



Remote PHY QAM Profile Configuration

This document describes how to configure the QAM profile on the Cisco cBR Series Converged Broadband Router.

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.

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

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Hardware Compatibility Matrix for Cisco Remote PHY Shelf 7200



Note Unless otherwise specified, the hardware components introduced in a given Cisco Remote PHY Shelf 7200 Software Release are supported in all subsequent releases.

Table 1: Hardware Compatibility Matrix for the Cisco Remote PHY Shelf 7200

Cisco CMTS Platform	Cisco Remote PHY Shelf 7200
Cisco cBR-8 Converged Broadband Router with Cisco IOS XE Gibraltar 16.10.1 and Later Releases	Cisco Remote PHY Shelf 7200 Software 1.1 and Later Releases Cisco Remote PHY Shelf 7200 <ul style="list-style-type: none">• PID—HA-RPHY

Information About QAM Profile

A QAM profile describes the common downstream channel modulator settings, referred to as physical layer parameters. This includes QAM constellation, symbol rate, interleaver-depth, spectrum-inversion, and annex.

The QAM profile is described by CCAP DownPhyParams object. Default QAM profiles are supported and customized for DOCSIS or MPEG Video, which are described as DocsisPhyDefault and VideoPhyDefault objects, respectively.

A maximum of 32 QAM profiles can be defined. There are four system-defined QAM profiles (0 to 3), which cannot be deleted or modified. You can define profiles 4 to 31.

The system defined profiles are:

- Profile 0 - default-annex-b-64-qam
 - interleaver-depth: I32-J4
 - symbol rate: 5057 kilo-symbol/second
 - spectrum-inversion: off
- Profile 1 - default-annex-b-256-qam
 - interleaver-depth: I32-J4
 - symbol rate: 5361 kilo-symbol/second
 - spectrum-inversion: off
- Profile 2 - default-annex-a-64-qam
 - interleaver-depth: I12-J17
 - symbol rate: 6952 kilo-symbol/second
 - spectrum-inversion: off
- Profile 3 - default-annex-a-256-qam
 - interleaver-depth: I12-J17
 - symbol rate: 6952 kilo-symbol/second
 - spectrum-inversion: off

Broadcast Video

Typically, broadcast video serves an entire area or service group. Cisco Remote PHY Shelf 7200 is designed to optimise traffic flow, such that broadcast video on a line card is received by backhaul ports 0 and 1. The broadcast video then replicates, and all six PHY devices can receive the replicated broadcast video from backhaul ports 0 and 1 based on the auxillary core configuration on Cisco cBR-8. Auxillary core configuration enables you to specify rf-channels and its parameters and establishes unicast GCP connection to each PHY device.

Depending on the mapping of backhaul ports and the configured redundancy mode, PHY devices mapped to backhaul ports send IGMP or MLD join request to the first CIN switch. The PHY devices then start receiving broadcast traffic from the backhaul ports.

