Configuring 802.11 parameters and Band Selection

Finding Feature Information

Your software release may not support all of the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release.

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

Restrictions on Band Selection, 802.11 Bands, and Parameters

- Band-selection enabled WLANs do not support time-sensitive applications like voice and video because of roaming delays.
- Band selection can be used only with Cisco Aironet 1040, 1140, 1250, 1260, 3500, and the 3600 series access points.
- Band selection operates only on access points that are connected to a controller. A FlexConnect access point without a controller connection does not perform band selection after a reboot.

- The band-selection algorithm directs dual-band clients only from the 2.4-GHz radio to the 5-GHz radio of the same access point, and it only runs on an access point when both the 2.4-GHz and 5-GHz radios are up and running.
- You can enable both band selection and aggressive load balancing on the controller. They run independently and do not impact one another.
- It is not possible to enable or disable band selection and client load balancing globally through the controller GUI or CLI. You can, however, enable or disable band selection and client load balancing for a particular WLAN. Band selection and client load balancing are enabled globally by default.

Information About Configuring Band Selection, 802.11 Bands, and Parameters

Band Selection

Band selection enables client radios that are capable of dual-band (2.4- and 5-GHz) operation to move to a less congested 5-GHz access point. The 2.4-GHz band is often congested. Clients on this band typically experience interference from Bluetooth devices, microwave ovens, and cordless phones as well as co-channel interference from other access points because of the 802.11b/g limit of three nonoverlapping channels. To prevent these sources of interference and improve overall network performance, you can configure band selection on the switch.

Band selection is enabled globally by default.

Band selection works by regulating probe responses to clients. It makes 5-GHz channels more attractive to clients by delaying probe responses to clients on 2.4-GHz channels.

802.11 Bands

You can configure the 802.11b/g/n (2.4-GHz) and 802.11a/n (5-GHz) bands for the controller to comply with the regulatory requirements in your country. By default, both 802.11b/g/n and 802.11a/n are enabled.

When a controller is configured to allow only 802.11g traffic, 802.11b client devices are able to successfully connect to an access point but cannot pass traffic. When you configure the controller for 802.11g traffic only, you must mark 11g rates as mandatory.

802.11n Parameter

This section provides instructions for managing 802.11n devices such as the Cisco Aironet 1140 and 3600 Series Access Points on your network. The 802.11n devices support the 2.4- and 5-GHz bands and offer high-throughput data rates.

The 802.11n high-throughput rates are available on all 802.11n access points for WLANs using WMM with no Layer 2 encryption or with WPA2/AES encryption enabled.

Note Some Cisco 802.11n APs may intermittently emit incorrect beacon frames, which can trigger false wIPS alarms. We recommend that you ignore these alarms. The issue is observed in the following Cisco 802.11n APs: 1140, 1250, 2600, 3500, and 3600.

802.11h Parameter

802.11h informs client devices about channel changes and can limit the transmit power of those client devices.

How to Configure 802.11 Bands and Parameters

Configuring Band Selection (CLI)

SUMMARY STEPS

1. **configure terminal**
2. **wireless client band-select cycle-count** *cycle_count*
3. **wireless client band-select cycle-threshold** *milliseconds*
4. **wireless client band-select expire suppression** *seconds*
5. **wireless client band-select expire dual-band** *seconds*
6. **wireless client band-select client-rssi** *client_rssi*
7. **end**
8. **wlan** *wlan_profile_name wlan_ID SSID_network_name* **band-select**
9. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Switch# configure terminal`	Enters global configuration mode.
Step 2	**wireless client band-select cycle-count** *cycle_count* **Example:** `Switch(config)# wireless client band-select cycle-count 3`	Sets the probe cycle count for band select. You can enter a value between 1 and 10 for the *cycle_count* parameter.
Step 3	**wireless client band-select cycle-threshold** *milliseconds*	Sets the time threshold for a new scanning cycle period. You can enter a value for threshold between 1 and 1000 for the *milliseconds* parameter.

