VIEW Certified Configuration Guide

Cisco

4400 Series Wireless LAN Controller (WLC), Wireless Integrated Services Module (WiSM), and 3750G Integrated Wireless LAN Controller with 1100, 1130, 1200, 1230 and 1240 Series APs

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Introduction

Polycom's Voice Interoperability for Enterprise Wireless (VIEW) Certification Program is designed to ensure interoperability and high performance between SpectraLink Wireless Telephones and Wireless LAN infrastructure products.

The products listed below have been thoroughly tested in Polycom's labs and have obtained VIEW Certification. This document details how to configure the Cisco 4400 series WLC, WiSM and 3750G controllers and Aironet 1100, 1130, 1200, 1230 and 1240 series access points (APs) with SpectraLink Wireless Telephones.

Certified Product Summary

Manufacturer:	Cisco Systems: www.cisco.com		
Approved products:	4400 series WLC†, WiSM and 3750G with LWAPP-capable 1100, 1130†, 1200, 1230 and 1240 series APs		
RF technology:	802.11b/g/a		
Radio:	2.4 GHz (802.11b/g), 5 GHz (802.11a)		
Tested security:	WPA-PSK, WPA2-PSK		
AP and WLC software version certified:	4.2.176.0		
SpectraLink handset models certified: **	e340/h340/i640	8020/8030†	
SpectraLink handset software certified:	89.135	122.020 or greater	
Radio mode:	802.11b	802.11b	802.11a
Maximum telephone calls per AP:	12	12	12 *
Network topology:	Switched Ethernet (recommended)		

† Denotes products directly used in VIEW Certification testing.

* Maximum calls tested during VIEW Certification. The certified product may actually support a higher number of maximum calls for 802.11a radio modes.

** SpectraLink handset models 8020/8030, e340/h340/i640, and their OEM derivates are VIEW Certified with the WLAN hardware and software identified in the table. Throughout the remainder of this document they will be referred to collectively as "SpectraLink Wireless Telephones".

Known Limitations

- Wi-Fi Multimedia **(**WMM**)** must be disabled in order for SpectraLink Wireless Telephones to work properly.
- Heavy multicast, broadcast, or push-to-talk **(**PTT**)** traffic may impair voice quality.
- The Cisco 1000 series APs are not VIEW Certified at this time.
- Voice and data must be separated onto separate service set identifiers (SSIDs) to obtain the best voice performance.
- The Cisco 1252 (802.11n) series access points are not VIEW Certified at this time.

This document does not cover the steps involved in converting autonomous APs to Lightweight Access Point Protocol (LWAPP) APs such that they can be controlled by the 4400 WLC. Please contact Cisco's Customer Support at www.cisco.com for instructions on this procedure. Once the APs are converted, this document can be used to provision LWAPP APs.

Subnet roaming was successfully tested, although it is not represented in the network configuration diagram, nor is it covered in the subsequent configuration steps contained in this document. It is important to note that the SpectraLink Wireless Telephones cannot roam across subnets without the creation of a tunnel between two Cisco WLCs. Please consult the Cisco documentation in order to configure these tunneling mechanisms.

Access Point Capacity and Positioning

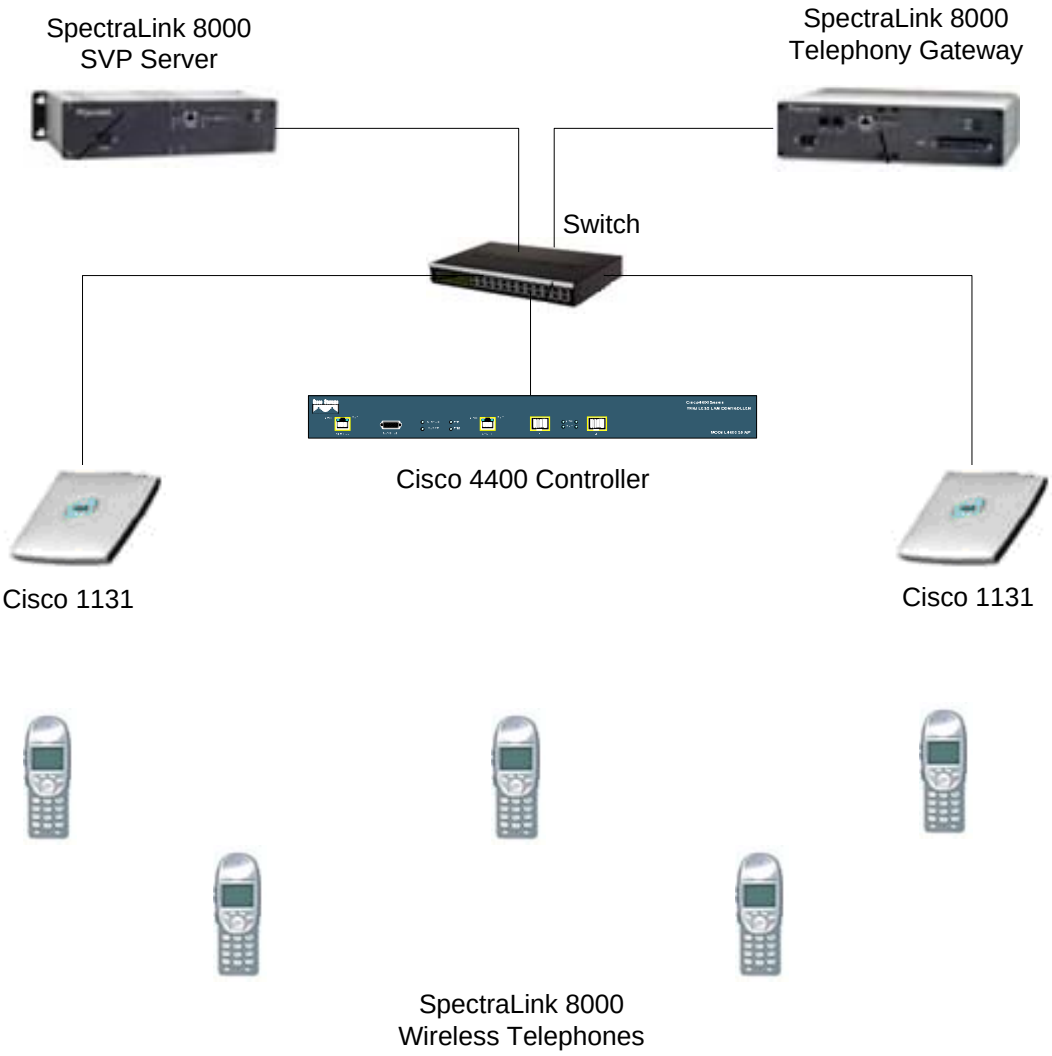
Please refer to the Polycom *Deploying Enterprise-Grade Wi-Fi Telephony* white paper. This document covers the security, coverage, capacity and QoS considerations necessary for ensuring excellent voice quality with enterprise Wi-Fi networks.

