



Cisco Aironet 1540 Series Outdoor Access Points Hardware Installation Guide

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Preface

This section describes the objectives, audience, organization, and conventions of the *Cisco Aironet 1540 Series Outdoor Access Point Hardware Installation Guide*.

Objectives

This publication explains the steps for installing the Cisco Aironet 1540 Series Outdoor Access Points (called the *access point* or *AP* in this document).

Audience

This publication is for the person installing and configuring an 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.
Statement 1030


Warning

This equipment must be installed in restricted access locations in Norway, Finland, and Sweden. Only trained and qualified personnel are allowed to install, replace, or service this equipment as instructed in this installation guide.

Organization

This guide contains the following sections:

Chapter	Title	Description
Chapter 1	Overview	Describes the major components and features of the access point.
Chapter 2	Installing the Access Point	Provides warnings, safety information, and mounting information you need to install your access point.

Chapter	Title	Description
Chapter 3	Troubleshooting	Provides basic troubleshooting procedures for the access point.
Appendix A	Safety Guidelines and Warnings	Provides the safety warnings and guidelines that need to be strictly followed during the deployment of the access point.
Appendix B	Declarations of Conformity and Regulatory Information	Describes the regulatory conventions to which the access point conforms and provides guidelines for operating access points in Japan.
Appendix E	Access Point Pinouts	Describes the connector pinouts for the access point.

Conventions

This publication uses the following conventions:

Convention	Description
boldface font	Commands, command options, and keywords are in boldface.
<i>italic</i> font	Arguments for which you supply values are in italics.
[]	Elements in square brackets are optional.
screen font	Terminal sessions and information the system displays are in screen font.
boldface screen font	Information you must enter is in boldface screen font.
<i>italic</i> screen font	Arguments for which you supply values are in italic screen font.
^	The symbol ^ represents the key labeled Control. For example, the key combination ^D in a screen display means hold down the Control key while you press the D key.
< >	Nonprinting characters, such as passwords, are in angle brackets.

Notes use the following conventions:



Note

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

Cautions use the following conventions:



Caution

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

Warnings use the following conventions:



IMPORTANT SAFETY INSTRUCTIONS

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. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Waarschuwing

BELANGRIJKE VEILIGHEIDSinSTRUCTIES

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 de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.

BEWAAR DEZE INSTRUCTIES

Varoitus

TÄRKEITÄ TURVALLISUUSOHJEITA

Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET

Attention

IMPORTANTES INFORMATIONS DE SÉCURITÉ

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS

Warnung

WICHTIGE SICHERHEITSHINWEISE

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

Avvertenza **IMPORTANTI ISTRUZIONI SULLA SICUREZZA**

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.

CONSERVARE QUESTE ISTRUZIONI

Advarsel **VIKTIGE SIKKERHETSINSTRUKSJONER**

Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.

TA VARE PÅ DISSE INSTRUKSJONENE

Aviso **INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo.

GUARDE ESTAS INSTRUÇÕES

¡Advertencia! **INSTRUCCIONES IMPORTANTES DE SEGURIDAD**

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES

Varning! **VIKTIGA SÄKERHETSANVISNINGAR**

Denna varningssignal 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 vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.

SPARA DESSA ANVISNINGAR

Figyelem FONTOS BIZTONSÁGI ELOÍRÁSOK

Ez a figyelmeztető jel veszélyre utal. Sérülésveszélyt rejtő helyzetben van. Mielőtt bármely berendezésen munkát végezne, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplő figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján kereshető meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!

Предупреждение ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ

警告 重要的安全性说明

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

警告 安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

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이 지시 사항을 보관하십시오.

Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA

Este símbolo de aviso significa perigo. Você se encontra em uma situação em que há risco de lesões corporais. Antes de trabalhar com qualquer equipamento, esteja ciente dos riscos que envolvem os circuitos elétricos e familiarize-se com as práticas padrão de prevenção de acidentes. Use o número da declaração fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham o dispositivo.

GUARDE ESTAS INSTRUÇÕES

Advarsel VIGTIGE SIKKERHEDSANVISNINGER

Dette advarselssymbol betyder fare. Du befinder dig i en situation med risiko for legemeskade. Før du begynder arbejde på udstyr, skal du være opmærksom på de involverede risici, der er ved elektriske kredsløb, og du skal sætte dig ind i standardprocedurer til undgåelse af ulykker. Brug erklæringsnummeret efter hver advarsel for at finde oversættelsen i de oversatte advarsler, der fulgte med denne enhed.

GEM DISSE ANVISNINGER

تحذير

إرشادات الأمان الهامة

يوضح رمز التحذير هذا وجود خطر. وهذا يعني أنك متواجد في مكان قد ينتج عنه التعرض لإصابات. قبل بدء العمل، احذر مخاطر التعرض للصدمات الكهربائية وكن على علم بالإجراءات القياسية للحيلولة دون وقوع أي حوادث. استخدم رقم البيان الموجود في آخر كل تحذير لتحديد مكان ترجمته داخل تحذيرات الأمان المترجمة التي تأتي مع الجهاز. قم بحفظ هذه الإرشادات

Upozorenje VAŽNE SIGURNOSNE NAPOMENE

Ovaj simbol upozorenja predstavlja opasnost. Nalazite se u situaciji koja može prouzročiti tjelesne ozljede. Prije rada s bilo kojim uređajem, morate razumjeti opasnosti vezane uz električne sklopove, te biti upoznati sa standardnim načinima izbjegavanja nesreća. U prevedenim sigurnosnim upozorenjima, priloženima uz uređaj, možete prema broju koji se nalazi uz pojedino upozorenje pronaći i njegov prijevod.

SAČUVAJTE OVE UPUTE

Upozornění DŮLEŽITÉ BEZPEČNOSTNÍ POKYNY

Tento upozorňující symbol označuje nebezpečí. Jste v situaci, která by mohla způsobit nebezpečí úrazu. Před prací na jakémkoliv vybavení si uvědomte nebezpečí související s elektrickými obvody a seznamte se se standardními opatřeními pro předcházení úrazům. Podle čísla na konci každého upozornění vyhledejte jeho překlad v přeložených bezpečnostních upozorněních, která jsou přiložena k zařízení.

USCHOVEJTE TYTO POKYNY

Προειδοποίηση

ΣΗΜΑΝΤΙΚΕΣ ΟΔΗΓΙΕΣ ΑΣΦΑΛΕΙΑΣ

Αυτό το προειδοποιητικό σύμβολο σημαίνει κίνδυνο. Βρίσκεστε σε κατάσταση που μπορεί να προκαλέσει τραυματισμό. Πριν εργαστείτε σε οποιοδήποτε εξοπλισμό, να έχετε υπόψη σας τους κινδύνους που σχετίζονται με τα ηλεκτρικά κυκλώματα και να έχετε εξοικειωθεί με τις συνήθεις πρακτικές για την αποφυγή ατυχημάτων. Χρησιμοποιήστε τον αριθμό δήλωσης που παρέχεται στο τέλος κάθε προειδοποίησης, για να εντοπίσετε τη μετάφρασή της στις μεταφρασμένες προειδοποιήσεις ασφαλείας που συνοδεύουν τη συσκευή.

ΦΥΛΑΞΤΕ ΑΥΤΕΣ ΤΙΣ ΟΔΗΓΙΕΣ

אזהרה

הוראות בטיחות חשובות

סימן אזהרה זה מסמל סכנה. אתה נמצא במצב העלול לגרום לפציעה. לפני שתעבוד עם ציוד כלשהו, עליך להיות מודע לסכנות הכרוכות במעגלים חשמליים ולהכיר את הנהלים המקובלים למניעת תאונות. השתמש במספר ההוראה המסופק בסופה של כל אזהרה כדי לאתר את התרגום באזהרות הבטיחות המתורגמות שמצורפות להתקן.

שמור הוראות אלה

Opomena

ВАЖНИ БЕЗБЕДНОСНИ НАПАТСТВИЈА

Симболот за предупредување значи опасност. Се наоѓате во ситуација што може да предизвика телесни повреди. Пред да работите со опремата, бидете свесни за ризикот што постои кај електричните кола и треба да ги познавате стандардните постапки за спречување на несреќни случаи. Искористете го бројот на изјавата што се наоѓа на крајот на секое предупредување за да го најдете неговиот период во преведените безбедносни предупредувања што се испорачани со уредот.

ЧУВАЈТЕ ГИ ОВИЕ НАПАТСТВИЈА

Ostrzeżenie**WAŻNE INSTRUKCJE DOTYCZĄCE BEZPIECZEŃSTWA**

Ten symbol ostrzeżenia oznacza niebezpieczeństwo. Zachodzi sytuacja, która może powodować obrażenia ciała. Przed przystąpieniem do prac przy urządzeniach należy zapoznać się z zagrożeniami związanymi z układami elektrycznymi oraz ze standardowymi środkami zapobiegania wypadkom. Na końcu każdego ostrzeżenia podano numer, na podstawie którego można odszukać tłumaczenie tego ostrzeżenia w dołączonym do urządzenia dokumencie z tłumaczeniami ostrzeżeń.

NINIEJSZE INSTRUKCJE NALEŻY ZACHOWAĆ**Upozornienie****DÔLEŽITÉ BEZPEČNOSTNÉ POKYNY**

Tento varovný symbol označuje nebezpečenstvo. Nachádzate sa v situácii s nebezpečenstvom úrazu. Pred prácou na akomkoľvek vybavení si uvedomte nebezpečenstvo súvisiace s elektrickými obvodmi a oboznámte sa so štandardnými opatreniami na predchádzanie úrazom. Podľa čísla na konci každého upozornenia vyhľadajte jeho preklad v preložených bezpečnostných upozorneniach, ktoré sú priložené k zariadeniu.

USCHOVAJTE SI TENTO NÁVOD

Related Documents

To view all support information for the Cisco Aironet 1540 Series, see:

([URL to be added at CCO](#))

In addition to the documentation available on the support page, you will need to refer to the following guides:

- *Cisco Wireless LAN Controller Configuration Guide*

([URL to be added at CCO](#))

- *Release Notes for Cisco Wireless LAN Controllers and Lightweight Access Points*

([URL to be added at CCO](#))

- *Cisco Mobility Express Configuration and User Guide*

([URL to be added at CCO](#))

- *DHCP OPTION 43 for Lightweight Cisco Aironet Access Points Configuration Example*

<http://www.cisco.com/c/en/us/support/docs/wireless-mobility/wireless-lan-wlan/97066-dhcp-option-43-00.html>

Obtaining Documentation, Support, and Security Guidelines

For information on obtaining documentation and support, providing documentation feedback, security guidelines, and recommended aliases and general Cisco documents, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/c/en/us/td/docs/general/whatsnew/whatsnew.html>

To view all new wireless documentation, click on **Wireless**.





Overview

The Cisco Aironet 1540 Series Outdoor Access Point (hereafter called the *access point* or *AP*) is a wireless outdoor access point which is designed for use in a variety of network configurations. The access point supports wireless client access, bridging, and mesh wireless connectivity.



Note

Mesh and bridge modes are not supported in Cisco Wireless Release 8.3 software. Mesh mode is not supported in Cisco Wireless Release 8.4 software.

About the 1540 Series Access Points

The detailed up-to-date technical specifications for the Cisco Aironet 1540 Series Outdoor Access Points are available in the *Cisco Aironet 1540 Series Outdoor Access Point Data Sheet*, at the following URL: [\(URL to be added at CCO\)](#)

The 1540 series access points support both 2.4 GHz and 5 GHz radios, and provide client access using the unlicensed RF Wi-Fi spectrum. The radios have 802.11ac Wave 2 capability.

The 2.4 GHz and 5 GHz radios can be used for client access, backhaul traffic, or both. Depending on the model, the access point can support data rates of up to 1.3 Gbps.

