



Configuring Voice and Video Parameters

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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.

Prerequisites for Voice and Video Parameters

You can confirm the following points before configuring voice and video parameters:

- Ensure that the device has access points connected to it.
- Configure SSID.

Restrictions for Voice and Video Parameters

The following are the restrictions that you should keep in mind while configuring voice and video parameters:

- SIP CAC can be used for the 9971 Cisco phones that support TSPEC-based admission control. You can also use the phones that support Status code 17.

- SIP snooping is supported for providing voice priority to the non-TSPEC SIP phones.
- TSPEC for video CAC is not supported.
- Cisco 792x IP phones that are admitted as non-WMM devices with 11K enabled will experience audio problems with the phones.



Note Disable 11K for voice WLAN for all 792x Cisco IP phones that are admitted as non-WMM devices with 11K enabled. Upgrade the firmware on Cisco Unified Call Manager to 1.4.5 to resolve this issue. Refer to the Cisco Unified Call Manager configuration guide for more information.

Information About Configuring Voice and Video Parameters

Three parameters on the device affect voice and/or video quality:

- Call Admission Control
- Expedited bandwidth requests
- Unscheduled automatic power save delivery

Call Admission Control (CAC) and UAPSD are supported on Cisco Compatible Extensions (CCX) v4 and v5; however, these parameters are also supported even without CCX but on any device implementing WMM (that supports 802.1e). Expedited bandwidth requests are supported only on CCXv5.

Traffic stream metrics (TSM) can be used to monitor and report issues with voice quality.

Call Admission Control

Call Admission Control (CAC) enables an access point to maintain controlled quality of service (QoS) when the wireless LAN is experiencing congestion. The WMM protocol deployed in CCXv4 maintains QoS under differing network loads.

Two types of Over The Air (OTA) CAC are available: static-based CAC and load-based CAC.

The device supports the following QoS policies:

- User-defined policies: You can define your own QoS policies. You can have more control over these policies than the existing metal policies.
- System-defined precious metal policies: To support backward compatibility.
 - Platinum: Used for VoIP clients.
 - Gold: Used for video clients.
 - Silver: Used for best effort traffic.
 - Bronze: Used for NRT traffic.

Static-Based CAC

Voice over WLAN applications supporting WMM and TSPEC can specify how much bandwidth or shared medium time is required to initiate a call. Bandwidth-based, or static, CAC enables the access point to determine whether it is capable of accommodating a particular call. The access point rejects the call if necessary in order to maintain the maximum allowed number of calls with acceptable quality.

The QoS setting for a WLAN determines the level of bandwidth-based CAC support. To use bandwidth-based CAC with voice applications, the WLAN must be configured for Platinum QoS. With bandwidth-based CAC, the access point bandwidth availability is determined based on the amount of bandwidth currently used by the access point clients, to which the bandwidth requested by the Voice over WLAN applications is added. If this total exceeds a configured bandwidth threshold, the new call is rejected.



Note You must enable admission control (ACM) for CCXv4 clients that have WMM enabled. Otherwise, bandwidth-based CAC does not operate properly for these CCXv4 clients.

Load-Based CAC

Load-based CAC incorporates a measurement scheme that takes into account the bandwidth consumed by all traffic types (including that from clients), cochannel access point loads, and coallocated channel interference, for voice and video applications. Load-based CAC also covers the additional bandwidth consumption resulting from PHY and channel impairment.

In load-based CAC, the access point continuously measures and updates the utilization of the RF channel (that is, the mean time of bandwidth that has been exhausted), channel interference, and the additional calls that the access point can admit. The access point admits a new call only if the channel has enough unused bandwidth to support that call. By doing so, load-based CAC prevents oversubscription of the channel and maintains QoS under all conditions of WLAN loading and interference.



Note If you disable load-based CAC, the access points start using bandwidth-based CAC.

IOSd Call Admission Control

IOSd Call Admission Control (CAC) controls bandwidth availability from device to access point.

You can configure class-based, unconditional packet marking features on your switch for CAC.

CAC is a concept that applies to voice and video traffic only—not data traffic. If an influx of data traffic oversubscribes a particular link in the network, queueing, buffering, and packet drop decisions resolve the congestion. The extra traffic is simply delayed until the interface becomes available to send the traffic, or, if traffic is dropped, the protocol or the end user initiates a timeout and requests a retransmission of the information.

Network congestion cannot be resolved in this manner when real-time traffic, sensitive to both latency and packet loss, is present, without jeopardizing the quality of service (QoS) expected by the users of that traffic. For real-time delay-sensitive traffic such as voice, it is better to deny network access under congestion conditions than to allow traffic onto the network to be dropped and delayed, causing intermittent impaired QoS and resulting in customer dissatisfaction.

