CleanAir Command Reference, Cisco IOS XE Release 3SE (Catalyst 3850 Switches)

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Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

Text Part Number: OL-28516-02

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Preface

This preface describes the audience, organization, and conventions of the Cisco 5760 Wireless LAN Controller CleanAir Configuration Guide. It also provides information on how to obtain other documentation. This chapter includes the following sections:

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Audience

This guide is for the networking professional managing the Catalyst 3850 switch, hereafter referred to as the switch module. Before using this guide, you should have experience working with the Cisco IOS software and be familiar with the concepts and terminology of Ethernet and local area networking.

Document Organization

Conventions

This publication uses these conventions to convey instructions and information:

Command descriptions use these conventions:

- Commands and keywords are in **boldface** text.
- Arguments for which you supply values are in *italic*.
- Square brackets ([ ]) means optional elements.
- Braces ({}) group required choices, and vertical bars (|) separate the alternative elements.

- Braces and vertical bars within square brackets ([{ | }]) mean a required choice within an optional element.

Interactive examples use these conventions:

- Terminal sessions and system displays are in screen font.
- Information you enter is in boldface screen font
- Nonprinting characters, such as passwords or tabs, are in angle brackets (< >).

Notes, cautions, and warnings use these conventions and symbols:

Note Means reader take note. Notes contain helpful suggestions or references to materials not contained in this manual.

Purpose

This guide provides the information that you need about the CleanAir feature that have been created or changed for use with the Catalyst 3850 switch.

This guide provides procedures for configuring the Cisco CleanAir feature for the access point and the controller.

This guide does not describe system messages you might encounter or how to install your switch. For more information, see the Catalyst 3850 Switch System Message Guide for this release and the Catalyst 3850 Switch Hardware Installation Guide.

For documentation updates, see the release notes for this release.

This guide provides the information that you need about the Radio Resource Management feature that have been created or changed for use with the Catalyst 3850 switch.

This guide provides procedures for configuring the Radio Resource Management feature for the access point and the controller.

This guide does not describe system messages you might encounter or how to install your switch. For more information, see the Catalyst 3850 Switch System Message Guide for this release and the Catalyst 3850 Switch Hardware Installation Guide.

For documentation updates, see the release notes for this release.

This guide provides the information that you need about the Multicast feature that have been created or changed for use with the Catalyst 3850 switch.

This guide provides procedures for configuring the Multicast feature for the access point and the controller.

This guide does not describe system messages you might encounter or how to install your switch. For more information, see the Catalyst 3850 Switch System Message Guide for this release and the Catalyst 3850 Switch Hardware Installation Guide.

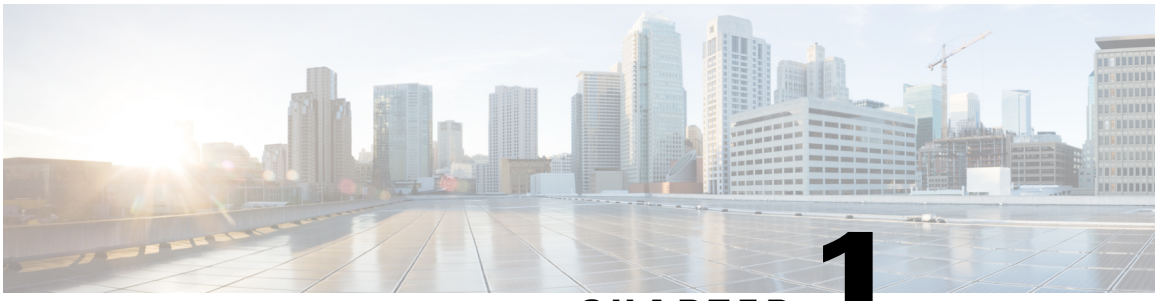
For documentation updates, see the release notes for this release.

Related Documentation

For additional information about wireless LAN technology documentation, see the following guides:

-

Obtaining Documentation and Submitting a Service Request



CHAPTER 1

Using the Command-Line Interface

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Information About Using the Command-Line Interface

Command Modes

The Cisco IOS user interface is divided into many different modes. The commands available to you depend on which mode you are currently in. Enter a question mark (?) at the system prompt to obtain a list of commands available for each command mode.

You can start a CLI session through a console connection, through Telnet, a SSH, or by using the browser.

When you start a session, you begin in user mode, often called user EXEC mode. Only a limited subset of the commands are available in user EXEC mode. For example, most of the user EXEC commands are one-time commands, such as **show** commands, which show the current configuration status, and **clear** commands, which clear counters or interfaces. The user EXEC commands are not saved when the switch reboots.

To have access to all commands, you must enter privileged EXEC mode. Normally, you must enter a password to enter privileged EXEC mode. From this mode, you can enter any privileged EXEC command or enter global configuration mode.

Using the configuration modes (global, interface, and line), you can make changes to the running configuration. If you save the configuration, these commands are stored and used when the switch reboots. To access the various configuration modes, you must start at global configuration mode. From global configuration mode, you can enter interface configuration mode and line configuration mode.

This table describes the main command modes, how to access each one, the prompt you see in that mode, and how to exit the mode.

Table 1: Command Mode Summary

Mode	Access Method	Prompt	Exit Method	About This Mode
User EXEC	Begin a session using Telnet, SSH, or console.	`Switch>`	Enter **logout** or **quit**.	Use this mode to • Change terminal settings. • Perform basic tests. • Display system information.
Privileged EXEC	While in user EXEC mode, enter the **enable** command.	`Switch#`	Enter **disable** to exit.	Use this mode to verify commands that you have entered. Use a password to protect access to this mode.
Global configuration	While in privileged EXEC mode, enter the **configure** command.	`Switch(config)#`	To exit to privileged EXEC mode, enter **exit** or **end**, or press **Ctrl-Z**.	Use this mode to configure parameters that apply to the entire switch.
VLAN configuration	While in global configuration mode, enter the **vlan** *vlan-id* command.	`Switch(config-vlan)#`	To exit to global configuration mode, enter the **exit** command. To return to privileged EXEC mode, press **Ctrl-Z** or enter **end**.	Use this mode to configure VLAN parameters. When VTP mode is transparent, you can create extended-range VLANs (VLAN IDs greater than 1005) and save configurations in the switch startup configuration file.
Interface configuration	While in global configuration mode, enter the **interface** command (with a specific interface).	`Switch(config-if)#`	To exit to global configuration mode, enter **exit**. To return to privileged EXEC mode, press **Ctrl-Z** or enter **end**.	Use this mode to configure parameters for the Ethernet ports.

Mode	Access Method	Prompt	Exit Method	About This Mode
Line configuration	While in global configuration mode, specify a line with the **line vty** or **line console** command.	`Switch(config-line)#`	To exit to global configuration mode, enter **exit**. To return to privileged EXEC mode, press **Ctrl-Z** or enter **end**.	Use this mode to configure parameters for the terminal line.

Using the Help System

You can enter a question mark (?) at the system prompt to display a list of commands available for each command mode. You can also obtain a list of associated keywords and arguments for any command.

SUMMARY STEPS

1. **help**
2. *abbreviated-command-entry* **?**
3. *abbreviated-command-entry* <Tab>
4. **?**
5. *command* **?**
6. *command keyword* **?**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**help** **Example:** `Switch# help`	Obtains a brief description of the help system in any command mode.

Step 2	*abbreviated-command-entry* **?**
	Example:
	`Switch# di?`
	`dir disable disconnect`
		Obtains a list of commands that begin with a particular character string.

Step 3	*abbreviated-command-entry* <Tab>
	Example:
	`Switch# sh conf<tab>`
	`Switch# show configuration`
		Completes a partial command name.

	Command or Action	Purpose
Step 4	**?** **Example:** `Switch> ?`	Lists all commands available for a particular command mode.
Step 5	*command* **?** **Example:** `Switch> show ?`	Lists the associated keywords for a command.