The access point is a standalone unit which can be wall, pole, or ceiling mounted, depending on the model. The access point can also operate as a relay node for other access points that are not directly connected to a wired network.

The access point provides intelligent wireless routing using the patented Adaptive Wireless Path Protocol (AWPP). This enables each access point to identify neighbors and intelligently choose the optimal path to the wired network by calculating the cost of each path in terms of signal strength and the number of hops required to get to a controller.

The access point can be configured, monitored, and operated through a Cisco wireless LAN controller. The controllers use a browser-based management system, a command-line interface (CLI), or the Cisco Prime Infrastructure (PI) network management system to manage the controller and the associated access points. The access point supports hardware-based advanced encryption standard (AES) encryption between wireless nodes to provide end-to-end security.

Access Point Models

The model numbers (or part numbers) and configuration for the Cisco Aironet 1540 Series outdoor access points are described in [Table 1-1](#).

Table 1-1 1540 Series Access Points Model Numbers and Descriptions

Model (or part number)	Configuration
AIR-AP1542I- <i>x</i> -K9	<p>The AP1542I has integrated omni antennas and contains a 2.4 GHz and a 5 GHz radio with an option to configure in centralized, Flexconnect, Mobility Express, or mesh mode. It can also operate as a relay node for other access points that are not directly connected to a wired network.</p> <p>This model can be mounted vertically, on a wall or pole, to provide 180 degree coverage; or can be mounted horizontally on a ceiling, to provide 360 degree coverage.</p>
AIR-AP1542D- <i>x</i> -K9	<p>The AP1542D has integrated directional antennas and contains a 2.4 GHz and a 5 GHz radio with an option to configure in centralized, Flexconnect, or mesh mode. It can also operate as a relay node for other access points that are not directly connected to a wired network.</p> <p>This model can be mounted vertically, on a wall or pole, to provide a directed 90 degree coverage.</p>

Regulatory Domains

The “-*x*” in the 1540 model numbers represent the domain. For example, in AIR-AP1542I-*x*-K9, the -*x* represents a regulatory domain for a specific country. For specific regulatory domains supported by each 1540 series access point model, refer to the Wireless LAN Compliance Status at the following URL:

<http://www.cisco.com/go/aironet/compliance>

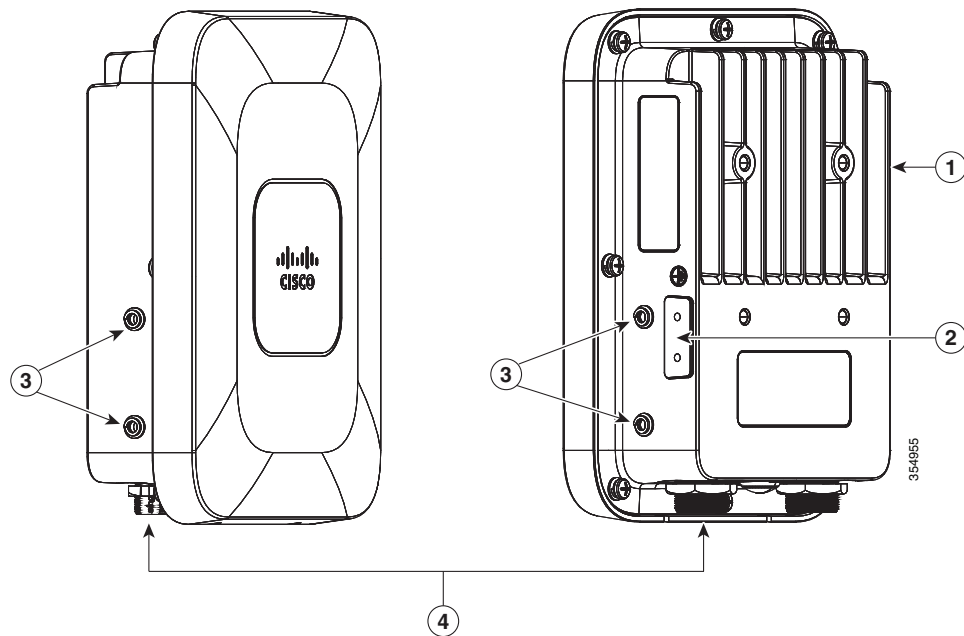
Hardware Features

This section describes the hardware features of the 1540 series access point models. The following hardware features are described in this section:

- [Ports and Connectors, page 1-3](#)
- [AP1542I Internal Omni Antenna, page 1-5](#)
- [AP1542D Internal Directional Antenna, page 1-5](#)
- [Power Sources, page 1-6](#)

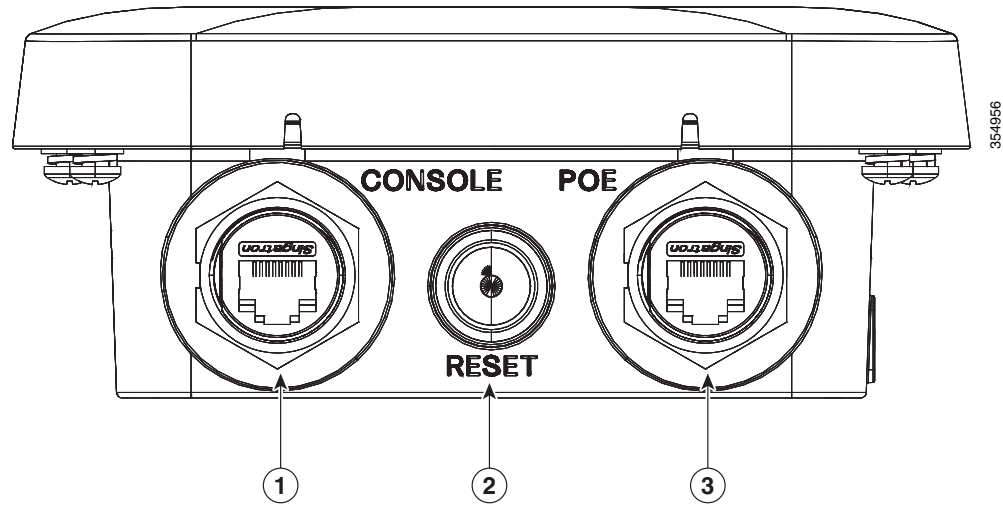
Ports and Connectors

Figure 1-1 Front and Rear Three-Quarters View of the AP



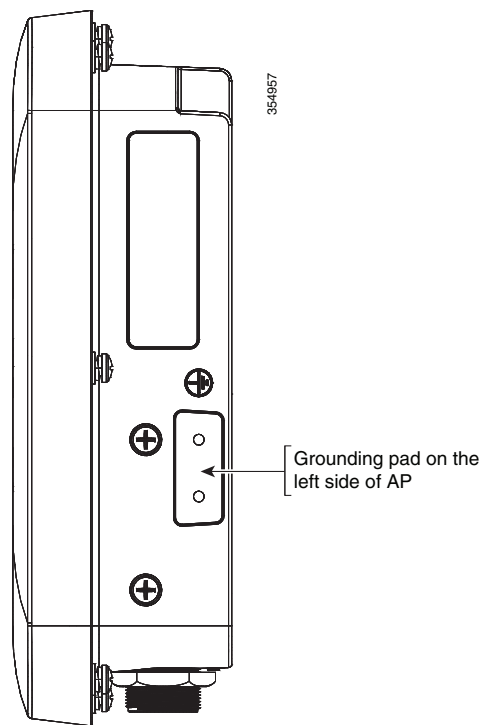
1	Back side of the AP with four screw holes for fastening the pole and wall mount bracket.	3	Screw holes for fastening the optional solar cover.
2	Grounding pad.	4	Reset button, PoE/data port, and Console port, on the base of the AP.

Figure 1-2 Ports and Reset Button on the Base of the AP



1	Console port. The console port is shipped with a covering cap on it. Inspect the cap at the time of installation. Every time the cap is removed or replaced, properly tighten it. If you do not tighten properly, it will not meet IP67 criteria, and may lead to water leaking into the unit.	3	PoE-In port.
2	Reset button with the status LED in its center.		

Figure 1-3 Grounding Pad on the Left Side of the AP



AP1542I Internal Omni Antenna

The AP1542I model has an internal omnidirectional antenna. The AP1542I access point 802.11b/g/n radio is used primarily for local access and its 802.11a/n/ac radio for wireless backhaul in the Mesh.

The 2.4 GHz b/g/n radio operates in 2.4 GHz ISM band. It has two transmitters with a maximum total output power of 29 dBm for 802.11b/g/n operation. Output power is configurable for 8 levels in 3 dB steps. It has two receivers which enable maximum-ratio combining (MRC).

The 5 GHz a/n radio operates in the UNII-1 band (5.15-5.25 GHz), UNII-2 band (5.25 - 5.35 GHz), UNII-2 Extended/ETSI band (5.47 - 5.725 GHz), and the upper ISM band (5.725 - 5.850 GHz). It has two transmitters with a maximum total output power of 29 dBm depending on the regulatory domain. Tx power settings will change depending on the regulatory domain. Output power is configurable in 3 dB steps. It has two receivers which enable maximum-ratio combining (MRC).

The AP1542I model access point is equipped with the following integrated antennas:

- 2 single band 2.4 GHz antennas with 5 dBi gain for WiFi operation.
- 2 single band 5 GHz antennas with 5 dBi gain for WiFi operation.
- 1 single band 2.4 GHz antenna with 3 dBi gain for BLE operation.

AP1542D Internal Directional Antenna

The AP1542D access point 802.11b/g/n radio is used primarily for local access and its 802.11a/n/ac radio for wireless backhaul in the Mesh.

The 2.4 GHz b/g/n radio operates in 2.4 GHz ISM band. It has two transmitters with a maximum total output power of 27 dBm for 802.11b/g/n operation. Output power is configurable for 8 levels in 3 dB steps. It has two receivers which enable maximum-ratio combining (MRC).

The 5 GHz a/n radio operates in the UNII-1 band (5.15-5.25 GHz), UNII-2 band (5.25 - 5.35 GHz), UNII-2 Extended/ETSI band (5.47 - 5.725 GHz), and the upper ISM band (5.725 - 5.850 GHz). It has two transmitters with a maximum total output power of 27 dBm depending on the regulatory domain. Tx power settings will change depending on the regulatory domain. Output power is configurable in 3 dB steps. It has two receivers which enable maximum-ratio combining (MRC).

The AP1542D model access point is equipped with the following integrated antennas:

- 2 single band 2.4 GHz antennas with 8 dBi gain for WiFi operation.
- 2 single band 5 GHz antennas with 9 dBi gain for WiFi operation.
- 1 single band 2.4 GHz antenna with 3 dBi gain for BLE operation.

Power Sources

**Note**

This product is intended to be supplied by a Listed PoE Power Supply rated 48-55V dc, minimum 350 mA.

The 1540 series access points can be powered only through Power over Ethernet (PoE). The 1540 series access points support the following power injectors:

- 802.3af Power Injector AIR-PWRINJ5=
- 802.3at Power Injector AIR-PWRINJ6=
- AIR-PWRINJ-30RGD1
- AIR-PWRINJ-60RGD1

**Caution**

When the access point is installed outdoors or in a wet or damp location, the AC branch circuit that is powering the access point should be provided with ground fault protection (GFCI), as required by Article 210 of the National Electrical Code (NEC).

Ethernet (PoE) Ports

The access point has a PoE-In port. The port uses an RJ45 connector (with weatherproofing) to link the access point to the inline power from the power injector or a suitably powered switch port.

The Ethernet cable must be a shielded outdoor rated Category 5e (CAT5e), or better, cable.

Network Deployment Examples

The 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 access point provides 5-GHz backhaul capability to link with another access point to reach a wired network connection or to provide repeater operations for other access points.

