Conducting Cisco Unified Wireless Site Survey

Course Administration Guide

Version 1.0

Refer to Student Guide

Text Part Number: xx-xxxx-xx
Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at www.cisco.com/go/offices.

CCDE, CCENT, CCNP, Cisco, Cisco ACI, Cisco ASA, Cisco IOS, Cisco Nexus, Cisco Security, Cisco Stacks, 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, 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, FrameShare, GigaDrive, HomeLink, Internet Control, IOS, iPhone, Quick Study IronPort, the IronPort logo, LightStream, Linksys, MediaTone MeetingRoom, MeetingPlace, Chime Sound, MDS, Networkers, Networking Academy, Network Registrar, PCNow, PIX, PowerPanels, ProConnect, ScriptShare, SenderBase, SMARTnet, Spectrum Expert, StackWise, The Fastest Way to Increase Your InternetQotient, 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.

DISCLAIMER WARRANTY: THIS CONTENT IS BEING PROVIDED “AS IS.” CISCO MAKES AND YOU RECEIVE NO WARRANTIES IN CONNECTION WITH THE CONTENT PROVIDED HEREUNDER, EXPRESS, IMPLIED, STATUTORY OR IN ANY OTHER PROVISION OF THIS CONTENT OR COMMUNICATION BETWEEN CISCO AND YOU. CISCO SPECIFICALLY DISCLAIMS ALL IMPLIED WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT AND FITNESS FOR A PARTICULAR PURPOSE, OR ARISING FROM A COURSE OF DEALING, USAGE OR TRADE PRACTICE. This learning product may contain early release content, and while Cisco believes it to be accurate, it falls subject to the disclaimer above.
Overview

Conducting Cisco Unified Wireless Site Survey (CUWSS) v1.0 is a five-day day instructor-led course, designed to help students prepare for the CCNP® wireless certification, a professional-level certification specializing in the wireless field. The goal of the course is to provide students with information and practice activities to prepare students to technically plan and conduct a wireless site survey. The student should be able to design the RF network and conduct a post-installation assessment to ensure compliancy.

Outline

The Course Management section of the Course Administration Guide includes these topics:

- Overview
- Course Instruction Details
- Course Evaluations
- Equipment List
- Course Delta Information

Course Version

This is the original release of the course named Conducting Cisco Unified Wireless Site Survey (CUWSS) v1.0.

Course Objectives

Upon completing this course, the learner will be able to meet these overall objectives:

- Describe the requirements for preparing for a site survey
- Describe the requirements for planning a site survey
- Perform a site survey for data, voice, and location applications
- Determine the placement of the access points for data, voice, and location applications
- Assess the deployment of the WLAN
Target Audience

The primary audience for this course is as follows:

- Network engineers
- Test engineers
- Network administrators
- Network managers
- Midlevel wireless support engineers

The primary audience is formed of individuals involved in the technical handling of Cisco platforms and solutions, namely performing or overseeing the implementation of a site survey for a WLAN solution.

The secondary audience for this course is as follows:

- Network designers
- Project managers

The secondary audience is formed of individuals who need to know how to sell, design, install, and support the implementation of a site survey for a WLAN solution.

Learner Skills and Knowledge

The knowledge and skills that a learner must have before attending this course are as follows:

- *Implementing Cisco Unified Wireless Networking Essentials (IUWNE)*
- *Interconnecting Cisco Networking Devices Part 1 (ICND1)*
- *Interconnecting Cisco Networking Devices Part 2 (ICND2)*
Course Instruction Details

This topic provides the information that you need to prepare the course materials and set up the classroom environment.

Instructor Requirements

To teach this course, instructors must have attended the following training or completed the following requirements:

- Be an active Cisco Certified Systems Instructor in good standing
- Attend a Train the Trainer (TTT) or open enrollment delivery of a course facilitated by a qualified Cisco Certified Systems Instructor

or

- Attend the CUWSS v1.0 course as a learner
- Pass the Conducting Cisco Unified Wireless Site Survey exam #642-731 at the Instructor pass score

Note: Submit questions concerning instructor certification to icad@external.cisco.com.

Classroom Reference Materials

These items should be available for the learner during the course:

- Student Guide
- Lab Guide
- Course Evaluation Form

Class Environment

This information describes recommended class size and classroom setup:

- Room set up classroom style with chairs and tables large enough for 16 learners
- Eight pairs of chairs sharing access to eight laptops
- Projector to display course slides and projection screen as needed
- Sufficient power for all equipment
- For local labs, table and floor space to locate all equipment

Course Flow

This is the suggested course schedule. You can make adjustments based on the skills, knowledge, and preferences of the learners in attendance. The presentation of all topics is optional for noncertification offerings, but you are encouraged to use them because they are designed to reinforce the lesson concepts and ensure that learners apply some of the concepts.
Day 1: Course Introduction, Identifying Site Survey Requirements for Different Vertical Markets, Identifying Customer Requirements, Identifying Regulatory Issues, Identifying Safety and Aesthetic Requirements, Selecting the Proper Survey Model

8:00–8:45 (0830–0845) Course Introduction

8:45–9:00 (0845–900) Module 0 – Course Introduction

9:00–10:20 (9000–1020) Identifying Site Survey Requirements for Different Vertical Industries

10:20–10:35 (1020–1030) Break

10:35–12:00 (1035–1200) Identifying Customer Requirements

12:00–1:00 (1200–1300) Lunch

1:00–2:00 (1300–1400) Identifying Regulatory Issues

2:00–2:35 (1400–1435) Identifying Safety and Aesthetic Requirements

2:35–3:00 (1435–1500) Understanding Logistical Considerations

3:00–3:15 (1500–1515) Break

3:15–3:35 (1515–1535) Module Summary and Self Check

3:35–5:00 (1535–1700) Selecting the Proper Survey Model

5:00 (1700) Day ends

Day 2: Selecting the Proper Survey Model (Cont.), Determining the Proper Deployment Characteristics, Specifying the Tools Necessary to Complete a Site Survey, Defining Site Survey Documentation, Producing the Predictive Site Survey, Lab 3-1: Producing a Predictive Site Survey, Conducting a Layer 1 Site Survey

8:00–8:45 (0800–0845) Review of Day 1

8:45–9:15 (0845–0915) Selecting the Proper Survey Model (Cont.)