For more detailed information on wireless LAN layout, network infrastructure, QoS, security and subnets, please see the *Best Practices Guide for Deploying SpectraLink 8020/8030 Wireless Telephones.* This document identifies issues and solutions based on Polycom's extensive experience in enterprise-class Wi-Fi telephony, and provides recommendations for ensuring that a network environment is adequately optimized for use with SpectraLink 8020/8030 Wireless Telephones.

Network Topology

The following configuration was tested during VIEW Certification.

It is important to note that this configuration is not necessarily applicable to all customer environments.

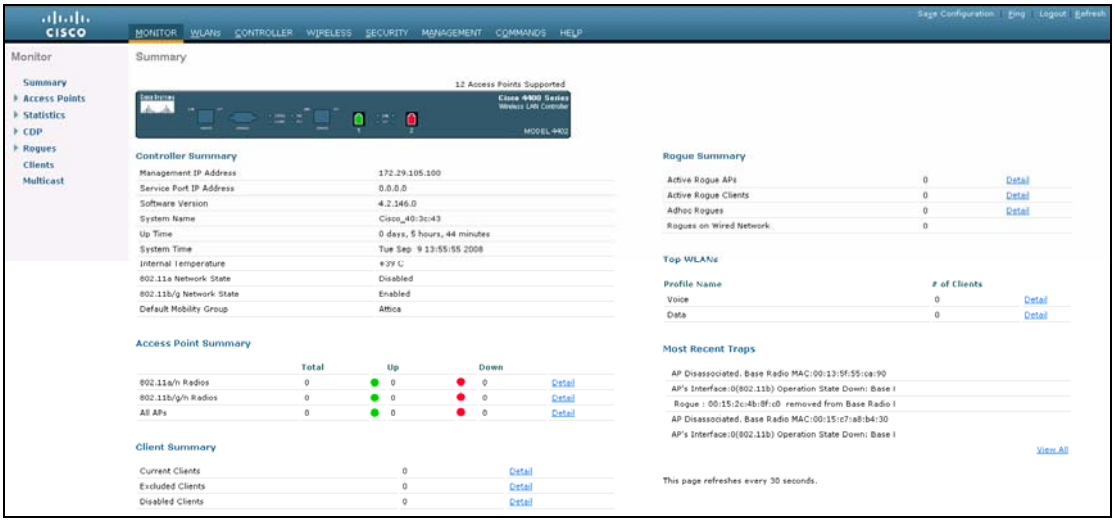


Configuring a New Controller Starting from Factory Defaults

1. Initial provisioning of the controller is done via the command line interface (CLI). Connect a null modem serial cable between the console port of the controller and the serial port of a PC.
2. Open a terminal program, such as Hyper Terminal, and configure the port settings to **9600 baud, no parity, 8 data bits** and **1 stop bit.**
3. Power-on the controller. Status of the controller's boot process will appear as the controller is powering up. Once the controller is running, it will prompt you to run the **Startup Wizard**.
4. The Startup Wizard provides for an easy means to perform initial controller setup and provisioning. Refer to the *Quick Start Guide: Cisco 4400 Series Wireless LAN Controllers* found at Cisco's website. This document contains a detailed explanation of using the Startup Wizard: http://www.cisco.com/en/US/docs/wireless/controller/4400/quick/guide/ctrlv32.html
5. Once the controller has been configured via the Startup Wizard, the remaining configuration can be configured through the switch's Web interface using a Web browser (Cisco recommends using MS IE 6.0+).
6. If necessary, the controller can be reset to factory defaults. To reset the WLC to factory default, you must reboot, then type **`Recover-config`** at the CLI. This only works before the first time a user logs in via the console.

Connecting to the Controller via a Browser

1. Connect to the WLC by pointing your internet browser to the URL: https<IP_Addr> (where <IP_Addr> is the IP address of the management interface of the WLC).
2. Click the **Login** prompt. The default **User Name** and **Password** is **admin**.
3. Once logged in properly, a page similar to the one below displays.



Installing Software

1. Make sure that the VIEW Certified version of software is installed on the controller. From the main menu, click **Monitor**.
2. In the navigation pane, click **Summary.** The heading labeled **Software Version** shows the current software version.
3. Download the appropriate software for your model of controller from the Cisco website.
4. Set up a Trivial File Transfer Protocol (TFTP) server running on a PC to download the file to the controller.
5. Connect to the controller via a Web browser.
6. From the main menu, click **Commands.**
7. In the navigation pane, click **Download File**.
8. For **File Type,** select **Code.**
9. For **TFTP Server,** type in the **IP Address** of the TFTP server.
10. Add the **File Path** (this is the path in the TFTP server's root directory and not the system path where the TFTP server is located) and **File Name** of the firmware file to download.
11. Allow a few minutes for the download to complete.

