



Cable Commands: snmp through w

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snmp manager

To create a DOCSIS configuration file that specifies the IP address for the Simple Network Management Protocol (SNMP) manager, use the **snmp manager** command in cable config-file configuration mode. To disable this function, use the **no** form of this command.

snmp manager *ip-address*

no snmp manager

Syntax Description

<i>ip-address</i>	Specifies an IP address for the SNMP manager.
-------------------	---

Command Default

No SNMP manager is defined.

Command Modes

Cable config-file configuration

Command History

Release	Modification
12.1(2)EC1	This command was introduced.
12.2(4)BC1	Support was added to the Release 12.2 BC train.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

For SNMP commands that affect the operation of the CMTS, see the [Cisco IOS Configuration Fundamentals Command Reference Guide](#).

Examples

The following example shows how to specify the IP address of the SNMP manager in a DOCSIS configuration file:

```
router(config)# cable config-file snmp.cm
router(config-file)# snmp manager 10.10.1.1
router(config-file)# exit
router(config)#

```

Related Commands

Command	Description
cable config-file	Creates a DOCSIS configuration file and enters configuration file mode.

Command	Description
access-denied	Disables access to the network.
channel-id	Specifies upstream channel ID.
cpe max	Specifies CPE information.
download	Specifies download information for the configuration file.
frequency	Specifies downstream frequency.
option	Provides config-file options.
privacy	Specifies privacy options for baseline privacy images.
service-class	Specifies service class definitions for the configuration file.
timestamp	Enables time-stamp generation.

snmp-server enable traps cable

snmp-server enable traps cable

To enable the sending of Simple Network Management Protocol (SNMP) traps for cable related events, use the **snmp-server enable traps cable** command in global configuration mode. To disable the sending of traps, use the **no** form of this command.

Cisco uBR10012 Universal Broadband Router and Cisco cBR-8 Converged Broadband Router

```
snmp-server enable traps cable [admission_control] [cm-chover] [cm-onoff] [cm-remote-query]
[dmic-lock] [enfrule-violation] [hccp-failover] [hopping] [metering] [rfswitch-polling] [sfp-link]
no snmp-server enable traps cable [admission_control] [cm-chover] [cm-onoff] [cm-remote-query]
[dmic-lock] [enfrule-violation] [hccp-failover] [hopping] [metering] [rfswitch-polling] [sfp-link]
```

Cisco uBR7225VXR and Cisco uBR7246VXR Universal Broadband Routers

```
snmp-server enable traps cable [admission_control] [cm-chover] [cm-onoff] [cm-remote-query]
[dmic-lock] [enfrule-violation] [hccp-failover] [hopping] [metering]
no snmp-server enable traps cable [admission_control] [cm-chover] [cm-onoff] [cm-remote-query]
[dmic-lock] [enfrule-violation] [hccp-failover] [hopping] [metering]
```

Syntax Description

admission_control	Enables traps for Service Flow Admission Control (SFAC), as defined in CISCO-CABLE-ADMISSION-CTRL-MIB.
cm-chover	Enables traps that are sent upon completion of CMTS channel override operations, as defined in CISCO-DOCS-EXT-MIB.
cm-onoff	Enables traps for CM online/offline status changes, as defined in CISCO-DOCS-EXT-MIB.
cm-remote-query	Enables traps that are sent when the remote polling of CMs has been completed, as defined in CISCO-DOCS-REMOTE-QUERY-MIB.
dmic-lock	Enables traps that are sent when a cable modem fails the dynamic shared-secret security checks, as defined in CISCO-DOCS-EXT-MIB.
enfrule-violation	Enables traps that are sent when a user violates their quality of service (QoS) profile, as defined in the CISCO-CABLE-QOS-MONITOR-MIB.
hccp-failover	Enables traps for Hot Standby Connection-to-Connection Protocol (HCCP) redundancy switchover events, as defined in CISCO-CABLE-AVAILABILITY-MIB.

hopping	Enables traps for spectrum hopping events, as defined in CISCO-CABLE-SPECTRUM-MIB.
metering	Enables traps that are sent to indicate success or failure in creating the metering record file or streaming it to the collection server, as defined in CISCO-CABLE-METERING-MIB.
rfswitch-polling	Enables traps that are sent when the connectivity between the Cisco CMTS and the Cisco RF Switch is lost, as defined in CISCO-CABLE-AVAILABILITY-MIB.
sfp-link	Enables the traps that are sent when the SFP port link status changes on the Cisco Wideband SPA, and on the Cisco uBR-MC3GX60V line card, as defined in CISCO-CABLE-WIDEBAND-MIB.

Command Default

No SNMP traps for cable-related events are enabled. You can specify one type of trap or any combination of traps. When the **snmp-server enable traps cable** command is given without any options, all cable-related traps are enabled.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.0(5)T	This command, with the cm-chover and cm-onoff options, was added.
12.0(7)XR2, 12.1(1)T	The cm-remote-query option, along with the CISCO-DOCS-REMOTE-QUERY-MIB MIB, was introduced.
12.1(2)EC1	This command was supported on the 12.1 EC train.
12.1(7)CX1	The hopping and cmts-event options were introduced.
12.2(4)BC1	This command was supported on the Cisco uBR10012 universal broadband router. The cmts-event option was also removed as redundant.
12.2(8)BC1	The hccp-failover option was supported on the Cisco uBR10012 router.
12.2(11)BC1	The hccp-failover option was supported on the Cisco uBR7200 series router.
12.2(15)BC1	The enforce-rule option was added to generate traps for subscribers who violate their enforce-rule QoS profile.
12.2(15)BC21	The dmic-lock and usage options were added.

snmp-server enable traps cable

Release	Modification
12.3BC	The admission_control , metering , and rfswitch-polling options were added.
12.2(33)SCG	The sfp-link option was added to generate traps when the SFP port link status changed on the Cisco uBR10012 router.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

For other SNMP commands that affect the operation of the CMTS, see the [Cisco CMTS Universal Broadband Router Series MIB Specifications Guide](#).

Examples

The following example shows how to enable all traps for cable-related events except HCCP switchover on the CMTS:

```
Router# configure terminal
Router(config)# snmp-server enable traps cable cm-chover cm-onoff cm-remote-query hopping
Router(config)#
The following example shows how to enable traps for any HCCP switchovers that occur on the CMTS:
```

```
Router# configure terminal
Router(config)# snmp-server enable traps cable hccp-failover
Router(config)#
The following example shows how to enable traps for when a user violates the maximum bandwidth for the quality of service (QoS) profile specified by their enforce-rule.
```

```
Router# configure terminal
Router(config)# snmp-server enable traps cable enforce-rule
Router(config)#
The following example shows how to enable traps for to see the SFP port link status on the Cisco uBR10012 router and Cisco cBR-8 router.
```

```
Router# configure terminal
Router(config)# snmp-server enable traps cable sfp-link
Router(config)#
The following example shows how to enable traps for to see the SFP port link status on the Cisco uBR10012 router and Cisco cBR-8 router.
```

Related Commands

Command	Description
cable modem remote-query	Enables and configures the remote-query feature to gather CM performance statistics on the CMTS.
debug cable remote-query	Turns on debugging to gather information from remote CMs.
show cable modem remote-query	Displays the statistics accumulated by the remote-query feature.

snmp-server enable traps docsis-cm

To enable one or more Simple Network Management Protocol (SNMP) traps for DOCSIS 1.1 events, use the **snmp-server enable traps docsis-cm** command in global configuration mode. To disable the SNMP traps, use the **no** form of this command.

Cisco uBR905 and Cisco uBR925 cable access routers, and Cisco CVA122 Cable Voice Adapter

```
snmp-server enable traps docsis-cm [bpi|bpkm|dcack|dcreq|decrsp|dhcp|dsack|dsreq|dsrsp|
dynsa|swupcvc|swupfail|swupinit|swupsucc|tlv]
```

```
no snmp-server enable traps docsis-cm [bpi|bpkm|dcack|dcreq|decrsp|dhcp|dsack|dsreq|dsrsp|
dynsa|swupcvc|swupfail|swupinit|swupsucc|tlv]
```

Syntax Description

bpi	(Optional) Enables Baseline Privacy Interface (BPI) initialization failure traps.
bpkm	(Optional) Enables Baseline Privacy Key Management (BPKM) initialization failure traps.
dcack	(Optional) Enables dynamic channel change acknowledgement failure traps.
dcreq	(Optional) Enables dynamic channel change request failure traps.
decrsp	(Optional) Enables dynamic channel change response failure traps.
dhcp	(Optional) Enables DHCP failure traps.
dsack	(Optional) Enables dynamic service acknowledgement failure traps.
dsreq	(Optional) Enables dynamic service request failure traps.
dsrsp	(Optional) Enables dynamic service response failure traps.
dynsa	(Optional) Enables dynamic SA failure traps.
swupcvc	(Optional) Enables secure software upgrade code verification certificate (CVC) failure traps.
swupfail	(Optional) Enables secure software upgrade failure traps.

snmp-server enable traps docsis-cm

swupinit	(Optional) Enables secure software upgrade initialization failure traps.
swupsucc	(Optional) Enables secure software upgrade success traps.
tlv	(Optional) Enables unknown Type/Length/Value (TLV) traps.

Command Default No traps are enabled. If no options are specified, all DOCSIS-related traps are enabled.

Command Modes Global configuration

Command History	Release	Modification
	12.2(15)CZ	This command was introduced on the Cisco uBR905 and Cisco uBR925 cable access routers, and the Cisco CVA122 Cable Voice Adapter.

Usage Guidelines This command enables the sending of SNMP traps when DOCSIS-related events occur. Multiple traps can be enabled at the same time.



The traps are described in the [DOCS-CABLE-DEVICE-TRAP-MIB](#). MIB, which is an extension of the CABLE DEVICE MIB that is defined in RFC 2669.

Examples The following example shows the BPI+ and secure software download traps being enabled:

```
Router# config terminal
Router(config)# snmp-server enable traps docsis-cm bpi bpkm swupcvc swupfail swupinit
swupsucc
Router(config)#

```

Related Commands

Command	Description
show snmp	Checks the status of SNMP communications.
snmp-server manager	Starts the SNMP manager process.

snmp-server enable traps docsis-cmts

To enable the sending of Simple Network Management Protocol (SNMP) traps for DOCSIS-related events, use the **snmp-server enable traps docsis-cmts** command in global configuration mode. To disable the sending of traps, use the **no** form of this command.

```
snmp-server enable traps docsis-cmts [ docsis-events ]
no snmp-server enable traps docsis-cmts [ docsis-events ]
```

Syntax Description	
	<p><i>docsis-events</i></p> <p>Specifies one or more of the following DOCSIS event types:</p> <ul style="list-style-type: none"> • bpi—Enables traps for BPI initialization failure events. • bpkm—Enables traps for BPKM failure events. • dcack—Enables traps for the failure of Dynamic Channel Change Acknowledgement (DCC-ACK) requests. • dcreq—Enables traps for the failure of Dynamic Channel Change Request (DCC-REQ) requests. • dcrsp—Enables traps for the failure of Dynamic Channel Change Response (DCC-RSP) requests. • dsac—Enables traps for the failure of Dynamic Service Acknowledgement (DSx-ACK) requests. • dsreq—Enables traps for the failure of Dynamic Service Request (DSx-REQ) requests. • dsrsp—Enables traps for the failure of Dynamic Service Response (DSx-RSP) requests. • dynsa—Enables traps for the failure of Dynamic Service Addition (DSA-ACK) requests. • regack—Enables traps for the failure of Registration Acknowledgement (REG-ACK) requests. • regreq—Enables traps for the failure of Registration Request (REG-REQ) requests. • regrsp—Enables traps for the failure of Registration Response (REG-RSP) requests.

```
snmp-server enable traps docsis-cmts
```

Command Default No SNMP traps for DOCSIS-related events are enabled. When the **snmp-server enable traps docsis-cmts** command is given without any options, all DOCSIS-related traps are enabled.

Command Modes Global configuration

Command History	Release	Modification
	12.1(7)CX1, 12.2(4)BC1	This command, along with the DOCS-CABLE-DEVICE-TRAP-MIB MIB, was introduced.
	IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines This command enables traps that are defined in the [DOCS-CABLE-DEVICE-TRAP-MIB](#) MIB.

For other SNMP commands that affect the operation of the CMTS, see the [Cisco IOS Configuration Fundamentals Command Reference Guide](#).

Examples The following example shows how to enable traps for the failure of DOCSIS registration-related events on the CMTS:

```
router(config)# snmp-server enable traps docsis-cmts reqack reqreq regrsp
router(config)#
```

Related Commands

Command	Description
snmp-server enable traps cable	Enables traps for cable-related events.

snmp-server enable traps docsis-resil

To enable Simple Network Management Protocol (SNMP) traps for Wideband Resiliency specific events on the Cisco CMTS, use the **snmp-server enable traps docsis-resil** command in global configuration mode. To disable SNMP traps, use the **no** form of this command.

snmp-server enable traps docsis-resil [*resil-events*]

no snmp-server enable traps docsis-resil [*resil-events*]

Syntax Description

<i>resil-events</i>	<p>Specifies one or more of the following wideband resiliency specific event types:</p> <ul style="list-style-type: none"> • cm-pmode—Enables the wideband resiliency cable modem partial service trap. • cm-recover—Enables the wideband resiliency cable modem full service trap. • event—Enables the wideband resiliency event trap. • rf-down—Enables the wideband resiliency RF channel down status trap. • rf-up—Enables the wideband resiliency RF channel up status trap.
---------------------	---

Command Default

No SNMP traps for wideband resiliency specific events are enabled. When the **snmp-server enable traps docsis-resil** command is given without any options, all wideband resiliency specific traps are enabled.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)SCG2	This command was introduced.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command enables traps that are defined in the [CISCO-DOCS-EXT-MIB.my](#) MIB.

For other SNMP commands that affect the operation of the Cisco CMTS, see the [Cisco IOS Configuration Fundamentals Command Reference Guide](#).

snmp-server enable traps docsis-resil

Examples

The following example shows how to enable traps when the RF channel logical status changes to DOWN on the Cisco CMTS:

```
router(config)# snmp-server enable traps docsis-resil rf-down
router(config)#

```

Associated Features

The **snmp-server enable traps docsis-resil** command is associated with the [Wideband Modem Resiliency](#) feature.

Related Commands

Command	Description
cableresiliencytraps-interval	Sets the interval at which traps must be sent for Wideband Resiliency related events for each cable modem on the Cisco CMTS.
show cable modem resiliency	Displays resiliency status of the cable modem in resiliency mode on the Cisco CMTS router.
snmp-server enable traps cable	Enables traps for cable-related events on the Cisco CMTS.

snmp-server host traps docsis-resil

To enable Wideband Resiliency trap notifications to a specific Simple Network Management Protocol (SNMP) host on the Cisco CMTS, use the **snmp-server host traps docsis-resil** command in global configuration mode. To disable Wideband Resiliency trap notifications to a specific SNMP host, use the **no** form of this command.

```
snmp-server host ipaddr traps string docsis-resil
no snmp-server host ipaddr traps string
```

Syntax Description

<i>ipaddr</i>	IPv4 or IPv6 address of the SNMP notification host.
<i>string</i>	SNMPv1 community string, SNMPv2c community string, or SNMPv3 username.

Command Default

Wideband Resiliency trap notifications are not sent to an SNMP host.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)SCG2	This command was introduced.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Use this command to start or stop sending Wideband Resiliency traps to a specific SNMP host.

Examples

The following example shows how to enable Wideband Resiliency trap notifications to an SNMP host:

```
Router# configure terminal
Router(config)# snmp-server host 172.17.2.0 traps snmphost01 docsis-resil
```

Associated Features

The **snmp-server host traps docsis-resil** command is associated with the [Wideband Modem Resiliency](#) feature.

snmp-server host traps docsis-resil

Related Commands

cable resiliency traps-interval	Sets the interval at which traps must be sent for Wideband Resiliency related events for each cable modem on the Cisco CMTS.
show cable modem resiliency	Displays resiliency status of the cable modem in resiliency mode on the Cisco CMTS router.
snmp-server enable traps docsis-resil	Enables SNMP Wideband Resiliency traps for Wideband Resiliency specific events on the Cisco CMTS.

spectrum-inversion

To enable or disable the spectrum-inversion for a specific QAM profile, use the **spectrum-inversion** command in QAM profile configuration mode.

spectrum-inversion {off|on}

Command Default None

Command Modes QAM profile configuration (config-qam-prof)

Command History	Release	Modification
	IOS-XE 3.15.0S	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines Use this command to enable or disable the spectrum-inversion for a specific QAM profile.

Examples The following example shows how to enable the spectrum-inversion for a specific QAM profile:

```
Router# configure terminal
Router(config)# cable downstream qam-profile 4
Router(config-qam-prof)# spectrum-inversion on
```

Related Commands

Command	Description
cable downstream qam-profile	Set the QAM profile for the cable interface line card.
interleaver-depth	Set the interleaver-depth.
modulation	Set the QAM modulation format.
annex	Set the MPEG framing format.
symbol-rate	Set the symbol rate.

start-delay

start-delay

To configure the time between start of crypto period and start of ECM broadcast, use the **start-delay** command in the DVB scrambling ECMG overrule configuration mode. To void the start delay configuration, use the **no** form of this command.

start-delay *time*

no start-delay

start-delay <i>time</i>	Specifies the time between start of crypto period and start of ECM broadcast in milliseconds.
--------------------------------	---

Command Default

None

Command Modes

DVB scrambling ECMG overrule configuration mode (config-video-encrypt-dvb-ecmg-overrule)

Release	Modification
IOS-XE 16.4.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command specifies the time between start of crypto period and start of ECM broadcast in milliseconds. The valid range is from -30000 to 0.