CAC is therefore a deterministic and informed decision that is made before a voice call is established and is based on whether the required network resources are available to provide suitable QoS for the new call.

Based on the admit CAC CLI configuration in addition to the existing CAC algorithm, device allows either voice or video with TSPEC or SIP snooping. The **admit cac** CLI is mandatory for the voice call to pass through.

If the BSSID policer is configured for the voice or video traffic, then additional checks are performed on the packets.

Expedited Bandwidth Requests

The expedited bandwidth request feature enables CCXv5 clients to indicate the urgency of a WMM traffic specifications (TSPEC) request (for example, an e911 call) to the WLAN. When the controller receives this request, it attempts to facilitate the urgency of the call in any way possible without potentially altering the quality of other TSPEC calls that are in progress.

You can apply expedited bandwidth requests to both bandwidth-based and load-based CAC. Expedited bandwidth requests are disabled by default. When this feature is disabled, the controller ignores all expedited requests and processes TSPEC requests as normal TSPEC requests.

The following table lists examples of TSPEC request handling for normal TSPEC requests and expedited bandwidth requests.

Table 1: TSPEC Request Handling Examples

CAC Mode	Reserved bandwidth for voice calls	Usage	Normal TSPEC Request	TSPEC with Expedited Bandwidth Request
Bandwidth-based CAC	75% (default setting)	Less than 75%	Admitted	Admitted
		Between 75% and 90% (reserved bandwidth for voice calls exhausted)	Rejected	Admitted
		More than 90%	Rejected	Rejected
Load-based CAC		Less than 75%	Admitted	Admitted
		Between 75% and 85% (reserved bandwidth for voice calls exhausted)	Rejected	Admitted
		More than 85%	Rejected	Rejected

¹ For bandwidth-based CAC, the voice call bandwidth usage is per access point radio and does not take into account cochannel access points. For load-based CAC, the voice call bandwidth usage is measured for the entire channel.

² Bandwidth-based CAC (consumed voice and video bandwidth) or load-based CAC (channel utilization [Pb]).



Note Admission control for TSPEC G711-20ms and G711-40 ms codec types are supported.

U-APSD

Unscheduled automatic power save delivery (U-APSD) is a QoS facility defined in IEEE 802.11e that extends the battery life of mobile clients. In addition to extending battery life, this feature reduces the latency of traffic flow delivered over the wireless media. Because U-APSD does not require the client to poll each individual packet buffered at the access point, it allows delivery of multiple downlink packets by sending a single uplink trigger packet. U-APSD is enabled automatically when WMM is enabled.

Traffic Stream Metrics

In a voice-over-wireless LAN (VoWLAN) deployment, traffic stream metrics (TSM) can be used to monitor voice-related metrics on the client-access point air interface. It reports both packet latency and packet loss. You can isolate poor voice quality issues by studying these reports.

The metrics consist of a collection of uplink (client side) and downlink (access point side) statistics between an access point and a client device that supports CCX v4 or later releases. If the client is not CCX v4 or CCXv5 compliant, only downlink statistics are captured. The client and access point measure these metrics. The access point also collects the measurements every 5 seconds, prepares 90-second reports, and then sends the reports to the controller. The controller organizes the uplink measurements on a client basis and the downlink measurements on an access point basis and maintains an hour's worth of historical data. To store this data, the controller requires 32 MB of additional memory for uplink metrics and 4.8 MB for downlink metrics.

TSM can be configured through either the GUI or the CLI on a per radio-band basis (for example, all 802.11a radios). The controller saves the configuration in flash memory so that it persists across reboots. After an access point receives the configuration from the controller, it enables TSM on the specified radio band.

This table shows the upper limit for TSM entries in different controller series.

TSM Entries	5700
MAX AP TSM entries	100
MAX Client TSM entries	250
MAX TSM entries	100*250=25000



Note Once the upper limit is reached, additional TSM entries cannot be stored and sent to WCS or NCS. If client TSM entries are full and AP TSM entries are available, then only the AP entries are stored, and viceversa. This leads to partial output. TSM cleanup occurs every one hour. Entries are removed only for those APs and clients that are not in the system.

Information About Configuring Voice Prioritization Using Preferred Call Numbers

You can configure a device to provide support for SIP calls from VoWLAN clients that do not support TSPEC-based calls. This feature is known as SIP CAC support. If bandwidth is available in the configured voice pool, the SIP call uses the normal flow and the device allocates the bandwidth to those calls.

You can also prioritize up to six preferred call numbers. When a call comes to one of the configured preferred numbers, the device does not check the configured maximum voice bandwidth. The device allocates the bandwidth needed for the call, even if it exceeds the maximum bandwidth for voice configured for voice CAC. The preferred call will be rejected if bandwidth allocation exceeds 85% of the radio bandwidth. The bandwidth allocation is 85 percent of the entire bandwidth pool, not just from the maximum configured voice pool. The bandwidth allocation is the same even for roaming calls.