9:15–9:50 (0915–0950) Determining the Proper Deployment Characteristics

9:50–10:30 (0950–1030) Specifying the Tools Necessary to Complete a Site Survey

10:30–10:45 (1030–1045) Break

10:45–11:35 (1045–1135) Defining Site Survey Documentation

11:35–12:00 (1135–1200) Module Summary and Self Check

12:00–1:00 (1200–1300) Lunch
Day 3: Lab 3-2: Conducting a Layer 1 Site Survey, Lab 3-3: Locating an Interfering Device, Conducting a Layer 2 Site Survey for Data, Lab 3-4: Conducting a Layer 2 Site Survey for Data, Conducting an AirMagnet Site Survey for Data

8:00–8:30 Review of Day 2
(0800–0830)

8:30–10:00 Lab 3-2: Conducting a Layer 1 Site Survey
(0830–1000)

10:00–10:15 Break
(1000–1015)

10:15–11:00 Lab 3-3: Locating an Interfering Device
(1015–1100)

11:00–12:00 Conducting a Layer 2 Site Survey for Data
(1100–1200)

12:00–1:00 Lunch
(1200–1300)

1:00–1:40 Conducting a Layer 2 Site Survey for Data (Cont.)
(1300–1340)

1:40–3:00 Lab 3-4: Conducting a Layer 2 Site Survey for Data
(1340–1500)

3:00–3:15 Break
(1500–1515)

3:15–5:00 Lab 3-4 Conducting an AirMagnet Site Survey for Data (Cont.)
(1515–1700)

5:00 (1700) Day ends

Day 4: Lab 3-4 Review, Conducting a Layer 2 Site Survey for Voice Applications, Lab 3-5: Conducting an AirMagnet Site Survey for VoWLAN, Review Lab 3-5, Conducting a Layer 2 Site Survey for 802.11n Clients, Lab 3-6: Conducting a Greenfield AirMagnet Site Survey

8:00–8:30 Review of Day 3
(0800–0830)

8:30–9:30 Review Lab 3-4 results with class
(0830–0930)

9:30–10:00 Conducting a Layer 2 Site Survey for Voice Applications
(0930–1000)

10:00–10:15 Break
(1000–1015)

10:15–12:00 Lab 3-5: Conducting an AirMagnet Site Survey for VoWLAN
(1015–1200)

12:00–1:00 Lunch
(1200–1300)
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:00–1:30</td>
<td>Lab 3-5: Conducting an AirMagnet Site Survey for VoWLAN (Cont.)</td>
</tr>
<tr>
<td>1:30–2:00</td>
<td>Review Lab 3-5 results with class</td>
</tr>
<tr>
<td>2:00–2:30</td>
<td>Conducting a Layer 2 Site Survey for 802.11n Clients</td>
</tr>
<tr>
<td>2:30–3:00</td>
<td>Lab 3-6: Conducting a Greenfield AirMagnet Site Survey</td>
</tr>
<tr>
<td>3:00–3:15</td>
<td>Break</td>
</tr>
<tr>
<td>3:15–5:00</td>
<td>Lab 3-6: Conducting a Greenfield AirMagnet Site Survey (Cont.)</td>
</tr>
<tr>
<td>5:00 (1700)</td>
<td>Day ends</td>
</tr>
</tbody>
</table>

**Day 5: Review Lab 3-6, Conducting a Layer 2 Site Survey for Location, Determining the Infrastructure Requirements for the WLAN, Determining the WLAN Equipment and Licenses, Verifying the RF Coverage, Verifying WLAN Readiness, Lab 5-1: Performing a Floor Calibration**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00–8:30</td>
<td>Review of Day 4</td>
</tr>
<tr>
<td>8:30–9:00</td>
<td>Conducting a Layer 2 Site Survey for Location</td>
</tr>
<tr>
<td>9:00–9:15</td>
<td>Module Summary and Self Check</td>
</tr>
<tr>
<td>9:15–9:30</td>
<td>Determining the Infrastructure Requirements for the WLAN</td>
</tr>
<tr>
<td>9:30–9:45</td>
<td>Determining the WLAN Equipment and Licenses</td>
</tr>
<tr>
<td>9:45–10:00</td>
<td>Module Summary and Self Check</td>
</tr>
<tr>
<td>10:00–10:15</td>
<td>Break</td>
</tr>
<tr>
<td>10:15–10:30</td>
<td>Verifying the RF Coverage</td>
</tr>
<tr>
<td>10:30–11:00</td>
<td>Verifying WLAN Readiness</td>
</tr>
<tr>
<td>11:00–12:00</td>
<td>Lab 5-1: Performing a Floor Calibration</td>
</tr>
<tr>
<td>12:00–1:00</td>
<td>Lunch</td>
</tr>
<tr>
<td>1:00–2:15</td>
<td>Lab 5-1: Performing a Floor Calibration (Cont.)</td>
</tr>
<tr>
<td>2:15–3:00</td>
<td>Module Summary and Self Check</td>
</tr>
<tr>
<td>2:30–3:00</td>
<td>Wrap-up</td>
</tr>
</tbody>
</table>
High-Level Course Outline

This subtopic provides an overview of how the course is organized. The course contains these components:

- Course Introduction
- Prepare for the Site Survey
- Plan for the Site Survey
- Conduct the Site Survey
- Design the RF Network
- Assessment of the Deployment

Detailed Course Outline

This in-depth outline of the course structure lists each module, lesson, and topic.

Course Introduction

The Course Introduction provides learners with the course objectives and prerequisite learner skills and knowledge. The Course Introduction presents the course flow diagram and the icons that are used in the course illustrations and figures. This course component also describes the curriculum for this course, providing learners with the information that they need to make decisions regarding their specific learning path.

- Overview
  - Learner Skills and Knowledge
- Course Goal and Objectives
- Course Flow
- Additional References
  - Cisco Glossary of Terms
- Your Training Curriculum

Module 1: Prepare for the Site Survey

Describe the requirements for preparing for a site survey.

Lesson 1: Identifying Site Survey Requirements for Different Vertical Industries

This lesson identifies site survey requirements for different vertical industries. Upon completing this lesson, the learner will be able to meet these objectives:

- Identify the criteria for determining the requirements of the RF application
- Describe the RF environment common to an enterprise office
- Describe the RF environment common to vertical markets
The lesson includes these topics:

- Determining RF Application Requirements
- The Enterprise Office
- Vertical Markets

**Lesson 2: Identifying Customer Requirements**

This lesson identifies customer requirements. Upon completing this lesson, the learner will be able to meet these objectives:

- Describe the contents and importance of the pre-site survey customer questionnaire
- Describe RF applications and the client devices associated with them
- Describe the customer facility and the impact it has on the site survey
- Describe the customer’s current network infrastructure and the impact it has on the site survey

The lesson includes these topics:

- The Customer Questionnaire
- RF Applications and Client Devices
- The Customer Facility
- The Current Network Infrastructure

**Lesson 3: Identifying Regulatory Issues**

This lesson identifies various regulatory issues affecting a site survey. Upon completing this lesson, the learner will be able to meet these objectives:

- Describe the RF regulations for 2.4 GHz and 5 GHz bandwidths for North America, Europe, and Japan
- Describe how to calculate EIRP

The lesson includes these topics:

- RF Regulations
- Effective Isotropic Radiated Power

**Lesson 4: Identifying Safety and Aesthetic Requirements**

This lesson identifies safety and aesthetic requirements of which a person performing a site survey should be aware. Upon completing this lesson, the learner will be able to meet these objectives:

- Describe safety issues of which a person performing a site survey should be aware
- Identify various governmental safety regulations that can affect a site survey
- Identify the various enterprise requirements that can affect a site survey
The lesson includes these topics:

- Safety Issues
- Government Safety Regulations
- Enterprise Requirements

**Lesson 5: Understanding Logistical Considerations**

This lesson defines various logistical requirements necessary to conduct a site survey. Upon completing this lesson, the learner will be able to meet these objectives:

- Describe criteria necessary to determine resources needed for a site survey
- Identify the information to be gathered about facility access
- Describe deployment criteria that will affect the site survey

The lesson includes these topics:

- Resource Planning
- Facility Access
- Deployment Considerations

---

**Note** Slides on pages 1-116 through 1-120 are explained in more detail in Module 2, Lesson 1.

---

The lesson includes these activities:

- Activity 1-1: Preparing for a Site Survey

**Module 2: Plan for the Site Survey**

Describe the requirements for planning a site survey.