Examples

The following is an example of how to configure the time between start of crypto period and start of ECM broadcast in milliseconds:

```
Router>enable
Router#configure terminal
Router(config)#cable video
Router(config-video)#encryption
Router(config-video-encrypt)#dvb
Router(config-video-encrypt-dvb)#ecmg ECMG-7 id 7
Router(config-video-encrypt-dvb-ecmg)#overrule
Router(config-video-encrypt-dvb-ecmg-overrule)#start-delay 10000
```

Related Commands

Command	Description
overrule	Enters DVB scrambling configuration mode.
ac-start-delay	Specifies the time between start of first CP after a change in AC and start of ECM broadcast.

Command	Description
ac-stop-delay	Specifies the time between end of last CP preceding a change in AC and end of ECM broadcast.
max-comp-time	Specifies the maximum time needed by ECMG to compute an ECM.
max-streams	Specifies the maximum number of simultaneous open streams supported by the ECMG on a channel.
min-cp-duration	Specifies the minimum crypto period.
rep-period	Specifies the time between two ECM packets at the output.
stop-delay	Specifies the delay between the end of CP and ECM broadcast.
trans-start-delay	Specifies the transition start delay.
trans-stop-delay	Specifies the transition stop delay.

start-frequency

start-frequency

To specify the starting frequency associated with the first configurable subcarrier in the profile determined by the width, use the **start-frequency** command in OFDM modulation profile configuration mode. To undo the start frequency assignment, use **no** form of this command.

start-frequency *frequency*

no start-frequency

Syntax Description

<i>frequency</i>	OFDM channel start frequency in Hz.
------------------	-------------------------------------

Command Default

None

Command Modes

OFDM modulation profile configuration (config-ofdm-mod-prof)

Command History

Release	Modification
IOS-XE 3.18.0SP	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Use this command to specify the starting frequency associated with the first configurable subcarrier in the profile determined by the width.

Modulation profiles configured with a start frequency can only be applied to channels with the same start frequency. If no start frequency is configured, the profile can be applied to any channel.

Examples

The following example shows how to specify the starting frequency:

```
Router# configure terminal
Router(config)# cable downstream ofdm-modulation-profile 21
Router(config-ofdm-mod-prof)# start-frequency 108000000
```

Related Commands

Command	Description
cable downstream ofdm-modulation-profile	Define the OFDM modulation profile on the OFDM channel.
description (OFDM modulation profile)	Specify a user defined description for the profile up to 64 characters.

Command	Description
assign	Assign modulations to subcarriers.
subcarrier-spacing	Specify the spacing for specific subcarriers configured in this profile.
width	Specify width of profile in Hz.

stop-delay

stop-delay

To configure the time between end of crypto period and end of ECM broadcast, use the **stop-delay** command in the DVB scrambling ECMG overrule configuration mode. To void the stop delay configuration, use the **no** form of this command.

stop-delay *time*

no stop-delay

stop-delay <i>time</i>	Specifies the time between end of crypto period and end of ECM broadcast in milliseconds.
-------------------------------	---

Command Default

None

Command Modes

DVB scrambling ECMG overrule configuration mode (config-video-encrypt-dvb-ecmg-overrule)

Release	Modification
IOS-XE 16.4.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command specifies the time between end of crypto period and end of ECM broadcast in milliseconds. The valid range is from 0 to 30000.

Examples

The following is an example of how to configure the time between end of crypto period and end of ECM broadcast in milliseconds:

```
Router>enable
Router#configure terminal
Router(config)#cable video
Router(config-video)#encryption
Router(config-video-encrypt)#dvb
Router(config-video-encrypt-dvb)#ecmg ECMG-7 id 7
Router(config-video-encrypt-dvb-ecmg)#overrule
Router(config-video-encrypt-dvb-ecmg-overrule)#stop-delay 10000
```

Related Commands

Command	Description
overrule	Enters DVB scrambling configuration mode.
ac-start-delay	Specifies the time between start of first CP after a change in AC and start of ECM broadcast.

Command	Description
ac-stop-delay	Specifies the time between end of last CP preceding a change in AC and end of ECM broadcast.
max-comp-time	Specifies the maximum time needed by ECMG to compute an ECM.
max-streams	Specifies the maximum number of simultaneous open streams supported by the ECMG on a channel.
min-cp-duration	Specifies the minimum crypto period.
rep-period	Specifies the time between two ECM packets at the output.
start-delay	Specifies the delay between the start of CP and ECM broadcast.
trans-start-delay	Specifies the transition start delay.
trans-stop-delay	Specifies the transition stop delay.

strong-pairing-enforce

strong-pairing-enforce

To switch on the NDS strong pairing enforcement, use the **strong-pairing-enforce** command in the DVB scrambling configuration mode. To switch off the NDS strong pairing enforcement, use the **no** form of this command.

strong-pairing-enforce

no strong-pairing-enforce

Command Default None

Command Modes DVB scrambling configuration mode (config-video-encrypt-dvb)

Release	Modification
IOS-XE 16.4.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines Strong pairing enforcement is used in the NDS CA setup. When strong pairing enforcement is enabled, the strong pairing enforcement bit is always reset in the control word.

Examples The following is an example of how to switches on the NDS strong pairing enforcement:

```
Router>enable
Router#configure terminal
Router(config) #cable video
Router(config-video) #encryption
Router(config-video-encrypt) #dvb
Router(config-video-encrypt-dvb) #strong-pairing-enforce
```

Related Commands

Command	Description
dvb	Enters DVB scrambling configuration mode.
scramble-video-audio	Scrambles only video and audio pids.
check-scg-at-prov	Enables Check SCG at provision time.
route-ecmg	Configures the route to the ECMG server.
mgmt-ip	Configures the manangement IP for EIS/Broadcast ECMG.
ca-interface	Configures the conditional access interface.

Command	Description
tier-based	Enters the tier-based scrambling configuration mode.
ecmg	Enters the ECM Generator configuration mode.
eis	Enters the Event Information Scheduler configuration mode.

subcarrier-spacing

To specify the spacing for specific subcarriers configured in this profile, use the **subcarrier-spacing** command in OFDMA modulation profile, OFDM modulation profile, or OFDM channel profile configuration mode. To undo the spacing assignment, use **no** form of this command.

subcarrier-spacing [25KHz| 50KHz]

no subcarrier-spacing

Command Default 50 KHz

Command Modes OFDM modulation profile configuration (config-ofdm-mod-prof)
OFDM channel profile configuration (config-ofdm-chan-prof)
OFDMA modulation profile configuration (config-ofdma-mod-profile)

Command History	Release	Modification
	IOS-XE 3.18.0SP	This command was introduced on the Cisco cBR Series Converged Broadband Routers.
	Cisco IOS XE Everest 16.6.1	This command can be used in the OFDMA modulation profile configuration (config-ofdma-mod-profile) command mode.

Usage Guidelines Use this command to specify the spacing for specific subcarriers configured in this profile. When a modulation profile is configured in a channel profile, the modulation profile subcarrier spacing must match the channel profile subcarrier spacing.

Examples The following example shows how to specify the subcarrier spacing:

```
Router# configure terminal
Router(config)# cable downstream ofdm-modulation-profile 21
Router(config-ofdm-mod-prof)# subcarrier-spacing 25KHz
```

The following example shows how to specify the subcarrier spacing for OFDMA channel:

```
outer# configure terminal
Router(config)# cable mod-profile-ofdma 466
Router(config-ofdma-mod-profile)# subcarrier-spacing 50KHz
```

Related Commands

Command	Description
cable downstream ofdm-modulation-profile	Define the OFDM modulation profile on the OFDM channel.
description (OFDM modulation profile)	Specify a user defined description for the profile up to 64 characters.
assign	Assign modulations to subcarriers.
start-frequency	(Optional) Specify the starting frequency associated with the first configurable subcarrier in the profile determined by the width.
width	Specify width of profile in Hz.

switchover pxf restart

switchover pxf restart

To configure the maximum number of PXF crashes that are allowed within a specified time period, use the **switchover pxf restart** command in redundancy configuration (main-cpu) mode. To reset the router to its default values, use the **no** form of this command.

switchover pxf restart *number-of-crashes* *time-period*

no switchover pxf restart

Syntax Description

<i>number-of-crashes</i>	Maximum number of PXF crashes that are allowed within the specified time period. If the PXF processors crash this many times within the given time period, the router switches over to the redundant PRE1 module. The valid range is 1 to 25, with a default of 2.
<i>time-period</i>	Time period, in hours, that PXF crashes are monitored. The valid range is 0 to 120 hours, with a default of 5.

Command Default 2 PXF crashes within 5 hours are allowed (**switchover pxf restart 2 5**)

Command Modes Redundancy configuration, main-cpu mode

Command History

Release	Modification
12.2(15)BC2	This command was introduced for the Cisco uBR10012 router.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The PXF processors that are onboard the PRE1 module automatically restart themselves if a crash occurs. Occasional crashes could be expected, but repeated crashes could indicate a hardware problem.

The **switchover pxf restart** command specifies the maximum number of times that a PXF processor can crash during a specified time period before the router switches over to the redundant PRE1 module. If the PXF processors crash this number of times, the router assumes a hardware problem and initiates a switchover to the redundant PRE1 module.

**Note**

When a switchover occurs because of repeated PXF crashes, the router displays the following system message: C10KEVENTMGR-3-PXF_FAIL_SWITCHOVER: Multiple PXF failures, switchover to redundant PRE initiated.

Examples

The following example shows how to configure the router so that if five PXF crashes occur within a one-hour period, the router should initiate a switchover to the redundant PRE1 module.

```
Router# config t
Router(config)# redundancy
Router(config-r)# main-cpu
Router(config-r-mc)# switchover pxf restart 5 1
Router(config-r-mc)# exit
Router(config-f)# exit
Router(config)#

```

Related Commands

Command	Description
main-cpu	Enters main-CPU redundancy configuration mode, so that you can configure the synchronization of the active and standby Performance Routing Engine (PRE1) modules.
redundancy	Configures the synchronization of system files between the active and standby PRE1 modules.
redundancy force-failover main-cpu	Forces a manual switchover between the active and standby PRE1 modules.

switchover timeout

switchover timeout

To configure the switchover timeout period of the PRE1 module, use the **switchover timeout** command in redundancy configuration (main-cpu) mode. To reset the timeout period to its default value, use the **no** form of this command.

switchover timeout *timeout-period*

no switchover timeout

Syntax Description

<i>timeout-period</i>	Specifies the timeout, in milliseconds. The range is 0 to 25000 milliseconds (25 seconds), where 0 specifies no timeout period.
-----------------------	---

Command Default 0

Command Modes Redundancy configuration, main-cpu mode

Command History

Release	Modification
12.2(11)BC3	This command was introduced for the Cisco uBR10012 router.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The **switchover timeout** command specifies how long the standby PRE module should wait when it does not detect a heartbeat from the active PRE module before initiating a switchover and assuming responsibility as the active PRE module. If set to 0, the standby PRE module initiates a switchover immediately when the active PRE module misses a scheduled heartbeat.

Examples

The following example shows how to set the timeout period to 60 milliseconds:

```
Router# config t
Router(config)# redundancy
Router(config-r)# main-cpu
Router(config-r-mc)# switchover timeout 60
Router(config-r-mc)# exit
Router(config-f)# exit
```

```
Router(config) #
```

Related Commands

Command	Description
main-cpu	Enters main-CPU redundancy configuration mode, so that you can configure the synchronization of the active and standby Performance Routing Engine (PRE1) modules.
redundancy	Configures the synchronization of system files between the active and standby PRE1 modules.
redundancy force-failover main-cpu	Forces a manual switchover between the active and standby PRE1 modules.

symbol-rate

symbol-rate

To set the symbol rate for a specific QAM profile, use the **symbol-rate** command in QAM profile configuration mode.

symbol-rate *symbol-rate*

Syntax Description

<i>symbol-rate</i>	Specifies the symbol rate value in kilo-symbol/sec.
--------------------	---

Command Default None

Command Modes QAM profile configuration (config-qam-prof)

Command History

Release	Modification
IOS-XE 3.15.0S	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines Use this command to set the symbol rate for a specific QAM profile.

Examples The following example shows how to set the symbol rate for a specific QAM profile:

```
Router# configure terminal
Router(config)# cable downstream qam-profile 4
Router(config-qam-prof)# symbol-rate 5361
```

Related Commands

Command	Description
cable downstream qam-profile	Set the QAM profile for the cable interface line card.
interleaver-depth	Set the interleaver-depth.
modulation	Set the QAM modulation format.
spectrum-inversion	Set the spectrum-inversion on or off.
annex	Set the MPEG framing format.

table-based

To define a table based video session, use the **table-based** command in video configuration mode. To delete all table based sessions, use the **no** form of this command.

table-based

no table-based

Command Default None

Command Modes Video configuration (config-video)

Command History	Release	Modification
	IOS-XE 3.18.0S	This command is introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines This command defines the video session as table based.

Examples The following example shows how to define a table based video session:

```
Router# configure terminal
Router(config)#cable video
Router(config-video)#table-based
```

Related Commands

Command	Description
session	Specifies and configures the table based video session.
vei-bundle	Bundles the virtual edge inputs for a particular LED.
show cable video vei-bundle	Displays the virtual edge input bundle information.
show controllers integrated-cable	Displays the integrated cable configuration information.
show cable video integrated-cable	Displays the integrated cable controller information.

tag

tag

To add a tag to a restricted load balancing group (RLBG), use the **tag** command in the config-lb-group configuration mode. To remove the tag, use the **no** form of this command.

tag *tag-name*

no tag *tag-name*

Syntax Description

<i>tag-name</i>	The name of the tag that has been created and configured for the load balancing group.
-----------------	--

Command Default

No default behavior or values.

Command Modes

DOCSIS load balancing group mode (config-lb-group)

Command History

Release	Modification
12.2(33)SCC	This command was introduced.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

You can use the **tag** command to add a tag to a RLBG, only if the tag is already created using the **cable tag** command for the DOCSIS load balancing group on the CMTS.

Examples

The following example shows how to add a tag to a RLBG using the **tag** command.

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# cable load-balance docsis-group 1
Router(config-lb-group)# restricted
Router(config-lb-group)# tag CSCO
Router(config-lb-group)#

```

Related Commands

Command	Description
cable load-balance docsis-group	Configures a DOCSIS load balancing group on the CMTS.

Command	Description
show cable load-balance docsis-group	Displays real-time configuration, statistical, and operational information for load balancing operations on the router.
cable tag	Configures a tag for a DOCSIS load balancing group on the CMTS.

test cable dcc (Supporting Dynamic Channel Change)

To move a specified cable modem or a group of cable modems to another channel, or to test Dynamic Channel Change (DCC) for load balancing on the Cisco CMTS, use the following command in privileged EXEC mode.

```
test cable dcc {source-interface [cable slot/subslot/cable-interface-index | integrated-cable slot/subslot/cable-interface-index | modular-cable slot/subslot/cable-interface-index] | sid | ip-addr | mac-addr | frequency frequency} {destination-interface [cable slot/subslot/cable-interface-index | integrated-cable slot/subslot/cable-interface-index | modular-cable slot/subslot/cable-interface-index] upstream-port} {init-tech | force | tlv}
```

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```
test cable dcc { source-interface [ integrated-cable slot/subslot/cable-interface-index | ip-addr | mac-addr ] {destination-interface [ integrated-cable slot/subslot/cable-interface-index ] upstream-port} {init-tech}}
```

Syntax Description

<i>source-interface</i>	Source interface of the cable modem. Use any one of the following options: <ul style="list-style-type: none">• (Not applicable for Cisco cBR Series Converged Broadband Routers) cable—Specifies the name of the source downstream interface for the DCC transaction.• (For Cisco cBR Series Converged Broadband Routers) integrated-cable—Specifies the name of the integrated-cable interface to which the cable modem belongs.• (Not applicable for Cisco cBR Series Converged Broadband Routers) modular-cable—Specifies the name of the modular-cable interface to which the cable modem belongs.• <i>slot/subslot/cable-interface-index</i>—Slot, subslot, and downstream controller number assigned to the cable modem.
sid	(Optional) Specifies the primary Service ID (sid) value of the cable modem for that interface.
ip-addr	Specifies the IP address of the cable modem to be moved for DCC test.
mac-addr	Specifies the MAC address of the cable modem to be moved for DCC test.

frequency <i>frequency</i>	Specifies the DCC downstream frequency parameter. (Not applicable for Cisco cBR Series Converged Broadband Routers) <i>frequency</i> —New downstream frequency in Hz. The valid range is between 55000000 to 1050000000 Hz.
<i>destination-interface</i>	Destination interface of the cable modem. Use any one of the following options: <ul style="list-style-type: none"> • cable—Specifies the name of the target or destination downstream interface to which the cable modem should be moved. • integrated-cable—Specifies the name of the integrated-cable interface to which the cable modem should be moved. • modular-cable—Specifies the name of the modular-cable interface to which the cable modem should be moved. • <i>slot/subslot/cable-interface-index</i>—Slot, subslot, and downstream controller number assigned to the cable modem.
upstream-port	Specifies the upstream port of the destination interface.
<i>init-tech</i>	(Optional) DOCSIS 3.0 GLBG DCC initialization techniques. The valid range is from 1 to 4. For Cisco cBR Series Converged Broadband Routers, the valid range is from 0 to 4. Note If <i>init-tech</i> is not specified, its value is taken as 0.
<i>force</i>	(Optional) (Not for Cisco cBR Series Routers) Target modem or group of modems that are forced to move to the specified downstream interface or upstream channel. Note This option is available only when <i>init-tech</i> is set to 0 and is used to move cable modems with Internet Group Management Protocol (IGMP) or Resource-reservation protocol (RSVP) configuration. Note This option cannot be used with the <i>tlv</i> option.
<i>tlv</i>	(Optional) (Not for Cisco cBR Series Routers) Specifies the type-length-value (TLV) in a DCC request message. This is represented as HEX data. Note <i>force</i> option is not available if the <i>tlv</i> option is used.

test cable dcc (Supporting Dynamic Channel Change)

Command Default Test functions are disabled by default.

