Upstream Interface Configuration

This document describes how to configure the upstream interfaces on the Cisco cBR Series Converged Broadband Router.

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Finding Feature Information

Finding Feature Information

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

Hardware Compatibility Matrix for the Cisco cBR Series Routers

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

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

Cisco CMTS Platform	Processor Engine	Interface Cards
Cisco cBR-8 Converged Broadband Router	**Cisco IOS-XE Release 16.5.1 and Later Releases** Cisco cBR-8 Supervisor: • PID—CBR-SUP-250G • PID—CBR-CCAP-SUP-160G • PID—CBR-CCAP-SUP-60G	**Cisco IOS-XE Release 16.5.1 and Later Releases** Cisco cBR-8 CCAP Line Cards: • PID—CBR-LC-8D30-16U30 • PID—CBR-LC-8D31-16U30 • PID—CBR-RF-PIC • PID—CBR-RF-PROT-PIC • PID—CBR-CCAP-LC-40G • PID—CBR-CCAP-LC-40G-R • PID—CBR-CCAP-LC-G2-R • PID—CBR-SUP-8X10G-PIC • PID—CBR-2X100G-PIC Digital PICs: • PID—CBR-DPIC-8X10G • PID—CBR-DPIC-2X100G Cisco cBR-8 Downstream PHY Module: • PID—CBR-D31-DS-MOD Cisco cBR-8 Upstream PHY Modules: • PID—CBR-D31-US-MOD

Information About Upstream Interface Configuration

The cable interface in the Cisco cBR router supports upstream signals and serves as the radio frequency (RF) interface. This chapter provides an overview of the upstream interfaces on the Cisco cBR Series Converged Broadband Router.

Cisco IOS XE Fuji 16.9.1 and later releases support 10 Gbps of upstream throughput on the following line cards on the Cisco cBR Series Converged Broadband Router:

- CBR-CCAP-LC-40G
- CBR-CCAP-LC-40G-R

Upstream Channel Management

Upstream Channel Management (UCM) is responsible for the physical (PHY) layer configuration and resource management of upstream channels in the Cisco cBR Series Converged Broadband Router.

Upstream Controller

An upstream port represents a physical upstream RF connector on a cable line card, connected to one or more fiber nodes. An upstream RF port is a container of upstream RF channels, which imposes constraints on both topology and spectrum for the group of RF channels contained in the physical port. An upstream RF port also represents the RF front-end hardware component on a cable line card including the connector, variable gain adjustment (VGA), and A/D converter. This is directly connected to a set of upstream physical channel receivers. The number of upstream physical channels per port is thus constrained by the number of receivers accessible to the port.

Upstream Channel

An upstream RF channel represents DOCSIS physical layer operation on a single upstream center frequency with a particular channel width. It is contained by a single physical port on the CMTS line card hardware.

Upstream Resource Management

The upstream resource management (URM) feature is primarily responsible for the maintenance of the relationship between a physical upstream connector on the line card and the upstream RF channels received on that connector.

How to Configure Upstream Interfaces

This section contains the following:

Configuring the Cisco CMTS Manually Using Configuration Mode

Connect a console terminal to the console port on the I/O controller. When asked if you want to enter the initial dialog, answer **no** to go into the normal operating mode of the router. After a few seconds the user EXEC prompt (**Router>**) appears.

Configuring the Modulation Profile and Assigning to an Upstream Channel

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:**	Enters global configuration mode.

	Command or Action	Purpose
	`Router# configure terminal`	
Step 3	**cable modulation-profile** *profile mode_of_oper qam_profile* **Example:** `Router(config)# cable modulation-profile 23 tdma qam-16`	Creates a preconfigured modulation profile, where the burst parameters are set to their default values for each burst type.
Step 4	**Controller Upstream-Cable** *slot/subslot/port* **Example:** `Router(config)# Controller Upstream-Cable 7/0/0`	Enters the controller interface configuration mode.
Step 5	**us-channel** *n* **modulation-profile** *primary-profile-number* [*secondary-profile-number*] [*tertiary-profile-number*] **Example:** `Router(config-if)#cable upstreamus-channel 0 modulation-profile 23`	Assigns up to three modulation profiles to an upstream port.
Step 6	**end** **Example:** `Router(config-controller)# end`	Exits controller configuration submode and returns to privileged EXEC mode.

