Cisco Beacon Point —Hardware Installation Guide

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Preface

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Audience

This document is for Connected Mobile Experiences (CMX) network and IT administrators who deploy Cisco Beacon Point (BP) or Cisco Beacon Point Module (BPM) for high accuracy virtual beacon solution.

Conventions

This document uses the following conventions:

Table 1: Conventions

Convention	Indication
bold font	Commands and keywords and user-entered text appear in **bold** font.
italic font	Document titles, new or emphasized terms, and arguments for which you supply values are in *italic* font.
[ ]	Elements in square brackets are optional.
{x | y | z }	Required alternative keywords are grouped in braces and separated by vertical bars.
[x | y | z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string. Otherwise, the string will include the quotation marks.
`courier` font	Terminal sessions and information the system displays appear in `courier` font.
<>	Nonprinting characters such as passwords are in angle brackets.
[]	Default responses to system prompts are in square brackets.

Convention	Indication
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

Note Means reader take note. Notes contain helpful suggestions or references to material not covered in the manual.

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

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

Related Documentation

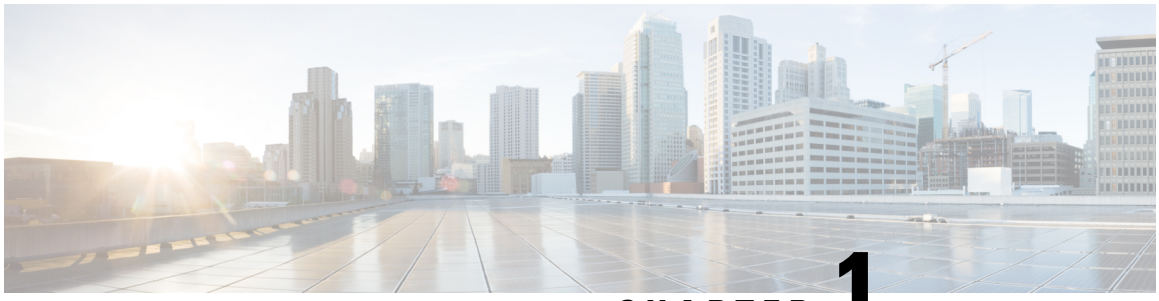
For more information, see:

- https://support.cmxcisco.com/hc/en-us
- Cisco Beacon Center Configuration Guide

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see What's New in Cisco Product Documentation.

To receive new and revised Cisco technical content directly to your desktop, you can subscribe to the . RSS feeds are a free service.



CHAPTER 1

Overview of Cisco Beacon Point

This guide introduces you to the Cisco Beacon Point and provides instructions on how to install and mount the this device.

- About Cisco Beacon Point, on page 1
- Cisco Beacon Point Features , on page 2
- Cisco Beacon Point Model Number , on page 3
- Installing a Cisco Beacon Point, on page 4

About Cisco Beacon Point

Cisco Beacon Point (AIR-VBLE1-K9) is a Bluetooth Low Energy (BLE version v4.2) beacon point, and includes a BLE transmitter with 16 antenna in a sector geometry and 1 omni-directional antenna element. You must connect Cisco Beacon Point Ethernet Port Eth0 to a PoE switch to power on the device. This creates eight virtual beams that are essential to create virtual beacons. The smart device receives signals from multiple Cisco Beacon Points with different strengths.

Cisco Beacon Point deployment is similar to any Wi-Fi location based service solution. The recommended density for deploying Cisco Beacon Point is 1 per 2500 sq.ft. The recommended height for the Cisco Beacon Point is 13 ft (3.9 m). Cisco Beacon Center requires the correct physical orientation, position, and height of Cisco Beacon Point for providing clients with indoor navigation, turn-by-turn guidance and proximity messaging for best indoor navigation experience.

Cisco Beacon Points connect with Cisco Beacon Center over the internet using secure HTTPS protocol. Each Cisco Beacon Point has a unique IP address just like any enterprise grade networking device. Cisco Beacon Point should connect with Cisco Beacon Center for management and control. Allow the port numbers 80 (TCP) and 443 (TCP, UDP) to be open from the firewall or configure an access control list (ACL) policy permitting the same within the enterprise network.

Figure 1: Cisco Beacon Point (AIR-VBLE1-K9)

You have multiple mounting options:

- T-Bar Mounting Bracket(AIR-AP-BRACKET-4)—Mount Cisco Beacon Point to a T-bar. This is the default option.
- Cisco Adaptor Mounting Bracket(AIR-AP-VBLE-ADPTR)—Mount Cisco Beacon Point to an existing Cisco AIR-AP-BRACKET-1 or AIR-AP-BRACKET-2. Order this bracket separately if needed.

