



## **Cisco SPA525G Wireless Deployment Guide for Cisco SBCS**

January 2009

### **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-18871-01

CCDE, CCENT, Cisco Eos, Cisco HealthPresence, the Cisco logo, Cisco Lumin, Cisco Nexus, Cisco StadiumVision, Cisco TelePresence, Cisco WebEx, DCE, and Welcome to the Human Network are trademarks; Changing the Way We Work, Live, Play, and Learn and Cisco Store are service marks; and Access Registrar, Aironet, AsyncOS, Bringing the Meeting To You, Catalyst, CCDA, CCDP, CCIE, CCIP, CCNA, CCNP, CCSP, CCVP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Cisco Unity, Collaboration Without Limitation, EtherFast, EtherSwitch, Event Center, Fast Step, Follow Me Browsing, FormShare, GigaDrive, HomeLink, Internet Quotient, IOS, iPhone, iQuick Study, IronPort, the IronPort logo, LightStream, Linksys, MediaTone, MeetingPlace, MeetingPlace Chime Sound, MGX, Networkers, Networking Academy, Network Registrar, PCNow, PIX, PowerPanels, ProConnect, ScriptShare, SenderBase, SMARTnet, Spectrum Expert, StackWise, The Fastest Way to Increase Your Internet Quotient, TransPath, WebEx, and the WebEx logo are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

All other trademarks mentioned in this document or website are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0812R)

Any Internet Protocol (IP) addresses used in this document are not intended to be actual addresses. Any examples, command display output, and figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses in illustrative content is unintentional and coincidental.

*Cisco SPA525G Wireless Deployment Guide for Cisco SBCS*  
© 2009 Cisco Systems, Inc. All rights reserved.



# CONTENTS

## About This Guide v

Introduction v

Audience v

Organization v

Conventions vi

Obtaining Documentation and Submitting a Service Request vi

---

## CHAPTER 1

### Introducing the Cisco IP Phone SPA525G 1-1

Cisco SPA525G Features and Specifications 1-1

Wired and Wireless Headsets 1-2

Related Product Resources 1-2

Cisco IP Phone SPA525G Documentation 1-3

---

## CHAPTER 2

### Planning a Cisco SPA525G Wireless Deployment 2-1

Overview 2-2

Quality of Service (QoS) 2-2

Radio Frequency (RF) Design Guidelines 2-3

Wireless Access Point Placement 2-3

Wireless Site Survey 2-5

Wireless Voice Security 2-6

---

## CHAPTER 3

### Reference Designs for Cisco SPA525G Wireless Deployments 3-1

Overview 3-1

Reference Design #1 — Small Office, Up to 8 Users 3-3

Reference Design #2 — Small Office, Up to 16 Users 3-4

Reference Design #3 — Large Office, Up to 12 Users 3-5

Reference Design #4 — Large Office, Up to 16 Users 3-6

Limitations and Caveats 3-7

---

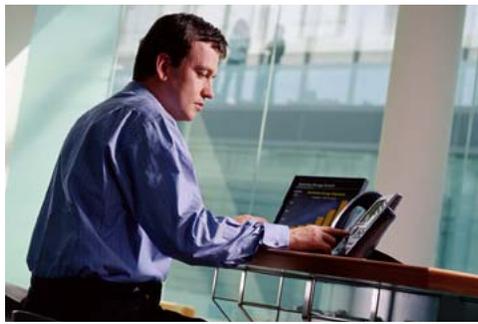
## CHAPTER 4

### Installation, Configuration, and Administration for Cisco SPA525G Wireless Deployments 4-1

Initial Installation and Configuration Steps 4-1

Before You Begin 4-1

Launch CCA and Create a Community	4-2
Run the CCA Wireless Setup Wizard	4-2
Manually Configuring the Wireless Profile on the Cisco SPA525G	4-4
Verify the Installation	4-5
Customize Network and Voice Features Using CCA	4-5
Administration Tasks After Initial Installation	4-5
Adding Cisco SPA525G IP Phones (Wi-Fi Mode)	4-6
Wireless Phone SSID and Profile Configuration Recovery	4-6
Adding an External Access Point	4-7
Changing the Wireless Voice or Data Password (WPA Pre-Shared Key)	4-8
Migrating to a Different Reference Design to Add More Phones	4-9



## About This Guide

---

### Introduction

Release 1.4 of the Cisco Smart Business Communications System (SBCS) adds enhanced wireless capabilities and support for the Cisco IP Phone SPA525G to the SBCS platform to provide a fully integrated solution that is simple to use, combines wired and wireless voice and data, and is delivered through trusted local partners. This deployment guide:

- Provides an overview of Cisco Small Business Pro IP Phone SPA525G features and capabilities
- Covers design guidelines for deploying wireless voice with Cisco SPA525G IP phones
- Describes each of the supported reference designs for Cisco SPA525G wireless deployments for Cisco SBCS, including target customers, features and benefits, components, design characteristics, limitations, and caveats
- Provides an overview of the steps required for initial installation and configuration using Cisco Configuration Assistant (CCA), version 1.9.
- Describes administration tasks that may be required after initial installation and manual migration between reference designs

### Audience

The audience for this guide includes Cisco SBCS-certified Value Added Resellers (VARs) who are planning an SBCS wireless voice deployment with Cisco SPA525G IP phones. The guide assumes VARs are familiar with configuration of voice, data, and network features for Cisco SBCS platforms using CCA.

### Organization

This guide includes the following chapters:

Chapter	Title	Description
1	<a href="#">Introducing the Cisco IP Phone SPA525G</a>	Describes features and benefits of the Cisco Small Business Pro IP Phone SPA525G.
2	<a href="#">Planning a Cisco SPA525G Wireless Deployment</a>	Describes Cisco SPA525G wireless voice network planning guidelines for SBCS deployments using the supported reference designs.

Chapter	Title	Description
3	<a href="#">Reference Designs for Cisco SPA525G Wireless Deployments</a>	Describes solution components and design characteristics for the four reference designs that are fully supported in SBCS 1.4.
4	<a href="#">Installation, Configuration, and Administration for Cisco SPA525G Wireless Deployments</a>	Describes steps required to set up and configure Cisco SPA525 G wireless deployments, including the CCA Wireless Setup Wizard. Also covers administration tasks after the initial installation and manual migration to a different reference design.

## Conventions

This document uses the following conventions:

Convention	Indication
<b>bold font</b>	Commands and keywords and user-entered text appear in <b>bold font</b> .
<i>italic font</i>	Document titles, new or emphasized terms, and arguments for which you supply values are in <i>italic font</i> .



### Note

Means *reader take note*.



### Tip

Means *the following information will help you solve a problem*.



### Caution

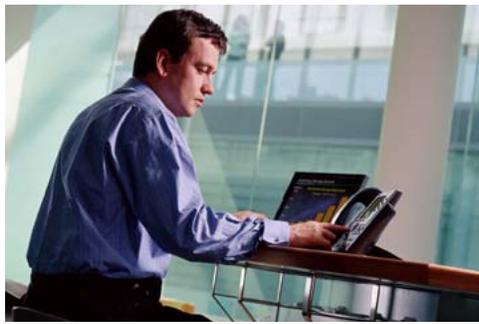
Means *reader be careful*. In this situation, you might perform an action that could result in equipment damage or loss of data.

## Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS Version 2.0.



# CHAPTER 1

## Introducing the Cisco IP Phone SPA525G

---

Cisco SBCS 1.4 adds support for the new Cisco IP Phone SPA525G. The following topics are covered in this section:

- [Cisco SPA525G Features and Specifications, page 1-1](#)
- [Related Product Resources, page 1-2](#)
- [Cisco IP Phone SPA525G Documentation, page 1-3](#)

### Cisco SPA525G Features and Specifications

The Cisco IP Phone SPA525G is a full-featured VoIP (Voice over Internet Protocol) phone that provides voice communication over an IP network. It supports traditional features, such as call forwarding, redial, speed dialing, transferring calls, conference calling and accessing voice mail. Calls can be made or received with a handset, headset, or speaker.



The Cisco SPA525G IP phone is connected to the network through its wired Ethernet port or the built-in Wireless-G connection. Unlike traditional phones, the Cisco SPA525G requires a separate power source when not connected to a PoE (Power over Ethernet) source. When the phone is operating in Wireless-G mode, as it does in a Cisco SBCS wireless voice deployment, a separate power adapter (Model PA100) is required for connecting the phone to a power source.

**Important**

Although the Cisco SPA525G has an additional Ethernet port that allows a computer to be connected to the network through the IP phone, this option is only available when the phone is connected to the network via the wired Ethernet port.

The SPA525G has a 320 x 240 color, 3.2" inch LCD screen and provides up to five telephone extensions.

It provides the following hardware features:

- 2 Ethernet 10/100 Mbps ports
- 802.3af Power over Ethernet support
- USB 2.0 host port for connecting a USB memory device to play MP3 music files
- Bluetooth capability for headset support
- 2.5-mm stereo earphone jack for headset
- Wireless-G client
- Kensington security slot

## Wired and Wireless Headsets

Cisco SPA525G IP phones support headsets from different manufacturers. For the latest supported models, contact your reseller. Additional information can be found at the following manufacturer's websites:

- Plantronics — <http://www.plantronics.com>
- Jabra — <http://www.jabra.com>

## Related Product Resources

Resource	Link
Cisco Partner Central (requires partner registration and login)	<a href="http://www.cisco.com/web/partners/sell/smb/">www.cisco.com/web/partners/sell/smb/</a>
Cisco SMB Product Information	<a href="http://www.cisco.com/go/smallbusiness">www.cisco.com/go/smallbusiness</a>

# Cisco IP Phone SPA525G Documentation

The following table describes related documents that Cisco provides to help you use your Cisco IP Phone SPA525G. These documents and more are available on Cisco.com at:

[http://www.cisco.com/en/US/products/ps10033/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/ps10033/tsd_products_support_series_home.html)

They are also included on the CD-ROM that ships with the product.

<b>Document Title</b>	<b>Description</b>	<b>Intended Audience</b>
<i>Cisco Small Business Pro SPA IP Phone Quick Start Guide</i>	Installation and initial configuration of your Cisco SPA525G IP Phone	End Users, VARs, and Service Providers
<i>Cisco Small Business Pro SPA and Wireless IP Phone Administration Guide</i>	Administration and advanced configuration of your Cisco SPA525G IP Phone	System Administrators, VARs, and Service Providers
<i>Cisco Unified Communications 500 Office Administrator Guide</i>	Administration and advanced configuration of phones using Cisco Unified Communications 500	System Administrators, VARs, and Service Providers





## CHAPTER 2

# Planning a Cisco SPA525G Wireless Deployment

This chapter discusses wireless voice network planning guidelines for Cisco SPA525G wireless deployments using the reference designs described in [Chapter 3, “Reference Designs for Cisco SPA525G Wireless Deployments.”](#)



### Caution

Consult the wireless regulatory compliance information to verify that the Cisco IP Phone SPA525G is certified for operation in your country.



### Important

Wireless data network design is outside the scope of this guide.

Also, this deployment guide does not cover wireless voice mobility, which is the ability for Wi-Fi phones to roam across different endpoints, while maintaining call states and voice quality. The Cisco IP Phone SPA525G is a desktop phone with a built-in Wireless-G client that is served by a single access point. It is not a wireless mobile phone. When the Cisco IP Phone SPA525G is operating in Wireless-G mode, it still requires a connection to power.

Customers who wish to deploy a wireless mobility solution should use Cisco Model 7921G IP phones. For more information, refer to the *Guide to Configuring Cisco 7921 Phones in an SBCS Environment*, available on Cisco.com at the following URL:

[http://www.cisco.com/en/US/products/ps7320/products\\_white\\_paper09186a0080973d69.shtml#design\\_sbcs](http://www.cisco.com/en/US/products/ps7320/products_white_paper09186a0080973d69.shtml#design_sbcs).

The following topics are covered:

- [Overview, page 2-2](#)
- [Quality of Service \(QoS\), page 2-2](#)
- [Radio Frequency \(RF\) Design Guidelines, page 2-3](#)
- [Wireless Access Point Placement, page 2-3](#)
- [Wireless Site Survey, page 2-5](#)
- [Wireless Voice Security, page 2-6](#)

# Overview

Cisco Smart Business Communications System (SBCS) 1.4 adds enhanced wireless capabilities and support for Cisco SPA525G IP Phones to the SBCS platform to provide a fully integrated solution that is simple to use, combines wired and wireless voice and data, and is delivered through trusted local partners.

The SBCS wireless voice solution is designed for small businesses who want a flexible, affordable, full-featured business communications system that is reliable, easy to deploy or move, requires no new wiring, and helps the business operate more efficiently and effectively. It offers growth and reduced costs, unlike point product offerings from competitors that are potentially incompatible and could require complex integration efforts, resulting in a higher overall cost of ownership.

Traditionally, small businesses wishing to deploy IP telephony had the option of replacing desktop phones with IP phones that use a wired connection to IP resources. As a result, this often required business to upgrade the network infrastructure to support voice features or employ skilled IT staff with technical knowledge to configure the end-to-end solution. SBCS 1.4 provides small business customers with a way to overcome some of these technical challenges when deploying converged voice and data by using wireless media as the transport mechanism. The only investment required for the small business is the wireless infrastructure and wireless IP phone endpoints.

Wireless voice deployments are well-suited to businesses housed in historical buildings where network cabling is limited or non-existent or mobile business locations such as trailers, kiosks, and oil rigs.

Another advantage is rapid deployment. The Wireless Setup Wizard included with Cisco Configuration Assistant (CCA), version 1.9 enables customers to save time when deploying one of the four wireless voice reference designs presented in this guide. Using the Wireless Setup Wizard, customers can securely associate Cisco SPA525G phones with an embedded or external wireless access point without having to manually program the phones.

## Quality of Service (QoS)

QoS refers to the capability of a network to provide differentiated service to selected network traffic over various transport technologies. QoS provides the following benefits:

- Capability for network resources to be shared more efficiently and expedite the handling of mission-critical applications
- Management of time-sensitive multimedia and voice application traffic to ensure that this traffic receives higher priority, greater bandwidth, and less delay than best-effort data traffic

With QoS, bandwidth can be managed more efficiently across LANs, including WLANs. QoS provides enhanced and reliable network service by:

- Supporting dedicated bandwidth for critical users and applications
- Controlling jitter and latency (required for real-time voice traffic)
- Managing and minimizing network congestion
- Setting network traffic priorities

SBCS 1.4 provides QoS by:

- Offering separate VLANs for voice and data
- Giving priority to voice traffic over the shared RF (radio frequency) link

This QoS configuration is automatically enabled by CCA 1.9 and requires no user interaction.