**Lesson 1: Selecting the Proper Survey Model**

This lesson defines how to select the proper survey model. Upon completing this lesson, the learner will be able to meet these objectives:

- Describe the criteria for planning a site survey for data applications
- Determine client density and throughput requirements
- Describe the criteria for planning a site survey for voice applications
- Describe the criteria for planning a site survey for location-based services
- Describe Cisco Aironet 1250 Series Access Point deployments and access point placement
- Describe the criteria for planning a site survey for outdoor bridging
- Describe grounding and lightning protection considerations for an outdoor WLAN deployment

The lesson includes these topics:

- Selecting a Data Model
- Client Density and Throughput Requirements
Lesson 2: Determining the Proper Deployment Characteristics

This lesson determines the proper deployment characteristics for a site survey. Upon completing this lesson, the learner will be able to meet these objectives:

- Describe characteristics of a highly mobile deployment
- Describe characteristics of an indoor mesh network
- Compare a predictive site survey with a physical site survey

The lesson includes these topics:

- Highly Mobile Deployments
- Indoor Enterprise Wireless Mesh Networks
- Comparing Predictive and Physical Site Surveys

Lesson 3: Specifying the Tools Necessary to Complete a Site Survey

This lesson specifies the tools necessary to complete a site survey. Upon completing this lesson, the learner will be able to meet these objectives:

- Describe software tools used to perform a site survey
- Describe the Cisco WCS planning tool
- Describe Cisco Spectrum Expert
- Describe site survey tools that are available to perform a site survey
- Describe the components in a site survey kit

The lesson includes these topics:

- Site Survey Software Tools
- Cisco WCS Planning Tool
- Cisco Spectrum Expert
- AirMagnet Survey Software Tools
- A Site Survey Kit

Lesson 4: Defining Site Survey Documentation

This lesson defines the contents of site survey documentation. Upon completing this lesson, the learner will be able to meet these objectives:

- Describe the contents of a preassessment form
- Describe the contents of a site survey report
The lesson includes these topics:
- Preassessment Form
- Site Survey Report

The lesson includes these activities:
- Activity 2-1: Plan for a Site Survey

Module 3: Conduct the Site Survey

Perform a site survey for data, voice, and location applications.

Lesson 1: Producing a Predictive Site Survey

This lesson describes the steps necessary to use the Cisco WCS planning mode tool to produce a predictive site survey. Upon completing this lesson, the learner will be able to meet these objectives:
- Describe the process to create a map for a predictive site survey
- Describe the process that the Cisco WCS planning mode tool uses to calculate access point requirements

The lesson includes these topics:
- Creating Maps
- Cisco WCS Planning Mode Tool

The lesson includes these activities:
- Lab 3-1: Producing a Predictive Site Survey

Lesson 2: Conducting a Layer 1 Site Survey

This lesson defines how to conduct a Layer 1 site survey using Cisco Spectrum Expert. Upon completing this lesson, the learner will be able to meet these objectives:
- Introduce Cisco Spectrum Expert for Wi-Fi
- Describe the relationship between decibel and the power measured in milliwatts and watts
- Describe FFT, FFT plots, and spectrograms
- Describe Cisco Spectrum Expert charts
- Describe the different settings and tools available in the Cisco Spectrum Expert product
- Identify interference and interference sources using Cisco Spectrum Expert
- Describe the necessary steps to set up Cisco Spectrum Expert
- Describe how to locate interference sources using Cisco Spectrum Expert

The lesson includes these topics:
- Cisco Spectrum Expert
- Understanding Decibels
- FFT, FFT Plots, and Spectrograms
- Spectrum Expert Charts
Lesson 3: Conducting a Layer 2 Site Survey for Data

This lesson defines how to conduct a Layer 2 site survey for data applications using AirMagnet Survey PRO. Upon completing this lesson, the learner will be able to meet these objectives:

- Describe signal attenuation as the signal passes through different objects
- Identify site survey best practices for a data site survey
- Describe how to create a data site survey with AirMagnet Survey PRO
- Describe how to configure AirMagnet Survey PRO
- Describe how to conduct a data site survey with AirMagnet Survey PRO
- Describe how to merge and display data collected during the active and passive survey
- Describe how to generate reports using the reports feature in AirMagnet Survey PRO

The lesson includes these topics:

- Attenuation Characteristics of Building Materials
- Site Survey Best Practices for a Data Site Survey
- Create a Data Site Survey Project
- Configure AirMagnet Survey PRO
- Conduct the Survey
- Merge and Display Data
- Generate a Report

The lesson includes these activities:

- Lab 3-4: Conducting an AirMagnet Site Survey for Data

Note: Ensure the students remove the charger from the site survey battery pack before connecting it to the Cisco 1250 Series access point. Failure to do so can damage the site survey battery pack.

Note: Make sure students follow directions on Step 20. Click 2.4 GHz as the media type.
Lesson 4: Conducting a Layer 2 Site Survey for Voice Applications

This lesson defines how to conduct a Layer 2 site survey for voice applications using AirMagnet Survey PRO. Upon completing this lesson, the learner will be able to meet these objectives:

- Describe the RF recommendations for a VoWLAN site survey for 2.4-GHz phones
- Describe the RF recommendations for a VoWLAN site survey with 5-GHz phones

The lesson includes these topics:

- IEEE 802.11b/g/n and VoWLAN Deployments
- IEEE 802.11a/n and VoWLAN Deployments

The lesson includes these activities:

- Lab 3-5: Conducting an AirMagnet Site Survey for VoWLAN

Lesson 5: Conducting a Layer 2 Site Survey for 802.11n Clients

This lesson defines how to conduct a Layer 2 site survey for 802.11n clients using AirMagnet Survey PRO. Upon completing this lesson, the learner will be able to meet these objectives:

- Describe the recommendations for surveying in greenfield mode using Iperf
- Describe where to download Iperf, and how to install and configure it
- Describe how to configure AirMagnet Site Survey PRO to perform an active Iperf survey
- Describe three types of surveys used when performing a survey with an 802.11n access point

The lesson includes these topics:

- Active Survey with Iperf
- Iperf Download and Installation
- Configuring AirMagnet for an Active Iperf Survey
- Three Types of Surveys Using 802.11n Access Points

The lesson includes these activities:

- Lab 3-6: Conducting an AirMagnet Site Survey for Greenfield Mode
Lesson 6: Conducting a Layer 2 Site Survey for Location

This lesson defines how to conduct a Layer 2 site survey for location services using AirMagnet Survey PRO. Upon completing this lesson, the learner will be able to meet these objectives:

- Describe the minimum signal level thresholds for location-aware WLAN design
- Describe access point placement for location-aware WLAN design
- Describe access point separation recommendations for location-aware WLAN design
- Describe recommendations for a voice, data, and location-aware WLAN design

The lesson includes these topics:

- Minimum Signal Level Thresholds
- Access Point Placement
- Access Point Separation
- Location, Voice, and Data Coexistence

Module 4: AP and Controller Density and Licensing

Determine the placement of the access points for data, voice, and location applications as well as controller placement and redundancy.

