

Cisco Remote PHY Controller Profile and RPD Configuration

The Remote PHY (R-PHY) Controller Profile includes upstream controller-profile and downstream controller-profile. Upstream controller-profile is used to specify the upstream (US) channels and related parameters, which are part of a specific profile, similar to the following:

- Channel width
- DOCSIS mode
- Frequency
- Minislot size
- Modulation-profile

The downstream controller-profile is used to specify the RF channels and their RF parameters that belong to a specific profile, including the following details:

- Channel type (DOCSIS, Video Sync, Video Async)
- Frequency
- RF output
- QAM-profile (annex, modulation, inter-leaver, symbol rate, and so on)

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.

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Hardware Compatibility Matrix for Cisco Remote PHY Device

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

Table 1: Hardware Compatibility Matrix for the Cisco Remote PHY Device

Cisco HFC Platform	Remote PHY Device
Cisco GS7000 Super High Output Node	**Cisco 1x2 / Compact Shelf RPD Software 2.1 and Later Releases** Cisco Remote PHY Device 1x2 • PID—RPD-1X2= **Cisco 1x2 / Compact Shelf RPD Software 2.1a and Later Releases** Cisco Remote PHY Device 1x2 • PID—RPD-1X2-PKEY=
Cisco GS7000 Super High Output Intelligent Node (iNode)	**and Later Releases** Cisco Intelligent Remote PHY Device 1x2 • PID—iRPD-1X2= • PID—iRPD-1X2-PKEY=

Note The -PKEY suffix in the PID indicates units that enable the SCTE-55-2 Out-of-Band protocol support.

Controller Profile and RPD

The Controller Profile functions in a similar way to the controller integrated-cable Slot/Bay/Port (for downstream controller) or upstream-cable Slot/Bay/Port (for upstream controller) in I-CMTS. However if a Controller Profile is not associated to an RPD, physical resources cannot be allocated.

You can either unicast or multicast this profile. Multicast profile is used for DS sharing. You can multicast the same traffic to all RPDs in the multicast group, or to applications such as switched digital video (SDV) or BC video.

An R-PHY configuration consists of one principal core interface and one auxiliary core interface. The principal core specifies the DPIC interface to which the RPD connects. Auxiliary core interfaces specify the external

DPIC interfaces that can be used for downstream sharing. Auxiliary core is used in this release only for video multicast and video OOB.

Configuring Controller Profile and cable RPD are the prerequisites for configuring R-PHY video.

The following table lists the DSCP value for different kinds of items.

Item	Per-Hop-Behavior (PHB)	DSCP Value
DOCSIS data (L2TP)	Best Effort	0
PTP	EF	46
GCP	Best Effort	0
MAP/UCD (L2TP, DOCSIS control)	EF	46
BWR and RNG-REG	EF	46
Video	CS4	32
MDD (L2TP, DOCSIS control), voice	CS5	40

RPD Configurations

Compared to the iCMTS configuration, R-PHY configuration supports the following features:

- Up to 512 RPDs per CBR-8 chassis and 64 RPDs per CBR-CCAP-LC-40G-R line card
- 128 separate service groups per CBR-8 chassis
- 32 downstream controllers and up to 768 downstream channels per CBR-CCAP-LC-40G-R line card
- Up to 158 downstream channels (0-157) per downstream controller
- 64 upstream controllers and 128 upstream channels per CBR-CCAP-LC-40G-R line card



Note In Cisco IOS XE Fuji 16.8.1 and earlier releases, although 128 maximum upstream SCQAM channels per CBR-CCAP-LC-40G-R line card could be configured, the upstream maximum throughput per CBR-CCAP-LC-40G-R line card is 3 Gbps which is due to USJIB limitation. So, if the the upstream maximum throughput per CBR-CCAP-LC-40G-R line card is higher than 3 Gbpsm, upstream service cannot be guranteed.