# Radio Frequency (RF) Design Guidelines

The SPA525G wireless voice deployment is designed with the assumption that all wireless clients are Wireless-G enabled. Other wireless protocols are not covered. Connecting wireless clients that do not support Wireless-G (such as Wireless-b clients) can have a negative impact on the performance of the network, since the access point will serve all wireless clients using the lowest common denominator in the frequency spectrum.

The most important factor to consider in an SBCS wireless voice deployment with SPA525G phones is coverage—that is, how far the signal can reach wireless clients with acceptable quality. To achieve reliable voice service, a Voice over Wireless LAN (VoWLAN) cell boundary of -67 dBm or better is recommended.

Roaming is not supported for SPA525G phones operating in Wireless-G mode. Cisco SPA525G phones are served by a single access point only and require connection to power. As a result, this guide does not cover mobility support, access point overlap, roaming considerations, or wireless LAN controller (WLC) configuration.

## Wireless Access Point Placement

The physical environment affects performance of any wireless access point, and careful placement of access points is critical in providing reliable coverage throughout the office. It is important to note that every obstacle placed between an access point and wireless client will degrade the signal to some extent. Leaded glass, metal, concrete floors, water, and walls will all inhibit the signal and reduce range. In addition, electrical equipment such as heavy machinery or items such as microwave ovens can generate interference that also degrades signal quality in the immediate vicinity.

Small installations may be implemented relatively easily and using only basic tools such as wireless site survey applications bundled with many wireless client devices. Access points may be initially positioned in a convenient location central to the area requiring coverage, and then adjusted based on the actual coverage as measured using a wireless client device.

Keep the following general rules in mind when placing access points:

- Access points should be placed as high as possible to ensure the best possible coverage.
- Access points should not be placed close to metal cabinets, concrete walls, or other obstacles.
- Access points should not be placed on a metallic surface such as a cabinet or aluminum heat dissipater.
- Access points should not be placed within any type of enclosure.
- Antennas should be vertically oriented for most uses. Adjusting the antenna angle may affect performance.

For the Cisco SPA525G wireless deployment reference designs, two types of access points can be deployed:

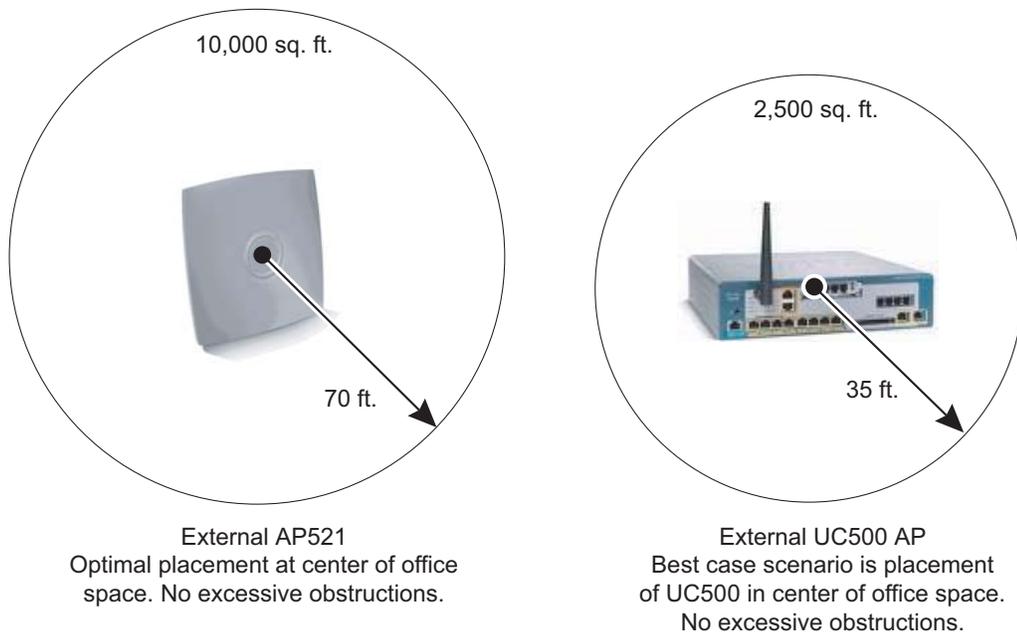
- The UC500 embedded access point
- External Cisco AP521 access points

The main difference between these two types of access points is signal reach. Theoretically, the UC500 embedded access point can serve an area of 5,000 square feet (464 m<sup>2</sup>), and the external Cisco AP521 access point can cover up to 20,000 square feet (1,858 m<sup>2</sup>). However, because of the nature of voice traffic, and the fact that a typical office building has walls, ceiling, RF interference, and other factors that can affect signal strength, the recommended effective coverage area defined for the solution has been reduced to provide a safety margin:

- UC500 embedded access point recommended coverage area — 2,500 sq ft (232 m<sup>2</sup>)
- External AP521 access point coverage area — 10,000 sq ft (929 m<sup>2</sup>)

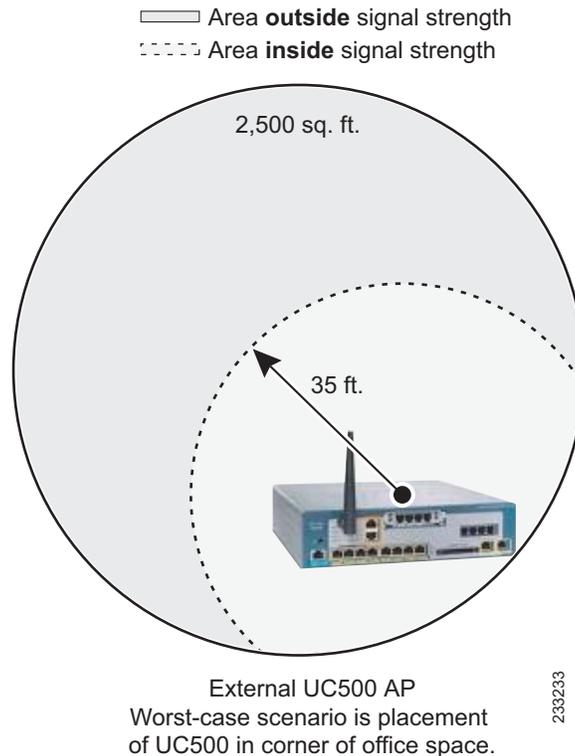
The diagram in [Figure 2-1](#) shows optimal placement of a single UC500 embedded access point and a single external access points in an office building without excessive obstructions. Only two-dimensional coverage is considered. For multi-floor deployments, you cannot assume the same distances, as floors and ceilings are significant obstructions that can greatly reduce signal strength.

**Figure 2-1** *Optimal Placement of Access Points for Coverage (Embedded UC500 or External AP)*



The diagram in [Figure 2-2](#) shows a worst-case scenario in which the UC500 embedded access point is positioned at the furthest point possible (for example, when the office telecommunications equipment is located in one corner of the office). When the access point is placed in the corner of an office, the effective signal reach is greatly reduced because a large part of the coverage area is outside the office.