Command Modes Privileged EXEC (#)

Command History

Release	Modification
12.3(17a)BC	This command was introduced on the Cisco uBR10012 router and the Cisco uBR7246VXR router, with supporting broadband processing engines (BPEs) or cable interface line cards on the respective routers.
12.2(33)SCF2	The <i>force</i> argument was introduced.
IOS-XE 3.15.OS	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Examples

The following examples illustrate DCC verification, using the **test cable dcc** command.

The following example shows how to move a target cable modem, specified by MAC address, IP address, or the primary SID value on the source interface to a target downstream with the specified frequency using DCC intialization technique 0:

```
Router# test cable dcc [<mac-addr>|<ip-addr>|<cable-if-src><sid>] frequency <freq-value>
Frequency-value: <55000000-85800000> New Downstream Frequency in HZ.
The following example shows how to move a target cable modem, specified by MAC address, IP address, or the primary SID value on the source interface to a upstream channel on a target downstream with the DCC-REQ TLV given in the specified HEX data.
```

```
Router# test cable dcc [<mac-addr>|<ip-addr>|<cable-if-src><sid>] TLV<Hex-data>
The following example shows how to move all cable modems on a source interface to a target downstream with the specified frequency using DCC intialization technique 0.
```

```
Router# test cable dcc <cable-if-src> frequency<frequency-value>
Frequency-value: <55000000-85800000> New Downstream Frequency in HZ.
The following example shows how to force a cable modem to move to a modular-cable interface 7/0/0:2 with init-tech set to 0:
```

```
Router# test cable dcc 0023.4ed0.db25 modular-Cable 7/0/0:0 0 0 force
Router# show cable modem 0023.4ed0.db25
Load for five secs: 1%/0%; one minute: 1%; five minutes: 1%
Time source is hardware calendar, *10:00:48.167 SGT Wed Nov 16 2011
MAC Address      IP Address      I/F          MAC          Prim RxPwr  Timing Num I
                                         State        Sid (dBmV)  Offset CPE P
                                         offline      19    0.50   1862    0   N
0023.4ed0.db25 30.11.2.118   C7/0/0/U0
The following example illustrates using test cable dccc command on Cisco cBR Series Converged Broadband Routers:
Router# test cable dcc 0025.2e2d.77c8 integrated-Cable 3/0/0:0 1 0
Router# show cable modem 0025.2e2d.77c8
DMAC Address IP Address I/F MAC Prim RxPwr Timing Num I
```

```
State Sid (dBm) Offset CPE P
0025.2e2d.77c8 100.1.0.2 C3/0/0/U1 online 1 -1.00 1796 0 N
test dcc integrated-Cable 3/0/0:0 1 integrated-Cable 3/0/0:0 0 1
```

```
Router# show cable modem 0025.2e2d.77c8
MAC Address IP Address I/F MAC Prim RxPwr Timing Num I
State Sid (dBm) Offset CPE P
0025.2e2d.77c8 100.1.0.2 C3/0/0/U0 online 1 -1.00 1796 0 N
```

Usage Guidelines

This command is subject to the restrictions and prerequisites described in [Load Balancing, Dynamic Channel Change, and Dynamic Bonding Change on the Cisco CMTS Routers](#).

The Cisco CMTS does not support the *force* option for **test cable dcc tlv** command where *tlv* is a HEXDATA node.

Related Commands

Command	Description
cable load-balance group (Supporting Dynamic Channel Change)	Sets multiple parameters for load balancing with DCC.
cable load-balance group dcc-init-technique (Supporting Dynamic Channel Change)	Sets the initialization technique for Dynamic Channel Change (DCC) for load balancing.
cable load-balance group policy (Supporting Dynamic Channel Change)	Sets the type of service flow policy (PacketCable MultiMedia (PCMM) or Unsolicited Grant Service (UGS)) for use with load balancing and DCC.
cable load-balance group threshold (Supporting Dynamic Channel Change)	Sets the threshold levels for corresponding service flow types for the specified load balancing group, supporting Dynamic Channel Change (DCC).
show controllers cable	Displays statistics for Dynamic Channel Change (DCC) for load balancing.
show cable modem	Displays the information about registered and unregistered cable modems.

threshold

threshold

To specify the load limit beyond which load balancing occurs, use the **threshold** command in the config-lb-group configuration mode. To remove the specified load limit, use the **no** form of this command.

threshold {load| {minimum *I-100*| 1-100}| pcmm *I-100*| stability *0-100*| ugs *I-100*}

nothreshold {load| {minimum *I-100*| 1-100}| pcmm *I-100*| stability *0-100*| ugs *I-100*}

Syntax Description

load {minimum}	Specifies interface load threshold settings as a percentage value. You can also set minimum number of modems/flows difference ranging from 1 to 100 before load balancing starts.
pcmm	Specifies PCMM service flow threshold as a percentage value.
stability	Specifies stability condition detection threshold as a percentage value.
ugs	Specifies stability detection threshold as a percentage value.
<i>I-100</i>	<p>Interface utilization threshold in percentage of the interface capacity.</p> <p>Note When utilization method is used, the <i>I-100</i> utilization threshold is a percentage of the interface capacity. When modem method is used, the <i>I-100</i> utilization threshold is a percentage difference of number of modems between the two interfaces.</p>

Command Default None

Command Modes DOCSIS load balancing group mode (config-lb-group)

Command History

Release	Modification
12.2(33)SCC	This command was introduced.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Examples

The following example shows how to configure the threshold of the DOCSIS LBG using the **threshold** command.

```
Router# configure terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
Router(config)# cable load-balance docsis-group 1  
Router(config-lb-group)# threshold load minimum 10  
Router(config-lb-group)#{/pre>
```

Related Commands

Command	Description
cable load-balance docsis-group	Configures a DOCSIS load balancing group on the CMTS.
show cable load-balance docsis-group	Displays real-time configuration, statistical, and operational information for load balancing operations on the router.

tier-based

tier-based

To enter the tier-based scrambling configuration mode, use the **tier-based** command in the DVB scrambling configuration mode. To void the tier-based scrambling configuration, use the **no** form of this command.

tier-based

no tier-based

Command Default None

Command Modes DVB scrambling configuration mode (config-video-encrypt-dvb)

Release	Modification
IOS-XE 16.4.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Examples The following is an example of how to enter the tier-based scrambling configuration mode:

```
Router>enable
Router#configure terminal
Router(config)#cable video
Router(config-video)#encryption
Router(config-video-encrypt)#dvb
Router(config-video-encrypt-dvb)#tier-based
Router(config-video-encrypt-dvb-tier)#

```

Related Commands

Command	Description
ecmg	Configures the tier-based scrambling.
enable	Enables the tier-based scrambling.

timeout init-session

To set the default video session initial ranging timeout, use the **timeout init-session** command in the video configuration mode.

timeout init-session *number*

Syntax Description

<i>number</i>	The initial ranging timeout value . The default video session init timeout is 1000 msec. The permissible range is 100 to 60000 msec.
---------------	--

Command Default

None.

Command Modes

Video configuration mode (config-video)

Command History

Release	Modification
Cisco IOS-XE Release 3.18.0S	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command is used to change the default video session initial ranging timeout.

Examples

The following example shows how to change the default video session initial ranging timeout:

```
configure terminal  
cable video  
timeout init-session 5000
```

timeout idle-session

timeout idle-session

To set the default video timeout idle-session, use the **timeout idle-session** command in the video configuration mode.

timeout idle-session *number*

Syntax Description	<i>number</i>	The idle session timeout value. The default video idle session timeout is 250 msec. The permissible range is 100 to 5000 msec.
--------------------	---------------	---

Command Default	None.
------------------------	-------

Command Modes	Video configuration mode (config-video)
----------------------	---

Command History	Release	Modification
	Cisco IOS-XE Release 3.18.0S	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines	This command is used to change the default video timeout idle-session.
-------------------------	--

Examples	The following example shows how to change the default video timeout idle-session:
-----------------	---

```
configure terminal
cable video
timeout idle-session 1500
```

timeout off-session

To set the default off-session timeout, use the **timeout off-session** command in the video configuration mode.

timeout off-session *number*

Syntax Description	<i>number</i>	Off session timeout value. The default value is 60 seconds. The permissible range is 1 to 1800.
--------------------	---------------	---

Command Default	None.
------------------------	-------

Command Modes	Video configuration mode (config-video)
----------------------	---

Command History	Release	Modification
	Cisco IOS-XE Release 3.18.0S	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines	This command is used to change the default off session timeout value.
-------------------------	---

Examples	The following example shows how to change the default off session timeout value:
-----------------	--

```
configure terminal  
cable video  
timeout off-session 100
```

timestamp

timestamp

To create a DOCSIS configuration file that enables timestamp generation, use the **timestamp** command in cable config-file configuration mode. To disable this function, use the **no** form of this command.

timestamp

no timestamp

Syntax Description This command has no arguments or keywords.

Command Default None

Command Modes Cable config-file configuration

Command History	Release	Modification
	12.1(2)EC1	This command was introduced.
	12.2(4)BC1	Support was added to the Release 12.2 BC train.
	IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines The DOCSIS specification supports the optional time-stamping of DOCSIS configuration files by adding a field to the file that shows the time that the file was sent to the CM. This prevents someone from trying to subvert DOCSIS security by replaying a valid DOCSIS configuration file to another CM. The timestamp is expressed as the number of seconds since midnight on January 1, 1900.

Examples The following example shows how to enable timestamp generation for the DOCSIS configuration file.

```
router(config)# cable config-file upgrade.cm
router(config-file)# timestamp
router(config-file)# exit
router(config)#
```

Related Commands

Command	Description
cable config-file	Creates a DOCSIS configuration file and enters configuration file mode.
access-denied	Disables access to the network.

Command	Description
channel-id	Specifies upstream channel ID.
cpe max	Specifies CPE information.
download	Specifies download information for the configuration file.
frequency	Specifies downstream frequency.
option	Provides config-file options.
privacy	Specifies privacy options for baseline privacy images.
service-class	Specifies service class definitions for the configuration file.
snmp manager	Specifies Simple Network Management Protocol (SNMP) options.

tlv

To configure a TLV type tag matching rule, use the **tlv** command in CMTS-tag configuration mode.

tlv type value

Syntax Description

<i>type</i>	Specifies the type identifier. It can be one of the following: <ul style="list-style-type: none">• mrcs - Multiple Receive Channel Support.• mtcs - Multiple Transmit Channel Support.• ufrs - Upstream Frequency Range Support.
<i>value</i>	Specifies a decimal number value for the type tag. The range is 0 to 255.

Command Default None

Command Modes CMTS tag configuration mode (config-cmts-tag).

Command History

Release	Modification
12.2(33)SCH	This command was introduced.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Examples

The following example shows how to configure the **tlv** command:

```
Router# configure terminal
Router(config)# cable tag 1
Router(config-cmts-tag)# tlv mrcs 3
```

Related Commands

Command	Description
cable tag	To configure a tag for a DOCSIS load balancing group on the CMTS.

tos

To configure the Type of Service (ToS) byte in the header of Layer 2 tunneled packets, use the **tos** command in DEPI tunnel configuration mode. To disable a configured ToS value, use the **no** form of this command.

tos value

no tos value

Syntax Description

value	Value of the ToS byte for IP packets in a Layer 2 Tunnel Protocol version 3 (L2TPv3) data session. The valid values range from 0 to 255. The default value is 0.
--------------	--

Command Default None

Command Modes DEPI tunnel configuration

Command History

Release	Modification
12.2(33)SCC	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The **tos** command allows you to manually configure the value of the ToS byte used in the headers of Layer 2 tunneled packets.

Examples

The following example shows how to assign a ToS value of 100:

```
Router# configure terminal
Router(config)# depi-tunnel rf6
Router(config-depi-tunnel)# tos 100
```

Related Commands

Command	Description
depi-tunnel	Specifies the name of the depi-tunnel and enters the DEPI tunnel configuration mode.

tos

tos (multicast qos)

To set type of service (ToS) low byte, high byte, and mask values within a multicast QoS group, use the **tos** command in multicast QoS configuration mode. To disable the type of service, use the **no** form of this command.

tos *low-byte high-byte mask*

no tos *low-byte high-byte mask*

Syntax Description		
	<i>low-byte</i>	Specifies the minimum ToS data bytes for a multicast QoS group. The valid range is 0–255.
	<i>high-byte</i>	Specifies the maximum ToS data bytes for a multicast QoS group. The valid range is 0–255.
	<i>mask</i>	Specifies the ToS mask for a multicast QoS group. The valid range is 0–255.

Command Default ToS parameters are not defined for a specific multicast QoS group.

Command Modes Multicast QoS configuration (config-mqos)

Command History	Release	Modification
	12.2(33)SCA	This command was introduced.
	IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines The three precedence bits in the ToS byte in the IP header specifies a class of service assignment for each packet. Those packets with the precedence bit set in the ToS field are given higher priority.

Examples The following example defines the low and high ToS rates and the mask value using the **tos** command:

```
Router(config)# cable multicast qos group 20 priority 55 global
Router(config-mqos)# tos 1 6 15
```

tos (multicast qos)

Related Commands

Command	Description
cable multicast qos group	Specifies and configures a cable multicast QoS group.
show interface bundle multicast-sessions	Displays multicast session information for a specific virtual cable bundle.
show interface cable multicast-sessions	Displays multicast session information for a specific cable interface.

trans-start-delay

To configure the transition start delay, use the **trans-start-delay** command in the DVB scrambling ECMG overrule configuration mode. To void the transition start delay configuration, use the **no** form of this command.

trans-start-delay time

no trans-start-delay

trans-start-delay *time* Specifies the transition start delay in milliseconds.

Command Default None

DVB scrambling ECMG overrule configuration mode (config-video-encrypt-dvb-ecmg-overrule)

Release	Modification
IOS-XE 16.4.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command specifies the transition start delay in milliseconds. The valid range is from -30000 to 0.

Examples

The following is an example of how to configure the transition start delay in milliseconds:

```
Router>enable
Router#configure terminal
Router(config)#cable video
Router(config-video)#encryption
Router(config-video-encrypt)#dvb
Router(config-video-encrypt-dvb)#ecmg ECMG-7 id 7
Router(config-video-encrypt-dvb-ecmg)#overrule
Router(config-video-encrypt-dvb-ecmg-overrule)#trans-start-delay -10000
```

Related Commands

Command	Description
overrule	Enters DVB scrambling configuration mode.
ac-start-delay	Specifies the time between start of first CP after a change in AC and start of ECM broadcast.
ac-stop-delay	Specifies the time between end of last CP preceding a change in AC and end of ECM broadcast.

trans-start-delay

Command	Description
max-comp-time	Specifies the maximum time needed by ECMG to compute an ECM.
max-streams	Specifies the maximum number of simultaneous open streams supported by the ECMG on a channel.
min-cp-duration	Specifies the minimum crypto period.
rep-period	Specifies the time between two ECM packets at the output.
start-delay	Specifies the delay between the start of CP and ECM broadcast.
stop-delay	Specifies the delay between the end of CP and ECM broadcast.
trans-stop-delay	Specifies the transition stop delay.

trans-stop-delay

To configure the transition stop delay, use the **trans-stop-delay** command in the DVB scrambling ECMG overrule configuration mode. To void the transition stop delay configuration, use the **no** form of this command.

trans-stop-delay time

no trans-stop-delay

trans-stop-delay <i>time</i>	Specifies the transition stop delay in milliseconds.
-------------------------------------	--

Command Default None

DVB scrambling ECMG overrule configuration mode (config-video-encrypt-dvb-ecmg-overrule)

Release	Modification
IOS-XE 16.4.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command specifies the transition stop delay in milliseconds. The valid range is from 0 to 30000.