Step 6	*command keyword* **?**
	
	Example:
	`Switch(config)# cdp holdtime ?`
	`  <10-255> Length of time (in sec) that receiver must keep this packet`
		Lists the associated arguments for a keyword.

Understanding Abbreviated Commands

You need to enter only enough characters for the switch to recognize the command as unique.

This example shows how to enter the **show configuration** privileged EXEC command in an abbreviated form:

```
Switch# show conf
```

No and Default Forms of Commands

Almost every configuration command also has a **no** form. In general, use the **no** form to disable a feature or function or reverse the action of a command. For example, the **no shutdown** interface configuration command reverses the shutdown of an interface. Use the command without the keyword **no** to reenable a disabled feature or to enable a feature that is disabled by default.

Configuration commands can also have a **default** form. The **default** form of a command returns the command setting to its default. Most commands are disabled by default, so the **default** form is the same as the **no** form. However, some commands are enabled by default and have variables set to certain default values. In these cases, the **default** command enables the command and sets variables to their default values.

CLI Error Messages

This table lists some error messages that you might encounter while using the CLI to configure your switch.

Table 2: Common CLI Error Messages

Error Message	Meaning	How to Get Help
`% Ambiguous command: "show con"`	You did not enter enough characters for your switch to recognize the command.	Reenter the command followed by a question mark (?) without any space between the command and the question mark. The possible keywords that you can enter with the command appear.
`% Incomplete command.`	You did not enter all of the keywords or values required by this command.	Reenter the command followed by a question mark (?) with a space between the command and the question mark. The possible keywords that you can enter with the command appear.
`% Invalid input detected at '^' marker.`	You entered the command incorrectly. The caret (^) marks the point of the error.	Enter a question mark (?) to display all of the commands that are available in this command mode. The possible keywords that you can enter with the command appear.

Configuration Logging

You can log and view changes to the switch configuration. You can use the Configuration Change Logging and Notification feature to track changes on a per-session and per-user basis. The logger tracks each configuration command that is applied, the user who entered the command, the time that the command was entered, and the parser return code for the command. This feature includes a mechanism for asynchronous notification to registered applications whenever the configuration changes. You can choose to have the notifications sent to the syslog.

Note Only CLI or HTTP changes are logged.

How to Use the CLI to Configure Features

Configuring the Command History

The software provides a history or record of commands that you have entered. The command history feature is particularly useful for recalling long or complex commands or entries, including access lists. You can customize this feature to suit your needs.

Changing the Command History Buffer Size

By default, the switch records ten command lines in its history buffer. You can alter this number for a current terminal session or for all sessions on a particular line. This procedure is optional.

SUMMARY STEPS

1. **terminal history** [**size** *number-of-lines*]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**terminal history** [**size** *number-of-lines*] **Example:** `Switch# terminal history size 200`	Changes the number of command lines that the switch records during the current terminal session in privileged EXEC mode. You can configure the size from 0 to 256.

Recalling Commands

To recall commands from the history buffer, perform one of the actions listed in this table. These actions are optional.

Note The arrow keys function only on ANSI-compatible terminals such as VT100s.

SUMMARY STEPS

1. **Ctrl-P** or use the **up arrow** key
2. **Ctrl-N** or use the **down arrow** key
3. **show history**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**Ctrl-P** or use the **up arrow** key	Recalls commands in the history buffer, beginning with the most recent command. Repeat the key sequence to recall successively older commands.
Step 2	**Ctrl-N** or use the **down arrow** key	Returns to more recent commands in the history buffer after recalling commands with **Ctrl-P** or the up arrow key. Repeat the key sequence to recall successively more recent commands.

	Command or Action	Purpose
Step 3	**show history** **Example:** `Switch# show history`	Lists the last several commands that you just entered in privileged EXEC mode. The number of commands that appear is controlled by the setting of the **terminal history** global configuration command and the **history** line configuration command.

Disabling the Command History Feature

The command history feature is automatically enabled. You can disable it for the current terminal session or for the command line. This procedure is optional.

SUMMARY STEPS

1. **terminal no history**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**terminal no history** **Example:** `Switch# terminal no history`	Disables the feature during the current terminal session in privileged EXEC mode.

Enabling and Disabling Editing Features

Although enhanced editing mode is automatically enabled, you can disable it and reenable it.

SUMMARY STEPS

1. **terminal editing**
2. **terminal no editing**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**terminal editing** **Example:** `Switch# terminal editing`	Reenables the enhanced editing mode for the current terminal session in privileged EXEC mode.

	Command or Action	Purpose
Step 2	**terminal no editing** **Example:** `Switch# terminal no editing`	Disables the enhanced editing mode for the current terminal session in privileged EXEC mode.

Editing Commands Through Keystrokes

The keystrokes help you to edit the command lines. These keystrokes are optional.

Note The arrow keys function only on ANSI-compatible terminals such as VT100s.

Table 3: Editing Commands

Editing Commands	Description
Ctrl-B or use the **left arrow** key	Moves the cursor back one character.
Ctrl-F or use the **right arrow** key	Moves the cursor forward one character.
Ctrl-A	Moves the cursor to the beginning of the command line.
Ctrl-E	Moves the cursor to the end of the command line.
Esc B	Moves the cursor back one word.
Esc F	Moves the cursor forward one word.
Ctrl-T	Transposes the character to the left of the cursor with the character located at the cursor.
Delete or **Backspace** key	Erases the character to the left of the cursor.
Ctrl-D	Deletes the character at the cursor.
Ctrl-K	Deletes all characters from the cursor to the end of the command line.
Ctrl-U or **Ctrl-X**	Deletes all characters from the cursor to the beginning of the command line.
Ctrl-W	Deletes the word to the left of the cursor.

Esc D	Deletes from the cursor to the end of the word.
Esc C	Capitalizes at the cursor.
Esc L	Changes the word at the cursor to lowercase.
Esc U	Capitalizes letters from the cursor to the end of the word.
Ctrl-V or **Esc Q**	Designates a particular keystroke as an executable command, perhaps as a shortcut.
Return key	Scrolls down a line or screen on displays that are longer than the terminal screen can display. **Note** The More prompt is used for any output that has more lines than can be displayed on the terminal screen, including **show** command output. You can use the **Return** and **Space** bar keystrokes whenever you see the More prompt.
Space bar	Scrolls down one screen.
Ctrl-L or **Ctrl-R**	Redisplays the current command line if the switch suddenly sends a message to your screen.

Editing Command Lines That Wrap

You can use a wraparound feature for commands that extend beyond a single line on the screen. When the cursor reaches the right margin, the command line shifts ten spaces to the left. You cannot see the first ten characters of the line, but you can scroll back and check the syntax at the beginning of the command. The keystroke actions are optional.

To scroll back to the beginning of the command entry, press **Ctrl-B** or the left arrow key repeatedly. You can also press **Ctrl-A** to immediately move to the beginning of the line.

Note The arrow keys function only on ANSI-compatible terminals such as VT100s.

The following example shows how to wrap a command line that extends beyond a single line on the screen.

SUMMARY STEPS

1. **access-list**
2. **Ctrl-A**
3. **Return** key

DETAILED STEPS

	Command or Action	Purpose

Step 1	**access-list**
	
	Example:
	`Switch(config)# access-list 101 permit tcp 10.15.22.25 255.255.255.0 10.15.22.35`
	`Switch(config)# $ 101 permit tcp 10.15.22.25 255.255.255.0 10.15.22.35 255.25`
	`Switch(config)# $t tcp 10.15.22.25 255.255.255.0 131.108.1.20 255.255.255.0 eq`
	`Switch(config)# $15.22.25 255.255.255.0 10.15.22.35 255.255.255.0 eq 45`
		Displays the global configuration command entry that extends beyond one line.
		
		When the cursor first reaches the end of the line, the line is shifted ten spaces to the left and redisplayed. The dollar sign ($) shows that the line has been scrolled to the left. Each time the cursor reaches the end of the line, the line is again shifted ten spaces to the left.