**Figure 2-2 Worst-Case Placement of Embedded UC500 Access Point for Coverage**



Note that a worst-case scenario for the external AP521 is not shown. This is because it is a standalone device, and there is greater flexibility for placement.

## Wireless Site Survey

A wireless site survey must be performed for CiscoSPA525G wireless deployments to check for sources of wireless interference and guarantee that coverage will meet recommended guidelines.

A number of tools exist for performing a wireless site survey. Using these tools, businesses can detect, classify, locate, and mitigate sources of wireless interference to optimize network performance for voice applications.

A full-featured solution is Cisco Wireless Spectrum. For more information, see the following URL on Cisco.com:

<http://www.cisco.com/en/US/products/ps9393/index.html>

After the equipment is installed, the installer should verify coverage and signal strength is within acceptable thresholds and adjust placement of phones and access points to optimize performance. Cisco recommends Voice over Wireless LAN (VoWLAN) cell boundary value of -67 dBm or better for optimal voice quality.

**Tip**

The Cisco IP Phone SPA525G displays the received signal strength from its associated access point. To check the signal level during installation, press the **Setup** button on the phone and navigate to **Network Configuration > Wireless > Wireless Status**.

## Wireless Voice Security

This section only covers wireless security for voice and data. Wireless security for data and voice can be configured independently. Separate SSIDs and passwords are configured for data and voice via the CCA Wireless Setup Wizard.

The SSID (service set identifier) is a unique identifier that wireless endpoints must use to be able to communicate with each other or to an access point. The SSID can be any alphanumeric entry up to a maximum of 32 characters.

The solution provides SSID and security synchronization across access points for the supported reference designs, with the following features and limitations:

- The solution supports wireless security setting WPA2-PSK (pre-shared key) only.  
Pre-shared key mode (also known as personal mode) is designed for SOHO and small office networks. Each wireless data user must use the SSID and password configured for the wireless access points to access the network.  
When setting up the SSID and password for the network, use a strong password for security. You can also disable network broadcast of the SSID.
- Encrypted wireless profile transfer over Wi-Fi is provided for Cisco SPA525G IP phones only.
- The security profile for PCs connected wirelessly must be configured separately for each client.
- No SSID/security synchronization is provided for Cisco Model 7921G and 7925G phones. SSID and security configuration can be performed manually through each phone handset.
- No synchronization or profile support is provided if a wireless LAN controller (WLC526) is used to control the wireless access points. In this case, the SSID and security configurations can be performed manually through each phone handset.



## CHAPTER 3

# Reference Designs for Cisco SPA525G Wireless Deployments

---

This chapter covers components, design characteristics, target customers, deployment limitations, and caveats for each supported SBCS 1.4 wireless voice reference design:

- [Overview, page 3-1](#)
- [Reference Design #1 — Small Office, Up to 8 Users, page 3-3](#)
- [Reference Design #2 — Small Office, Up to 16 Users, page 3-4](#)
- [Reference Design #3 — Large Office, Up to 12 Users, page 3-5](#)
- [Reference Design #4 — Large Office, Up to 16 Users, page 3-6](#)
- [Limitations and Caveats, page 3-7](#)

## Overview

[Table 3-1](#) summarizes components and design characteristics for the four wireless voice reference designs that are fully supported in SBCS 1.4.

Although it is possible to deploy a system outside these limits, Cisco strongly recommends that customers deploy one of these four designs as specified.

Reference designs #1, #2, #3, and #4 can be combined with existing wired-line devices (for example, Cisco CE520 switches and SR520 routers) or IP phones (for example, Cisco Model 7960 IP phones). They are compatible with the current SBCS teleworker solution (Cisco Secure Router SR520 and Cisco C877).



### Note

---

Phone capacity recommendations for these reference designs address wireless phone capacity only.

The maximum phone capacity for deployments with a combination of wired and wireless phones is determined by the license capacity of the UC500 platform being deployed.

---

**Table 3-1** Summary of Supported Wireless Voice Network Reference Designs for SBCS 1.4

Reference Design	Number of Embedded UC500 APs	Number of External AP521 APs	Number of Wireless SPA525G Phones/PCs	Maximum Number of Simultaneous Calls	Maximum Office Area sq ft (m <sup>2</sup> )
Reference Design #1	1	0	8/8	8	2,500 sq ft (232 m <sup>2</sup> )
Reference Design #2	1	1	16/16	16	2,500 sq ft (232 m <sup>2</sup> )
Reference Design #3	0	1	12/12	12	10,000 sq ft (929 m <sup>2</sup> )
Reference Design #4	0	2	16/16	16	10,000 sq ft (929 m <sup>2</sup> )

The following notes apply to the above summary:

- Reference design #1 supports all UC500 wireless 8-user SKUs.
- Reference design #2 supports all UC500 wireless 8- and 16-user SKUs.
- Reference design #2, #3, and #4 support all three autonomous AP521 SKUs.
- Reference designs #3 and #4 support all UC500 SKUs with 16 or more user licenses.

The CCA Wireless Setup Wizard is designed to detect the components that are present in the system and apply the appropriate wireless SSID and profile configuration template automatically, based on these reference designs. For more information, see the [“Run the CCA Wireless Setup Wizard” section on page 4-2](#).

## Reference Design #1 — Small Office, Up to 8 Users

Reference design #1 is a perfect fit for a small business with up to 8 users who are housed in a single workspace of up to 2,500 square feet. One of the advantages of this design is that it the small business can take advantage of the full license capacity of the UC500 8-user SKU to deploy an all-wireless solution.

In this design, a single Cisco UC500 with an embedded wireless AP is used for both voice and data traffic.

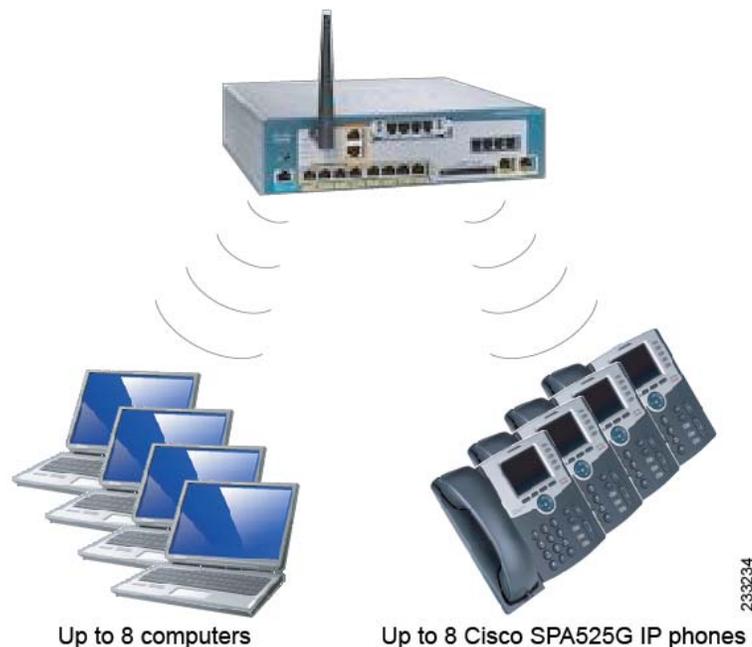
Automatic QoS settings allow for the co-existence of voice and data on the wireless network, while maintaining voice quality. All 8 users can be engaged in active calls simultaneous with good voice quality. When no calls are present on the system and all phones are in an idle state, computers can take advantage of the full throughput offered by the Wireless-G radio on the built-in UC500 access point. IP phone-to-IP phone communication within a site over the wireless LAN uses toll-quality voice compression (G.711 codec).