	Command or Action	Purpose
	Example: `Switch(config)# wireless client band-select cycle-threshold 5000`	
Step 4	**wireless client band-select expire suppression** *seconds* **Example:** `Switch(config)# wireless client band-select expire suppression 100`	Sets the suppression expire to the band select. You can enter a value for suppression between 10 to 200 for the *seconds* parameter.
Step 5	**wireless client band-select expire dual-band** *seconds* **Example:** `Switch(config)# wireless client band-select expire dual-band 100`	Sets the dual band expire. You can enter a value for dual band between 10 and 300 for the *seconds* parameter.
Step 6	**wireless client band-select client-rssi** *client_rssi* **Example:** `Switch(config)# wireless client band-select client-rssi 40`	Sets the client RSSI threshold. You can enter a value for minimum dBm of a client RSSI to respond to a probe between 20 and 90 for the *client_rssi* parameter.
Step 7	**end** **Example:** `Switch(config)# end`	Returns to privileged EXEC mode. Alternatively, you can also press **Ctrl-Z** to exit global configuration mode.

Step 8	**wlan** *wlan_profile_name wlan_ID SSID_network_name* **band-select**
	Example:
	`Switch(config)# wlan wlan1 25 ssid12`
	`Switch(config-wlan)# band-select`
		Configures band selection on specific WLANs.
		You can enter a value between 1 and 512 for the *wlan_ID* parameter.
		You can enter the up to 32 alphanumeric characters for *SSID_network_name* parameter.

Step 9	**end** **Example:** `Switch(config)# end`	Returns to privileged EXEC mode. Alternatively, you can also press **Ctrl-Z** to exit global configuration mode.

Configuring the 802.11 Bands (CLI)

You can configure 802.11 bands and parameters.

SUMMARY STEPS

1. **configure terminal**
2. **ap dot11 5ghz shutdown**
3. **ap dot11 24ghz shutdown**
4. **ap dot11 {5ghz | 24ghz} beaconperiod** *time_unit*
5. **ap dot11 {5ghz | 24ghz} fragmentation** *threshold*
6. **ap dot11 {5ghz | 24ghz} dtpc**
7. **wireless client association limit** *number* **interval** *milliseconds*
8. **ap dot11 {5ghz | 24ghz} rate** *rate {disable | mandatory | supported}*
9. **no ap dot11 5ghz shutdown**
10. **no ap dot11 24ghz shutdown**
11. **ap dot11 24ghz dot11g**
12. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Switch# configure terminal`	Enters global configuration mode.
Step 2	**ap dot11 5ghz shutdown** **Example:** `Switch(config)# ap dot11 5ghz shutdown`	Disables the 802.11a band. **Note** You must disable the 802.11a band before configuring the 802.11a network parameters.
Step 3	**ap dot11 24ghz shutdown** **Example:** `Switch(config)# ap dot11 24ghz shutdown`	Disables the 802.11b band. **Note** You must disable the 802.11b band before configuring the 802.11b network parameters.
Step 4	**ap dot11 {5ghz | 24ghz} beaconperiod** *time_unit* **Example:** `Switch(config)# ap dot11 5ghz beaconperiod 500`	Specifies the rate at which the SSID is broadcast by the access point. The beacon interval is measured in time units (TUs). One TU is 1024 microseconds. You can configure the access point to send a beacon every 20 to 1000 milliseconds.
Step 5	**ap dot11 {5ghz | 24ghz} fragmentation** *threshold* **Example:** `Switch(config)# ap dot11 5ghz fragmentation 300`	Specifies the size at which packets are fragmented. The threshold is a value between 256 and 2346 bytes (inclusive). Specify a low number for areas where communication is poor or where there is a great deal of radio interference.

	Command or Action	Purpose

Step 6	**ap dot11 {5ghz | 24ghz} dtpc**
	
	Example:
	`Switch(config)# ap dot11 5ghz dtpc`
	
	`Switch(config)# no ap dot11 24ghz dtpc`
		Enables access points to advertise their channels and transmit the power levels in beacons, and probe responses.
		
		The default value is enabled. Client devices using dynamic transmit power control (DTPC) receive the channel and power level information from the access points and adjust their settings automatically. For example, a client device used primarily in Japan could rely on DTPC to adjust its channel and power settings automatically when it travels to Italy and joins a network there.
		Note On access points that run Cisco IOS software, this feature is called world mode.
		
		The **no** form of the command disables the 802.11a or 802.11b DTPC setting.