Cisco IOS XE Fuji 16.9.1 and later releases support 10 Gbps of upstream throughput on the CBR-CCAP-LC-40G and CBR-CCAP-LC-40G-R line cards on the Cisco cBR Series Converged Broadband Router.

In the R-PHY configuration, the following mapping relationships are supported between the controller and the port on RPD:

- Downstream 1:N (N>= 2) mapping: one DS controller is shared by several RPDs and one DS controller is mapped to one DS port of all these RPDs, that is “DS virtual split”, all these DS ports share the same signals from the same DS controller.
- Downstream N:1 mapping: several DS controllers are mapped into the same DS port of one RPD. Notice: the DS channels in these DS controller should use different rf-channel numbers
- Downstream N:N mapping: mixed 1:N and N:1 mapping. For example: several DS controllers are mapped into one DS port of one RPD. But at the same time they are “virtual split” DS controllers and are shared by several RPDs.
- Upstream 1:N(N<=8) mapping: one US controller can be shared by N (N<=8) US ports of multiple RPDs. Currently max two US ports are supported on one RPD, and for each US port, one US controller can be configured.

  For the two US ports of one RPD, the same US controller number can be configured.

Note Downstream 1:1 mapping is not supported under 512 RPD configuration, but still supported under smaller scale configuration.

Prerequisites for Configuring Controller Profile and RPD

The following restrictions are applicable to configuring controller profiles:

- All channels within the profiles of an RPD must be unique. Frequencies must not overlap each other.
- The principal core must contain at least one DOCSIS downstream profile
- Auxiliary core should contain only video and out-of-band profiles
- A DS controller can be associated to only one profile

Restrictions for Configuring Controller Profile and RPD

The following restrictions are applicable to configuring upstream controller profiles:

- Legacy controller configuration commands are not supported
- Legacy controller configuration cannot be shown in running-configuration

Configure Controller Profile and RPD

Note To know more about the commands referenced in this module, see the Cisco IOS Master Command List.

Configure Upstream Controller Profile

To configure the upstream controller-profile, use the cable upstream controller-profile command, as given in the following example:

```
Router#cable upstream controller-profile 4
  cable def-phy-burst 0
  us-channel 0 chan-class-id 0
  us-channel 0 channel-width 1600000 1600000
  us-channel 0 docsis-mode atdma
  us-channel 0 equalization-coefficient
  us-channel 0 frequency 50000000
  us-channel 0 hop-priority frequency modulation channel-width
  us-channel 0 ingress-noise-cancellation 100
  us-channel 0 maintain-psd
  us-channel 0 max-logical-chans 1
  us-channel 0 minislot-size 4
  us-channel 0 modulation-profile 221
  us-channel 0 power-level 0
  us-channel 0 rng-holdoff 0
  us-channel 0 shutdown
  us-channel 0 specsvl error-adaptive-profile 1
  us-channel 0 threshold cnr-profiles 25 13
  us-channel 0 threshold corr-fec 3
  us-channel 0 threshold hysteresis 3
  us-channel 0 threshold snr-profiles 25 13
  us-channel 0 threshold uncorr-fec 1
  ...
  end
```

Verify Upstream Controller Profile Configuration

To verify the Upstream controller profile configuration, use the **show cable downstream controller-profile** command or **show running-config | section upstream controller-profile** <*ID*> command, as shown in the following example:

```
Router#show cable upstream controller-profile 0
Load for five secs: 2%/0%; one minute: 3%; five minutes: 3%
Time source is NTP, 15:14:27.916 CST Fri Feb 24 2017

Upstream controller-profile 0
Description:
Upstream controller-profile 0 is being used by controller Upstream-Cable:
8/0/1,  8/0/0
  Controller Upstream-Cable
    ...
  Upstream-channel 0
    chan-class-id                : 0x0
    channel-width                : 1600000 1600000
    docsis-mode                  : atdma
    ...
```

