applicable Cisco IOS Releases
Option 1	Cisco IOS Release 12.2(33)SCB and later releases.
Option 2	Cisco IOS Release 12.2(33)SCC and later releases.
Option 3	<p>Default behavior in Cisco IOS Release 12.2(33)SCB and SCB-based releases. All downstream service flows (primary or secondary) are moved to primary channel interface.</p> <p>Configurable behavior in Cisco IOS Release 12.2(33)SCE4 and later releases. The decision to move all secondary service flows can be configured using the <b>cable rf-change-trigger</b> command. For more information, see the <i>Cisco IOS CMTS Cable Command Reference</i> guide.</p>

# How to Configure Wideband Modem Resiliency

The following tasks describe how to configure the Wideband Modem Resiliency feature on a Cisco uBR10012 or Cisco uBR7200 series router:

## Specifying Trigger Thresholds for Downstream Events

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Router> <b>enable</b>	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Router# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 3</b>	<b>cable rf-change-trigger [percent value] [count number] [secondary]</b>  <b>Example:</b> Router(config)# <b>cable rf-change-trigger percent 50 count 1 secondary</b>	Specifies the amount of time an event must persist before it triggers an action for the reporting cable modem. <ul style="list-style-type: none"> <li>• <b>percent value</b>—(Optional) Indicates the percentage of cable modems that must report that a particular non-primary RF channel is down before that channel is removed from the bonding group with that NP RF channel configured. The valid range is from 1 to 100. The default value is 0.</li> <li>• <b>count number</b>—(Optional) Specifies the number of cable modems reporting an impairment for a non-primary downstream channel. The default value is 0.</li> <li>• <b>secondary</b>—(Optional) Configures the Cisco CMTS to move the unicast secondary service flows to primary interface, when the number of cable modems reporting RF channel impairment is less than the configured (percent or count) threshold.</li> </ul> <p><b>Note</b> Only those unicast secondary service flows, which share the same wideband interface as the primary interface, are moved to the primary channel interface.</p>

## Specifying Persistence Time for RF Channels

To configure the amount of time a non-primary RF channel must remain in its current state (either up or down), use the **cable rf-change-dampen-time** command.

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> <b>enable</b>	Enables privileged EXEC mode.  <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<b>configure terminal</b>  <b>Example:</b> Router# <b>configure terminal</b>	Enters global configuration mode.
Step 3	<b>cable rf-change-dampen-time</b> <i>seconds</i>  <b>Example:</b> Router(config)# <b>cable rf-change-dampen-time</b> 10	Specifies the amount of time in seconds for a non-primary RF channel to remain in its new state. The default value is 30.

## Changing Default CM-STATUS Configuration

To change the default configuration values of “Event Holdoff Timer” and “Number of Reports per Event” for any or all events, use the **cable cm-status** command.

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> <b>enable</b>	Enables privileged EXEC mode.  <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<b>configure terminal</b>  <b>Example:</b> Router# <b>configure terminal</b>	Enters global configuration mode.
Step 3	<b>cable cm-status</b> {all   event} [holdoff {timer   default}   reports {reportvalue   default}]  <b>Example:</b> Router(config-if)# <b>cable cm-status</b> 1 holdoff 1	Sets the holdoff timer (in units of 20 milliseconds) and the number of reports per event value.  <ul style="list-style-type: none"> <li>• <i>event</i>—CM-STATUS event. The valid range is from 1 to 10.</li> <li>• <i>timer</i>—Holdoff timer value. The valid range is from 1 to 65535. The default value is 50.</li> <li>• <i>reportvalue</i>—Report value. The valid range is from 0 to 255. The default value is 2.</li> </ul>

## Verifying Wideband Modem Resiliency

Use the following **show** commands to verify the state of RF channels and the other configuration details:

- **show interface rf-status**
- **show cable rf-status**
- **show cable modem wideband rcs-status**
- **show cable modem**