Examples

The following is an example of how to configure the transition stop delay in milliseconds:

```
Router>enable
Router#configure terminal
Router(config)#cable video
Router(config-video)#encryption
Router(config-video-encrypt)#dvb
Router(config-video-encrypt-dvb)#ecmg ECMG-7 id 7
Router(config-video-encrypt-dvb-ecmg)#overrule
Router(config-video-encrypt-dvb-ecmg-overrule)#trans-stop-delay 10000
```

Related Commands

Command	Description
overrule	Enters DVB scrambling configuration mode.
ac-start-delay	Specifies the time between start of first CP after a change in AC and start of ECM broadcast.
ac-stop-delay	Specifies the time between end of last CP preceding a change in AC and end of ECM broadcast.

trans-stop-delay

Command	Description
max-comp-time	Specifies the maximum time needed by ECMG to compute an ECM.
max-streams	Specifies the maximum number of simultaneous open streams supported by the ECMG on a channel.
min-cp-duration	Specifies the minimum crypto period.
rep-period	Specifies the time between two ECM packets at the output.
start-delay	Specifies the delay between the start of CP and ECM broadcast.
stop-delay	Specifies the delay between the end of CP and ECM broadcast.
trans-start-delay	Specifies the transition start delay.

type

To define the QAM data type, use the **type** command in the RF channel sub configuration mode.

type {docsis | video}

Syntax Description	docsis Defines the QAM data type as DOCSIS. video Defines the QAM data type as video.
---------------------------	--

Command Default	None.
Command Modes	RF channel sub configuration mode (config-rf-chan)
Usage Guidelines	This command is used to define the QAM data type.

Examples	The following example shows how to change the output mode:
<pre>router#configure terminal router(config)#controller integrated-cable 3/0/0 router(config-controller)#rf Chan 5 10 router(config-controller)#shutdown router(config-rf-chan)#type video router(config-rf-chan)#frequency 723000000 router(config-rf-chan)#rf-output alt router(config-rf-chan)#exit router(config-controller)#exit router(config)#exit router#show controller integrated-Cable 3/0/0 rf-channel 5 10 Chan State Admin Frequency Type Annex Mod srate Interleaver dcid power output 5 TEST UP 723000000 VIDEO B 256 5361 I32-J4 164 34 ALT 10 TEST UP 753000000 VIDEO B 256 5361 I32-J4 169 34 ALT</pre>	

Related Commands	Command	Description
	controller integrated-cable	Enters the controller configuration mode.
	frequency	Defines the RF channel frequency.
	qam-profile	Defines the QAM profile number.
	rf-chan	Enters the RF channel sub configuration mode.
	rf-output	Defines the QAM output mode.
	power-adjust	Defines the channel power level.

type

type (ECMG)

To configure the ECMG type, use the **type** command in the DVB scrambling ECMG configuration mode.

```
type {hitachi|irdeto|nagra|pkey|standard}
```

Command Default	None
------------------------	------

Command Modes	DVB scrambling ECMG configuration mode (config-video-encrypt-dvb-ecmg)
----------------------	--

Release	Modification
IOS-XE 16.4.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Examples	The following is an example of how to configure the ECMG type:
-----------------	--

```
Router>enable
Router#configure terminal
Router(config)#cable video
Router(config-video)#encryption
Router(config-video-encrypt)#dvb
Router(config-video-encrypt-dvb)#ecmg ECMG-7 id 7
Router(config-video-encrypt-dvb-ecmg)#type standard
```

Related Commands

Command	Description
ecmg	Enters the ECM Generator configuration mode.
auto-channel-id	Enables automatic channel ID selection.
connection	Configures the ECMG connection.
ecm-pid-source	Configures the source of ECM PID.
ca-system-id	Configures the CA system ID.
mode	Configures the application mode of ECMG.
desc-rule	Configures the descriptor rule.
overrule	Overrules the default settings.

upgrade fpd auto

upgrade fpd auto

To enable automatic upgrade of the Field Programmable Device (FPD) image on the Cisco cBR-8 router, use the **upgrade fpd auto** command in privileged EXEC mode.

upgrade fpd auto

no upgrade fpd auto

Command Default FPD auto upgrade is enabled by default.

Command Modes Global configuration (config)

Command History	Release	Modification
	IOS-XE 3.15.0S	This command was introduced on the Cisco cBR Series Converged Broadband Routers. This command replaces the upgrade fpga auto-upgrade command.

Usage Guidelines The FPD auto upgrade feature enables automatic upgrade of the FPD image on the Cisco cBR-8 router. To disable auto upgrade of the FPD, use the **no upgrade fpd auto** command.

Examples The following example shows how to enable automatic upgrade of the FPD firmware on the Cisco cBR-8 router:

```
Router# upgrade fpd auto
```

The following example shows how to disable automatic upgrade of the FPD firmware on the Cisco cBR-8 router:

```
Router# no upgrade fpd auto
```

The following example shows how to display the FPD version:

```
Router# show upgrade fpd table
Field Programmable Devices (FPD) Bundle Information Table:
=====
```

```
For IOS version 15.5(20150412:160914)
```

```
Entry #1: RF Switch PIC (0xB86), Minimal H/W Version: 0.0
FPD ID FPD Name Min. Req. Version
-----
```

```
34 CBR RFSW PIC 7.35
```

```
Entry #2: RF Switch PIC (0xB87), Minimal H/W Version: 0.0
FPD ID FPD Name Min. Req. Version
-----
```

```
35 CBR STEALTHSTAR 7.13
```

```
Entry #3: 8x10GE Supervisor PIC (0xB82), Minimal H/W Version: 0.0
FPD ID FPD Name Min. Req. Version
-----
36 CBR SUP PIC 0.130
```

Related Commands

Command	Description
upgrade fpd file	Upgrades the FPD on the PRE4 module on the Cisco uBR10012 router.

upgrade fpd file

upgrade fpd file

To upgrade the Field-Programmable Device (FPD) image on the Cisco cBR-8 router, use the **upgrade fpd file** command in privileged EXEC mode.

upgrade hw-module subslot slot/subslot fpd bundled

Syntax Description

<i>slot</i>	The slot where a SIP resides. On the Cisco cBR-8 router, slots 0 to 9 can be used for a SIP.
<i>subslot</i>	The subslot where the Wideband SIP resides. On the Cisco cBR-8 router, subslot 1 is always specified.

Command Default FPD is disabled by default.

Command Modes Privileged EXEC (#)

Command History

Release	Modification
IOS-XE 3.15.0S	This command was introduced on the Cisco cBR Series Converged Broadband Routers. This command replaces the upgrade fpga file command.

Usage Guidelines Use this command to upgrade the FPD image on the Cisco cBR-8 router.

Examples The following example shows how to upgrade the FPD on the Cisco cBR-8 router:

```
Router# upgrade hw-module subslot 4/1 fpd bundled
```

Related Commands

Command	Description
show upgrade fpd progress	Display in progress FPD image upgrade.

upgrade fpga auto-upgrade

To perform a firmware Field-Programmable Gate Array (FPGA) automatic upgrade on the PRE4 module on the Cisco uBR10012 router, use the **upgrade fpga auto-upgrade** command in privileged EXEC mode.

upgrade fpga auto-upgrade {debug-off| debug-on| disable| enable| show}

Syntax Description

debug-off	Turns off debugging of the firmware FPGA auto upgrade of the PRE4 module.
debug-on	Turns on debugging of the firmware FPGA auto upgrade of the PRE4 module.
disable	Disables auto upgrade of the FPGA.
enable	Enables auto upgrade of the FPGA.
show	Displays information on the FPGA upgrade on the Cisco uBR10012 router.

Command Default FPGA auto upgrade is enabled by default.

Command Modes Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SCG	This command was introduced.
IOS-XE 3.15.0S	This command was replaced by the upgrade fpd auto command on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

The FPGA auto upgrade feature enables automatic upgrade of the FPGA image on the PRE4 module on the Cisco uBR10012 router. To disable auto upgrade of the FPGA, use the **upgrade fpga auto-upgrade disable** command.

Examples

The following example shows how to activate the FPGA debugging on the Cisco uBR10012 router:

```
Router# upgrade fpga auto-upgrade debug-on
Router#
```

upgrade fpga auto-upgrade

The following example shows how to disable automatic upgrade of the FPGA firmware on the Cisco uBR10012 router:

```
Router# upgrade fpga auto-upgrade disable
```

The following example shows how to display the FPGA version, which is the FPGA in the flash on the PRE4 module:

```
Router# upgrade fpga auto-upgrade show
Alternative IOFPGA Running, version - 0x05111800
Default IOFPGA version - 0x00000000
Alternative IOFPGA version - 0x00000000
Bundle IOFPGA version - 0x0A0A0D01
IOFPGA auto-upgrade enabled - No
IOFPGA auto-upgrade debug - No
IOFPGA auto-upgrade test mode - (Default IOFPGA:flash image verify error)
Table below describes the significant fields shown in the display.
```

Table 1: upgrade fpga auto-upgrade show Field Descriptions

Field	Description
Alternative IOFPGA Running, version	Alternative IOFPGA image that is running, and its version.
Default IOFPGA version	Default IOFPGA version.
Alternative IOFPGA version	Alternative IOFPGA version.
Bundled IOFPGA version	Bundled IOFPGA version.
IOFPGA auto-upgrade enabled	IOFPGA auto-upgrade is enabled.
IOFPGA auto-upgrade debug	IOFPGA debug is turned on.
IOFPGA auto-upgrade test mode	IOFPGA test mode is turned on.

Associated Features

The **upgrade fpga auto-upgrade** command is used to automatically upgrade of the FPGA on the PRE4 module on the Cisco uBR10012 router.

- Cisco uBR10012 Universal Broadband Router Performance Routing Engine Module

Related Commands

Command	Description
upgrade fpga file	Upgrades the FPGA on the PRE4 module on the Cisco uBR10012 router.

upgrade fpga file

To upgrade the Field-Programmable Gate Array (FPGA) image on the Performance Routing Engine 4 (PRE4) module on the Cisco uBR10012 router, use the **upgrade fpga file** command in privileged EXEC mode.

upgrade fpga {alt| def} file{url| version }

Syntax Description

alt	Specifies the alternative IOFPGA version.
def	Specifies the default IOFPGA version.
<i>url</i>	URL of the IOFPGA file.
<i>version</i>	Version of the IOFPGA file.

Command Default

FPGA is disabled by default.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SCB	This command was introduced.
12.2(33)SCG	This command is modified. The argument <i>version</i> is added to the command.
IOS-XE 3.15.0S	This command was replaced by the upgrade fpd file command on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Use this command to upgrade the FPGA image on the PRE4 module on the Cisco uBR10012 router.

In Cisco IOS Releases 12.2(33)SCG, you must specify the version of the IOFPGA file to manually upgrade the PRE4 module.

If you are using a PRE4 VE board and running Cisco IOS Release 12.2(33)SCG, use the **upgrade fpga {alt | def} file {url }** command upgrade the PRE4 module.

Examples

The following example shows how to upgrade the FPGA on the Cisco uBR10012 router:

```
Router# upgrade fpga alt file disk0:pre4_iopfpga.bin 0x0A0A0D01
```

Associated Features

upgrade fpga file

The **upgrade fpga file** command is used to manually upgrade the FPGA on the PRE4 module on the Cisco uBR10012 router. For more information, see

- [Cisco uBR10012 Universal Broadband Router Performance Routing Engine Module](#)

Related Commands

Command	Description
upgrade fpga auto-upgrade	Performs automatic upgrade of the IOFPGA on the PRE4 module on the Cisco uBR10012 router.

upstream

To add upstream channels to an upstream bonding group, use the **upstream** command in upstream bonding configuration submode. To disable this configuration, use the **no** form of this command.

upstream number

no upstream number

Syntax Description

<i>number</i>	Upstream channel number. The valid range is from 0 to 7.
---------------	--

Command Default

None

Command Modes

Upstream bonding configuration submode (config-upstream-bonding)

Command History

Release	Modification
12.2(33)SCC	This command was introduced in Cisco IOS Release 12.2(33)SCC.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

DOCSIS 3.0-certified cable modems can support only four upstream channels on an upstream bonding group. These cable modems cannot accept additional upstream channels that you have added to an upstream bonding group.

Examples

The following example shows how to add upstream channels to an upstream bonding group on a cable interface line card on a Cisco uBR10012 router:

```
Router# configure terminal
Router(config)# interface cable7/1/0
Router(config-if)# cable upstream bonding-group 20
Router(config-upstream-bonding)# upstream 0
Router(config-upstream-bonding)# upstream 1
Router(config-upstream-bonding)# upstream 2
Router(config-upstream-bonding)# upstream 3
```

upstream**Related Commands**

Command	Description
cable upstream bonding-group	Creates an upstream bonding group on a cable interface.
cable fiber-node	Creates a fiber node and enters cable fiber-node configuration mode.

upstream (config-lb-group)

To set upstream channels in a DOCSIS load balancing group, use the **upstream** command in the config-lb-group configuration mode. To disable the upstream channel configuration, use the **no** form of this command.

Cisco cBR Series Router

```
upstream Upstream-Cable slot /card /port us-channel grouplist
no upstream Upstream-Cable slot /card /port us-channel grouplist
```

Cisco uBR10012 Router

```
upstream cable slot /subslot /port upstream-list
no upstream cable slot /subslot /port upstream-list

upstream
```

Cisco uBR7225VXR and Cisco uBR7246VXR Routers

```
upstream cable slot /port upstream-list
no upstream cable slot /port upstream-list
```

Syntax Description

cable slot/card/port	Specifies the CMTS interface slot, subslot, and port number parameters on the Cisco cBR series router. <ul style="list-style-type: none"> • <i>slot</i>—Slot where the line card resides. The permitted range is from 0 to 9. • <i>card</i>—Subslot where the line card resides. The available slots is 0. • <i>port</i>—The downstream controller number on the line card. The permitted <i>port</i> range is from 0 to 7.
cable slot/subslot/port	Specifies the CMTS interface slot, subslot, and port number parameters on the Cisco uBR10002 router. <ul style="list-style-type: none"> • <i>slot</i>—Slot where the line card resides. The permitted range is from 5 to 8. • <i>subslot</i>—Subslot where the line card resides. The available slots are 0 or 1. • <i>port</i>—The downstream controller number on the line card. The permitted <i>port</i> range is from 0 to 4.

upstream (config-lb-group)

cable slot/port	Specifies the CMTS interface slot and port number parameters on the Cisco uBR7246VXR or Cisco uBR7225VXR router. <ul style="list-style-type: none">• <i>slot</i>—Slot where the line card resides.<ul style="list-style-type: none">◦ Cisco uBR7225VXR router—The range is from 1 to 2.◦ Cisco uBR7246VXR router—The range is from 3 to 6.• <i>port</i>—Downstream controller number on the line card. The permitted <i>port</i> values are 0 or 1.
<i>upstream-list</i>	Upstream channel list ranging from 0 to 7.
<i>grouplist</i>	Upstream channel number ranging from .

Command Default None**Command Modes** DOCSIS load balancing group mode (config-lb-group)**Command History**

Release	Modification
12.2(33)SCC	This command was introduced.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers. The value ranges for the <i>slot/card/port</i> variables were changed.

Examples

The following example shows how to set upstream channels in a DOCSIS LBG using the upstream command on the Cisco uBR series router.

```
Router# configure terminal
Router(config)# cable load-balance docsis-group 1
Router(config-lb-group)# upstream cable 1/0/1 2
```

The following example shows how to set upstream channels in a DOCSIS LBG using the upstream command on the Cisco cBR series router.

```
Router# configure terminal
Router(config)# cable load-balance docsis-group 1
Router(config-lb-group)# upstream Upstream-Cable 3/0/1 us-channel 1
```

Related Commands

Command	Description
cable load-balance docsis-group	Configures a DOCSIS load balancing group on the CMTS.
show cable load-balance docsis-group	Displays real-time configurational, statistical, and operational information of load balancing operations on the router.

upstream cable channel

To configure upstream channels, use the **upstream cable channel** command in channel group or fiber node configuration modes. To disable the configuration, use the **no** form of the command.

upstream cable slot/subslot/port channel grouplist

no upstream cable slot/subslot/port channel grouplist

Syntax Description

cable	Specifies the cable interface.
<i>slot/subslot/port</i>	<ul style="list-style-type: none"> • <i>slot</i>—Chassis slot number of the cable interface line card. The valid range is from 5 to 8. • <i>subslot</i>—Secondary slot number of the cable interface line card. The valid range is from 0 to 1. • <i>port</i>—Port number on the line card. The valid range is from 0 to 14.
channel grouplist	Specifies the list of upstream channels.
	<ul style="list-style-type: none"> • <i>grouplist</i>—List or range of upstream channel numbers. The value can be one or more upstream channel numbers, a range of channel numbers separated by a hyphen, or a combination of both. The valid range is from 0 to 7 for the channel group configuration and 0 to 3 for the fiber node configuration.

Command Default

Upstream channel is not configured.

Command Modes

Channel group configuration (config-ch-group)

Fiber node configuration (config-fiber-node)

Command History

Release	Modification
Cisco IOS Release 12.2(33)CX	This command was introduced.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

All the upstream channels in a channel group must be associated with the same connector.

Examples

The following example shows how to configure upstream channels for a channel group:

```
Router# configure terminal  
Router(config)# cable channel-group 1  
Router(config-ch-group)# upstream Cable 7/1/0 channel 0-3
```

Related Commands

Command	Description
cable channel-group	Configures channel group.
show cable channel-group	Displays the channel group information.
show cable fiber-node	Displays the fiber node information.

upstream cable connector

To configure an upstream cable connector for a fiber node, use the **upstream cable connector** command in cable fiber node configuration mode. To disable the configuration, use the **no** form of this command.