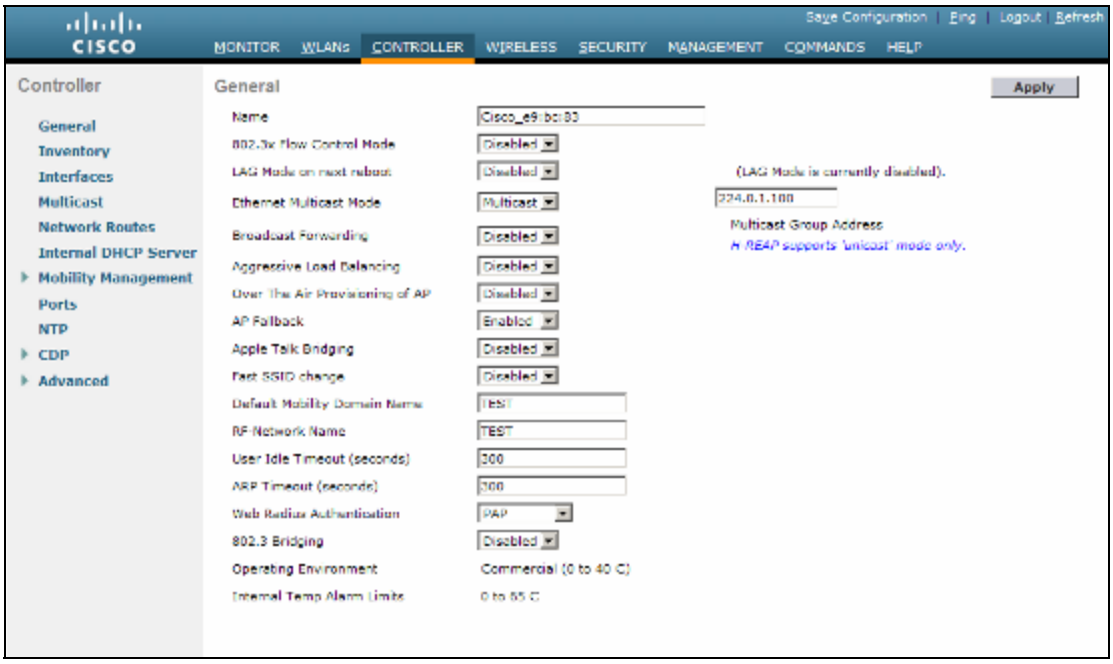
Controller Setup

The initial setup of the controller is shown below.

The setup instructions outlined in this document are for the configuration shown in the diagram only. Your configuration may differ, and the appropriate adjustments must be made.

It is not necessary to configure each AP individually. The WLC is capable of provisioning the APs.

1. From the main menu, click **Controller.**
2. Set the **Ethernet Multicast Mode** to **Multicast** and enter a multicast IP address that is currently not being used on your network for the **Multicast Group Address**.
3. Click the **Apply** button.
4. Click **Save Configuration**.



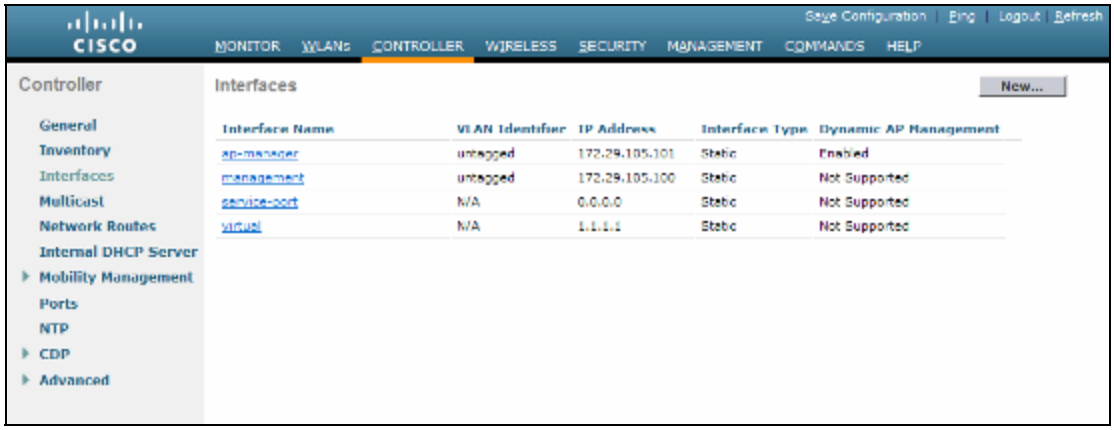
Connecting APs

As the APs are connected to the network, they should automatically find the controller via the LWAPP discovery algorithms. The Dynamic Host Configuration Protocol (DHCP) server will assign each AP an IP address.

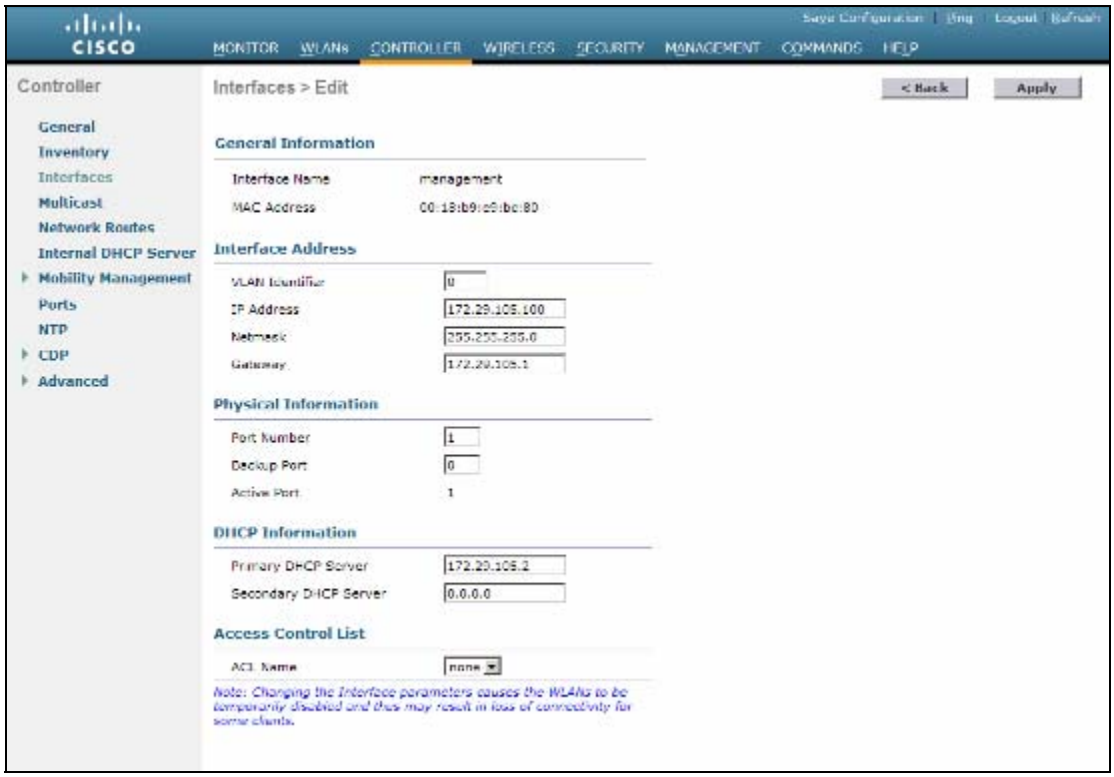
You can configure a DHCP server to run on a remote PC for a small deployment. However, for large-scale deployments, an enterprise-grade DHCP server must be used.