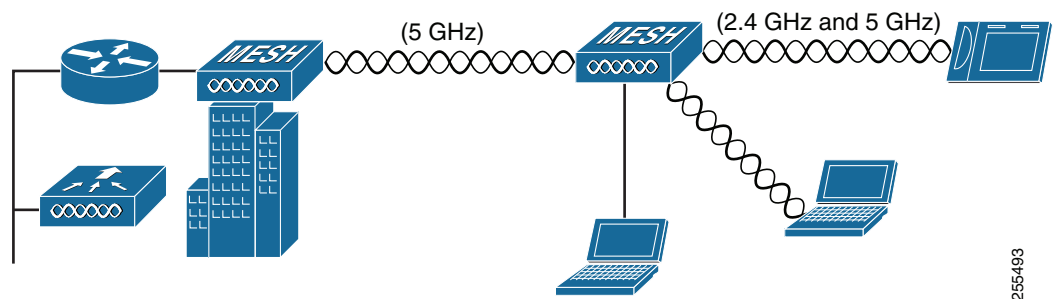
The access point plays two primary radio roles: a root access point (hereafter called a RAP) or a mesh (non-root) access point (hereafter called a MAP), which is the default role of all access points. When the access point has a fiber or wired Ethernet connection to the controller (through a switch), the radio role is called a RAP. In order to be considered a RAP, the access point must be configured as a RAP. A RAP is a parent node to any bridging or mesh network. A controller can support one or more RAPs, each one parenting the same or different wireless networks. There can be more than one RAP for the same mesh network for redundancy. RAPs and MAPs can support wireless clients on the 2.4-GHz and 5-GHz band. Client access on 5-GHz is called universal client access.

When the access point does not have a wired Ethernet connection to the controller (through a switch), the radio role is called a MAP. The MAPs have a wireless connection (through the backhaul interface) to other MAPs and finally to a RAP which has an Ethernet connection through a switch to the controller. MAPs may also have a wired Ethernet connection to a local LAN and serve as a bridge endpoint for that LAN (using a point-to-point or point-to-multipoint bridge connection).

Wireless Backhaul

The access point supports wireless backhaul capability using the 5 GHz radio to bridge to another access point to reach a wired network connection to a controller (see [Figure 1-4](#)). The access point connected to the wired network is considered a RAP in this configuration. The remote access point is considered a MAP and transfers wireless client traffic to the RAP for transfer to the wired network. Control And Provisioning of Wireless Access Points (CAPWAP) control traffic is also transferred over this bridged link.

Figure 1-4 Access Point Backhaul Example



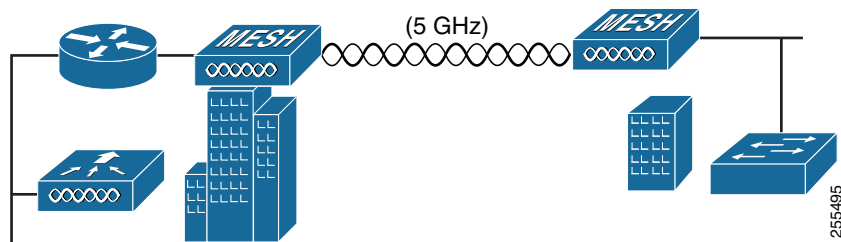
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Point-to-Point Bridging

The access points can be used to extend a remote network by using the 5 GHz backhaul radio to bridge the two network segments as shown in [Figure 1-5](#). To support Ethernet bridging, you must enable bridging on the controller for each access point. By default this capability is turned-off for all access points.

Wireless client access is supported; however, if bridging between tall buildings, the 2.4-GHz wireless coverage area may be limited and possibly not suitable for direct wireless client access.

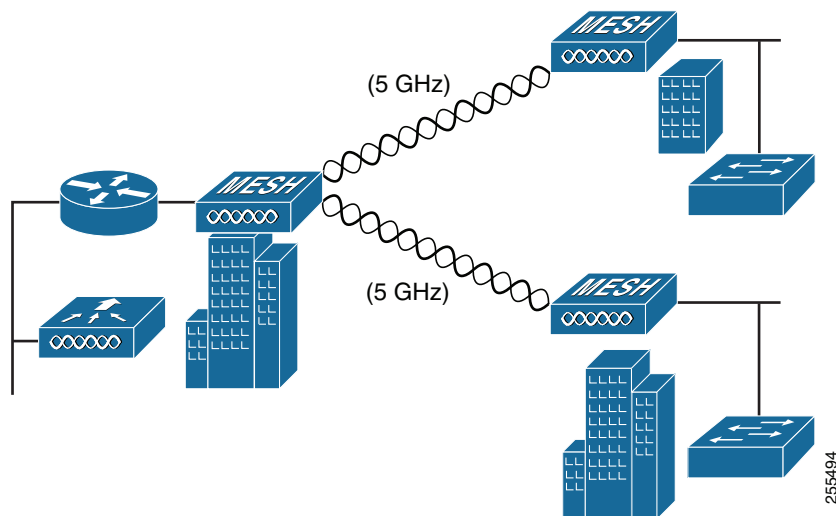
Figure 1-5 Access Point Point-to-Point Bridging Example



Point-to-Multipoint Bridging

The access points can be used as a RAP to connect multiple remote MAPs with their associated wired networks. By default this capability is turned-off for all access points. To support Ethernet bridging, you must enable bridging on the controller for each access point. Wireless client access can be provided over the bridging link; however, if bridging between tall buildings, the 2.4-GHz wireless coverage area may be limited and possibly not suitable for direct wireless client access. [Figure 1-6](#) illustrates an example of access point-to-multipoint bridging.

Figure 1-6 Access Point to Multipoint Bridging Example



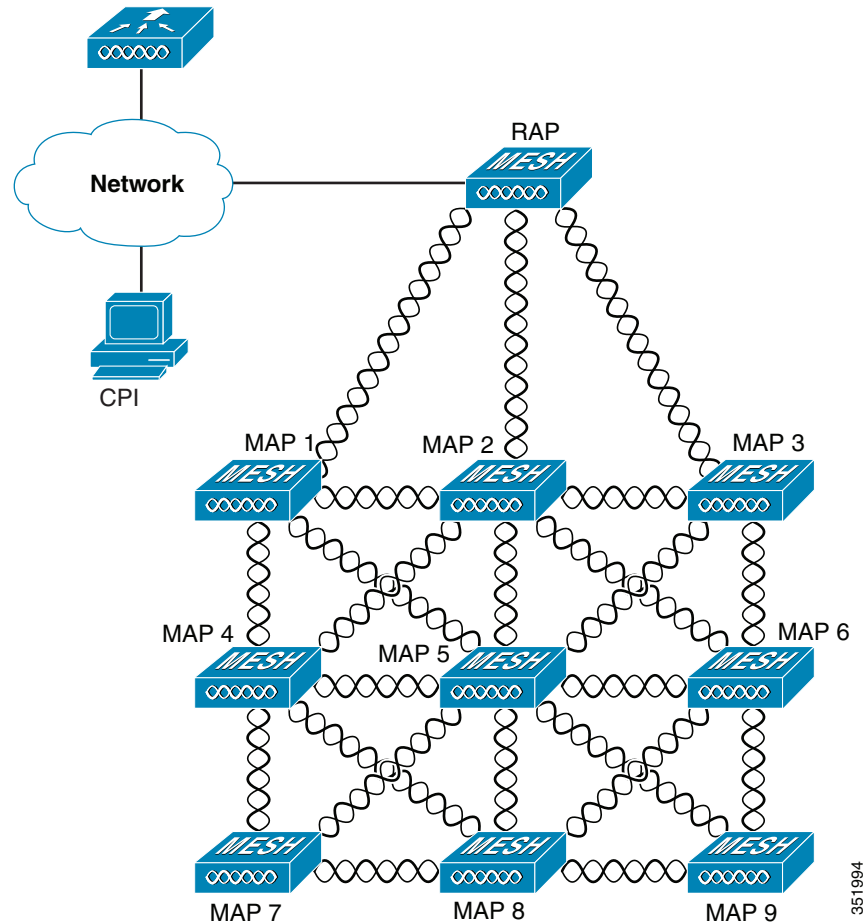
Point-to-Multipoint Mesh Network

The access point is typically deployed in a mesh network configuration. In a typical mesh deployment, one or more RAPs have a wired network connection through a switch to a controller. Other remote MAPs without wired network connections use the backhaul feature to optimally link to a RAP that is connected to the wired network. In the mesh network, the links between the access points are referred to as the *backhaul links*.

Intelligent wireless routing is provided by the Adaptive Wireless Path protocol (AWPP). This enables each MAP to identify its neighbors and intelligently choose the optimal path to the RAP with the wired network connection by calculating the cost of each path in terms of signal strength and the number of hops required to get to a controller with signal strength given priority since signal strength determines the data rate available for backhaul.

Figure 1-7 illustrates a typical mesh configuration using MAPs and RAPs.

Figure 1-7 Typical Mesh Configuration Using Access Points

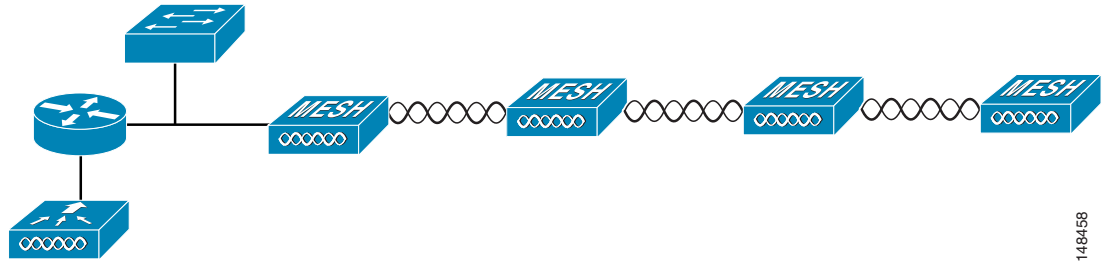


Layer 3 Network Operation

The access points support Layer 3 network operation. Access points and controllers in Layer 3 configurations use IP addresses and UDP packets, which can be routed through large networks. Layer 3 operation is scalable and recommended by Cisco.

Figure 1-8 illustrates a typical Layer-3 wireless network configuration containing access points and a controller.

Figure 1-8 Typical Layer 3 Access Point Network Configuration Example





Installing the Access Point

This chapter describes how to install the 1540 series access point and accessories. It contains the following sections:

- [Unpacking the Access Point, page 2-2](#)
- [Mounting the Access Point, page 2-5](#)
- [Installing AP Cover AIR-ACC1540-CVR=, page 2-11](#)
- [Grounding the Access Point, page 2-12](#)
- [Powering the Access Point, page 2-13](#)
- [Configuring the Access Point, page 2-17](#)

Unpacking the Access Point

To unpack the access point, follow these steps:

-
- 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 “[Package Contents](#)” are included in the shipment. If any item is damaged or missing, notify your authorized Cisco sales representative.

Your shipment may also contain additional equipment as per your order, as listed in [Optional Tools and Hardware From Cisco, page 2-2](#).

For additional hardware that is required for installation, see [Additional Tools and Hardware Required for Installation, page 2-2](#).