Step 7	**wireless client association limit** *number* **interval** *milliseconds* **Example:** `Switch(config)# wireless client association limit 50 interval 1000`	Specifies the maximum allowed clients that can be configured. You can configure a maximum number of association request on a single access point slot at a given interval. The range of association limit that you can configure is from one through 100. The association request limit interval is measured between 100 to 10000 milliseconds.
Step 8	**ap dot11 {5ghz | 24ghz} rate** *rate {disable | mandatory | supported}* **Example:** `Switch(config)# ap dot11 5ghz rate 36 mandatory`	Specifies the rate at which data can be transmitted between the controller and the client. • *disabled*—Defines that the clients specify the data rates used for communication. • *mandatory*—Defines that the clients support this data rate in order to associate to an access point on the controller. • *supported*—Any associated clients that support this data rate may communicate with the access point using that rate. However, the clients are not required to be able to use this rate in order to associate. • *rate*—Specifies the rate at which data is transmitted. For the 802.11a and 802.11b bands, the data is transmitted at the rate of 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, or 54 Mbps.
Step 9	**no ap dot11 5ghz shutdown** **Example:** `Switch(config)# no ap dot11 5ghz shutdown`	Enables the 802.11a band. **Note** The default value is enabled.
Step 10	**no ap dot11 24ghz shutdown** **Example:** `Switch(config)# no ap dot11 24ghz shutdown`	Enables the 802.11b band. **Note** The default value is enabled.
Step 11	**ap dot11 24ghz dot11g**	Enables or disables 802.11g network support.

	Command or Action	Purpose
	Example: `Switch(config)# ap dot11 24ghz dot11g`	The default value is enabled. You can use this command only if the 802.11b band is enabled. If you disable this feature, the 802.11b band is enabled without 802.11g support.
Step 12	**end** **Example:** `Switch(config)# end`	Returns to privileged EXEC mode.

Configuring the 802.11 Bands (GUI)

Step 1 Choose **Configuration** > **Wireless** > **802.11a/n/ac** > **Network** or **Configuration** > **Wireless** > **802.11b/g/n** > **Network** to open the Global Parameters page.

Step 2 Select the **802.11a/n/ac** (or **802.11b/g**) **Network Status** check box to enable the 802.11a or 802.11b/g band. To disable the band, unselect the check box. The default value is enabled. You can enable both the 802.11a and 802.11b/g bands.

Step 3 If you enabled the 802.11b/g band in *Step 2*, select the **802.11g Support** check box if you want to enable 802.11g network support. The default value is enabled. If you disable this feature, the 802.11b band is enabled without 802.11g support.

Step 4 Specify the period at which the SSID is broadcast by the access point by entering a value between 20 and 1000 milliseconds (inclusive) in the Beacon Period text box. The default value is 100 milliseconds.

Note The beacon period in controllers is listed in terms of milliseconds. The beacon period can also be measured in time units, where one time unit equals 1024 microseconds or 102.4 milliseconds. If a beacon interval is listed as 100 milliseconds in a controller, it is only a rounded off value for 102.4 milliseconds. Due to hardware limitation in certain radios, even though the beacon interval is, say 100 time units, it is adjusted to 102 time units, which roughly equals 104.448 milliseconds. When the beacon period is to be represented in terms of time units, the value is adjusted to the nearest multiple of 17.

Step 5 Specify the size at which packets are fragmented by entering a value between 256 and 2346 bytes (inclusive) in the Fragmentation Threshold text box. Enter a low number for areas where communication is poor or where there is a great deal of radio interference.

Step 6 Make access points advertise their channel and transmit power level in beacons and probe responses for CCX clients. Select the **DTPC Support** check box. Otherwise, unselect this check box. The default value is enabled.
Client devices using dynamic transmit power control (DTPC) receive the channel and power level information from the access points and adjust their settings automatically. For example, a client device used primarily in Japan could rely on DTPC to adjust its channel and power settings automatically when it travels to Italy and joins a network there.

Note On access points that run Cisco IOS software, this feature is called *world mode*.

Note DTPC and 801.11h power constraint cannot be enabled simultaneously.

Step 7 Specify the maximum allowed clients by entering a value between 1 to 200 in the Maximum Allowed Client text box. The default value is 200.

Step 8 Use the Data Rates options to specify the rates at which data can be transmitted between the access point and the client. These data rates are available:

- 802.11a—6, 9, 12, 18, 24, 36, 48, and 54 Mbps
- 802.11b/g—1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, or 54 Mbps

For each data rate, choose one of these options:

- **Mandatory**—Clients must support this data rate in order to associate to an access point on the controller.
- **Supported**—Any associated clients that support this data rate may communicate with the access point using that rate. However, the clients are not required to be able to use this rate in order to associate.
- **Disabled**—The clients specify the data rates used for communication.

Step 9 Click **Apply**.

Step 10 Click **Save Configuration**.