The **ap-manager** and **management** interfaces' configuration should include the DHCP server you have configured. Alternately, you can configure the DHCP server internally on the controller to hand out leases to the connected clients. (Note: The WLC's DHCP server does not lease addresses to the AP.) The instructions for doing so are included at the end of this document.

1. From the main menu, click **Controller.**
2. In the navigation pane, click **Interfaces.** Verify that the proper IP addresses are assigned to the interfaces.
3. Under **Interface Name** click **management.**



4. Under **DHCP Information,** enter the IP address of the **Primary DHCP Server.**
5. Repeat this step for the **ap-manager** interface.
6. Click the **Apply** button and save the changes.

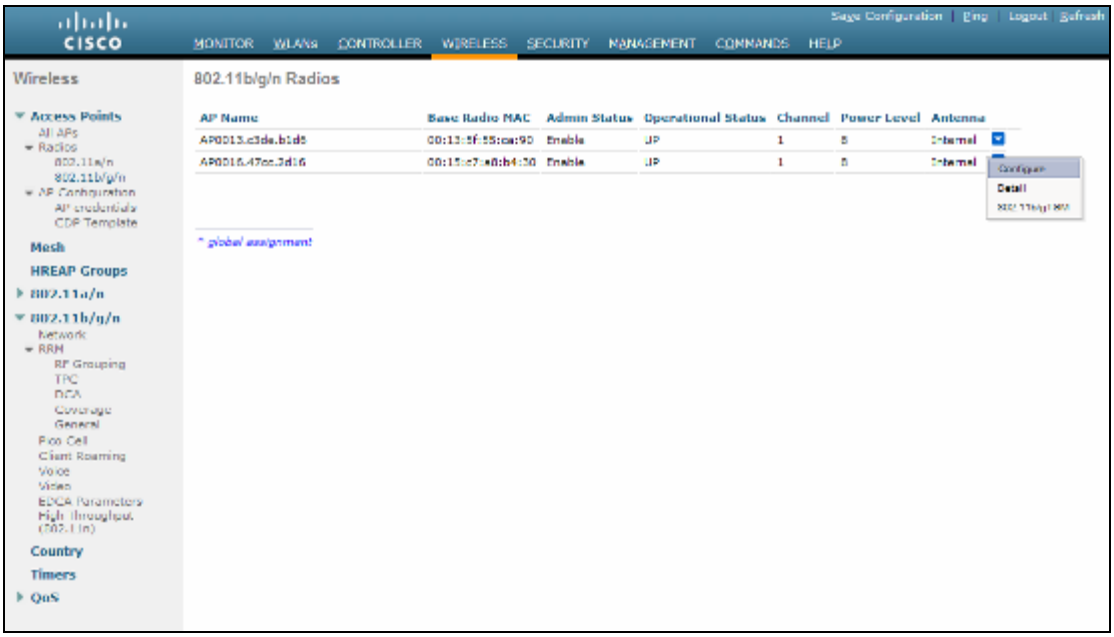


AP Configuration

1. Power-on and connect the APs to the network. Wait a few minutes for the APs to find the controller.
2. Verify the APs are associated to the WLC.
3. From the main menu, click **Monitor.**

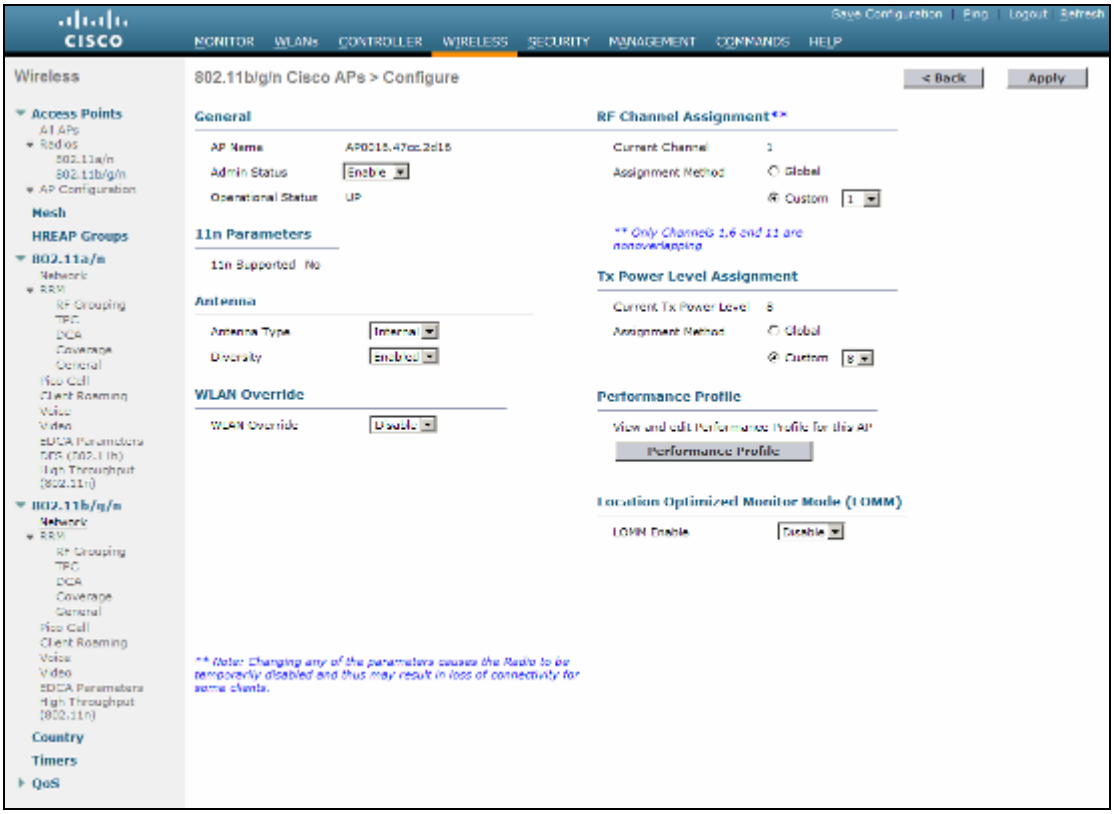
Configuration for SpectraLink Wireless Telephones running in 802.11b mode

1. From the main menu, click **Wireless**.
2. In the navigation pane, under **Access Points** select **Radios**, then select **802.11b/g/n.** All the APs that are connected should be listed, showing their **Operational Status** as **UP**.
3. Select **Configure** from the drop-down list for the access point you wish to change.

