Overview of the Cisco Wideband SPA

Cisco Wideband SPA Release History

Table 1: Cisco Wideband SPA Release History

Cisco IOS Release	Modification
12.3(23)BC	Added support for primary-capable SPA downstream channels.
12.3(21)BC	Support for the Cisco Wideband SPA on the Cisco Wideband SIP was introduced.
12.2(33)SCB	Support for the Cisco Wideband SPA on the Cisco 10000 Series SPA Interface Processor-600 was introduced.
12.2(33)SCF	Updated the document to include support for the DWDM-XFP-xx.xx.

Cisco Wideband SPA Overview

The Cisco Wideband SPA is a single-wide, half-height shared port adapter that provides Cisco Wideband Protocol for a DOCSIS network formatting to the downstream data packets. It is used for downstream data traffic only. The Cisco Wideband SPA is a key component for the Cisco IOS features, DOCSIS 3.0 Downstream Channel Bonding and DOCSIS M-CMTS network architecture.

Each Cisco Wideband SPA is installed into a bay of the Cisco Wideband SIP or Cisco 10000 Series SPA Interface Processor-600 on a Cisco uBR10012 universal broadband router. See the Identifying the Location of the Cisco Wideband SIP and Cisco Wideband SPA for information on slot restrictions. The Cisco Wideband SPA has one active and one redundant Gigabit Ethernet port that is used to send traffic to the external edge QAM device. If the link states of both Gigabit Ethernet ports are up, port 0 comes up as the active port and port 1 becomes the redundant port. If the link state of port 0 is not up, port 1 comes up as the active port.

The Cisco uBR10012 router can support up to six Cisco Wideband SPAs. Depending on how it is configured, each Cisco Wideband SPA supports up to 24 RF channels. Each Cisco Wideband SPA can support up to 32 logical wideband channels (bonding groups).

Note For annex A and 256 QAM, each Cisco Wideband SPA supports up to 18 RF channels at full rate and up to 24 RF channels at less than full rate. For all other cases, the Cisco Wideband SPA supports up to 24 RF channels.

The Cisco Wideband SPA contains field-programmable devices: the Cisco Wideband SPA FPGAs and Complex Programmable Logic Device (CPLDs). The FPGA and CPLD upgrade information is part of the Cisco IOS release rather than a separate file to be downloaded by users.

Features Supported by Cisco Wideband SPA

- Up to 32 channel-bonded wideband channels per Cisco Wideband SPA
- Up to 24 radio frequence (RF) channels (Annex B) or 18 RF channels (Annex A) per Cisco Wideband SPA
- Cisco Wideband Cable for DOCSIS Network support
- Two Gigabit Ethernet ports (one of which is redundant) for link to edge QAM devices
- Traditional DOCSIS 1.x/2.0 upstream channels
- Primary-capable SPA downstream channels
- DOCSIS 1.x/2.0 modem support on primary-capable SPA downstream channels
- DOCSIS 1.x/2.0 modem support and legacy feature support on primary-capable SPA downstream channels
- Extensible MAC domain support via Channel Grouping Domain
- 64 QAM and 256 QAM support
- 6 MHz and 8 MHz support
- Euro-DOCSIS and J-DOCSIS support [Not sure]

- Baseline Privacy Interface(BPI)/BPI+ encryption
- Single-wide, half-height SPA form factor
- Small form-factor pluggable (SFP) modules that plug into the Gigabit Ethernet ports
- SFP module support for SX, LX/LH, and ZX optical fiber (1000BASE-SX, 1000BASE-LX/LH, 1000BASE-ZX)
    - Standard Category 5 copper and RJ45 connections (1000BASE-T)
- Cisco IOS command set for wideband-channel configuration, provisioning, and maintenance
- Cisco IOS command set for wideband channel hardware monitoring, troubleshooting, and debugging
- MIB support
- Online insertion and removal (OIR)
- Multipoint Bridging

Restrictions for Cisco Wideband SPA

The following restrictions apply to the Cisco Wideband SPA for Cisco IOS Release 12.3(23)BC, Cisco IOS Release 12.2(33)SCA, and Cisco IOS Release 12.2(33)SCB:

- Voice call service flows are configurable only on wideband interfaces.
- Full DOCSIS QoS, including CIR support and downstream low latency service flows for voice, are configurable only on wideband interfaces.
- Dynamic services are configurable only on wideband interfaces.
- A wideband interface can only use RF channels from the same SPA.
- Scientific Atlanta DPC2505 and EPC2505 wideband cable modems support multicast traffic on the primary downstream channel only. These modems do not support multicast traffic on wideband downstream channels.
- Currently only data services are supported.
- The **rf-channel rf shutdown** command cannot be executed on the Cisco 1 Gbps Wideband Shared Port Adapter (SPA) configured with manual DEPI.