Configuring 802.11n Parameters (CLI)

SUMMARY STEPS

1. **configure terminal**
2. **ap dot11 {5ghz | 24ghz} dot11n**
3. **ap dot11 {5ghz | 24ghz} dot11n mcs tx** *rtu*
4. **wlan***wlan_profile_name wlan_ID SSID_network_name* **wmm require**
5. **ap dot11 {5ghz | 24ghz} shutdown**
6. **{ap | no ap} dot11 {5ghz | 24 ghz} dot11n a-mpdu tx priority {all | 0-7}**
7. **no ap dot11 {5ghz | 24ghz} shutdown**
8. **ap dot11 {5ghz | 24ghz} dot11n guard-interval {any | long}**
9. **ap dot11 {5ghz | 24ghz} dot11n rifs rx**
10. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Switch# configure terminal`	Enters global configuration mode.
Step 2	**ap dot11 {5ghz | 24ghz} dot11n** **Example:** `Switch(config)# ap dot11 5ghz dot11n`	Enables 802.11n support on the network. The **no** form of the command disables the 802.11n support on the network.

	Command or Action	Purpose
Step 3	**ap dot11 {5ghz | 24ghz} dot11n mcs tx** *rtu* **Example:** `Switch(config)# ap dot11 5ghz dot11n mcs tx 20`	Specifies the modulation and coding scheme (MCS) rates at which data can be transmitted between the access point and the client. You can set a value from 0 through 23 for the **mcs tx** parameter. The **no** form of the command disables the MCS rates that is configured.

Step 4	**wlan***wlan_profile_name wlan_ID SSID_network_name* **wmm require**
	
	Example:
	`Switch(config)# wlan wlan1 25 ssid12`
	`Switch(config-wlan)# wmm require`
		Enables WMM on the WLAN and uses the 802.11n data rates that you configured.
		The **require** parameter requires client devices to use WMM. Devices that do not support WMM cannot join the WLAN.

Step 5	**ap dot11 {5ghz | 24ghz} shutdown** **Example:** `Switch(config)# ap dot11 5ghz shutdown`	Disables the network.
Step 6	**{ap | no ap} dot11 {5ghz | 24 ghz} dot11n a-mpdu tx priority {all | 0-7}** **Example:** `Switch(config)# ap dot11 5ghz dot11n a-mpdu tx priority all`	Specifies the aggregation method used for 802.11n packets. Aggregation is the process of grouping packet data frames together rather than transmitting them separately. Two aggregation methods are available: Aggregated MAC Protocol Data Unit (A-MPDU) and Aggregated MAC Service Data Unit (A-MSDU). Both A-MPDU and A-MSDU are performed in the software. You can specify the aggregation method for various types of traffic from the access point to the clients. The following table defines the priority levels (0-7) assigned per traffic type. ***Table 1: Traffic Type Priority Levels***

User Priority	Traffic Type
0	Best effort
1	Background
2	Spare
3	Excellent effort
4	Controlled load
5	Video, less than 100-ms latency and jitter
6	Voice, less than 100-ms latency and jitter

	Command or Action	Purpose
		7 — Network control You can configure each priority level independently, or you can use the all parameter to configure all of the priority levels at once. You can configure priority levels so that the traffic uses either A-MPDU transmission or A-MSDU transmission. • When you use the **ap** command along with the other options, the traffic associated with that priority level uses A-MPDU transmission. • When you use the **no ap** command along with the other options, the traffic associated with that priority level uses A-MSDU transmission. Configure the priority levels to match the aggregation method used by the clients. By default, A-MPDU is enabled for priority level 0, 4 and 5 and the rest are disabled. By default, A-MPDU is enabled for all priorities except 6 and 7.
Step 7	**no ap dot11 {5ghz | 24ghz} shutdown** **Example:** `Switch(config)# no ap dot11 5ghz shutdown`	Reenables the network.
Step 8	**ap dot11 {5ghz | 24ghz} dot11n guard-interval {any | long}** **Example:** `Switch(config)# ap dot11 5ghz dot11n guard-interval long`	Configures the guard interval for the network.
Step 9	**ap dot11 {5ghz | 24ghz} dot11n rifs rx** **Example:** `Switch(config)# ap dot11 5ghz dot11n rifs rx`	Configures the Reduced Interframe Space (RIFS) for the network.
Step 10	**end** **Example:** `Switch(config)# end`	Returns to privileged EXEC mode. Alternatively, you can also press **Ctrl-Z** to exit global configuration mode.

Configuring the 802.11n Parameters (GUI)

Step 1 Choose **Configuration** > **Wireless** > **802.11a/n/ac or 802.11b/g/n** > **High Throughput (802.11n)** to open the 802.11n/ac (5 GHz or 2.4 GHz) Throughput page.