Example for the **show running-config | section upstream controller-profile <ID>** command

```
Router#show running-config | s cable upstream controller-profile 0
cable upstream controller-profile 0
 us-channel 0 channel-width 1600000 1600000
 us-channel 0 docsis-mode atdma
 us-channel 0 equalization-coefficient
 us-channel 0 frequency 6000000
 us-channel 0 minislot-size 4
 us-channel 0 modulation-profile 221
```

```
 no us-channel 0 shutdown
 us-channel 1 channel-width 1600000 1600000
 us-channel 1 docsis-mode atdma
 us-channel 1 equalization-coefficient
 us-channel 1 frequency 7600000
 us-channel 1 minislot-size 4
 us-channel 1 modulation-profile 221
 no us-channel 1 shutdown
 us-channel 2 channel-width 1600000 1600000
 us-channel 2 docsis-mode atdma
 us-channel 2 equalization-coefficient
 us-channel 2 frequency 9200000
 us-channel 2 minislot-size 4
 us-channel 2 modulation-profile 221
 no us-channel 2 shutdown
 us-channel 3 channel-width 1600000 1600000
 us-channel 3 docsis-mode atdma
 us-channel 3 equalization-coefficient
 us-channel 3 frequency 10800000
 us-channel 3 minislot-size 4
 us-channel 3 modulation-profile 221
 no us-channel 3 shutdown
 us-channel 4 channel-width 1600000 1600000
 us-channel 4 docsis-mode atdma
 us-channel 4 frequency 12400000
 us-channel 4 minislot-size 4
 us-channel 4 modulation-profile 221
 no us-channel 4 shutdown
 us-channel 5 channel-width 1600000 1600000
 us-channel 5 docsis-mode atdma
 us-channel 5 frequency 14000000
 us-channel 5 minislot-size 4
 us-channel 5 modulation-profile 221
```

Configure RPD for US Controller Profile

To configure RPD for associating an upstream controller-profile, using the **rpd-ds** <*port-id*> **Upstream-Cable** <*slot/sub-slot/controller*> *[profile <id>]* command, as given in the following example:

```
Router#cable rpd 1
 identifier 0004.9f00.0743
 core-interface Te8/1/0
  principal
  rpd-us 0 upstream-cable 8/0/0 profile 0
  rpd-us 1 upstream-cable 8/0/1 profile 4
 r-dti 11
 rpd-event profile 0
 rpd-55d1-us-event profile 0
---
end
```

The Remote PHY (R-PHY) Controller Profile now provides a new summary that displays the Per RPD us port description. The summary helps distinguish between the different controllers that share the same description of us-channels.

For example, the **show cable modem rpd all summary** command displays the following information:

```
Router#show cable modem rpd all summary

Load for five secs: 5%/0%; one minute: 5%; five minutes: 5%
No time source, *15:36:49.777 UTC Thu Mar 8 2018

RPD ID: badb.ad13.417c
```

```
Interface                      Cable Modem                                  Description
          Total Reg Oper  Unreg Offline Wideband initRC initD initIO initO
C9/0/4/U0  1     0   0     1     0       0        1      0     0      0  badb.ad13.417c us
 0
C9/0/4/U1  2     0   0     2     0       0        2      0     0      0  badb.ad13.417c us
 0
C9/0/4/U3  1     0   0     1     0       0        1      0     0      0  badb.ad13.417c us
 0
C9/0/5/U0  2     0   0     2     0       0        2      0     0      0  badb.ad13.417c us
 1
C9/0/5/U1  1     0   0     1     0       0        1      0     0      0  badb.ad13.417c us
 1

RPD ID: badb.ad13.41fa
Interface                      Cable Modem                                  Description
          Total Reg   Oper  Unreg Offline Wideband initRC initD initIO initO
C9/0/2/U0  2     0     0     2     0       1        1      0     0      1  badb.ad13.41fa
us 0
C9/0/2/U1  1     0     0     1     0       0        1      0     0      0  badb.ad13.41fa
us 0
C9/0/2/U3  1     0     0     1     0       0        1      0     0      0  badb.ad13.41fa
us 0
C9/0/3/U1  1     0     0     1     0       0        1      0     0      0  badb.ad13.41fa
us 1
C9/0/3/U2  2     0     0     2     0       0        2      0     0      0  badb.ad13.41fa
us 1
C9/0/3/U3  1     0     0     1     0       0        1      0     0      0  badb.ad13.41fa
us 1
```

