



DOCSIS 3.1 Downstream Profile Selection

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DOCSIS 3.1 introduces the concept of downstream profiles for OFDM channels.

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Hardware Compatibility Matrix for Cisco cBR Series Routers



Note The hardware components 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	<p>Cisco IOS-XE Release 3.15.0S and Later Releases</p> <p>Cisco cBR-8 Supervisor :</p> <ul style="list-style-type: none"> • PID—CBR-CCAP-SUP-160G • PID—CBR-CCAP-SUP-60G¹ • PID—CBR-SUP-8X10G-PIC 	<p>Cisco IOS-XE Release 3.15.0S and Later Releases</p> <p>Cisco cBR-8 CCAP Line Cards:</p> <ul style="list-style-type: none"> • PID—CBR-LC-8D30-16U30 • PID—CBR-LC-8D31-16U30 • PID—CBR-RF-PIC • PID—CBR-RF-PROT-PIC <p>Cisco cBR-8 Downstream PHY Modules:</p> <ul style="list-style-type: none"> • PID—CBR-D30-DS-MOD • PID—CBR-D31-DS-MOD <p>Cisco cBR-8 Upstream PHY Modules:</p> <ul style="list-style-type: none"> • PID—CBR-D30-US-MOD

¹ Effective with Cisco IOS-XE Release 3.17.0S, CBR-CCAP-SUP-60G supports 8 cable line cards. The total traffic rate is limited to 60Gbps, the total number of downstream service flow is limited to 72268, and downstream unicast low-latency flow does not count against the limits.

Information about Downstream Profiles

A profile is a list of modulation orders that are defined for each of the subcarriers within an OFDM channel. The CMTS can define multiple profiles for use in an OFDM channel, where the profiles differ in the modulation orders assigned to each subcarrier.

You can use the following commands to view the profiles:

- To display the profiles associated with the cable modems (CMs), use the **show cable modem** [*ip-address/ mac-address/ cable/ {slot / subslot / cable-interface-index}*] **phy ofdm-profile** command.
- To display detailed profile management data associated with specific cable modem, use the **show cable modem** [*ip-address/ mac-address*] **prof-mgmt** command.

The CMTS can assign different profiles for different groups of CMs.

Default Data Profile

The first time a CM registers, it is assigned a default data profile. The default data profile is "profile-data 1". If "profile-data 1" is not configured, "profile-control" is assigned to the CM.



Note Profile A, with profile ID 0, is also referred to as the control profile.

Recommended Profile

Based on the Receive Modulation Error Ratio (RxMER) values collected from a modem using the **cable modem ip opt0** command, and collected automatically and periodically in the background, the CMTS finds among the existing profiles the one that may provide the highest speed, and yet at the same time may have sufficient Signal to Noise Ratio (SNR) margin for the modem to receive code words with acceptable error. This profile is called the recommended profile for that CM. The **show cable modem phy ofdm-profile** command displays the recommended profile for each CM.

Internal PMA is enabled by default on the cBR-8. If external PMA is enabled, internal PMA is disabled and can be enabled by running the following config command on the cBR-8:

```
no cable downstream ofdm-prof-mgmt prof-upgrade-pma
```

In external PMA, the cBR-8 does not automatically upgrade a CM's profile to the recommended profile. In internal PMA, the profile can be upgraded to the recommended profile in the next OFDM Profile Test (OPT) cycle.

A user configurable age is associated with each recommended profile, which can be configured as follows:

```
Router (config)#cable downstream ofdm-prof-mgmt recommend-profile-age age-in-minutes
```

If the recommended profile exceeds this age, it is no longer valid for that CM.

Unfit Profile

When the CMTS receives CM-STATUS Event 16 (DS OFDM Profile Failure), the profile indicated in the CM-STATUS message is marked as 'unfit profile' for this modem.

A user configurable maximum age is associated with each unfit profile, which can be configured as follows:

```
Router (config)#cable downstream ofdm-prof-mgmt unfit-profile-age age-in-minutes
```

If the unfit profile for a modem exceeds this age, it is no longer valid.