To verify the logical up and down state for each of the configured RF channels for a wideband interface, use the **show interface rf-status** command as shown in the following example:

### Cisco uBR10012 Universal Broadband Router:

```
Router# show interface wideband-cable 1/0/0:3 rf-status
Logical
RF   Status
--   -----
17   UP
18   UP
19   UP
```

### Cisco uBR7200 Series Universal Broadband Router:

```
Router# show interface wideband-cable 5/1:0 rf-status
Logical
Resource  RF   Status
-----
5/1       0    UP
          1    UP
          2    UP
```

To verify the logical up and down state of the specified channel number, or the logical state of all RF channels, use the **show cable rf-status** command as shown in the following example:

```
Router# show cable rf-status
Logical  Flap  Flap
RF       Status Counts Time
-----
1/0/0 0    UP    0
      1    UP    0
      2    UP    0
      3    UP    0
      5    UP    0
      6    UP    0
      7    UP    0
      8    UP    0
      9    UP    0
     10    UP    0
     11    UP    0
     12    UP    0
     13    UP    0
     14    UP    0
     15    UP    0
     16    UP    0
```



To verify details of events for each RF channel in the cable modem's Receive Channel Configuration (RCC), use the **show cable modem wideband rcs-status** command as shown in the following example:

```
Router# show cable modem 0019.474a.c0ba wideband rcs-status
CM : 0019.474a.c0ba
RF : 1/0/0 10
  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 : 1/0/0 11
  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
```

To verify the basic receive statistics for all possible event code types for the specified cable modem, use the **show cable modem** command as shown in the following example:

```
Router# show cable modem cm-status
I/F  MAC Address  Event      TID  Count  Error  Dups  Time
C7/0  001c.ea2b.79b2 MDD timeout 0    0      1     0    Jan 11 11:29:22
      001c.ea2b.79b2 QAM failure 0    0      1     0    Jan 11 11:29:02
      001c.ea2b.79b2 MDD recovery 0    0      1     0    Jan 11 11:30:20
      001c.ea2b.79b2 QAM recovery 0    0      1     0    Jan 11 11:30:13
C7/0  001c.ea2b.78b0 MDD timeout 0    0      1     0    Jan 11 11:29:16
      001c.ea2b.78b0 QAM failure 0    0      1     0    Jan 11 11:28:53
      001c.ea2b.78b0 MDD recovery 0    0      1     0    Jan 11 11:29:59
      001c.ea2b.78b0 QAM recovery 0    0      1     0    Jan 11 11:29:46

Router# show cable modem 001c.ea2b.79b2 cm-status
I/F  MAC Address  Event      TID  Count  Error  Dups  Time
C7/0  001c.ea2b.79b2 MDD timeout 0    0      1     0    Jan 11 11:29:22
      001c.ea2b.79b2 QAM failure 0    0      1     0    Jan 11 11:29:02
      001c.ea2b.79b2 MDD recovery 0    0      1     0    Jan 11 11:30:20
      001c.ea2b.79b2 QAM recovery 0    0      1     0    Jan 11 11:30:13

Router# show cable modem cable 7/0 cm-status
I/F  MAC Address  Event      TID  Count  Error  Dups  Time
C7/0  001c.ea2b.79b2 MDD timeout 0    0      1     0    Jan 11 11:29:22
      001c.ea2b.79b2 QAM failure 0    0      1     0    Jan 11 11:29:02
      001c.ea2b.79b2 MDD recovery 0    0      1     0    Jan 11 11:30:20
      001c.ea2b.79b2 QAM recovery 0    0      1     0    Jan 11 11:30:13
C7/0  001c.ea2b.78b0 MDD timeout 0    0      1     0    Jan 11 11:29:16
      001c.ea2b.78b0 QAM failure 0    0      1     0    Jan 11 11:28:53
      001c.ea2b.78b0 MDD recovery 0    0      1     0    Jan 11 11:29:59
      001c.ea2b.78b0 QAM recovery 0    0      1     0    Jan 11 11:29:46
```

## What to Do Next

To modify the default configuration of events for CM-STATUS reports, proceed to the [Modifying CM-STATUS Reports for Events](#), on page 10.

