



PRELIMINARY Quick Start Guide: Cisco Aironet 1500 Series Lightweight Outdoor Mesh Access Point

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Preface

This section describes the objectives, audience, organization, and conventions of the *Quick Start Guide: Cisco Aironet 1500 Series Lightweight Outdoor Mesh Access Point*.

Objectives

This publication explains the steps for installing the Cisco Aironet 1500 Series lightweight outdoor mesh access point (hereafter called the *outdoor access point*) supporting 2.4- and 5-GHz operation, and includes detailed instructions for mounting the outdoor access point and associated antennas.

Audience

This publication is for the person installing and configuring an outdoor access point for the first time. The installer should be familiar with network structures, terms, and concepts.



Warning

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

Organization

This guide contains the following sections:

[Chapter 1, “Overview,”](#) describes the major components and features of the outdoor access point.

[Chapter 2, “Installation Overview,”](#) provides warnings, safety information, and information needed before you begin the installation of your outdoor access point.

[Chapter 3, “Installation Instructions,”](#) provides an overview of components and features used during outdoor access point mounting and antenna mounting operations.

[Appendix A, “Translated Safety Warnings,”](#) lists translations of the safety warnings in this publication.

[Appendix A, “Declarations of Conformity and Regulatory Information,”](#) describes the regulatory conventions to which the outdoor access point conforms and provides guidelines for operating outdoor access points in Japan.

Conventions

This publication uses the following conventions to convey instructions and information:

- Commands and keywords are in **boldface** type.



Note

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



Caution

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



Warning

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. (To see translations of the warnings that appear in this publication, refer to the appendix “Translated Safety Warnings.”)

Waarschuwing

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen. (Voor vertalingen van de waarschuwingen die in deze publicatie verschijnen, kunt u het aanhangsel “Translated Safety Warnings” (Vertalingen van veiligheidsvoorschriften) raadplegen.)

Varoitus

Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista. (Tässä julkaisussa esiintyvien varoitusten käännökset löydät liitteestä “Translated Safety Warnings” (käännetyt turvallisuutta koskevat varoitukset).)

Attention

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures. Avant d'accéder à cet équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures courantes de prévention des accidents. Pour obtenir les traductions des mises en garde figurant dans cette publication, veuillez consulter l'annexe intitulée « Translated Safety Warnings » (Traduction des avis de sécurité).

Warnung

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewußt. (Übersetzungen der in dieser Veröffentlichung enthaltenen Warnhinweise finden Sie im Anhang mit dem Titel “Translated Safety Warnings” (Übersetzung der Warnhinweise).)

Avvertenza	Questo simbolo di avvertenza indica un pericolo. Si è in una situazione che può causare infortuni. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi ai circuiti elettrici ed essere al corrente delle pratiche standard per la prevenzione di incidenti. La traduzione delle avvertenze riportate in questa pubblicazione si trova nell'appendice, "Translated Safety Warnings" (Traduzione delle avvertenze di sicurezza).
Advarsel	Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du være oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker. (Hvis du vil se oversettelser av de advarslene som finnes i denne publikasjonen, kan du se i vedlegget "Translated Safety Warnings" [Oversatte sikkerhetsadvarsler].)
Aviso	Este símbolo de aviso indica perigo. Encontra-se numa situação que lhe poderá causar danos físicos. Antes de começar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possíveis acidentes. (Para ver as traduções dos avisos que constam desta publicação, consulte o apêndice "Translated Safety Warnings" - "Traduções dos Avisos de Segurança").
¡Advertencia!	Este símbolo de aviso significa peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos estándar de prevención de accidentes. (Para ver traducciones de las advertencias que aparecen en esta publicación, consultar el apéndice titulado "Translated Safety Warnings.")
Varning!	Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador. (Se förklaringar av de varningar som förekommer i denna publikation i appendix "Translated Safety Warnings" [Översatta säkerhetsvarningar].)

Related Publications

For more information about outdoor access points and related products, refer to the following publications:

- *Release Notes: Cisco Aironet 1400 Series Wireless Bridge* describes features and caveats for the outdoor access points. This document is available on the Cisco CCO web site at the following URL:
<http://www.cisco.com/univercd/cc/td/doc/product/wireless/index.htm>
- Cisco Secure Access Control Server for Windows 2000/NT Servers Version 3.0 User Guide provides complete instructions for using Cisco Secure ACS, including steps for configuring Cisco Secure ACS to support access points. This document is available on the Cisco CCO web site at the following URL:
http://www.cisco.com/univercd/cc/td/doc/product/access/acs_soft/csacs4nt/csnt30/user/index.htm

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation at this URL:

<http://www.cisco.com/univercd/home/home.htm>

You can access the Cisco website at this URL:

<http://www.cisco.com>

You can access international Cisco websites at this URL:

http://www.cisco.com/public/countries_languages.shtml

Documentation DVD

Cisco documentation and additional literature are available in a Documentation DVD package, which may have shipped with your product. The Documentation DVD is updated regularly and may be more current than printed documentation. The Documentation DVD package is available as a single unit.

Registered Cisco.com users (Cisco direct customers) can order a Cisco Documentation DVD (product number DOC-DOCDVD=) from the Ordering tool or Cisco Marketplace.

Cisco Ordering tool:

<http://www.cisco.com/en/US/partner/ordering/>

Cisco Marketplace:

<http://www.cisco.com/go/marketplace/>

Ordering Documentation

You can find instructions for ordering documentation at this URL:

http://www.cisco.com/univercd/cc/td/doc/es_inpk/pdi.htm

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Ordering tool:
<http://www.cisco.com/en/US/partner/ordering/>
- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 1 800 553-NETS (6387).

Documentation Feedback

You can send comments about technical documentation to bug-doc@cisco.com.

You can submit comments by using the response card (if present) behind the front cover of your document or by writing to the following address:

Cisco Systems
Attn: Customer Document Ordering
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Cisco Product Security Overview

Cisco provides a free online Security Vulnerability Policy portal at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

From this site, you can perform these tasks:

- Report security vulnerabilities in Cisco products.
- Obtain assistance with security incidents that involve Cisco products.
- Register to receive security information from Cisco.

A current list of security advisories and notices for Cisco products is available at this URL:

<http://www.cisco.com/go/psirt>

If you prefer to see advisories and notices as they are updated in real time, you can access a Product Security Incident Response Team Really Simple Syndication (PSIRT RSS) feed from this URL:

http://www.cisco.com/en/US/products/products_psirt_rss_feed.html

Reporting Security Problems in Cisco Products

Cisco is committed to delivering secure products. We test our products internally before we release them, and we strive to correct all vulnerabilities quickly. If you think that you might have identified a vulnerability in a Cisco product, contact PSIRT:

- Emergencies—security-alert@cisco.com
- Nonemergencies—psirt@cisco.com



Tip

We encourage you to use Pretty Good Privacy (PGP) or a compatible product to encrypt any sensitive information that you send to Cisco. PSIRT can work from encrypted information that is compatible with PGP versions 2.x through 8.x.

Never use a revoked or an expired encryption key. The correct public key to use in your correspondence with PSIRT is the one that has the most recent creation date in this public key server list:

<http://pgp.mit.edu:11371/pks/lookup?search=psirt%40cisco.com&op=index&exact=on>

In an emergency, you can also reach PSIRT by telephone:

- 1 877 228-7302
- 1 408 525-6532

Obtaining Technical Assistance

For all customers, partners, resellers, and distributors who hold valid Cisco service contracts, Cisco Technical Support provides 24-hour-a-day, award-winning technical assistance. The Cisco Technical Support Website on Cisco.com features extensive online support resources. In addition, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not hold a valid Cisco service contract, contact your reseller.

Cisco Technical Support Website

The Cisco Technical Support Website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day, 365 days a year, at this URL:

<http://www.cisco.com/techsupport>

Access to all tools on the Cisco Technical Support Website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

<http://tools.cisco.com/RPF/register/register.do>

**Note**

Use the Cisco Product Identification (CPI) tool to locate your product serial number before submitting a web or phone request for service. You can access the CPI tool from the Cisco Technical Support Website by clicking the **Tools & Resources** link under Documentation & Tools. Choose **Cisco Product Identification Tool** from the Alphabetical Index drop-down list, or click the **Cisco Product Identification Tool** link under Alerts & RMAs. The CPI tool offers three search options: by product ID or model name; by tree view; or for certain products, by copying and pasting **show** command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco TAC engineer. The TAC Service Request Tool is located at this URL:

<http://www.cisco.com/techsupport/servicerequest>

For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco TAC engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)

EMEA: +32 2 704 55 55

USA: 1 800 553-2447

For a complete list of Cisco TAC contacts, go to this URL:

<http://www.cisco.com/techsupport/contacts>

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—Your network is “down,” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- Cisco Marketplace provides a variety of Cisco books, reference guides, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:
<http://www.cisco.com/go/marketplace/>
- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:
<http://www.ciscopress.com>
- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:
<http://www.cisco.com/packet>
- *iQ Magazine* is the quarterly publication from Cisco Systems designed to help growing companies learn how they can use technology to increase revenue, streamline their business, and expand services. The publication identifies the challenges facing these companies and the technologies to help solve them, using real-world case studies and business strategies to help readers make sound technology investment decisions. You can access iQ Magazine at this URL:
<http://www.cisco.com/go/iqmagazine>
- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:
<http://www.cisco.com/ipj>
- World-class networking training is available from Cisco. You can view current offerings at this URL:
<http://www.cisco.com/en/US/learning/index.html>



Overview

The Cisco Aironet 1500 Series lightweight outdoor mesh access point (hereafter called the *outdoor access point*) is a wireless device designed for wireless client access and point-to-point bridging, point-to-multipoint bridging, and point-to-multipoint mesh wireless connectivity. The outdoor access point is a standalone unit that can be mounted on a building wall or overhang, on a rooftop pole, or on a street light pole. It is a self-contained outdoor unit which can be configured with a wired backhaul connection to an Ethernet segment for a rooftop deployment, or can be configured with a wireless backhaul for a pole-top deployment.