How to Configure Profiles

Configuring Profile Downgrade

A CM sends a CM-STATUS Event 16 message to indicate a DS OFDM profile failure. When this indication is received by the CMTS, it takes immediate action to downgrade the modem to a lower profile, as per the profile ordering displayed by the following command:

```
Router# show controllers integrated-Cable 2/0/3 rf-channel 158 prof-order
```

The following table, extracted from [DOCSIS 3.1 MULPI], lists the CM-Status events that will trigger a profile downgrade:

Table 2: Table: CM-Status Events for Profile Downgrade

Event Type	Event Condition	Status Report Events		Parameters reported by CM	
		Trigger event to "on"	Trigger event to "off"	DCID	Profile ID
16	DS OFDM profile failure	Loss of FEC lock on one of the assigned downstream OFDM profiles of a channel	Re-establishment of FEC lock for that OFDM profile; OR Removal of the channel from the active channel list in the primary channel MDD; OR Removal of the channel from the CM's Receive Channel set via DBC-REQ	Yes	Yes

To disable the automatic profile downgrade, use the following command in global configuration mode:

```
Router (config)#no cable downstream ofdm-prof-mgmt prof-dwngrd-auto
```

Configuring RxMER to Bit Loading Mapping

There are many ways to map the Receive Modulation Error Ratio (RxMER) values to bit loading values. We use the following mapping recommended in [DOCSIS 3.1 OSSI], as our baseline mapping:

RxMER (in ¼ DB)	QAM	Bit Loading
60	16	4
84	64	6
96	128	7
108	256	8
122	512	9
136	1024	10
148	2048	11
164	4096	12

RxMER (in ¼ DB)	QAM	Bit Loading
184	8192	13
208	16384	14

- To configure a margin to adjust the RxMER to bit loading mapping, use the following command:

```
Router(config)# cable downstream ofdm-prof-mgmt mer-margin-qdb interval-in-minutes
```

This configured value (*quarter-DB*) is added to the RxMER values collected by CMTS before using the above mapping table, thus giving a user more control in selecting the recommended profiles.

- To specify the percentage of subcarriers that can be ignored in the recommended profile calculation, use the following command:

```
Router(config)# cable downstream ofdm-prof-mgmt exempt-sc-pct percent
```

This provides a way to specify the extent that the outliers can be ignored.

- To configure the RxMER poll interval, use the following command:

```
Router(config)# cable downstream ofdm-prof-mgmt rxmer-poll-interval interval-in-minutes
```

The CMTS uses OPT message with bit-0 option to collect RxMER data from CMs, after the initial CM registration and periodically thereafter. The collected RxMER data is used to compute the recommended profile for each CM.

Verifying the Profile Configuration

To display the profile management related information, use the **show cable modem phy ofdm-profile** and **show cable modem prof-mgmt** commands as shown in the example below:

```
router# show cable modem fc52.8d5e.84bd phy ofdm-profile
MAC Address      I/F              Chan             DCID  Curr  Recm  Dwngrd  Unfit
                Prof  Prof  Prof  Prof
fc52.8d5e.84bd  C1/0/0/UB       In1/0/0:158     159   5    5    4       N/A

router# show cable modem fc52.8d5e.84bd prof-mgmt
MAC Address      : fc52.8d5e.84bd
IP Address       : ---
IPv6 Address     : 2001:DB8:8888:8888:60A8:AAA:F80A:A88

RxMer Exempt Percent : 11
RxMer Margin qDB     : 20
Automatic Prof Dwngrd : Active

DCID              : 159
Configured Profile(s) : 0 1 2 3 4 5
Profile(s) in REG-RSP-MP : 0 1 2 3
Profile(s) in DBC-REQ   : 0 3 4 5
Current profile       : 5 [4096-QAM]
Percentages of ideal BL vs Curr Prof : 90 (better) 0 (equal)
Downgrade profile    : 4
Recommend profile    : 5
Unfit profile(s)     : N/A
Recommend profile (Expired) : N/A
Unfit profile(s) (Expired) : N/A
Number of SubCarriers : 4096
1st Active SubCarrier : 1126
# of Active SubCarriers: 1844
Tx Time             : 0h:03m:47s ago
```