You must configure the following parameters before configuring voice prioritization:

- Set WLAN QoS to allow voice calls to pass through.
- Enable ACM for the radio.
- Enable SIP call snooping on the WLAN.

Information About EDCA Parameters

Enhanced distributed channel access (EDCA) parameters are designed to provide preferential wireless channel access for voice, video, and other quality-of-service (QoS) traffic.

How to Configure Voice and Video Parameters

Configuring Voice Parameters (CLI)

Before you begin

Ensure that you have configured SIP-based CAC.

You should have created a class map for CAC before beginning this procedure.

SUMMARY STEPS

1. **show wlan summary**
2. **show wlan *wlan_id***
3. **configure terminal**
4. **policy-map *policy-map name***
5. **class {*class-name* | **class-default**}**
6. **admit cac wmm-tspec**
7. **service-policy *policy-map name***
8. **end**
9. **wlan *wlan_profile_name* *wlan_ID* *SSID_network_name* wlan shutdown**

10. **wlan** *wlan_profile_name* *wlan_ID* *SSID_network_name*
11. **wlan** *wlan_name* **call-snoop**
12. **wlan** *wlan_name* **service-policy input** *input_policy_name*
13. **wlan** *wlan_name* **service-policy output** *ouput_policy_name*
14. **wlan** *wlan_name* **service-policy input** *ingress_policy_name*
15. **wlan** *wlan_name* **service-policy output** *egress_policy_name*
16. **ap dot11** {5ghz | 24ghz} **shutdown**
17. **ap dot11** {5ghz | 24ghz} **cac voice sip**
18. **ap dot11** {5ghz | 24ghz} **cac voice acm**
19. **ap dot11** {5ghz | 24ghz} **cac voice max-bandwidth** *bandwidth*
20. **ap dot11** {5ghz | 24ghz} **cac voice roam-bandwidth** *bandwidth*
21. **no wlan shutdown**
22. **no ap dot11** {5ghz | 24ghz} **shutdown**
23. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	show wlan summary Example: Device# show wlan summary	Specifies all of the WLANs configured on the device.
Step 2	show wlan <i>wlan_id</i> Example: Device# show wlan 25	Specifies the WLAN that you plan to modify. For voice over WLAN, ensure that the WLAN is configured for WMM and the QoS level is set to Platinum.
Step 3	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 4	policy-map <i>policy-map name</i> Example: Device(config)# policy-map test_2000 Device(config-pmap)#	Enters policy map configuration mode. Creates or modifies a policy map that can be attached to one or more interfaces to specify a service policy. In WLAN, you need to configure service-policy for these commands to take effect.
Step 5	class { <i>class-name</i> class-default } Example: Device(config-pmap)# class test_1000 Device(config-pmap-c)#	Enters policy class map configuration mode. Specifies the name of the class whose policy you want to create or change. Specifies the name of the class whose policy you want to create or change. You can also create a system default class for unclassified packets.

	Command or Action	Purpose
Step 6	admit cac wmm-tspec Example: Device(config-pmap-c) # admit cac wmm-tspec Device(config-pmap-c) #	(Optional) Admits the request for Call Admission Control (CAC) for policy map.
Step 7	service-policy policy-map name Example: Device(config-pmap-c) # service-policy test_2000 Device(config-pmap-c) #	Configures the QoS service policy.
Step 8	end Example: Device(config) # end	Returns to privileged EXEC mode. Alternatively, you can also press Ctrl-Z to exit global configuration mode.
Step 9	wlan wlan_profile_name wlan_ID SSID_network_name wlan shutdown Example: Device(config) # wlan wlan1 Device(config-wlan) # wlan shutdown	Disables all WLANs with WMM enabled prior to changing the video parameters.
Step 10	wlan wlan_profile_name wlan_ID SSID_network_name Example: Device(config) # wlan wlan1 Device(config-wlan) # wlan shutdown	Disables all WLANs with WMM enabled prior to changing the voice parameters.
Step 11	wlan wlan_name call-snoop Example: Device(config) # wlan wlan1 call-snoop	Enables the call-snooping on a particular WLAN.
Step 12	wlan wlan_name service-policy input input_policy_name Example: Device(config) # wlan wlan1 Device(config-wlan) # service-policy input platinum-up	Configures input SSID policy on a particular WLAN to voice.
Step 13	wlan wlan_name service-policy output output_policy_name Example: Device(config) # wlan wlan1 Device(config-wlan) # service-policy output platinum	Configures output SSID policy on a particular WLAN to voice.
Step 14	wlan wlan_name service-policy input ingress_policy_name	Configures ingress SSID policy on a particular WLAN as user-defined policy.