You do not need to deploy all 8 phones in wireless mode—you can combine wired and wireless phones (the SPA525G also offers an uplink for wired connections). Bandwidth saved by deploying fewer phones in wireless mode can be used by data applications.

**Note**

This solution has only been tested with Wireless-G data and voice clients.

**Figure 3-1** Reference Design #1 — Small Office, Up to 8 Users, 1 Embedded AP



## Reference Design #2 — Small Office, Up to 16 Users

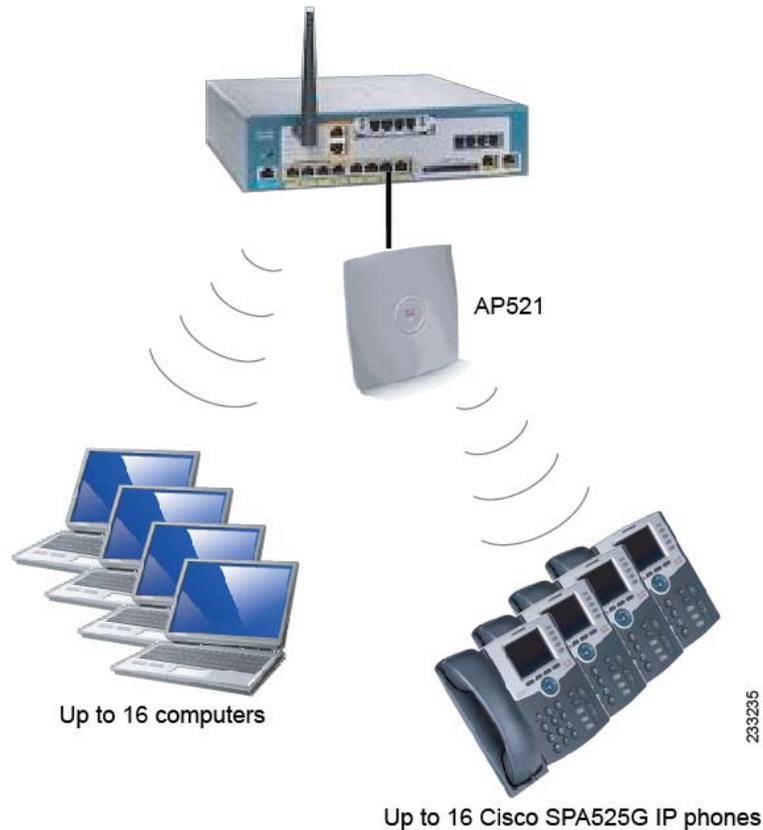
Reference design #2 is intended for businesses housed in small offices with up to 2,500 square feet of office space and up to 16 users.

This reference design also offers a migration path from reference design #1 by adding support for up to 16 wireless phone users and PCs. To migrate from reference design #1 to reference design #2, a business would only need to purchase a single external AP521 access point and a UC500 license upgrade to 16 users.

In this design:

- The embedded UC500 access point is used exclusively for data.
- One external access point is used exclusively for voice.
- As a result of the physical separation between voice and data achieved by using separate SSIDs on two different physical access points, QoS or a wireless LAN controller are not required.

**Figure 3-2** Reference Design #2: Small Office, Up to 16 users, 1 Embedded AP, and 1 External AP



## Reference Design #3 — Large Office, Up to 12 Users

Reference design #3 is intended for businesses housed in larger offices with up to 10,000 square feet of office space and 12 users. A 16-user UC500 SKU or higher is required. However, Cisco recommends that customers consider using a 24-user UC500 hardware platform to provide a more flexible upgrade path.

The difference between this reference design and reference design #2 is that a single external AP521 access point serves both wireless voice and data clients. Because voice and data are shared, the maximum number of wireless phones and computers is limited to 12 each.

You do not need to deploy all 12 phones in wireless mode—you can combine wired and wireless phones (the SPA525G also offers an uplink for wired connections). Bandwidth saved by deploying fewer phones in wireless mode can be used by data applications.

The QoS settings required to guarantee voice quality in the presence of data traffic are configured automatically by CCA for this design.

**Figure 3-3** Reference Design #3: Large Office, Up to 12 Users, 1 External AP



## Reference Design #4 — Large Office, Up to 16 Users

Reference design #4 is intended for businesses housed in larger offices with up to 10,000 square feet of office space and 16 users. A 16-user UC500 SKU is required. Cisco recommends that customers consider deploying a 24-user UC500 hardware platform to provide a more flexible upgrade path.

In this design, two external Cisco AP521 wireless APs are used: one for voice traffic and one for data traffic. Use of separate physical access points for voice and data eliminates the need for a wireless LAN controller (WLC).



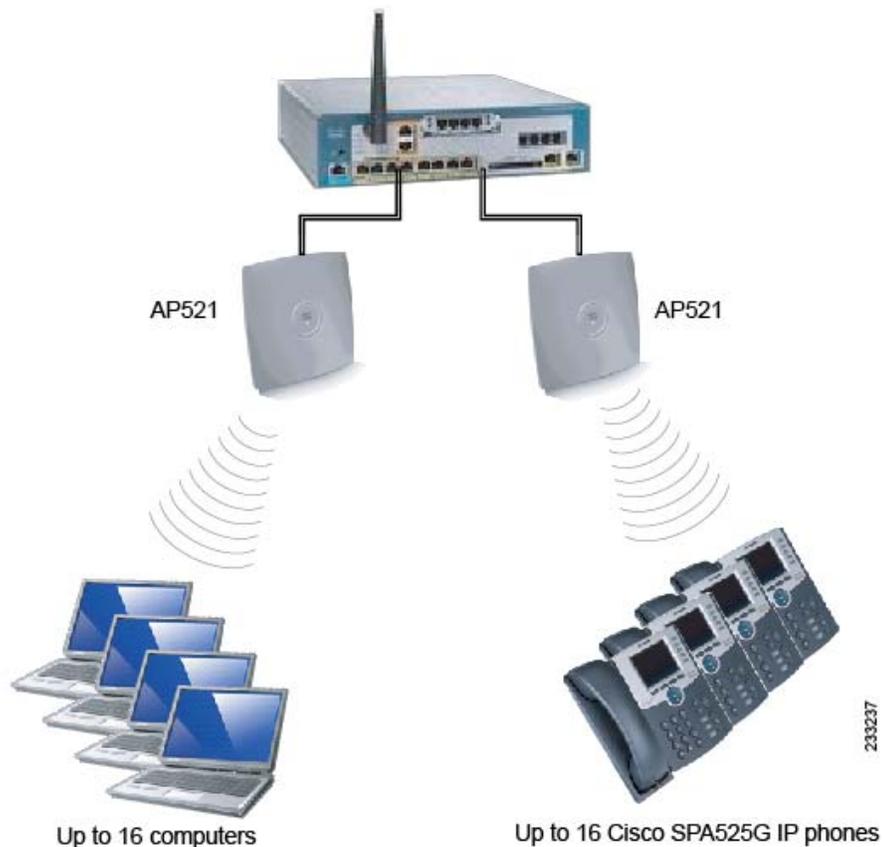
### Note

If your office needs more than 16 wireless phones, and you have the license capacity on the UC500, it is possible to increase the number of wireless phones beyond 16. However, this requires additional access points and a WLC526 wireless LAN controller for synchronizing SSIDs and security profiles, and is outside the scope of the reference designs.