Cisco uBR10012 Router

upstream cable slot /subslot connector port-number
no upstream cable slot /subslot connector port-number

Cisco uBR7225VXR and Cisco uBR7246VXR Routers

upstream cable slot connector port-number
no upstream cable slot connector port-number

Syntax Description

cable slot/ subslot	Identifies the cable interface on the Cisco uBR10012 router. • <i>slot</i> —Chassis slot number of the cable interface line card. The valid range is from 5 to 8. <i>subslot</i> —Secondary slot number of the cable interface line card. The valid range is from 0 or 1.
cable slot	Identifies the cable interface on the Cisco uBR7246VXR or Cisco uBR7225VXR router. • <i>slot</i> —Slot where the line card resides. ◦ Cisco uBR7246VXR router: The valid range is from 3 to 6. ◦ Cisco uBR7225VXR router: The valid range is from 1 to 2.
connector	Specifies the physical upstream port connector on the cable interface line card.

<i>port-number</i>	A range of physical port numbers on the cable interface line card. The <i>port-number</i> can be one or more port numbers or a range of port numbers separated by a hyphen or combinations of both. <ul style="list-style-type: none"> • Cisco uBR10012 router—The range for port numbers is from 0 to 19. • Cisco uBR7246VXR or Cisco uBR7225VXR router—The range for port numbers is from 0 to 7.
--------------------	---

Command Default None

Command Modes Cable fiber node configuration (config-fiber-node)

Command History	Release	Modification
	12.3(21)BC	This command was introduced for the Cisco uBR10012 router.
	12.2(33)SCA	This command was integrated into Cisco IOS Release 12.2(33)SCA.
	12.2(33)SCC	This command was introduced in Cisco IOS Release 12.2(33)SCC.
	12.2(33)SCD	This command was modified. Added support for Cisco uBR7246VXR and Cisco uBR7225VXR routers.
	IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Examples The following example shows how to configure upstream channels for fiber node 1. Notice that the list of port numbers (connectors) can be a single port number, a range of port numbers, or some combination of the two.

```
Router(config)# cable fiber-node 1
Router(config-fiber-node)# upstream cable 5/0 connector 0
Router(config-fiber-node)# upstream cable 5/0 connector 1-2
Router(config-fiber-node)# upstream cable 6/0 connector 0 1-2 3
```

Related Commands

Command	Description
cable fiber-node	Enters cable fiber-node configuration mode to configure a fiber node.

Command	Description
cable upstream bonding-group	Creates an upstream bonding group on a cable interface line card.
description (cable fiber-node)	Specifies a description for a fiber node.
downstream cable	Assigns a primary downstream channel for a fiber node.
downstream modular-cable rf-channel	Specifies the RF channels that are available for wideband channels on a fiber node.

upstream freq-range

To configure the Cisco CMTS router for the range of frequencies that are acceptable on upstreams, use the **upstream freq-range** command in global configuration mode. To restore the default value of North American ranges, use the **no** form of this command.

upstream freq-range [european| japanese| north american]

no upstream freq-range

Syntax Description

european	Configures the Cisco CMTS router to accept upstream frequency ranges that conform with the EuroDOCSIS specifications (5 MHz to 65 MHz).
japanese	Configures the Cisco CMTS router to accept upstream frequency ranges that conform to the expanded range used in Japan (5 MHz to 55 MHz).
north american	Configures the Cisco CMTS router to accept upstream frequency ranges that conform to the DOCSIS specifications (5 MHz to 42 MHz).

Command Default North American (DOCSIS, 5 MHz to 42 MHz)

Command Modes Global configuration

Command History

Release	Modification
12.2(15)BC2	This command was introduced for the Cisco uBR7246VXR and Cisco uBR10012 universal broadband routers.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

In Cisco IOS Release 12.2(15)BC2 and later, the Cisco CMTS router supports three different modes of operation, depending on the cable interface line cards being used. The range of frequencies that are allowed in each mode are as follows:

- North American DOCSIS (Annex B)—Upstreams use frequencies between 5 MHz and 42 MHz.
- European EuroDOCSIS (Annex A)—Upstreams use frequencies between 5 MHz and 65 MHz.
- Japanese Expanded Range (Annex B)—Upstreams use frequencies between 5 MHz and 55 MHz.

upstream freq-range

To configure the router so that it supports the proper range of upstream frequencies, use the **upstream freq-range** command. After you have configured the router with the **upstream freq-range** command, the **cable upstream frequency** command then accepts only frequencies that are in the configured range.

**Note**

This command configures only the range of frequencies that can be configured on an upstream. It does not configure the upstreams for the DOCSIS (Annex B) or EuroDOCSIS (Annex A) modes of operation, which is done using the **cable downstream annex** interface command. (Annex C mode is not supported.)

The allowable range for the upstream channel frequency depends on the cable interface line card and Cisco IOS software release being used. See Table 2-12 for the currently supported values.

Examples

The following example shows how to configure the Cisco CMTS router to support the EuroDOCSIS upstream frequency range of 5 MHz to 65 MHz:

```
Router# configure terminal
Router(config)# upstream freq-range european
```

The following example shows how to configure the Cisco CMTS router to support the expanded Japanese upstream frequency range of 5 MHz to 55 MHz:

```
Router# configure terminal
Router(config)# upstream freq-range japanese
```

The following example shows how to configure the Cisco CMTS router for its default configuration (DOCSIS upstream frequency range of 5 MHz to 42 MHz):

```
Router# configure terminal
Router(config)# upstream freq-range north_american
```

The following example shows all of the commands that are needed to configure the cable interface and upstream on a Cisco uBR-MC28U/X cable interface line card to support a frequency in the EuroDOCSIS upstream frequency range of 5 MHz to 65 MHz:

```
Router# configure terminal
Router(config)# upstream freq-range european
Router(config)# interface 3/0
Router(config-if)# cable downstream annex a
Router(config-if)# cable upstream 0 frequency 62500000
Router(config-if)#

```

Related Commands

Command	Description
cable spectrum-group (global configuration)	Creates spectrum groups, which contain one or more upstream frequencies.

Command	Description
cable upstream frequency	Configures a fixed frequency of the upstream radio frequency (RF) carrier for an upstream port.
show controllers cable	Displays information about the cable interface, including the upstream center frequency.

upstream upstream-cable

upstream upstream-cable

To configure upstream port, use the **upstream upstream-cable** command in fiber node configuration modes. To disable the configuration, use the **no** form of the command.

upstream upstream-cable *slot/subslot/port*

no upstream upstream-cable *slot/subslot/port*

Syntax Description	<i>slot/subslot/port</i> Specifies the cable interface. <ul style="list-style-type: none"> • <i>slot</i>—Chassis slot number of the cable interface line card. The valid range is from 0 to 3 and 6 to 9. • <i>subslot</i>—Subslot number of the cable interface line card. The valid range is 0. • <i>port</i>—Port number on the line card. The valid range is from 0 to 15. 						
Command Default	Upstream port is not configured.						
Command Modes	Fiber node configuration (config-fiber-node)						
Command History	<table border="1"> <thead> <tr> <th>Release</th><th>Modification</th></tr> </thead> <tbody> <tr> <td>IOS-XE 3.15.0S</td><td>This command was introduced on the Cisco cBR Series Converged Broadband Routers.</td></tr> </tbody> </table>	Release	Modification	IOS-XE 3.15.0S	This command was introduced on the Cisco cBR Series Converged Broadband Routers.		
Release	Modification						
IOS-XE 3.15.0S	This command was introduced on the Cisco cBR Series Converged Broadband Routers.						
Usage Guidelines	All the upstream channels in a port must be associated with the same fiber node.						
Examples	<p>The following example shows how to configure upstream port for a fiber node:</p> <pre>Router# configure terminal Router(config)# cable fiber-node 1 Router(config-fiber-node)# upstream Upstream-Cable 6/0/0</pre>						
Related Commands	<table border="1"> <thead> <tr> <th>Command</th><th>Description</th></tr> </thead> <tbody> <tr> <td>cable fiber-node</td><td>Configures fiber node.</td></tr> <tr> <td>show cable fiber-node</td><td>Displays the fiber node information.</td></tr> </tbody> </table>	Command	Description	cable fiber-node	Configures fiber node.	show cable fiber-node	Displays the fiber node information.
Command	Description						
cable fiber-node	Configures fiber node.						
show cable fiber-node	Displays the fiber node information.						

us-channel

To configure the OOB upstream channel, use the **us-channel** command in the profile configuration mode. To void the OOB upstream channel configuration, use the **no** form of this command.

us-channel id {frequency *f-value* | shutdown | varpd-portid *va-id* varpd-demodid *vd-id*}

us-channel id [docsis-mode ofdma] [subcarrier-spacing *value*] [frequency-range *start value end value*] [modulation-profile *id*][cyclic-prefix *value* roll-off-period *value*] [symbols-per-frame *value*] [data-iuc *id* band *start-value end-value* modulation *value* pilot-pattern *value*]

no ds-channel id {frequency | shutdown | varpd-portid}

Syntax Description

<i>f-value</i>	Specifies the OOB upstream channel frequency value.
<i>va-id</i>	Specifies the OOB upstream channel virtual ARPD portid.
<i>vd-id</i>	Specifies the OOB upstream channel virtual ARPD demodid.
docsis-mode ofdma	Configures the upstream for DOCSIS 3.1 Orthogonal frequency-division multiple access (OFDMA) modulation profiles.
subcarrier-spacing	Specify the spacing for specific subcarriers configured in modulation profile.
frequency-range	Configure the frequency range of OFDMA channel.
modulation-profile	Modulation profile number.
[cyclic-prefix <i>value</i> roll-off-period <i>value</i>]	Set cyclic prefix for OFDMA only.
symbols-per-frame	Configure number of symbols per frame for OFDMA channel
[data-iuc <i>id</i> band <i>start value end value</i> modulation <i>value</i> pilot-pattern <i>value</i>]	Configure the data iuc profile for the channel.
shutdown	Shutdown the upstream channel.

Command Default

None

Command Modes

Profile configuration (config-profile)

Command History

Release	Modification
Cisco IOS XE Everest 16.5.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.
Cisco IOS XE Everest 16.6.1	The docsis-mode ofdma , subcarrier-spacing , frequency-range , modulation-profile , cyclic-prefix , roll-off-period , symbols-per-frame , data-iuc , band , modulation , shutdown and pilot-pattern keywords were added.

Usage Guidelines**Examples**

The following example shows how to configure the OFDMA channel:

```
Router# enable
Router# configure terminal
Router(config)# controller Upstream-Cable 1/0/4
Router(config-controller)# us-channel 12 docsis-mode ofdma
Router(config-controller)# us-channel 12 subcarrier-spacing 25KHz
Router(config-controller)# us-channel 12 frequency-range 40000000 85000000
Router(config-controller)# us-channel 12 modulation-profile 423
Router(config-controller)# us-channel 12 cyclic-prefix 640 roll-off-period 224
Router(config-controller)# us-channel 12 symbols-per-frame 9
Router(config-controller)# us-channel 12 data-iuc 9 band 50000000 60000000 modulation 512-QAM
    pilot-pattern 8
Router(config-controller)# no us-channel 12 shutdown
```

The following example shows how to configure the Exclusion / Unused Bands:

```
Router# enable
Router# configure terminal
Router(config)# controller Upstream-Cable 1/0/2
Router(config-controller)# cable ofdma-frequency-exclusion-band 48000000 54200000
Router(config-controller)# cable ofdma-frequency-unused-band 50000000 52000000
Router(config-controller)# us-channel 12 docsis-mode ofdma
Router(config-controller)# us-channel 12 subcarrier-spacing 25KHz
Router(config-controller)# us-channel 12 modulation-profile 423
Router(config-controller)# us-channel 12 frequency-range 45000000 70000000
Router(config-controller)# us-channel 12 cyclic-prefix 96 roll-off-period 64
Router(config-controller)# us-channel 12 symbols-per-frame 18
```

The following example shows how to override the modulation and pilot pattern used by a particular IUC on a given OFDMA channel:

```
Router# enable
Router# configure terminal
Router(config)# controller Upstream-Cable 1/0/2
Router(config-controller)# us-channel 12 docsis-mode ofdma
Router(config-controller)# us-channel 12 subcarrier-spacing 25KHz
Router(config-controller)# us-channel 12 modulation-profile 423
Router(config-controller)# us-channel 12 frequency-range 28000000 70000000
Router(config-controller)# us-channel 12 cyclic-prefix 96 roll-off-period 64
Router(config-controller)# us-channel 12 symbols-per-frame 18
Router(config-controller)# us-channel 12 data-iuc 6 band 60000000 65000000 modulation 128-QAM
    pilot-pattern 9
Router(config-controller)# no us-channel 12 shutdown
```

us-channel

The following example shows how to configure the OOB upstream channel:

```
Router# configure terminal  
Router(config)# controller upstream-oob 55d1-profile 1  
Router(config-profile)# us-channel 1 frequency 6000000  
Router(config-profile)# us-channel 1 varpd-portid 3 varpd-demodid 4
```

Related Commands

Command	Description
controller upstream-oob 55d1-profile	Configures the OOB upstream controller profile.

us-channel chan-class-id

To configure a channel class ID for a logical upstream channel, use the **us-channel chan-class-id** command in controller configuration mode. To disable the channel class ID configuration, use the **no** form of this command.

us-channel *n* chan-class-id *id*

no us-channel *n* chan-class-id *id*

Syntax Description		
	<i>n</i>	Specifies the upstream port number. The valid range is from 0 to 11.
	<i>id</i>	Channel class ID for the logical upstream channel in the hexadecimal format. The valid range is from 0 to ffffffff. The default value is 0.

Command Default None

Command Modes Controller configuration (config-controller)

Command History	Release	Modification
	IOS-XE 3.18.0SP	This command was introduced on the Cisco cBR Series Converged Broadband Routers. This command replaces the cable upstream chan-class-id command.

Usage Guidelines The **us-channel chan-class-id** command is associated with the https://www.cisco.com/c/en/us/td/docs/cable/cbr/configuration/guide/b_cbr_layer2_docsis/b_cbr_layer2_docsis_chapter_010010.html feature.

An upstream channel descriptor (UCD) message includes type, length, value (TLV) 18 and 19 for an upstream logical channel based on the channel class ID and ranging hold-off priority configuration. If a channel class ID is not configured, the UCD does not include TLV18 and 19 irrespective of the ranging hold-off priority configuration.

Examples The following example shows how to configure a channel class ID for a logical upstream channel on a cable interface line card on the cisco cBR router:

```
Router# configure terminal
Router(config)# controller Upstream-Cable 3/0/0
Router(config-controller)# us-channel 3 chan-class-id ff
```

us-channel chan-class-id**Related Commands**

Command	Description
us-channel rng-holdoff	Configures an upstream ranging hold-off priority value for an upstream logical channel on the router.
show cable modem verbose	Displays information about the registered and unregistered cable modems connected to the CMTS router.

us-channel channel-width

To set the channel-width in upstream channel configuration, use the **us-channel channel-width** command in controller configuration mode. To restore the default value, use the **no** form of this command.

us-channel *n* channel-width {*first-choice-width* [*last-choice-width*]}
no us-channel *n* channel-width

Syntax Description

<i>n</i>	Specifies the upstream port number. The valid range is from 0 to 11.
<i>first-choice-width</i>	Specifies the upstream channel width in hertz. The valid values are 1600000, 3200000 and 6400000.
<i>last-choice-width</i>	(Optional) Specifies the upstream channel width in hertz. The valid values are 1600000, 3200000 and 6400000.

Command Default The default channel width is 1600000 Hz.

Command Modes Controller configuration (config-controller)

Command History

Release	Modification
IOS-XE 3.15.OS	This command was introduced on the Cisco cBR Series Converged Broadband Routers. This command replaces the cable upstream channel-width command.

Usage Guidelines

When you specify both channel width values, the smaller value is taken as the last-choice-width parameter and the larger value is taken as the first-choice-width parameter. In the event of noise in the channel, the symbol rate automatically steps down to a value that is lower than the first-choice-width and greater or equal to the last-choice-width to maintain a stable channel.

Refer to the **cable upstream channel-width** command for more information.

Examples

The following example shows how to set the channel-width using **us-channel channel-width** command:

```
Router# configure terminal
Router(config)# controller Upstream-Cable 3/0/0
Router(config-controller)# us-channel 1 channel-width 1600000
Router(config-controller)#

```

us-channel channel-width

Related Commands

Command	Description
cable upstream hopping blind	Disables optimum frequency hopping on the Cisco uBR-MC16S and Cisco uBR-MC5X20S cable interface line cards.
cable upstream minislot-size	Specifies the minislot size for a specific upstream interface.
cable upstream modulation-profile	Overrides modulation types specified in the modulation profile for the specified upstream channel.
cable upstream docsis-mode	Configures an upstream to use either DOCSIS 1.x or DOCSIS 2.0 modulation profiles.

us-channel description

To assign a label to an upstream, use the **us-channel description** command in controller configuration mode. To remove the label from the upstream, use the **no** form of this command.

us-channel *n* description *label*

Syntax Description

<i>n</i>	Upstream channel number. The range is from 0 to 11 on the Cisco cBR-8 router.
<i>label</i>	An arbitrary string, up to 80 characters long, that describes this upstream for management and tracking purposes. If the string contains any spaces, enclose the string within quotes.

Command Default

No description is assigned to upstreams.

Command Modes

Controller configuration—upstream-cable only (config-controller)

Command History

Release	Modification
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers. This command replaces the cable upstream description command.

Usage Guidelines

Use the **us-channel description** command to assign arbitrary labels to the upstreams. These labels can contain any information that identifies the upstream and that could aid in network management or troubleshooting.