Note The length of configurable limitation is 20 characters while there are 80 characters reserved.

Configure Downstream Controller Profile

To configure downstream controller profile, use the following commands:

```
configure terminal
cable downstream controller-profile <profile ID>
multicast-pool <id>
rf-chan 20 47
type video <SYNC | ASYNC>
frequency 231000000
rf-output NORMAL
qam-profile <profile ID>
```

The *multicast-pool <id>* defines the DEPI multicast group. The type video *<SYNC | ASYNC>* defines synchronous or asynchronous mode.

Verify Downstream Controller Profile Configuration

To verify the Downstream controller profile configuration, use the show cable downstream controller-profile command as shown in the following example:

```
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
```

Configure RPD for DS Controller Profile

To configure RPD for associating a downstream controller-profile, use the following commands:

```
configure terminal
cable rpd RPD01
identifier 0004.9f31.0435
core-interface Te3/1/0
principal
rpd-ds 0 downstream-cable 3/0/0 profile 1
rpd-ds 0 downstream-cable 3/0/1 profile 2
rpd-us 0 upstream-cable 3/0/0 profile 1
core-interface te6/1/0
rpd-ds 0 downstream-cable 6/0/0 profile 2
r-dti 1
rpd-event profile 0
rpd-55d1-us-event profile 0
```

The **rpd-ds** *0* **downstream-cable** *3/0/0 profile 1* associates *controller 3/0/0* with *profile 1*, which is a DOCSIS profile.

The **rpd-ds** *0* **downstream-cable** *3/0/1 profile 2* associates *controller 3/0/1* with *profile 3*, which is a video profile.

The *core-interface te6/1/0* defines an auxiliary interface for this RPD. This auxiliary interface is used to configure downstream sharing across line cards.

Verify RPD Association with Controller Profile

To verify the downstream controller profile association with RPD, use the **show running-config | section cable rpd <ID>** command as shown in the following example:

```
Router#show running-config | section cable rpd RPD01
cable rpd toi-test1
 identifier 0000.1cbf.0000
 core-interface Te2/1/0
  principal
  rpd-ds 0 downstream-cable 2/0/9 profile 0
 rpd-event profile 0
rpd-55d1-us-event profile 0
```

Configure Downstream Sharing

This configuration is optional. DS sharing is used for multicast (MC) traffic. To configure downstream sharing, use the following commands:

```
configure terminal
cable rpd RPD01
core-interface Te3/1/0
principal
rpd-ds 0 downstream-cable 3/0/1 profile 2
cable rpd RPD02
core-interface te3/1/0
principal
rpd-ds 0 downstream-cable 3/0/1 profile 2
```

Note All RDPs in the same multicast group should have the same controller and profile association.

Configure Controller in Fiber Node

To configure the controllers in fiber-node, use the **cable fiber-node** command, as given in the following example:

```
cable fiber-node 113
 downstream Downstream-Cable 8/0/0
 upstream Upstream-Cable 8/0/1
```

Verify CM RPD Association

To verify the RPD associated with the cable modem, use the **show cable modem rpd** command as shown in the following example:

```
Router# show cable modem rpd 0004.9f03.0249
Load for five secs: 4%/2%; one minute: 3%; five minutes: 4%
Time source is NTP, 10:48:11.763 CST Tue Feb 28 2017
                                                                                D
MAC Address    IP Address      I/F           MAC               Prim  RxPwr  Timing Num I
                                             State             Sid   (dBmv) Offset CPE P
0023.be5a.bb6c 10.10.10.12     C6/0/0/UB     w-online          5     0.00   862    0   N
1859.3356.8876 10.10.10.13     C6/0/0/UB     w-online          6     0.50   907    0   N
```