Package Contents

Each access point package contains the following items:

- One 1540 series access point
- Ground lug and screws with lock washers
- Plastic cable gland and rubber seal
- Weatherization tape and anti-corrosion sealant
- Cisco product documentation and pointer card
- Wall/Pole mount bracket AIR-ACC1530-PMK1=

Optional Tools and Hardware From Cisco

Depending on what you ordered, the following optional equipment may be part of your shipment:

- Power injector AIR-PWRINJ6=
- Power injector AIR-PWRINJ5=
- AP cover / Solar Shield for 1540, AIR-ACC1540-CVR=
- Spare Parts kit containing extra cable glands, power connector, ground lug, etc.
- AIR-PWRINJ-60RGD1=
- Lightning Arrestor kit (AIR-ACC245LA-N=)

Additional Tools and Hardware Required for Installation

You need to independently procure the following tools and materials which maybe required during various stages of installing the AP:

- 10 mm open end or box wrench
- Ground lug crimping tool (Panduit CT-720 with CD-720-1 die)

- 6 AWG copper ground wire
- Medium flat or Phillips screw driver (for the solar cover)
- Shielded outdoor-rated Ethernet (CAT5e or better) cable of 0.20 to 0.35 inches (0.51 to 0.89 cm) diameter.
- Ethernet RJ45 connector and installation tool
- Ground rod as required by local regulations

Pre-Installation Checks and Installation Guidelines

As the 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:

- Thoroughly review the information provided in [Safety Guidelines and Warnings, page A-1](#).
- For information on planning and initially configuring your Cisco Mesh network, refer to the *Cisco Wireless Access Points, Design and Deployment Guide, Release 7.3*.
- Review the FCC guidelines for installing and operating outdoor wireless LAN devices at:
http://www.cisco.com/c/en/us/products/collateral/routers/3200-series-rugged-integrated-services-routers-isr/data_sheet_c78-647116.html
- Install the access point in an area where structures, trees, or hills do not obstruct radio signals to and from the access point.
- We recommend installing the access points no higher than 40 feet to allow support for wireless clients on the ground. Best throughput is achieved when all the access points are mounted at the same height.
- The console port is shipped with a cap on it. Inspect the cap at the time of installation. Every time the cap is removed or replaced, properly tighten it. If you do not tighten the cap properly, it will not meet IP67 criteria, and may lead to water leaking into the unit.



Note

To calculate path loss and to determine how far apart to install access points, consult an RF planning expert.

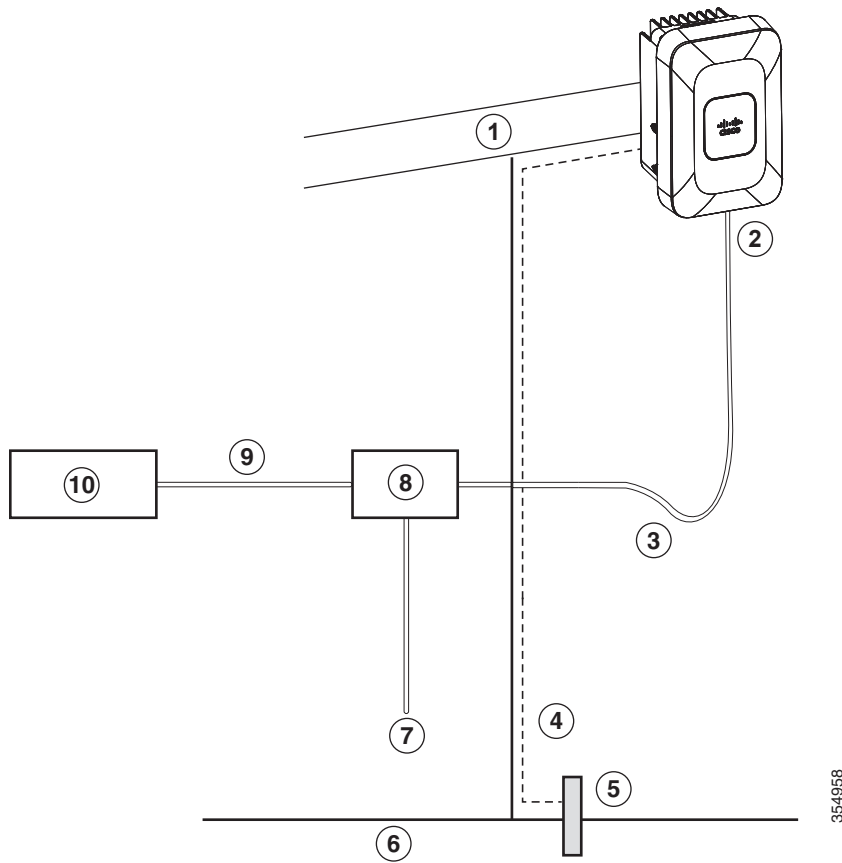
Before you begin the installation process, ensure the following:

- Perform a site survey. See the [“Performing Site Surveys” section on page A-3](#).
- Your network infrastructure devices must be operational and properly configured.
- Your controllers are connected to switch trunk ports.
- Your switch is configured with untagged access ports for connecting your access points.
- A DHCP server with Option 43 configured is reachable by your access points, or manually configure the controller information in the access point. For information on configuring the DHCP Option 43, visit the following URL:
<http://www.cisco.com/c/en/us/support/docs/wireless-mobility/wireless-lan-wlan/97066-dhcp-option-43-00.html>
- Become familiar with the access point installation components. See the [“Typical Access Point Installation Components” section on page 2-4](#).

Typical Access Point Installation Components

The access point is designed to be installed in an outdoor environment, such as the exterior roof overhang of a tall building or a streetlight pole. Carefully review [Figure 2-1](#) to become familiar with the system components, connectors, indicators, cables, system interconnection, and grounding.

Figure 2-1 Components in a Typical Access Point Installation



1	Building roof-overhang	6	Ground
2	Shielded outdoor-rated Ethernet (CAT5e or better) cable ¹	7	Power cord
3	Water drip loop	8	Power injector
4	6 AWG copper grounding wire ¹	9	Shielded Ethernet (CAT5e or better) cable ¹
5	Ground rod ¹	10	Controller (through a switch)

1. Independently sourced by the user.

Mounting the Access Point

This section provides instructions for installing your access points. Personnel installing the access point must have a good understanding of wireless access points, bridging techniques, and grounding methods.

The 1540 series access point can be wall, or pole mounted. The available mounting options are provided in the table below.

AP Mounting Kit	Purpose
AIR-ACC1530-PMK1=	<p>Fixed mounting kit for vertical mounting on wall and pole. See:</p> <ul style="list-style-type: none">• Wall Mounting the Access Point with AIR-ACC1530-PMK1=, page 2-6• Pole Mounting the Access Point with AIR-ACC1530-PMK1=, page 2-9 <p>Mount the access point in such a way that there are no obstructions to accessing the console port.</p>

Wall Mounting the Access Point with AIR-ACC1530-PMK1=

The AIR-ACC1530-PMK1= mounting kit contains a mounting bracket for wall mounting or pole mounting.

You can use the mounting bracket as a template to mark the positions of the mounting holes for your installation, install the mounting bracket, and then attach the access point to the bracket.

Table 2-1 lists the materials needed for this installation.

Table 2-1 *Materials Required to Mount Access Point Using AIR-ACC1530-PMK1=*

Materials Required	In Kit?
Ground lug and screws (provided with access point)	Yes
Wall Mount Bracket	Yes
Four M6 x 12-mm Hex-head Bolts	Yes
Crimping tool for ground lug, Panduit CT-720 with CD-720-1 die (http://www.panduit.com)	No
Four wall mounting screws	No
Four wall anchors (specified for all material)	No
Drill bit for wall anchors	No
Electric drill and standard screwdriver	No
#6 AWG ground wire	No
Shielded outdoor-rated Ethernet (CAT5e or better) cable	No
Grounding block	No
Grounding rod	No
10-mm box-end wrench or socket set	No

**Caution**

The mounting wall, attaching screws, and wall anchors must be able to support a 50 lb (22.7 kg) static weight.

To mount the access point vertically on a wall, follow these instructions:

- Step 1** Use the mounting bracket as a template to mark four screw hole locations on the mounting wall. The mounting bracket screw hole locations are shown in Figure 2-2. The dimensions of the mounting bracket is shown in Figure 2-3.
- Step 2** Use four screws and, if required, wall anchors to attach the mounting plate to the mounting surface. These screws and anchors are to be sourced independently.

**Note**

You can use an exterior-grade plywood backboard to mount the access point to stucco, cement, or dry wall.

**Note**

The mounting wall, attaching screws, and wall anchors must be able to support a 50 lb (22.7 kg) static weight.

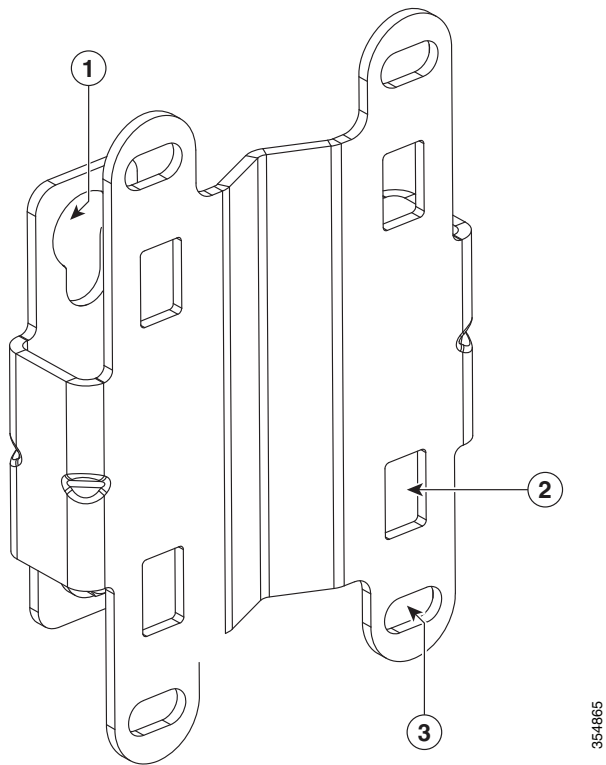
- Step 3** Screw an M6 x12 mm bolt into each of the four support bolt holes on the back of the access point. Do not screw the bolt all the way in, but leave a gap of approximately 0.13 inch (3.3 mm).
- Step 4** Position the access point against mounting bracket such that the four support bolts on the back of the AP, slot into the keyhole slots on the mounting bracket.
- Step 5** Slide the access point down to seat it securely in the keyhole slots on the mounting bracket.

**Note**

The access point should be mounted with the status LED on the base facing downwards.

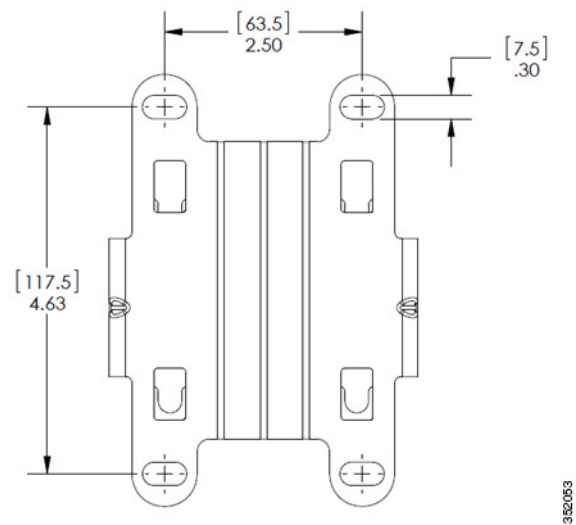
- Step 6** Using a 10mm wrench, tighten the four bolts that connect the access point to the bracket, to a torque of 40 lbf-in.
- Step 7** Proceed with connecting the data cables, grounding the access point, powering and configuring the access point.

Figure 2-2 Mounting Bracket for Wall and Pole Mounting



1	One of four keyhole slots for mounting the AP.	3	Bracket mount holes for fastening bracket to the wall. You can use bolts of up to 1/4 inch or 6 mm in diameter.
2	One of four slots for steel band clamps, used for pole mounting only.		

Figure 2-3 Mounting Bracket Dimensions in inches [and millimeters]





Pole Mounting the Access Point with AIR-ACC1530-PMK1=

The AIR-ACC1530-PMK1= mounting kit contains a mounting bracket that can be used for both wall mounting and pole mounting. This kit can be used to install the access point on a pole, mast or streetlight. It supports metal, wood or fiberglass poles from 2 to 8 inches in diameter.