Lesson 1: Determining the Infrastructure Requirements for the WLAN

This lesson determines the infrastructure requirements for the WLAN. Upon completing this lesson, the learner will be able to meet these objectives:

- Describe the power requirements for a WLAN deployment
- Describe the current network infrastructure
- Describe access point mounting considerations for a WLAN deployment
- Describe the recommendations for adding additional access points to the WLAN deployment for voice or location-based services

The lesson includes these topics:

- Power Requirements
- Evaluating the Current Network Infrastructure
- Mounting Considerations
- Adding Additional Access Points

Lesson 2: Determining the WLAN Equipment and Licenses

This lesson determines the number of access points, controllers, location appliances, and Cisco WCS licenses needed for the WLAN. Upon completing this lesson, the learner will be able to meet these objectives:

- Determine the number of access points and controllers needed for a WLAN deployment
- Determine the Cisco WCS license and number of location servers or MSE needed for a WLAN deployment
The lesson includes these topics:

- Controllers and Access Points
- Cisco WCS Licenses for Location Servers and the MSE

The lesson includes these activities:

- Activity 4-1: Determine the WLAN Equipment and Licenses

**Module 5: Assessment of the Deployment**

Assess the deployment of the WLAN.

**Lesson 1: Verifying the RF Coverage**

This lesson describes the steps necessary to verify the RF coverage of the deployment and make necessary adjustments. Upon completing this lesson, the learner will be able to meet these objectives:

- Describe how to perform an RF audit using AirMagnet Survey PRO
- Describe how to tune the Radio Resource Management parameters for the deployed WLAN
- Describe how to tune various network appliances deployed in the WLAN
- Describe how to verify the applications using the local client

The lesson includes these topics:

- RF Audit
- RRM Tuning
- Network Appliance and Application Tuning
- Verify the Applications

**Lesson 2: Verifying WLAN Readiness**

This lesson describes the steps necessary to use the Cisco WCS tools to verify the readiness of the WLAN to support the desired applications. Upon completing this lesson, the learner will be able to meet these objectives:

- Describe how to perform a site calibration using Cisco WCS
- Describe how to perform the WCS location readiness test
- Describe how to perform the voice readiness test using Cisco WCS

The lesson includes these topics:

- Cisco WCS Site Calibration
- Cisco WCS Location Readiness Test
- Cisco WCS Voice Readiness Test

The lesson includes these activities:

- Lab 5-1: Performing a Floor Calibration
Lesson 3: Presenting an Installation Report

This lesson describes the information needed in an installation report. Upon completing this lesson, the learner will be able to meet these objectives:

- Describe the contents of an installation report
- Describe the information given to the customer in an installation report

The lesson includes these topics:

- Preparing an Installation Report
- Presenting an Installation Report
Course Evaluations

Cisco uses a post-course evaluation system, Metrics That Matter (MTM), for its instructor-led courses. The instructor must ensure that each student is aware of the confidential evaluation process and that all students submit an evaluation for each course. There are two options for students to complete the evaluation.

For Classes with Internet Access

A URL will be made available, specific to each Cisco Learning Partner. Obtain the URL from your MTM system administrator before the last day of class.

1. Upon completion of the course, instruct the students to enter the URL into their browser.
2. Make sure that the students input their e-mail address (used only for a follow-up evaluation).

Note

Sixty days following a learning event, students will receive a brief follow-up evaluation, and, again, responses will be kept confidential. E-mail addresses will not be used for marketing purposes. (If students do not have e-mail addresses, they can type in a “dummy” address.)

3. Instruct the students to select the appropriate course from the drop-down list.
4. Instruct the students to complete the course evaluation and click Submit one time only.
5. Advise the students to wait for “Thank you” to appear on the screen before leaving.

For Classes Without Internet Access

A paper-based version of the post-course evaluation is available. Your MTM system administrator can provide you with copies.

1. Distribute paper-based evaluations at the beginning of the last day of class.
2. Instruct the students to complete the survey only after completing the course.
3. Collect the evaluations and submit them to your MTM system administrator.

To View Evaluation Results

To view your post-course evaluation results:

1. Go to www.metricsthatmatter.com/client. (Reminder: All data is confidential; you will see only your own data.)
2. Log in using your ID and the password sent to you from MTM or provided by your company MTM system administrator to ensure confidentiality.
3. Choose Menu Option – Learner Evaluation Reports:
   — Evaluation Retrieval Tool
   — Class Evaluation Summary Report
4. Search for and select the appropriate class.
Lab Setup

Overview

The purpose of the Lab Setup section is to assist in the setup and configuration of the training equipment for the Conducting Cisco Wireless Site Survey (CUWSS) v1.0 course. This section includes these topics:

- Lab Topology
- Hardware and Software Requirements
- Workstation Configuration
- Lab Equipment Configuration
- General Lab Setup
- Lab 3-1: Producing a Predictive Site Survey
- Lab 3-2: Conducting a Layer 1 Sweep with Cisco Spectrum Expert
- Lab 3-3: Locating an Interfering Device
- Lab 3-4: Conducting an AirMagnet Site Survey for Data
- Lab 3-5: Conducting an AirMagnet Site Survey for VoWLAN
- Lab 3-6: Conducting an AirMagnet Site Survey for Greenfield Mode
- Lab 5-1: Performing a Floor Calibration
- Configuration Files Summary
- Lab Activity Solutions
- Teardown and Restoration
Lab Topology

This topic describes the lab topology for Conducting Cisco Unified Wireless Site Survey (CUWSS) v1.0.

There are two lab configurations for this class. One configuration involves four AP1252 lightweight access points directly connected to a 2106 controller. The 2106 controller is also directly connected to a Windows 2003 Server running WCS version 5.1. The access points can be powered by either midspan power injectors or the TerraWave Site Survey Battery pack. This lab model is used for Labs 3-2 and 5-1 by all pods. Students are connected via their laptop internal Intel 4965a/g/n wireless NIC.