MIBs Supported on Cisco Wideband SPA

The following MIBs are supported in Cisco IOS Release 12.3(23)BC and later for the Cisco uBR10012 router and the Cisco Wideband SIP and Cisco Wideband SPA:

The following MIBS have been introduced in Cisco IOS Release 12.3(23)BC:

- DOCS-DSG-IF-MIB
- DTI-MIB

The following MIBS have been modified for Cisco IOS Release 12.3(23)BC:

- CISCO-CABLE-SPECTRUM-MIB
- CISCO-DOCS-EXT-MIB
- DOCS-IF-MIB
- DOCS-BPI-PLUS-MIB
- ENTITY-MIB
- IF-MIB

The following MIBS continue to be supported in Cisco IOS Release 12.3(23)BC:

- CISCO-CABLE-WIDEBAND-MIB
- CISCO-VENDORTYPE-OID-MIB

For more information about MIB support on a Cisco uBR10012 router, see the Cisco CMTS Universal Broadband Router MIB Specifications Guide at the following URL:

http://www.cisco.com/en/US/docs/cable/cmts/mib/12_2sc/reference/guide/ubrmibv5.html

For information about MIBs associated with edge QAM devices or wideband cable modems, see the vendor documentation.

To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:

http://tools.cisco.com/ITDIT/MIBS/servlet/index

If Cisco MIB Locator does not support the MIB information that you need, you can also obtain a list of supported MIBs from the Cisco MIBs page at the following URL:

http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

To access Cisco MIB Locator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions found at this URL:

https://tools.cisco.com/RPF/register/register.do

Cisco Wideband SPA Architecture

This section provides an overview of the architecture of the Cisco Wideband SPA and describes the path of a packet in the ingress and egress directions. Some of these areas of the architecture are referenced in the SPA software and can be helpful to understand when troubleshooting or interpreting some of the SPA CLI and show command output.

Every incoming and outgoing packet on the Gigabit Ethernet SPAs goes through the physical (PHY) SFP optics, Media Access Control (MAC), and ASIC devices.

Path of a Packet in the Ingress Direction

The steps below describe the path of an ingress packet through the Gigabit Ethernet SPAs:

1. The PHY SFP optics device receives incoming frames on a per-port basis from one of the laser-optic interface connectors.
2. The PHY laser optics device processes the frame and sends it over the XAUI path to the MAC device.
3. The MAC device receives the frame, strips the CRCs, and sends the packet via the SPI 4.2 bus to the ASIC.
4. The ASIC takes the packet from the MAC devices and classifies the Ethernet information. CAM lookups based on etype, port, VLAN, and source and destination address information determine whether the packet is dropped or forwarded to the SPA interface.

Path of a Packet in the Egress Direction

The steps below describe the path of an egress packet from the SIP through the Gigabit Ethernet SPA:

1. The packet is sent to the ASIC using the SPI 4.2 bus. The packets are received with Layer 2 and Layer 3 headers in addition to the packet data.
2. The ASIC uses port number, destination MAC address, destination address type, and VLAN ID to perform parallel CAM lookups. If the packet is forwarded, it is forwarded via the SPI 4.2 bus to the MAC device.
3. The MAC device forwards the packets to the PHY laser-optic interface, which transmits the packet.

Information on Configuring SPAs

This section describes terminologies used while configuring SPAs:

Wideband Channel or Bonding Group

A wideband channel or bonding group is a logical grouping of one or more physical radio frequency (RF) channels over which wideband MPEG-TS packets are carried. By aggregating or “channel bonding” multiple RF channels, the wideband channel is capable of greater bandwidth capacity for downstream data traffic than a single narrowband channel. During Cisco Wideband SPA configuration, each wideband channel is associated with one or more RF channels. Each Cisco Wideband SPA supports 32 wideband channels.

Narrowband Channel

A narrowband channel is a logical representation of a non-bonded channel that is a standard DOCSIS 1.x/2.0 protocol downstream channel that contains one RF channel.