	Command or Action	Purpose
	Example: Device(config)# wlan wlan1 Device(config-wlan)# service-policy input policy1	
Step 15	wlan wlan_name service-policy output egress_policy_name Example: Device(config)# wlan wlan1 Device(config-wlan)# service-policy output policy2	Configures egress SSID policy on a particular WLAN as user-defined policy.
Step 16	ap dot11 {5ghz 24ghz} shutdown Example:	Disables the radio network. Device(config)# ap dot11 5ghz shutdown
Step 17	ap dot11 {5ghz 24ghz} cac voice sip Example: Device(config)# ap dot11 5ghz cac voice sip	Enables or disables SIP IOSd CAC for the 802.11a or 802.11b/g network.
Step 18	ap dot11 {5ghz 24ghz} cac voice acm Example: Device(config)# ap dot11 5ghz cac voice acm	Enables or disables bandwidth-based voice CAC for the 802.11a or 802.11b/g network.
Step 19	ap dot11 {5ghz 24ghz} cac voice max-bandwidth bandwidth Example: Device(config)# ap dot11 5ghz cac voice max-bandwidth 85	Sets the percentage of maximum bandwidth allocated to clients for voice applications on the 802.11a or 802.11b/g network. The bandwidth range is 5 to 85%, and the default value is 75%. Once the client reaches the value specified, the access point rejects new videos on this network.
Step 20	ap dot11 {5ghz 24ghz} cac voice roam-bandwidth bandwidth Example: Device(config)# ap dot11 5ghz cac voice roam-bandwidth 10	Sets the percentage of maximum allocated bandwidth reserved for roaming voice clients. The bandwidth range is 0 to 25%, and the default value is 6%. The device reserves this much bandwidth from the maximum allocated bandwidth for roaming voice clients.
Step 21	no wlan shutdown Example: Device(config-wlan)# no wlan shutdown	Reenables all WLANs with WMM enabled.
Step 22	no ap dot11 {5ghz 24ghz} shutdown Example: Device(config)# no ap dot11 5ghz shutdown	Reenables the radio network.
Step 23	end Example: Device(config)# end	Returns to privileged EXEC mode. Alternatively, you can also press Ctrl-Z to exit global configuration mode.

Example

Configuring Video Parameters (CLI)

SUMMARY STEPS

1. `show wlan summary`
2. `show wlan wlan_id`
3. `configure terminal`
4. `policy-map policy-map name`
5. `class {class-name | class-default}`
6. `admit cac wmm-tspec`
7. `service-policy policy-map name`
8. `end`
9. `wlan wlan_profile_name`
10. `ap dot11 {5ghz | 24ghz} shutdown`
11. `ap dot11 {5ghz | 24ghz} cac video acm`
12. `ap dot11 {5ghz | 24ghz} cac video load-based`
13. `ap dot11 {5ghz | 24ghz} cac video max-bandwidth bandwidth`
14. `ap dot11 {5ghz | 24ghz} cac video roam-bandwidth bandwidth`
15. `no wlan shutdown wlan_id`
16. `no ap dot11 {5ghz | 24ghz} shutdown`
17. `end`

DETAILED STEPS

	Command or Action	Purpose
Step 1	show wlan summary Example: Device# <code>show wlan summary</code>	Specifies all of the WLANs configured on the device.
Step 2	show wlan wlan_id Example: Device# <code>show wlan 25</code>	Specifies the WLAN that you plan to modify.
Step 3	configure terminal Example: Device# <code>configure terminal</code>	Enters global configuration mode.
Step 4	policy-map policy-map name Example: Device(config)# <code>policy-map test_2000</code>	Enters policy map configuration mode. Creates or modifies a policy map that can be attached to one or more interfaces to specify a service policy.

	Command or Action	Purpose
	Device(config-pmap) #	In WLAN, you need to configure service-policy for these commands to take effect.
Step 5	class { <i>class-name</i> class-default } Example: Device(config-pmap) # class test_1000 Device(config-pmap-c) #	Enters policy class map configuration mode. Specifies the name of the class whose policy you want to create or change. Specifies the name of the class whose policy you want to create or change. You can also create a system default class for unclassified packets.
Step 6	admit cac wmm-tspec Example: Device(config-pmap-c) # admit cac wmm-tspec Device(config-pmap-c) #	(Optional) Admits the request for Call Admission Control (CAC) for policy map.
Step 7	service-policy <i>policy-map name</i> Example: Device(config-pmap-c) # service-policy test_2000 Device(config-pmap-c) #	Configures the QoS service policy.
Step 8	end Example: Device(config) # end	Returns to privileged EXEC mode. Alternatively, you can also press Ctrl-Z to exit global configuration mode.
Step 9	wlan <i>wlan_profile_name</i> Example: Device(config) # wlan wlan1 Device(config-wlan) # wlan shutdown	Disables all WLANs with WMM enabled prior to changing the video parameters.
Step 10	ap dot11 {5ghz 24ghz} shutdown Example: Device(config) # ap dot11 5ghz shutdown	Disables the radio network.
Step 11	ap dot11 {5ghz 24ghz} cac video acm Example: Device(config) # ap dot11 5ghz cac video acm	Enables or disables bandwidth-based video CAC for the 802.11a or 802.11b/g network.
Step 12	ap dot11 {5ghz 24ghz} cac video load-based Example: Device(config) # ap dot11 5ghz cac video load-based	Configures the load-based CAC method. If you do not enter this command, then the default static CAC is applied.