Step 2 Select the **Enable 11n** check box to enable 802.11n support on the network. The default value is enabled.

Step 3 Select the check boxes of the desired rates to specify the modulation and coding scheme (MCS) rates at which data can be transmitted between the access point and the client. These data rates, which are calculated for a 20-MHz channel width using a short guard interval, are available:

- 0 (7 Mbps)
- 1 (14 Mbps)
- 2 (21 Mbps)
- 3 (29 Mbps)
- 4 (43 Mbps)
- 5 (58 Mbps)
- 6 (65 Mbps)
- 7 (72 Mbps)
- 8 (14 Mbps)
- 9 (29 Mbps)
- 10 (43 Mbps)
- 11 (58 Mbps)
- 12 (87 Mbps)
- 13 (116 Mbps)
- 14 (130 Mbps)
- 15 (144 Mbps)
- 16 (22 Mbps)
- 17 (43 Mbps)
- 18 (65 Mbps)
- 19 (87 Mbps)
- 20 (130 Mbps)
- 21 (173 Mbps)
- 22 (195 Mbps)
- 23 (217 Mbps)

- Any associated clients that support the selected rates may communicate with the access point using those rates. However, the clients are not required to be able to use this rate in order to associate. The MCS settings determine the number of spatial streams, the modulation, the coding rate, and the data rate values that are used.

Step 4 Click **Apply**.

Step 5 Use the 802.11n data rates that you configured by enabling WMM on the WLAN as follows:

a) Choose **WLANs** to open the WLANs page.

b) Click the ID number of the WLAN for which you want to configure WMM mode.

c) When the WLANs > Edit page appears, choose the **QoS** tab to open the WLANs > Edit (Qos) page.

d) From the WMM Policy drop-down list, choose **Required** or **Allowed** to require or allow client devices to use WMM. Devices that do not support WMM cannot join the WLAN.
If you choose **Allowed**, devices that cannot support WMM can join the WLAN but will not benefit from the 802.11n rates.

e) Click **Apply**.

Step 6 Click **Save Configuration**.

Note To determine if an access point supports 802.11n, look at the 11n Supported text box on either the 802.11a/n (or 802.11b/g/n) Cisco APs > Configure page or the 802.11a/n (or 802.11b/g/n) AP Interfaces > Details page.

Configuring 802.11h Parameters (CLI)

SUMMARY STEPS

1. **configure terminal**
2. **ap dot11 5ghz shutdown**
3. **{ap | no ap} dot11 5ghz channelswitch mode** *switch_mode*
4. **ap dot11 5ghz power-constraint** *value*
5. **no ap dot11 5ghz shutdown**
6. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Switch# configure terminal`	Enters global configuration mode.
Step 2	**ap dot11 5ghz shutdown** **Example:** `Switch(config)# ap dot11 5ghz shutdown`	Disables the 802.11a network.

	Command or Action	Purpose
Step 3	**{ap | no ap} dot11 5ghz channelswitch mode** *switch_mode* **Example:** `Switch(config)# ap dot11 5ghz channelswitch mode 0`	Enables or disables the access point to announce when it is switching to a new channel. You can enter a 0 or 1 for the **channelswitch** parameter to specify whether transmissions are restricted until the actual channel switch (0) or are not restricted (1). The default value is disabled.
Step 4	**ap dot11 5ghz power-constraint** *value* **Example:** `Switch(config)# ap dot11 5ghz power-constraint 200`	Configures the 802.11h power constraint value in a range from zero through 255. The default value for the value parameter is 3 dB.
Step 5	**no ap dot11 5ghz shutdown** **Example:** `Switch(config)# no ap dot11 5ghz shutdown`	Reenables the 802.11a network.
Step 6	**end** **Example:** `Switch(config)# end`	Returns to privileged EXEC mode. Alternatively, you can also press **Ctrl-Z** to exit global configuration mode.

Configuring the 802.11h Parameters (GUI)

Step 1 Disable the 802.11 band as follows:
a) Choose **Configuration** > **Wireless > 802.11a/n/ac > Network** to open the 802.11a/n/ac Global Parameters page.
b) Unselect the **802.11a Network Status** check box.
c) Click **Apply**.

Step 2 Choose **Configuration** > **Wireless > 802.11a/n/ac > DFS (802.11h)** to open the 802.11h Global Parameters page.