Display GCP Ralated Information

To display Generic Control Plane (GCP) related information of the RPD, use the command as shown in the following example:

```
Router#show cable rpd 0004.9f03.0280 Te3/1/0 gcp-state

MAC Address     IP Address       I/F       State        Role HA  Name
0004.9f03.0280  10.10.10.11      Te3/1/0   ready        Pri  Act 2

A06#show cable rpd 0004.9f03.0280 Te3/1/0 gcp-state
MAC Address     IP Address       I/F       State        Role HA  Name
0004.9f03.0280  10.10.10.11      Te3/1/0   ready        Pri  Act 2

Router#show cable rpd name node te1/1/0 gcp-session

GCP Session ID : 10
Core Address   : 10.100.10.11:8190
RPD Address    : 10.10.10.11:60656
Next Hop MAC   : 0004.9F00.0901
Session State  : Active

Packet Statistics:
========================
Rx         : 5038
Tx         : 5034
Rx Dropped : 0
Tx Dropped : 0
```

```
Message Statistics:
=========================
Rx         : 5948
Tx         : 5954
Rx Dropped : 7
Tx Dropped : 0
Rx Illegal : 0
Tx Illegal : 0

Router#show cable rpd 120.102.6.7 te9/1/1 gcp-transaction
 Load for five secs: 3%/1%; one minute: 4%; five minutes: 4%
No time source, *10:22:57.158 CST Thu Mar 16 2017

RPD ID           I/F        TRANS ID   GCP MSG TYPE             RCP MSG TYPE   TIMESTAMP
---------------- ---------- ---------- ------------------------ --------------
-------------------------
0004.9f31.1007   Te9/1/1    7452       GCP_MSG_ID_EDS_RSP       TYPE_REX       2017-03-16
10:22:54.440
0004.9f31.1007   Te9/1/1    7452       GCP_MSG_ID_EDS           TYPE_REX       2017-03-16
10:22:54.415
0004.9f31.1007   Te9/1/1    7451       GCP_MSG_ID_EDS_RSP       TYPE_REX       2017-03-16
10:22:54.240
0004.9f31.1007   Te9/1/1    7451       GCP_MSG_ID_EDS           TYPE_REX       2017-03-16
10:22:54.215
0004.9f31.1007   Te9/1/1    7450       GCP_MSG_ID_EDS_RSP       TYPE_REX       2017-03-16
10:22:54.040
0004.9f31.1007   Te9/1/1    7450       GCP_MSG_ID_EDS           TYPE_REX       2017-03-16
10:22:54.015
0004.9f31.1007   Te9/1/1    7449       GCP_MSG_ID_EDS_RSP       TYPE_REX       2017-03-16
10:22:53.836
0004.9f31.1007   Te9/1/1    7449       GCP_MSG_ID_EDS           TYPE_REX       2017-03-16
10:22:53.815
0004.9f31.1007   Te9/1/1    7448       GCP_MSG_ID_EDS_RSP       TYPE_REX       2017-03-16
10:22:50.236
0004.9f31.1007   Te9/1/1    7448       GCP_MSG_ID_EDS           TYPE_REX       2017-03-16
10:22:50.215
0004.9f31.1007   Te9/1/1    7447       GCP_MSG_ID_EDS_RSP       TYPE_REX       2017-03-16
10:22:50.038
0004.9f31.1007   Te9/1/1    7447       GCP_MSG_ID_EDS           TYPE_REX       2017-03-16
10:22:50.015
0004.9f31.1007   Te9/1/1    7446       GCP_MSG_ID_EDS_RSP       TYPE_REX       2017-03-16
10:22:49.839
0004.9f31.1007   Te9/1/1    7446       GCP_MSG_ID_EDS           TYPE_REX       2017-03-16
10:22:49.815
```