	Command or Action	Purpose
Step 13	ap dot11 {5ghz 24ghz} cac video max-bandwidth <i>bandwidth</i> Example: Device(config)# ap dot11 5ghz cac video max-bandwidth 20	Sets the percentage of maximum bandwidth allocated to clients for video applications on the 802.11a or 802.11b/g network. The bandwidth range is 5 to 85%, and the default value is 75%. The default value is 0, which means no bandwidth request control. The sum of the voice bandwidth and video bandwidth should not exceed 85% or configured maximum media bandwidth.
Step 14	ap dot11 {5ghz 24ghz} cac video roam-bandwidth <i>bandwidth</i> Example: Device(config)# ap dot11 5ghz cac video roam-bandwidth 9	Sets the percentage of maximum allocated bandwidth reserved for roaming clients for video. The bandwidth range is 0 to 25%, and the default value is 0%.
Step 15	no wlan shutdown <i>wlan_id</i> Example: Device(config-wlan)# no wlan shutdown 25	Reenables all WLANs with WMM enabled.
Step 16	no ap dot11 {5ghz 24ghz} shutdown Example: Device(config)# no ap dot11 5ghz shutdown	Reenables the radio network.
Step 17	end Example: Device(config)# end	Returns to privileged EXEC mode. Alternatively, you can also press Ctrl-Z to exit global configuration mode.

Example

Configuring SIP-Based CAC (CLI)

SIP CAC controls the total number of SIP calls that can be made.

SUMMARY STEPS

1. **configure terminal**
2. **wlan *wlan-name***
3. **call-snoop**
4. **service-policy [client] input *policy-map name***
5. **service-policy [client] output *policy-map name***
6. **end**
7. **show wlan {*wlan-id* | *wlan-name*}**
8. **configure terminal**
9. **ap dot11 {5ghz | 24ghz} cac {voice | video} acm**

- ```

10. ap dot11 {5ghz | 24ghz} cac voice sip
11. end

```

## DETAILED STEPS

|         | Command or Action                                                                                                                       | Purpose                                                                                                             |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Step 1  | <b>configure terminal</b><br><b>Example:</b><br>Device# <b>configure terminal</b>                                                       | Enters global configuration mode.                                                                                   |
| Step 2  | <b>wlan wlan-name</b><br><b>Example:</b><br>Device(config)# <b>wlan qos-wlan</b><br>Device(config-wlan)#                                | Enters WLAN configuration submode.                                                                                  |
| Step 3  | <b>call-snoop</b><br><b>Example:</b><br>Device(config-wlan)# <b>call-snoop</b>                                                          | Enables the call-snooping feature for a particular WLAN.                                                            |
| Step 4  | <b>service-policy [client] input policy-map name</b><br><b>Example:</b><br>Device(config-wlan)# <b>service-policy input platinum-up</b> | Assigns a policy map to WLAN input traffic. Ensure that you provide QoS policy to voice for input traffic.          |
| Step 5  | <b>service-policy [client] output policy-map name</b><br><b>Example:</b><br>Device(config-wlan)# <b>service-policy output platinum</b>  | Assigns policy map to WLAN output traffic. Ensure that you provide QoS policy to voice for output traffic.          |
| Step 6  | <b>end</b><br><b>Example:</b><br>Device(config)# <b>end</b>                                                                             | Returns to privileged EXEC mode. Alternatively, you can also press <b>Ctrl-Z</b> to exit global configuration mode. |
| Step 7  | <b>show wlan {wlan-id   wlan-name}</b><br><b>Example:</b><br>Device# <b>show wlan qos-wlan</b>                                          | Verifies the configured QoS policy on the WLAN.                                                                     |
| Step 8  | <b>configure terminal</b><br><b>Example:</b><br>Device# <b>configure terminal</b>                                                       | Enters global configuration mode.                                                                                   |
| Step 9  | <b>ap dot11 {5ghz   24ghz} cac {voice   video} acm</b><br><b>Example:</b><br>Device(config)# <b>ap dot11 5ghz cac voice acm</b>         | Enables the ACM static on the radio.<br>When enabling SIP snooping, use the static CAC, not the load-based CAC.     |
| Step 10 | <b>ap dot11 {5ghz   24ghz} cac voice sip</b>                                                                                            | Configures SIP-based CAC.                                                                                           |

|                | Command or Action                                                     | Purpose                                                                                                             |
|----------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
|                | <b>Example:</b><br>Device(config)# <b>ap dot11 5ghz cac voice sip</b> |                                                                                                                     |
| <b>Step 11</b> | <b>end</b><br><b>Example:</b><br>Device(config)# <b>end</b>           | Returns to privileged EXEC mode. Alternatively, you can also press <b>Ctrl-Z</b> to exit global configuration mode. |

### Example

## Configuring a Preferred Call Number (CLI)

### Before you begin

You must set the following parameters before configuring a preferred call number.