Step 2	**Ctrl-A** **Example:** `Switch(config)# access-list 101 permit tcp 10.15.22.25 255.255.255.0 10.15.2$`	Checks the complete syntax. The dollar sign ($) appears at the end of the line to show that the line has been scrolled to the right.
Step 3	**Return** key	Execute the commands. The software assumes that you have a terminal screen that is 80 columns wide. If you have a different width, use the **terminal width** privileged EXEC command to set the width of your terminal. Use line wrapping with the command history feature to recall and modify previous complex command entries.

Searching and Filtering Output of show and more Commands

You can search and filter the output for **show** and **more** commands. This is useful when you need to sort through large amounts of output or if you want to exclude output that you do not need to see. Using these commands is optional.

SUMMARY STEPS

1. {**show** | **more**} *command* | {**begin** | **include** | **exclude**} *regular-expression*

DETAILED STEPS

	Command or Action	Purpose
Step 1	{**show** | **more**} *command* | {**begin** | **include** | **exclude**} *regular-expression*	Searches and filters the output.

	Command or Action	Purpose

	Example:
	`Switch# show interfaces | include protocol`
	`Vlan1 is up, line protocol is up`
	`Vlan10 is up, line protocol is down`
	`GigabitEthernet1/0/1 is up, line protocol is down`
	`GigabitEthernet1/0/2 is up, line protocol is up`
		Expressions are case sensitive. For example, if you enter **| exclude output**, the lines that contain **output** are not displayed, but the lines that contain **output** appear.

Accessing the CLI on a Switch Stack

You can access the CLI through a console connection, through Telnet, a SSH, or by using the browser.

You manage the switch stack and the stack member interfaces through the . You cannot manage stack members on an individual switch basis. You can connect to the through the console port or the Ethernet management port of one or more stack members. Be careful with using multiple CLI sessions on the . Commands that you enter in one session are not displayed in the other sessions. Therefore, it is possible to lose track of the session from which you entered commands.

Note We recommend using one CLI session when managing the switch stack.

If you want to configure a specific stack member port, you must include the stack member number in the CLI command interface notation.

Accessing the CLI Through a Console Connection or Through Telnet

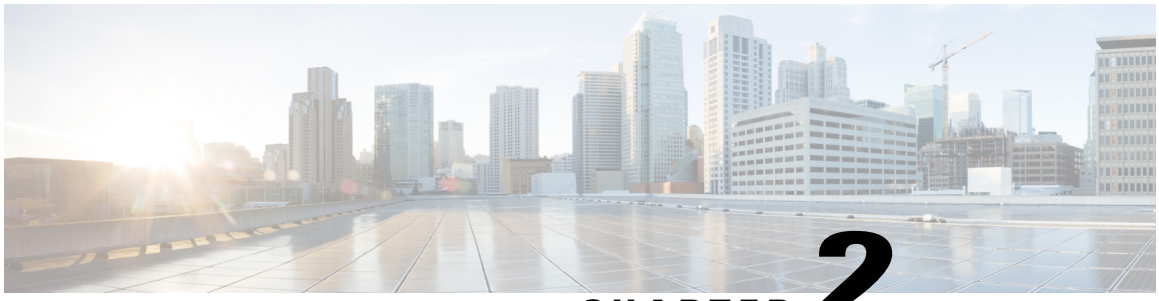
Before you can access the CLI, you must connect a terminal or a PC to the switch console or connect a PC to the Ethernet management port and then power on the switch, as described in the hardware installation guide that shipped with your switch.

If your switch is already configured, you can access the CLI through a local console connection or through a remote Telnet session, but your switch must first be configured for this type of access.

You can use one of these methods to establish a connection with the switch:

- Connect the switch console port to a management station or dial-up modem, or connect the Ethernet management port to a PC. For information about connecting to the console or Ethernet management port, see the switch hardware installation guide.
- Use any Telnet TCP/IP or encrypted Secure Shell (SSH) package from a remote management station. The switch must have network connectivity with the Telnet or SSH client, and the switch must have an enable secret password configured.
    - The switch supports up to 16 simultaneous Telnet sessions. Changes made by one Telnet user are reflected in all other Telnet sessions.
    - The switch supports up to five simultaneous secure SSH sessions.

After you connect through the console port, through the Ethernet management port, through a Telnet session or through an SSH session, the user EXEC prompt appears on the management station.



CHAPTER 2

CleanAir Commands

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ap dot11 24ghz cleanair

To enable CleanAir for detecting 2.4-GHz devices, use the **ap dot11 24ghz cleanair** command in global configuration mode. To disable CleanAir for detecting 2.4-GHz devices, use the **no** form of this command.

ap dot11 24ghz cleanair

Syntax Description

This command has no arguments or keywords.

Command Default

Disabled.

Command Modes

Global configuration (config).

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

Usage Guidelines

You must enable this CleanAir command before you configure other CleanAir commands.

This example shows how to enable CleanAir for 2.4-GHz devices:

```
Switch(config)# ap dot11 24ghz cleanair
```

ap dot11 24ghz cleanair alarm air-quality

To configure the alarm for the threshold value of Air Quality (AQ) for all 2.4-GHz devices, use the **ap dot11 24ghz cleanair alarm air-quality** command in global configuration mode. To disable the alarm for the threshold value of AQ for all 2.4-GHz devices, use the **no** form of this command.

ap dot11 24ghz cleanair alarm air-quality threshold *threshold_value*

Syntax Description

threshold *threshold_value*	Configures the threshold value for AQ. The range is from 1 to 100.

Command Default The default threshold value for AQ is 10.

Command Modes Global configuration (config)

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

Usage Guidelines You must enable CleanAir using the **ap dot11 24ghz cleanair** command before you configure this command.

This example shows how to set the threshold value for the AQ:

```
Switch(config)# ap dot11 24ghz cleanair alarm air-quality threshold 50
```

ap dot11 24ghz cleanair alarm device

To configure the alarm for the 2.4-GHz interference devices, use the **ap dot11 24ghz cleanair alarm device** command in global configuration mode. To disable the alarm for the 2.4-GHz interference devices, use the **no** form of this command.

ap dot11 24ghz cleanairalarm {**device** | **bt-discovery** | **bt-link canopy**| **cont-tx** | **dect-like** | **fh** | **inv** | **jammer** | **mw-oven** | **nonstd** | **superag** | **tdd-tx video** | **wimax-fixed** | **wimax-mobile** | **xbox** | **zigbee**}

Syntax Description

bt-discovery	Configures the alarm for Bluetooth interference devices.
bt-link	Configures the alarm for any Bluetooth link.
canopy	Configures the alarm for canopy interference devices.
cont-tx	Configures the alarm for continuous transmitters.
dect-like	Configures the alarm for Digital Enhanced Cordless Communication (DECT)-like phones.
fh	Configures the alarm for 802.11 frequency hopping (FH) devices.
inv	Configures the alarm for devices using spectrally inverted Wi-Fi signals.
jammer	Configures the alarm for jammer interference devices.
mw-oven	Configures the alarm for microwave ovens.

nonstd	Configures the alarm for devices using nonstandard Wi-Fi channels.
superag	Configures the alarm for 802.11 SuperAG interference devices.
tdd-tx	Configures the alarm for Time Division Duplex (TDD) transmitters.
video	Configures the alarm for video cameras.
wimax-fixed	Configures the alarm for WiMax fixed interference devices.
wimax-mobile	Configures the alarm for WiMax mobile interference devices.
xbox	Configures the alarm for Xbox interference devices.
zigbee	Configures the alarm for 802.15.4 interference devices.

Command Default

The alarm for Wi-Fi inverted devices is enabled. The alarm for all other devices is disabled.

Command Modes

Global configuration (config).

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

Usage Guidelines

You must enable CleanAir using the **ap dot11 24ghz cleanair** command before you configure this command.