The outdoor access point provides client access and point-to-point connectivity and provides wireless backhaul in the 2.4-GHz UNII band as defined in the 802.11b and 802.11g standards and in the 5-GHz UNII 3 band derived from the 802.11a standard. The outdoor access point delivers 6 to 54 Mbps data rates without the need for a license.

The outdoor access point is configured, monitored, and operated through a Cisco Wireless LAN Controller as described in the *Cisco Wireless LAN Solution Product Guide*. The Cisco Wireless LAN Controllers use a browser-based management system, a command-line interface (CLI), or the Cisco WCS (Wireless Control System) network management system to manage the Cisco Wireless LAN Controller and the associated outdoor access points.

This chapter provides information on the following topic:

- [Key Features, page 1-2](#)

Key Features

Key features of the outdoor access point:

- Unlicensed UNII 2.4- and 5-GHz radio operation
- Metal enclosure supports outdoor installations
- Industrial temperature rating
- Mounting plate shipping configuration for external antennas (see [Figure 1-1](#))
- Mil-spec Ethernet and power ports
- Inline power over Ethernet cables or 100- to 240-VAC 50/60 Hz power over separate power cables
- Optional light pole mounting kit for rooftop and pole-top deployments
- Outdoor access point control using a browser-based management system, a CLI, or Cisco WCS

Figure 1-1 *Outdoor Access Point*



Power

The outdoor access point transmit output power can be configured to support many international regulatory domains, as specified in the *Cisco Wireless LAN Solution Product Guide*.

The rooftop outdoor access point receives inline power from the Cisco Aironet Power Injector (hereafter called the *power injector*) or from a 110- to 220-VAC power source. Shielded Ethernet cables provide Ethernet data and power from the power injector, and optional shielded power cables provide power from the power source to the outdoor access point. The power injector is a separate unit designed for operation in a sheltered indoor environment, such as inside a building. The power injector also functions as an Ethernet repeater by connecting to a Category 5 LAN backbone and using the Ethernet cable interface to the outdoor access point.

The power injector uses an external 48-VDC power module and injects the DC voltage into the Ethernet cables to power the outdoor access point.



Caution

Only use the power injector specified for the Cisco Aironet 1500 Series lightweight outdoor mesh access point. Other power injectors, including 802.03af power injectors, can damage the outdoor access point and/or can cause a hazardous condition.



Warning

The power injector and the power module should not be placed in an unprotected outdoor environment.

External Antennas

The outdoor access point is equipped with an N-type RF connector on the front of the unit for an external 2.4-GHz antenna and with an N-type RF connector on the end of the unit for an external 5-GHz antenna (see [Figure 1-1](#)). When using the optional Cisco external omnidirectional antennas, the 2.4-GHz antenna connects directly to the outdoor access point, and the 5-GHz antenna connects to the outdoor access point using the antenna's included coax cable.

The Cisco omnidirectional external antennas use vertical polarization.

The outdoor access point can also be equipped with third-party external antennas, subject to local regulatory requirements. Note that when you are installing third-party antennas, that they must be waterproof and installed with all waterproofing steps recommended by the third-party manufacturer.



Warning

To meet regulatory restrictions, the outdoor access point and external antennas must be professionally installed.

Ethernet Port

When used, the outdoor access point's power injector port accepts a Mil-spec connector, linking the outdoor access point to your 100BASE-T Ethernet LAN through the optional power injector. The Ethernet cables are used to send and receive Ethernet data and to optionally supply inline 48-VDC power from the power injector.

**Warning**

When you are installing the outdoor access point with a ethernet cable, and powering through that cable, the outdoor access point must be reliably grounded using an external ground wire as described in the [Rooftop Installations, page 3-14](#) and [Pole-Top Installations, page 3-15](#) sections.

**Tip**

The outdoor access point senses the Ethernet and power signals and automatically switches internal circuitry to match the cable connections.

**Note**

This product is designed for connection to an IT power distribution system, as well as other systems (TN, TT).

**Note**

Use only the optional Cisco power injector for the outdoor access point. The optional Cisco power injector is specified to meet the requirements of the outdoor access point and is a Listed Class 2 Limited Power Source (LPS).

Metal Enclosure

The outdoor access point uses a metal enclosure that supports outdoor operating environments and supports an industrial temperature operating range of -30 to 55 degrees C.



Installation Overview

This chapter provides warnings, safety information, and information needed before you begin the installation of your outdoor access point. This chapter includes the following sections:

- [Warnings, page 2-6](#)
- [Safety Information, page 2-7](#)
- [Unpacking the Outdoor Access Point, page 2-9](#)
- [Before Beginning the Installation, page 2-11](#)

Warnings

Translated versions of the following safety warnings are provided in [Appendix A, “Translated Safety Warnings.”](#)



Warning

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. (To see translations of the warnings that appear in this publication, refer to the appendix “Translated Safety Warnings.”)



Warning

You can be killed when installing the outdoor access point. To avoid this, locate the external antennas away from electric power lines or other power circuits, or where they can come into contact with such circuits. Make sure you follow all of the instructions and pay attention to all the Warning notes in this manual.

For proper installation and grounding of the antenna, please refer to national and local codes (e.g. U.S.:NFPA 70, National Electrical Code, Article 810, in Canada: Canadian Electrical Code, Section 54).



Warning

When installing the antenna, take extreme care not to come into contact with such circuits, as they may cause serious injury or death. For proper installation and grounding of the antenna, please refer to national and local codes (e.g. U.S.:NFPA 70, National Electrical Code, Article 810, in Canada: Canadian Electrical Code, Section 54).



Warning

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.



Warning

The outdoor access point is a sealed unit, and may not be opened in the field, or the outdoor access point can become a hazard. Should the seal be broken on an outdoor access point, return it to Cisco for a replacement.



Warning

This equipment must be externally grounded using a customer-supplied ground wire before power is applied. Refer to the mounting instructions in the [Rooftop Installations, page 3-14](#) or [Pole-Top Installations, page 3-15](#) sections for more information. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.



Warning

Read the installation instructions before you connect the system to its power source.



Warning

Do not work on the system or connect or disconnect cables during periods of lightning activity.



Warning

Do not operate your wireless network device near unshielded blasting caps or in an explosive environment unless the device has been modified to be especially qualified for such use.

**Warning**

In order to comply with radio frequency (RF) exposure limits, the antennas for this product should be positioned no less than 6.56 ft (2 m) from your body or nearby persons.

Safety Information

Follow the guidelines in this section to ensure proper operation and safe use of the outdoor access point.

FCC Safety Compliance Statement

The FCC, with its action in ET Docket 96-8, has adopted a safety standard for human exposure to RF electromagnetic energy emitted by FCC-certified equipment. When used with approved Cisco Aironet antennas, Cisco Aironet products meet the uncontrolled environmental limits found in OET-65 and ANSI C95.1, 1991. Proper operation of this radio device according to the instructions in this publication results in user exposure substantially below the FCC recommended limits.

Safety Precautions

**Warning**

You can be killed when installing the outdoor access point. To avoid this, locate the external antennas away from electric power lines or other power circuits, or where they can come into contact with such circuits. Make sure you follow all of the instructions and pay attention to all the Warning notes in this manual.

For proper installation and grounding of the antenna, please refer to national and local codes (e.g. U.S.:NFPA 70, National Electrical Code, Article 810, in Canada: Canadian Electrical Code, Section 54).

Each year hundreds of people are killed or injured when attempting to install antennas. In many of these cases, the victim was aware of the danger of electrocution, but did not take adequate steps to avoid the hazard.

For your safety, and to help you achieve a good installation, please read and follow these safety precautions. They may save your life!

1. Select your installation site with safety, as well as performance in mind. Remember: electric power lines and phone lines look alike. For your safety, assume that any overhead line can kill you.
2. Call your electric power company. Tell them your plans and ask them to come look at your proposed installation. This is a small inconvenience considering your life is at stake.
3. Plan your installation carefully and completely before you begin. Successfully raising a pole is largely a matter of coordination. Each person should be assigned to a specific task, and should know what to do and when to do it. One person should be in charge of the operation to issue instructions and watch for signs of trouble.
4. When installing your antenna, remember:
 - a. Do not use a metal ladder.
 - b. Do not work on a wet or windy day.
 - c. Do dress properly—shoes with rubber soles and heels, rubber gloves, long sleeved shirt or jacket.

5. If the assembly starts to drop, get away from it and let it fall. Remember, the antenna, pole, cable, and metal guy wires are all excellent conductors of electrical current. Even the slightest touch of any of these parts to a power line complete an electrical path through the antenna and the installer: you!
6. If any part of the antenna system should come in contact with a power line, don't touch it or try to remove it yourself. Call your local power company. They will remove it safely.

If an accident should occur with the power lines call for qualified emergency help immediately.

Typical Outdoor Access Point Installation Components

The outdoor access point is designed to be installed in an outdoor environment, such as a tower, street light, or tall building. Note that you can install the outdoor access point at any height, but best outdoor access point-to-outdoor access point throughput is achieved when the outdoor access points are mounted within line of sight of each other.

A typical outdoor access point installation diagram is shown in [Figure 2-1](#).

Figure 2-1 *Typical Outdoor Access Point Rooftop and Street Light Installation Diagram*

(Graphic to be determined)



Note

Grounding and wiring means must comply with Articles 810 and 820 of the National Electrical Code (NEC) and Section 54 of the Canadian Electrical Code (CEC).



Caution

To ensure correct installation and grounding, install the outdoor access point in compliance with your local and national electrical codes: National Fire Protection Association (NFPA) 70, National Electrical Code (U.S.); Canadian Electrical Code, Part I, CSA 22.1 (Canada); and if local or national electrical codes are not available, refer to IEC 364, Part 1 through 7 (other countries).

Installation Guidelines

Because the outdoor access point is a radio device, it is susceptible to common causes of interference that can reduce throughput and range. Follow these basic guidelines to ensure the best possible performance:

- Install the outdoor access point in an area where structures, trees, or hills do not obstruct radio signals to and from the outdoor access point.
- Install the outdoor access point at a height sufficient to provide clear line-of-sight signal path.

Site Surveys

Every network application is a unique installation. Before installing multiple outdoor access points, you should perform a site survey to determine the optimum use of networking components and to maximize range, coverage, and network performance.