Wideband-Cable Interface

A wideband-cable interface is a logical representation of the channels in the bonding group and is configured using the interface wideband-cable command.

Modular-Cable Interface

A modular-cable interface is a logical representation of the downstream channel’s capability to carry non-bonded data traffic on the SPA downstream channels and is configured using the interface modular-cable command.

The Cisco DOCSIS 3.0 Downstream Channel Bonding feature can be deployed in parallel with DOCSIS 1.x/2.0 technology. The CMTS supports DOCSIS 1.x/ 2.0 modems on non-wideband interfaces while wideband cable modems deliver higher-speed throughput on the wideband ports.

Virtual Bundle

For a fiber node to be in valid state, all wideband and modular cable interfaces that use the RF channels in the fiber node must belong to the same virtual bundle interface. You must assign virtual bundle numbers for wideband interfaces using CLI configuration. The bundle membership of the MAC domain, namely the line card host interface, is inherited by the modular-cable interface via the CGD configuration.

Wideband-Cable Interfaces Belonging to the Same Virtual Bundle

The example below shows wideband-cable interfaces that belong to the same virtual bundle. Fiber node 1 includes RF channels 0 to 3 of Cisco Wideband SPA 1/0/0 and these RF channels are used by two wideband interfaces.

The fiber node is in valid state because the two wideband channels share the same RF channel and the wideband interfaces are in the same virtual bundle.

Note This example shows the syntax supported prior to Cisco IOS Release 12.2(33)SCB.

```
interface Wideband-Cable1/0/0:12
 no ip address
 cable bundle 1
 cable bonding-group-id 36
 cable rf-channel 0 bandwidth-percent 90
 cable rf-channel 1 bandwidth-percent 50
 cable rf-channel 2
end


interface Wideband-Cable1/0/0:13
 no ip address
 cable bundle 1
 cable bonding-group-id 37
 cable rf-channel 1 bandwidth-percent 50
 cable rf-channel 2
 cable rf-channel 3
end
```

Modular-Cable Interfaces Belonging to the Same Virtual Bundle

In the example shown above, if RF channel 0 of the Cisco Wideband SPA 1/0/0 is configured as a primary-capable channel and is associated with the line card host interface 6/0/1, then the modular-cable interface 1/0/0:0 inherits the bundle membership of this host interface. This bundle number must be the same as the two wideband interfaces, interface Wideband-Cable 1/0/0:12 and interface Wideband-Cable 1/0/0:13. Otherwise, fiber node 1 that includes the RF channels 0 to 3 will be in invalid state.

The virtual bundle number of the wideband or modular-cable interfaces cannot be changed after the RF channels that belong to these interfaces are added to the fiber node. To change the virtual bundle number, you must remove the RF channel from the fiber node before making the change.

All wideband channels on a fiber node and all associated primary downstream channels must belong to the same virtual bundle interface. The tasks involved in configuring wideband channels and primary downstream channels as members of the same virtual bundle are as follows:

1. Define a virtual bundle interface.
2. Use the cable bundle command to add wideband channels as virtual bundle members.

Note For recent releases of Cisco IOS, a virtual bundle interface with virtual bundle members has replaced the master-slave model that was previously used for cable bundles. The virtual bundle model is used in Cisco IOS Release 12.3(21)BC and subsequent releases.

Primary-Capable Downstream Channel

A SPA downstream channel is made primary-capable via Channel Grouping Domain (CGD) configuration. A primary-capable downstream channel can carry narrowband traffic as well as wideband traffic. An RF channel is considered primary-capable when it has been associated with one or more upstream channels from a Cisco uBR10-MC5X20 cable interface and this RF channel can carry DOCSIS MAC management messages (MMM) including SYNC messages, Mini-slot Allocation Packet (MAP) messages, and Upstream Channel Descriptors (UCDs). Such an RF channel downstream is referred to as a primary-capable downstream channel. A DOCSIS Timing Interface (DTI) server that interfaces with the EQAM device and the Cisco DTCC card is used to synchronize DOCSIS MAC-layer messages. The interface represented by a single primary-capable downstream represents the narrowband portion of the RF channel.

A SPA downstream channel, whether primary-capable or not, can always be part of a bonded channel that carries bonded data traffic.