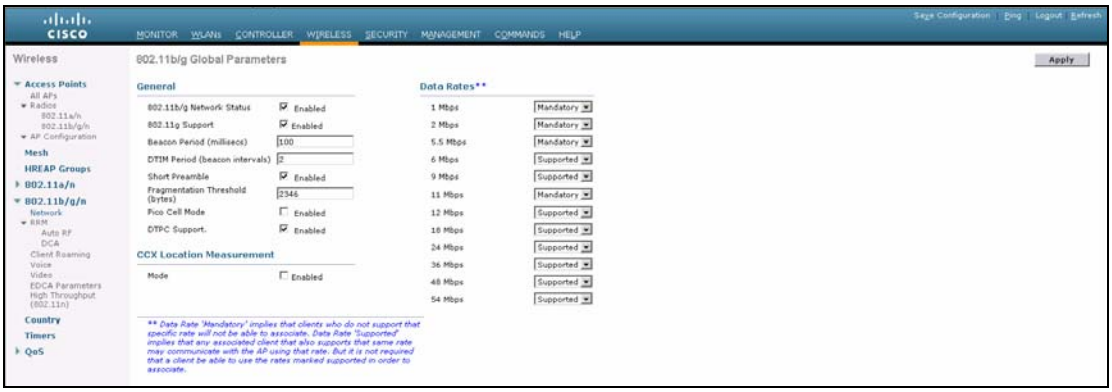


Global settings for **RF Channel Assignment** and **Tx Power Level Assignment** were not tested during VIEW Certification. For **Custom Tx Power** and **RF Channel** settings please consult your facility's RF site survey — optimized for wireless voice traffic — to determine correct power and channel settings for each AP using only channels **1, 6** and **11**.

4. Set **Admin Status** to **Enable**.
5. Configure any other settings that might be relevant to your deployment as needed.
6. Click the **Apply** button to save all changes.



7. In the navigation pane under **802.11b/g/n,** select **Network.**
8. Set **802.11b/g Network Status** to **Disable**. The radio will be re-enabled after setting radio parameters



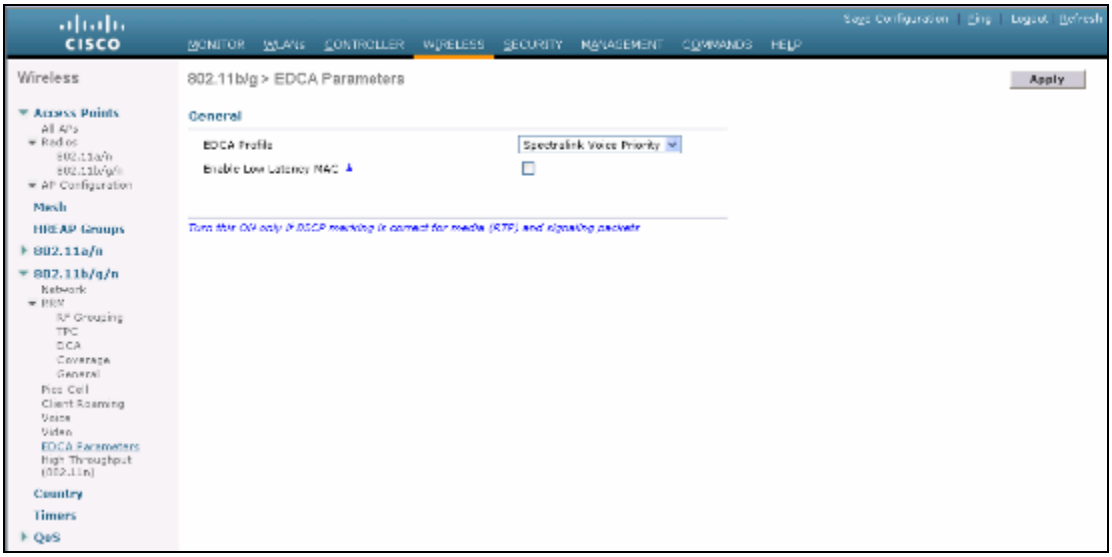
For setting up the **Data Rates**, please consult your facility's RF site survey, designed for voice traffic, to determine if you have sufficient coverage to support all data rates. SpectraLink Wireless Telephones

require the following minimum dBm reading to support the corresponding **Mandatory** data rate setting in the access point.

802.11 Radio Standard	Minimum Available Signal Strength (RSSI)	Maximum "Mandatory" Data Rate
802.11b	-70 dBm	1 Mb/s
	-60 dBm	11 Mb/s
802.11a	-60 dBm	6 Mb/s
	-45 dBm	54 Mb/s

For additional details on RF deployment please see the *Deploying Enterprise-Grade Wi-Fi Telephony* white paper and the *Best Practices Guide for Deploying SpectraLink 8020/8030 Wireless Telephones*.