This example shows how to enable the alarm to notify interferences from a Zigbee device:

```
Switch(config)# ap dot11 24ghz cleanair alarm device zigbee
```

default ap dot11 24ghz cleanair device

To configure the default state of report generation for 2.4-GHz interference devices, use the **default ap dot11 24ghz cleanair device** command in global configuration mode.

default ap dot11 24ghz cleanair device {**bt-discovery | bt-link | canopy | cont-tx | dect-like | fh | inv | jammer | mw-oven | nonstd | report | superag | tdd-tx | video | wimax-fixed | wimax-mobile | xbox | zigbee**}

Syntax Description

bt-discovery	Configures the alarm for Bluetooth interference devices.
bt-link	Configures the alarm for any Bluetooth link.

canopy	Configures the alarm for canopy interference devices.
cont-tx	Configures the alarm for continuous transmitters.
dect-like	Configures the alarm for Digital Enhanced Cordless Communication (DECT)-like phones.
fh	Configures the alarm for 802.11 frequency hopping devices.
inv	Configures the alarm for devices using spectrally inverted Wi-Fi signals.
jammer	Configures the alarm for jammer interference devices.
mw-oven	Configures the alarm for microwave ovens.
nonstd	Configures the alarm for devices using nonstandard Wi-Fi channels.
superag	Configures the alarm for 802.11 SuperAG interference devices.
tdd-tx	Configures the alarm for Time Division Duplex (TDD) transmitters.
video	Configures the alarm for video cameras.
wimax-fixed	Configures the alarm for WiMax fixed interference devices.
wimax-mobile	Configures the alarm for WiMax mobile interference devices.
xbox	Configures the alarm for Xbox interference devices.
zigbee	Configures the alarm for 802.15.4 interference devices.

Command Default

The alarm for Wi-Fi inverted devices is enabled. The alarm for all other devices is disabled.

Command Modes

Global configuration (config).

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

Usage Guidelines

You must enable CleanAir using the **ap dot11 24ghz cleanair**command before you configure this command.

This example shows how to enable CleanAir to report when a video camera interferes:

```
Switch(config)# default ap dot11 24ghz cleanair device video
```

ap dot11 24ghz rrm channel cleanair-event

To enable Event-Driven RRM (EDRRM) and the sensitivity for 2.4-GHz devices, use the **ap dot11 24ghz rrm channel cleanair-event** command in global configuration mode. To disable EDRRM, use the **no** form of this command.

ap dot11 24ghz rrm channel cleanair-event sensitivity {**high | low | medium**}

no ap dot11 24ghz rrm channel cleanair-event sensitivity {**high | low | medium**}

Syntax Description

sensitivity	Configures the EDRRM sensitivity of the CleanAir event.
high	Specifies the highest sensitivity to non-Wi–Fi interference as indicated by the air quality (AQ) value.
low	Specifies the least sensitivity to non-Wi–Fi interference as indicated by the AQ value.
medium	Specifies medium sensitivity to non-Wi–Fi interference as indicated by the AQ value.

Command Default

EDRRM is disabled and the sensitivity is low.

Command Modes

Global configuration (config).

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

Usage Guidelines

You must enable EDRRM using the **ap dot11 24ghz rrm channel cleanair-event** command before you configure the sensitivity.

This example shows how to enable EDRRM and set the EDRRM sensitivity to low:

```
Switch(config)# ap dot11 24ghz rrm channel cleanair-event
Switch(config)# ap dot11 24ghz rrm channel cleanair-event sensitivity low
```

ap dot11 24ghz rrm channel device

To configure persistent non-Wi-Fi device avoidance in the 802.11b channel, use the **ap dot11 24ghz rrm channel device** command in global configuration mode. To disable persistent device avoidance, use the **no** form of this command.

ap dot11 24ghz rrm channel device

no ap dot11 24ghz rrm channel device

Syntax Description

This command has no arguments or keywords.

Command Default

Persistent device avoidance is disabled.

Command Modes

Global configuration (config).

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

Usage Guidelines

CleanAir-capable monitor mode access points collect information about persistent devices on all configured channels and stores the information in the switch. Local and bridge mode access points detect interference devices on the serving channels only.

This example shows how to enable persistent device avoidance:

```
Switch(config)# ap dot11 24ghz rrm channel device
```

ap dot11 5ghz cleanair

To enable CleanAir for detecting 5-GHz devices, use the **ap dot11 5ghz cleanair** command in global configuration mode.

ap dot11 5ghz cleanair

Command Default

Disabled.

Command Modes

Global configuration.

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

Usage Guidelines

You must enable this CleanAir command before you configure other CleanAir commands.

This example shows how to enable CleanAir for 5-GHz devices:

```
Switch(config)# ap dot11 5ghz cleanair
```

ap dot11 5ghz cleanair alarm air-quality

To configure the alarm when the Air Quality (AQ) reaches the threshold value for the 5-GHz devices, use the **ap dot11 5ghz cleanair alarm air-quality** command.

ap dot11 5ghz cleanair alarm air-quality threshold *threshold _value*

Syntax Description

air-quality	Configures the alarm for the AQ of 5-GHz devices.
threshold *threshold _value*	Configures the threshold value for air quality. The range is from 1 to 100.

Command Default

The default threshold value for AQ is 10.

Command Modes

Global configuration.

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

Usage Guidelines

You must enable CleanAir before you configure this command.

This example shows how to set the threshold value for the AQ:

```
Switch(config)# ap dot11 5ghz cleanair alarm air-quality threshold 30
```

ap dot11 5ghz cleanair alarm device

To configure the alarm for the 5-GHz interference devices, use the **ap dot11 5ghz cleanair alarm device** command.

ap dot11 5ghz cleanair alarm device [**canopy | cont-tx | dect-like | inv | jammer | nonstd | radar | superag | tdd-tx | video | wimax-fixed | wimax-mobile**]

Syntax Description

canopy	Configures the alarm for canopy interference devices.
cont-tx	Configures the alarm for continuous transmitters.
dect-like	Configures the alarm for Digital Enhanced Cordless Communication (DECT)-like phones.
inv	Configures the alarm for devices using spectrally inverted Wi-Fi signals.
jammer	Configures the alarm for jammer interference devices.
nonstd	Configures the alarm for devices using nonstandard Wi-Fi channels.
radar	Configures the alarm for radars.
superag	Configures the alarm for 802.11 SuperAG interference devices.
tdd-tx	Configures the alarm for Time Division Duplex (TDD) transmitters.
video	Configures the alarm for video cameras.
wimax-fixed	Configures the alarm for WiMax fixed interference devices.
wimax-mobile	Configures the alarm for WiMax mobile interference devices.

Command Default

The default alarm values of the following 5-GHz interference devices are:

- Canopy devices—Disabled
- Continuous Transmitter devices—Disabled
- DECT-like Phone—Disabled
- WiFi Inverted devices—Enabled
- Jammer devices—Disabled
- Devices using nonstandard Wi-Fi channels—Disabled
- Radar devices—Disabled
- SuperAG devices—Disabled

- TDD Transmitter devices—Disabled
- Video Cameras—Disabled
- WiMax Fixed devices—Disabled
- WiMax Mobile devices—Disabled

Command Modes

Global configuration.

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

Usage Guidelines

You must enable CleanAir before you configure this command.

This example shows how to enable the alarm to notify interferences from a radar device:

```
Switch(config)# ap dot11 5ghz cleanair alarm device radar
```

default ap dot11 5ghz cleanair device

To configure the default state of the alarm for 5-GHz interference devices, use the **default ap dot11 5ghz cleanair device** command.

default ap dot11 5ghz cleanair device {**canopy | cont-tx | dect-like | inv | jammer | nonstd | radar | report | superag | tdd-tx | video | wimax-fixed | wimax-mobile**}

Syntax Description

canopy	Configures the alarm for canopy interference devices.
cont-tx	Configures the alarm for continuous transmitters.
dect-like	Configures the alarm for Digital Enhanced Cordless Communication (DECT)-like phones.
inv	Configures the alarm for devices using spectrally inverted Wi-Fi signals.
jammer	Configures the alarm for jammer interference devices.
nonstd	Configures the alarm for devices using nonstandard Wi-Fi channels.
radar	Configures the alarm for radars.
report	Enables interference device reports.
superag	Configures the alarm for 802.11 SuperAG interference devices.

tdd-tx	Configures the alarm for Time Division Duplex (TDD) transmitters.
video	Configures the alarm for video cameras.
wimax-fixed	Configures the alarm for WiMax fixed interference devices.
wimax-mobile	Configures the alarm for WiMax mobile interference devices.