- Set WLAN QoS to voice.
- Enable ACM for the radio.
- Enable SIP call snooping on the WLAN.
- Enable SIP-based CAC.

### SUMMARY STEPS

1. **configure terminal**
2. **wlan *wlan-name* qos platinum**
3. **ap dot11 {5ghz | 24ghz} cac {voice | video} acm**
4. **wlan *wlan-name***
5. **wireless sip preferred-call-no *call\_index* *call\_number***
6. **no wireless sip preferred-call-no *call\_index***
7. **end**

### DETAILED STEPS

|               | Command or Action                                                                                                                             | Purpose                                 |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Step 1</b> | <b>configure terminal</b><br><b>Example:</b><br>Device# <b>configure terminal</b>                                                             | Enters global configuration mode.       |
| <b>Step 2</b> | <b>wlan <i>wlan-name</i> qos platinum</b><br><b>Example:</b><br>Device(config)# <b>wlan wlan1</b><br>Device(config-wlan)# <b>qos platinum</b> | Sets QoS to voice on a particular WLAN. |

|        | Command or Action                                                                                                                                 | Purpose                                                                                                             |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Step 3 | <b>ap dot11 {5ghz   24ghz} cac {voice   video} acm</b><br><b>Example:</b><br>Device(config)# <b>ap dot11 5ghz cac voice acm</b>                   | Enables the static ACM on the radio.<br><br>When enabling SIP snooping, use the static CAC, not the load-based CAC. |
| Step 4 | <b>wlan wlan-name</b><br><b>Example:</b><br>Device(config)# <b>wlan wlan1</b><br>Device(config-wlan)# <b>call-snoop</b>                           | Enables the call-snooping feature for a particular WLAN.                                                            |
| Step 5 | <b>wireless sip preferred-call-no call_index call_number</b><br><b>Example:</b><br>Device(config)# <b>wireless sip preferred-call-no 1 555333</b> | Adds a new preferred call.                                                                                          |
| Step 6 | <b>no wireless sip preferred-call-no call_index</b><br><b>Example:</b><br>Device(config)# <b>no wireless sip preferred-call-no 1</b>              | Removes a preferred call.                                                                                           |
| Step 7 | <b>end</b><br><b>Example:</b><br>Device(config)# <b>end</b>                                                                                       | Returns to privileged EXEC mode. Alternatively, you can also press <b>Ctrl-Z</b> to exit global configuration mode. |

### Example

## Configuring EDCA Parameters (CLI)

### SUMMARY STEPS

1. **configure terminal**
2. **ap dot11 {5ghz | 24ghz} shutdown**
3. **ap dot11 {5ghz | 24ghz} edca-parameters {custom-voice | optimized-video-voice | optimized-voice | svp-voice | wmm-default}**
4. **show ap dot11 {5ghz | 24ghz} network**
5. **no ap dot11 {5ghz | 24ghz} shutdown**
6. **end**

### DETAILED STEPS

|        | Command or Action                            | Purpose                           |
|--------|----------------------------------------------|-----------------------------------|
| Step 1 | <b>configure terminal</b><br><b>Example:</b> | Enters global configuration mode. |