Step 3 In the Power Constraint area, enter the local power constraint. The valid range is between 0 dBm and 30 dBm.

Step 4 In the Channel Switch Announcement area, enter the channel switch announcement mode. You can enter a value of either 1 or 0.

Step 5 Click **Apply**.

Step 6 Reenable the 802.11a band as follows:
a) Choose **Wireless > 802.11a/n/ac > Network** to open the 802.11a/n/ac Global Parameters page.
b) Select the **802.11a Network Status** check box.
c) Click **Apply**.

Step 7 Click **Save Configuration**.

Monitoring Configuration Settings for Band Selection, 802.11 Bands, and Parameters

Monitoring Configuration Settings Using Band Selection and 802.11 Bands Commands

This section describes the new commands for band selection and 802.11 bands.

The following commands can be used to monitor band selection, and 802.11 bands and parameters the switch.

Table 2: Monitoring Configuration Settings Using Band Selection and 802.11 Bands Commands

Command	Purpose
show ap dot11 5ghz network	Displays 802.11a bands network parameters, 802.11a operational rates, 802.11n MCS settings, and 802.11n status information.
show ap dot11 24ghz network	Displays 802.11b bands network parameters, 802.11b/g operational rates, 802.11n MCS settings, and 802.11n status information.
show wireless dot11h	Displays 802.11h configuration parameters.
show wireless band-select	Displays band select configuration settings.

Example: Viewing the Configuration Settings for 5-GHz Band

```
Switch# show ap dot11 5ghz network
802.11a Network : Enabled
11nSupport : Enabled
  802.11a Low Band : Enabled
  802.11a Mid Band : Enabled
  802.11a High Band : Enabled

802.11a Operational Rates
  802.11a 6M : Mandatory
  802.11a 9M : Supported
  802.11a 12M : Mandatory
  802.11a 18M : Supported
  802.11a 24M : Mandatory
  802.11a 36M : Supported
  802.11a 48M : Supported
  802.11a 54M : Supported
802.11n MCS Settings:
  MCS 0 : Supported
  MCS 1 : Supported
  MCS 2 : Supported
  MCS 3 : Supported
```

```
  MCS 4 : Supported
  MCS 5 : Supported
  MCS 6 : Supported
  MCS 7 : Supported
  MCS 8 : Supported
  MCS 9 : Supported
  MCS 10 : Supported
  MCS 11 : Supported
  MCS 12 : Supported
  MCS 13 : Supported
  MCS 14 : Supported
  MCS 15 : Supported
  MCS 16 : Supported
  MCS 17 : Supported
  MCS 18 : Supported
  MCS 19 : Supported
  MCS 20 : Supported
  MCS 21 : Supported
  MCS 22 : Supported
  MCS 23 : Supported
802.11n Status:
  A-MPDU Tx:
    Priority 0 : Enabled
    Priority 1 : Disabled
    Priority 2 : Disabled
    Priority 3 : Disabled
    Priority 4 : Enabled
    Priority 5 : Enabled
    Priority 6 : Disabled
    Priority 7 : Disabled
  A-MSDU Tx:
    Priority 0 : Enabled
    Priority 1 : Enabled
    Priority 2 : Enabled
    Priority 3 : Enabled
    Priority 4 : Enabled
    Priority 5 : Enabled
    Priority 6 : Disabled
    Priority 7 : Disabled
Guard Interval : Any
  Rifs Rx : Enabled
Beacon Interval : 100
CF Pollable mandatory : Disabled
CF Poll Request Mandatory : Disabled
CFP Period : 4
CFP Maximum Duration : 60
Default Channel : 36
Default Tx Power Level : 1
DTPC Status : Enabled
Fragmentation Threshold : 2346
Pico-Cell Status : Disabled
Pico-Cell-V2 Status : Disabled
TI Threshold : 0
Legacy Tx Beamforming setting : Disabled
Traffic Stream Metrics Status : Disabled
Expedited BW Request Status : Disabled
EDCA profile type check : default-wmm
Call Admision Control (CAC) configuration
Voice AC
  Voice AC - Admission control (ACM) : Disabled
  Voice Stream-Size : 84000
  Voice Max-Streams : 2
  Voice Max RF Bandwidth : 75
  Voice Reserved Roaming Bandwidth : 6
  Voice Load-Based CAC mode : Enabled
  Voice tspec inactivity timeout : Enabled
CAC SIP-Voice configuration
  SIP based CAC : Disabled
  SIP Codec Type : CODEC_TYPE_G711
  SIP call bandwidth : 64
  SIP call bandwith sample-size : 20
Video AC
  Video AC - Admission control (ACM) : Disabled
```

```
  Video max RF bandwidth : Infinite
  Video reserved roaming bandwidth : 0
```