Cisco Beacon Point Features

Cisco Beacon Point comes with the following features:

Table 2: Hardware Feature Summary

Feature	Description
Radio Frequency	2.4-GHz Bluetooth Low Energy (BLE) 4.2 internal antenna array.
Eth0 + Power over Ethernet (PoE) in port	A PoE in port, which is a 10/100/1000 BaseT RJ45 interface. This supports 802.3at and 802.3af power supplies.
Eth1 + Power over Ethernet (PoE) out port	A PoE out port, which is a 48-54V, 10/100/1000 BaseT RJ45 interface. This port is not enabled and is for future use only.
LED indicators	A multicolor system status LED on the front-face of the unit. There are no LEDs for the Ethernet RJ45 ports.
Reset button	A recessed button that resets a Cisco Beacon Point to factory settings when pressed after the Cisco Beacon Point is powered up.
Power Options	• PoE sourced from a switch that is connected on the Eth0 port. • External PoE injector (AIR-PWRINJ5) on the Eth0 port.
Physical Security	Option to add a Kensington lock.

Technical Specifications

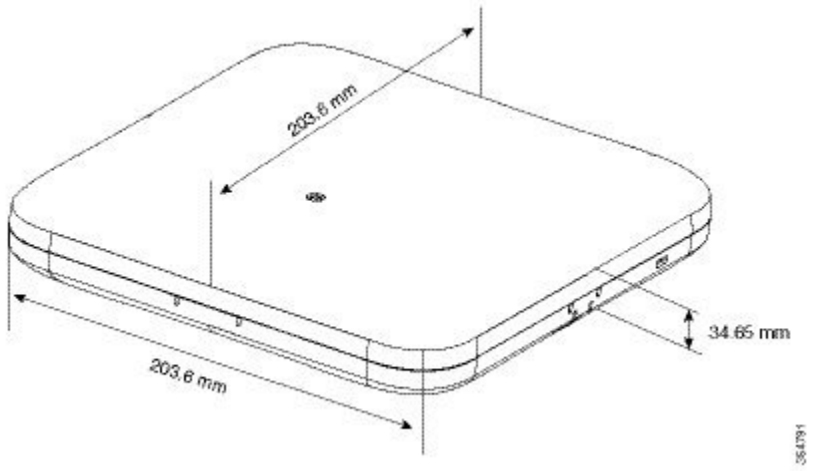


Table 3: Technical Specifications of Cisco Beacon Point

Feature	Description
Dimensions	203 mm x 203 mm x 40 mm 7.99 in x 7.99 in x 1.57 in
Weight	0.636 kg (1.4 lbs)
Compliance standards	UL 60950-1 CAN/CSA-C22.2 No. 60950-1 FCC Part 15.247, 15.407, 15.107, and 15.109 FCC Part 15 Class B RSS-247 ICES-003 (Canada)
Environmental	Fanless operation; passive cooling Nonoperating (storage) temperature: -30 to 70□ (-22 to 158□) Operating temperature: 0 to 40□ (32 to 104□) Operating humidity: 10 to 90% (noncondensing) Operating altitude: 9843 ft (3000 m)
Power Dissipation	Less than 6W

Cisco Beacon Point Model Number

Cisco Beacon Point is available in the following model:

Table 4: Cisco Beacon Point Model Number

Product ID	Description
AIR-VBLE1-K9	Cisco Beacon Point with internal antennas.

Installing a Cisco Beacon Point

Unpacking a Cisco Beacon Point

Step 1 Unpack and remove a Cisco Beacon Point and the mounting accessories from the shipping box.

Step 2 Return the packing material to the shipping container and save it for future use.