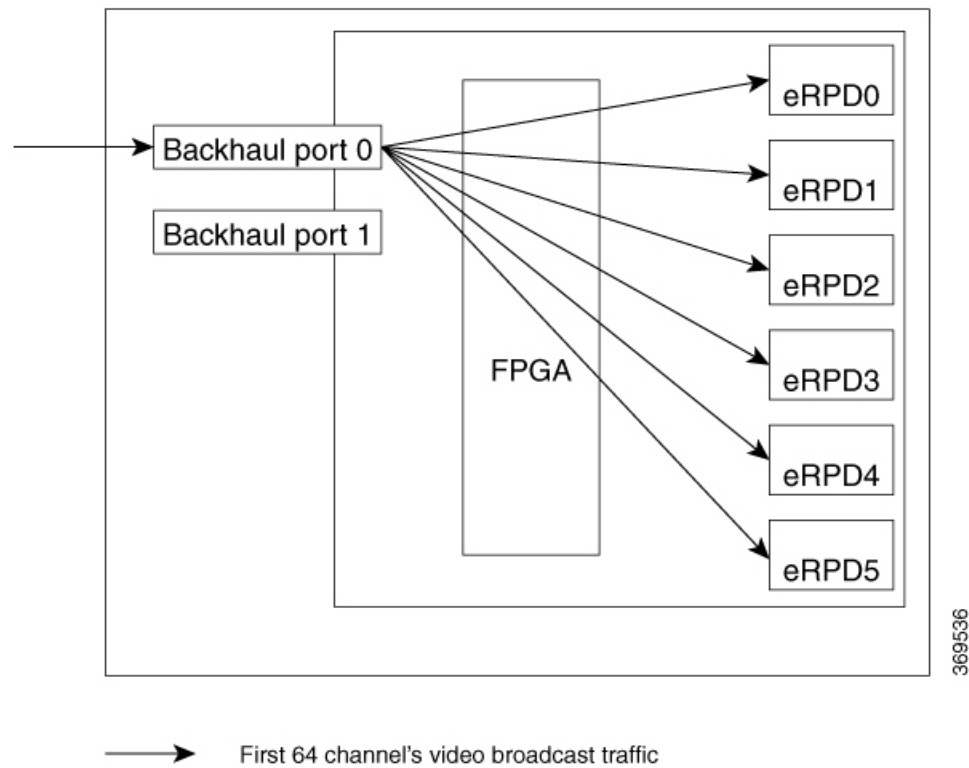


Note CIN switches must be enabled in IGMP/MLD snooping and PIM must be enabled at L3.

A total of 96 QAM channels are supported for video broadcast. For ease of managing traffic flow, backhaul port 0 sends IGMP/MLD join request for the first 64 QAM channels while backhaul port 1 sends IGMP/MLD join request for the next 32 QAM channels. At any instance, only backhaul ports 1 and 0 sends IGMP/MLD join request to the CIN switch. Backhaul ports 2,3,4,5,6,7 does not send IGMP/MLD join request for broadcast video.

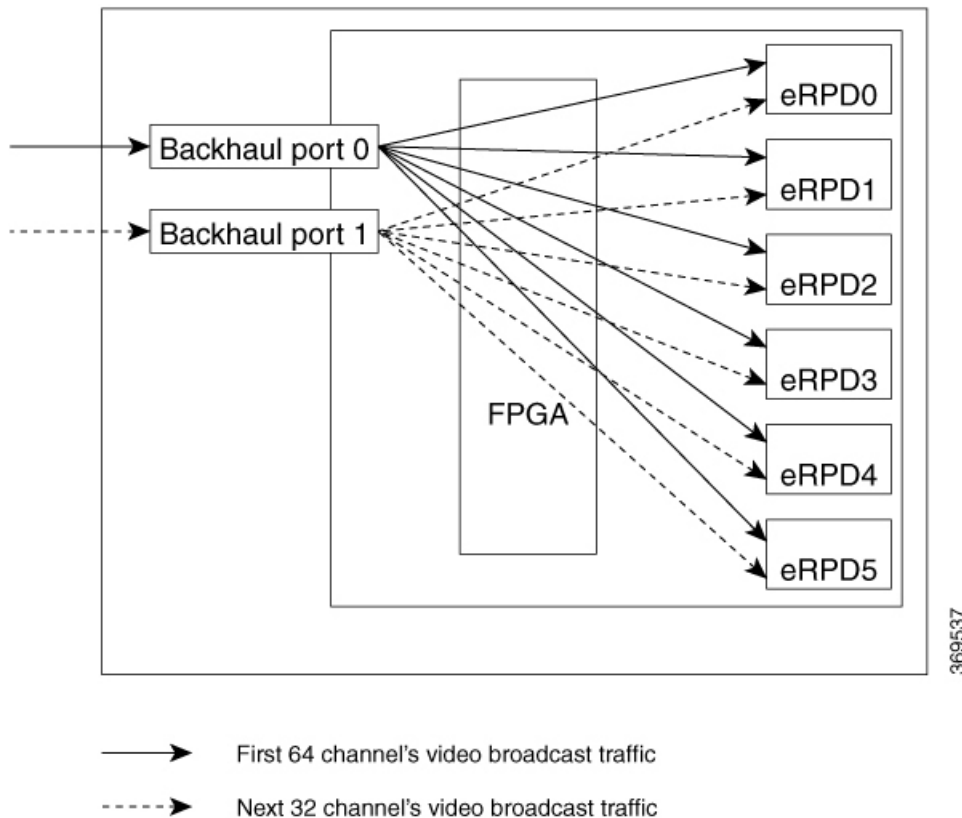
This figure shows the first 64 QAM channels used for video broadcast.