Example: Viewing the Configuration Settings for 24-GHz Band

```
Switch# show ap dot11 24ghz network
802.11b Network : Enabled
11gSupport : Enabled
11nSupport : Enabled

  802.11b/g Operational Rates
  802.11b 1M : Mandatory
  802.11b 2M : Mandatory
  802.11b 5.5M : Mandatory
  802.11g 6M : Supported
  802.11g 9M : Supported
  802.11b 11M : Mandatory
  802.11g 12M : Supported
  802.11g 18M : Supported
  802.11g 24M : Supported
  802.11g 36M : Supported
  802.11g 48M : Supported
  802.11g 54M : Supported
802.11n MCS Settings:
  MCS 0 : Supported
  MCS 1 : Supported
  MCS 2 : Supported
  MCS 3 : Supported
  MCS 4 : Supported
  MCS 5 : Supported
  MCS 6 : Supported
  MCS 7 : Supported
  MCS 8 : Supported
  MCS 9 : Supported
  MCS 10 : Supported
  MCS 11 : Supported
  MCS 12 : Supported
  MCS 13 : Supported
  MCS 14 : Supported
  MCS 15 : Supported
  MCS 16 : Supported
  MCS 17 : Supported
  MCS 18 : Supported
  MCS 19 : Supported
  MCS 20 : Supported
  MCS 21 : Supported
  MCS 22 : Supported
  MCS 23 : Supported
802.11n Status:
  A-MPDU Tx:
    Priority 0 : Enabled
    Priority 1 : Disabled
    Priority 2 : Disabled
    Priority 3 : Disabled
    Priority 4 : Enabled
    Priority 5 : Enabled
    Priority 6 : Disabled
    Priority 7 : Disabled
  A-MSDU Tx:
    Priority 0 : Enabled
    Priority 1 : Enabled
    Priority 2 : Enabled
    Priority 3 : Enabled
    Priority 4 : Enabled
    Priority 5 : Enabled
  Priority 6 : Disabled
    Priority 7 : Disabled
  Guard Interval : Any
  Rifs Rx : Enabled
```

```
Beacon Interval : 100
CF Pollable Mandatory : Disabled
CF Poll Request Mandatory : Disabled
CFP Period : 4
CFP Maximum Duration : 60
Default Channel : 11
Default Tx Power Level : 1
DTPC Status : true
Call Admission Limit : 105
G711 CU Quantum : 15
ED Threshold : -50
Fragmentation Threshold : 2346
PBCC Mandatory : Disabled
Pico-Cell Status : Disabled
Pico-Cell-V2 Status : Disabled
RTS Threshold : 2347
Short Preamble Mandatory : Enabled
Short Retry Limit : 7
Legacy Tx Beamforming setting : Disabled
Traffic Stream Metrics Status : Disabled
Expedited BW Request Status : Disabled
EDCA profile type : default-wmm
Call Admision Control (CAC) configuration
Voice AC
  Voice AC - Admission control (ACM) : Disabled
  Voice Stream-Size : 84000
  Voice Max-Streams : 2
  Voice Max RF Bandwidth : 75
  Voice Reserved Roaming Bandwidth : 6
  Voice Load-Based CAC mode : Enabled
  Voice tspec inactivity timeout : Enabled
CAC SIP-Voice configuration
  SIP based CAC : Disabled
  SIP Codec Type : CODEC_TYPE_G711
  SIP call bandwidth : 64
  SIP call bandwith sample-size : 20
Video AC
  Video AC - Admission control (ACM) : Disabled
  Video max RF bandwidth : Infinite
  Video reserved roaming bandwidth : 0
```

Example: Viewing the status of 802.11h Parameters

```
Switch# show wireless dot11h
Power Constraint: 0
Channel Switch: 0
Channel Switch Mode: 0
```

Example: Verifying the Band Selection Settings

```
Switch# show wireless band-select
Band Select Probe Response    : per WLAN enabling
Cycle Count                   : 2
Cycle Threshold (millisec)    : 200
Age Out Suppression (sec)     : 20
Age Out Dual Band (sec)       : 60
Client RSSI (dBm)             : 80
```