Configuring the Upstream Channel with PHY Layer

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**controller upstream-cable** *slot/subslot/port* **Example:** `Router(config)# controller upstream-cable 1/0/0`	Specifies the controller interface line card and enters upstream controller config configuration submode.
Step 4	**us-channel** *rf-channel* **frequency** *freq-val* **Example:** `Router(config-controller)# us-channel 1 frequency 20000000`	Assigns frequency to an RF channel on a controller interface.

	Command or Action	Purpose
Step 5	**us-channel** *rf-channel* **docsis-mode** *mode* **Example:** `Router(config-controller)# us-channel 1 docsis-mode tdma`	Assigns DOCSIS mode to an RF channel on a controller interface.
Step 6	**us-channel** *rf-channel* **channel-width** *value* **Example:** `Router(config-controller)# us-channel 1 channel-width 3200000`	Assigns channel width in Hertz to an RF channel on a controller interface.
Step 7	**us-channel** *rf-channel* **modulation-profile** *profile* **Example:** `Router(config-controller)# us-channel 1 modulation-profile 21`	Assigns modulation profile to an RF channel on a controller interface.
Step 8	**no us-channel** *rf-channel* **shutdown** **Example:** `Router(config-controller)# no us-channel 1 shutdown`	Enables the upstream channel.
Step 9	**end** **Example:** `Router(config-controller)# end`	Exits upstream controller configuration submode and returns to privileged EXEC mode.

Associating Upstream Channels with a MAC Domain and Configuring Upstream Bonding

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**interface cable** *slot/subslot/cable-interface-index* **Example:** `Router(config)# interface cable 7/0/0`	Specifies the cable interface line card on a Cisco CMTS router.

	Command or Action	Purpose
Step 4	**downstream integrated-cable** *slot*/*subslot*/*port* **rf-channel** *rf-chan* [**upstream** *grouplist*] **Example:** `Router(config-if)# downstream integrated-cable 7/0/0 rf-channel 3 upstream 3`	Associates a set of upstream channels to the integrated downstream channels.
Step 5	**upstream** *md-us-chan-id* **upstream-cable** *slot*/*subslot*/*port* **us-channel** *rf-channel* **Example:** `Router(config-if)# upstream 0 upstream-cable 7/0/0 us-channel 0`	Associates a set of physical upstream channels with the Mac Domain.
Step 6	**cable upstream bonding-group** *id* **Example:** `Router(config-if)# cable upstream bonding-group 200`	Creates the upstream bonding group on the specified cable interface and enters upstream bonding configuration submode.
Step 7	**upstream** *number* **Example:** `Router(config-upstream-bonding)# upstream 1`	Adds an upstream channel to the upstream bonding group. A maximum of 16 upstream channels can be configured for each MAC Domain, which are divided into two groups: • Group 1: upstream channel 0-7 • Group 2: upstream channel 8-15 The **upstream bonding-group** should include all the upstream channels either from Group 1 or Group 2 only.
Step 8	**attributes** *value* **Example:** `Router(config-upstream-bonding)# attributes eeeeeeee`	Modifies the attribute value for the specified upstream bonding group.
Step 9	**end** **Example:** `Router(config-upstream-bonding)# end`	Exits upstream bonding configuration submode and returns to privileged EXEC mode.

Configuration Examples

Upstream Channel with PHY Layer Configuration Example

```
...
us-channel 0 frequency 20000000
us-channel 0 channel-width 3200000 3200000
us-channel 0 power-level 0
us-channel 0 docsis-mode tdma
us-channel 0 minislot-size 2
us-channel 0 modulation-profile 21
```

```
no us-channel 0 shutdown
...
```

Upstream Channels with a MAC Domain Configuration Example

```
...
interface Cable8/0/0
downstream Modular-Cable 8/0/0 rf-channel 0
upstream 0 Upstream-Cable 8/0/0 us-channel 0
upstream 1 Upstream-Cable 8/0/0 us-channel 1
cable mtc-mode
cable upstream bonding-group 1
  upstream 0
  upstream 1
  attributes 80000000

...
```

Additional References

Technical Assistance

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

Feature Information for Upstream Interface Configuration on the Cisco cBR Router

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

Table 2: Feature Information for Upstream Interface Configuration

Feature Name	Releases	Feature Information
Upstream Interface Configuration	Cisco IOS XE Fuji 16.7.1	This feature was integrated on theCisco cBR Series Converged Broadband Routers.