## Modifying CM-STATUS Reports for Events

You can enable or modify the following ten CM-STATUS events per interface using the **cable cm-status enable** command:

- Secondary channel MDD time-out
- QAM/FEC lock failure
- Sequence out of range
- MDD recovery
- QAM/FEC lock recovery
- T4 time-out
- T3 re-tries exceeded
- Successful ranging after T3 re-tries exceeded
- CM operating on battery backup
- CM returned to A/C power

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Router> <b>enable</b>	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Router# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 3</b>	<b>interface cable {slot/port   slot/subslot/port}</b>  <b>Example:</b> Router(config)# <b>interface cable8/0/0</b>	Specifies the cable interface line card on a Cisco CMTS router: <ul style="list-style-type: none"> <li>• <i>slot</i>—Chassis slot number of the cable interface line card. <ul style="list-style-type: none"> <li>◦ Cisco uBR7246VXR router: The valid range is from 3 to 6.</li> <li>◦ Cisco uBR7225VXR router: The valid range is from 1 to 2.</li> <li>◦ Cisco uBR10012 router: The valid range is from 5 to 8.</li> </ul> </li> <li>• <i>subslot</i>—(Cisco uBR10012 only) Secondary slot number of the cable interface line card. Valid subslots are 0 or 1.</li> <li>• <i>port</i>—Downstream port number. <ul style="list-style-type: none"> <li>◦ Cisco uBR7246VXR and Cisco uBR7225VXR routers: The valid port value is 0 or 1.</li> </ul> </li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>◦ Cisco uBR10012 router: The valid range is from 0 to 4 (depending on the cable interface).</li> </ul>
<b>Step 4</b>	<b>cable cm-status enable</b> <i>range</i>  <b>Example:</b> Router(config-if) # <b>cable cm-status enable 6-9</b>	<p>Enables a particular CM-STATUS event on a primary cable interface. The valid range is from 1 to 10.</p> <p>The following events are enabled by default on cable and modular cable interfaces:</p> <ul style="list-style-type: none"> <li>• Secondary channel MDD time-out</li> <li>• QAM/FEC lock failure</li> <li>• Sequence out of range</li> <li>• MDD recovery</li> <li>• QAM/FEC lock recovery</li> </ul> <p>To disable a CM-STATUS event, use the <b>no</b> form of the <b>cable cm-status enable</b> command.</p>

## Enabling SNMP Traps for Wideband Resiliency Events

You can enable Simple Network Management Protocol (SNMP) traps for Wideband Resiliency specific events using the **snmp-server enable traps docsis-resil** command.

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Router> <b>enable</b>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Router# <b>configure terminal</b>	<p>Enters global configuration mode.</p>
<b>Step 3</b>	<b>snmp-server enable traps docsis-resil</b> [ <i>resil-events</i> ]  <b>Example:</b> Router(config) # <b>snmp-server enable traps docsis-resil rf-up</b>	<p>Enables SNMP traps for wideband resiliency specific events. Traps can be sent for specific events using the <i>resil-events</i> option:</p> <ul style="list-style-type: none"> <li>• <b>cm-pmode</b>—Enables the wideband resiliency cable modem partial service trap.</li> <li>• <b>cm-recover</b>—Enables the wideband resiliency cable modem full service trap.</li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• <b>event</b>—Enables the wideband resiliency event trap.</li> <li>• <b>rf-down</b>—Enables the wideband resiliency RF channel down status trap.</li> <li>• <b>rf-up</b>—Enables the wideband resiliency RF channel up status trap.</li> </ul> <p>To disable sending of the trap, use the <b>no</b> form of this command.</p>
<b>Step 4</b>	<b>exit</b>  <b>Example:</b> Router(config) # <b>exit</b>	Exits global configuration mode.