Consider the following operating and environmental conditions when performing a site survey:

- Data rates—Sensitivity and range are inversely proportional to data bit rates. The maximum radio range is achieved at the lowest workable data rate. A decrease in receiver sensitivity occurs as the radio data increases.
- Antenna type and placement—Proper antenna configuration is a critical factor in maximizing radio range. As a general rule, range increases in proportion to antenna height. However, do not place the antenna higher than necessary, because the extra height also increases potential interference from other unlicensed radio systems.
- Physical environment—Clear or open areas provide better radio range than closed or filled areas.
- Obstructions—Physical obstructions such as buildings, trees, or hills can hinder performance of wireless devices. Avoid locating the devices in a location where there is an obstruction between the sending and receiving antennas.

Unpacking the Outdoor Access Point

**Note**

When you are unpacking the outdoor access point, do not remove the foam block attached to the face of the outdoor access point until after the outdoor access point is installed. The foam protects the antenna connector.

Follow these steps to unpack the outdoor access point:

-
- Step 1** Open the shipping container and carefully remove the contents.
 - Step 2** Return all packing materials to the shipping container and save it.
 - Step 3** Ensure that all items listed in the [“Package Contents”](#) section are included in the shipment. If any item is damaged or missing, notify your authorized Cisco sales representative.
-

Package Contents

Each outdoor access point package contains the following items:

- Outdoor access point
- Installed mounting plate
- Cisco product registration and Cisco documentation feedback cards

Optional Equipment

- Street light adapter
- Ethernet cable
- Power injector unit
- Pole mount kit
- Cisco external omnidirectional antennas, 2.4- and 5-GHz
- Third-party external antennas
- Third-party lightning arrestors, as required by local authorities

Before Beginning the Installation

Before you begin the installation process, please carefully review the following list of figures to become familiar with the system components, connectors, indicators, cables, system interconnection, and grounding:

- Outdoor access point installation diagram ([Figure 2-1](#))
- Outdoor access point connectors ([Figure 2-2](#))

Figure 2-2 Outdoor Access Point Connectors





Installation Instructions



Note

To meet regulatory restrictions, the outdoor access point and the external antennas must be professionally installed.

Personnel installing the outdoor access point must understand wireless bridging techniques and grounding methods.



Warning

The outdoor access point is a sealed unit, and may not be opened in the field, or the outdoor access point can become a hazard. Should the seal be broken on an outdoor access point, return it to Cisco for a replacement.

Required Tools and Materials

To install the outdoor access point you will need the following:

- Open and box-end wrenches
- Pocket level
- Customer-supplied 10 AWG ground wire
- Customer-supplied UL-Listed ground lug
- Other tools, as required

Installation Options

There are two common installation locations, using the Cisco-supplied mounting plate and/or optional Cisco pole mount kit. Refer to the appropriate sections for installation details.

- [Rooftop Installations, page 3-14](#)
- [Pole-Top Installations, page 3-15](#)
- [Installing the Outdoor Access Point on a Wall or Overhang, page 3-17](#)
- [Installing the Outdoor Access Point on a Pole, page 3-21](#)

Rooftop Installations

While installing a rooftop outdoor access point, you will typically perform the following operations:

1. Mount the outdoor access point to a wall, overhang, or external tower or pole. Refer to the [Installing the Outdoor Access Point on a Wall or Overhang, page 3-17](#) or [Installing the Outdoor Access Point on a Pole, page 3-21](#) section, as appropriate.
2. Connect a 10 AWG or larger ground wire to the outdoor access point grounding screw, and make sure it is connected to a reliable earth ground, such as a grounded pole or a grounding rod.

Loop the bare end of the ground wire about 7/8 of the way around the grounding screw, and tighten the grounding screw to 20 ft-lbs. Do not overtighten!



Warning

This equipment must be externally grounded using a customer-supplied ground wire before power is applied. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.

3. Connect a user-supplied Category 5 Ethernet cable from your wired LAN network to the optional Cisco power injector.



Note

Use only the optional Cisco power injector for the outdoor access point. The optional Cisco power injector is specified to meet the requirements of the outdoor access point and is a Listed Class 2 Limited Power Source (LPS).

4. Connect a user-supplied Category 5 Ethernet cable from the optional Cisco power injector to the optional third-party lightning arrestor.
5. Connect the Cisco-supplied Ethernet cable between the power injector or optional third-party lightning arrestor and the outdoor access point Ethernet and DC Power Connector, which is shown in [Figure 3-1](#).



Note

You should hand tighten the cable connector to between 15 and 20 inch-pounds.



Note

Leave the AC Power Connector cap installed on its connector.

Figure 3-1 Outdoor Access Point Connectors**Warning**

Use the captive connector cap on the unused mil spec connector to prevent water intrusion and possible safety hazards.

6. When using the optional Cisco external omnidirectional antennas, connect them to the outdoor access point as shown in [Figure 3-3](#).

--OR--

When using optional third-party external antennas, connect them to the outdoor access point as described in the installation documents that shipped with those antennas.

7. If necessary, align the outdoor access point external antennas. The outdoor access point can be ordered with two compact omnidirectional antennas, which normally do not require alignment when the outdoor access point is mounted horizontally. For additional information on third-party external antennas, refer to the installation documents that shipped with those antennas.

Pole-Top Installations

**Warning**

When powered by 100- to 240-VAC 50/60 Hz, connect this equipment only to a twist-lock outdoor lighting control as shown in [Figure 3-2](#). Do not connect it to a twist-lock outdoor lighting control powered by higher voltages.

While installing an outdoor access point on a light pole, you will typically perform the following operations:

1. Mount the outdoor access point to the light pole within 3 feet (1 meter) of the outdoor lighting control. Refer to the [Installing the Outdoor Access Point on a Pole, page 3-21](#) section.
2. Connect a 10 AWG or larger ground wire to the outdoor access point grounding screw, and make sure it is connected to a reliable earth ground, such as a grounded pole or a grounding rod.
 Loop the bare end of the ground wire about 7/8 of the way around the grounding screw, and tighten the grounding screw to 20 ft-lbs. Do not overtighten!

**Warning**

This equipment must be externally grounded using a customer-supplied ground wire before power is applied. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.

**Warning**

When powering the product with AC power – other than the street lamp power option – the power plug should be installed:

- (1) where it can be conveniently accessed to de-energize power from the unit. Power should not be removed by disconnecting the AC power connector at the equipment itself, and
- (2) where it is not subjected to water or the outdoor elements. This may be accomplished by the use of UL Listed power receptacles, such as GFCIs, provided with UL Listed waterproofing covers suitable for covering the receptacle and plugs with the plugged in equipment in use.

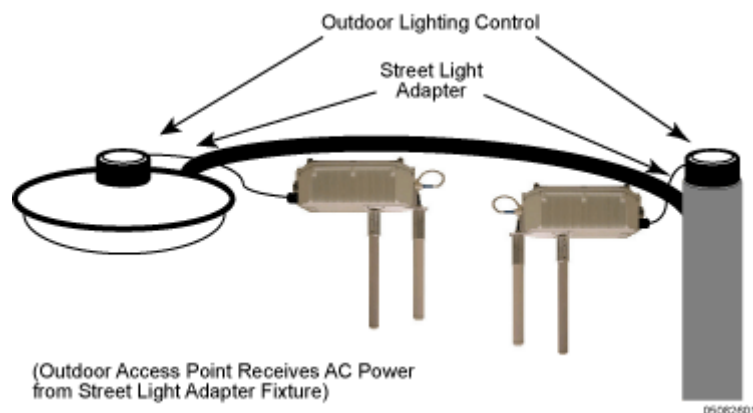
3. Refer to the AC power connections for Category C power from a street light outdoor lighting control shown in [Figure 3-2](#). The street light adapter uses a 3-prong NEMA twist-lock adapter that installs between the outdoor lighting control and its fixture. The NEMA twist-lock adapter is designed to be used with UL 773 listed outdoor lighting controls operating at and rated for 100 and 240 VAC 50/60 Hz.

**Warning**

Be very careful when connecting the street light adapter to Category 3 pole-top power to avoid being hurt or killed!

4. Disconnect the outdoor lighting control from its fixture.
5. Verify that the voltage available at the fixture is between 100 and 240 VAC 50/60 Hz.
6. Turn off power to the fixture at the designated circuits.
7. Plug the Cisco-supplied street light adapter into the outdoor lighting control fixture. Refer to [Figure 3-2](#).
8. Plug the outdoor lighting control to the street light adapter.

Figure 3-2 Using the Street Light Adapter



9. Connect the other end of the Cisco-supplied street light adapter to the outdoor access point AC Power Connector, as shown in [Figure 3-2](#).

**Warning**

When installing the Cisco-supplied street light adapter to the outdoor access point AC Power Connector, ALWAYS connect the outdoor access point end of the cable FIRST. When removing the Cisco-supplied street light adapter, ALWAYS disconnect the outdoor access point end of the cable LAST.

**Warning**

Use the captive connector cap on the unused mil spec connector to prevent water intrusion and possible safety hazards.

**Note**

You should hand tighten the cable connector on the outdoor access point end to between 15 and 20 inch-pounds.

**Note**

Move the AC Power Connector cap to the Ethernet and DC Power connector, because that connector is not used in pole-top deployments.

10. Turn power back on to the outdoor lighting control fixture at the designated circuits.
11. Use a pocket level to verify that the outdoor access point is horizontal, and tighten its adjustment screws.
12. When using the optional Cisco external omnidirectional antennas, connect them to the outdoor access point as shown in [Figure 3-3](#).

--OR--

When using optional third-party external antennas, connect them to the outdoor access point as described in the installation documents that shipped with those antennas.

13. If necessary, align the outdoor access point external antennas. The outdoor access point can be ordered with two compact omnidirectional antennas, which normally do not require alignment when the outdoor access point is mounted horizontally. For additional information on third-party external antennas, refer to the installation documents that shipped with those antennas.