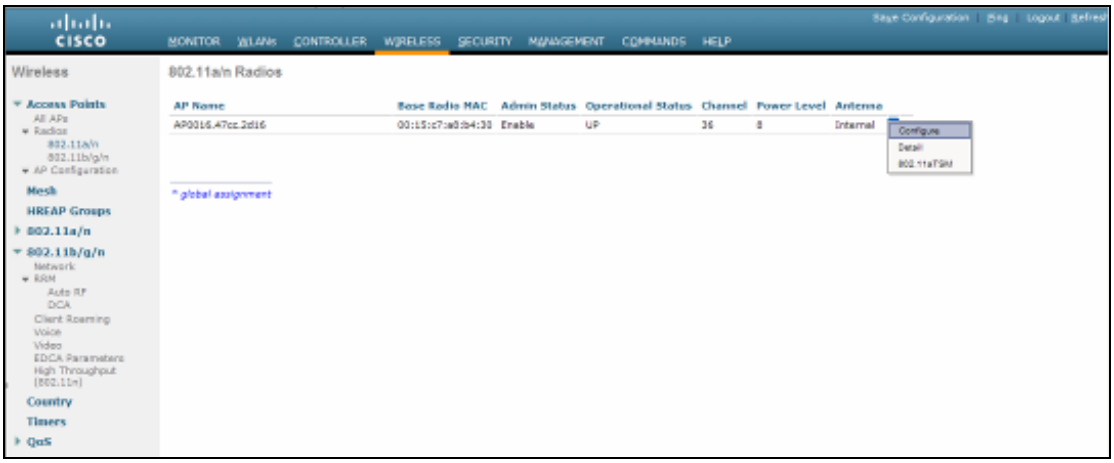
9. Use the default **Fragmentation Threshold** (2346 bytes).
10. Set the **Beacon Period** to **100.**
11. Set **DTIM Period** to **2**.
12. SpectraLink Wireless Telephones do not support dynamic power and will not utilize the information element that is set when **DTPC Support** is enabled. SpectraLink Wireless Telephone power should be configured to match the highest transmit power of the APs.
13. Click the **Apply** button to save the settings.
14. In the navigation pane under **802.11b/g/n,** select **EDCA Parameters.**
15. Select **Spectralink Voice Priority** from the drop-down list.
16. Click the **Apply** button to save the settings.



17. In the navigation pane under **802.11b/g/n,** select **Network.**
18. Enable **802.11b/g Network Status** and **802.11g Support** if SpectraLink Wireless Telephones are configured for 802.11b & b/g mixed mode.
19. Click the **Apply** button to save the settings.

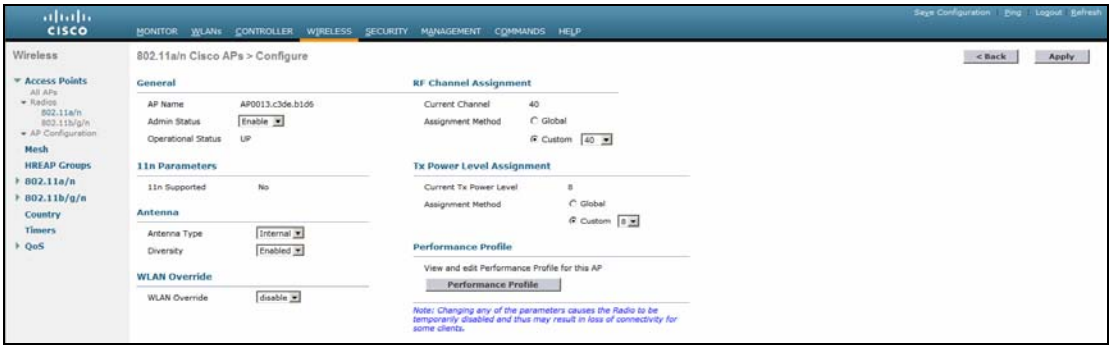
Configuration for SpectraLink Wireless Telephones running in 802.11a mode

1. From the main menu, click **Wireless.**
2. In the navigation pane, under **Access Points** select **Radios**, then select **802.11a /n.** All the APs that are connected should be listed, showing their **Operational Status** as **UP**.
3. Select **Configure** from the drop-down list for the access point you wish to change.



Global settings for **RF Channel Assignment** and **Tx Power Level Assignment** were not tested during VIEW Certification. For **Custom Tx Power** and **RF Channel** settings please consult your facility's RF site survey — optimized for wireless voice traffic — to determine correct power and channel settings for each AP using non-overlapping channels.

4. Set **Admin Status** to **Enable**.
5. Configure any other settings that might be relevant to your deployment as needed.
6. Click the **Apply** button to save all changes.

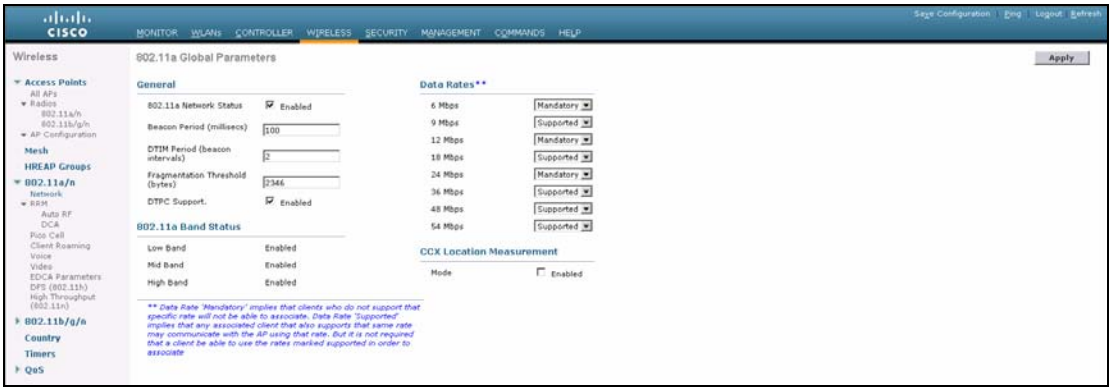


7. In the navigation pane under **802.11a/n,** select **Network.**
8. Set **802.11a Network Status** to **Disable**; the radio will be re-enabled after setting radio parameters
9. For setting up the **Data Rates**, please consult your facility's RF site survey, designed for voice traffic, to determine if you have sufficient coverage to support all data rates. SpectraLink Wireless Telephones require the following minimum dBm reading to support the corresponding **Mandatory** data rate setting in the access point.