Command Default

The default alarm values of the following 5-GHz interference devices are:

- Canopy devices—Disabled
- Continuous Transmitter devices—Disabled
- DECT-like Phone—Disabled
- 802.11 FH devices—Disabled
- WiFi Inverted devices—Enabled
- Jammer devices—Disabled
- Devices using nonstandard Wi-Fi channels—Disabled
- SuperAG devices—Disabled
- TDD Transmitter devices—Disabled
- Video Cameras—Disabled
- WiMax Fixed devices—Disabled
- WiMax Mobile devices—Disabled

Command Modes

Global configuration.

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

Usage Guidelines

You must enable CleanAir before you configure this command.

This example shows how to enable CleanAir to report when a video camera interferes:

```
Switch(config)# default ap dot11 5ghz cleanair device video
```

ap dot11 5ghz rrm channel cleanair-event

To enable Event-Driven RRM (EDRRM) and configure the sensitivity for 5-GHz devices, use the **ap dot11 5ghz rrm channel cleanair-event** command in global configuration mode. To disable EDRRM, use the **no** form of the command.

ap dot11 5ghz rrm channel cleanair-event [**sensitivity** {**high**| **low**| **medium**}]

no ap dot11 5ghz rrm channel cleanair-event [**sensitivity** {**high**| **low**| **medium**}]

Syntax Description

sensitivity	Configures the EDRRM sensitivity of the CleanAir event.
high	Specifies the highest sensitivity to non-Wi–Fi interference as indicated by the air quality (AQ) value.
low	Specifies the least sensitivity to non-Wi–Fi interference as indicated by the AQ value.
medium	Specifies medium sensitivity to non-Wi–Fi interference as indicated by the AQ value.

Command Default

EDRRM is disabled and the EDRRM sensitivity is low.

Command Modes

Global configuration.

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

Usage Guidelines

You must enable EDRRM using the **ap dot11 5ghz rrm channel cleanair-event** command before you configure the sensitivity.

This example shows how to enable EDRRM and set the EDRRM sensitivity to high:

```
Switch(config)# ap dot11 5ghz rrm channel cleanair-event
Switch(config)# ap dot11 5ghz rrm channel cleanair-event sensitivity high
```

ap dot11 5ghz rrm channel device

To configure persistent non-Wi-Fi device avoidance in the 802.11a channel, use the **ap dot11 5ghz rrm channel device** command in global configuration mode. To disable persistent device avoidance, use the **no** form of this command.

ap dot11 5ghz rrm channel device

no ap dot11 5ghz rrm channel device

Syntax Description

This command has no arguments or keywords.

Command Default

The CleanAir persistent device state is disabled.

Command Modes

Global configuration (config)

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

Usage Guidelines

CleanAir-capable monitor mode access points collect information about persistent devices on all configured channels and stores the information in the switch. Local and bridge mode access points detect interference devices on the serving channels only.

This example shows how to enable persistent device avoidance on 802.11a devices:

```
Switch(config)# ap dot11 5ghz rrm channel device
```

ap name mode se-connect

To configure the access point for SE-Connect mode, use the **ap name** *ap_name* **mode se-connect** command.

ap name *ap_name* **mode se-connect**

Syntax Description

ap_name	Name of the access point.

Command Default

No access point is configured for SE-Connect mode.

Command Modes Privileged EXEC (#)

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

Usage Guidelines The access point will reboot after you change the mode.

SE-connect mode enables a user to connect a Spectrum Expert application running on an external Microsoft Windows XP or Vista PC to a Cisco CleanAir-enabled access point in order to display and analyze detailed spectrum data. The Spectrum Expert application connects directly to the access point, by passing the controller. An access point in SE-Connect mode does not provide any Wi-Fi, RF, or spectrum data to the controller. All CleanAir system functionality is suspended while the AP is in this mode, and no clients are served. This mode is intended for remote troubleshooting only.

This example shows how to change the mode of the access point to SE-Connect:

```
Switch# ap name AS-5508-5-AP3 mode se-connect

Changing the AP's mode will cause the AP to reboot.
Are you sure you want to continue? (y/n)[y]: y
% switch-1:wcm:Cisco AP does not support the seconnect mode
```

default ap dot11 24ghz cleanair alarm device

To configure the default value of the alarm for 2.4-GHz interference devices, use the **default ap dot11 24ghz cleanair alarm device** command in global configuration mode.

default ap dot11 24ghz cleanair alarm device {**bt-discovery** | **bt-link** | **canopy** | **cont-tx** | **dect-like** | **fh** | **inv** | **jammer** | **mw-oven**| **nonstd** | **superag** | **tdd-tx** | **video** | **wimax-fixed** | **wimax-mobile** | **xbox** | **zigbee**}

Syntax Description

bt-discovery	Configures the alarm for Bluetooth interference devices.
bt-link	Configures the alarm for any Bluetooth link.
canopy	Configures the alarm for canopy interference devices.
cont-tx	Configures the alarm for continuous transmitters.
dect-like	Configures the alarm for Digital Enhanced Cordless Communication (DECT)-like phones.
fh	Configures the alarm for 802.11 frequency hopping (FH) devices.
inv	Configures the alarm for devices using spectrally inverted Wi-Fi signals.

jammer	Configures the alarm for jammer interference devices.
mw-oven	Configures the alarm for microwave ovens.
nonstd	Configures the alarm for devices using nonstandard Wi-Fi channels.
superag	Configures the alarm for 802.11 SuperAG interference devices.
tdd-tx	Configures the alarm for Time Division Duplex (TDD) transmitters.
video	Configures the alarm for video cameras.
wimax-fixed	Configures the alarm for WiMax fixed interference devices.
wimax-mobile	Configures the alarm for WiMax mobile interference devices.
xbox	Configures the alarm for Xbox interference devices.
zigbee	Configures the alarm for 802.15.4 interference devices.

Command Default

The alarm for Wi-Fi inverted devices is enabled. The alarm for all the other devices is disabled.

Command Modes

Global configuration (config)

Command History

Release	Modification
Cisco IOS XE 3.3SE	This command was introduced.

Usage Guidelines

You must enable CleanAir using the **ap dot11 24ghz cleanair** command before you configure this command.

This example shows how to configure the default CleanAir 2.4-GHz interference devices alarm:

```
Switch(config)# default ap dot11 24ghz cleanair alarm device inv
```

default ap dot11 24ghz cleanair device

To configure the default state of report generation for 2.4-GHz interference devices, use the **default ap dot11 24ghz cleanair device** command in global configuration mode.

default ap dot11 24ghz cleanair device {**bt-discovery** | **bt-link** | **canopy** | **cont-tx** | **dect-like** | **fh** | **inv** | **jammer** | **mw-oven** | **nonstd** | **report** | **superag** | **tdd-tx** | **video** | **wimax-fixed** | **wimax-mobile** | **xbox** | **zigbee**}

Syntax Description

bt-discovery	Configures the alarm for Bluetooth interference devices.
bt-link	Configures the alarm for any Bluetooth link.
canopy	Configures the alarm for canopy interference devices.
cont-tx	Configures the alarm for continuous transmitters.
dect-like	Configures the alarm for Digital Enhanced Cordless Communication (DECT)-like phones.
fh	Configures the alarm for 802.11 frequency hopping devices.
inv	Configures the alarm for devices using spectrally inverted Wi-Fi signals.
jammer	Configures the alarm for jammer interference devices.
mw-oven	Configures the alarm for microwave ovens.
nonstd	Configures the alarm for devices using nonstandard Wi-Fi channels.
superag	Configures the alarm for 802.11 SuperAG interference devices.
tdd-tx	Configures the alarm for Time Division Duplex (TDD) transmitters.
video	Configures the alarm for video cameras.
wimax-fixed	Configures the alarm for WiMax fixed interference devices.
wimax-mobile	Configures the alarm for WiMax mobile interference devices.
xbox	Configures the alarm for Xbox interference devices.
zigbee	Configures the alarm for 802.15.4 interference devices.