Examples

The following example shows how to assign descriptions to the first two upstreams for upstream-cable 3/0/1 on the Cisco cBR-8 router:

```
Router# configure terminal
Router(config)# controller upstream-Cable 3/0/1
Router(config-controller)# us-channel 0 description "SJ-Node1-Upstream channel 0"
Router(config-controller)# us-channel 1 description "SJ-Node1-Upstream channel 1 (Unused)"
Router(config-controller)#

```

Related Commands

Command	Description
show interfaces cable	Displays the current configuration and status of the cable interface.

us-channel docsis-mode

us-channel docsis-mode

To configure an upstream to use DOCSIS modulation profiles, use the **us-channel docsis-mode** command in controller configuration mode. To restore the default value, use the **no** form of this command.

```
us-channel n docsis-mode {atdma| tdma| tdma-atdma| ofdma}
no us-channel n docsis-mode {atdma| tdma| tdma-atdma| ofdma}
```

Syntax Description

n	The upstream channel number. The valid range is from 0 to 11. OFDMA use upstream channel range from 12 to 15.
atdma	Configures the upstream only for DOCSIS 2.0 Advanced Time Division Multiple Access (A-TDMA) modulation profiles.
tdma	Configures the upstream only for DOCSIS 1.0/DOCSIS 1.1 Time Division Multiple Access (TDMA) modulation profiles.
tdma-atdma	Configures the upstream for both A-TDMA and TDMA operations (mixed mode).
ofdma	Configures the upstream for DOCSIS 3.1 Orthogonal frequency-division multiple access (OFDMA) modulation profiles.

Command Default All upstreams are configured ATDMA-only mode

Command Modes Controller configuration (config-controller)

Command History

Release	Modification
IOS-XE 3.15.OS	This command was introduced on the Cisco cBR Series Converged Broadband Routers. This command replaces the cable upstream docsis-mode command.
Cisco IOS XE Everest 16.6.1	The ofdma keyword was added to this command.

Usage Guidelines

The DOCSIS 2.0 specification builds on the existing TDMA to support advanced modulation profiles that increase potential upstream bandwidth. The A-TDMA profiles support higher QAM rates of up to 64-QAM and wider channel widths of up to 6.4 MHz (5.12 Msymbols).

Starting from Cisco IOS XE Everest 16.6.1 release, DOCSIS 3.1 Upstream OFDMA channel can be bonded with DOCSIS 3.0 ATDMA channel. If the user wants to utilize the non-best effort flows, it is recommended to bond the OFDMA channel with one or more ATDMA channel. But be aware that in Cisco IOS XE Everest 16.6.1 release, a maximum of one OFDMA channel and four ATDMA channels can be bonded together.

Refer to the **cable upstream docsis-mode** command for more information .

Examples

The following example shows how configure an upstream to use DOCSIS TDMA mode using **us-channel docsis-mode** command:

```
Router# configure terminal
Router(config)# controller Upstream-Cable 3/0/0
Router(config-controller)# us-channel 1 docsis-mode tdma
```

The following example shows how configure an upstream to use DOCSIS OFDMA mode using **us-channel docsis-mode ofdma** command:

```
Router# configure terminal
Router(config)# controller Upstream-Cable 1/0/4
Router(config-controller)# us-channel 12 docsis-mode ofdma
```

Related Commands

Command	Description
cable modulation-profile	Defines a modulation profile for use on the router.
cable modulation-profile global-scheme	Defines a global modulation profile for use on the router.
cable upstream channel-width	Specifies an upstream channel width for an upstream port.
cable upstream equalization-coefficient	Enables the use of a DOCSIS 1.1 pre-equalization coefficient on an upstream.
cable upstream maintain-psd	Requires DOCSIS 2.0 CMs on an A-TDMA-only upstream to maintain a constant power spectral density after a modulation rate change.
cable upstream modulation-profile	Assigns one or two modulation profiles to an upstream port.
show cable modulation-profile	Displays the modulation profile information for a Cisco CMTS.
show interface cable mac-scheduler	Displays the current time-slot scheduling state and statistics.

us-channel docsis-mode

us-channel equalization-coefficient

To enable equalization-coefficient in upstream channel configuration, use the **us-channel equalization-coefficient** command in controller configuration mode. To restore the default value, use the **no** form of this command.

us-channel *n* equalization-coefficient

no us-channel *n* equalization-coefficient

Syntax Description

<i>n</i>	Specifies the upstream port number. The valid range is from 0 to 11.
----------	--

Command Default

None.

Command Modes

Controller configuration (config-controller)

Command History

Release	Modification
IOS-XE 3.15.OS	This command was introduced on the Cisco cBR Series Converged Broadband Routers. This command replaces the cable upstream equalization-coefficient command.

Usage Guidelines

The DOCSIS 1.1 and 2.0 specifications allow a CMTS to specify a pre-equalization coefficient in the DOCSIS ranging response (RNG-RSP) MAC management messages it forwards to the cable modems (CM)s. When this is enabled, a CM can engage in transmit-side equalization (pre-equalization) to mitigate the effects of certain impairments in the cable plant, such as in-channel tilt, and group delay.

Refer to the **cable upstream equalization-coefficient** command for more information.

Examples

The following example shows how to enable equalization-coefficient in controller configuration mode using **us-channel equalization-coefficient** command:

```
Router# configure terminal
Router(config)# controller Upstream-Cable 3/0/0
Router(config-controller)# us-channel 1 equalization-coefficient
Router(config-controller)#

```

Related Commands

Command	Description
show cable modem phy	Displays the physical layer RF parameters of the cable modem, including USSNR estimate (MER).
show cable modem docsis version	Displays the DOCSIS version of a cable modem, and the upstream DOCSIS mode— TDMA or ATDMA.
show cable modem [verbose]	Displays detailed information about the cable modem. Lines with the string Equalizer describe modem specific equalizer data.
debug cable range	Debugging commands to display the equalizer coefficients being sent by the CMTS to the cable modem in the DOCSIS RNG-RSP MAC management messages.
debug cable interface {interface} {cm-mac-address}[verbose]	Debugging commands to display the equalizer coefficients being sent by the CMTS to the cable modem in the DOCSIS RNG-RSP MAC management messages. Caution Certain debug settings can produce a very large amount of data on a production router, and should be used with caution. Specifying the CM mac-address will dramatically reduce the amount of data produced.

us-channel frequency

To enter a fixed frequency of the upstream radio frequency (RF) carrier for an upstream port, use the **us-channel frequency** command in controller configuration mode. To restore the default value, use the **no** form of this command.

```
us-channel nfrequency {up-freq-hz }
no us-channel n frequency {up-freq-hz }
```

Syntax Description

<i>n</i>	The upstream channel number. The valid range is from 0 to 11.
<i>up-freq-hz</i>	The upstream center frequency configured to a fixed Hertz (Hz) value. The valid range is from 5000000 Hz to 85000000 Hz

Command Default The default upstream channel number is 0. The default frequency is 0 Hz.

Command Modes Controller configuration (config-controller)

Command History

Release	Modification
IOS-XE 3.15.0S	This command was introduced on the Cisco cBR Series Converged Broadband Routers. This command replaces the cable upstream frequency command.

Usage Guidelines

The upstream channel frequency of your RF output must be set to comply with the expected input frequency of your cable interface line card. To configure an upstream channel frequency, you may:

- Configure a fixed frequency between the allowable ranges and enable the upstream port, or
- Create a global spectrum group, assign the interface to it, and enable the upstream port.

Refer to the **cable upstream frequency** command for more information.

Examples

The following example shows how to configure how to configure the upstream center frequency using **us-channel frequency** command:

```
Router# configure terminal
Router(config)# controller Upstream-Cable 3/0/0
Router(config-controller)# us-channel 1 frequency 5700000
```

us-channel frequency

Related Commands

Command	Description
cable spectrum-group (global configuration)	Creates spectrum groups, which contain one or more upstream frequencies.
show controllers cable	Displays information about the cable interface, including the upstream center frequency.
upstream freq-range	Configures the Cisco CMTS router for the range of frequencies that are acceptable on upstreams.

us-channel hop-priority

To configure the priority of the corrective actions to be taken when a frequency hop is necessary due to ingress noise on the upstream, use the **us-channel hop** command in controller configuration mode. To restore the default value, use the **no** form of this command.

us-channel *n* hop-priority frequency modulation channel-width
us-channel *n* hop-priority modulation frequency channel-width
us-channel *n* hop-priority frequency channel-width modulation

Syntax Description

<i>n</i>	The upstream channel number. The valid range is from 0 to 11.
frequency, modulation, channel-width	Specifies the priority of corrective actions to be taken when ingress noise occurs on a downstream.

Command Default The default priority is **frequency,modulation, and channel-width**.

Command Modes Controller configuration (config-controller)

Command History

Release	Modification
IOS-XE 3.15.OS	This command was introduced on the Cisco cBR Series Converged Broadband Routers. This command replaces the cable upstream hop-priority command.

Usage Guidelines

This command specifies the priority of the corrective actions that should be taken when a frequency hop is necessary to correct excessive ingress noise on an upstream.

Refer to the **cable upstream hop-priority** command for more information.

Examples

The following example shows the usage of **us-channel hop-priority** command when ingress noise on the upstream exceeds the threshold allowed for the primary modulation profile:

```
Router# configure terminal
Router(config)# controller Upstream-Cable 3/0/0
Router(config-controller)# us-channel 1 hop-priority modulation frequency channel-width
```

us-channel hop-priority

Related Commands

Command	Description
cable modulation-profile	Creates a cable modulation profile.
cable upstream channel-width	Configures an upstream for a range of allowable channel widths.
cable upstream modulation-profile	Configures an upstream for one modulation profile (static profile) or two modulation profiles (Dynamic Upstream Modulation).
show cable hop	Displays the current hop period and threshold for an upstream, along with other statistics.
show cable modulation-profile	Displays the cable modulation profiles that have been created.

us-channel ingress-noise-cancellation

To configure how often a cable interface line card should train its noise-cancellation circuitry so as to adjust to noise levels on the upstream, use the **us-channel ingress-nosie-cancellation** command in controller configuration mode. To restore the default value, use the **no** form of this command.

us-channel *n* ingress-nosie-cancellation [*interval*]

no us-channel *n* ingress-nosie-cancellation [*interval*]

Syntax Description	<i>n</i>	The upstream channel number. The valid range is from 0 to 11.
	<i>interval</i>	(Optional) Triggering interval in milliseconds. The valid range is from 40 to 300.

Command Default Enabled.

Command Modes Controller configuration (config-controller)

Command History	Release	Modification
	IOS-XE 3.15.0S	This command was introduced on the Cisco cBR Series Converged Broadband Routers. This command replaces the cable upstream hop-prioingress-nosie-cancellation command.

Usage Guidelines The **us-channel ingress-nosie-cancellation** command is used to configure how often these line cards should train their noise cancellation circuitry so as adapt to changes in the noise types and levels.

Examples The following example shows how to perform ingress noise cancellation every 200 milliseconds using **us-channel ingress-nosie-cancellation** command:

```
Router# configure terminal
Router(config)# controller Upstream-Cable 3/0/0
Router(config-controller)# us-channel 1 ingress-nosie-cancellation 200
```

Related Commands	Command	Description
	cable modulation-profile	Defines a modulation profile for use on the router.

us-channel ingress-noise-cancellation

Command	Description
cable upstream channel-width	Specifies an upstream channel width for an upstream port.

us-channel maintain-psd

To maintain a constant power spectral density (PSD) after a modulation rate change, use the **us-channel maintain-psd** command in controller configuration mode. To restore the default value, use the **no** form of this command.

us-channel *n* maintain-psd
no us-channel *n* maintain-psd

Syntax Description

<i>n</i>	The upstream channel number. The valid range is from 0 to 11.
----------	---

Command Default

Enabled.

Command Modes

Controller configuration (config-controller)

Command History

Release	Modification
IOS-XE 3.15.OS	This command was introduced on the Cisco cBR Series Converged Broadband Routers. This command replaces the cable upstream maintain-psd command.

Usage Guidelines

Use this command to specify whether DOCSIS 2.0 CMs should maintain their power spectral density when the Cisco CMTS changes their upstream modulation rate in an upstream channel descriptor (UCD) message. Refer to **cable upstream maintain-psd** command for more information.

Examples

The following example shows how to maintain a constant power spectral density after a modulation rate change using **us-channel maintain-psd** command:

```
Router# configure terminal
Router(config)# controller Upstream-Cable 3/0/0
Router(config-controller)# us-channel 1 maintain-psd
```

Related Commands

Command	Description
cable upstream docsis-mode	Configures an upstream to use either DOCSIS 1.x or DOCSIS 2.0 modulation profiles.

us-channel minislot-size

us-channel minislot-size

To specify the minislot size (in ticks) for a specific upstream interface, use the **us-channel minislot-size** command in controller configuration mode. To restore the default value, use the **no** form of this command.

us-channel *n* minislot-size *size*

no us-channel *n* minislot-size

Syntax Description

<i>n</i>	The upstream channel number. The valid range is from 0 to 11.
<i>size</i>	<p>Specifies the minislot size in time ticks. valid minislot sizes are:</p> <ul style="list-style-type: none"> • 1 • 2 • 4 • 8 • 16 • 32 • 64

Command Default

The default minislot size is 4.

Command Modes

Controller configuration (config-controller)

Command History

Release	Modification
IOS-XE 3.15.0S	This command was introduced on the Cisco cBR Series Converged Broadband Routers. This command replaces the cable upstream minislot-size command.

Usage Guidelines

The minislot size determines the minimum amount of information that can be transmitted on the upstream. How much a particular minislot size can contain depends on the modulation profile and channel width being used, with higher-bandwidth settings allowing larger amounts of data.

Refer to **cable upstream minislot-size** command for more information.

Examples

The following example shows how to set the minislot size using **us-channel minislot-size** command:

```
Router# configure terminal
Router(config)# controller Upstream-Cable 3/0/0
Router(config-controller)# us-channel 1 minislot-size 64
```

Related Commands

Command	Description
cable upstream modulation-profile	Assigns one or two modulation profiles to an upstream port.
show cable hop	Displays CM configuration settings.
show cable modulation-profile	Displays the modulation profile information for a Cisco CMTS.
show interface cable mac-schedule	Displays the current time-slot scheduling state and statistics.
show interface cable sid	Displays cable interface information.

us-channel modulation-profile

To assign modulation profiles to an upstream port, use the **us-channel modulation-profile** command in controller configuration mode. To restore the default value, use the **no** form of this command.

us-channel *n* modulation-profile *primary-profile-number* [*secondary-profile-number*] [*tertiary-profile-number*]

no us-channel *n* modulation-profile *primary-profile-number* [*secondary-profile-number*] [*tertiary-profile-number*]

Syntax Description

<i>n</i>	The upstream channel number. The valid range is from 0 to 11.
<i>primary-profile-number</i>	Specifies the primary modulation profile. The valid range is from 1 to 400.
<i>secondary-profile-number</i>	(Optional) Specifies the secondary modulation profile. The valid range is from 1 to 400.
<i>tertiary-profile-number</i>	(Optional) Specifies the tertiary modulation profile. The valid range is from 1 to 400.

Command Default

The default value is 221.

Command Modes

Controller configuration (config-controller)

Command History

Release	Modification
IOS-XE 3.15.0S	This command was introduced on the Cisco cBR Series Converged Broadband Routers. This command replaces the cable upstream modulation-profile command.

Usage Guidelines

The **us-channel modulation-profile** command assigns up to three modulation profiles to an upstream port, depending on the type of cable interface and Cisco IOS software release being used.

Refer to the **cable upstream modulation-profile** command for more information.

Examples

The following example shows how assign modulation profiles using **us-channel modulation-profile** command:

```
Router# configure terminal
```

```
Router(config)# controller Upstream-Cable 3/0/0
Router(config-controller)# us-channel 1 modulation-profile 2 1
```

Related Commands

Command	Description
cable modulation-profile	Creates a cable modulation profile.
cable modulation-profile global-scheme	Defines a global modulation profile for use on the router.
cable upstream hop-priority	Determines the order of the corrective actions to be taken when ingress noise exceeds the allowable value for an upstream. This command is related to the cable upstream modulation-profile command only when using advanced dynamic modulation configuration, that is, when spectrum group is defined for the upstream channel.
show cable modulation-profile	Displays the cable modulation profiles that have been created.

us-channel power-level

To set the input power level for the upstream radio frequency (RF) carrier in decibels per millivolt (dBmV), use the **us-channel power-level** command in controller configuration mode. To restore the input power level to its default value, use the **no** form of this command.

us-channel *n* power-level *dbmv*

Syntax Description

<i>n</i>	Upstream channel number. The range is from 0 to 11 on the Cisco cBR-8 router.
<i>dbmv</i>	Decibels per millivolt designating the upstream signal input power level. The range is from -13 to 23 on the Cisco cBR-8 router depending on the upstream symbol rate (channel width).

Command Default 0 dBmV

Command Modes Controller configuration—upstream-cable only (config-controller)

Command History

Release	Modification
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers. This command replaces the cable upstream power-level command.

Usage Guidelines

The Cisco CMTS controls the output power levels of the CMs to meet the desired upstream input power level. The nominal input power level for the upstream RF carrier is specified in decibels per millivolt (dBmV). The default setting of 0 dBmV is the optimal setting for the upstream power level.

The valid range for the input power level depends on the data rate, as expressed as the symbol rate and channel width. The table below shows the valid power levels for each allowable rate, as given in the DOCSIS specification. Higher (more positive) values cause the CMs to increase their transmit power, achieving a greater carrier-to-noise ratio (CNR).