Table 2-2 Materials Needed to Mount the AP on a Vertical Pole

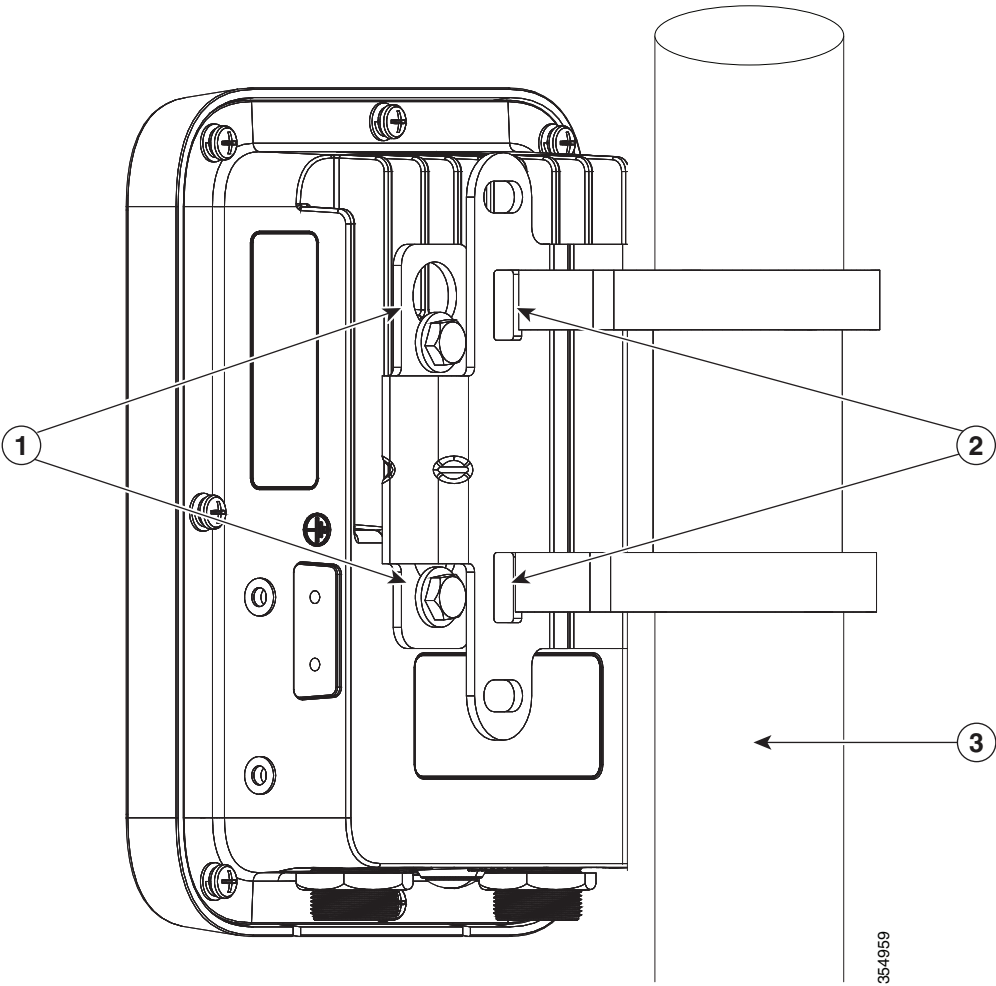
Materials Needed	In Kit?
One wall mount bracket	Yes
Four M6 x12mm hex head bolts	Yes
Two stainless steel band clamps (adjustable 2"–5", 51–127 mm)	Yes
Two stainless steel band clamps (adjustable 5"–8", 127–203 mm)	Yes
10 mm box-end wrench	No
Outdoor rated shielded Ethernet cable	No
Ground lug (provided with the access point)	Yes
Ground block and rod	No
Crimping tool for ground lug, Panduit CT-720 with CD-720-1 die (http://www.panduit.com)	No
#6 AWG ground wire	No

To mount the access point onto a vertical pole, follow these steps:

-
- Step 1** Select a mounting location on the pole to mount the access point. You can attach the access point to a pole having a diameter of 2 to 8 inches (5.1 to 20.1 cm).
-  **Note** If you will be using a streetlight power tap adapter, position the access point within 3 ft (1 m) of the outdoor light control. An AC/DC adapter needs to be used for street light pole deployments.
-
- Step 2** Hold the bracket up against the pole, and slide the two band straps through the top and bottom sets of mounting slots on the mounting bracket (see [Figure 2-4](#)).
- Step 3** Wrap the band straps around the pole, lock them, and then lightly tighten the clamps using a wrench. Only tighten them enough to keep the bracket from sliding down the pole
- Step 4** Screw an M6 bolt into each of the four bolt holes on the back side of the access point. Do not screw the bolt in all the way. Leave a gap of about 0.13-inch (3.3 mm).
- Step 5** Position the four bolts on the access point into the bracket keyhole slots. Check to be sure that the access point is properly seated in the slots (see [Figure 2-4](#)).
-  **Note** The access point should be mounted with the status LED on the base facing downwards.
-
- Step 6** Using a 10 mm wrench, tighten the four bolts that connect the access point to the bracket to a torque of 40 lbf-in.

- Step 7
- Locate the access point to the final position. Tighten the band clamps with the wrench so that the access point does not slide on the pole. Ensure that the clamps are tight enough to not let the AP move.
- Step 8
- Proceed with connecting the data cables, grounding the access point, powering and configuring the access point.

Figure 2-4 AP Mounted on a Pole



1	One of four M6 keyhole slots for mounting the AP on the bracket.	3	Pole (wood, metal, or fiberglass), 2-inches to 8-inches (50 mm to 203 mm) diameter.
2	Top and bottom steel band clamps passing through band clamp slots on the bracket.		

Installing AP Cover AIR-ACC1540-CVR=

You can install a cover AIR-ACC1540-CVR=, which also acts as a solar shield. The cover can be installed before or after all connections are made.

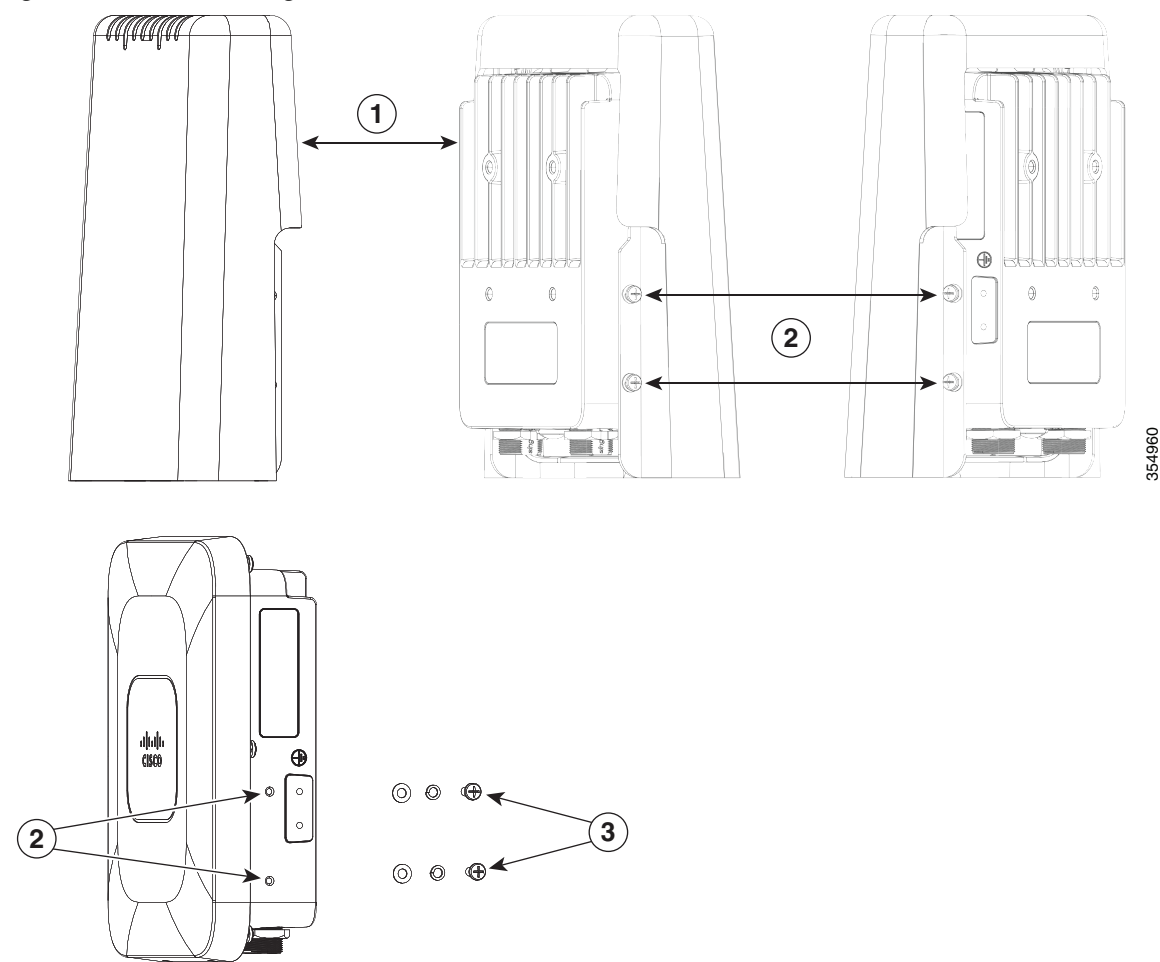
- Step 1

Position and slide the cover over the AP as shown in [Figure 2-5](#).
- Step 2

Align the two holes on each side of the cover with the screw holes on corresponding side of the AP.
- Step 3

Insert and fasten #8-32 screws through the screw holes in the cover, into the AP. Tighten the screws to 10 lb-in.

Figure 2-5 Installing the Cover on the AP



1	Solar Shield.	3	Two of four #8-32 screws, circular washers, and split washers.
2	Four screw holes for fastening the solar cover. Two on each side of the AP.		

Grounding the Access Point

The access point must be grounded before connecting power.

In all outdoor installations and when powering the access point with AC power, you must follow these instructions to properly ground the case:

Step 1 If you are using insulated 6 AWG copper ground wire, strip the insulation as required for the grounding lug.

Step 2 Use the appropriate crimping tool to crimp the bare 6 AWG copper ground wire to the supplied grounding lug.



Note The grounding lug and hardware used must comply with local and national electrical codes.

Step 3 Open the anti-corrosion sealant (supplied), and apply a liberal amount over the metal surface, called the Ground Pad, where the ground strap screw holes are located (see [Figure 1-3](#)).

Step 4 Connect the grounding lug to the access point grounding screw holes (see [Figure 1-3](#)) using the supplied two Phillips head screws (M4 x10 mm) with lock washers. Tighten the grounding screw to 22 to 24 lb-in (2.49 to 2.71 Nm).

Step 5 If necessary, strip the other end of the ground wire and connect it to a reliable earth ground, such as a grounding rod or an appropriate grounding point on a metal streetlight pole that is grounded.

Powering the Access Point

**Note**

This product is intended to be supplied by a Listed PoE Power Supply rated 48-55V dc, minimum 350 mA.

The 1540 series access points can be powered only through Power-over-Ethernet (PoE), using 802.3af or 802.3at power, from in-line power injector or a suitably powered switch port. Power for full operation is provided by 802.3af (or higher), and operates at 2x2:2 for both 2.4 GHz and 5 GHz radios.

The 1540 series access point supports the following power injectors:

- AIR-PWRINJ5 (provides 802.3af power)
- AIR-PWRINJ6 (provides 802.3at power). This power injector can only be used in an indoor environment. Therefore the cable from the injector must travel from the indoor location to the access point mounted outdoor.
- AIR-PWRINJ-60RGD1
- AIR-PWRINJ-60RGD2

Connecting a Power Injector

When your access point is powered by a power injector, follow these steps to complete the installation:

- Step 1** Before applying PoE to the access point, ensure that the access point is grounded (see the [“Grounding the Access Point”](#) section on page 2-12).
- Step 2** See the [“Typical Access Point Installation Components”](#) section on page 2-4, to identify the components needed for the installation.
- Step 3** Connect a CAT5e or better Ethernet cable from your wired LAN network to the power injector.