For more information, see *Cisco Smart Business Communications System Setup Guide*, available on Cisco.com at the following URL:

[www.cisco.com/en/US/products/ps7293/prod\\_installation\\_guides\\_list.html](http://www.cisco.com/en/US/products/ps7293/prod_installation_guides_list.html)

**Figure 3-4** Reference Design #4: Large Office, Up to 16 Users, 2 External APs



# Limitations and Caveats

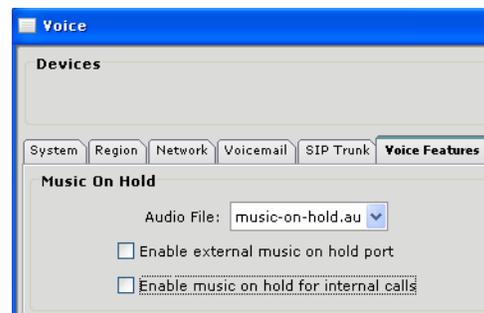
The following limitations and caveats apply to wireless voice deployments with Cisco SPA525G IP phones for SBCS 1.4:

- Cisco SPA525G phones are not supported for use with any 3rd-party wireless AP.
- A mix of Cisco SPA525G IP phones and Cisco Model 7921G/7925G IP phones is not supported for any of the wireless voice network reference designs for SBCS 1.4.
- The Cisco IP Phone SPA525G is supported for teleworkers in wired mode only.
- There is no support for automated migration. Customers can manually migrate from lower to higher reference designs to add capacity. For more information, refer to the [“Migrating to a Different Reference Design to Add More Phones”](#) section on page 4-9.
- All wireless clients must support Wireless-G protocol. Use of Wireless-B clients is not recommended and will have a negative impact on network performance.
- Multicast Music on Hold (MoH) for internal calls (IP phone-to-IP phone) is not supported for this solution and must be disabled using CCA.

When you disable MoH for internal calls, Music on Hold for the external MoH port on the UC500 is also disabled.

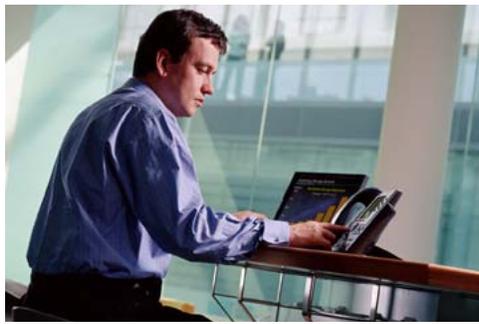
To disable Music on Hold for internal calls using CCA:

1. Launch CCA and navigate to **Configure > Telephony > Voice**.
2. Click the **Voice Features** tab and go to the **Music on Hold** section of the tab.
3. Uncheck both **Enable external music on hold port** and **Enable music on hold for internal calls**.



- Unicast paging groups are required with Cisco SPA525G wireless phones. A maximum of ten (10) phones can be in a unicast paging group.





## CHAPTER 4

# Installation, Configuration, and Administration for Cisco SPA525G Wireless Deployments

---

This chapter covers the following topics:

- [Initial Installation and Configuration Steps, page 4-1](#)
- [Administration Tasks After Initial Installation, page 4-5](#)

## Initial Installation and Configuration Steps

This section contains the following procedures for first-time installation and configuration of a Cisco SPA525G wireless deployment:

- [Before You Begin, page 4-1](#)
- [Launch CCA and Create a Community, page 4-2](#)
- [Run the CCA Wireless Setup Wizard, page 4-2](#)
- [Verify the Installation, page 4-5](#)
- [Customize Network and Voice Features Using CCA, page 4-5](#)

## Before You Begin

Before installing a wireless voice deployment with Cisco SPA525G phones for the first time, make sure that the following requirements are met:

- Each of the SPA525G phones that will be connected wirelessly must have a Model PA100 external power supply. The power supply does not ship with the phone and must be ordered separately.
- Verify that you have the correct number and type of access points for the deployment.
- Verify that the UC500 has software licensing for the number of phones being deployed.
- Download and install Cisco Configuration Assistant, Version 1.9 or later to local PC to be used for the installation. The CCA software is available from Cisco.com at the following location:

[www.cisco.com/go/configassist](http://www.cisco.com/go/configassist)

You must be a registered Cisco.com user to download the software; no other access privileges are required.

- Verify that the UC500 has been upgraded to Cisco SBCS Software Package Version 7.0.2 or later, which includes Cisco IOS version 12.4(20)T2.

To view the version of Cisco IOS currently installed on the UC500 using CCA:

1. Launch CCA and display the Topology view.
2. Right-click on the UC500 in the Topology view.
3. Click **Properties**. The Software Version field displays the current IOS version.

To perform software upgrades using CCA, navigate to **Maintenance**, choose **Software Upgrade**, and follow the instructions in the CCA online help.

## Launch CCA and Create a Community

Before you can run the Wireless Setup Wizard, perform the following steps to create a community using CCA.

- 
- Step 1** Connect and power up the UC500 platform.
  - Step 2** If needed, connect each external AP521 access point to a PoE port on the UC500 platform and allow the access point to boot up.
  - Step 3** Connect a PC to one of the PoE ports on the UC500 platform and launch CCA.
  - Step 4** Create a community using the LAN IP address (192.168.10.1) of the UC500 platform as the seed IP address and connect to the community.



**Tip** The default username and password for the UC500 is cisco/cisco; the default password for the AP521 is Cisco/cisco (on the AP 521, an uppercase “C” is used for the first letter of the username).

---

See the *Getting Started Guide for Cisco Configuration Assistant, Version 1.9*, for detailed instructions on how launch CCA and create a community. This guide is available on Cisco.com at the following URL:  
[http://www.cisco.com/en/US/products/ps7287/prod\\_installation\\_guides\\_list.html](http://www.cisco.com/en/US/products/ps7287/prod_installation_guides_list.html)

- Step 5** Verify that the UC500 and any external access points are discovered and displayed in the network topology map as part of the community.

Once the community is established, the **Setup > Wireless Setup Wizard** option is displayed on the feature bar in CCA. This option is not available until you have created a community.

---

## Run the CCA Wireless Setup Wizard

Once you have logged in to the community, you are ready to run the Wireless Setup Wizard.

- To launch the wizard, choose **Setup** from the feature bar in CCA, then click **Wireless Setup Wizard**.
- Follow the on-screen instructions to complete the automated installation.

- For reference designs #1 and #2, make sure that all phones have completed registering with the UC500 and display an extension before entering the SSID information for your access points.  
If phones do not register as expected while running the Wireless Setup Wizard, you can manually configure the wireless profile from the phone. For more information, see the [“Manually Configuring the Wireless Profile on the Cisco SPA525G”](#) section on page 4-4.
- For reference designs #3 and #4, follow the steps at the end of the wizard to manually register the phones with the UC500 and synchronize with the network. These are the same steps described in the [“Adding Cisco SPA525G IP Phones \(Wi-Fi Mode\)”](#) section on page 4-6.