Command Default

The alarm for Wi-Fi inverted devices is enabled. The alarm for all other devices is disabled.

Command Modes

Global configuration (config).

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

Usage Guidelines You must enable CleanAir using the **ap dot11 24ghz cleanair**command before you configure this command.

This example shows how to enable CleanAir to report when a video camera interferes:

```
Switch(config)# default ap dot11 24ghz cleanair device video
```

default ap dot11 24ghz rrm channel cleanair-event

To configure the default Event-Driven radio resource management (EDRRM) state and sensitivity for 2.4-GHz devices, use the **default ap dot11 24ghz rrm channel cleanair-event** command in global configuration mode.

default ap dot11 24ghz rrm channel cleanair-event sensitivity {**high | low | medium**}

Syntax Description

sensitivity	Configures the EDRRM sensitivity of the CleanAir event.
high	Specifies the highest sensitivity to non-Wi–Fi interference as indicated by the Air Quality (AQ) value.
low	Specifies the least sensitivity to non-Wi–Fi interference as indicated by the AQ value.
medium	Specifies medium sensitivity to non-Wi–Fi interference as indicated by the AQ value.

Command Default EDRRM is disabled and the sensitivity is low.

Command Modes Global configuration (config)

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

This example shows how to enable EDRRM and set the default EDRRM sensitivity:

```
Switch(config)# default ap dot11 24ghz rrm channel cleanair-event
Switch(config)# default ap dot11 24ghz rrm channel cleanair-event sensitivity
```

default ap dot11 5ghz cleanair device

To configure the default state of the alarm for 5-GHz interference devices, use the **default ap dot11 5ghz cleanair device** command.

default ap dot11 5ghz cleanair device {**canopy | cont-tx | dect-like | inv | jammer | nonstd | radar | report | superag | tdd-tx | video | wimax-fixed | wimax-mobile**}

Syntax Description

canopy	Configures the alarm for canopy interference devices.
cont-tx	Configures the alarm for continuous transmitters.
dect-like	Configures the alarm for Digital Enhanced Cordless Communication (DECT)-like phones.
inv	Configures the alarm for devices using spectrally inverted Wi-Fi signals.
jammer	Configures the alarm for jammer interference devices.
nonstd	Configures the alarm for devices using nonstandard Wi-Fi channels.
radar	Configures the alarm for radars.
report	Enables interference device reports.
superag	Configures the alarm for 802.11 SuperAG interference devices.
tdd-tx	Configures the alarm for Time Division Duplex (TDD) transmitters.
video	Configures the alarm for video cameras.
wimax-fixed	Configures the alarm for WiMax fixed interference devices.
wimax-mobile	Configures the alarm for WiMax mobile interference devices.

Command Default

The default alarm values of the following 5-GHz interference devices are:

- Canopy devices—Disabled
- Continuous Transmitter devices—Disabled
- DECT-like Phone—Disabled
- 802.11 FH devices—Disabled
- WiFi Inverted devices—Enabled
- Jammer devices—Disabled

- Devices using nonstandard Wi-Fi channels—Disabled
- SuperAG devices—Disabled
- TDD Transmitter devices—Disabled
- Video Cameras—Disabled
- WiMax Fixed devices—Disabled
- WiMax Mobile devices—Disabled

Command Modes

Global configuration.

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

Usage Guidelines

You must enable CleanAir before you configure this command.

This example shows how to enable CleanAir to report when a video camera interferes:

```
Switch(config)# default ap dot11 5ghz cleanair device video
```

default ap dot11 5ghz rrm channel cleanair-event

To configure the default state of Event-Driven radio resource management (EDRRM) and the EDRRM sensitivity for 5-GHz devices, use the **default ap dot11 5ghz rrm channel cleanair-event** command in global configuration mode.

default ap dot11 5ghz rrm channel cleanair-event [**sensitivity** {**high | low | medium**}]

Syntax Description

sensitivity	(Optional) Configures the EDRRM sensitivity of the CleanAir event.
high	(Optional) Specifies the highest sensitivity to non-Wi–Fi interference as indicated by the Air Quality (AQ) value.
low	(Optional) Specifies the least sensitivity to non-Wi–Fi interference as indicated by the AQ value.
medium	(Optional) Specifies medium sensitivity to non-Wi–Fi interference as indicated by the AQ value.

Command Default

EDRRM is disabled and the sensitivity is low.

Command Modes Global configuration (config).

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

Usage Guidelines You must enable EDRRM before you configure the sensitivity.

This example shows how to set the default EDRRM state and sensitivity:

```
Switch(config)# default ap dot11 5ghz rrm channel cleanair-event
Switch(config)# default ap dot11 5ghz rrm channel cleanair-event sensitivity
```

default ap dot11 5ghz rrm channel device

To configure the default state of the persistent non-Wi-Fi device avoidance in the 802.11a channels, use the **default ap dot11 5ghz rrm channel device** command in global configuration mode.

default ap dot11 5ghz rrm channel device

Syntax Description This command has no arguments or keywords.

Command Default Persistent device state is disabled.

Command Modes Global configuration (config)

Command History

Release	Modification
Cisco IOS XE 3.3SE	This command was introduced.

This example shows how to configure persistent non-Wi-Fi device avoidance in the 802.11a channels:

```
Switch(config)# default ap dot11 5ghz rrm channel device
```

show ap dot11 24ghz cleanair air-quality summary

To display the CleanAir AQ data for 2.4-GHz band, use the **show ap dot11 24ghz cleanair air-quality summary** command in user EXEC mode or privileged EXEC mode.

show ap dot11 24ghz cleanair air-quality summary

This command has no arguments or keywords.

Command Default None

Command Modes User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

This example shows how to display the CleanAir AQ data for 2.4-GHz band:

```
Switch# show ap dot11 24ghz cleanair air-quality summary

AQ = Air Quality
DFS = Dynamic Frequency Selection

AP Name             Channel   Avg AQ  Min AQ  Interferers  DFS
-----------------------------------------------------------------
AP270ca.9b86.4546   1         99      99      0            No
AP2894.0f26.22df    6         98      97      0            No
AP2894.0f58.cc6b    11        99      99      0            No
AP2894.0f39.1040    6         97      97      0            No
AP2894.0f63.c6da    11        99      99      0            No
```

show ap dot11 24ghz cleanair air-quality worst

To display the worst air quality data for 2.4-GHz band, use the **show ap dot11 24ghz cleanair air-quality worst** command in user EXEC mode or privileged EXEC mode.

show ap dot11 24ghz cleanair air-quality worst

This command has no arguments or keywords.

Command Modes User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

This example shows how to display the worst AQ data for 2.4-GHz band:

```
Switch# show ap dot11 24ghz cleanair air-quality worst

AQ = Air Quality
DFS = Dynamic Frequency Selection

AP Name             Channel   Avg AQ  Min AQ  Interferers  DFS
-----------------------------------------------------------------
AP2895.0f39.1040    6         97      97      0            No
```

show ap dot11 24ghz cleanair config

To display the CleanAir configuration for 2.4-GHz band, use the **show ap dot11 24ghz cleanair config** command in user EXEC mode or privileged EXEC mode.

show ap dot11 24ghz cleanair config

This command has no arguments or keywords.

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

Usage Guidelines

In Release 3.3SE, you can configure this command on the Mobility Agent (MA).

