Configuring 802.11 parameters and Band Selection

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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.
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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td>Example: SwitchControllerDevice# configure terminal</td>
<td></td>
</tr>
<tr>
<td>Step 2 wireless client band-select cycle-count cycle_count</td>
<td>Sets the probe cycle count for band select.</td>
</tr>
<tr>
<td>Example: SwitchControllerDevice(config)# wireless client band-select cycle-count 3</td>
<td>You can enter a value between 1 and 10 for the cycle_count parameter.</td>
</tr>
<tr>
<td>Step 3 wireless client band-select cycle-threshold milliseconds</td>
<td>Sets the time threshold for a new scanning cycle period.</td>
</tr>
<tr>
<td>Command or Action</td>
<td>Purpose</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Example: SwitchControllerDevice(config)# wireless client band-select cycle-threshold 5000</td>
<td>You can enter a value for threshold between 1 and 1000 for the milliseconds parameter.</td>
</tr>
<tr>
<td>Step 4 wireless client band-select expire suppression seconds</td>
<td>Sets the suppression expire to the band select. You can enter a value for suppression between 10 to 200 for the seconds parameter.</td>
</tr>
<tr>
<td>Example: SwitchControllerDevice(config)# wireless client band-select expire suppression 100</td>
<td></td>
</tr>
<tr>
<td>Step 5 wireless client band-select expire dual-band seconds</td>
<td>Sets the dual band expire. You can enter a value for dual band between 10 and 300 for the seconds parameter.</td>
</tr>
<tr>
<td>Example: SwitchControllerDevice(config)# wireless client band-select expire dual-band 100</td>
<td></td>
</tr>
<tr>
<td>Step 6 wireless client band-select client-rssi client_rssi</td>
<td>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.</td>
</tr>
<tr>
<td>Example: SwitchControllerDevice(config)# wireless client band-select client-rssi 40</td>
<td></td>
</tr>
<tr>
<td>Step 7 end</td>
<td>Returns to privileged EXEC mode. Alternatively, you can also press Ctrl-Z to exit global configuration mode.</td>
</tr>
<tr>
<td>Example: SwitchControllerDevice(config)# end</td>
<td></td>
</tr>
<tr>
<td>Step 8 wlan wlan_profile_name wlan_ID SSID_network_name band-select</td>
<td>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.</td>
</tr>
<tr>
<td>Example: SwitchControllerDevice(config)# wlan wlan1 25 ssid12 SwitchControllerDevice(config-wlan)# band-select</td>
<td></td>
</tr>
<tr>
<td>Step 9 end</td>
<td>Returns to privileged EXEC mode. Alternatively, you can also press Ctrl-Z to exit global configuration mode.</td>
</tr>
<tr>
<td>Example: SwitchControllerDevice(config)# end</td>
<td></td>
</tr>
</tbody>
</table>

**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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong> SwitchControllerDevice# configure terminal</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong> ap dot11 5ghz shutdown</td>
<td>Disables the 802.11a band.</td>
</tr>
<tr>
<td><strong>Example:</strong> SwitchControllerDevice(config)# ap dot11 5ghz shutdown</td>
<td>Note You must disable the 802.11a band before configuring the 802.11a network parameters.</td>
</tr>
<tr>
<td><strong>Step 3</strong> ap dot11 24ghz shutdown</td>
<td>Disables the 802.11b band.</td>
</tr>
<tr>
<td><strong>Example:</strong> SwitchControllerDevice(config)# ap dot11 24ghz shutdown</td>
<td>Note You must disable the 802.11b band before configuring the 802.11b network parameters.</td>
</tr>
<tr>
<td><strong>Step 4</strong> ap dot11 {5ghz</td>
<td>24ghz} beaconperiod time_unit</td>
</tr>
<tr>
<td><strong>Example:</strong> SwitchControllerDevice(config)# ap dot11 5ghz beaconperiod 500</td>
<td>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.</td>
</tr>
<tr>
<td><strong>Step 5</strong> ap dot11 {5ghz</td>
<td>24ghz} fragmentation threshold</td>
</tr>
<tr>
<td><strong>Example:</strong> SwitchControllerDevice(config)# ap dot11 5ghz fragmentation 300</td>
<td>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.</td>
</tr>
</tbody>
</table>
### Configuring the 802.11 Bands (CLI)