|               | Command or Action                                                                                                                                                                                                                  | Purpose                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               | Device# <code>configure terminal</code>                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Step 2</b> | <b>ap dot11 {5ghz   24ghz} shutdown</b><br><b>Example:</b><br>Device(config)# <code>ap dot11 5ghz shutdown</code>                                                                                                                  | Disables the radio network.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Step 3</b> | <b>ap dot11 {5ghz   24ghz} edca-parameters {custom-voice   optimized-video-voice   optimized-voice   svp-voice   wmm-default}</b><br><b>Example:</b><br>Device(config)# <code>ap dot11 5ghz edca-parameters optimized-voice</code> | Enables a specific EDCA parameters for the 802.11a or 802.11b/g network. <ul style="list-style-type: none"> <li>• <b>custom-voice</b>—Enables custom voice parameters for the 802.11a or 802.11b/g network.</li> <li>• <b>optimized-video-voice</b>—Enables EDCA voice- and video-optimized parameters for the 802.11a or 802.11b/g network.<br/>Choose this option when both voice and video services are deployed on your network.</li> <li>• <b>optimized-voice</b>—Enables non-SpectraLink voice-optimized profile parameters for the 802.11a or 802.11b/g network.<br/>Choose this option when voice services other than SpectraLink are deployed on your network.</li> <li>• <b>svp-voice</b>—Enables SpectraLink voice priority parameters for the 802.11a or 802.11b/g network.<br/>Choose this option if SpectraLink phones are deployed on your network to improve the quality of calls.</li> <li>• <b>wmm-default</b>—Enables the Wi-Fi Multimedia (WMM) default parameters for the 802.11a or 802.11b/g network.<br/>This is the default value. Choose this option when voice or video services are not deployed on your network.</li> </ul> |
| <b>Step 4</b> | <b>show ap dot11 {5ghz   24ghz} network</b><br><b>Example:</b><br>Device(config)# <code>show ap dot11 5ghz network</code>                                                                                                          | Displays the current status of MAC optimization for voice.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Step 5</b> | <b>no ap dot11 {5ghz   24ghz} shutdown</b><br><b>Example:</b><br>Device(config)# <code>no ap dot11 5ghz shutdown</code>                                                                                                            | Reenables the radio network.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Step 6</b> | <b>end</b><br><b>Example:</b><br>Device(config)# <code>end</code>                                                                                                                                                                  | Returns to privileged EXEC mode. Alternatively, you can also press <b>Ctrl-Z</b> to exit global configuration mode.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |



## Example

## Monitoring Voice and Video Parameters

This section describes the new commands for the voice and video parameters.

The following commands can be used to monitor voice and video parameters.

**Table 2: Monitoring Voice Parameters Commands**

| Command                                                | Purpose                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>show ap dot11 {5ghz   24ghz} network</b>            | Displays the radio-based statistics for voice.                                                                                                                                                                                                                                                                                                                                                                    |
| <b>show ap name <i>ap_name</i> dot11 24ghz tsm all</b> | Displays the TSM voice metrics and current status of MAC optimization for voice.                                                                                                                                                                                                                                                                                                                                  |
| <b>show ap name <i>apname</i> cac voice</b>            | Displays the information about CAC for a particular access point.                                                                                                                                                                                                                                                                                                                                                 |
| <b>show client detail <i>client_mac</i></b>            | Displays the U-APSD status for a particular client.                                                                                                                                                                                                                                                                                                                                                               |
| <b>show policy-map interface wireless client</b>       | Displays the video client policy details.                                                                                                                                                                                                                                                                                                                                                                         |
| <b>show access-list</b>                                | Displays the video client dynamic access-list from the device.                                                                                                                                                                                                                                                                                                                                                    |
| <b>show wireless client voice diag status</b>          | <p>Displays information about whether voice diagnostics are enabled or disabled. If enabled, this also displays information about the clients in the watch list and the time remaining for the diagnostics of the voice call.</p> <p><b>Note</b> To work on voice diagnostics CLIs, you need to enter the following command: <b>debug voice-diagnostic mac-addr <i>client_mac_01</i> <i>client_mac_02</i></b></p> |
| <b>show wireless client voice diag tspec</b>           | Displays the TSPEC information sent from the clients that are enabled for voice diagnostics.                                                                                                                                                                                                                                                                                                                      |
| <b>show wireless client voice diag qos-map</b>         | Displays information about the QoS/DSCP mapping and packet statistics in each of the four queues: VO, VI, BE, BK. The different DSCP values are also displayed.                                                                                                                                                                                                                                                   |
| <b>show wireless client voice diag rssi</b>            | Display the client's RSSI values in the last 5 seconds when voice diagnostics is enabled.                                                                                                                                                                                                                                                                                                                         |
| <b>show client voice-diag roam-history</b>             | Displays information about the last three roaming calls. The output contains the timestamp, access point associated with roaming, roaming reason, and if there is a roaming failure, reason for roaming-failure.                                                                                                                                                                                                  |

|                                                                  |                                                                        |
|------------------------------------------------------------------|------------------------------------------------------------------------|
| <b>show policy-map interface wireless mac</b> <i>mac-address</i> | Displays information about the voice and video data packet statistics. |
| <b>show wireless media-stream client summary</b>                 | Displays a summary of the media stream and video client information.   |
| <b>show controllers d0   b queue</b>                             | Displays which queue the packets are going through on an access point. |
| <b>show platform qos queue stats</b> <i>interface</i>            | Displays which queue packets are going through from the device.        |

You can monitor the video parameters using the following commands.