**Warning**

To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord. Statement 1023

**Note**

The installer is responsible for ensuring that powering the access point from this type of power injector is allowed by local and/or national safety and telecommunications equipment standards.

**Tip**

To forward bridge traffic, add a switch between the power injector and controller. Refer to the *Cisco Wireless Mesh Access Points, Design and Deployment Guide, Release 7.0* for more information.

- Step 4** Ensure that the access point is grounded before you apply power to the access point.
- Step 5** Connect a shielded outdoor-rated Ethernet (CAT5e or better) cable between the power injector and the PoE-in connector of the access point.

- Step 6** Connect the Ethernet cable to the access point PoE-In port. See [“Connecting an Ethernet Cable to the Access Point” section on page 2-15](#).
-

For details on installing Ethernet, see [Connecting an Ethernet Cable to the Access Point, page 2-15](#).

Connecting an Ethernet Cable to the Access Point

You need to supply these tools and materials:

- Shielded outdoor-rated Ethernet (CAT5e or better) cable with a diameter of 0.2 to 0.35 inch (0.51 to 0.89 cm)
- RJ45 connector and installation tool
- Adjustable Wrench or 28 mm box wrench

To connect the shielded Ethernet cable to the access point, follow these steps:

Step 1

Disconnect power to the power injector, and ensure all power sources to the access point are turned off.

**Warning**

This unit might have more than one power supply connection. All connections must be removed to de-energize the unit. Statement 1028

Step 2

Ensure a 6 AWG ground wire is connected to the access point (see the [“Grounding the Access Point” section on page 2-12](#)).

Step 3

Remove the covering cap from the PoE port.

Step 4

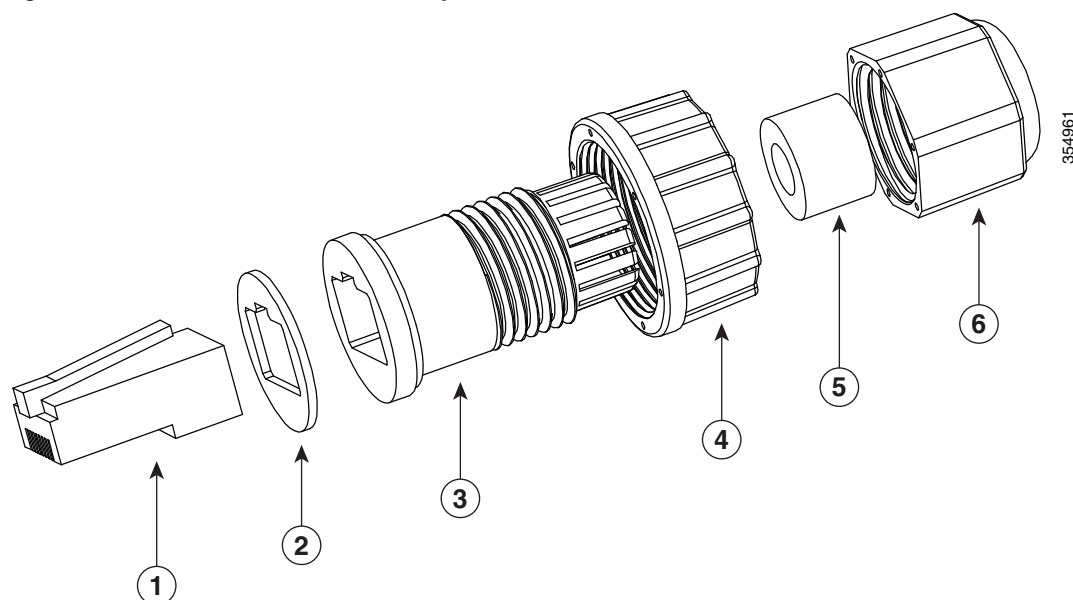
Loosen the Thread-Lock sealing nut of the cable gland by turning it counter clockwise, but do not remove it (see [Figure 2-6](#)).

**Note**

Verify that the cable gland has a rubber seal and ensure that it is not damaged.

**Warning**

Failure to install the cable gland and rubber gasket properly will cause the cable grip to leak.

Figure 2-6 Cable Gland Assembly

1	RJ45 Plug	4	Screw nut
2	Gasket	5	Seal
3	Clamp ring	6	Thread-lock sealing nut

Step 5 Insert the unterminated end of the Ethernet cable through the sealing nut-end of the cable gland (see [Figure 2-6](#)), and pull several inches of cable through.

Step 6 Install an RJ45 connector on the unterminated end of the Ethernet cable using your Ethernet cable installation tool.



Warning To reduce the risk of fire, use only **No. 26 AWG or larger telecommunication line cord**. Statement 1023

Step 7 Carefully connect the RJ45 cable connector to the PoE port on the access point.

Step 8 Slide the cable gland with the rubber seal towards the access point, and screw the threaded end of the body into the access point, and hand-tighten.

Step 9 Use an adjustable wrench or a 28 mm wrench to tighten the threaded end of the body into the enclosure. Tighten to 15 lb-in.

Step 10 Use an adjustable wrench and tighten the thread-lock seal nut to 15 lb-in.

Step 11 Route your Ethernet cable, and cut off any excess cable.

Step 12 Install an RJ45 connector on the unterminated cable end, and insert it into the power injector.

Step 13 Turn on the power to the power injector.

Configuring the Access Point

When you power up an AP that is not connected to a wired Ethernet, fiber-optic, or cable network to the controller, the access point uses the Cisco Adaptive Wireless Path Protocol (AWPP) to bind to another mesh access point with the best path to a root access point (RAP) connected to the wired network to a controller. The access point sends a discovery request when powered up. If you have configured the access point in the controller correctly, the controller sends back a discovery response to the access point. When that happens, the access point sends out a join request to the controller, and the controller responds with a join confirmation response. Then the access point establishes a Control And Provisioning of Wireless Access Points (CAPWAP) connection to the controller and gets the shared secret configured on the controller.

For information on configuring the access point, see the following documents:

- For Lightweight Access Points and Mesh Access Points, see the *Cisco Wireless LAN Controller Configuration Guide*, which is available at:
([URL to be added at FCS](#))
- For Mesh Access Points, see the *Cisco Wireless Mesh Access Points, Design and Deployment Guide*, which is available at:
([URL to be added at FCS](#))



Troubleshooting

This chapter provides troubleshooting procedures for basic problems with the access point. For the most up-to-date, detailed troubleshooting information, refer to the Cisco Technical Support and Documentation website at the following URL:

<http://www.cisco.com/cisco/web/support/index.html>

Sections in this chapter include:

- [Guidelines for Using the Access Point, page 3-2](#)
- [Using DHCP Option 43, page 3-3](#)
- [Monitoring the Access Point Status LED, page 3-3](#)
- [Resetting the Access Point, page 3-6](#)
- [Verifying Controller Association, page 3-6](#)
- [Changing the Bridge Group Name, page 3-6](#)

Guidelines for Using the Access Point

- The access point only supports Layer 3 CAPWAP communications with the controllers.
In Layer 3 operation, the access point and the controller can be on the same or different subnets. The access point communicates with the controller using standard IP packets. A Layer 3 access point on a different subnet than the controller requires a DHCP server on the access point subnet and a route to the controller. The route to the controller must have destination UDP ports 12222 and 12223 open for CAPWAP communications. The route to the primary, secondary, and tertiary controllers must allow IP packet fragments.
- Before deploying your access points, ensure that the following has been done:
 - Your controllers are connected to switch ports that are configured as trunk ports.
 - Your access points are connected to switch ports that are configured as untagged access ports.
 - A DHCP server is reachable by your access points and has been configured with Option 43. Option 43 provides the IP addresses of the management interfaces of your controllers. Typically, a DHCP server can be configured on a Cisco switch.
 - Optionally, a DNS server can be configured to enable CISCO-CAPWAP-CONTROLLER. Use *local domain* to resolve to the IP address of the management interface of your controller.
 - Your controllers are configured and reachable by the access points.
 - Your controllers are configured with the access point MAC addresses and the MAC filter list is enabled.
 - Your switch must forward DHCP requests.
- After the access points are associated to the controller, you should change the bridge group name (BGN) from the default value. With the default BGN, the mesh access points (MAPs) can potentially try to connect with other mesh networks and slow down the convergence of the network.

Convergence Delays

During deployment, the access points can experience convergence delays due to various causes. The following list identifies some operating conditions that can cause convergence delays:

- A root access point (RAP) attempts to connect to a controller using any of the wired ports (cable, fiber-optic, PoE-in). If the wired ports are operational, the RAP can potentially spend several minutes on each port prior to connecting to a controller.
- If a RAP is unable to connect to a controller over the wired ports, it attempts to connect using the wireless network. This results in additional delays when multiple potential wireless paths are available.
- If a MAP is unable to connect to a RAP using a wireless connection, it then attempts to connect using any available wired port. The access point can potentially spend several minutes for each connection method, before attempting the wireless network again.

Bridge Loop

The access point supports packet bridging between wired and wireless network connections. The same network must never be connected to multiple wired ports on an access point or on two bridged access points. A bridge loop causes network routing problems.

Controller DHCP Server

The controller DHCP server only assigns IP addresses to lightweight access points and wireless clients associated to an access point. It does not assign an IP address to other devices, including Ethernet bridging clients on the mesh access points.

MAP Data Traffic

If the signal on the access point backhaul channel has a high signal-to-noise ratio, it is possible for a MAP to connect to the controller, via parent node, but not be able to pass data traffic, such as pinging the access point. This can occur because the default data rate for backhaul control packets is set to 6 Mb/s, and the backhaul data rate set to auto by the user.

Controller MAC Filter List

Before activating your access point, you must ensure that the access point MAC address has been added to the controller MAC filter list and that **Mac Filter List** is enabled.

**Note**

The access point MAC address and barcode is located on the bottom of the unit. When two MAC addresses are shown, use the top MAC address.

To view the MAC addresses added to the controller MAC filter list, you can use the controller CLI or the controller GUI:

- Controller CLI—Use the **show macfilter summary** controller CLI command to view the MAC addresses added to the controller filter list.
- Controller GUI—Log into your controller web interface using a web browser, and choose **SECURITY > AAA > MAC Filtering** to view the MAC addresses added to the controller filter list.

Using DHCP Option 43

You can use DHCP Option 43 to provide a list of controller IP addresses to the access points, enabling the access point to find and join a controller. Refer to the product documentation for your DHCP server for instructions on configuring DHCP Option 43. To see sample configurations for DHCP Option 43 for, go to the following URL:

<http://www.cisco.com/c/en/us/support/docs/wireless-mobility/wireless-lan-wlan/97066-dhcp-option-43-00.html>

Monitoring the Access Point Status LED

If your access point is not working properly, look at the LED on the Reset button, on the base of the unit. You can use them to quickly assess the status of the unit.

**Note**

It is expected that there will be small variations in LED color intensity and hue from unit to unit. This is within the normal range of the LED manufacturer specifications and is not a defect.

The access point LED signals are listed in [Table 3-1](#).