Table 2: Allowable DOCSIS Power Levels

Symbol Rate (Symbols per second)	Channel Width (Hz)	Allowable Power Range (dBmV)
160,000	200,000	-16 to +14 (minimum valid value for DOCSIS is -13)
320,000	400,000	-13 to +17

Symbol Rate (Symbols per second)	Channel Width (Hz)	Allowable Power Range (dBmV)
640,000	800,000	-10 to +20
1,280,000	1,600,000	-7 to +23
2,560,000	3,200,000	-4 to +26 (maximum valid value for DOCSIS is +23)
5,120,000 ¹	6,400,000	-1 to +29 (maximum valid value for DOCSIS is +23)

¹ The 5.12 MSymbols/sec symbol rate and 6.4 MHz channel width are supported only on upstreams that are configured for DOCSIS 2.0 A-TDMA-only operation.

**Tip**

You can use inline attenuators to force CMs to transmit at higher power levels and to achieve a higher CNR value on the network.

**Caution**

If you increase the input power level or add inline attenuators before the Cisco CMTS, the CMs on your HFC network increase their transmit power level. Be careful if you adjust this parameter. You might violate the upstream return laser design parameters or exceed the CM's maximum transmit power level.

**Note**

Do not adjust your input power level by more than 5 dB in a 30-second interval. If you increase the power level by more than 5 dB within 30 seconds, you will disrupt CM service on your network. If you decrease the power level by more than 5 dB within 30 seconds, the CMs on your network will be forced to re-range.

**Tip**

When setting upstream power levels, we recommend that the adjacent channels of equal bandwidth do not have a large variation. The recommended maximum input power variance is 5 to 6 dB.

Examples

The following example shows how to input power level for upstream channel 10 on the Cisco cBR-8 router:

```
Router# configure terminal
Router(config)# controller upstream-Cable 3/0/1
Router(config-controller)# us-channel 10 power-level 22
Router(config-controller)#

```

Related Commands

Command	Description
show interfaces cable	Displays the current configuration and status of the cable interface.

us-channel rng-holdoff

us-channel rng-holdoff

To hold off a cable modem from initial ranging (init rl) on a logical upstream channel, use the **us-channel rng-holdoff** command in controller configuration mode. To disable the ranging hold-off, use the **no** form of this command.

us-channel *n* rng-holdoff *priority*

no us-channel *n* rng-holdoff *priority*

Syntax Description

<i>n</i>	Specifies the upstream port number. The valid range is from 0 to 11.
rng-holdoff <i>priority</i>	Specifies the ranging hold-off priority value in the hexadecimal format. The valid range is from 0 to ffffffff. The default value is 0.

Command Default None

Command Modes Controller configuration (config-controller)

Command History

Release	Modification
IOS-XE 3.18.0SP	This command was introduced on the Cisco cBR Series Converged Broadband Routers. This command replaces the cable upstream rng-holdoff command.

Usage Guidelines

The **us-channel rng-holdoff** command is associated with the https://www.cisco.com/c/en/us/td/docs/cable/cbr/configuration/guide/b_cbr_layer2_docsis/b_cbr_layer2_docsis_chapter_010010.html feature.

An upstream channel descriptor (UCD) message includes type, length, value (TLV) 18 and 19 for an upstream logical channel based on the channel class ID and ranging hold-off priority configuration. If a ranging hold-off priority value is not configured, the value of TLV 18 becomes zero. If an upstream channel class ID is configured and a ranging hold-off priority value is not configured, the UCD message includes TLV 18 and 19, and the value of TLV 18 becomes zero.

Examples

The following example shows how to specify a ranging hold-off priority value for a logical upstream channel on a cable interface line card on the Cisco cBR router:

```
Router# config terminal
Router(config)# controller upstream-cable 3/0/0
Router(config-controller)# us-channel 3 rng-holdoff ff
```

Related Commands

Command	Description
us-channel chan-class-id	Configures a channel class ID for a logical upstream channel on the CMTS router.
show cable modem verbose	Displays information about the registered and unregistered cable modems connected to the CMTS router.

us-channel spectrum-group

us-channel spectrum-group

To set up spectrum group in upstream channel configuration, use the **us-channel spectrum-group** command in controller configuration mode. To restore the default value, use the **no** form of this command.

us-channel upstream channel number spectrum-group {spectrum group number}

no us-channel upstream channel number spectrum-group

Syntax Description

<i>upstream channel number</i>	The upstream channel number. The valid range is from 0 to 11.
spectrum-group	Specifies spectrum group set up.
<i>spectrum group number</i>	The spectrum group number. The valid range is from 1 to 40.

Command Default None.

Command Modes Controller configuration (config-controller)

Command History

Release	Modification
IOS-XE 3.15.OS	This command was introduced on the Cisco cBR Series Converged Broadband Routers. This command replaces the cable upstream spectrum-group command.

Usage Guidelines

This command assigns a spectrum group to a single us-channel in the upstream-controller. To configure the spectrum groups, use the set of **cable spectrum-group** commands in global configuration mode.

In addition, you can also spectrum groups to all of the us-channels for one specific upstream-controller, use the **cable spectrum-group** (upstream-cable controller configuration) command.

Examples

The following example shows how to assign spectrum group 12 to the first us-channel of the upstream-cable controller 0 in slot 9/0:

```
Router(config)# controller upstream-cable 9/0/0
Router(config-controller)# us-channel 0 spectrum-group 12
Router(config-controller)# exit
Router(config)#
```

Related Commands

Command	Description
cable modulation-profile	Defines a modulation profile for using on the router.
cable spectrum-group(global configuration)	Create and configure a spectrum-group.
cable spectrum-group hop period	Changes the minimum time between frequency hops.
cable spectrum-group hop threshold	Specifies a frequency hop threshold for a spectrum group.

us-channel threshold

To set spectrum management thresholds in upstream channel configuration, use the **us-channel threshold** command in controller configuration mode. To restore the default value, use the **no** form of this command.

us-channel upstream channel number threshold { {cnr-profile1 cnr-profile2 {bypass CNR threshold | CNR threshold in DB }} | {corr-fec {corrected FEC threshold in percentage}} | {snr-profile1 snr-profile2 {bypass SNR threshold | SNR threshold in DB }} } | {uncorr-fec {uncorrected FEC threshold in percentage }} }

us-channel upstream channel number threshold { {cnr-profile1 cnr-profile2 } | {corr-fec } | {snr-profile1 snr-profile2} | {uncorr-fec } }

Syntax Description

<i>upstream channel number</i>	The upstream channel number. The valid range is from 0 to 11.
cnr-profiles	Specifies CNR thresholds.
<i>bypass CNR threshold</i>	Bypasses CNR threshold for modulation profile1 and profile2. The valid value is 0.
<i>CNR threshold in DB</i>	The CNR threshold in Decibel for the modulation profile1 and profile2. The valid range is from 5 to 35.
corr-fec	Specifies corrected FEC threshold.
<i>corrected FEC threshold in percentage</i>	The corrected FEC threshold in percentage. The valid range is from 0 to 30 where 0 denotes the bypass threshold.
snr-profiles	Specifies SNR thresholds .
<i>bypass SNR threshold</i>	Bypasses SNR threshold for modulation profile1 and profile2. The valid value is 0.
<i>SNR threshold in DB</i>	The SNR threshold in Decibel for the modulation profile1 and profile2. The valid range is from 5 to 35.
uncorr-fec	Specifies uncorrected FEC threshold.
<i>uncorrected FEC threshold in percentage</i>	The uncorrected FEC threshold in percentage. The valid range is from 0 to 30 where 0 denotes the bypass threshold.

Command Default

The default value for:

- **cnr-profile1** is 25.

- **cnr-profile2** is 13.
- **corr-fec** is 3
- **uncorr-fec** is 1.
- **snr-profile1** is 25.
- **snr-profile2** is 13.

Command Modes	Controller configuration (config-controller)
----------------------	--

Command History	Release	Modification
	IOS-XE 3.15.OS	This command was introduced on the Cisco cBR Series Converged Broadband Routers. This command replaces the cable upstream threshold command.

Usage Guidelines	The us-channel threshold command allows setting the of spectrum management thresholds in upstream channel configuration.
-------------------------	---

Examples	The following example shows how to set spectrum management thresholds in upstream channel configuration using us-channel threshold command:
-----------------	--

```
Router# configure terminal
Router(config)# controller Upstream-Cable 3/0/0
Router(config-controller)# us-channel 1 threshold ?
Router(config-controller)# cnr-profiles CNR thresholds in dB
    corr-fec      Corrected FEC threshold
    hysteresis   CNR/SNR upgrade threshold hysteresis value
    snr-profiles SNR thresholds in dB
    uncorr-fec   Uncorrected FEC threshold
```

Related Commands	Command	Description
	show cable hop thresholds	Displays all the thresholds of the active line card.

us-channel threshold hysteresis

To upgrade CNR/SNR threshold hysteresis value, use the **us-channel threshold hysteresis** command in controller configuration mode. To restore the default value, use the **no** form of this command.

us-channel upstream channel number threshold hysteresis *CNR/SNR upgrade threshold hysteresis in DB*
us-channel upstream channel number threshold hysteresis

Syntax Description

<i>upstream channel number</i>	The upstream channel number. The valid range is from 0 to 11.
<i>CNR/SNR upgrade threshold hysteresis in DB</i>	The CNR/SNR upgrade threshold hysteresis in Decibel. The valid range is from 0 to 10.

Command Default

The default value for **threshold hysteresis** is 3.

Command Modes

Controller configuration (config-controller)

Command History

Release	Modification
IOS-XE 3.15.0S	This command was introduced on the Cisco cBR Series Converged Broadband Routers. This command replaces the cable upstream threshold hysteresis command.

Usage Guidelines

The **us-channel threshold hysteresis** command allows upgrading the CNR/SNR threshold hysteresis value in the controller configuration mode.

Examples

The following example shows how to upgrade CNR/SNR threshold hysteresis value using **us-channel threshold hysteresis** command:

```
Router# configure terminal
Router(config)# controller Upstream-Cable 3/0/0
Router(config-controller)# us-channel 1 threshold hysteresis 1
Router(config-controller) #
```

vcg

To specify the virtual carrier group assigned to this logical edge device, use the **vcg** command in logical edge device protocol configuration mode. To undo the virtual carrier group assignment, use the **no** form of this command.

vcg name
no vcg name

Syntax Description

vcg name	Specifies the virtual carrier group.
-----------------	--------------------------------------

Command Default

None.

Command Modes

Logical edge device protocol configuration (config-video-led-protocol)

Command History

Release	Modification
IOS-XE 3.18.0S	This command is introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command specifies the virtual carrier group assigned to this logical edge device.

Examples

The following example shows how to specify the virtual carrier group assigned to this logical edge device:

```
Router# configure terminal
Router(config)# cable video
Router(config-video)# logical-edge-device vod id 1
Router(config-video-led)# protocol table-based
Router(config-video-led-protocol)# vcg vod
```

Related Commands

Command	Description
logical-edge-device	Define a logical edge device.
protocol	Specifies the protocol used in the logical edge device.
virtual-edge-input-ip	Specifies and configures a cable multicast QoS group.
active	Activates the logical edge device.

Command	Description
show cable video logical-edge-device	Displays the logical edge device information.

vcg (config-video-bd)

To configure the virtual carrier group and service distribution group for replication, use the **vcg name sdg name** command in virtual carrier group binding configuration mode. To undo the virtual carrier group assignment, use the **no** form of this command.

vcg name sdg name

no vcg name sdg name

Syntax Description	<table border="1"> <tr> <td>vcg name</td><td>Specifies the virtual carrier group.</td></tr> <tr> <td>sdg name</td><td>Specifies the service distribution group.</td></tr> </table>	vcg name	Specifies the virtual carrier group.	sdg name	Specifies the service distribution group.
vcg name	Specifies the virtual carrier group.				
sdg name	Specifies the service distribution group.				

Command Default None.

Command Modes Virtual carrier group binding configuration (config-video-bd)

Command History	Release	Modification
	IOS-XE 3.18.0S	This command is introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines This command configures the virtual carrier group and service distribution group for replication.

Examples The following example shows how to configure the virtual carrier group and service distribution group for replication:

```
Router# configure terminal
Router(config)# cable video
Router(config-video)# service-distribution-group sdg-replication id 1
Router(config-video-sdg)# rf-port integrated-cable 7/0/0
Router(config-video-sdg)# rf-port integrated-cable 7/0/1
Router(config-video-sdg)# rf-port integrated-cable 7/0/2
Router(config-video-sdg)# rf-port integrated-cable 7/0/3
Router(config-video-sdg)# virtual-carrier-group vcg-replication
Router(config-video-vcg)# virtual-edge-input-ip 172.31.1.1 input-port-number 1
Router(config-video-vcg)# rf-channel 21-31 tsid 21-31 output-port-number 21-31
Router(config-video-vcg)# bind-vcg
Router(config-video-bd)# vcg vcg-replication sdg sdg-replication
```

Related Commands

Command	Description
service-distribution-group	Defines a service distribution group.
virtual-carrier-group	Defines a virtual carrier group.
virtual-edge-input-ip	Specifies and configures a cable multicast QoS group.
rf-port integrated-cable	Specifies the RF ports in a service distribution group.
rf-channel	Specifies the virtual RF channels in a virtual carrier group.
bind-vcg	Binds a set of virtual RF-channels defined in the virtual carrier group to the physical port in the service distribution group.
show cable video virtual-carrier-group	Displays the virtual carrier group information.

vcg (table-based)

To specify the virtual carrier group associated with the table-based session, use the **vcg** command in cable video configuration mode. To delete the configuration, use the **no** form of this command.

vcg name

no vcg name

Command Default None.

Command Modes Table-based session configuration (config-video-tb)

Release	Modification
IOS-XE 16.4.1	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Examples The following example shows how to set session jitter:

```
Router# configure terminal
Router(config)# cable video
Router(config-video)# table-based
Router(config-video-tb)# vcg vcg1
```

Related Commands

Command	Description
table-based	Defines a table based video session.

vei-bundle

To bundle the virtual edge inputs, use the **vei-bundle id input-port-number numbers** command in logical edge device protocol configuration mode. To delete a virtual edge input bundle, use the **no** form of this command.

vei-bundle id input-port-number numbers
no vei-bundle id input-port-number numbers

Syntax Description

vei-bundle id	Specifies the virtual edge input bundle ID. The valid range is from 1 to 65535.
input-port-number numbers	Specifies the virtual edge input port number. You can specify maximum of five input port numbers separated by commas.

Command Default None.

Command Modes Logical edge device protocol configuration (config-video-led-protocol)

Command History

Release	Modification
IOS-XE 3.18.0S	This command is introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines This command bundles the virtual edge inputs.

Examples The following example shows how to bundle the virtual edge inputs:

```
Router# configure terminal
Router(config)# cable video
Router(config-video)# service-distribution-group sdg-vei id 1
Router(config-video-sdg)# rf-port integrated-cable 7/0/3
Router(config-video-sdg)# virtual-carrier-group vcg-vei id 1
Router(config-video-vcg)# virtual-edge-input-ip 111.111.111.111 input-port-number 111
Router(config-video-vcg)# virtual-edge-input-ip 222.222.222.222 input-port-number 222
Router(config-video-vcg)# virtual-edge-input-ip 33.33.33.33 input-port-number 33
Router(config-video-vcg)# virtual-edge-input-ip 44.44.44.44 input-port-number 44
Router(config-video-vcg)# rf-channel 0-4 tsid 0-4 output-port-number 1-5
Router(config-video-vcg)# virtual-carrier-group vcg-veil id 2
Router(config-video-vcg)# virtual-edge-input-ip 111.111.111.111 input-port-number 111
Router(config-video-vcg)# virtual-edge-input-ip 222.222.222.222 input-port-number 222
Router(config-video-vcg)# virtual-edge-input-ip 33.33.33.33 input-port-number 33
Router(config-video-vcg)# virtual-edge-input-ip 44.44.44.44 input-port-number 44
```

```

Router(config-video-vcg) # rf-channel 5-10 tsid 5-10 output-port-number 5-10
Router(config-video-vcg) # bind-vcg
Router(config-video-bd) # vcg vcg-vei sdg sdg-vei
Router(config-video-bd) # vcg vcg-vei1sdg sdg-vei
Router(config-video-bd) # logical-edge-device led-vei id 1
Router(config-video-led) # protocol table-based
Router(config-video-led-protocol) # virtual-edge-input-ip 11.11.11.11 input-port-number 11
Router(config-video-led-protocol) # virtual-edge-input-ip 22.22.22.22 input-port-number 22
Router(config-video-led-protocol) # virtual-edge-input-ip 66.66.66.66 input-port-number 66
Router(config-video-led-protocol) # virtual-edge-input-ip 77.77.77.77 input-port-number 77
Router(config-video-led-protocol) # virtual-edge-input-ip 222.222.222.222 input-port-number
                                222
Router(config-video-led-protocol) # vcg vcg-vei
Router(config-video-led-protocol) # vei-bundle 40000 input-port-number 33,44,66,77,222
Router(config-video-led-protocol) # active

```

Related Commands

Command	Description
logical-edge-device	Defines a logical edge device.
virtual-carrier-group	Defines a virtual carrier group.
protocol	Specifies the protocol used in the logical edge device.
virtual-edge-input-ip	Specifies and configures a cable multicast QoS group.
rf-port integrated-cable	Specifies the RF ports in a service distribution group.
rf-channel	Specifies the virtual RF channels in a virtual carrier group.
bind-vcg	Binds a set of virtual RF-channels defined in the virtual carrier group to the physical port in the service distribution group.
active	Activates the logical edge device.
show cable video virtual-carrier-group	Displays the virtual carrier group information.

virtual-carrier-group

To define a virtual carrier group, use the **virtual-carrier-group** command in video configuration mode. To delete a virtual carrier group, use the **no** form of this command.

virtual-carrier-group name [id id]

no virtual-carrier-group name [id id]

Syntax Description

virtual-carrier-group name	Specifies the virtual carrier group name.
id id	Specifies the virtual carrier group identifier.