Student pods consist of (eight total) one laptop computer with an integrated Intel Wireless WiFi Link 4965AGN card. Loaded on each laptop is the following software: Windows XP Pro Service Pack (SP) 2, AirMagnet Site Survey PRO, Cisco Spectrum Expert, Cisco Aironet Desktop Utility (ADU), and the student files (digital floor plans, Iperf.exe, and survey documentation PDF templates).

**Caution** Ensure that student laptops do not have Windows XP Pro SP3 loaded. If SP3 is loaded, you will have issues running AirMagnet Site Survey software.

For Labs 3-3 through 3-6, each pod will need one USB-to-serial cable, one Cisco console cable, one AP 1252, one TerraWave site survey battery pack, one AirMagnet 802.11a/b/g/n wireless PC Card, and one Cisco Aironet 802.11a/b/g Wireless Adapter.
# Student Pod (x8)

AP1250 with Cisco IOS Software

Pod Laptop with IntelPro a/g/n Wireless NIC Cisco Spectrum Expert, AirMagnet Survey PRO, Cisco Aironet Desktop Utility, and Windows XP Pro SP2

## Common Equipment to Support Eight Pods: One Set per Class

<table>
<thead>
<tr>
<th>Device Name</th>
<th>Device Name Abbreviation</th>
<th>Assigned Pod</th>
<th>Interface</th>
<th>Network Address, Mask /24</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>2106 controller</td>
<td>2106-1</td>
<td>1-8</td>
<td>1</td>
<td>10.9.4.20/24</td>
<td></td>
</tr>
<tr>
<td>2003 server with WCS 5.1</td>
<td>WCS</td>
<td>1-8</td>
<td>1</td>
<td>10.9.4.10/24</td>
<td></td>
</tr>
<tr>
<td>1252 AP</td>
<td>1252-1</td>
<td>1-8</td>
<td>2</td>
<td>10.9.4.100 - 254</td>
<td>LWAPP with DHCP</td>
</tr>
<tr>
<td>1252 AP</td>
<td>1252-2</td>
<td>1-8</td>
<td>3</td>
<td>10.9.4.100 - 254</td>
<td>LWAPP with DHCP</td>
</tr>
<tr>
<td>1252 AP</td>
<td>1252-3</td>
<td>1-8</td>
<td>4</td>
<td>10.9.4.100 - 254</td>
<td>LWAPP with DHCP</td>
</tr>
<tr>
<td>1252 AP</td>
<td>1252-4</td>
<td>1-8</td>
<td>5</td>
<td>10.9.4.100 - 254</td>
<td>LWAPP with DHCP</td>
</tr>
</tbody>
</table>
### Pods 1 Through 8

<table>
<thead>
<tr>
<th>Device Name</th>
<th>Device Name Abbreviation</th>
<th>Assigned Pod</th>
<th>Interface</th>
<th>Network Address, mask /24</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laptop</td>
<td>LT1E</td>
<td>1</td>
<td>Ethernet</td>
<td>192.168.1.12</td>
<td>Static IP</td>
</tr>
<tr>
<td>Intel 4965 a/g/n</td>
<td>LT1I</td>
<td>1</td>
<td>Wireless</td>
<td>192.168.1.11</td>
<td>Static IP</td>
</tr>
<tr>
<td>AirMagnet 6910</td>
<td>LT1A</td>
<td>1</td>
<td>Wireless</td>
<td>192.168.1.22</td>
<td>Static IP</td>
</tr>
<tr>
<td>AP 1252</td>
<td>AP1</td>
<td>1</td>
<td>Ethernet</td>
<td>192.168.1.10</td>
<td>Static IP</td>
</tr>
<tr>
<td>Laptop</td>
<td>LT2E</td>
<td>2</td>
<td>Ethernet</td>
<td>192.168.1.21</td>
<td>Static IP</td>
</tr>
<tr>
<td>Intel 4965 a/g/n</td>
<td>LT2I</td>
<td>2</td>
<td>Wireless</td>
<td>192.168.1.31</td>
<td>Static IP</td>
</tr>
<tr>
<td>AirMagnet 6910</td>
<td>LT2A</td>
<td>2</td>
<td>Wireless</td>
<td>192.168.1.32</td>
<td>Static IP</td>
</tr>
<tr>
<td>AP 1252</td>
<td>AP2</td>
<td>2</td>
<td>Ethernet</td>
<td>192.168.1.42</td>
<td>Static IP</td>
</tr>
<tr>
<td>Laptop</td>
<td>LT3E</td>
<td>3</td>
<td>Ethernet</td>
<td>192.168.1.52</td>
<td>Static IP</td>
</tr>
<tr>
<td>Intel 4965 a/g/n</td>
<td>LT3I</td>
<td>3</td>
<td>Wireless</td>
<td>192.168.1.62</td>
<td>Static IP</td>
</tr>
<tr>
<td>AirMagnet 6910</td>
<td>LT3A</td>
<td>3</td>
<td>Wireless</td>
<td>192.168.1.72</td>
<td>Static IP</td>
</tr>
<tr>
<td>AP 1252</td>
<td>AP4</td>
<td>4</td>
<td>Ethernet</td>
<td>192.168.1.82</td>
<td>Static IP</td>
</tr>
<tr>
<td>Laptop</td>
<td>LT4E</td>
<td>5</td>
<td>Ethernet</td>
<td>192.168.1.92</td>
<td>Static IP</td>
</tr>
<tr>
<td>Intel 4965 a/g/n</td>
<td>LT4I</td>
<td>5</td>
<td>Wireless</td>
<td>192.168.1.100 -254/24</td>
<td>DHCP</td>
</tr>
<tr>
<td>AirMagnet 6910</td>
<td>LT4A</td>
<td>5</td>
<td>Wireless</td>
<td>192.168.1.110 -254/24</td>
<td>DHCP</td>
</tr>
<tr>
<td>AP 1252</td>
<td>AP5</td>
<td>6</td>
<td>Ethernet</td>
<td>192.168.1.120 -254/24</td>
<td>DHCP</td>
</tr>
<tr>
<td>Laptop</td>
<td>LT5E</td>
<td>7</td>
<td>Ethernet</td>
<td>192.168.1.130 -254/24</td>
<td>DHCP</td>
</tr>
<tr>
<td>Intel 4965 a/g/n</td>
<td>LT5I</td>
<td>7</td>
<td>Wireless</td>
<td>192.168.1.140 -254/24</td>
<td>DHCP</td>
</tr>
<tr>
<td>AirMagnet 6910</td>
<td>LT5A</td>
<td>7</td>
<td>Wireless</td>
<td>192.168.1.150 -254/24</td>
<td>DHCP</td>
</tr>
<tr>
<td>AP 1252</td>
<td>AP6</td>
<td>8</td>
<td>Ethernet</td>
<td>192.168.1.160 -254/24</td>
<td>DHCP</td>
</tr>
<tr>
<td>Laptop</td>
<td>LT6E</td>
<td>9</td>
<td>Ethernet</td>
<td>192.168.1.170 -254/24</td>
<td>DHCP</td>
</tr>
<tr>
<td>Intel 4965 a/g/n</td>
<td>LT6I</td>
<td>9</td>
<td>Wireless</td>
<td>192.168.1.180 -254/24</td>
<td>DHCP</td>
</tr>
<tr>
<td>AirMagnet 6910</td>
<td>LT6A</td>
<td>9</td>
<td>Wireless</td>
<td>192.168.1.190 -254/24</td>
<td>DHCP</td>
</tr>
<tr>
<td>AP 1252</td>
<td>AP7</td>
<td>10</td>
<td>Ethernet</td>
<td>192.168.1.200 -254/24</td>
<td>DHCP</td>
</tr>
<tr>
<td>Laptop</td>
<td>LT7E</td>
<td>11</td>
<td>Ethernet</td>
<td>192.168.1.210 -254/24</td>
<td>DHCP</td>
</tr>
<tr>
<td>Intel 4965 a/g/n</td>
<td>LT7I</td>
<td>11</td>
<td>Wireless</td>
<td>192.168.1.220 -254/24</td>
<td>DHCP</td>
</tr>
<tr>
<td>AirMagnet 6910</td>
<td>LT7A</td>
<td>11</td>
<td>Wireless</td>
<td>192.168.1.230 -254/24</td>
<td>DHCP</td>
</tr>
<tr>
<td>AP 1252</td>
<td>AP8</td>
<td>12</td>
<td>Ethernet</td>
<td>192.168.1.240 -254/24</td>
<td>DHCP</td>
</tr>
</tbody>
</table>
# Hardware and Software Requirements