An RF channel can be shared by the associated modular-cable interface and by the wideband interfaces. The bandwidth of each RF channel can be configured to be statically divided between the modular-cable and wideband interfaces. Each RF channel's bandwidth can be used for wideband channels or narrowband channels or for a combination of the two.

A primary downstream channel is a primary-capable channel that is being used as a narrowband channel or as part of a wideband channel. A SPA DS channel may only be a primary-capable downstream channel for a single MAC domain. However, the same SPA DS channel may be part of one or more bonded channels (wideband interface) that serve multiple MAC domains. A primary downstream channel of one MAC domain can serve as non-primary downstream channel of another MAC domain. The total available bandwidth of a primary downstream channel, which is 96 percent, is split between the primary-capable downstream and non-primary-capable downstream channels. The remaining 4 percent is reserved for DOCSIS MAP and SYNC bandwidth.

Extensible MAC Domain Support via Channel Grouping Domain

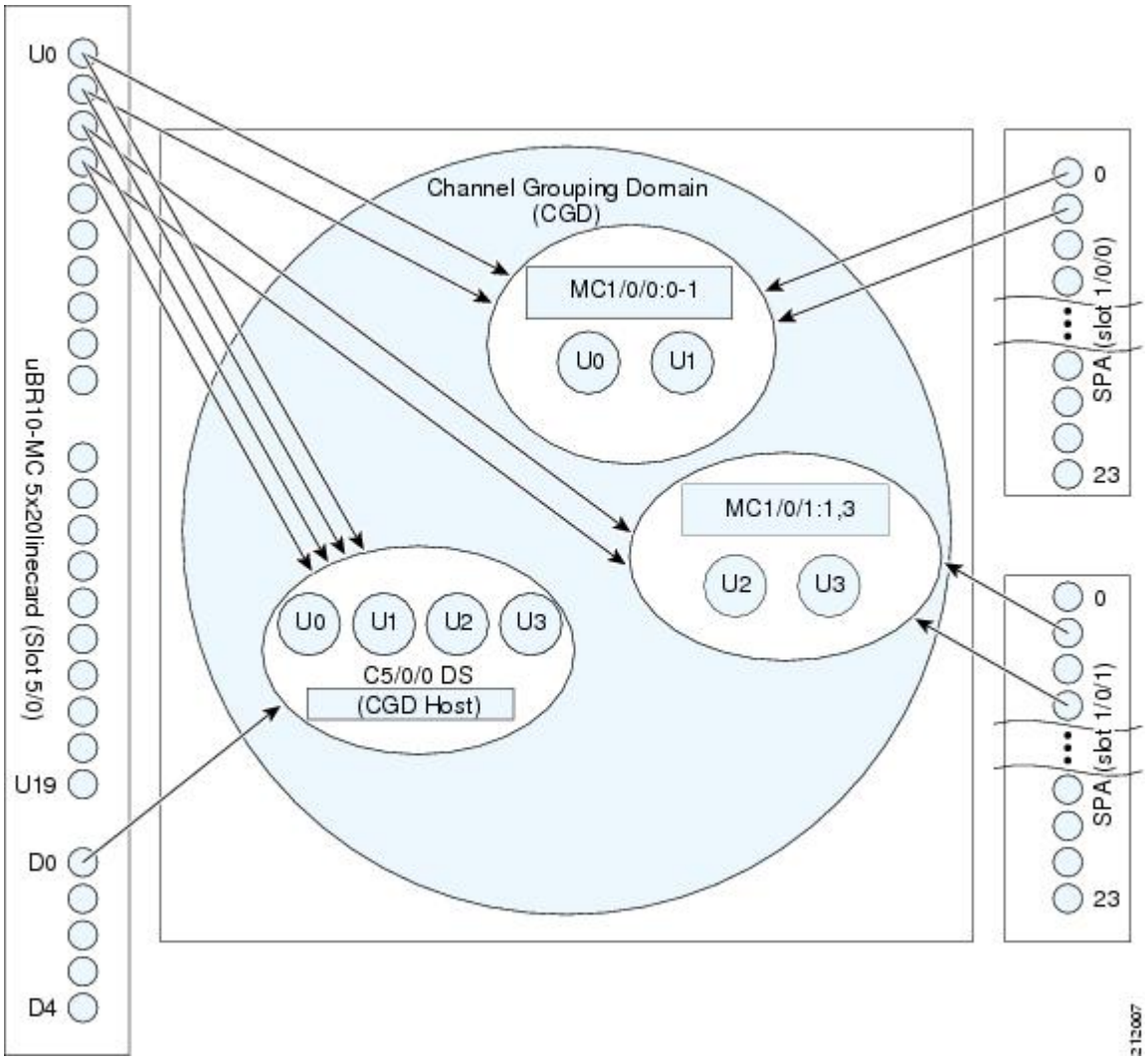
A Channel Grouping Domain (CGD) is a collection of primary-capable downstream channels that are associated with a common set of upstream channels under a cable interface, where the downstream channels can be shared by one or more upstreams.. A CGD is always specified within the context of a MAC domain to which all the downstream and upstream channels belong. The downstream channel local to the MAC domain on the line card is always primary-capable, but a SPA DS channel has to be made primary-capable by explicit CGD configuration. A CGD provides the additional flexibilty of associating a subset of the upstream channels within a MAC domain to any of the primary-capable downstream channels, including the local downstream channels. When an upstream channel is associated with a downstream channel, its information is included in the MAP and UCD messages sent through that downstream channel. Multiple CGD configurations may be included in the same MAC domain, allowing the flexibility of the MAC domain to include various primary-capable downstream channels associated with common or different sets of upstream channels.