**Note**

During the installation, Cisco SPA525G IP phones reboot twice: once when Wi-Fi mode is enabled, and a second time when the SSID and password are applied to the access point and synchronized with the phones.

The Wireless Setup Wizard detects the hardware components connected to the network at runtime and applies the configuration rules listed in [Table 4-1](#). For all reference designs, wireless phones are configured in the same way. They are automatically associated to the voice SSID and assigned the same voice security profile.

**Table 4-1** Wireless Network Setup Wizard Automatic Configuration

Hardware Detected	Reference Design Template	Automated Configuration Details
UC500 with an embedded access point; no other access points present	<a href="#">Reference Design #1 — Small Office, Up to 8 Users, page 3-3</a>	Combined QoS configuration for voice and data configured on the embedded access point, with separate SSIDs and passwords for voice and data.  Support for up to 8 wireless phones.
UC500 with an embedded access point and one (1) external AP521 access point	<a href="#">Reference Design #2 — Small Office, Up to 16 Users, page 3-4</a>	Separate QoS configuration for voice and data, with voice SSID and security configured on the external access point and data SSID and security configured on the embedded access point.  Support for up to 16 wireless phones.
One (1) external access point; no embedded access point on the UC500	<a href="#">Reference Design #3 — Large Office, Up to 12 Users, page 3-5</a>	Combined QoS configuration on the external access point with separate SSIDs and passwords for voice and data.  Support for up to 12 wireless phones.
Two (2) or more external access points	<a href="#">Reference Design #4 — Large Office, Up to 16 Users, page 3-6</a>	Separate QoS configuration for voice and data, with voice SSID and security configured on one of the external access points and data SSID and security configured on the other.  Support for up to 16 wireless phones.  If more than two external access points are present, the configuration for reference design #4 is applied to the first two external access points discovered by CCA.  Additional access points will have both SSIDs configured (voice and data), except for the UC500 embedded access point, which will be shut down.

The Wireless Setup Wizard uses the following values for the Data and Voice VLANs:

- Data VLAN — VLAN ID: 1 Name: default
- Voice VLAN— VLAN ID: 100 Name: Cisco-Voice



**Caution**

Do not modify the Voice VLAN.

The Wireless Setup Wizard does not populate default values for the data and voice SSIDs.

## Manually Configuring the Wireless Profile on the Cisco SPA525G

Perform the following procedure to manually configure the Wireless Profile on a Cisco SPA525G. This may be needed if the phone fails to register when running the Wireless Setup Wizard. This can occur if the phone has a previously configured wireless profile.

Before you begin, you must have the following information. This information must exactly match what is configured on the UC500 through the Wireless Setup Wizard.

- SSID for the wireless voice profile, for example, uc520-voice
- Password for the wireless voice profile (Pre-shared WPA2/PSK key (must have at least 8 characters and can contain up to 64 characters))

- 
- Step 1** On the Cisco SPA525G phone, press the **Setup** button.
- Step 2** Navigate to **Network Configuration > Wi-Fi Configuration > Wireless Profile**.
- The current profile is shown.
- Step 3** To delete the current profile, press the **Option** softkey, scroll to the **Delete** option, then press the **Select** softkey.
- Step 4** Choose **OK** when asked to confirm the profile deletion.
- Step 5** Press the **Option** softkey again.
- Step 6** Choose **Add New**, then press the **Select** softkey.
- Step 7** Enter the following setting to create the wireless voice profile:
- **Security Mode** — Choose **WPA2PSK**.
  - **Profile** — Enter a descriptive name for the profile, for example, “voice.”
  - **SSID** — Enter the wireless voice SSID exactly as you entered it in the Wireless Setup Wizard, for example, uc520-voice.
  - **Cipher Type** — Leave the default setting of **TKIP**.
  - **WPA Shared Key** — Enter the password for wireless security exactly as you entered it in the Wireless Setup Wizard.
- Step 8** Click **Save**.
- Step 9** Click **Connect**.

If the phone is able to successfully register with the UC500, an extension number appears in the top right corner of the phone display.

---

## Verify the Installation

After you run the Wireless Setup Wizard, all phones should reboot, auto-register, and receive an extension from the system. At this point, you should be able to make internal calls between extensions. Further customization is needed to complete your site installation.

**Important**

Once setup is verified, make sure that you save and back up your device configuration through CCA.

## Customize Network and Voice Features Using CCA

Once you have completed the Wireless Setup Wizard, you will need to use CCA to customize network and voice features.

The suggested order of configuration for a typical installation is as follows:

- Provision Internet connection and DNS
- Configure telephony features — Set up voice mail, business schedules, auto attendant, phones and users, and other voice features.
- Configure the dial plan for outgoing numbers (off-net calls).

Refer to the following documentation and resources for more information:

- CCA online help
- CCA documentation page on Cisco.com  
[www.cisco.com/en/US/products/ps7287/prod\\_installation\\_guides\\_list.html](http://www.cisco.com/en/US/products/ps7287/prod_installation_guides_list.html)
- The Cisco SMB SmartDesign site on Partner Central provides design and implementation guides for SBCS configuration using CCA. You must have a partner login to access this site.  
[www.cisco.com/go/partner/smartdesigns](http://www.cisco.com/go/partner/smartdesigns)
- SBCS Support Community:  
[www.cisco.com/go/smallbizsupport](http://www.cisco.com/go/smallbizsupport)
- CCA product page on Cisco.com  
[www.cisco.com/go/configassist](http://www.cisco.com/go/configassist)

## Administration Tasks After Initial Installation

The procedures in this section apply to administering a Cisco SPA525G wireless voice deployment after the initial installation:

- [Adding Cisco SPA525G IP Phones \(Wi-Fi Mode\), page 4-6](#)
- [Wireless Phone SSID and Profile Configuration Recovery, page 4-6](#)
- [Adding an External Access Point, page 4-7](#)
- [Changing the Wireless Voice or Data Password \(WPA Pre-Shared Key\), page 4-8](#)

## Adding Cisco SPA525G IP Phones (Wi-Fi Mode)

To add a Cisco SPA525G IP phone that will be operating in Wi-Fi mode to an existing installation:

- 
- Step 1**    Unpack and set up the Cisco SPA525G IP phone.
- Step 2**    Connect one end of an Ethernet cable to the Ethernet port on the phone and the other to an available PoE port on the UC500 or a CE520 switch, if one is present in the community.
- The phone will boot up and receive its SSID and profile information from the UC500 automatically. The phone reboots once it receives this information.
- When the phone has finished rebooting, it will have the correct SSID and profile and receive an extension.
- Step 3**    Unplug the Ethernet cable from the phone and move the phone to the desired location.
- Step 4**    Connect the phone to power using a PA100 power supply.
- Step 5**    Enable Wi-Fi mode on the phone (these are the same steps included in the Wireless Setup Wizard):
- a. Press the **Settings** button on the phone.
  - b. Use the down arrow key on the Navigation button to scroll to the **Network Configuration** option, then press the **Select** softkey.
  - c. Press the right arrow key on the Navigation button to enable Wi-Fi mode (Wi-Fi setting will change from OFF to ON).
  - d. Click **Save**.
  - e. Click **Exit**.
  - f. Verify that the wireless icon that displays signal strength appears at the top of the phone display.
  - g. Press the **Setup** button on the phone and navigate to **Network Configuration > Wireless > Wireless Status** to check the signal strength level at the location of the phone.
- Once Wi-Fi mode is enabled, the phone will begin registering with UC500. It will receive the same extension that it did previously when plugged into the PoE port on the UC500.
- Step 6**    Continue configuring the phone in CCA, just as you would configure a wired phone.
- Step 7**    Once setup is verified, save and back up your device configuration through CCA.
- 

## Wireless Phone SSID and Profile Configuration Recovery

If a wireless phone is disconnected from the network or loses connectivity during an SSID and password update, the phone must be re-connected to the UC500 and must re-register to receive the new profile; it does not automatically re-connect.