Display DEPI Related Information

To display the Downstream External PHY Interface (DEPI) related information, use the command as shown in the following example:

```
Router#show cable rpd depi

DEPI Tunnel and Session Information Total tunnels 1 sessions 26
LocTunID   RemTunID   Remote Device  State  Remote Address  Sessn L2TP Class
                                                           Count
338514820  671581873  0004.9f00.0901 est    10.10.10.11     26    rphy-l2tp-gl...

LocID      RemID      Pseudowire      State  Last Chg Uniq ID    Type Mode RemSt
0x41040008 0x00000B02 US1/0/0:2(R)    est    00:34:57 21          P    PSP  UP
0x41010000 0x00000600 US1/0/0:0(D)    est    00:34:57 11          P    PSP  UP
0x00002006 0x00000405 DS1/0/0:5       est    00:34:57 6           P    PSP  UP
0x00002004 0x00000403 DS1/0/0:3       est    00:34:57 4           P    PSP  UP
```

```
0x4100000C 0x00000D03 US1/0/0:3(M)    est    00:34:57 23         P    PSP  UP
0x00002002 0x00000401 DS1/0/0:1       est    00:34:57 2          P    PSP  UP
0x00002007 0x00000406 DS1/0/0:6       est    00:34:57 7          P    PSP  UP
0x00002008 0x00000407 DS1/0/0:7       est    00:34:57 8          P    PSP  UP
0x4101000C 0x00000603 US1/0/0:3(D)    est    00:34:57 24         P    PSP  UP
0x41000004 0x00000D01 US1/0/0:1(M)    est    00:34:57 15         P    PSP  UP
0x00002001 0x00000400 DS1/0/0:0       est    00:34:57 1          P    PSP  UP
0x41080008 0x00000F02 US1/0/0:2(S)    est    00:34:57 22         P    PSP  UP
0x41010004 0x00000601 US1/0/0:1(D)    est    00:34:57 16         P    PSP  UP
0x41020000 0x00000800 US1/0/0:0(B)    est    00:34:57 12         P    PSP  UP
0x00002009 0x00000408 DS1/0/0:8       est    00:34:57 9          P    PSP  UP
0x41010008 0x00000602 US1/0/0:2(D)    est    00:34:57 20         P    PSP  UP
0x41000008 0x00000D02 US1/0/0:2(M)    est    00:34:57 19         P    PSP  UP
0x4108000C 0x00000F03 US1/0/0:3(S)    est    00:34:57 26         P    PSP  UP
0x00002003 0x00000402 DS1/0/0:2       est    00:34:57 3          P    PSP  UP
0x41080000 0x00000F00 US1/0/0:0(S)    est    00:34:57 14         P    PSP  UP
0x41040004 0x00000B01 US1/0/0:1(R)    est    00:34:57 17         P    PSP  UP
0x41080004 0x00000F01 US1/0/0:1(S)    est    00:34:57 18         P    PSP  UP
0x41000000 0x00000D00 US1/0/0:0(M)    est    00:34:56 10         P    PSP  UP
0x00002005 0x00000404 DS1/0/0:4       est    00:34:56 5          P    PSP  UP
0x4104000C 0x00000B03 US1/0/0:3(R)    est    00:34:56 25         P    PSP  UP
0x41040000 0x00000B00 US1/0/0:0(R)    est    00:34:56 13         P    PSP  UP

outer#show cable rpd 0004.9f03.0214 te7/1/0 depi tunnel

Load for five secs: 7%/2%; one minute: 6%; five minutes: 6%
No time source, *12:41:44.228 CST Mon Mar 20 2017

LocTunID   RemTunID   Remote Device  State  Remote Address  Sessn L2TP Class
                                                           Count
3388764998 1054297851 0004.9f03.0214 est    10.10.10.11     29    rphy-l2tp-gl...
```

Table 2: show cable rpd depi Field Descriptions

Field	Description
LocID	Local session ID.
RemID	Remote session ID.
US1/0/0:2(R)	US means UEPI session, DS means DEPI session. This string means UEPI session on line card slot 1, controller 0, rf-channel 2.
est in State	Established state.
P in Type	On primary line card.