A CGD is created using the following:

- Upstream channels 1 to 8 from a single line card
- A single downstream from the line card (This downstream can optionally be disabled.)

- Downstream channels 0 to 24 from one or more SPAs

Figure 1: MAC Domain Support via Channel Grouping Domain Configurations



In this example:

- The Interface Cable 5/0/0 serves as the Channel Grouping Domain host downstream channel.
- Upstream channels 0 to 3 from the line card are associated, by default, with the CGD host downstream channel.
- Downstream RF channels 0 and 1 from the SPA residing in slot 1, subslot 0, and bay 0 are associated with the line card upstream channels 0 and 1.
- Downstream RF channels 1 and 3 from the SPA residing in slot 1, subslot 0, and bay 0 are associated with the line card upstream channels 2 and 3.

Note The downstream channel from the line card can serve either as a MAC domain or as a primary downstream channel.

The CGD allows load balancing groups to be created across one or more CGDs and enables the load balancing groups by default within the CGDs.

Fiber Node Configuration

In a cable network, a fiber node is a point of interface between a fiber trunk and the coaxial portion of the cable plant. A cable modem is physically connected to only one fiber node. Fiber node software configuration mirrors the physical topology of the cable network and is needed to optimize the DOCSIS MAC-layer messages for channel bonding. When configuring fiber nodes with Cisco IOS CLI commands, a fiber node is a software mechanism to define the following:

- The set of downstream RF channels that will flow into the fiber node
- At least one primary downstream channel for the fiber node
- The set of upstream channel ports on the cable interface line card that are connected to the fiber node and available as upstream channels

A fiber node will be associated with at least one primary downstream channel. A fiber node can be associated with more than one primary downstream channel though only one primary downstream channel is used at any given point in time. Each primary-capable downstream channel can be associated with up to 8 fiber nodes. All channels that belong to a fiber node are configured with different non-overlaying frequencies.

Fiber Nodes for Wideband

In a cable network, a fiber node is a point of interface between a fiber trunk and the coaxial distribution. A cable modem is physically connected to only one fiber node. Fiber node software configuration mirrors the physical topology of the cable network. When configuring wideband channels, a fiber node is a software mechanism to define a set of downstream and upstream channels that will flow into the physical fiber node.

Configuring cable fiber nodes with the **cable fiber-node** command is required for fiber nodes that are used for wideband channels. Cable fiber node configuration does not allow downstream interfaces to be combined into the same fiber node unless they are members of the same virtual bundle interface.

For a wideband channel to work correctly, each fiber node must be configured as follows:

1. Use the **cable fiber-node** command to create the fiber node and to enter cable fiber-node configuration mode.
2. Use the **downstream cable** command to associate the fiber node with one or more line card downstream channels. Each fiber node should have at least one primary downstream. This command is optional if the primary downstream channel for this fiber node is assigned from a SPA downstream.
3. Use the **upstream** command to specify the upstream channel ports that are connected to a fiber node.
4. Use the **downstream modular-cable rf-channel** command to associate one or more SPA RF channels or primary-capable RF channels from the SPA with the fiber node.
5. Optionally, use the **description** command to specify a description for the fiber node.