## Enabling Wideband Resiliency Trap Notifications

You can enable Wideband Resiliency trap notifications to a specific SNMP host using the **snmp-server host traps docsis-resil** command.

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Router> <b>enable</b>	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Router# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 3</b>	<b>snmp-server host <i>ipaddr</i> traps <i>string</i> docsis-resil</b>  <b>Example:</b> Router(config) # <b>snmp-server host 172.17.2.0 traps snmhost01 docsis-resil</b>	Enables wideband resiliency traps for a specific SNMP host. <ul style="list-style-type: none"> <li>• <i>ipaddr</i>—IPv4 or IPv6 address of the SNMP notification host.</li> <li>• <i>string</i>—SNMPv1 community string, SNMPv2c community string, or SNMPv3 username.</li> </ul> <p>To disable, use the <b>no</b> form of this command.</p>
<b>Step 4</b>	<b>exit</b>  <b>Example:</b> Router(config) # <b>exit</b>	Exits global configuration mode.

## Setting the Trap Interval

You can set the interval at which traps must be sent for Wideband Resiliency related events for each cable modem using the **cable resiliency traps-interval** command.

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> <b>enable</b>	Enables privileged EXEC mode.  <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<b>configure terminal</b>  <b>Example:</b> Router# <b>configure terminal</b>	Enters global configuration mode.
Step 3	<b>cable resiliency traps-interval</b> <i>count</i>  <b>Example:</b> Router(config)# <b>cable resiliency traps-interval 0</b>	Sets the time interval at which traps must be sent for each cable modem.  <ul style="list-style-type: none"> <li>• <i>count</i>—Time interval (in seconds) at which the traps must be sent for each cable modem. The valid range is from 0 to 86400. The default value is 1.</li> </ul> To disable, use the <b>no</b> form of this command.
Step 4	<b>exit</b>  <b>Example:</b> Router(config)# <b>exit</b>	Exits global configuration mode.

## Configuration Example for Wideband Modem Resiliency

The following example shows how to configure the Wideband Modem Resiliency feature by specifying the dampening time and persistence thresholds for non-primary RF channels:

```
Router# configure terminal
Router(config)# cable rf-change-dampen-time 40
Router(config)# cable rf-change-trigger percent 50 count 1
Router(config)# cable cm-status 1 holdoff 1
```

# Additional References

The following sections provide references related to the Wideband Modem Resiliency feature.

## Related Documents

Related Topic	Document Title
Commands on the Cisco CMTS (universal broadband) routers	<i>Cisco IOS CMTS Cable Command Reference</i> <a href="http://www.cisco.com/en/US/docs/ios/cable/command/reference/cbl_book.html">http://www.cisco.com/en/US/docs/ios/cable/command/reference/cbl_book.html</a>
Cisco DOCSIS 3.0 Downstream Solution	<i>Cisco DOCSIS 3.0 Downstream Solution Design and Implementation Guide</i> <a href="http://www.cisco.com/en/US/docs/cable/cmts/wideband/solution/guide/release_2.0/ds_solu.html">http://www.cisco.com/en/US/docs/cable/cmts/wideband/solution/guide/release_2.0/ds_solu.html</a>
Cisco Cable Wideband Solution Design	<i>Cisco Cable Wideband Solution Design and Implementation Guide</i> <a href="http://www.cisco.com/en/US/docs/cable/cmts/wideband/solution/guide/release_1.0/wb_solu.html">http://www.cisco.com/en/US/docs/cable/cmts/wideband/solution/guide/release_1.0/wb_solu.html</a>

## Standards

Standard	Title
CM-SP-MULPIv3.0-I08-080522	DOCSIS 3.0 MAC and Upper Layer Protocol Interface Specification

## MIBs

MIB	MIBs Link
CISCO-DOCS-EXT-MIB	To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use Cisco MIB Locator found at the following URL: <a href="http://tools.cisco.com/ITDIT/MIBS/servlet/index">http://tools.cisco.com/ITDIT/MIBS/servlet/index</a>

**Technical Assistance**

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a>

## Feature Information for Wideband Modem Resiliency

Use Cisco Feature Navigator to find information about 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 <http://www.cisco.com/go/cfn>. An account on [Cisco.com](http://www.cisco.com) is not required.