This example shows how to display the CleanAir configuration for 2.4-GHz band on the Mobility Controller:

```
Switch# show ap dot11 24ghz cleanair config

CleanAir Solution................................ : Enabled
Air Quality Settings:
    Air Quality Reporting........................ : Enabled
    Air Quality Reporting Period (min)........... : 15
    Air Quality Alarms........................... : Enabled
    Air Quality Alarm Threshold.................. : 1
Interference Device Settings:
    Interference Device Reporting................ : Enabled
        TDD Transmitter.......................... : Enabled
        Jammer................................... : Enabled
        Continuous Transmitter................... : Enabled
        DECT-like Phone.......................... : Enabled
        Video Camera............................. : Enabled
        WiFi Inverted............................ : Enabled
        WiFi Invalid Channel..................... : Enabled
        SuperAG.................................. : Enabled
        Canopy................................... : Enabled
        WiMax Mobile............................. : Enabled
        WiMax Fixed.............................. : Enabled
    Interference Device Types Triggering Alarms:
        TDD Transmitter.......................... : Enabled
        Jammer................................... : Enabled
        Continuous Transmitter................... : Enabled
```

```
        DECT-like Phone..................... : Enabled
        Video Camera........................ : Enabled
        WiFi Inverted....................... : Enabled
        WiFi Invalid Channel................ : Enabled
        SuperAG............................. : Enabled
        Canopy.............................. : Enabled
        WiMax Mobile........................ : Enabled
        WiMax Fixed......................... : Enabled
    Interference Device Alarms.............. : Enabled
Additional CleanAir Settings:
    CleanAir Event-driven RRM State......... : Enabled
    CleanAir Driven RRM Sensitivity......... : HIGH
    CleanAir Persistent Devices state....... : Enabled
```

This example shows how to display the CleanAir configuration for 2.4-GHz band on the Mobility Agent:

```
Switch# show ap dot11 24ghz cleanair config

Mobility Controller Link Status.............. : UP
CleanAir Solution............................ : Enabled
Air Quality Settings:
    Air Quality Reporting.................... : Enabled
    Air Quality Reporting Period (min)....... : 15
    Air Quality Alarms....................... : Enabled
    Air Quality Alarm Threshold.............. : 10
Interference Device Settings:
    Interference Device Reporting............ : Enabled
        TDD Transmitter..................... : Enabled
        Jammer.............................. : Enabled
        Continuous Transmitter.............. : Enabled
        DECT-like Phone..................... : Enabled
        Video Camera........................ : Enabled
        WiFi Inverted....................... : Enabled
        WiFi Invalid Channel................ : Enabled
        SuperAG............................. : Enabled
        Canopy.............................. : Enabled
        WiMax Mobile........................ : Enabled
        WiMax Fixed......................... : Enabled
    Interference Device Types Triggering Alarms:
        TDD Transmitter..................... : Disabled
        Jammer.............................. : Disabled
        Continuous Transmitter.............. : Disabled
        DECT-like Phone..................... : Disabled
        Video Camera........................ : Disabled
        WiFi Inverted....................... : Enabled
        WiFi Invalid Channel................ : Enabled
        SuperAG............................. : Enabled
        Canopy.............................. : Disabled
        WiMax Mobile........................ : Disabled
        WiMax Fixed......................... : Disabled
    Interference Device Alarms.............. : Enabled
Additional CleanAir Settings:
    CleanAir Event-driven RRM State......... : Disabled
    CleanAir Driven RRM Sensitivity......... : LOW
    CleanAir Persistent Devices state....... : Disabled
```

show ap dot11 24ghz cleanair device type

To display the 2.4-GHz interference devices, use the **show ap dot11 24ghz cleanair device type** command.

show ap dot11 24ghz cleanair device type {**all | bt-discovery | bt-link | canopy | cont-tx | dect-like | fn | inv| jammer | mv-oven | nonstd | persistent | superag | tdd-tx | video | winmax-fixed | wimax-mobile | xbox | zigbee**}

Syntax Description

all	Displays all CleanAir interferers for 2.4-GHz band.
bt-discovery	Displays CleanAir interferers of type Bluetooth for 2.4-GHz band.
bt-link	Displays CleanAir interferers of type Bluetooth Link for 2.4-GHz band.
canopy	Displays CleanAir interferers of type canopy for 2.4-GHz band.
cont-tx	Displays CleanAir interferers of type continuous transmitter for 2.4-GHz band.
dect-like	Displays CleanAir interferers of type Digital Enhanced Cordless Communication (DECT)-like phone for 2.4-GHz band.
fh	Displays CleanAir interferers of type 802.11FH for 2.4-GHz band.
inv	Displays CleanAir Interferer devices using spectrally inverted WiFi signals for 2.4-GHz band.
jammer	Displays CleanAir interferers of type jammer for 2.4-GHz band.
mv-oven	Displays CleanAir interferers of type microwave oven for 2.4-GHz band.
nonstd	Displays CleanAir Interferer devices using non-standard WiFi channels for 2.4-GHz band.
persistent	Displays CleanAir persistent interferer devices for 2.4-GHz band.
superag	Displays CleanAir interferers of type superAG for 2.4-GHz band.
tdd-tx	Displays CleanAir interferers of type Time Division Duplexing (TDD) transmitter for 2.4-GHz band.
video	Displays CleanAir interferers of type video camera for 2.4-GHz band.
winmax-fixed	Displays CleanAir interferers of type WiMax fixed for 2.4-GHz band.
wimax-mobile	Displays CleanAir interferers of type WiMax mobile for 2.4-GHz band.
xbox	Displays CleanAir interferers of type Xbox for 2.4-GHz band.
zigbee	Displays CleanAir interferers of type ZigBee for 2.4-GHz band.

Command Default

None

Command Modes

Global configuration.

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

Usage Guidelines

Interference devices will be listed only if there is an interference from any 2.4-GHz devices.

This example shows how to view all the 2.4-GHz interference devices:

```
Switch# show ap dot11 24ghz cleanair device type all

DC    = Duty Cycle (%)
ISI   = Interference Severity Index (1-Low Interference, 100-High Interference)
RSSI  = Received Signal Strength Index (dBm)
DevID = Device ID

No    ClusterID          DevID  Type           AP Name                 ISI  RSSI  DC
Channel
------------------------------------------------------------------------------------------------
1     7c:00:16:00:00:15  0x403f Xbox          NY-16                   2    -48   1    1
2     7c:00:16:00:00:15  0x501e Xbox          NY-18                   4    -61   4
4,5,6,7,8,9,10,11
3     7c:00:16:00:00:15  0xb011 Xbox          Mrat-3700               4    -54   4
2,3,4,5,6,7,8,9,10,11
4     7c:00:16:00:00:15  0x3005 Xbox          NY-8                    3    -60   1    11
```

show ap dot11 24ghz cleanair summary

To display a summary of 2.4-GHz CleanAir devices, use the **show ap dot11 24ghz cleanair summary** command in user EXEC mode or privileged EXEC mode.

show ap dot11 24ghz cleanair summary

This command has no arguments or keywords.

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

Release	Modification
Cisco IOS XE 3.3SE	This command was introduced.

This is an example of output from the **show ap dot11 24ghz cleanair summary** command:

```
Switch# show ap dot11 24ghz cleanair summary

AP Name               MAC Address         Slot ID  Spectrum Capable  Spectrum Intelligence
   Spectrum Oper State
-------------------------------------------------------------------------------------------------
```

```
AP1cdf.0f95.1719      0817.35c7.1a60           0  Disabled          Disabled
   Down
AS-5508-5-AP3         0817.35dd.9f40           0  Disabled          Disabled
   Down
AP270ca.9b86.4546     0c85.259e.c350           0  Enabled           Enabled
   Up
AP2894.0f26.22df      0c85.25ab.cca0           0  Enabled           Enabled
   Up
AP2894.0f58.cc6b      0c85.25c7.b7a0           0  Enabled           Enabled
   Up
AP2894.0f39.1040      0c85.25de.2c10           0  Enabled           Enabled
   Up
AP2894.0f63.c6da      0c85.25de.c8e0           0  Enabled           Enabled
   Up
```

show ap dot11 5ghz cleanair air-quality summary

To display the CleanAir AQ data for 5-GHz band, use the **show ap dot11 5ghz cleanair air-quality summary** command in user EXEC mode or privileged EXEC mode.

show ap dot11 5ghz cleanair air-quality summary

This command has no arguments or keywords.