Verifying the Profile Configuration

```

Rx Time                : 0h:03m:47s ago
OFDM Profile Failure Rx: N/A
MER Poll Period (min): 60
Recommend Timeout (min): 120
Unfit Timeout (min): 60
Source                 : OPT
Sub-Carrier           : RxMER
Carrier
0x0000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0020 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0040 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0060 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0080 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x00A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x00C0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x00E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0100 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0120 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0140 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0160 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0180 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x01A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x01C0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x01E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0200 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0220 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0240 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0260 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0280 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x02A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x02C0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x02E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0300 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0320 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0340 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0360 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0380 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x03A0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x03C0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x03E0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0400 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0420 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0440 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0460 00000000 0000AFB8 ACB1B3B3 B5B100B0 B5B6B6B3 B2B2B6B4 B2B5B7B2 B2B6B3B6

0x0480 B3B6B5B5 B1B4B6B1 B3B1B4B2 B4B2B9B2 ADB6B0B5 B2B4B4B6 B4B4B1B4 B4B4B4B4
0x04A0 B3B5B2B1 B4B1B4B6 B5B8B7B6 B5B6B3B4 B5B6B5B0 B3B100B6 B1B0B7B3 B2B1AFB1
0x04C0 B5B0B3B7 B5B0B4B5 B1B7B3B4 AFB2B4B0 B4AEB3B5 B2B1B4B3 B2B4B3B4 B6B5B2B2
0x04E0 B0B1B5B4 B6B6B3B4 B2B1AFB3 B1B1B7B4 B3B6B8B4 B0B6B1B5 B6B3B8B5 B6B500B4
0x0500 B9B2B6B6 B4B5B1B1 B0B3B6B7 B2B4B7B3 B2AFB8B5 B0B4B4B1 B5B5B4B2 B4B0AFB2
0x0520 B5B5B1B6 B5B5B4B5 B7B5B5B4 B7B6B5B4 B4B6B1B4 B5B5B2B6 B5B5B4B5 B0B0B4B4
0x0540 B5B3B6B2 B2B200B0 AFB2B1B1 B2B7B4B3 B6B6B5B6 B2B3B1B5 B8B7AFB1 B6B5B6B3
0x0560 B8B4B2B2 B2B5B4B6 B0B4B4B4 B3B2B2AD B9B6B4B2 B5B2B0B9 B4B5B4B1 B3B3B3B5
0x0580 B3B1B6B3 B3B8B3B2 B2B4B3B6 B6B200B4 B0B1B8B6 B0B6B6B2 B0B0B3AF B5B6B1B4
0x05A0 B1B3B4B5 B3B5B4B4 B1B6B5B5 B5B8B4B2 B2B2B4B2 B2B3B6B2 B1B0B5B2 B2B2B1B3
0x05C0 B5B5B5B5 B5B8B3B1 B4B4B4B4 B5B4B7B4 B5B3B7B3 B3B300AF B7B1B1B0 B3B4B3B8
0x05E0 B7B8B3B3 B4B6B6B5 B4B4B3B4 B5B4B2B2 B0B5B2B3 B2B5B2B6 B5B0B4B5 B4B7B2B3
0x0600 B3B5B8B7 B3B4B7B3 B5B3B3BA B5AFB7B7 B3B3B2B4 B5B6B2B7 B3B3B3B2 B3AE00B3
0x0620 B0B5B3B3 B6B1B5B4 B3B8B3B8 B4B4B5B3 B2B6B4B2 B2B5B7B9 B6B3B5B3 B2B0AFB4
0x0640 B1B3B8B3 B5B2B5B6 B5B7B0B3 B8B3B8B7 B5B6B9B6 B5B2B4B3 B7B4B3B2 B2B3B3B5
0x0660 B6B1B2B8 B3B300B4 B1B3B1B3 B4B4B0B3 B5B5B1AF B6B4B7B5 B4B3B6B4 B4B4B6B4
0x0680 B2B1B6B5 B3B7B3B2 B4B5B1AF B2B3B5B2 B0B2B7B0 B4B4B4B1 B3B0B5B1 B3B2B1B7
0x06A0 B2B3B4B7 B2AFB4B5 B3B7B8B4 B5AF00B4 AFB2B2B3 B4AFB5B4 B5B9BAB5 B2B2B4B1
0x06C0 B6B4B3B5 B5B5B4B3 B2AEB3B1 B0B4B5B6 B2B7B5B4 B2B3B5B2 B4B4B5B5 BAB2B1B2