#### Configuring 802.11 parameters and Band Selection

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 6</strong></td>
<td>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. <strong>Note</strong> On access points that run Cisco IOS software, this feature is called world mode. The <strong>no</strong> form of the command disables the 802.11a or 802.11b DTPC setting.</td>
</tr>
<tr>
<td>ap dot11 {5ghz</td>
<td>24ghz} dtpc</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td><strong>Example:</strong></td>
</tr>
<tr>
<td>SwitchControllerDevice(config)# ap dot11 5ghz dtpc</td>
<td>SwitchControllerDevice(config)# no ap dot11 24ghz dtpc</td>
</tr>
<tr>
<td><strong>Step 7</strong></td>
<td>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.</td>
</tr>
<tr>
<td>wireless client association limit number interval milliseconds</td>
<td><strong>Step 7</strong></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td><strong>Example:</strong></td>
</tr>
<tr>
<td>SwitchControllerDevice(config)# wireless client association limit 50 interval 1000</td>
<td></td>
</tr>
<tr>
<td><strong>Step 8</strong></td>
<td>Specifies the rate at which data can be transmitted between the controller and the client.</td>
</tr>
<tr>
<td>ap dot11 {5ghz</td>
<td>24ghz} rate rate {disable</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td><strong>Example:</strong></td>
</tr>
<tr>
<td>SwitchControllerDevice(config)# ap dot11 5ghz rate 36 mandatory</td>
<td></td>
</tr>
<tr>
<td><strong>Step 9</strong></td>
<td>Enables the 802.11a band. <strong>Note</strong> The default value is enabled.</td>
</tr>
<tr>
<td>no ap dot11 5ghz shutdown</td>
<td><strong>Step 9</strong></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td><strong>Example:</strong></td>
</tr>
<tr>
<td>SwitchControllerDevice(config)# no ap dot11 5ghz shutdown</td>
<td></td>
</tr>
<tr>
<td><strong>Step 10</strong></td>
<td>Enables the 802.11b band. <strong>Note</strong> The default value is enabled.</td>
</tr>
<tr>
<td>no ap dot11 24ghz shutdown</td>
<td><strong>Step 10</strong></td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td><strong>Example:</strong></td>
</tr>
<tr>
<td>SwitchControllerDevice(config)# no ap dot11 24ghz shutdown</td>
<td></td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>configure terminal</td>
</tr>
<tr>
<td>Example:</td>
<td>SwitchControllerDevice# configure terminal</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td>ap dot11 {5ghz</td>
</tr>
<tr>
<td>Example:</td>
<td>SwitchControllerDevice(config)# ap dot11 5ghz dot11n</td>
</tr>
</tbody>
</table>

Enables or disables 802.11g network support.

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.

Returns to privileged EXEC mode.
### Command or Action

<table>
<thead>
<tr>
<th>Step</th>
<th>Command Syntax</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>`ap dot11 {5ghz</td>
<td>24ghz} dot11n mcs tx rtu`</td>
</tr>
<tr>
<td>4</td>
<td><code>wlan wlan_profile_name wlan_ID SSID_network_name wmm require</code></td>
<td>Enables WMM on the WLAN and uses the 802.11n data rates that you configured. The <strong>require</strong> parameter requires client devices to use WMM. Devices that do not support WMM cannot join the WLAN.</td>
</tr>
<tr>
<td>5</td>
<td>`ap dot11 {5ghz</td>
<td>24ghz} shutdown`</td>
</tr>
<tr>
<td>6</td>
<td>`{ap</td>
<td>no ap} dot11 {5ghz</td>
</tr>
</tbody>
</table>

### Table 1: Traffic Type Priority Levels

<table>
<thead>
<tr>
<th>User Priority</th>
<th>Traffic Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Best effort</td>
</tr>
<tr>
<td>1</td>
<td>Background</td>
</tr>
<tr>
<td>2</td>
<td>Spare</td>
</tr>
<tr>
<td>3</td>
<td>Excellent effort</td>
</tr>
<tr>
<td>4</td>
<td>Controlled load</td>
</tr>
<tr>
<td>5</td>
<td>Video, less than 100-ms latency and jitter</td>
</tr>
<tr>
<td>Command or Action</td>
<td>Purpose</td>
</tr>
<tr>
<td>-------------------------------------------------------</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>6</td>
<td>Voice, less than 100-ms latency and jitter</td>
</tr>
<tr>
<td>7</td>
<td>Network control</td>
</tr>
</tbody>
</table>

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:

```
SwitchControllerDevice(config)# no ap dot11 5ghz shutdown
```

Reenables the network.