Installing the Outdoor Access Point on a Wall or Overhang

While installing a rooftop outdoor access point on a wall or overhang, you will typically use the Cisco-supplied mounting plate and perform the following operations:

**Note**

When the product is installed outside of the building, and the DC power/Ethernet connection is used, this cabling should be installed in accordance with the requirements of a Class 2 circuit, as detailed in Article 725 of the National Electric Code (NEC). Such requirements include, but are not limited to, routing the Class 2 cabling away from AC power lines and AC building wiring, and limiting the exposed cable runs external to the building to less than 140ft (42m) – or is directly buried or in underground conduit, where a continuous metallic cable shield or a

continuous metallic conduit containing the cable is bonded to each building grounding electrode system. If such installation methods are not followed, the cabling must be installed according to the requirements for telecommunication circuits (TNV) as detailed in Article 800, which includes requirements for a Listed primary protector upon entering the building, and limits the installation to only Listed networking equipment designed to accommodate telecommunication interfaces.

**Note**

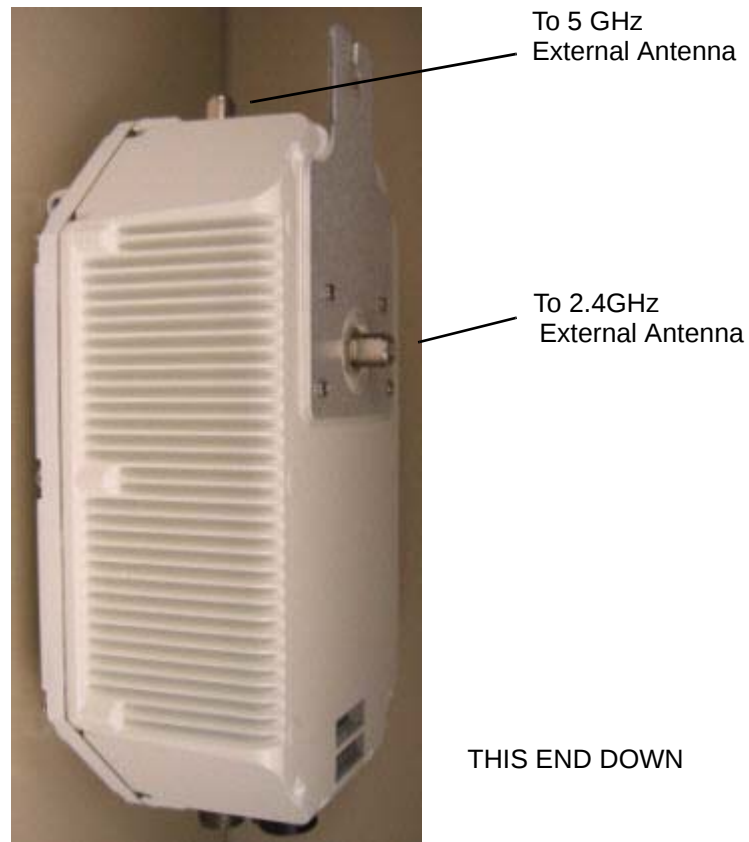
When used with the Cisco external omnidirectional antennas, the outdoor access point provides the greatest coverage area and data transfer rate when the outdoor access point is mounted horizontally and the omnidirectional antennas are mounted vertically. [Figure 3-3](#) shows the preferred outdoor access point and antenna mounting orientation. As shown in [Figure 3-4](#), the outdoor access point can be mounted vertically and the external antennas can be mounted independent of the outdoor access point. Note that when you install the outdoor access point vertically, you must install the AC Power and Ethernet and DC Power connectors facing DOWN to prevent water intrusion.

Figure 3-3 Preferred Outdoor Access Point and Antenna Orientation

**Note**

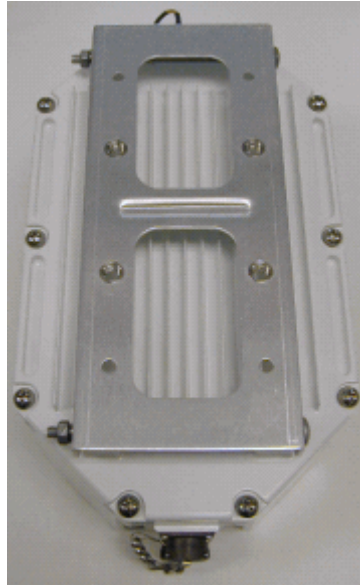
Mount the Cisco external omnidirectional antennas facing DOWN to prevent water intrusion.

Figure 3-4 *Optional Outdoor Access Point and Antenna Orientation*



1. Refer to [Figure 3-5](#) for the mounting plate location. Note that during shipping the mounting plate is attached to the outdoor access point by two carriage bolts.

Figure 3-5 *Cisco-Supplied Mounting Plate Location*



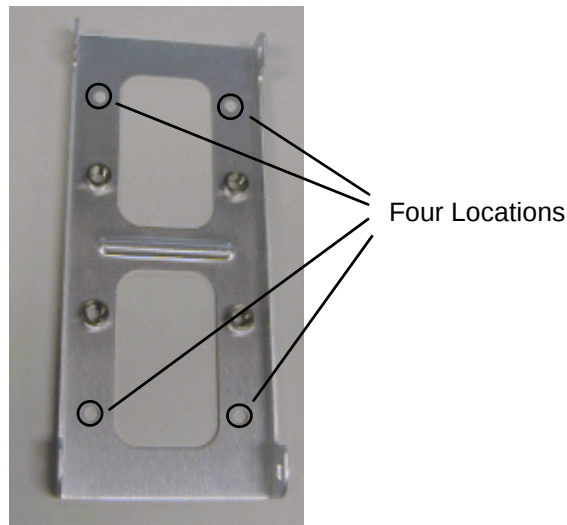
2. Remove the nuts and washers from the carriage bolts and remove the carriage bolts.
3. Remove the mounting plate from the outdoor access point.

4. Use the mounting plate as a template to mark four screw hole locations on your mounting surface. [Figure 3-6](#) shows the mounting plate screw hole locations.



Note The mounting surface must be able to support 50 pounds static weight.

Figure 3-6 **Mounting Plate Screw Hole Locations**



5. Use four customer-supplied screws to attach the mounting plate to the mounting surface. Make sure the screws are able to hold at least 50 pounds of static weight.



Note If necessary, use suitable screw anchors and/or an exterior-grade plywood backboard to mount the outdoor access point to a stucco, cement, or drywall surface.

6. Use the carriage bolts and the associated nuts and washers to reattach the outdoor access point to the mounting plate.
7. Continue with the [Rooftop Installations, page 3-14](#) or [Pole-Top Installations, page 3-15](#) procedure.

Installing the Outdoor Access Point on a Pole

While installing a outdoor access point on a light pole, you will typically use the optional Cisco pole mount kit and perform the following operations. Note that the optional Cisco-supplied pole mount kit is works best on galvanized steel or aluminum light poles. The pole mount kit brackets are designed to bite through any oxidation on the outside of the pole, ensuring an electrical grounding connection to the pole.

**Note**

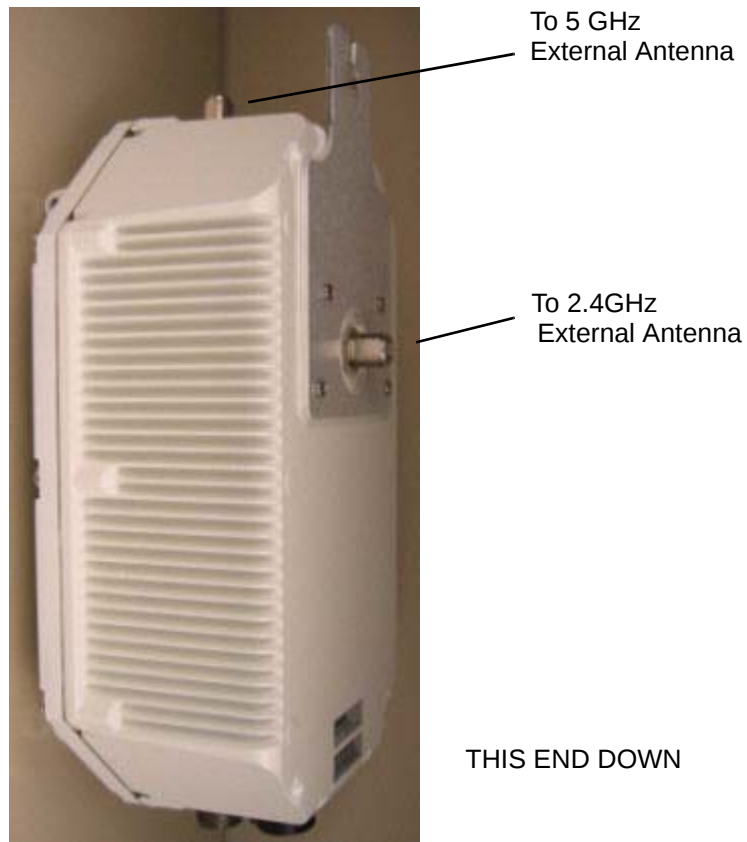
When used with the Cisco external omnidirectional antennas, the outdoor access point provides the greatest coverage area and data transfer rate when the outdoor access point is mounted horizontally and the omnidirectional antennas are mounted vertically. [Figure 3-7](#) shows the preferred outdoor access point and antenna mounting orientation. As shown in [Figure 3-8](#), the outdoor access point can be mounted vertically and the external antennas can be mounted independent of the outdoor access point. Note that when you install the outdoor access point vertically, you must install the AC Power and Ethernet and DC Power connectors facing DOWN to prevent water intrusion.

Figure 3-7 Preferred Outdoor Access Point and Antenna Orientation

**Note**

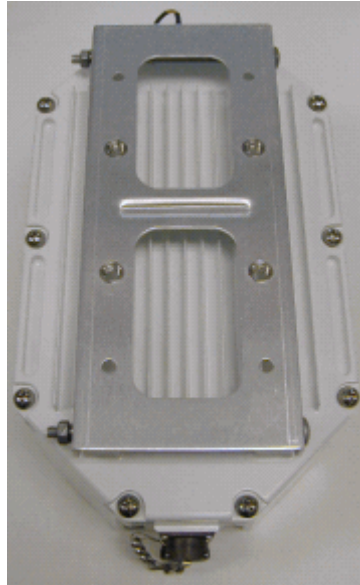
Mount the Cisco external omnidirectional antennas facing DOWN to prevent water intrusion.