Command Default

None.

Command Modes

Video configuration (config-video)

Command History

Release	Modification
IOS-XE 3.18.0S	This command is introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

This command defines a virtual carrier group.

Examples

The following example shows how to define a virtual carrier group:

```
Router# configure terminal
Router(config)# cable video
Router(config-video)# virtual-carrier-group vod id 1
```

Related Commands

Command	Description
virtual-edge-input-ip	Defines a virtual edge input.
encrypt	Encrypts the virtual carrier group.
service-type	Specifies the service type of the virtual carrier group.
rf-channel	Specifies the virtual RF channels in a virtual carrier group.

Command	Description
show cable video virtual-carrier-group	Displays the virtual carrier group information.

virtual-edge-input-ip

To define a virtual edge input, use the **virtual-edge-input-ip ip [vrf vrfname] input-port-number port** command in virtual carrier group configuration mode or logical edge device protocol configuration mode. To delete a virtual edge input, use the **no** form of this command.

```
virtual-edge-input-ip ip [vrf vrfname]input-port-number port
no virtual-edge-input-ip ip [vrf vrfname]input-port-number port
```

Syntax Description

virtual-edge-input-ip ip	Specifies the virtual edge input IP address.
vrf vrfname	Specifies the virtual edge input VRF name.
input-port-number port	Specifies the virtual edge input port number.

Command Default

None.

Command Modes

Virtual carrier group configuration (config-video-vcg)
Logical edge device protocol configuration (config-video-led-protocol)

Command History

Release	Modification
IOS-XE 3.18.0S	This command is introduced on the Cisco cBR Series Converged Broadband Routers.
IOS-XE 3.18.0Sa	This command was modified. An optional parameter vrf vrfname was added.

Usage Guidelines

This command defines a virtual edge input.

Examples

The following example shows how to define a virtual edge input in virtual carrier group configuration:

```
Router# configure terminal
Router(config)# cable video
Router(config-video)# virtual-carrier-group vod id 1
Router(config-video-vcg)# virtual-edge-input-ip 174.1.1.1 input-port-number 1
The following example shows how to define a virtual edge input in logical edge device protocol configuration:
```

```
Router# configure terminal
Router(config)# cable video
Router(config-video)# logical-edge-device vod id 1
```

```
Router(config-video-led) # protocol table-based  
Router(config-video-led-protocol) # virtual-edge-input-ip 174.1.1.1 input-port-number 1
```

Related Commands

Command	Description
logical-edge-device	Defines a logical edge device.
virtual-carrier-group	Defines a virtual carrier group.
show cable video logical-edge-device	Displays the logical edge device information.
show cable video virtual-carrier-group	Displays the virtual carrier group information.

vrf (multicast qos)

To specify the name for a virtual routing and forwarding (VRF) instance, use the **vrf** command in multicast QoS configuration mode. To disable the VRF instance, use the **no** form of this command.

vrf *name*

no vrf *name*

Syntax Description

<i>name</i>	Specifies the routing and forwarding instance that is populated with multicast Virtual Private Network (MVPN) routes.
-------------	---

Command Default

A VRF name is not defined for the multicast QoS group.

Command Modes

Multicast QoS configuration (config-mqos)

Command History

Release	Modification
12.2(33)SCA	This command was introduced.
IOS-XE 3.15.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

If a multicast QoS (MQoS) group is not defined for the named VRF instance, you will see an error message. You must either define a specific MQoS group for each VRF instance, or define a default MQoS that can be assigned in those situations where no matching MQoS group is found.

Examples

The following example identifies a multicast QoS group VRF name using the **vrf** command:

```
Router(config)# cable multicast qos group 20 priority 55 global
Router(config-mqos)# vrf name1
```

Related Commands

Command	Description
cable multicast qos group	Specifies and configures a cable multicast QoS group.
show interface bundle multicast-sessions	Displays multicast session information for a specific virtual cable bundle.

Command	Description
show interface cable multicast-sessions	Displays multicast session information for a specific cable interface.

weekend duration

To configure different subscriber monitoring options over weekends on a Cisco CMTS router, use the **weekend duration** command in enforce-rule configuration mode. To remove the weekend monitoring configuration and to return to the same monitoring conditions for all days of the week, use the **no weekend** form of this command.

weekend duration *minutes avg-rate rate sample-interval interval [penalty-period duration] {downstream|upstream} [enforce]*

no weekend duration *minutes avg-rate rate sample-interval interval [penalty-period duration] {downstream|upstream} [enforce]*

no weekend

Syntax Description

minutes	Specifies the size of the sliding window (in minutes) during which subscriber usage is monitored. The range is 10 to 44640 with a default of 360 minutes (6 hours).
avg-rate rate	Specifies the average sampling rate in kilobits per second for the specified duration. The range is 1 to 400000 kilobits with no default.
sample-interval interval	Specifies how often (in minutes) the CMTS router should sample a service flow to get an estimate of subscriber usage. The range is 1 to 30, with a default value of 15.
(Optional) Specifies the period (in minutes) during which a cable modem (CM) can be under penalty. The range is 1 to 10080.	(Optional) Specifies the period (in minutes) during which a cable modem (CM) can be under penalty. The range is 1 to 10080.
penalty-period minutes	(Optional) Specifies the period during which an enforced quality of service (QoS) profile should be in force for subscribers who violate their registered QoS profile. The range is 1 to 10080.
downstream	Specifies monitoring of traffic in the downstream direction.
upstream	Specifies monitoring of traffic in the upstream direction.
enforce	(Optional) Specifies that the enforce-rule QoS profile should be applied automatically if a user violates their registered QoS profile.

Command Default Weekend monitoring is disabled.

Command Modes Enforce-rule configuration (enforce-rule)

Command History

Release	Modification
12.3(23)BC2	This command was introduced.
12.2(33)SCB	This command was integrated into Cisco IOS Release 12.2(33)SCB. Support for the Cisco uBR7225VXR router was added.
12.2(33)SCD2	The penalty keyword option was added.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.
IOS-XE 3.17.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Note

This command is applicable only after the **monitoring-basics** command is configured with the keyword **legacy**.

The **weekend duration** command works similarly to the **duration** command for subscriber traffic monitoring. Use the **weekend duration** command when you want to configure different monitoring parameters for subscribers on weekends.

This command can only be used when you have already configured the **duration** or **peak-time1** commands as weekday monitoring conditions for an enforce-rule.

If you still want to monitor traffic over the weekend, but want to return to the same monitoring conditions for every day of the week, use the **no weekend** command. This command removes the weekend monitoring conditions, but still performs monitoring over the weekends according to the other monitoring options that you have configured in the enforce-rule.

If you want to disable monitoring entirely over the weekend, use the **weekend off** command.

The **penalty** duration, which is configured using the **weekend duration** command, is unique to weekends, and takes precedence over the global penalty duration configured using the **penalty-period** command.

Examples

The following example specifies automatic monitoring of upstream traffic over the weekend if a subscriber is identified as violating their QoS profile. The monitoring will take place every 10 minutes and last for 5 minutes, with traffic sampled at an average rate of 2 kb/s:

```
Router(enforce-rule)# weekend duration 5 avg-rate 2 sample-interval 10 penalty 11 upstream
enforce
```

weekend duration

Related Commands

Command	Description
duration	Specifies the time period and sample rate to be used for monitoring subscribers.
peak-time1	Specifies peak and offpeak monitoring times on a Cisco CMTS router.
penalty-period	Specifies the period during which an enforced quality of service (QoS) profile should be in force for subscribers who violate their registered QoS profile.
weekend off	Disables peak and offpeak monitoring on weekends on a Cisco CMTS router.
weekend peak-time1	Configures peak and offpeak subscriber monitoring over weekends on a Cisco CMTS router.

weekend off

To disable peak and offpeak monitoring on weekends on a Cisco CMTS router, use the **weekend off** command in enforce-rule configuration mode. To re-enable the configuration for weekend monitoring, use the **no** form of this command.

weekend off

no weekend off

Syntax Description This command has no arguments or keywords.

Command Default Weekend monitoring is enabled once you configure the **weekend duration** or **weekend peak-time1** commands.

Command Modes Enforce-rule configuration (enforce-rule)

Command History

Release	Modification
12.3(23)BC2	This command was introduced.
12.2(33)SCB	This command was integrated into Cisco IOS Release 12.2(33)SCB. Support for the Cisco uBR7225VXR router was added.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.
IOS-XE 3.17.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Use the **weekend off** command to disable previously configured weekend monitoring and stop the CMTS router from monitoring cable modems (CMs) with that enforce-rule over the weekend. This command allows you to retain or modify your weekend monitoring configuration without enabling it for actual monitoring use on the CMTS router.

To perform weekend monitoring according to the same parameters used for weekday monitoring, use the **no weekend** command.

Examples

The following example shows how to disable weekend monitoring when weekend peak-time monitoring has previously been configured on a Cisco CMTS router:

```
Router(config)# cable qos enforce-rule test
Router(enforce-rule)# weekend peak-time1 8 duration 60 avg-rate 100 peak-time2 20 duration
  60 avg-rate 10000 duration 90 avg-rate 20000 sample-interval 20 downstream enforce
Router(enforce-rule)# weekend off
```

weekend off

Related Commands

Command	Description
weekend duration	Configures different subscriber monitoring options over weekends on a Cisco CMTS router.
weekend peak-time1	Configures peak and offpeak subscriber monitoring over weekends on a Cisco CMTS router.

weekend peak-time1

To configure peak and offpeak subscriber monitoring over weekends on a Cisco CMTS router, use the **weekend peak-time1** command in enforce-rule configuration mode. To remove the peak and offpeak weekend monitoring configuration, use the **no** form of this command.

```
weekend peak-time1 {hour| hh:mm} duration minutes avg-raterate peak-time2 {hour| hh:mm} duration minutes avg-rate rateduration offpeak-minutes avg-rate offpeak-rate sample-interval minutes penalty-period minutesdownstream| upstreamenforce
```

```
weekend peak-time1 {hour| hh:mm} duration minutes avg-raterate peak-time2 {hour| hh:mm} duration minutes avg-rate rateduration offpeak-minutes avg-rate offpeak-rate sample-interval minutes penalty-period minutesdownstream| upstreamenforce
```

```
weekend peak-time1 {hour| hh:mm}duration minutes avg-raterate[peak-time2 {hour| hh:mm}duration minutes avg-rate rate ]duration minutes avg-rate rate sample-interval minutes [penalty-period minutes ]{downstream| upstream}{[enforce]}
```

```
no weekend peak-time1 {hour| hh:mm}duration minutes avg-raterate[peak-time2 {hour| hh:mm}duration minutes avg-rate rate ]duration minutes avg-rate rate sample-interval minutes [penalty-period minutes ]{downstream| upstream}{[enforce]}
```

```
no weekend
```

Syntax Description

hour hour:minutes	Specifies the time of day, in either hh or hh:mm format, during which monitoring occurs for the peak time. If the time is specified in hour (hh), the valid range is 1 to 23 using a 24-hour clock. If the time is specified in hour:minutes (hh:mm), the valid range for hour is 1 to 23 using a 24-hour clock, and the valid range for minutes is 0 to 59.
duration minutes	Specifies the size of the sliding window (in minutes) during which the subscriber usage is monitored for the first peak time, and optionally for a second peak time when used with the peak-time2 keyword. The valid range is 60 to 1440. For Cisco cBR Series Converged Broadband Routers, the valid range is 6 to 1440.
avg-rate rate	Specifies the average sampling rate in kilobits per second for the specified duration. The valid range is 1 to 400000 kilobits with no default.

duration <i>offpeak-minutes</i>	(Optional) Specifies the size of the sliding window during which the subscriber usage is monitored for the remaining offpeak time (time not specified for peak monitoring). Valid range is 60 to 1440 minutes.
avg-rate <i>offpeak-rate</i>	Specifies the average sampling rate in kilobits per second for the specified offpeak duration. The valid range is 1 to 400000 kilobits with no default.
peak-time2	(Optional) Specifies the time of day during which monitoring occurs for a second peak time. The time can be specified either in hours or hour:minutes format.
sample-interval <i>minutes</i>	Specifies how often (in minutes) the CMTS router should sample a service flow to get an estimate of subscriber usage. The valid range is 1 to 30, with a default value of 15 For Cisco cBR Series Converged Broadband Routers, the valid range is 1 to 30.
penalty <i>minutes</i> penalty-period <i>minutes</i>	(Optional) Specifies the period (in minutes) during which a cable modem can be under penalty. The range is 1 to 10080. Specifies the period for which an enforced quality of service (QoS) profile should be in force for subscribers who violate their registered QoS profile. The range is from 1 to 10080.
downstream	Specifies monitoring of traffic in the downstream direction.
upstream	Specifies monitoring of traffic in the upstream direction.
enforce	(Optional) Specifies that the enforce-rule QoS profile should be applied automatically if a user violates their registered QoS profile.

Command Default

Weekend monitoring is disabled. The only default value for the **weekend peak-time1** command is the 15-minute sample interval.

Command Modes

Enforce-rule configuration (enforce-rule)

Command History

Release	Modification
12.3(23)BC2	This command was introduced.
12.2(33)SCB	This command was integrated into Cisco IOS Release 12.2(33)SCB. Support for the Cisco uBR7225VXR router was added.
12.2(33)SCD2	The minute-level granularity (hh:mm) for weekend peak-time1 and peak-time2 duration, and the penalty keyword option were added.
IOS-XE 3.15.0S	This command is not supported on the Cisco cBR Series Converged Broadband Routers.
IOS-XE 3.17.0S	This command was implemented on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines**Note**

This command is applicable only after the monitoring-basics command is configured with the keyword **peak-offpeak**.

The **weekend peak-time1** command is similar to the **peak-time1** command for subscriber traffic monitoring. Use the **weekend peak-time1** command when you want to configure different peak and offpeak monitoring parameters for subscribers on weekends.

This command can only be used when you have already configured the **duration** or **peak-time1** commands as weekday monitoring conditions for an enforce-rule.

The **penalty** duration, which is configured using the **weekend peak-time1** command, is unique to weekends, and takes precedence over the global penalty duration configured using the **penalty-period** command.

Examples

The following example shows configuration of two peak monitoring windows on the weekend, with the first monitoring period beginning at 8:00 A.M. for one hour and the second monitoring period beginning at 8:00 P.M. for one hour, and monitoring at all other times of the weekend for 1-1/2 hours (90 minutes) for downstream traffic. The unique penalty period for both **weekend peaktime1** and **peaktime2** is configured as 60 minutes:

```
Router(enforce-rule)# weekend peak-time1 8 duration 60 avg-rate 10000 peak-time2 20 duration 60 avg-rate 100 duration 90 avg-rate 20000 sample-interval 20 penalty 60 downstream enforce
```

Related Commands

Command	Description
peak-time1	Specifies peak and offpeak monitoring times on a Cisco CMTS router.
weekend duration	Configures different subscriber monitoring options over weekends on a Cisco CMTS router.

weekend peak-time1

Command	Description
penalty-period	Specifies the period for which an enforced quality of service (QoS) profile should be in force for subscribers who violate their registered QoS profile.
weekend off	Disables peak and offpeak monitoring on weekends on a Cisco CMTS router.

width

To specify width of profile in Hz, use the **width** command in OFDM modulation profile configuration mode. To undo the width assignment, use **no** form of this command.

width width

no width

Syntax Description

<i>width</i>	Profile width in Hz.
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Command Default

192000000

Command Modes

OFDM modulation profile configuration (config-ofdm-mod-prof)

Command History

Release	Modification
IOS-XE 3.18.0SP	This command was introduced on the Cisco cBR Series Converged Broadband Routers.

Usage Guidelines

Use this command to specify width of profile in Hz.

The width determines the range of subcarriers that can be assigned specific modulations in lists or ranges using the **assign** command. Regardless of the specified width, each modulation profile has a default modulation range that covers the entire FFT spectrum (204.8 MHz) from subcarrier 0 to 4095 or 8192 depending on spacing. The default modulation is configured using the **assign** command.

Examples

The following example shows how to specify the width:

```
Router# configure terminal
Router(config)# cable downstream ofdm-modulation-profile 21
Router(config-ofdm-mod-prof)# width 24000000
```

Related Commands

Command	Description
cable downstream ofdm-modulation-profile	Define the OFDM modulation profile on the OFDM channel.
description (OFDM modulation profile)	Specify a user defined description for the profile up to 64 characters.

width

Command	Description
assign	Assign modulations to subcarriers.
subcarrier-spacing	Specify the spacing for specific subcarriers configured in this profile.
start-frequency	(Optional) Specify the starting frequency associated with the first configurable subcarrier in the profile determined by the width.