## Hardware List

The hardware listed in the following table is suggested for this learning product.

<table>
<thead>
<tr>
<th>Description</th>
<th>Mfr.</th>
<th>Part Number</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Common Equipment – Supports 8 Pods – 1 Set per Class</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP1252 Lightweight Access Point</td>
<td>Cisco</td>
<td>AIR-LAP1252AG-X-K9</td>
<td>4</td>
</tr>
<tr>
<td>Power Injectors for AP1252</td>
<td>Cisco</td>
<td>AIR-PWRINJ4</td>
<td>4</td>
</tr>
<tr>
<td>2.2-dBi 2.4GHz dipole antenna</td>
<td>Cisco</td>
<td>AIR-ANT2422DW-R</td>
<td>12</td>
</tr>
<tr>
<td>3.5-dBi dipole 5 GHz antenna</td>
<td>Cisco</td>
<td>AIR-ANT5135DW-R</td>
<td>12</td>
</tr>
<tr>
<td>WLAN Controller 2106</td>
<td>Cisco</td>
<td>AIR-WLC2106-K9</td>
<td>1</td>
</tr>
<tr>
<td>Cat 5 cable – Minimum 50 ft or 15 meters</td>
<td>Various</td>
<td>TBD</td>
<td>4</td>
</tr>
<tr>
<td>Cat 5 cable – minimum 6 feet or 2 meters</td>
<td>Various</td>
<td>TBD</td>
<td>1</td>
</tr>
<tr>
<td>Windows 2003 Server with 4+ Gigabit memory for WCS</td>
<td>Various</td>
<td>TBD</td>
<td>1</td>
</tr>
<tr>
<td><strong>Student Pod Equipment – 2 Students per Pod – 8 Pods Total per Class</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP1252 Autonomous Access Point</td>
<td>Cisco</td>
<td>AIR-AP1252AG-X-K9</td>
<td>8</td>
</tr>
<tr>
<td>2.4-GHz 2.2 dBi Dipole Antenna w/RP-TNC connector</td>
<td>Cisco</td>
<td>AIR-ANT2422DW-R</td>
<td>24</td>
</tr>
<tr>
<td>5-GHz 3.5 dBi Dipole Antenna w/RP-TNC connector</td>
<td>Cisco</td>
<td>AIR-ANT5135DW-R</td>
<td>24</td>
</tr>
<tr>
<td>Site Survey Battery Pack (example: TerraWave Battery Pack)</td>
<td>Various</td>
<td>TBD</td>
<td>8</td>
</tr>
<tr>
<td>Laptop with IntelPRO 4965 a/b/g/n wireless NIC, RS-232 port or USB to RS-232 adapter, 2+GHz processor, 2 G RAM, 802.3 10/100T, PCMCIA and USB ports.</td>
<td>Various</td>
<td>TBD</td>
<td>8</td>
</tr>
<tr>
<td>Cisco Spectrum Expert Card Bus Adapter with SAgE2 ASIC (order after June 2008)</td>
<td>Cisco</td>
<td>AIR-CSCO-SE-WIFI-C</td>
<td>8</td>
</tr>
<tr>
<td>AirMagnet 802.11a/b/g/n Wireless PC Card</td>
<td>AirMagnet</td>
<td>C1060</td>
<td>8</td>
</tr>
<tr>
<td>Cisco Aironet 802.11a/b/g Wireless adapter</td>
<td>Cisco</td>
<td>AIR-CB21AG-A-K9</td>
<td>8</td>
</tr>
<tr>
<td>Cat 5 Cabling Crossover cable</td>
<td>Various</td>
<td>TBD</td>
<td>8</td>
</tr>
<tr>
<td>Console Cable for AP 1250</td>
<td>Cisco</td>
<td>AIR-CONCAB1200</td>
<td>8</td>
</tr>
<tr>
<td><strong>Other Required Equipment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel cases (example: Pelican 1660)</td>
<td>Various</td>
<td>TBD</td>
<td>1*</td>
</tr>
<tr>
<td>Wireless interferer (example: Linksys WVC54GCA wireless monitoring camera)</td>
<td>Generic</td>
<td>TBD</td>
<td>1</td>
</tr>
<tr>
<td>DECT Cordless Phone 2.4 GHz</td>
<td>Generic</td>
<td>TBD</td>
<td>1</td>
</tr>
</tbody>
</table>
## Software List

The software listed in the following table is suggested for this learning product.

<table>
<thead>
<tr>
<th>Description</th>
<th>Mfr.</th>
<th>Part Number</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>WCS version 5.1 with location and license</td>
<td>Cisco</td>
<td>WCS-Standard-K9 with WCS-APLOG-50 license</td>
<td>1</td>
</tr>
<tr>
<td>Pod Laptops: Windows XP Pro SP2</td>
<td>Microsoft</td>
<td>TBD</td>
<td>8</td>
</tr>
<tr>
<td>Cisco Spectrum Intelligence License v.3.3</td>
<td>Cisco</td>
<td>WCS-ADV-K9</td>
<td>8</td>
</tr>
<tr>
<td>AirMagnet Survey PRO v.6.0</td>
<td>AirMagnet</td>
<td>TBD</td>
<td>8</td>
</tr>
<tr>
<td>Windows 2003 SP3 on server</td>
<td>Microsoft</td>
<td>N/A</td>
<td>1</td>
</tr>
<tr>
<td>Cisco Aironet Desktop Utility (ADU) v.4.2</td>
<td>Cisco</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Cisco IOS Software Release 12.3.8(JA)</td>
<td>Cisco</td>
<td>TBD</td>
<td>8</td>
</tr>
<tr>
<td>WLC code 5.1</td>
<td>Cisco</td>
<td>TBD</td>
<td>1</td>
</tr>
<tr>
<td>PCs: Windows XP SP2</td>
<td>Microsoft</td>
<td>N/A</td>
<td>8</td>
</tr>
</tbody>
</table>
Workstation Configuration

These instructions describe how to set up the lab when workstations are required.