Figure 3-8 *Optional Outdoor Access Point and Antenna Orientation*



8. Refer to [Figure 3-9](#) for the mounting plate location. Note that during shipping the mounting plate is attached to the outdoor access point by two carriage bolts.

Figure 3-9 *Cisco-Supplied Mounting Plate Location*

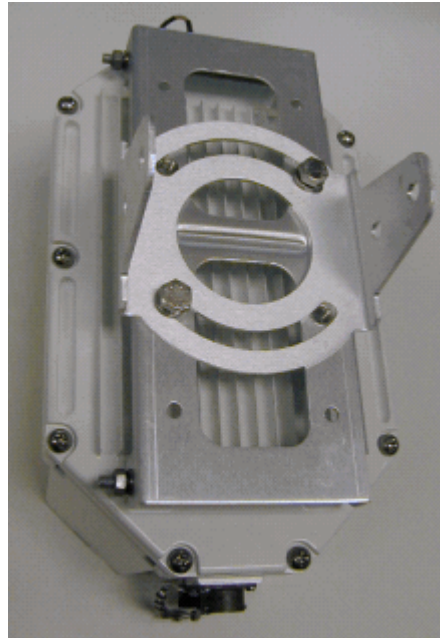


9. Use two supplied nut and lock washer sets to loosely attach the pole mount kit adjustment plate to the outdoor access point mounting plate to create the adjustment and mounting plate subassembly as shown in [Figure 3-10](#).



Note Make sure to leave the screws somewhat loose so you can adjust the outdoor access point orientation later.

Figure 3-10 *Adjustment and Mounting Plate Subassembly Attached to the Outdoor Access Point*

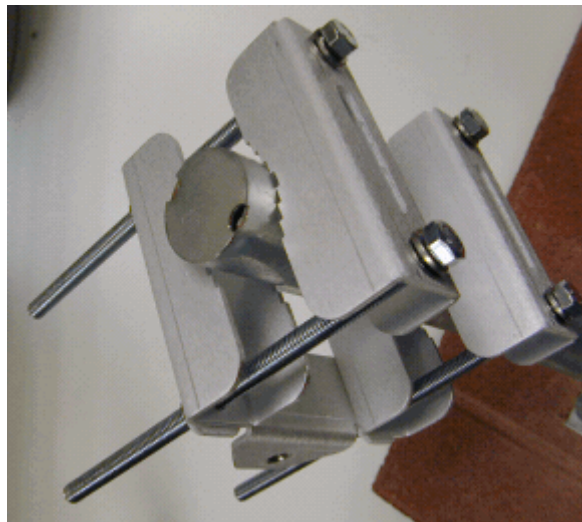


10. Select a mounting location. You can attach the outdoor access point to any light pole upright or arm with between XXX and YYY inches in diameter.
11. Loosely assemble the rest of the pole mount kit components AROUND THE POLE. [Figure 3-11](#) shows the pole clamp subassembly attached to a pole.
12. Use a pocket level to verify that the top edge of the pole clamp subassembly is horizontal, and tighten its adjustment screws.



Note Snug the screws to ZZZZ inch pounds. If you overtighten the pole clamp screws, you will bend the clamps.

Figure 3-11 Pole Clamp Subassembly Mounted on a Pole



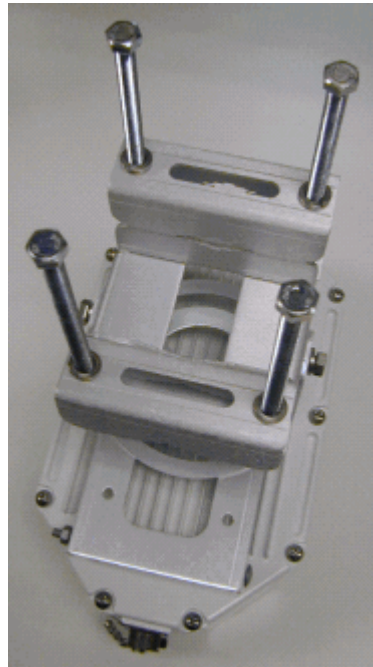
13. If necessary, use a hacksaw or cutoff wheel to remove any excess bolt length. (The bolts can protrude 1 to 3 inches and still allow the final pole mount assembly to swivel and rotate.)

14. Use the last two screw and lock washer sets to loosely assemble the outdoor access point to the pole clamp subassembly as shown in [Figure 3-12](#).



Note Make sure to leave the screws somewhat loose so you can adjust the outdoor access point orientation.

Figure 3-12 *Attaching the Outdoor Access Point to the Pole Clamp Subassembly (pole not shown)*



15. If necessary, rotate the outdoor access point until it is level. Use a pocket level to verify that the top edge of the outdoor access point is horizontal, and tighten all four of its adjustment screws.



Note Snug the screws to ZZZZ inch pounds. If you overtighten the adjustment screws, you can twist the captive T-nuts loose.

16. Continue with the [Rooftop Installations, page 3-14](#) or [Pole-Top Installations, page 3-15](#) procedure.

Where to Go From Here

When the outdoor access point is initially powered up, it attempts to associate with a rooftop outdoor access point. If it is unable to associate with a rooftop outdoor access point, it continues broadcasting its beacon until it associates with a rooftop outdoor access point.

Refer to the *Cisco Wireless LAN Solution Product Guide* for more information on configuring, monitoring, and operating the outdoor access point.



Translated Safety Warnings

This appendix provides translations of the safety warnings that appear in this publication. These translated warnings apply to other documents in which they appear in English. The following safety warnings appear in this appendix:

- [Installation Warning, page A-3](#)
- [Installation and Grounding Warning, page A-4](#)
- [Ground Conductor Warning, page A-6](#)
- [Ground Conductor Warning, page A-6](#)
- [Installation Warning, page A-8](#)
- [Lightning Activity Warning, page A-9](#)
- [Explosive Device Proximity Warning, page A-10](#)
- [Radio Frequency Exposure Limits, page A-10](#)

Warning Definition



Warning	This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. (To see translations of the warnings that appear in this publication, refer to the appendix “Translated Safety Warnings.”)
Waarschuwing	Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen. (Voor vertalingen van de waarschuwingen die in deze publicatie verschijnen, kunt u het aanhangsel “Translated Safety Warnings” (Vertalingen van veiligheidsvoorschriften) raadplegen.)
Varoitus	Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista. (Tässä julkaisussa esiintyvien varoitusten käännökset löydät liitteestä “Translated Safety Warnings” (käännetyt turvallisuutta koskevat varoitukset).)
Attention	Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures. Avant d'accéder à cet équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures courantes de prévention des accidents. Pour obtenir les traductions des mises en garde figurant dans cette publication, veuillez consulter l'annexe intitulée « Translated Safety Warnings » (Traduction des avis de sécurité).
Warnung	Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewusst. (Übersetzungen der in dieser Veröffentlichung enthaltenen Warnhinweise finden Sie im Anhang mit dem Titel “Translated Safety Warnings” (Übersetzung der Warnhinweise).)
Avvertenza	Questo simbolo di avvertenza indica un pericolo. Si è in una situazione che può causare infortuni. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi ai circuiti elettrici ed essere al corrente delle pratiche standard per la prevenzione di incidenti. La traduzione delle avvertenze riportate in questa pubblicazione si trova nell'appendice, “Translated Safety Warnings” (Traduzione delle avvertenze di sicurezza).
Advarsel	Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du være oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker. (Hvis du vil se oversettelser av de advarslene som finnes i denne publikasjonen, kan du se i vedlegget “Translated Safety Warnings” [Oversatte sikkerhetsadvarsler].)
Aviso	Este símbolo de aviso indica perigo. Encontra-se numa situação que lhe poderá causar danos físicos. Antes de começar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possíveis acidentes. (Para ver as traduções dos avisos que constam desta publicação, consulte o apêndice “Translated Safety Warnings” - “Traduções dos Avisos de Segurança”).

¡Advertencia!	Este símbolo de aviso significa peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos estándar de prevención de accidentes. (Para ver traducciones de las advertencias que aparecen en esta publicación, consultar el apéndice titulado “Translated Safety Warnings.”)
Varning!	Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador. (Se förklaringar av de varningar som förekommer i denna publikation i appendix “Translated Safety Warnings” [Översatta säkerhetsvarningar].)

Installation Warning



Warning

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

Waarschuwing	Deze apparatuur mag alleen worden geïnstalleerd, vervangen of hersteld door bevoegd geschoold personeel.
Varoitus	Tämän laitteen saa asentaa, vaihtaa tai huoltaa ainoastaan koulutettu ja laitteen tunteva henkilökunta.
Attention	Il est vivement recommandé de confier l'installation, le remplacement et la maintenance de ces équipements à des personnels qualifiés et expérimentés.
Warnung	Das Installieren, Ersetzen oder Bedienen dieser Ausrüstung sollte nur geschultem, qualifiziertem Personal gestattet werden.
Figyelem!	A berendezést csak szakképzett személyek helyezhetik üzembe, cserélhetik és tarthatják karban.
Avvertenza	Questo apparato può essere installato, sostituito o mantenuto unicamente da un personale competente.
Advarsel	Bare opplært og kvalifisert personell skal foreta installasjoner, utskiftninger eller service på dette utstyret.
Aviso	Apenas pessoal treinado e qualificado deve ser autorizado a instalar, substituir ou fazer a revisão deste equipamento.
¡Advertencia!	Solamente el personal calificado debe instalar, reemplazar o utilizar este equipo.
Varning!	Endast utbildad och kvalificerad personal bör få tillåtelse att installera, byta ut eller reparera denna utrustning.

Предупреждение Установку, замену и обслуживание этого оборудования может осуществлять только специально обученный квалифицированный персонал.

警告 只有经过培训且具有资格的人员才能进行此设备的安装、更换和维修。

警告 この装置の設置、交換、保守は、訓練を受けた相応の資格のある人が行ってください。

Installation and Grounding Warning



Warning

Do not locate the antenna near overhead power lines or other electric light or power circuits, or where it can come into contact with such circuits. When installing the antenna, take extreme care not to come into contact with such circuits, because they may cause serious injury or death. For proper installation and grounding of the antenna, please refer to national and local codes (for example, U.S.: NFPA 70, National Electrical Code, Article 810, Canada: Canadian Electrical Code, Section 54).