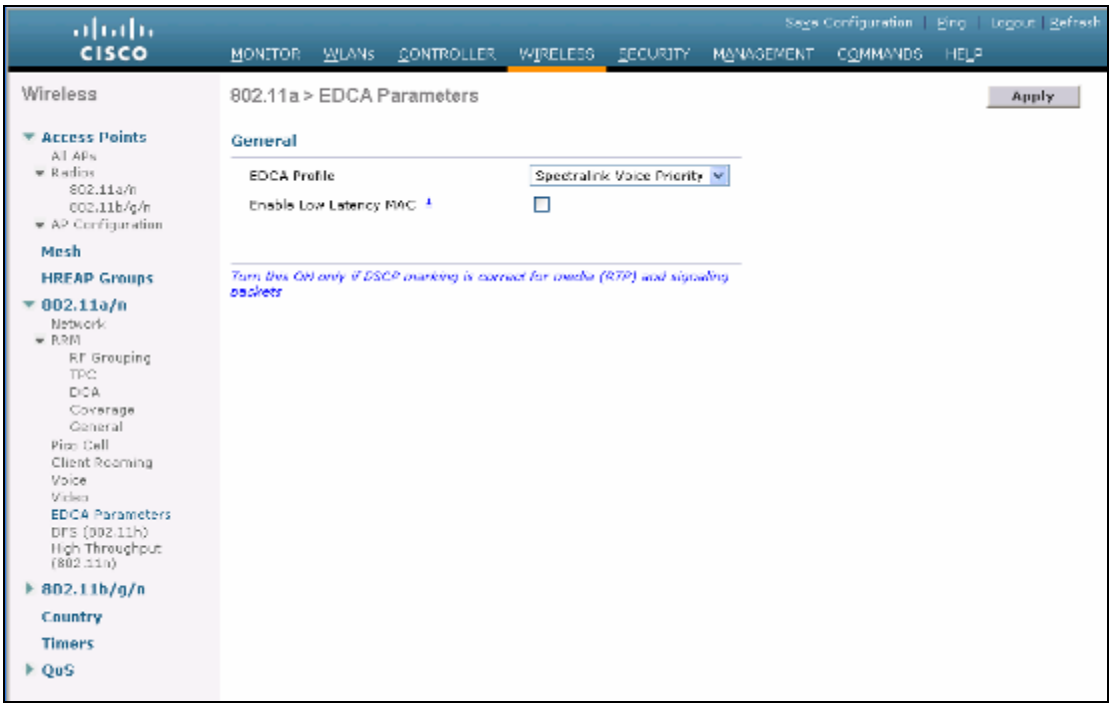
802.11 Radio Standard	Minimum Available Signal Strength (RSSI)	Maximum "Mandatory" Data Rate
802.11b	-70 dBm	1 Mb/s
	-60 dBm	11 Mb/s
802.11a	-60 dBm	6 Mb/s
	-45 dBm	54 Mb/s

For additional details on RF deployment please see the *Deploying Enterprise-Grade Wi-Fi Telephony* white paper and the *Best Practices Guide for Deploying SpectraLink 8020/8030 Wireless Telephones*.

10. Use the default **Fragmentation Threshold** (2346 bytes).
11. Set the **Beacon Period** to **100**.
12. Set **DTIM Period** to **2**.
13. SpectraLink Wireless Telephones do not support dynamic power and will not utilize the information element that is set when **DTPC support** is enabled. Handset power should be configured to match the highest transmit power of the APs.
14. Click the **Apply** button to save the settings.



15. In the navigation pane under **802.11a/n,** select **EDCA Parameters.**
16. Select **Spectralink Voice Priority** from the drop-down list.
17. Click the **Apply** button to save the settings.



18. In the navigation pane under **802.11a /n,** select **Network.**
19. For **802.11a Network Status,** click the **Enabled** check box.
20. Click the **Apply** button to save the settings.

Setting Up the SSIDs

It is required for voice and data to be on separate SSIDs to prioritize voice traffic. The voice SSID must be set to **Platinum** for **Quality of Service** (as shown in the screen shot below) and the data SSID must be set to **Silver** for **Quality of Service**.

Setting up the voice SSID

1. From the main menu, click **WLANs**.
2. In the **WLANs** screen, click the **New**…. button.

3. Type the **Profile Name** and the **WLAN SSID** name.
4. Click the **Apply** button.

5. Under the **Profile Name** heading, select the new **Voice** WLAN Profile.

6. Under the **General** tab**,** verify the **Radio Policy** corresponds to the SpectraLink Wireless Telephone configuration.

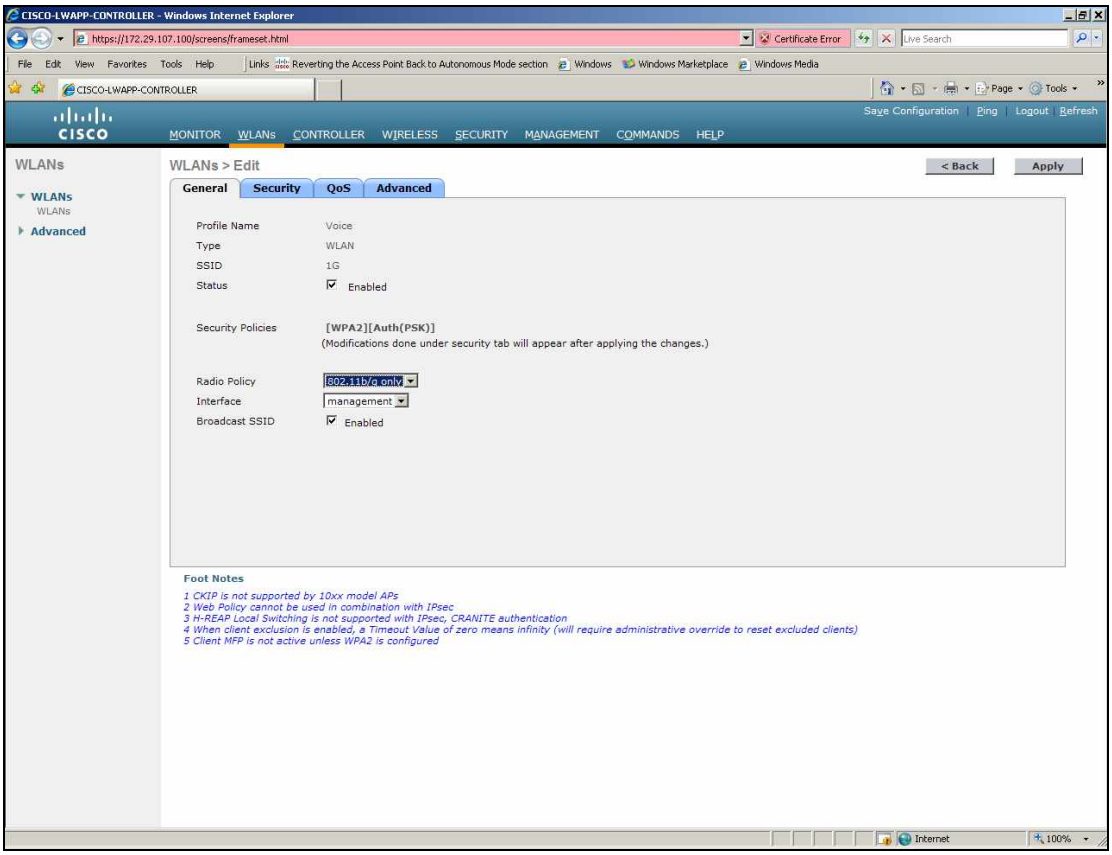
   a. For SpectraLink e340/h340/i640 Wireless Telephones:

   - The **Radio Policy** should be configured for **802.11b/g only.**

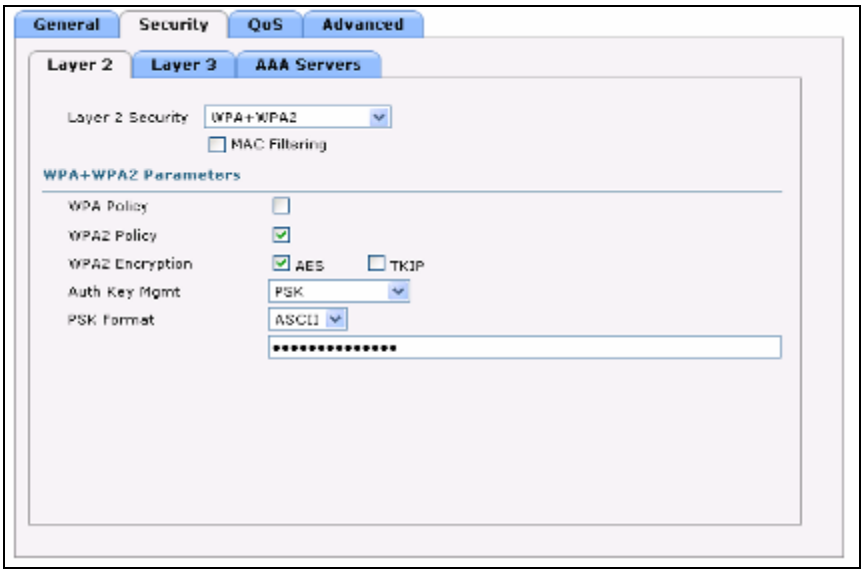
   b. For SpectraLink 8020/8030 Wireless Telephones:

   - When **Radio Policy** is configured for **802.11b/g only,** the handsets should be configured for **802.11b & b/g mixed**.
   - When **Radio Policy** is configured for **802.11a only**, the handsets should be configured for **802.11a.**

7. For **Status,** select the **Enabled** check box.

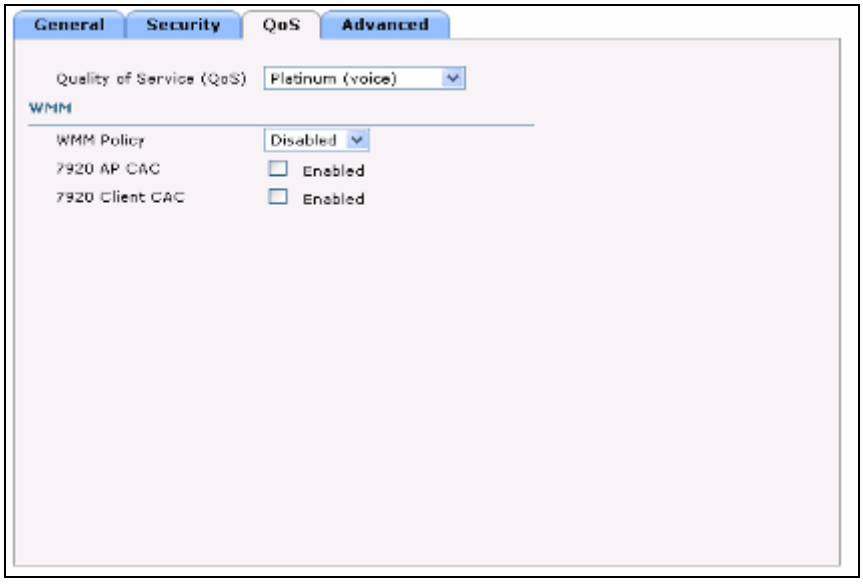


8. Under the **Security** tab, select the desired security policy (either **WPA** or **WPA2)** and enter all required options.



9. Under the **QoS** tab, set **Quality of Service** to **Platinum (voice**). (Note: This is the required setting for voice traffic.)

10. Set **WMM Policy** to **Disabled.** (Note: This is required for usage with SpectraLink Wireless Telephones.)



11. Click the **Apply** button to save all changes.

WEP was not tested during VIEW Certification. WEP is supported by both the LWAPPs and the SpectraLink Wireless Telephones.

Further Assistance

1. An installation and configuration guide for the 4400 WLC can be found on Cisco's website:
   http://www.cisco.com/en/US/docs/wireless/controller/5.0/configuration/guide/ccg50.html
2. To convert the 1200 series autonomous AP to an LWAPP, go to:
   http://www.cisco.com/en/US/products/hw/wireless/ps430/prod_technical_reference09186a00804fc3dc.html
3. For more information on the LWAPP-enabled APs, see *Quick Start Guide LWAPP-Enabled Cisco Aironet Access Points* at:
   http://www.cisco.com/en/US/products/hw/wireless/ps430/products_quick_start09186a00805100f5.html
4. For other assistance, contact either Cisco's or Polycom's customer service at:
   www.cisco.com
   or
   http://www.polycom.com/usa/en/support/voice/voice.html