Figure 1: 64 channel video broadcast traffic flow



This figure shows more than 64 QAM channels used for video broadcast.

Figure 2: More than 64 QAM channels used for video broadcast



How to Configure Remote PHY QAM Profile



Note To know more about the commands referenced in this section, see the [Cisco IOS Master Command List](#).

Configuring the QAM Profile on Downstream Channels

```

Enable
configure terminal
  cabledownstream qam-profile Qam_Profile_ID D

  annex {A | B | C}
  description LINE
  interleaver-depth {I12-J17 | I128-J1 | I128-J2 |
I128-J3 | I128-J4 | I128-J5 | I128-J6 | I128-J7 |
I128-J8 | I16-J8 | I32-J4 | I64-J2 | I8-J16}
  modulation {256 | 64} spectrum-inversion {off | on}
  symbol-rate value
exit
  
```

You can configure symbol rate for Annex A video and Annex C video. The valid range for Annex A video is 3500 to 7000 kilo-symbols/sec. The valid range for Annex C video is 3500 to 5309 kilo-symbols/sec. The channel width in kHz is symbol-rate * (1 + alpha) with 0.15 alpha for Annex A and 0.13 alpha for Annex C.

Verifying QAM Profile on Downstream Channels

Use the following commands to verify the QAM Profile on Downstream Channels:

```
Router#show running-config | section downstream controller-profile
cable downstream controller-profile 0
  rf-chan 0 3
  type DOCSIS
  frequency 111000000
  rf-output NORMAL
  qam-profile 1
  docsis-channel-id 1
```

Configuring QAM Profile for Broadcast Video

```
Enable
configure terminal
cable downstream controller-profile 131
multicast-pool 10
broadcast
max-carrier 158
rf-chan 68 157
type VIDEO SYNC
qam-profile 1
frequency 333000000
rf-output NORMAL
```

These are QAM profile configuration recommendations for broadcast video.

- Backhaul port 0 and eRPD 0 must be configured first for video broadcast.
- Backhaul port 0 and 1 must be provisioned if more than 64 QAM channels are used.
- eRPD 0 and eRPD 1 maps VBH 0 and VBH 1, which sends IGMP/MLD join request via the respective backhaul ports 0 and 1. Snooping must be configured on these backhaul ports.



Note Broadcast video QAM controller-profile must be configured separately and should not be combined with DOCSIS/Narrowcast controller-profiles.

Configuration Example

QAM Profile Configuration

```
configure terminal
cable downstream controller-profile 1
  multicast-pool 20
  Rf-channel 0 15
```

```

Type docsis
Frequency 111000000
Rf-output NORMAL
Qam-profile 1
Docsis-channel-id 1
cable downstream controller-profile 2
multicast-pool 20
Rf-channel 20 47
Type video sync
Frequency 231000000
Rf-output NORMAL
Qam-profile 14

```

Feature Information for QAM Profile Configuration

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



Note

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

Table 2: Feature Information for QAM Profile Configuration

Feature Name	Releases	Feature Information
QAM Profile Configuration	Cisco Remote PHY Shelf 7200 Software 2.x.	This feature was introduced on the Cisco Remote PHY Shelf 7200.
QAM Profile Configuration for Broadcast Video	Cisco Remote PHY Shelf 7200 Software 2.x.	This feature was introduced on the Cisco Remote PHY Shelf 7200.