Waarschuwing

Zorg dat antenne niet in de buurt wordt geplaatst van langs het plafond lopende stroomkabels of andere voorzieningen voor licht of elektriciteit of op een plaats waar contact met dergelijke stroomvoorzieningen mogelijk is. Wees bij het installeren van de antenne voorzichtig dat u niet in contact komt met dergelijke stroomvoorzieningen aangezien dit kan leiden tot ernstig lichamelijk of dodelijk letsel. Voor het juist installeren en aarden van de antenne, dient u de nationale en plaatselijke verordeningen te raadplegen (bijv. in de VS NFPA 70, National Electrical Code, Artikel 810, in Canada: Canadian Electrical Code, Sectie 54).

Varoitus

Älä sijoita antennia lähelle voimajohtoja, muita sähkövalo- tai virtapiirejä tai paikkaa, jossa se voi joutua kosketuksiin sellaisten piirien kanssa. Kun asennat antennia, varo, ettet joudu kosketuksiin mainittujen piirien kanssa, sillä seurauksena voi olla vakava vamma tai kuolema. Tarkista antennin asennus- ja maadoitustiedot kansallisista ja paikallisista sähkösäännöksistä (esimerkiksi Yhdysvalloissa NFPA 70, National Electrical Code, Article 810 ja Kanadassa Canadian Electrical Code, Section 54).

Attention

Ne placez pas l'antenne à proximité d'une ligne aérienne ou d'autres circuits d'éclairage ou d'alimentation, ou dans un endroit où elle risque d'être en contact avec des circuits de ce type. Lors de son installation, assurez-vous bien qu'elle ne touche pas de tels circuits car cela risquerait d'entraîner des blessures graves, voire mortelles. Pour une installation et mise à la terre correctes de l'antenne, veuillez consulter les codes nationaux et locaux (par exemple, États-Unis: NFPA 70, National Electrical Code, Article 810; Canada: Code électrique canadien, Section 54).

Warnung	Platzieren Sie die Antenne nicht in der Nähe von Starkstrom-Freileitungen oder Schwach- bzw. Starkstromkreisen oder an Stellen, wo sie damit in Kontakt kommen könnte. Gehen Sie bei der Installation der Antenne besonders vorsichtig vor, damit Sie nicht in Kontakt mit derartigen Stromkreisen kommt, da dies zu schweren Verletzungen sogar mit Todesfolge führen kann. Installieren und erden Sie die Antenne sachgerecht unter Einhaltung der jeweils gültigen Sicherheitsvorschriften (zum Beispiel USA: NFPA 70, National Electrical Code, Artikel 810 oder Kanada: Canadian Electrical Code, Abschnitt 54).
Figyelem!	Ne helyezze az antennát elektromos felsővezetékek és más elektromos világítási és tápellátási áramkörök közelébe, és semmilyen olyan környezetbe, ahol ilyen áramkörökkel érintkezhet. Az antenna felszerelésekor különösképpen ügyeljen arra, hogy ne kerüljön érintkezésbe ilyen áramkörökkel, mert az súlyos sérülést vagy halált okozhat. Az antenna helyes üzembe helyezésével és földelésével kapcsolatban az országos és helyi előírások tartalmazznak útmutatást (például az USA-ban: NFPA 70, National Electrical Code, Article 810, Kanadában: Canadian Electrical Code, Section 54).
Avvertenza	Non sistemare l'antenna nelle vicinanze di circuiti elettrici generali o di altri circuiti di illuminazione o di alimentazione, o dove questa possa venire a contatto con tali circuiti. Durante l'installazione dell'antenna, prestare particolare attenzione a non entrare in contatto con tali circuiti, in quanto questo potrebbe provocare seri danni o morte. Per una corretta installazione e messa a terra dell'antenna, fare riferimento ai codici nazionali e locali (es. U.S.A.: NFPA 70, Codice Elettrico Nazionale, articolo 810, Canada: Codice Elettrico Canadese, sezione 54).
Advarsel	Plasser ikke antennen nær de overliggende strømføringsledninger eller andre lys- eller strømkretser, eller der den kan komme i kontakt med slike kretser. Ved installering av antennen må du være ytterst forsiktig slik at du ikke kommer i kontakt med slike kretser. Dette kan føre til alvorlig skade eller død. For riktig installasjon og jording av antennen, se statlige og lokale forskrifter (for eksempel i USA: NFPA 70, National Electrical Code, Article 810, og i Canada: Canadian Electrical Code, Section 54).
Aviso	Não coloque a antena perto de linhas de alimentação, de outros circuitos ou onde possa entrar em contato com esses circuitos. Ao instalar a antena, tenha muito cuidado para não tocar nesses circuitos, visto que podem provocar ferimentos graves ou até a morte. Para obter informações sobre como instalar e aterrar corretamente a antena, consulte a legislação local e nacional (por ex., U.S.: NFPA 70, National Electrical Code, Artigo 810, Canadá: Canadian Electrical Code, Seção 54).
¡Advertencia!	No coloque la antena cerca de cables de tendido eléctrico u otros circuitos eléctricos, ni donde pueda entrar en contacto con los mismos. Al instalar la antena, extreme las precauciones para no entrar en contacto con dichos circuitos, ya que puede causar heridas graves e incluso la muerte. Para instalar la antena y conectarla a tierra correctamente, consulte los códigos nacionales y locales (p.ej., Estados Unidos: NFPA 70, National Electrical Code, Sección 810, Canadá: Canadian Electrical Code, Artículo 54).
Varning!	Placera inte antennen nära överhängande kraftledningar, andra elljus- eller strömkretsar eller där den kan komma i kontakt med sådan kretsar. Vid installation av antennen måste du vara mycket försiktig så att du inte kommer i kontakt med sådana kretsar eftersom de kan orsaka allvarlig kroppsskada eller dödsfall. För riktig installation och jording av antennen, hänvisas du till nationella och lokala koder (t.ex. USA: NFPA 70, National Electrical Code, Article 810, Kanada: Canadian Electrical Code, Section 54).

Предупреждение	Не размещайте антенну поблизости от линий электропередачи, проводов освещения и других силовых линий, а также в местах, где антенна может касаться таких линий. При установке антенны будьте предельно внимательны, чтобы не коснуться таких линий — это может привести к серьезным травмам и даже к смертельному исходу. Сведения о правилах установки и заземлении антенны содержатся в национальных и региональных электротехнических правилах и нормах (например в США — NFPA 70, National Electrical Code, статья 810; в Канаде — Canadian Electrical Code, раздел 54).
警告	请勿将天线安放在过热的电线或其它电灯或电路附近，也不要将它安放在能与此类电路相接触的地方。安装天线时，要特别当心不要接触此类电路，因为它们会造成严重的伤害，甚至导致死亡。有关天线的正确安装和接地，请参阅国家和当地的规范（例如，美国：NFPA 70、美国国家电气规程 810 条款，加拿大：加拿大电气规程，第 54 部分）。
警告	送電線またはその他の電灯/電力回線に近い場所や、これらの回線に接触する可能性のある場所には、アンテナを設置しないでください。アンテナを設置するときは、死傷事故のおそれがあるので、これらの回線に絶対に接触しないよう十分に注意する必要があります。アンテナの適切な設置およびアース接続の手順については、一般規定および地域の規定を参照してください（たとえば、NFPA 70, National Electrical Code, Article 810 [米国]、Canadian Electrical Code, Section 54 [カナダ]）。

Ground Conductor Warning



Warning

This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.

Waarschuwing

Deze apparatuur dient geaard te zijn. De aardingsleiding mag nooit buiten werking worden gesteld en de apparatuur mag nooit bediend worden zonder dat er een op de juiste wijze geïnstalleerde aardingsleiding aanwezig is. Neem contact op met de bevoegde instantie voor elektrische inspecties of met een elektricien als u er niet zeker van bent dat er voor passende aarding gezorgd is.

Varoitus

Laitteiden on oltava maadoitettuja. Älä koskaan ohita maajohdinta tai käytä laitteita ilman oikein asennettua maajohdinta. Ota yhteys sähkötarkastusviranomaiseen tai sähköasentajaan, jos olet epävarma maadoituksen sopivuudesta.

Attention

Cet équipement doit être mis à la masse. Ne jamais rendre inopérant le conducteur de masse ni utiliser l'équipement sans un conducteur de masse adéquatement installé. En cas de doute sur la mise à la masse appropriée disponible, s'adresser à l'organisme responsable de la sécurité électrique ou à un électricien.

Warnung

Dieses Gerät muss geerdet sein. Auf keinen Fall den Erdungsleiter unwirksam machen oder das Gerät ohne einen sachgerecht installierten Erdungsleiter verwenden. Wenn Sie sich nicht sicher sind, ob eine sachgerechte Erdung vorhanden ist, wenden Sie sich an die zuständige Inspektionsbehörde oder einen Elektriker.