For each fiber node, a primary downstream channel is used to carry SYNCs, MAPs, and other MAC-layer management messages, and the associated upstream channel is used to carry MAC management messages.

A DTI server that interfaces with the EQAM device and the Cisco DTCC card is used to synchronize DOCSIS MAC-layer messages.

In Cisco IOS Release 12.3(21)BC, the primary downstream channel, which is a traditional DOCSIS downstream channel on the cable interface line card, is used to carry MAC management and signaling messages, and the associated traditional DOCSIS upstream channel is used for return data traffic and signaling.

Beginning in Cisco IOS Releases 12.3(23)BC and 12.2(33)SCB, either an RF channel from the SPA or a line card downstream channel can serve as a primary channel in a fiber node. If the fiber node does not have a line card downstream channel, then make sure that at least one of the RF channels specified in the **downstream modular-cable rf-channel** command is a primary-capable downstream channel.

The maximum number of cable fiber nodes that can be configured is limited to 256 for each CMTS.

Load Balancing Groups

A Load Balancing Group (LBG) is an operator-configured managed object that controls how the CMTS assigns the service flows of registered cable modems among an identified set of upstream and downstream channels of the CMTS.

An operator configures a Load Balancing Group with the following attributes:

- A Load Balancing Group Index unique within the CMTS
- A set of downstream and upstream channels in the same MAC Domain cable modem Service Group (MD-CM-SG)
- A boolean optionally configuring the LBG as a “Restricted” LBG
- A policy that governs if and when the cable modem or its individual service flows can be moved
- A priority value that can be used by the CMTS in order to select which cable modems and service flows to move

For more information on load balancing, see the Cisco DOCSIS 3.0 Downstream Solution Design and Implementation Guide.

Primary Downstream Channel Selection in a Fiber Node Configured with Downstreams from the Cable Interface Line Card and SPA Downstreams

If a fiber node is configured with a primary downstream from a cable interface line card as well as a primary downstream from the SPA that is part of a wideband channel, then the primary downstream channel selection depends on the downstream channel selection policies (that govern when the cable modem can be moved) implemented and enforced by the configuration. The fiber node can be configured to force a Scientific Atlanta DPC2505 (EPC2505 for EuroDOCSIS) to perform 3-channel bonding. But this will also depend on the implemented downstream channel selection policies that govern when the cable modem can be moved.

Wideband Cable Modems

The number of RF channels that can be aggregated into a wideband channel is determined by the capability of the wideband cable modem. The Cisco Cable Wideband Solution, Release 2.0 supports DOCSIS 3.0-compliant multichannel modems, including the following Linksys and Scientific Atlanta modems:

Linksys WCM300-NA, WCM300-EURO, and WCM300-JP Modems

For wideband channels, the Linksys WCM300-NA (WCM300-EURO for EuroDOCSIS and WCM300-JP for Japanese DOCSIS) wideband cable modem supports the receiving of a 50-MHz capture window of up to

eight different downstream RF channels at 6 MHz per channel, or six different downstream RF channels at 8 MHz per channel. In addition to these eight RF channels, the Linksys WCM300 modem supports reception of one primary downstream channel (traditional DOCSIS channel).

The Linksys WCM300 wideband cable modem software supports the acquisition of up to eight wideband (bonded) downstream channels:

- One primary bonded channel is the wideband channel on which the wideband cable modem receives all of its unicast data and some multicast data.
- Up to two secondary bonded channels are the wideband channels on which the wideband cable modem receives common multicast data streams. Secondary bonded channels are intended to receive multicast data such as broadcast video that is not available on the primary bonded channel.

The DOCSIS configuration file and the cable bonding-group-id command define the primary and secondary bonded channels for the modem to select and acquire. The cable modem identifies the primary bonded channel and any secondary bonded channels to the CMTS at cable modem registration time.

For information on how the Linksys WCM300 modem selects primary and secondary bonded channels, see the Cisco DOCSIS 3.0 Downstream Solution Design and Implementation Guide, Release 2.0.

Scientific Atlanta DPC2505 and EPC2505 Modems

When used with the Cisco uBR10012 CMTS, the Scientific Atlanta DPC2505 and EPC2505 (for EuroDOCSIS) wideband cable modems support the receiving of one wideband channel, which consists of up to three bonded downstream RF channels from the SPA at 6 MHz per channel or at 8 MHz per channel. One of the RF channels from the Cisco Wideband SPA serves as the primary downstream channel.