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

This example shows how to display the CleanAir AQ data for 5-GHz band:

```
Switch# show ap dot11 5ghz cleanair air-quality summary

AQ = Air Quality
DFS = Dynamic Frequency Selection

AP Name             Channel   Avg AQ  Min AQ  Interferers  DFS
------------------------------------------------------------------
AP270ca.9b86.4546   1         99      99      0            No
AP2894.0f26.22df    6         98      97      0            No
AP2894.0f58.cc6b    11        99      99      0            No
AP2894.0f39.1040    6         97      97      0            No
AP2894.0f63.c6da    11        99      99      0            No
AP2894.0f58.d013    6         97      97      0            No
```

show ap dot11 5ghz cleanair air-quality worst

To display the worst AQ data for 5-GHz band, use the **show ap dot11 5ghz cleanair air-quality worst** command in user EXEC mode or privileged EXEC mode.

show ap dot11 5ghz cleanair air-quality worst

This command has no arguments or keywords.

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

This example shows how to display the worst AQ data for 5-GHz band:

```
Switch# show ap dot11 5ghz cleanair air-quality worst

AQ = Air Quality
DFS = Dynamic Frequency Selection

AP Name             Channel   Avg AQ  Min AQ  Interferers  DFS
-----------------------------------------------------------------
AP2894.0f39.1040    6         97      97      0            No
```

show ap dot11 5ghz cleanair config

To display the CleanAir configuration for 5-GHz band, use the **show ap dot11 5ghz cleanair config** command.

show ap dot11 5ghz cleanair config

This command has no arguments or keywords.

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

Usage Guidelines

In Release 3.3SE, you can configure this command on the Mobility Agent (MA).

This example shows how to display the CleanAir configuration for 5-GHz band on the Mobility Controller:

```
Switch# show ap dot11 5ghz cleanair config

CleanAir Solution................................ : Enabled
Air Quality Settings:
    Air Quality Reporting........................ : Enabled
    Air Quality Reporting Period (min)........... : 15
```

```
    Air Quality Alarms.......................... : Enabled
    Air Quality Alarm Threshold................. : 1
Interference Device Settings:
    Interference Device Reporting............... : Enabled
        TDD Transmitter......................... : Enabled
        Jammer.................................. : Enabled
        Continuous Transmitter.................. : Enabled
        DECT-like Phone......................... : Enabled
        Video Camera............................ : Enabled
        WiFi Inverted........................... : Enabled
        WiFi Invalid Channel.................... : Enabled
        SuperAG................................. : Enabled
        Canopy.................................. : Enabled
        WiMax Mobile............................ : Enabled
        WiMax Fixed............................. : Enabled
    Interference Device Types Triggering Alarms:
        TDD Transmitter......................... : Enabled
        Jammer.................................. : Enabled
        Continuous Transmitter.................. : Enabled
        DECT-like Phone......................... : Enabled
        Video Camera............................ : Enabled
        WiFi Inverted........................... : Enabled
        WiFi Invalid Channel.................... : Enabled
        SuperAG................................. : Enabled
        Canopy.................................. : Enabled
        WiMax Mobile............................ : Enabled
        WiMax Fixed............................. : Enabled
    Interference Device Alarms.................. : Enabled
Additional CleanAir Settings:
    CleanAir Event-driven RRM State............. : Enabled
    CleanAir Driven RRM Sensitivity............. : HIGH
    CleanAir Persistent Devices state........... : Enabled
```

This example shows how to display the CleanAir configuration for 5-GHz band on the Mobility Agent:

```
Switch# show ap dot11 5ghz cleanair config

Mobility Controller Link Status.................. : UP
CleanAir Solution................................ : Enabled
Air Quality Settings:
    Air Quality Reporting....................... : Enabled
    Air Quality Reporting Period (min).......... : 15
    Air Quality Alarms.......................... : Enabled
    Air Quality Alarm Threshold................. : 10
Interference Device Settings:
    Interference Device Reporting............... : Enabled
        TDD Transmitter......................... : Enabled
        Jammer.................................. : Enabled
        Continuous Transmitter.................. : Enabled
        DECT-like Phone......................... : Enabled
        Video Camera............................ : Enabled
        WiFi Inverted........................... : Enabled
        WiFi Invalid Channel.................... : Enabled
        SuperAG................................. : Enabled
        Canopy.................................. : Enabled
        WiMax Mobile............................ : Enabled
        WiMax Fixed............................. : Enabled
    Interference Device Types Triggering Alarms:
        TDD Transmitter......................... : Disabled
        Jammer.................................. : Disabled
        Continuous Transmitter.................. : Disabled
        DECT-like Phone......................... : Disabled
        Video Camera............................ : Disabled
        WiFi Inverted........................... : Enabled
        WiFi Invalid Channel.................... : Enabled
        SuperAG................................. : Enabled
        Canopy.................................. : Disabled
        WiMax Mobile............................ : Disabled
        WiMax Fixed............................. : Disabled
    Interference Device Alarms.................. : Enabled
Additional CleanAir Settings:
    CleanAir Event-driven RRM State............. : Disabled
    CleanAir Driven RRM Sensitivity............. : LOW
```

```
CleanAir Persistent Devices state..... : Disabled
```

show ap dot11 5ghz cleanair device type

To display the 5-GHz interference devices, use the **show ap dot11 5ghz cleanair device type** command.

show ap dot11 5ghz cleanair device type {**all | canopy | cont-tx | dect-like | inv | jammer | nonstd | persistent | superag | tdd-tx | video | wimax-fixed | wimax-mobile**}

Syntax Description

all	Displays all CleanAir interferer devices for 5-GHz band.
canopy	Displays CleanAir interferers of type canopy for 5-GHz band.
cont-tx	Displays CleanAir interferers of type continuous transmitter for 5-GHz band.
dect-like	Displays CleanAir interferers of type Digital Enhanced Cordless Communication (DECT)-like phone for 5-GHz band.
inv	Displays CleanAir interferer devices using spectrally inverted WiFi signals for 5-GHz band.
jammer	Displays CleanAir interferers of type jammer for 5-GHz band.
nonstd	Displays CleanAir interferer devices using non-standard WiFi channels for 5-GHz band.
persistent	Displays CleanAir persistent device interferers for 5-GHz band.
superag	Displays CleanAir interferers of type SuperAG for 5-GHz band.
tdd-tx	Displays CleanAir Time Division Duplex (TDD) transmitters for 5-GHz band.
video	Displays CleanAir interferers of type video camera for 5-GHz band.
winmax-fixed	Displays CleanAir interferers of type WiMax fixed for 5-GHz band.
wimax-mobile	Displays CleanAir interferers of type WiMax mobile for 5-GHz band.

Command Default

None

Command Modes

Global configuration.

Command History

Release	Modification
Cisco IOS XE 3.2SE	This command was introduced.

Usage Guidelines

Interference devices are listed only if there is an interference from any 5-GHz devices.

This example shows how to view all the 5-GHz interference devices:

```
Switch# show ap dot11 5ghz cleanair device type all

DC    = Duty Cycle (%)
ISI   = Interference Severity Index (1-Low Interference, 100-High Interference)
RSSI  = Received Signal Strength Index (dBm)
DevID = Device ID

No    ClusterID          DevID  Type           AP Name                 ISI  RSSI  DC
Channel
-------------------------------------------------------------------------------------------------
```

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