**Table 3: Monitoring Video Parameters Commands**

| Command                                                               | Purpose                                                                                                                                                |
|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>show ap join stats summary</b> <i>ap_mac</i>                       | Displays the last join error detail for a specific access point.                                                                                       |
| <b>show ip igmp snooping wireless mgid</b>                            | Displays the TSM voice metrics and current status of MAC optimization for voice.                                                                       |
| <b>show wireless media-stream multicast-direct state</b>              | Displays the media stream multicast-direct parameters.                                                                                                 |
| <b>show wireless media-stream group summary</b>                       | Displays the summary of the media stream and client information.                                                                                       |
| <b>show wireless media-stream group detail</b> <i>group_name</i>      | Displays the details of a specific media-stream group.                                                                                                 |
| <b>show wireless media-stream client summary</b>                      | Displays the details for a set of media-stream clients.                                                                                                |
| <b>show wireless media-stream client detail</b> <i>group_name</i>     | Displays the details for a set of media-stream clients.                                                                                                |
| <b>show ap dot11 {5ghz   24ghz} media-stream rrc</b>                  | Display the details of media stream.                                                                                                                   |
| <b>show wireless media-stream message details</b>                     | Displays information about the message configuration.                                                                                                  |
| <b>show ap name</b> <i>ap-name</i> <b>auto-rf dot11 5ghz   i Util</b> | Displays the details of channel utilization.                                                                                                           |
| <b>show controllers d0   b queue</b>                                  | Displays which queue the packets are going through on an access point based on 2.4- and 5-GHz bands.                                                   |
| <b>show controllers d1   b queue</b>                                  | Displays which queue the packets are going through on an access point based on 2.4- and 5-GHz bands.                                                   |
| <b>show cont d1   b Media</b>                                         | Displays the video metric details on the band A or B.                                                                                                  |
| <b>show capwap mcast mgid all</b>                                     | Displays information about all of the multicast groups and their corresponding multicast group identifications (MGIDs) associated to the access point. |

```
show capwap mcast mgid id id
```

Displays information about all of the video clients joined to the multicast group in a specific MGID.

# Configuration Examples for Voice and Video Parameters

## Example: Configuring Voice and Video

### Configuring Egress SSID Policy for Voice and Video

The following example shows how to create and configure an egress SSID policy for voice and video:

```
table-map egress_ssid_tb
 map from 24 to 24
 map from 34 to 34
 map from 46 to 46
 default copy

class-map match-any voice
 match dscp ef
class-map match-any video
 match dscp af41

policy-map ssid-cac
 class class-default
 shape average 25000000
 set dscp dscp table egress_ssid_tb
 queue-buffers ratio 0
 service-policy ssid-child-cac

policy-map ssid-child-cac
 class voice
 priority level 1
 police 5000000
 conform-action transmit
 exceed-action drop
 admit cac wmm-tspec
 rate 1000
 wlan-up 6 7
 class video
 priority level 2
 police 10000000
 conform-action transmit
 exceed-action drop
 admit cac wmm-tspec
 rate 3000
 wlan-up 4 5
```

### Configuring Ingress SSID Policy for Voice and Video

The following example shows how to create and configure an ingress SSID policy for voice and video:

```
table-map up_to_dscp
 map from 0 to 0
 map from 1 to 8
 map from 2 to 8
 map from 3 to 0
 map from 4 to 34
```

```

map from 5 to 34
map from 6 to 46
map from 7 to 48
default copy

policy-map ingress_ssid
class class-default
 set dscp wlan user-priority table up_to_dscp

```

### Configuring Egress Port Policy Voice and Video

The following example shows how to create and configure an egress port policy for voice and video:

```

policy-map port_child_policy
class non-client-nrt-class
bandwidth remaining ratio 10

class voice
priority level 1
police rate 3000000

class video
priority level 2
police rate 4000000

```

### Applying Ingress and Egress SSID policies for Voice and Video on a WLAN

The following example shows how to apply ingress and egress SSID policies for voice and video on a WLAN:

```

wlan voice_video 1 voice_video
service-policy input ingress_ssid
service-policy output ssid-cac

```

## Additional References for Voice and Video Parameters

### Related Documents

| Related Topic             | Document Title                                                                           |
|---------------------------|------------------------------------------------------------------------------------------|
| Multicast configuration   | <i>Multicast Configuration Guide, Cisco IOS XE Release 3SE (Cisco WLC 5700 Series)</i>   |
| VideoStream configuration | <i>VideoStream Configuration Guide, Cisco IOS XE Release 3SE (Cisco WLC 5700 Series)</i> |

### Standards and RFCs

| Standard/RFC | Title |
|--------------|-------|
| None         | —     |

**MIBs**

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

**Technical Assistance**

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

## Feature History and Information For Performing Voice and Video Parameters Configuration

| <b>Release</b>     | <b>Feature Information</b>   |
|--------------------|------------------------------|
| Cisco IOS XE 3.2SE | This feature was introduced. |