Figyelem!	A berendezés csak megfelelő védőföldeléssel működtethető. Ne iktassa ki a földelés csatlakozóját, és ne üzemeltesse a berendezést szabályosan felszerelt földelő vezeték nélkül! Ha nem biztos benne, hogy megfelelő földelés áll rendelkezésre, forduljon a helyi elektromos hatóságokhoz vagy egy villanyszerelőhöz.
Avvertenza	Questa apparecchiatura deve essere dotata di messa a terra. Non escludere mai il conduttore di protezione né usare l'apparecchiatura in assenza di un conduttore di protezione installato in modo corretto. Se non si è certi della disponibilità di un adeguato collegamento di messa a terra, richiedere un controllo elettrico presso le autorità competenti o rivolgersi a un elettricista.
Advarsel	Dette utstyret må jordes. Omgå aldri jordingslederen og bruk aldri utstyret uten riktig montert jordingsleder. Ta kontakt med fagfolk innen elektrisk inspeksjon eller med en elektriker hvis du er usikker på om det finnes velegnet jordning.
Aviso	Este equipamento deve ser aterrado. Nunca anule o fio terra nem opere o equipamento sem um aterramento adequadamente instalado. Em caso de dúvida com relação ao sistema de aterramento disponível, entre em contato com os serviços locais de inspeção elétrica ou um eletricitista qualificado.
¡Advertencia!	Este equipo debe estar conectado a tierra. No inhabilite el conductor de tierra ni haga funcionar el equipo si no hay un conductor de tierra instalado correctamente. Póngase en contacto con la autoridad correspondiente de inspección eléctrica o con un electricista si no está seguro de que haya una conexión a tierra adecuada.
Varning!	Denna utrustning måste jordas. Koppla aldrig från jordledningen och använd aldrig utrustningen utan en på lämpligt sätt installerad jordledning. Om det föreligger osäkerhet huruvida lämplig jordning finns skall elektrisk besiktningsauktoriteten eller elektriker kontaktas.
Предупреждение	Данное устройство должно быть заземлено. Никогда не отключайте провод заземления и не пользуйтесь оборудованием при отсутствии правильно подключенного провода заземления. За сведениями об имеющихся возможностях заземления обратитесь к соответствующим контролирующим организациям по энергоснабжению или к инженеру-электрику.
警告	此设备必须接地。切勿使接地导体失效，或者在没有正确安装接地导体的情况下操作该设备。如果您不能肯定接地导体是否正 常发挥作用，请咨询有关电路检测方面的权威人士或电工。
警告	この装置はアース接続する必要があります。アース導体を破損しないよう注意し、アース導体を正しく取り付けないまま装置を稼働させないでください。アース接続が適正であるかどうか分からない場合には、電気検査機関または電気技術者に相談してください。

Installation Warning



Warning

Read the installation instructions before connecting the system to the power source.

Waarschuwing

Raadpleeg de installatie-instructies voordat u het systeem op de voedingsbron aansluit.

Varoitus

Lue asennusohjeet ennen järjestelmän yhdistämistä virtälähteeseen.

Attention

Avant de brancher le système sur la source d'alimentation, consulter les directives d'installation.

Warnung

Vor dem Anschließen des Systems an die Stromquelle die Installationsanweisungen lesen.

Figyelem!

Mielőtt áramforráshoz csatlakoztatná a rendszert, olvassa el az üzembe helyezési útmutatót!

Avvertenza

Consultare le istruzioni di installazione prima di collegare il sistema all'alimentatore.

Advarsel

Les installasjonsinstruksjonene før systemet kobles til strømkilden.

Aviso

Leia as instruções de instalação antes de ligar o sistema à fonte de energia.

¡Advertencia!

Lea las instrucciones de instalación antes de conectar el sistema a la red de alimentación.

Varning!

Läs installationsanvisningarna innan du kopplar systemet till strömförsörjningsenheten.

Предупреждение

Перед подключением устройства к источнику электропитания ознакомьтесь с данной инструкцией по установке.

警告

在将系统与电源连接之前，请仔细阅读安装说明。

警告

必ず設置手順を読んでから、システムを電源に接続してください。

Lightning Activity Warning



Warning

Do not work on the system or connect or disconnect cables during periods of lightning activity.

Waarschuwing

Tijdens onweer dat gepaard gaat met bliksem, dient u niet aan het systeem te werken of kabels aan te sluiten of te ontkoppelen.

Varoitus

Älä työskentele järjestelmän parissa äläkä yhdistä tai irrota kaapeleita ukkosilmalla.

Attention

Ne pas travailler sur le système ni brancher ou débrancher les câbles pendant un orage.

Warnung

Arbeiten Sie nicht am System und schließen Sie keine Kabel an bzw. trennen Sie keine ab, wenn es gewittert.

Figyelem!

Villámlás közben ne dolgozzon a rendszeren, valamint ne csatlakoztasson és ne húzzon ki kábeleket!

Avvertenza

Non lavorare sul sistema o collegare oppure scollegare i cavi durante un temporale con fulmini.

Advarsel

Utfør aldri arbeid på systemet, eller koble kabler til eller fra systemet når det tordner eller lyner.

Aviso

Não trabalhe no sistema ou ligue e desligue cabos durante períodos de mau tempo (trovoada).

¡Advertencia!

No operar el sistema ni conectar o desconectar cables durante el transcurso de descargas eléctricas en la atmósfera.

Varning!

Vid åska skall du aldrig utföra arbete på systemet eller ansluta eller koppla loss kablar.

Предупреждение

Не следует работать с устройством, а также подключать или отключать кабели во время грозы.

警告

请勿在发生雷电时操作系统，也不要在此期间连接或断开电缆。

警告

雷が発生しているときは、システムに手を加えたり、ケーブルの接続や取り外しを行わないでください。

Explosive Device Proximity Warning



Warning

Do not operate your wireless network device near unshielded blasting caps or in an explosive environment unless the device has been modified to be especially qualified for such use.

Waarschuwing

Gebruik dit draadloos netwerkapparaat alleen in de buurt van onbeschermde ontstekers of in een omgeving met explosieven indien het apparaat speciaal is aangepast om aan de eisen voor een dergelijk gebruik te voldoen.

Varoitus

Älä käyttää johdotonta verkkolaitetta suojaamattomien räjäytysnallien läheisyydessä tai räjäytysalueella, jos laitetta ei ole erityisesti muunneltu sopivaksi sellaiseen käyttöön.

Attention

Ne jamais utiliser un équipement de réseau sans fil à proximité d'un détonateur non blindé ou dans un lieu présentant des risques d'explosion, sauf si l'équipement a été modifié à cet effet.

Warnung

Benutzen Sie Ihr drahtloses Netzwerkgerät nicht in der Nähe ungeschützter Sprengkapseln oder anderer explosiver Stoffe, es sei denn, Ihr Gerät wurde eigens für diesen Gebrauch modifiziert und bestimmt.

Avvertenza

Non utilizzare la periferica di rete senza fili in prossimità di un detonatore non protetto o di esplosivi a meno che la periferica non sia stata modificata a tale proposito.

Advarsel

Ikke bruk den trådløse nettverksenheten nært inntil uisolerte fenghetter eller i et eksplosivt miljø med mindre enheten er modifisert slik at den tåler slik bruk.

Aviso

Não opere o dispositivo de rede sem fios perto de cápsulas explosivas não protegidas ou num ambiente explosivo, a não ser que o dispositivo tenha sido modificado para se qualificar especialmente para essa utilização.

¡Advertencia!

No utilizar un aparato de la red sin cable cerca de un detonador que no esté protegido ni tampoco en un entorno explosivo a menos que el aparato haya sido modificado con ese fin.

Varning!

Använd inte den trådlösa nätverksenheten i närheten av oskyddade tändhattar eller i en explosiv miljö om inte enheten modifierats för att kunna användas i sådana sammanhang.

Radio Frequency Exposure Limits



Warning

In order to comply with radio frequency (RF) exposure limits, the antennas for this product should be positioned no less than 6.56 ft (2 m) from your body or nearby persons.

Waarschuwing

De antennes van dit product moeten minimaal 2 m van u of andere personen zijn verwijderd om te voldoen aan de vereisten voor blootstelling aan radiofrequenties (RF).

Varoitus	Radiotaajuuksille altistumista koskevien rajoitusten mukaan tämän tuotteen antennien tulee olla sijoitettuna vähintään kahden (2) metrin päähän käyttäjästä tai lähellä olevista henkilöistä.
Attention	Pour respecter les limites d'exposition à la fréquence radio, veuillez à placer les antennes de ce produit à plus de 2 m des personnes.
Warnung	Um die in den Richtlinien der Expositionshöchstgrenzen für Radiofrequenzen (RF) festgelegten Grenzwerte nicht zu überschreiten, sollten die Antennen für dieses Produkt mindestens 2 m von Ihnen oder anderen Personen entfernt aufgestellt werden.
Avvertenza	Per conformarsi ai limiti di esposizione alle frequenze radio (RF, Radio Frequency) posizionare l'antenna del prodotto ad almeno due metri di distanza dall'utente e dalle persone vicine.
Advarsel	I henhold til eksponeringsgrensene for radiofrekvenser (RF), skal antenner for dette produktet plasseres på en avstand av minst 2 meter fra mennesker.
Aviso	Para estar de acordo com os limites de exposição a frequência de rádio (RF), as antenas desse produto devem ser colocadas a um mínimo de 2 m (6,56 pol) de distância de seu corpo ou das pessoas ao redor.
¡Advertencia!	Para cumplir con los límites de exposición de radio frecuencia (RF), es preciso ubicar las antenas de este producto a un mínimo de 2 m (6,56 pies) de su cuerpo o de las personas que se encuentren cerca.
Varning!	För att följa exponeringsgränserna för radiofrekvens (RF), bör antennerna för denna produkt placeras minst 2 m från din kropp och från personer som finns i närheten.
Figyelem	A rádiófrekvenciás (RF) sugárzásra vonatkozó előírásoknak való megfelelés érdekében a termék antennáit úgy kell elhelyezni, hogy azok legalább 2 méterre legyenek Öntől vagy a közelben tartózkodó más személyektől.



Declarations of Conformity and Regulatory Information

This appendix provides declarations of conformity and regulatory information for the Cisco Aironet 1400 Series Outdoor Access Point.

This appendix contains the following sections:

- [Manufacturers Federal Communication Commission Declaration of Conformity Statement, page A-2](#)
- [Channels and Antenna Settings, page A-3](#)
- [Department of Communications—Canada, page A-4](#)
- [International Models, page A-4](#)
- [Declaration of Conformity for RF Exposure, page A-4](#)
- [Administrative Rules for Cisco Aironet Outdoor Access Points in Taiwan, page A-5](#)

Manufacturers Federal Communication Commission Declaration of Conformity Statement



Models: AIR-LAP1510AG-A-K9

FCC Certification number: LDK102058

Manufacturer: Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA

This device complies with Part 15 rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits of a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and radiates radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference. However, there is no guarantee that interference will not occur. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician.



Caution

The Part 15 radio device operates on a non-interference basis with other devices operating at this frequency when using Cisco-supplied antennas. Any changes or modification to the product not expressly approved by Cisco could void the user's authority to operate this device.



Caution

To meet regulatory restrictions, the outdoor access point must be professionally installed.