Configuration Examples for Band Selection, 802.11 Bands, and Parameters

Examples: Band Selection Configuration

This example shows how to set the probe cycle count and time threshold for a new scanning cycle period for band select:

```
Switch# configure terminal
Switch(config)# wireless client band-select cycle-count 3
Switch(config)# wireless client band-select cycle-threshold 5000
Switch(config)# end
```

This example shows how to set the suppression expire to the band select:

```
Switch# configure terminal
Switch(config)# wireless client band-select expire suppression 100
Switch(config)# end
```

This example shows how to set the dual band expire for the band select:

```
Switch# configure terminal
Switch(config)# wireless client band-select expire dual-band 100
Switch(config)# end
```

This example shows how to set the client RSSI threshold for the band select:

```
Switch# configure terminal
Switch(config)# wireless client band-select client-rssi 40
Switch(config)# end
```

This example shows how to configure band selection on specific WLANs:

```
Switch# configure terminal
Switch(config)# wlan wlan1 25 ssid12
Switch(config-wlan)# band-select
Switch(config)# end
```

Examples: 802.11 Bands Configuration

This example shows how to configure 802.11 bands using beacon interval, fragmentation, and dynamic transmit power control:

```
Switch# configure terminal
Switch(config)# ap dot11 5ghz shutdown
Switch(config)# ap dot11 24ghz shutdown
Switch(config)# ap dot11 5ghz beaconperiod 500
Switch(config)# ap dot11 5ghz fragmentation 300
Switch(config)# ap dot11 5ghz dtpc
Switch(config)# wireless client association limit 50 interval 1000
Switch(config)# ap dot11 5ghz rate 36 mandatory
Switch(config)# no ap dot11 5ghz shutdown
Switch(config)# no ap dot11 24ghz shutdown
Switch(config)# ap dot11 24ghz dot11g
Switch(config)#end
```

Examples: 802.11n Configuration

This example shows how to configure 802.11n parameters for 5-GHz band using aggregation method:

```
Switch# configure terminal
Switch(config)# ap dot11 5ghz dot11n
Switch(config)# ap dot11 5ghz dot11n mcs tx 20
Switch(config)# wlan wlan1 25 ssid12
Switch(config-wlan)# wmm require\
Switch(config-wlan)# exit
Switch(config)# ap dot11 5ghz shutdown
Switch(config)# ap dot11 5ghz dot11n a-mpdu tx priority all
Switch(config)# no ap dot11 5ghz shutdown
Switch(config)#exit
```

This example shows how to configure the guard interval for 5-GHz band:

```
Switch# configure terminal
Switch(config)# ap dot11 5ghz dot11n
Switch(config)# ap dot11 5ghz dot11n mcs tx 20
Switch(config)# wlan wlan1 25 ssid12
Switch(config-wlan)# wmm require\
Switch(config-wlan)# exit
Switch(config)# no ap dot11 5ghz shutdown
Switch(config)# ap dot11 5ghz dot11n guard-interval long
Switch(config)#end
```

This example shows how to configure the RIFS for 5-GHz band:

```
Switch# configure terminal
Switch(config)# ap dot11 5ghz dot11n
Switch(config)# ap dot11 5ghz dot11n mcs tx 20
Switch(config)# wlan wlan1 25 ssid12
Switch(config-wlan)# wmm require\
Switch(config-wlan)# exit
Switch(config)# ap dot11 5ghz shutdown
Switch(config)# ap dot11 5ghz dot11n rifs rx
Switch(config)#end
```

Examples: 802.11h Configuration

This example shows how to configure the access point to announce when it is switching to a new channel using restriction transmission:

```
Switch# configure terminal
Switch(config)# ap dot11 5ghz shutdown
Switch(config)# ap dot11 5ghz channelswitch mode 0
Switch(config)# no ap dot11 5ghz shutdown
Switch(config)#end
```

This example shows how to configure the 802.11h power constraint for 5-GHz band:

```
Switch# configure terminal
Switch(config)# ap dot11 5ghz shutdown
Switch(config)# ap dot11 5ghz power-constraint 200
Switch(config)# no ap dot11 5ghz shutdown
Switch(config)#end
```

Additional References for 802.11 Parameters and Band Selection

Related Documents

Related Topic	Document Title
System management commands	*System Management Command Reference, Cisco IOS XE Release 3SE (Cisco WLC 5700 Series)*

Standards and RFCs

Standard/RFC	Title
None	—

MIBs

MIB	MIBs Link
All supported MIBs for this release.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

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 History and Information For Performing 802.11 parameters and Band Selection Configuration

Release	Feature Information
Cisco IOS XE 3.3SE	This feature was introduced.