The procedure for recovering the SSID and wireless profile configuration is almost identical to that required to add a wireless phone after the initial installation. To recover the configuration:

- 
- Step 1**    Disconnect the phone from power.
- Step 2**    Plug the phone into an available PoE port on the UC500 or CE520 switch.
- Step 3**    Wait for the phone to power up and receive its profile information from the UC500 and reboot.

- Step 4** Unplug the phone from the PoE port on the UC500, move it to the correct location, and connect it to power via the PA100 power supply.
- Step 5** Verify that Wi-Fi mode is enabled on the phone. The phone extension and configuration information is preserved.
- 

## Adding an External Access Point

Perform the following steps to add an external AP521 access point to an existing Cisco SPA525G wireless voice deployment. This procedure is intended for use when replacing an access point or manually migrating to a different reference design to add support for additional wireless phones or changes in coverage area.

**Tip**

When migrating the voice SSID from one access point to another, use the same SSID and password setting on the new access point if you want to avoid having the SPA525G phones reboot and re-register.

---

**Note**

Notify users immediately if the pre-shared key for the data network has been modified. The security profile for PCs connected wirelessly must be configured separately for each client.

---

- Step 1** Connect the AP521 access point to a PoE port on the UC500.
- Step 2** Launch CCA and connect to the community.
- Step 3** When the AP521 has completed powering up, add the AP521 to the community.
- Step 4** From feature bar in CCA, choose **Configure > Wireless**, then click **Wireless (SSIDs)**.
- Step 5** In the Wireless (SSIDs) window, select the hostname for the AP521 access point you just added. The default hostname for the AP521 is “ap”.

Once you select the new access point, you will see that no SSIDs are configured.

Depending on the reference design you are using, you will need to set up the appropriate SSIDs and, if needed, remove SSIDs needed from the embedded access point on the UC500. For example:

- When migrating from reference design #1 to reference design #2, you will need to:
  - Retain the SSID for the data network on the embedded access point.
  - Create the voice SSID on the external access point you just added.
  - Remove the voice SSID from the embedded access point.
- When migrating from reference design #1 to reference design #3:
  - Create the voice SSID on one external access point.
  - Create the data SSID on the other external access point.
  - Remove both the voice and data SSIDs from the embedded access point.

The other variations for migrating between reference designs are similar. See [Chapter 3, “Reference Designs for Cisco SPA525G Wireless Deployments”](#) for more detailed information on each reference design.

**Step 6** Depending on the reference design you are using, create the appropriate SSIDs on the new AP.

To create a new SSID on the access point:

- a. In the Wireless (SSIDs) window, click **Create**.
- b. In the Create SSID dialog:
  - 1) Set the **VLAN ID** to 100 if you are creating an SSID for voice,
  - 2) Set the **VLAN ID** to 1 if you are creating an SSID for data.
  - 3) In the **Security** field, you must select WPA2-PSK.
  - 4) In the **WPA Pre-Shared Key** field, enter the password to use for the SSID you are creating.
  - 5) Click **OK**.
- c. Click **OK** to apply the changes.

Once you have updated the SSID settings on the AP, the new settings will be sent to the phones and the phones will reboot.

**Step 7** To remove an SSID on the embedded access point:

- a. In the Wireless (SSIDs) window, choose the hostname for the UC500 (the default hostname is UC500).
- b. Locate the SSID to be removed and click on it to select it.
- c. Click **Delete**.
- d. Click **OK** to apply the changes.

**Step 8** Once setup is verified, save and back up your device configuration through CCA.

## Changing the Wireless Voice or Data Password (WPA Pre-Shared Key)

Perform the following steps to change the password (pre-shared key) for the voice or data SSID.



### Note

Notify users immediately if the pre-shared key for the data network has been modified. The security profile for PCs connected wirelessly must be configured separately for each client.

**Step 1** Launch CCA and connect to the community.

**Step 2** From the feature bar in CCA, choose **Configure > Wireless**, then click **WLANS (SSIDs)**. CCA reads in the configuration

**Step 3** In the WLANS (SSIDs) window, select the hostname that applies to device that has the SSID information that you want to modify.

- The default hostname for the UC500 is “UC520”.
- The default hostname for the AP521 access point is “ap”.
- Security is set to WPA2-PSK.

**Step 4** Locate the SSID to modify (either uc-voice or uc-data, for example) and click on it to select it.

**Step 5** Click **Modify**.

**Step 6** In the **WPA Pre-Shared Key** field of the Modify SSID dialog, enter the new password (key).

**Step 7** Click **OK**.

Once you click **OK**, the Apply Updates to Wireless Phones dialog displays and shows the status of the profile update for each wireless phone. Each phone reboots once it receives the update.

**Step 8** Click **OK**.

**Step 9** Once setup is verified, save and back up your device configuration through CCA.

---

## Migrating to a Different Reference Design to Add More Phones

This section briefly describes steps required for manual migration to a different reference design.

To migrate from reference design #1 to reference design #2:

- Purchase a UC500 16-user upgrade license and install it onto the UC500. You can use CCA to install the upgrade license. From the feature bar in CCA, choose **Maintenance > License Management** and follow the instructions in the online help for upgrading the license.
- Purchase an external AP521 wireless access point.
- Remove the voice SSID from the embedded access point.
- Follow the instructions described in the [“Adding an External Access Point”](#) section on page 4-7 to add an external access point. Associate this access point to the voice SSID and configure the appropriate security settings.
- Follow the instructions described in the [“Adding Cisco SPA525G IP Phones \(Wi-Fi Mode\)”](#) section on page 4-6 to add up to 8 additional wireless phones to the system.
- Once setup is verified, make sure that you save and backup your configuration on both the UC500 and any external access points through CCA.

To migrate from reference design #1, #2, or #3 to reference design #4:

- Purchase a UC500 16-user upgrade license and install it onto the UC500, if you have not already done so.  
This step applies to 8-user UC500 platforms only. Cisco UC500-24U and higher platforms support a minimum of 24 users.
  - Add the necessary external AP521 access points, for a total of 2.  
Configure one external access point with the Voice SSID and security settings and the other access point with the data SSID and security settings, as described in [“Adding an External Access Point”](#) section on page 4-7.
  - If the base UC500 platform includes an embedded access point, make sure that the voice and data SSIDs are removed from the UC500 configuration.
  - Follow the instructions described in the [“Adding Cisco SPA525G IP Phones \(Wi-Fi Mode\)”](#) section on page 4-6 to add more wireless phones, up to a maximum of 16.
  - Once setup is verified, make sure that you save and backup your configuration on both the UC500 and any external access points through CCA.
-