Table 3-1 Access Point LED Signals

LED Message Type	Color	Meaning
Boot loader status sequence	Blinking Green	Boot loader status sequence: <ul style="list-style-type: none"> • DRAM memory test in progress • DRAM memory test OK • Board initialization in progress • Initializing FLASH file system • FLASH memory test OK • Initializing Ethernet • Ethernet OK • Starting AP OS • Initialization successful
Boot loader warnings	Blinking Amber	Configuration recovery is in progress (the Reset button has been pushed for 2-3 seconds)
	Red	There is an Ethernet failure or an image recovery (the Reset button has been pushed for 20-30 seconds)
	Blinking Green	An image recovery is in progress (the Reset button has been released)
Boot loader errors	Red	There has been a DRAM memory test failure
	Blinking Red and Amber	There has been a FLASH file system failure
	Blinking Red and Off	This sequence may indicate any of the following: <ul style="list-style-type: none"> • Environment variable failure • Bad MAC address • Ethernet failure during image recovery • Boot environment failure • No Cisco image file • Boot failure

Table 3-1 **Access Point LED Signals**

LED Message Type	Color	Meaning
AP OS errors	Red	There has been a software failure; a disconnect then reconnect of the unit power may resolve the issue
	Cycling through Red, Green, Amber and Off	This is a general warning of insufficient inline power.
Association status	Chirping (short blips) Green	This status indicates a normal operating condition. The unit is joined to a controller, but no wireless client is associated with it.
	Solid Green	Normal operating condition with at least one wireless client associated with the unit
Operating Status	Blinking Amber	A software upgrade is in progress
	Cycling through Green, Red and Amber	Discovery/join process is in progress
	Rapidly cycling through Red, Green, Amber and Off	This status indicates that the Access Point location command has been invoked.
	Blinking Red	This status indicates that an Ethernet link is not operational

Resetting the Access Point

The reset button is located on the base of the AP (see [Figure 1-2](#)). Using the Reset button you can:

- Reset the AP to the default factory-shipped configuration.
- Clear the AP internal storage, including all configuration files.

To use the Reset button, press, and keep pressed, the Reset button on the access point during the AP boot cycle. Wait until the AP status LED changes to Amber. During this, the AP console shows a seconds counter, counting the number of seconds the Reset button is pressed. Then:

- To reset the AP to default factory-shipped configuration, keep the Reset button pressed for less than 20 seconds. The AP configuration files are cleared.

This resets all configuration settings to factory defaults, including passwords, WEP keys, the IP address, and the SSID.

- To clear the AP internal storage, including all configuration files and the regulatory domain configuration, keep the Reset button pressed for more than 20 seconds, but less than 60 seconds.

The AP status LED changes from Amber to Red, and all the files in the AP storage directory are cleared.

If you keep the Reset button pressed for more than 60 seconds, the Reset button is assumed faulty and no changes are made.

Verifying Controller Association

To verify that your access point is associated to the controller, follow these steps:

-
- | | |
|---------------|---|
| Step 1 | Log into your controller web interface using a web browser.

You can also use the controller CLI show ap summary command from the controller console port. |
| Step 2 | Click Wireless , and verify that your access point MAC address is listed under Ethernet MAC. |
| Step 3 | Log out of the controller, and close your web browser. |
-

Changing the Bridge Group Name

The bridge group name (BGN) controls the association of the access points to a RAP. BGNs can be used to logically group the radios to avoid different networks on the same channel from communicating with each other. This setting is also useful if you have more than one RAP in your network in the same area.

If you have two RAPs in your network in the same area (for more capacity), we recommend that you configure the two RAPs with different BGNs and on different channels.

The BGN is a string of ten characters maximum. A factory-set bridge group name (NULL VALUE) is assigned during manufacturing. It is not visible to you, but allows new access point radios to join a network of new access points. The BGN can be reconfigured from the Controller CLI and GUI. After configuring the BGN, the access point reboots.

After the access points are deployed and associated to the controller, the BGN should be changed from the default value to prevent the MAPs from attempting to associate to other mesh networks.

The BGN should be configured very carefully on a live network. You should always start with the most distant access point (last node) from the RAP and move towards the RAP. If you start configuring the BGN in a different location, then the access points beyond this point (farther away) are dropped, as they have a different BGN.

To configure the BGN for the access points using the controller GUI, follow these steps:

-
- Step 1** Log into your controller using a web browser.
 - Step 2** Click **Wireless**. When access points associates to the controller, the access point name appears in the AP Name list.
 - Step 3** Click on an access point name.
 - Step 4** Find the Mesh Information section, and enter the new BGN in the Bridge Group Name field.
 - Step 5** Click **Apply**.
 - Step 6** Repeat Steps 2 through 5 for each access point.
 - Step 7** Log out from your controller, and close your web browser.
-



Safety Guidelines and Warnings

Translated versions of all safety warnings are available on Cisco.com. Additional safety information, along with regulatory information, is provided in [Appendix B, “Declarations of Conformity and Regulatory Information”](#).



Warning

This equipment is to be installed by trained and qualified personnel, as per these installation instructions. The installer is responsible for obtaining any required local or national safety inspections of the structural integrity of the installation by the local authority/inspection department.



Warning

Do not operate the unit near unshielded blasting caps or in an explosive environment unless the device has been modified to be especially qualified for such use. Statement 364



Warning

The cables specified in this installation guide that are used with the specified cable glands provide protection against ingress of moisture for a Type 4/IP67 classified enclosure. If substitute cable are used, the installer must ensure that the size (OD) of the cable meets the acceptable range allowed by the cable gland.



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. Statement 366



Warning

Read the installation instructions before connecting the system to the power source. Statement 1004



Warning

Ultimate disposal of this product should be handled according to all national laws and regulations. Statement 1040



Warning

Do not work on the system or connect or disconnect cables during periods of lightning activity. Statement 1001

**Warning****A readily accessible two-poled disconnect device must be incorporated in the fixed wiring.**

Statement 1022

**Warning****To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord.** Statement 1023**Warning****This unit might have more than one power supply connection. All connections must be removed to de-energize the unit.** Statement 1028**Warning****Only trained and qualified personnel should be allowed to install, replace, or service this equipment.**

Statement 1030

**Warning****When installing or replacing the unit, the ground connection must always be made first and disconnected last.** Statement 1046.**Caution**

Before connecting or disconnecting a power cord, you must remove power from the power cord using a suitable service disconnect.

**Warning****Installation of the equipment must comply with local and national electrical codes.** Statement 1074**Caution**

All installation methods for mounting an access point on any wall surface is subject to the acceptance of local jurisdiction.

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

For safety and to achieve a good installation, please read and follow these safety precautions:

- Select your installation site with safety, as well as performance in mind. Remember: electric power lines and phone lines look alike. For safety, assume that any overhead line can kill.

- Call your electric power company. Tell them your plans, and ask them to come look at your proposed installation.
- Plan your installation carefully and completely before you begin. Successful raising of a mast or tower 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.
- When installing the access points, remember:
 - Do not use a metal ladder.
 - Do not work on a wet or windy day.
 - Do dress properly—shoes with rubber soles and heels, rubber gloves, long sleeved shirt or jacket.
- Use a rope to lift the access point. If the assembly starts to drop, get away from it and let it fall.

If an accident should occur, call for qualified emergency help immediately.

Performing Site Surveys

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

Site surveys reveals problems that can be resolved before the network is operational. Because 802.11a/b/g/n operates in an unlicensed spectrum, there may be sources of interference from other 802.11a wireless devices (especially in multi-tenant buildings) that could degrade your 802.11 signals. A site survey can determine if such interference exists at the time of deployment.

A proper site survey involves temporarily setting up mesh links and taking measurements to determine whether your antenna calculations are accurate. Determine the correct locations and antenna types before you drill holes and route cables and mounting equipment.

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.
- 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.
- How far is your wireless link?
- Has a previous site survey been conducted?
- Do you have a clear Fresnel zone between the access points or radio line of sight?
- What is the minimum acceptable data rate within the link?
- Do you have access to both of the mesh site locations?
- Do you have the proper permits, if required?
- Are you following the proper safety procedures and practices?
- Have you configured the access points before you go onsite? It is always easier to resolve configurations or device problems first.

- Do you have the proper tools and equipment to complete your survey.

Translated Safety Warnings

(URL to be added at FCS)



Declarations of Conformity and Regulatory Information

This appendix provides declarations of conformity and regulatory information for the Cisco Aironet 1542 Outdoor Access Point.

This appendix contains the following sections:

- [Manufacturers Federal Communication Commission Declaration of Conformity Statement, page B-2](#)
- [Industry Canada, page B-3](#)
- [European Community, Switzerland, Norway, Iceland, and Liechtenstein, page B-6](#)
- [Declaration of Conformity for RF Exposure, page B-9](#)
- [Guidelines for Operating Cisco Aironet Access Points in Japan, page B-10](#)
- [VCCI Statement for Japan, page B-11](#)
- [Administrative Rules for Cisco Aironet Access Points in Taiwan, page B-11](#)
- [EU Declaration of Conformity, page B-13](#)

Manufacturers Federal Communication Commission Declaration of Conformity Statement

**Models:**

AIR-AP1542I-B-K9
AIR-AP1542D-B-K9

FCC Certification number:

LDK102109P

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 access point must be professionally installed.

Requirements of operator to register the RLAN device operating Outdoors in the 5150 -5250 MHz band and addressing possible interference issues in this band

Section 15.407(j) of the rules established filing requirements for U-NII operators that deploy a collection of more than 1000 outdoor access points with the 5.15-5.25 GHz band, parties must submit a letter to the FCC lab acknowledging that, should harmful interference to licensed services in this band occur, they will be required to take corrective action. Corrective actions may include reducing power, turning off devices, changing frequency bands, and/or further reducing power radiated in the vertical direction.

This material shall be submitted to:

Federal Communications Commission
Laboratory Division, Office of Engineering and Technology
7435 Oakland Mills Road, Columbia, MD, 21046
Attn: U-NII Coordination

or via website at <https://www.fcc.gov/labhelp>
use subject line U-NII Filing

Industry Canada

Models:

AIR-AP1542I-A-K9
AIR-AP1542D-A-K9

IC Certification Number:

2461B-102109P

Canadian Compliance Statement

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

This radio transmitter has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Antenna Type	Antenna Gain	Antenna Impedance
Dual-band Omni (1542I)	5/5 dBi	50 ohms
Dual-Band Directional (1542D)	8/9 dBi	50 ohms

Operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems.

La bande 5 150-5 250 MHz est réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux.

Users are advised that high-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and that these radars could cause interference and/or damage to LE-LAN devices.

Les utilisateurs êtes avisés que les utilisateurs de radars de haute puissance sont désignés utilisateurs principaux (c.-à-d., qu'ils ont la priorité) pour les bandes 5 250-5 350 MHz et 5 650-5 850 MHz et que ces radars pourraient causer du brouillage et/ou des dommages aux dispositifs LAN-EL

Declaration of Conformity for RF Exposure

This 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. AP 1542I, has internal antennas, and should be located at a minimum of 9.8 inches (25 cm) or more from the body of all persons. AP 1542D, has internal antennas, and should be located at a minimum of 11.8 inches (30 cm) or more from the body of all persons.

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

European Community, Switzerland, Norway, Iceland, and Liechtenstein

Access Point Models:

AIR-AP1542I-E-K9

AIR-AP1542D-E-K9

Declaration of Conformity with regard to the R&TTE Directive 1999/5/EC & Medical Directive 93/42/EEC

This declaration is only valid for configurations (combinations of software, firmware, and hardware) provided and supported by Cisco Systems. The use of software or firmware not provided and supported by Cisco Systems may result in the equipment no longer being compliant with the regulatory requirements.