Troubleshooting Tips

Refer to the following troubleshooting tips if configuration errors occur.

If you configure DS controller profile and cable RPD, you can check the controller status, regardless of the status of the RPD. If the channel's state is DOWN, use verbose option to view the reason.

```
Router#show controllers downstream-Cable 6/0/1 rf-channel 20 <verbose>
Chan State Admin Frequency Type       Annex Mod  srate Interleaver dcid output
20    UP    UP   231000000 VIDEO-SYNC B     256   5361  I128-J1     -   NORMAL
```

Configuration Examples

This section provides example configurations for the R-PHY Controller Profile.

Example: Controller Profile Configuration

Upstream Controller Profile Configuration

```
configure terminal
cable upstream controller-profile 2
  cable def-phy-burst 0
  us-channel 0 chan-class-id 0
  us-channel 0 channel-width 1600000 1600000
  us-channel 0 docsis-mode atdma
  us-channel 0 equalization-coefficient
  us-channel 0 frequency 50000000
  us-channel 0 hop-priority frequency modulation channel-width
  us-channel 0 ingress-noise-cancellation 100
  us-channel 0 maintain-psd
  us-channel 0 max-logical-chans 1
  us-channel 0 minislot-size 4
  us-channel 0 modulation-profile 221
  us-channel 0 power-level 0
  us-channel 0 rng-holdoff 0
  us-channel 0 shutdown
  us-channel 0 specsvl error-adaptive-profile 1
  us-channel 0 threshold cnr-profiles 25 13
  us-channel 0 threshold corr-fec 3
  us-channel 0 threshold hysteresis 3
  us-channel 0 threshold snr-profiles 25 13
  us-channel 0 threshold uncorr-fec 1
  ...
  end
```

Downstream Controller 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
```

Example: Downstream Sharing Configuration

```
cable rpd RPD01
identifier 0004.9f31.0979
```

```
core-interface te6/1/0
principal
rpd-ds 0 downstream-cable 6/0/0 profile 1
rpd-ds 0 downstream-cable 6/0/1 profile 2
rpd-us 0 upstream-cable 6/0/0 profile 1
r-dti 6
rpd-event profile 0
rpd-55d1-us-event profile 0
cable rpd RPD2
identifier 0004.9f31.1437
core-interface Te3/1/0
principal
rpd-ds 0 downstream-cable 3/0/0 profile 1
rpd-us 0 upstream-cable 3/0/0 profile 1
core-interface Te6/1/0
rpd-ds 0 downstream-cable 6/0/1 profile 2
r-dti 3
rpd-event profile 0
rpd-55d1-us-event profile 0
```

Feature Information for Remote PHY Controller Profile and RPD 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 www.cisco.com/go/cfn link. An account on the Cisco.com page is not required.

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

Table 3: Feature Information for Remote PHY Controller Profile and RPD Configuration

Feature Name	Releases	Feature Information
Large Scale Controller Support (32DS/64US) with node	Cisco 1x2 RPD Software 1.1	This feature was introduced on the Cisco Remote PHY Device.
256 RPD Support per Chassis	Cisco 1x2 RPD Software 1.1	This feature was introduced on the Cisco Remote PHY Device.
Controller profile configuration	Cisco 1x2 RPD Software 1.1	This feature was introduced on the Cisco Remote PHY Device.
US 128 channels	Cisco 1x2 RPD Software 1.1	This feature was introduced on the Cisco Remote PHY Device.