Table A-1 External 5-GHz Antennas

Cisco Part Number	Model	Gain
AIR-ANT5175V-N	4.9 GHz Omnidirectional	6.5 dBi
AIR-ANT5175V-N	5 GHz Compact Omnidirectional	7.5 dBi
AIR-ANT58G10SSA-N	5 GHz Sector	9.5 dBi
Cushcraft S49014WP	5 GHz Patch	14 dBi
Cushcraft S54717P	5 GHz Patch	17 dBi

Table A-2 External 2.4-GHz Antennas

Cisco Part Number	Model	Gain
AIR-ANT-2455V-N	2.4 GHz Compact Omnidirectional	5.5 dBi
Cushcraft S2406BP	2.4 GHz Omnidirectional	8 dBi

Channels and Antenna Settings

This section lists the IEEE 802.11a and 802.11b/g (5- and 2.4-GHz bands) and channels and indicates the maximum power levels for each regulatory domain supported by the outdoor access point.

An improper combination of power level and antenna configurations can result in equivalent isotropic radiated power (EIRP) above the amount allowed per regulatory domain. [Table A-3](#) indicates the maximum power levels and antenna gains allowed.

To configure your outdoor access point output power level, refer to the *Cisco Wireless LAN Solution Product Guide*.

Table A-3 2.4-GHz Maximum Power Levels and Antenna Gains

Channel ID	Frequency (MHz)	Maximum Conducted Average Power Levels in dBm with 8dBi Antenna			
		1-11 Mbps CCK	9-36 Mbps OFDM	48 Mbps OFDM	54 Mbps OFDM
1	2412	22.5	18.5	18.5	18.5
2	2417	24	24	22	21
3	2422	24	24	22	21
4	2427	24	24	22	21
5	2432	24	24	22	21
6	2437	24	24	22	21
7	2442	24	24	22	21
8	2447	24	24	22	21
9	2452	24	24	22	21
10	2457	24	24	22	21
11	2462	24	20	20	20

Department of Communications—Canada

Canadian Compliance Statement

This Class B Digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte les exigences du Règlement sur le matériel brouilleur du Canada.

This device complies with Class B Limits of Industry Canada. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Cisco's outdoor access points are certified to the requirements of RSS-210 issue 5, RSP 100, and RSS 102 for spread spectrum devices.

International Models

The international outdoor access point models are listed in [Table A-4](#).

Table A-4 International Outdoor Access Point Models

Models	Regulatory Region
AIR-LAP1510AG-N-K9	Canada, Australia, New Zealand, Mexico, and Taiwan

Declaration of Conformity for RF Exposure

This outdoor access point product has been found to be compliant to the requirements set forth in CFR 47 Section 1.1307 addressing RF Exposure from radio frequency devices as defined in Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields. The antennas should be positioned more than 6.56 feet (2 meters) from your body or nearby persons.

This outdoor access point is also compliant to EN 50835 for RF exposure.

Administrative Rules for Cisco Aironet Outdoor Access Points in Taiwan

This section provides administrative rules for operating Cisco Aironet outdoor access points in Taiwan. The rules are provided in both Chinese and English.

Chinese Translation

低功率電波輻射性電機管理辦法

第十二條 經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

第十四條 低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。

前項合法通信，指依電信法規定作業之無線電信。

低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

127048

English Translation

Administrative Rules for Low-power Radio-Frequency Devices

Article 12

For those low-power radio-frequency devices that have already received a type-approval, companies, business units or users should not change its frequencies, increase its power or change its original features and functions.

Article 14

The operation of the low-power radio-frequency devices is subject to the conditions that no harmful interference is caused to aviation safety and authorized radio station; and if interference is caused, the user must stop operating the device immediately and can't re-operate it until the harmful interference is clear.

The authorized radio station means a radio-communication service operating in accordance with the Communication Act.

The operation of the low-power radio-frequency devices is subject to the interference caused by the operation of an authorized radio station, by another intentional or unintentional radiator, by industrial, scientific and medical (ISM) equipment, or by an incidental radiator.



GLOSSARY

802.11 The IEEE standard that specifies carrier sense media access control and physical layer specifications for 1- and 2-megabit-per-second (Mbps) wireless LANs operating in the 2.4-GHz band.

802.11a The IEEE standard that specifies carrier sense media access control and physical layer specifications for wireless LANs operating in the 5-GHz frequency band.

A

ad hoc network A wireless network composed of stations without access points.

antenna gain The gain of an antenna is a measure of the antenna's ability to direct or focus radio energy over a region of space. High-gain antennas have a more focused radiation pattern in a specific direction.

associated A non-root outdoor access point is configured properly to allow it to wirelessly communicate with a root outdoor access point.

B

beacon A packet that signals the availability and presence of the wireless device. Beacon packets are sent by root outdoor access points.

BOOTP Boot Protocol. A protocol used for the static assignment of IP addresses to devices on the network.

broadcast packet A single data message (packet) sent to all addresses on the same subnet.

C

cell The area of radio range or coverage in which the wireless devices can communicate with the base station. The size of the cell depends upon the speed of the transmission, the type of antenna used, and the physical environment, as well as other factors.

CSMA Carrier sense multiple access. A wireless LAN media access method specified by the IEEE 802.11 specification.

D

data rates	The range of data transmission rates supported by a device. Data rates are measured in megabits per second (Mbps).
dBi	A ratio of decibels to an isotropic antenna that is commonly used to measure antenna gain. The greater the dBi value, the higher the gain, and the more narrow the angle of coverage.
dBm	An absolute power level described in decibels referenced to 1 mW. 0 dBm is equivalent to 1 mW.
DHCP	Dynamic Host Configuration Protocol. A protocol available with many operating systems that automatically issues IP addresses within a specified range to devices on the network. The device retains the assigned address for a specific administrator-defined period.
dipole	A type of low-gain (2.2-dBi) antenna consisting of two (often internal) elements.
domain name	The text name that refers to a grouping of networks or network resources based on organization-type or geography; for example: name.com commercial; name.edu educational; name.gov government; ISPname.net network provider (such as an ISP); name.ar Argentina; name.au Australia; and so on.
DNS	Domain Name System server. A server that translates text names into IP addresses. The server maintains a database of host alphanumeric names and their corresponding IP addresses.
DSSS	Direct sequence spread spectrum. A type of spread spectrum radio transmission that spreads its signal continuously over a wide frequency band.

E

EAP	Extensible Authentication Protocol. An optional IEEE 802.1x security feature ideal for organizations with a large user base and access to an EAP-enabled Remote Authentication Dial-In User Service (RADIUS) server.
Ethernet	The most widely used wired local area network. Ethernet uses carrier sense multiple access (CSMA) to enable computers to share a network and operates at 10, 100, or 1000 Mbps, depending on the physical layer used.

F

file server	A repository for files from which a local area network can share files, mail, and programs.
firmware	Software that is programmed on a memory chip.

G

gateway	A device that connects two otherwise incompatible networks.
GHz	Gigahertz. One billion cycles per second. A unit of measure for frequency.

I

IEEE	Institute of Electrical and Electronic Engineers. A professional society serving electrical engineers through its publications, conferences, and standards development activities. The body responsible for the Ethernet 802.3 and wireless LAN 802.11 specifications.
infrastructure	The wired Ethernet network.
IP address	The Internet Protocol (IP) address of a station.
IP subnet mask	The number used to identify the IP subnetwork, indicating whether the IP address can be recognized on the LAN or if it must be reached through a gateway. This number is expressed in a form similar to an IP address, such as 255.255.255.0.
isotropic	An antenna that radiates its signal in a spherical pattern.

M

MAC	Media Access Control address. A unique 48-bit number used in Ethernet data packets to identify an Ethernet device, such as a outdoor access point.
modulation	Any of several techniques for combining user information with a transmitter's carrier signal.
multipath	The echoes created as a radio signal bounces off physical objects.
multicast packet	A single data message (packet) sent to multiple addresses.

O

omni-directional	A primarily circular antenna radiation pattern.
Orthogonal Frequency Division Multiplex (OFDM)	A modulation technique used by IEEE 802.11a-compliant wireless LANs for transmission at 6, 9, 12, 18, 24, 36, 48, and 54 Mbps.
outdoor access point	A wireless LAN transceiver that is used to provide wireless Ethernet networks.

P

packet	A basic message unit for communication across a network. A packet usually includes routing information, data, and sometimes error-detection information.
pole-top outdoor access point (PAP)	A transceiver wirelessly connected to other pole-top access points (PAPs) and rooftop access points (RAPs), which are connected to a wired Ethernet network.
power injector	A device that supplies DC power to another device over unused Ethernet cable wires.

R

range	A linear measure of the distance that a transmitter can send a signal.
receiver sensitivity	A measurement of the weakest signal a receiver can receive and still correctly translate it into data.
RF	Radio frequency. A generic term for radio-based technology.
rooftop outdoor access point (RAP)	A wireless transceiver which is connected to a wired Ethernet network, and which then communicates with other pole-top access points (PAPs) and rooftop access points (RAPs).

S

spread spectrum	A radio transmission technology that spreads the user information over a much wider bandwidth than otherwise required in order to gain benefits such as improved interference tolerance and unlicensed operation.
SSID	Service Set Identifier (also referred to as Radio Network Name). A unique identifier used to identify a radio network and which stations must use to be able to communicate with each other or an outdoor access point. The SSID can be any alphanumeric entry up to 32 characters.

T

transmit power	The power level of radio transmission.
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U

UNII	Unlicensed National Information Infrastructure—regulations for UNII devices operating in the 5.15 to 5.35 GHz and 5.725 to 5.825 GHz frequency bands.
UNII-1	Regulations for UNII devices operating in the 5.15 to 5.25 GHz frequency band.
UNII-2	Regulations for UNII devices operating in the 5.25 to 5.35 GHz frequency band.

UNII-3 Regulations for UNII devices operating in the 5.725 to 5.825 GHz frequency band.

unicast packet A single data message (packet) sent to a specific IP address.

W

WEP Wired Equivalent Privacy. An optional security mechanism defined within the 802.11 standard designed to make the link integrity of wireless devices equal to that of a cable.

workstation A computing device with an installed PC card.



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