Class PCs

**Step 1** Make sure that PCs have Windows XP Pro SP2 installed, and have browser capability.

**Step 2** Make sure that PCs have Flash plug-in installed. It is required to access Cisco WCS.

**Step 3** Download and install Cisco Spectrum Expert.

**Step 4** Download and install AirMagnet Survey PRO.

**Step 5** Download and install Cisco ADU.

**Step 6** Install student files, and provide a shortcut on the desktop in a student files folder.

**Step 7** Download and install Iperf.exe on the root under a created folder called IPERF.

**Step 8** IPERF can be downloaded from [http://www.noc.ucf.edu/Tools/Iperf/](http://www.noc.ucf.edu/Tools/Iperf/).

---

**Note**

Student files consist of maps to be used for the predictive site survey. For the actual site survey labs, students will need a digital floor plan of the facility being surveyed to load into WCS and AirMagnet Survey PRO.

**Note**

Other files include Iperf.exe and any site survey PDF template documentation handouts.
Lab Equipment Configuration

This equipment configuration information is necessary for initial setup of the lab configuration.

Notes on Delivery

Lab Equipment: All equipment should be cleared except for the 2106 WLC prior to class start, to include, but not limited to, the following:

- In the laptops, all Cisco WCS maps should be deleted.
- In the laptops, all student files saved to the desktop should be deleted.
- In the laptops, all AirMagnet projects should be deleted.
- All autonomous IOS 1250 access points should be reset to factory default.
- In the laptops, all wireless profiles should be deleted.

The instructor will need to configure the 2106 WLC for a basic configuration with an IP address of 10.9.4.20/24 for the management interface. The management interface should be on Port 1. A WLAN with the SSID of survey should be created, and security on the survey WLAN should be disabled. Complete controller configuration is listed below.

Learners can access the WCS through the survey WLAN network.

The username and password for the WCS as written in the labs is root public. If your server is configured for root 12#$Pass, as in other wireless training, you will need to communicate this to the students prior to any labs that involve the WCS server.
General Lab Setup

This information details the procedure to set up and configure the lab equipment.

**Step 1** Interconnect the WCS server with the 2106 WLC on Port 1.

**Step 2** Interconnect all LWAPP 1252 access points to the 2106 WLC on Ports 2–5.

**Step 3** Configure the controller:

- Username: Admin
- Password: SURVEY
- Interface address ap-manager 10.9.4.192/24
- Interface address management 10.9.4.10/24
- Interface address virtual 1.1.1.1
- Interface dhcp ap-manager primary 10.9.4.10
- Interface dhcp management primary 10.9.4.10
- Interface port ap-manager 1
- Interface port management 1
- Mobility Group Domain Survey
- WLAN SSID survey
- Security: None

**Step 4** Make sure that the DHCP service on the server is configured for the 10.9.4.0/24 and the DHCP pool has been set for 10.9.4.100 to 10.9.4.50.

**Step 5** Make sure DHCP service is set up for Option 43 and that the Cisco Aironet 1250 Series Access Point has been added.

**Step 6** In the remote laptops, make sure that no Preferred network remains in the Windows Wireless Zero Configuration (WZC) utility.
Lab 3-1: Producing a Predictive Site Survey

This topic details the lab activity for Lab 3-1.

Objectives

You will complete these tasks in this lab:

- Create a wireless profile and connect to the Cisco WCS
- Create a building with one or more floors
- Create a coverage area
- Create a proposal

Visual Objective

The figure displays the lab topology that you will use to complete this lab.

Additional Setup Notes

A WLAN has been created on the 2106 WLC. The SSID is survey and it is being broadcast. There is no security on this connection. In this lab, students will connect to the Cisco WCS server.
Lab 3-2: Conducting a Layer 1 Sweep with Cisco Spectrum Expert

This topic details the lab activity for Lab 3-2.

Objectives

You will complete these tasks in this lab:
- Install Cisco Spectrum Expert Sensor on the computer provided
- Configure Cisco Spectrum Expert for a Layer 1 sweep
- Conduct a Layer 1 sweep of the training facility and identify any present interferers

Visual Objective

The figure displays the lab topology that you will use to complete this lab.

Instructor Notes

Pass out one Cisco Spectrum Expert CardBus sensor card to each student.

During Task 1 you will turn on a 2.4-GHz phone so that the students can view the extreme spike on channel 1. While the phone is on, Wi-Fi devices are unable to function on channel 1 due to the constant signal from the 2.4-GHz phone.

Before the students begin Task 3, provide them with a map of the area for the test sweep (this should be a printed map of the facility at which the lab is being conducted).
After the students have finished Task 3, have one person from your group prepare to debrief the class on your findings for the group.

The students must write down any interference or devices they encounter.

In Task 2, Step 9, the students are asked to view their 802.11 devices. For them to do this, their Wi-Fi card should be in passive mode. Make sure that it is not associated to an access point. The lab will still work if the wireless card is associated, but it is recommended for it not to be associated.
Lab 3-3: Locating an Interfering Device

This topic details the lab activity for Lab 3-3.

Objectives

You will complete these tasks in this lab:

- Locate an interferer with Cisco Spectrum Expert Device Finder

Visual Objective

The figure displays the lab topology that you will use to complete this lab.

Instructor Notes

After all the students have found the phone, they will return to the classroom for discussion of this exercise. Make sure that they do not turn the phone off or remove the phone from where it was found.

Common Issues

This subtopic presents common issues for this lab.

- **Battery Dead**: The phone runs out of battery before all students have located the interfering phone device.
  - Check this parameter:
    - Watch for the phone to drop in Cisco Spectrum Expert, which means battery life has been exhausted.
Lab 3-4: Conducting an AirMagnet Site Survey for Data

This topic details the lab activity for Lab 3-4.

Objectives

You will complete these tasks in this lab:

- Configure the access point for the site survey using the 802.11g/n AP interface
- Configure AirMagnet Survey PRO to perform a site survey of the facility
- Perform a survey of the facility or targeted area

Visual Objective

The figure displays the lab topology that you will use to complete this lab.

Instructor Notes

A key element of this lab is that each group should start in a different area, and groups should coordinate, before starting, to decide which channel each group will be using, to avoid interfering with one another.

Take some time at the beginning of the lab to advise the teams that one member of each group must stay with the access point at all times during the survey to ensure that the equipment is not damaged, stolen, or removed by security because it is an unknown device. Advise them to take turns surveying.
One member can do the first access point coverage area, and another member can do the next. Emphasize that while performing the survey each member of the group should perform all the roles of the group to ensure that everyone gets a chance to use AirMagnet Survey PRO.