```

0x06E0	B3B4B3B2	B8B3B3B6	B6AFB4B2	B4B4B4B6	B3B5AFB4	B1B600B6	B7B2B3B3	B3B1B6B8
0x0700	AFB5B6B7	B6B4B3B2	B1B2B3B3	B3B1B1B3	B1B0B3B2	B3B3B5B3	B7B1B3B2	B6B2AFB1
0x0720	B1B1B4B2	B1B3B5B6	B4B6B5B2	B5B3B4B3	B4B4B0B4	B4B4B5B4	B1B0B5B2	B2AE00B1
0x0740	AEB0B4B3	B6B1B3B4	B4B1B5B1	B4B3B5AD	B4B1B2B4	B2B4B9B2	B9B1B2B2	AFB8B1B8
0x0760	AFB4B3B1	B4B1B3B5	B3B1B5B3	B1B4B5B5	B5B0B6B5	B0B0B5B7	B2B5B2B5	B2AFB6B4
0x0780	B5B1B3B2	B5B300B0	B6B2B1B4	B1B0B3B1	B3B1B2B3	B4B3B2B2	B1B7B0B2	B3B1B1B3
0x07A0	B0B7B5B3	B5B2ADB5	B4B8B6B5	B4B6B4B1	B3B1B1B4	B0B4B6B2	B2B2B2B4	B0B3B4B0
0x07C0	B0B0B4B4	B6B1B2B1	B0B0B3B0	B3B500B4	B4B1B3B2	B0B3B1B1	B4B2AEB3	B1B4B6AF
0x07E0	B4B1B1B5	B4B2B7B3	B1B4B5B1	B2AFB2B6	B5B3B1B0	B5B5B4B2	B1B3B5B3	B1B3B3B4
0x0800	B2B4B3B2	B7B4B5B7	B6B3B4B4	B3B3B6B2	B2AFB0B1	B4B300B4	B3B0B4AF	B3B1B3B3
0x0820	B3B0B4B3	B0B0B1B7	B4B2B3B1	B5B4B3B5	B3B6B5B3	AEB1B4B3	B3B0B0B2	B3B1B3B1
0x0840	B1AFB2B0	B2B2B3B2	B2B5B4B3	B2B3B3B3	B4AEE0B2	B3B6B4B6	B1B4B4B5	B1B300B5
0x0860	B0AEB2B3	B5B4B3B0	B2B6B3B1	B1AFB2B6	B2B5B3B2	B7B5B0B5	B4B2B2B2	B2B3B2B4
0x0880	B1B6B3B6	B2B7B1B2	B2B0B6AE	B3B4B3B1	B0B1B5B3	B2B2B3B2	AFB3B3B3	B1B1ADB2
0x08A0	B5B4B1B2	B1AD00AC	B2B5B1B1	B2B6B4B2	B3B4AFAF	AFB5B3B7	B1B5B1B0	B1AFB1B7
0x08C0	B0AFB7B5	B5B2AFB2	B3B2B4AC	B4B4B6B2	B2B2B2B3	B6B0B5B2	B6B1B5B0	B6B5ABB2
0x08E0	B1B3B3B1	B3B3AEB6	B0B4B1AF	B4B000B0	B3B2B4AF	B1B3B1B3	B3B4B2B1	B5B2B4B3
0x0900	B3B3B3B4	B5B2AFB5	AEB0AFB5	B3B2B2B1	B5B4B2B5	AFB6B0B2	B2B2B2B0	B1AFAFB3
0x0920	B1ADB0AF	B2B0B2B5	B1B1B2B3	B3B5B4B1	B1B0AEBAD	B3AF00AF	B0B6B1B1	AFAEAFB2
0x0940	B2B1B4B4	B3B2B1B3	AFB0B1B4	B4B1B2B3	B5B3B4B5	B1AFB1B0	AFB1ABB3	AFB1B1B1
0x0960	B2AFB2B0	B1B2B4B3	B2AEAFB3	B1B0B2B0	B3B3AEAE	B6B3B2B1	AEB3AEAD	B1B000B2
0x0980	B4AEB1B3	B3B0B5B0	B1B1B0B3	B2B2B0B3	AFAEB3B2	AFB2AFB4	B4B1B3AF	B1B0AEB0
0x09A0	AFB1B1B1	B4B1B3AF	B2B5B3B1	B1B1B2B5	B1B4B1AC	B1B4AFB3	AFB7AFAE	B1B2ACAF
0x09C0	B4AFB0B7	B3B000B2	AFB1B3B0	B1B3B2B3	B0B0B0B4	B0B2B5B1	B2AEB6AF	B1B6ACAF
0x09E0	B3AFB2B0	B4B2B1B0	B1B2B6AF	B2AFAEB3	B2B0B1B1	B0B3B1AF	B0B3B6B3	B0B4B1B2
0x0A00	AFB0B0B3	B6B1B2B3	B0B3B3B1	B1AF00B3	AFB0B1B5	B3B4B1B1	B0B1B1B1	B3ADACB1
0x0A20	AFB3B6B6	B4B1B0AD	B0ADB4B2	B3B0B2AD	B8B2B1B0	AFB4B4B1	B5B2B7B6	ABB5AEAF
0x0A40	B2B3B0B5	B3B1AFAD	B4B6B2B3	B2B2B5B3	B1B2B0B1	B4B100B0	B3AFB3AF	B0AEB2AF
0x0A60	B1B3AEB0	B4ACAFB0	AFB3AFAF	B0B4AFB0	B3B1ADB5	B6B1B0B3	B2AEB3B0	B0AFB1AE
0x0A80	B2B2B1B1	B0AFB2B1	AEAFB0B3	B2B2B1B3	AEADB5AF	B0AFB1B2	B5B1ADAD	B3B100B0
0x0AA0	ADB3B1B4	B5B0AEB3	B1B2B0B2	B1B3B0B2	B4B4B1B1	B0B5B0B1	B0B4B3B1	AFB3B0B0
0x0AC0	B2AFB2B4	B4B4AFAE	AFB1B1B0	ADB0B2B0	B4AEAFB3	B2AEB4B2	B0B3B1B2	AEB1B3B0
0x0AE0	B0AEB0B2	B4AC00B0	B0AFB2B0	B2AFB4B2	AFACAAB1	AEB6B2B1	B3B4B1B0	B4AFB3B5
0x0B00	B3B0B3B0	B1B10000	00000000	00000000	00000000	00000000	00000000	00000000
0x0B20	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0B40	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0B60	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0B80	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0BA0	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0BC0	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0BE0	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0C00	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0C20	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0C40	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0C60	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0C80	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0CA0	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0CC0	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0CE0	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0D00	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0D20	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0D40	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0D60	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0D80	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0DA0	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0DC0	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0DE0	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0E00	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0E20	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0E40	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0E60	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0E80	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0x0EA0	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000

```

0x0EC0  00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0EE0  00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0F00  00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0F20  00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0F40  00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0F60  00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000

0x0F80  00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0FA0  00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0FC0  00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
0x0FE0  00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000

```

Additional References

Technical Assistance

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

Feature Information for Downstream Profile Selection

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on [Cisco.com](http://www.cisco.com) is not required.



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

Table 3: Feature Information for Downstream Profile Selection

Feature Name	Releases	Feature Information
Downstream Profile Selection	Cisco IOS-XE Release 3.18.0SP	This feature was introduced on the Cisco cBR Series Converged Broadband Routers.

Feature Name	Releases	Feature Information
DOCSIS3.1 Downstream OFDM Graceful Profile Assignment	Cisco IOS-XE Release 3.18.1SP	This feature was introduced on the Cisco cBR Series Converged Broadband Routers.