Declaration of Conformity with regard to the R&TTE Directive 1999/5/EC & Medical Directive 93/42/EEC

Български [Bulgarian]:	Това оборудване отговаря на съществените изисквания и приложими клаузи на Директива 1999/5/EC.
Česky [Czech]:	Toto zařízení je v souladu se základními požadavky a ostatními odpovídajícími ustanoveními Směrnice 1999/5/EC.
Dansk [Danish]:	Dette udstyr er i overensstemmelse med de væsentlige krav og andre relevante bestemmelser i Direktiv 1999/5/EF.
Deutsch [German]:	Dieses Gerät entspricht den grundlegenden Anforderungen und den weiteren entsprechenden Vorgaben der Richtlinie 1999/5/EU.
Eesti [Estonian]:	See seade vastab direktiivi 1999/5/EÜ olulistele nõuetele ja teistele asjakohastele sätetele.
English:	This equipment is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
Español [Spanish]:	Este equipo cumple con los requisitos esenciales así como con otras disposiciones de la Directiva 1999/5/CE.
Ελληνική [Greek]:	Αυτός ο εξοπλισμός είναι σε συμμόρφωση με τις ουσιώδεις απαιτήσεις και άλλες σχετικές διατάξεις της Οδηγίας 1999/5/EC.
Français [French]:	Cet appareil est conforme aux exigences essentielles et aux autres dispositions pertinentes de la Directive 1999/5/EC.
Íslenska [Icelandic]:	Þetta tæki er samkvæmt grunnkröfum og öðrum viðeigandi ákvæðum Tilskipunar 1999/5/EC.
Italiano [Italian]:	Questo apparato é conforme ai requisiti essenziali ed agli altri principi sanciti dalla Direttiva 1999/5/CE.
Latviešu [Latvian]:	Šī iekārta atbilst Direktīvas 1999/5/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.
Lietuvių [Lithuanian]:	Šis įrenginys tenkina 1999/5/EB Direktyvos esminius reikalavimus ir kitas šios direktyvos nuostatas.

142729

Nederlands [Dutch]:	Dit apparaat voldoet aan de essentiële eisen en andere van toepassing zijnde bepalingen van de Richtlijn 1999/5/EC.
Malti [Maltese]:	Dan l-apparat huwa konformi mal-htigiet essenzjali u l-provedimenti l-oħra rilevanti tad-Direttiva 1999/5/EC.
Magyar [Hungarian]:	Ez a készülék teljesíti az alapvető követelményeket és más 1999/5/EK irányelvben meghatározott vonatkozó rendelkezéseket.
Norsk [Norwegian]:	Dette utstyret er i samsvar med de grunnleggende krav og andre relevante bestemmelser i EU-direktiv 1999/5/EF.
Polski [Polish]:	Urządzenie jest zgodne z ogólnymi wymaganiami oraz szczególnymi warunkami określonymi Dyrektywą UE: 1999/5/EC.
Português [Portuguese]:	Este equipamento está em conformidade com os requisitos essenciais e outras provisões relevantes da Directiva 1999/5/EC.
Slovensko [Slovenian]:	Ta naprava je skladna z bistvenimi zahtevami in ostalimi relevantnimi pogoji Direktive 1999/5/EC.
Slovensky [Slovak]:	Toto zariadenie je v zhode so základnými požiadavkami a inými príslušnými nariadeniami direktiv: 1999/5/EC.
Suomi [Finnish]:	Tämä laite täyttää direktiivin 1999/5/EY olennaiset vaatimukset ja on siinä asetettujen muiden laitetta koskevien määräysten mukainen.
Svenska [Swedish]:	Denna utrustning är i överensstämmelse med de väsentliga kraven och andra relevanta bestämmelser i Direktiv 1999/5/EC.

121404

The following standards were applied:

EMC—EN 301.489-1 v1.8.1; EN 301.489-17 v2.1.1

Health & Safety—EN60950-1: 2005; EN 50385: 2002

Radio—EN 300 328 v 1.7.1; EN 301.893 v 1.5.1

The conformity assessment procedure referred to in Article 10.4 and Annex III of Directive 1999/5/EC has been followed.

This device also conforms to the EMC requirements of the Medical Devices Directive 93/42/EEC.



Note

This equipment is intended to be used in all EU and EFTA countries. Outdoor use may be restricted to certain frequencies and/or may require a license for operation. For more details, contact Cisco Corporate Compliance.

The product carries the CE Mark:



Declaration of Conformity for RF Exposure

The following is the declaration of conformity for RF exposure for the United States, Canada, European Union and Australia.

United States

This system has been evaluated for RF exposure for Humans in reference to ANSI C 95.1 (American National Standards Institute) limits. The evaluation was based on ANSI C 95.1 and FCC OET Bulletin 65C rev 01.01. To maintain compliance, the minimum separation distance for AP 1542I, having internal antennas, is 9.8 inches (25 cm) from general bystanders. The minimum separation distance from AP 1542D, having internal antennas, is 11.8 inches (30 cm) from general bystanders.

Canada

This system has been evaluated for RF exposure for Humans in reference to ANSI C 95.1 (American National Standards Institute) limits. The evaluation was based on RSS-102 Rev 5.

To maintain compliance, the minimum separation distance for AP 1542I, having internal antennas, is 9.8 inches (25 cm) from general bystanders. The minimum separation distance from AP 1542D, having internal antennas, is 11.8 inches (30 cm) from general bystanders..

Ce système a été évalué pour l'exposition aux RF pour les humains en référence à la norme ANSI C 95.1 (American National Standards Institute) limites. L'évaluation a été basée sur RSS-102 Rev 2.

La distance minimale de séparation de l'antenne de toute personne est de 9.8 "(25 cm) pour AP 1542I, pour assurer le respect.

La distance minimale de séparation de l'antenne de toute personne est de 11.8 "(30 cm) pour AP 1542D, pour assurer le respect.

European Union

This system has been evaluated for RF exposure for Humans in reference to the ICNIRP (International Commission on Non-Ionizing Radiation Protection) limits. The evaluation was based on the EN 50385 Product Standard to Demonstrate Compliance of Radio Base stations and Fixed Terminals for Wireless Telecommunications Systems with basic restrictions or reference levels related to Human Exposure to Radio Frequency Electromagnetic Fields from 300 MHz to 40 GHz. To maintain compliance, the minimum separation distance for AP 1542I, having internal antennas, is 9.8 inches (25 cm) from general bystanders. The minimum separation distance from AP 1542D, having internal antennas, is 11.8 inches (30 cm) from general bystanders.

Australia

This system has been evaluated for RF exposure for Humans as referenced in the Australian Radiation Protection standard and has been evaluated to the ICNIRP (International Commission on Non-Ionizing Radiation Protection) limits. To maintain compliance, the minimum separation distance for AP 1542I, having internal antennas, is 9.8 inches (25 cm) from general bystanders. The minimum separation distance from AP 1542D, having internal antennas, is 11.8 inches (30 cm) from general bystanders.

Guidelines for Operating Cisco Aironet Access Points in Japan

This section provides guidelines for avoiding interference when operating Cisco Aironet access points in Japan. These guidelines are provided in both Japanese and English.

Access Point Model:

AIR-AP1542I-Q-K9

AIR-AP1542D-Q-K9

Japanese Translation

この機器の使用周波数帯では、電子レンジ等の産業・科学・医療用機器のほか工場の製造ライン等で使用されている移動体識別用の構内無線局（免許を要する無線局）及び特定小電力無線局（免許を要しない無線局）が運用されています。

- 1 この機器を使用する前に、近くで移動体識別用の構内無線局及び特定小電力無線局が運用されていないことを確認して下さい。
- 2 万一、この機器から移動体識別用の構内無線局に対して電波干渉の事例が発生した場合には、速やかに使用周波数を変更するか又は電波の発射を停止した上、下記連絡先にご連絡頂き、混信回避のための処置等(例えば、パーティションの設置など)についてご相談して下さい。
- 3 その他、この機器から移動体識別用の特定小電力無線局に対して電波干渉の事例が発生した場合など何かお困りのことが起きたときは、次の連絡先へお問い合わせ下さい。

連絡先 : 03-6434-6500

43768

English Translation

This equipment operates in the same frequency bandwidth as industrial, scientific, and medical devices such as microwave ovens and mobile object identification (RF-ID) systems (licensed premises radio stations and unlicensed specified low-power radio stations) used in factory production lines.

1. Before using this equipment, make sure that no premises radio stations or specified low-power radio stations of RF-ID are used in the vicinity.
2. If this equipment causes RF interference to a premises radio station of RF-ID, promptly change the frequency or stop using the device; contact the number below and ask for recommendations on avoiding radio interference, such as setting partitions.
3. If this equipment causes RF interference to a specified low-power radio station of RF-ID, contact the number below.

Contact Number: 03-6434-6500

VCCI Statement for Japan

**Warning**

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

警告

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

VCCI-A

Administrative Rules for Cisco Aironet Access Points in Taiwan

This section provides administrative rules for operating Cisco Aironet 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.

Chinese Translation

低功率射頻電機技術規範

4.7 無線資訊傳輸設備

4.7.6 無線資訊傳輸設備須忍受合法通信之干擾且不得干擾合法通信；如造成干擾，應立即停用，俟無干擾之虞，始得繼續使用。

4.7.7 無線資訊傳輸設備的製造廠商應確保頻率穩定性，如依製造廠商使用手冊上所述正常操作，發射的信號應維持於操作頻帶中。

209139

English Translation

Low-power Radio-frequency Devices Technical Specifications

4.7

Unlicensed National Information Infrastructure

4.7.6

The U-NII devices shall accept any interference from legal communications and shall not interfere the legal communications. If interference is caused, the user must stop operating the device immediately and can't re-operate it until the harmful interference is clear.

4.7.7

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user manual.

Statement 371—Power Cable and AC Adapter

接続ケーブル、電源コード、AC アダプタ、バッテリーなどの部品は、必ず添付品または指定品をご使用ください。添付品・指定品以外の部品をご使用になると故障や動作不良、火災の原因となります。また、電気用品安全法により、当該法の認定（PSE とコードに表記）でなく UL 認定（UL または CSA マークがコードに表記）の電源ケーブルは弊社が指定する製品以外の電気機器には使用できないためご注意ください。

English Translation

When installing the product, please use the provided or designated connection cables/power cables/AC adapters. Using any other cables/adapters could cause a malfunction or a fire. Electrical Appliance and Material Safety Law prohibits the use of UL-certified cables (that have the “UL” shown on the code) for any other electrical devices than products designated by CISCO. The use of cables that are certified by Electrical Appliance and Material Safety Law (that have “PSE” shown on the code) is not limited to CISCO-designated products.

EU Declaration of Conformity

All the Declaration of Conformity statements related to this product can be found at the following location:

<http://www.ciscofax.com>

Operation of Cisco Aironet Access Points in Brazil

This section contains special information for operation of Cisco Aironet access points in Brazil.

Access Point Models

AIR-AP1542I-Z-K9

AIR-AP1542D-Z-K9

Regulatory Information

Figure B-1 contains Brazil regulatory information for the access point models identified in the previous section.

Figure B-1 ***Brazil Regulatory Information***

Portuguese Translation

Este equipamento opera em caráter secundário, isto é, não tem direito a proteção contra interferência prejudicial, mesmo de estações do mesmo tipo, e não pode causar interferência a sistemas operando em caráter primário.

English Translation

This equipment operates on a secondary basis and consequently must accept harmful interference, including interference from stations of the same kind. This equipment may not cause harmful interference to systems operating on a primary basis.



Access Point Pinouts

This appendix describes the pin signals of the access point Ethernet connectors, and the power injector input and output connectors.

[Table C-1](#) describes the pin signals of the access point LAN connector

Table C-1 Access Point LAN Connector Pinouts

Pin Number	Signal Name
1	Ethernet signal pair (10/100/1000BASE-T)
2	
3	Ethernet signal pair (10/100/1000BASE-T)
6	
4	Ethernet signal pair (10/100/1000BASE-T)
5	
7	Ethernet signal pair (10/100/1000BASE-T)
8	
Shield	Chassis ground

[Table C-2](#) describes the pin signals for the power injector input connector (To Switch).

Table C-2 Power Injector Input Connector (To Switch) Pinouts

Pin Number	Signal Name
1	Ethernet signal pair (10/100/1000BASE-T)
2	
3	Ethernet signal pair 10/100/1000BASE-T)
6	
4	Ethernet signal pair (1000BASE-T)
5	
7	Ethernet signal pair (1000BASE-T)
8	
Shield	Chassis ground