**Step 8**

ap dot11 {5ghz | 24ghz} dot11n guard-interval {any | long}

Example:

```
SwitchControllerDevice(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:

```
SwitchControllerDevice(config)# ap dot11 5ghz dot11n rifs rx
```

Configures the Reduced Interframe Space (RIFS) for the network.

**Step 10**

end

Example:

```
SwitchControllerDevice(config)# end
```

Returns to privileged EXEC mode. Alternatively, you can also press Ctrl-Z to exit global configuration mode.
# 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**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong> SwitchControllerDevice(config)# configure terminal</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong> ap dot11 5ghz shutdown</td>
<td>Disables the 802.11a network.</td>
</tr>
<tr>
<td><strong>Example:</strong> SwitchControllerDevice(config)# ap dot11 5ghz shutdown</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong> {ap</td>
<td>no ap} dot11 5ghz channelswitch mode switch_mode</td>
</tr>
<tr>
<td><strong>Example:</strong> SwitchControllerDevice(config)# ap dot11 5ghz channelswitch mode 0</td>
<td></td>
</tr>
<tr>
<td><strong>Step 4</strong> ap dot11 5ghz power-constraint value</td>
<td>Configures the 802.11h power constraint value in a range from zero through 255. The default value for the value parameter is 3 dB.</td>
</tr>
<tr>
<td><strong>Example:</strong> SwitchControllerDevice(config)# ap dot11 5ghz power-constraint 200</td>
<td></td>
</tr>
<tr>
<td><strong>Step 5</strong> no ap dot11 5ghz shutdown</td>
<td>Reenables the 802.11a network.</td>
</tr>
<tr>
<td><strong>Example:</strong> SwitchControllerDevice(config)# no ap dot11 5ghz shutdown</td>
<td></td>
</tr>
<tr>
<td><strong>Step 6</strong> end</td>
<td>Returns to privileged EXEC mode. Alternatively, you can also press Ctrl-Z to exit global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong> SwitchControllerDevice(config)# end</td>
<td></td>
</tr>
</tbody>
</table>
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>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>show ap dot11 5ghz network</td>
<td>Displays 802.11a bands network parameters, 802.11a operational rates, 802.11n MCS settings, and 802.11n status information.</td>
</tr>
<tr>
<td>show ap dot11 24ghz network</td>
<td>Displays 802.11b bands network parameters, 802.11b/g operational rates, 802.11n MCS settings, and 802.11n status information.</td>
</tr>
<tr>
<td>show wireless dot11h</td>
<td>Displays 802.11h configuration parameters.</td>
</tr>
<tr>
<td>show wireless band-select</td>
<td>Displays band select configuration settings.</td>
</tr>
</tbody>
</table>

Example: Viewing the Configuration Settings for 5-GHz Band

```
SwitchControllerDevice# 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 Admission 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 bandwidth sample-size : 20
Video AC
  Video AC - Admission control (ACM) : Disabled
Example: Viewing the Configuration Settings for 24-GHz Band

SwitchControllerDevice# 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 Admission 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 bandwidth 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

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

Example: Verifying the Band Selection Settings

SwitchControllerDevice# 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:

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

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

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

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

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

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

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

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

```
SwitchControllerDevice# configure terminal
SwitchControllerDevice(config)# wlan wlan1 25 ssid12
SwitchControllerDevice(config-wlan)# band-select
SwitchControllerDevice(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:

```
SwitchControllerDevice# configure terminal
SwitchControllerDevice(config)# ap dot11 5ghz shutdown
SwitchControllerDevice(config)# ap dot11 24ghz shutdown
SwitchControllerDevice(config)# ap dot11 5ghz beaconperiod 500
SwitchControllerDevice(config)# ap dot11 5ghz fragmentation 300
SwitchControllerDevice(config)# ap dot11 5ghz dtpc
SwitchControllerDevice(config)# wireless client association limit 50 interval 1000
SwitchControllerDevice(config)# ap dot11 5ghz rate 36 mandatory
SwitchControllerDevice(config)# no ap dot11 5ghz shutdown
SwitchControllerDevice(config)# no ap dot11 24ghz shutdown
SwitchControllerDevice(config)# ap dot11 24ghz dot11g
SwitchControllerDevice(config)# end
```
Examples: 802.11n Configuration

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

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

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

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

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

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

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

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

```
SwitchControllerDevice# configure terminal
SwitchControllerDevice(config)# ap dot11 5ghz shutdown
SwitchControllerDevice(config)# ap dot11 5ghz power-constraint 200
SwitchControllerDevice(config)# no ap dot11 5ghz shutdown
SwitchControllerDevice(config)#end
```
# Additional References for 802.11 Parameters and Band Selection

## Related Documents

<table>
<thead>
<tr>
<th>Related Topic</th>
<th>Document Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>System management commands</td>
<td>System Management Command Reference, Cisco IOS XE Release 3SE (Cisco WLC 5700 Series)</td>
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## Standards and RFCs

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## MIBs

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<th>MIB</th>
<th>MIBs Link</th>
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<tr>
<td>All supported MIBs for this release.</td>
<td>To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a></td>
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## Technical Assistance

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<tr>
<td>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.</td>
<td><a href="http://www.cisco.com/support">http://www.cisco.com/support</a></td>
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Feature History and Information For Performing 802.11 parameters and Band Selection Configuration

<table>
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<tr>
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<th>Feature Information</th>
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<td>Cisco IOS XE 3.2SE</td>
<td>This feature was introduced.</td>
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