The Scientific Atlanta DPC2505 is DOCSIS 3.0-compliant and can be used in this mode (for example, if the modem is connected to a non-wideband Cisco CMTS or to a non-Cisco CMTS). The modem is also backward compatible with existing DOCSIS 1.x networks.

Displaying Cisco Wideband SPA Information

To verify the SPA type that is installed in your Cisco uBR10012 router, you can use the **show diag** command.

Note With Cisco IOS commands, the Cisco Wideband SPA Gigabit Ethernet ports are not standard user-configurable interfaces and do not appear in the output of the **show interfaces** command. You can get information on the Cisco Wideband SPA Gigabit Ethernet ports using the **show controllers modular-cable** command with the **ge_phy** keyword.

The table below shows the card type that appears in the **show diag** command output for the Cisco Wideband SPA.

Table 2: Cisco Wideband SPA Card Descriptions in show Commands

SPA	Description in show diag command
Cisco Wideband SPA	24rfchannel-spa-1

The 12 wideband channels on each Cisco Wideband SPA are similar to cable interfaces and appear in the output of commands such as the **show interfaces** command.

The **show hw-module bay** command displays a variety of information about the RF channels and wideband channels on a Cisco Wideband SPA.

Examples of the show diag and show interface wideband-cable Commands

The following example shows output from the **show diag** command on a Cisco uBR10012 router with a Cisco Wideband SPA installed in slot 1, subslot 0, bay 0.

```
Router# show diag 1/0/0

Slot/Subslot/Port 1/0/0:
        24rfchannel-spa-1 card, 1 port + 1 redundant port
        Card is half slot size
        Card is analyzed
        Card detected 16:47:55 ago
        Card uptime: Not Supported
        Card idle time: Not Supported
        Voltage status: 3.3V (+3.291) NOMINAL 2.5V (+2.495) NOMINAL
                        1.2V (+1.201) NOMINAL 1.8V (+1.811) FIXED
EEPROM contents, slot 1/0/0:
        Hardware Revision         : 1.0
        Boot Timeout              : 500
        PCB Serial Number         : CSJ09379726
        Part Number               : 73-9597-03
        Part Number Revision      : 05
        Fab Version               : 03
        RMA Test History          : 00
        RMA Number                : 0-0-0-0
        RMA History               : 00
        Deviation Number          : 0
        Product (FRU) Number      : SPA-24XDS-SFP
        Version Identifier (VID)  : V01
        Top Assy. Part Number     : 68-2562-03
        Board Revision            : 05
        CLEI Code                 :
        MAC Address               : 0019.06a5.d9b2
        MAC Address block size    : 1
        Manufacturing Test Data   : 00 00 00 00 00 00 00 00
        Field Diagnostics Data    : 00 00 00 00 00 00 00 00
        Calibration Data : Minimum: 0 dBmV, Maximum: 0 dBmV
               Calibration values :
        Platform features         : 00 00 00 00 00 00 00 00
                                    00 00 00 00 00 00 00 00
                                    00 00 00 00 00 00 00 00
                                    00 00 00 00 00 00 00 00
```

The following example shows output from the **show interface wideband-cable** command. It shows information about the cable interface for wideband channel 1 on the Cisco Wideband SPA located in slot 1, subslot 0, bay 0.

Note The example below shows the syntax supported prior to Cisco IOS Release 12.2(33)SCB.

```
Router# show interface wideband-cable 1/0/0:1

Wideband-Cable1/0/0:1 is up, line protocol is up
 Hardware is Wideband CMTS Cable interface, address is 0012.001a.8897 (bia0012.001a.8897)
 MTU 1500 bytes, BW 74730 Kbit, DLY 1000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
 Encapsulation MCNS, loopback not set
 Keepalive set (10 sec)
 ARP type: ARPA, ARP Timeout 04:00:00
```

```
Last input never, output 00:00:09, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: fifo
Output queue: 0/40 (size/max)
30 second input rate 0 bits/sec, 0 packets/sec
30 second output rate 0 bits/sec, 0 packets/sec
   0 packets input, 0 bytes, 0 no buffer
   Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
   0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
   24224 packets output, 1222002 bytes, 0 underruns
   0 output errors, 0 collisions, 0 interface resets
   0 output buffer failures, 0 output buffers swapped out
```