Inform the groups that they must do a minimum of two active surveys for each access point placement, and that after all the active surveys are done for all access points they will need to perform a final passive survey using ANY for the SSID.

Advise the students to return to the classroom and merge their access point active data files for each access point. Then merge all the access point data merged files, and finally merge the access point active merged file with the passive data file.

After everyone has completed their tasks, you will need to discuss with the class the feasibility of each proposed installation.

**Common Issues**

This subtopic presents common issues for this lab.

- **Duplicate IP address:** Some students configure the first IP address (192.168.1.10) regardless of the group they are in. This creates a duplicate IP address issue, where a typical symptom is the inability to ping properly. Make sure that each group knows which IP address is allocated to them.

- **Client fails to attach to the access point:** If the client fails to attach to the access point, check these parameters:
  - Verify that the SSID is correct on client and on the access point. The SSID is case sensitive.
  - Verify that AP radio interface is up.
  - Verify that the right protocol is selected in AirMagnet (2.4 GHz versus 5 GHz).

- **Access point does not show while in passive site survey mode:** If the access point does not show while in the passive site survey mode, check the Scan tab under Configure and verify that the correct channels are enabled.

- **Damaged battery pack:** Make sure that the students remove the charger from the site survey battery pack before connecting it to the 1250 AP so that it does not damage the battery pack.
Lab 3-5: Conducting an AirMagnet Site Survey for VoWLAN

This topic details the lab activity for Lab 3-5.

Objectives

You will complete these tasks in this lab:
- Configure the access point for a 5-GHz survey
- Configure AirMagnet Survey PRO to perform a 5-GHz site survey
- Conduct a survey for VoWLAN at 5 GHz

Visual Objective

The figure displays the lab topology that you will use to complete this lab.

Instructor Notes

Before the students begin this lab activity, you will need to provide them with the floor plan dimensions. This information will be used in Task 2, Step 9. In addition, you will need to provide them with the actual distance so that the information can be added during Step 15 of the same task.

A key element of this lab is that each group should start in a different area, and groups should coordinate before starting to decide which channel each group will be using, to avoid interfering with one another. (Channels for each group are specified in the lab.)
Take some time at the beginning of the lab to advise the teams that one member of each group must stay with the access point at all times during the survey and that group members should switch roles so that everyone has the opportunity to perform all of the tasks.

Emphasize to the students that each group must perform two active surveys as well as a final passive survey using ANY for the SSID. After the survey is complete, have the students return to the classroom and have each group merge their files and get ready to propose their installation to the entire class. Discuss with the class the feasibility of each proposed installation.

**Common Issues**

This subtopic presents common issues for this lab.

- **Some groups cannot connect:** Students in Groups 3 and 7 cannot connect to the access point. This might be due to their not using the AirMagnet card to connect to the access point. For them to connect, they must first shut down AirMagnet to make the necessary changes to the access point. After their PC restarts, they should be able to connect wirelessly to the access point to make their parameter changes. The Intel wireless client does not understand the Band 3 (UNII II extended) channel set. Therefore, you cannot connect to the access point with the Intel wireless card on Band 3 channels.

- **Check these parameters:**
  - Groups 3 and 7 or groups using the Band 3 channel set should not attempt to use the Intel wireless client to connect to the access point. The Intel wireless client does not understand the channel set and will not connect. Use the AirMagnet wireless client to make parameter changes when using the Band 3 channel set.
  - While you are conducting the passive survey, no access points appear in the Access Point List.
  - Check the Scan tab under the configure menu and ensure that the Country Code Channels are enabled.
Lab 3-6: Conducting an AirMagnet Site Survey for Greenfield Mode

This topic details the lab activity for Lab 3-6.

Objectives

You will complete these tasks in this lab:

- Configure the access point for 5-GHz 40-MHz-wide channel
- Configure AirMagnet to perform an active Iperf survey
- Conduct a greenfield mode survey

Visual Objective

The figure displays the lab topology that you will use to complete this lab.

Instructor Notes

In this lab, two laptops are required for each group. One laptop is used to run Iperf, which is attached to the access point through the wireless client, and one laptop is used to survey the facility with AirMagnet Survey PRO. Form four groups. Pod 1 works with Pod 2, Pod 3 with Pod 4, Pod 5 with Pod 6, and Pod 7 with Pod 8.
Provide the students with the floor width of the classroom. This information will be needed in Task 3, Step 15.

Advise the students that they will perform this survey the way they performed the previous two surveys.

Discuss with the class the feasibility of each proposed installation.
Lab 5-1: Performing a Floor Calibration

This topic details the lab activity for Lab 5-1.

Objectives

You will complete these tasks in this lab:

- Create a wireless profile and connect to Cisco WCS
- Create a building with one or more floors
- Add access points to the floor (group 1 only)
- Conduct a calibration model for the first floor (all groups)
- Inspect the location quality using Cisco WCS
- Locate your client on the floor
- Check the floor for VoWLAN readiness

Visual Objective

The figure displays the lab topology that you will use to complete this lab.

Instructor Notes

Students should use the Cisco Aironet 802.11a/b/g Wireless Adapter for this lab. The adapter should be managed by Aironet Desktop Utility (ADU) for this lab.
Common Issues

This subtopic presents common issues for this lab.

- **Lab fails:** Ensure that the student is using the Cisco Aironet wireless adapter with ADU.
- **Calibration Fails:** Ensure that the student has collected enough access points. The program will not calibrate until a minimum of 50 unique locations have been taken and a total of 150 access point locations per protocol (2.4 or 5 GHz) have been taken.
Answer Key

The correct answers and expected solutions for the activities that are described in this guide appear here.

Lab 3-1 Answer Key: Produce a Predictive Site Survey

Task 5

Q1) 12
Q2) 54
Q3) 54
Q4) –55 to –60 dBm
Q5) 2.1%
Q6) –45 to –60 dBm and below
Q7) 4.7%
Q8) 10
Q9) 54
Q10) 36
Q11) –55 to –60 dBm
Q12) 4.4%
Q13) –45 to –50
Q14) 8.0

Note: Answers will vary depending on the exact sizing of the coverage area chosen.
Teardown and Restoration

This topic describes how to tear down and restore the equipment that is used in the course.

**Step 1** The Cisco Aironet 1252 IOS Access Points should be reset to factory default.

**Step 2** On the student laptops, delete any buildings and floors created in Cisco WCS Maps.

**Step 3** On the student laptops, delete the Preferred networks in the Windows WZC.

**Step 4** On the student laptops, delete any wireless profiles created in Aironet Desktop Utility.

**Step 5** On the student laptops, remove files that students might have left on the desktop.

**Step 6** On the student laptops, remove all AirMagnet projects. These are normally found in the My Documents folder.

**Step 7** On the student laptops, restore all wireless adapters to DHCP (delete any static address created).