**Note**

The table below lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

**Table 4: Feature Information for Wideband Modem Resiliency**

Feature Name	Releases	Feature Information
Wideband Modem Resiliency	12.2(33)SCB	<p>The Wideband Modem Resiliency feature provides the best possible service in the event of non-primary RF channel disruptions.</p> <p>The following sections provide information about this feature:</p> <ul style="list-style-type: none"> <li>• <a href="#">How to Configure Wideband Modem Resiliency</a>, on page 6</li> <li>• <a href="#">Configuration Example for Wideband Modem Resiliency</a>, on page 13</li> </ul> <p>The following commands were introduced or modified:</p> <ul style="list-style-type: none"> <li>• <b>cable rf-change-dampen-time</b></li> <li>• <b>cable rf-change-trigger</b></li> <li>• <b>cable cm-status enable</b></li> <li>• <b>show interface rf-status</b></li> <li>• <b>show cable rf-status</b></li> <li>• <b>show cable modem wideband rcs-status</b></li> <li>• <b>show cable modem summary wb-rf</b></li> <li>• <b>clear cable modem cm-status</b></li> <li>• <b>clear cable modem rcs-counts</b></li> <li>• <b>clear cable rf-status</b></li> <li>• <b>debug cable wbcmts resiliency</b></li> <li>• <b>show cable flap-list wb-rf</b></li> </ul>



Feature Name	Releases	Feature Information
Bypass the 24 Hour Timer for Wideband Cable Modems	12.2(33)SCB	<p>This feature removes the 24-hour timer required to clear these channels. Once the cable modem successfully completes registration, the list of failed RF channels for that cable modem is cleared. If the RF impairment has been eliminated when the cable modem re-registers, that channel can be reused immediately.</p> <p>There are no new or modified commands for this feature.</p>
Wideband Modem Resiliency	12.2(33)SCD	<p>In Cisco IOS Release 12.2(33)SCD, this feature was introduced on the Cisco uBR7225VXR and Cisco uBR7246VXR routers.</p> <p>The following commands were introduced or modified:</p> <ul style="list-style-type: none"> <li>• <b>interface cable</b></li> <li>• <b>show interface rf-status</b></li> <li>• <b>show cable modem</b></li> <li>• <b>clear cable modem cm-status</b></li> <li>• <b>cable cm-status</b></li> </ul>
Move Secondary Service Flows to Primary Channel Interface.	12.2(33)SCE4	<p>This feature enables the Cisco CMTS to move all the unicast secondary service flows to the primary channel interface, when the number of cable modems reporting the RF-channel impairment is less than the configured trigger threshold.</p> <p>For more information on this feature, see section <a href="#">Specifying Trigger Thresholds for Downstream Events</a>, on page 6.</p> <p>The <b>cable rf-change-trigger</b> command was modified.</p>

Feature Name	Releases	Feature Information
Downstream Wideband Resiliency Trap	12.2(33)SCG2	<p>This feature enables SNMP traps for Wideband Resiliency related events and setting of the trap interval.</p> <p>For more information, see:</p> <ul style="list-style-type: none"> <li>• <a href="#">Enabling SNMP Traps for Wideband Resiliency Events, on page 11</a></li> <li>• <a href="#">Enabling Wideband Resiliency Trap Notifications, on page 12</a></li> <li>• <a href="#">Setting the Trap Interval, on page 13</a></li> </ul> <p>The following commands were introduced or modified:</p> <ul style="list-style-type: none"> <li>• <b>cable resiliency traps-interval</b></li> <li>• <b>snmp-server enable traps docsis-resil</b></li> <li>• <b>snmp-server host traps docsis-resil</b></li> </ul>