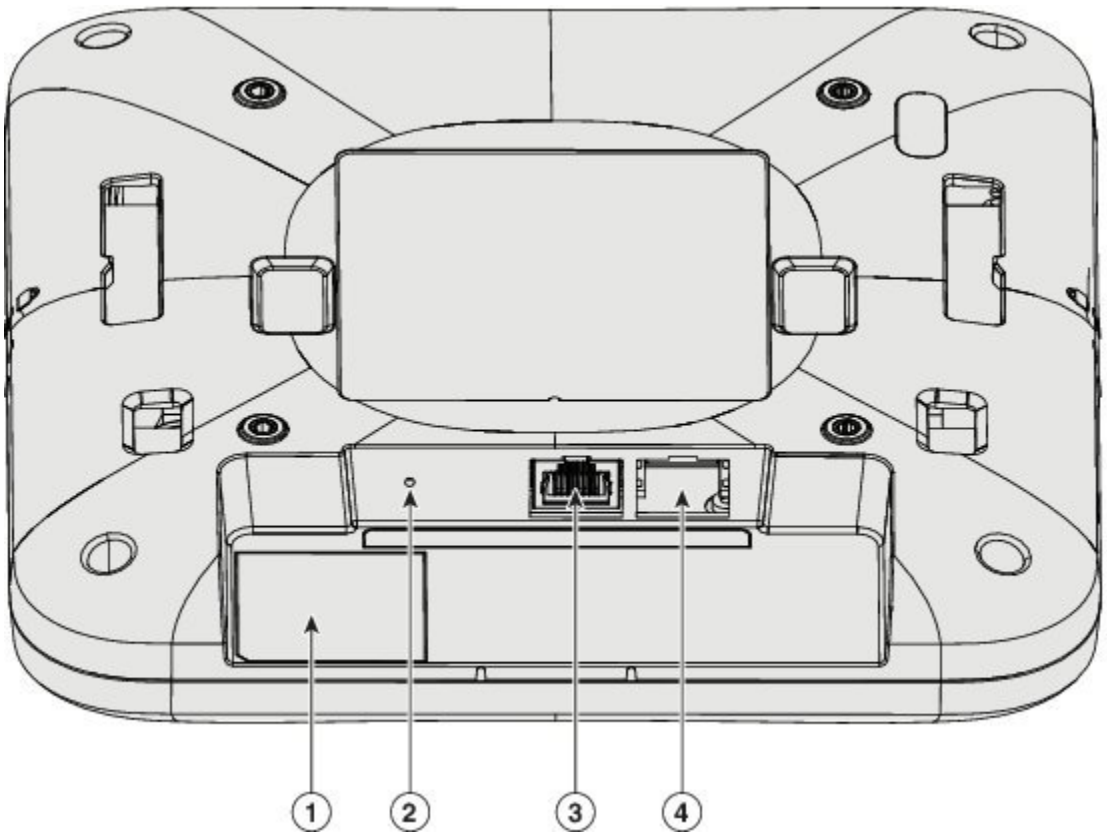
Step 3 Verify that you have received the item listed below. If an item is missing or is damaged, contact your Cisco representative or reseller for instructions.

- T-Bar Mounting Bracket—AIR-AP-BRACKET-4 with four Phillips wafer-head screws.
- Sandwich Bracket—Acoustic Tile Bracket with two Phillips wafer-head screws.

Step 4 Record the MAC address and CLAIM CODE of the Cisco Beacon Point and then use it to claim the Cisco Beacon Point from Cisco Beacon Center.

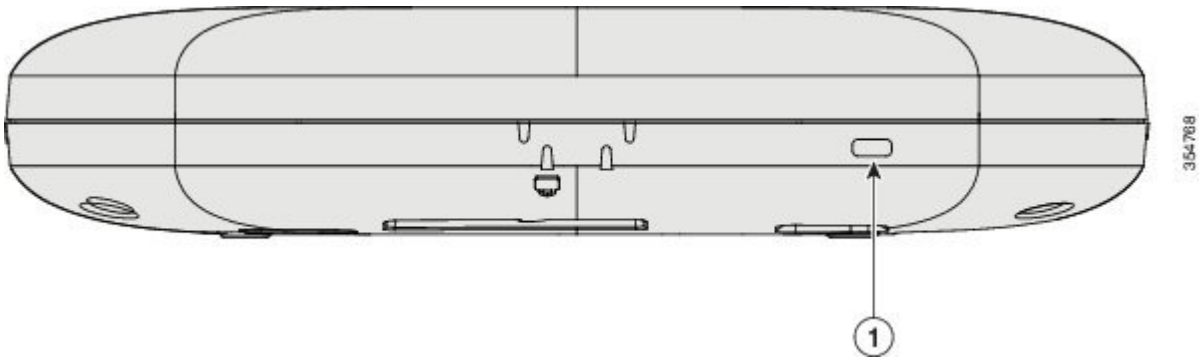
Ports and Connectors on the Cisco Beacon Point

Figure 2: Back of Cisco Beacon Point



1	Location of MAC address and Claim code.
2	A recessed reset button that resets the device to factory settings when powered up.
3	Eth1 + Power over Ethernet (PoE) out port. For future use only.
4	Eth0 + Power over Ethernet (PoE) in port, a PoE in port, which is a 10/100/1000 BaseT RJ45 interface.

Figure 3: Side of Cisco Beacon Point



1	Kensington lock slot

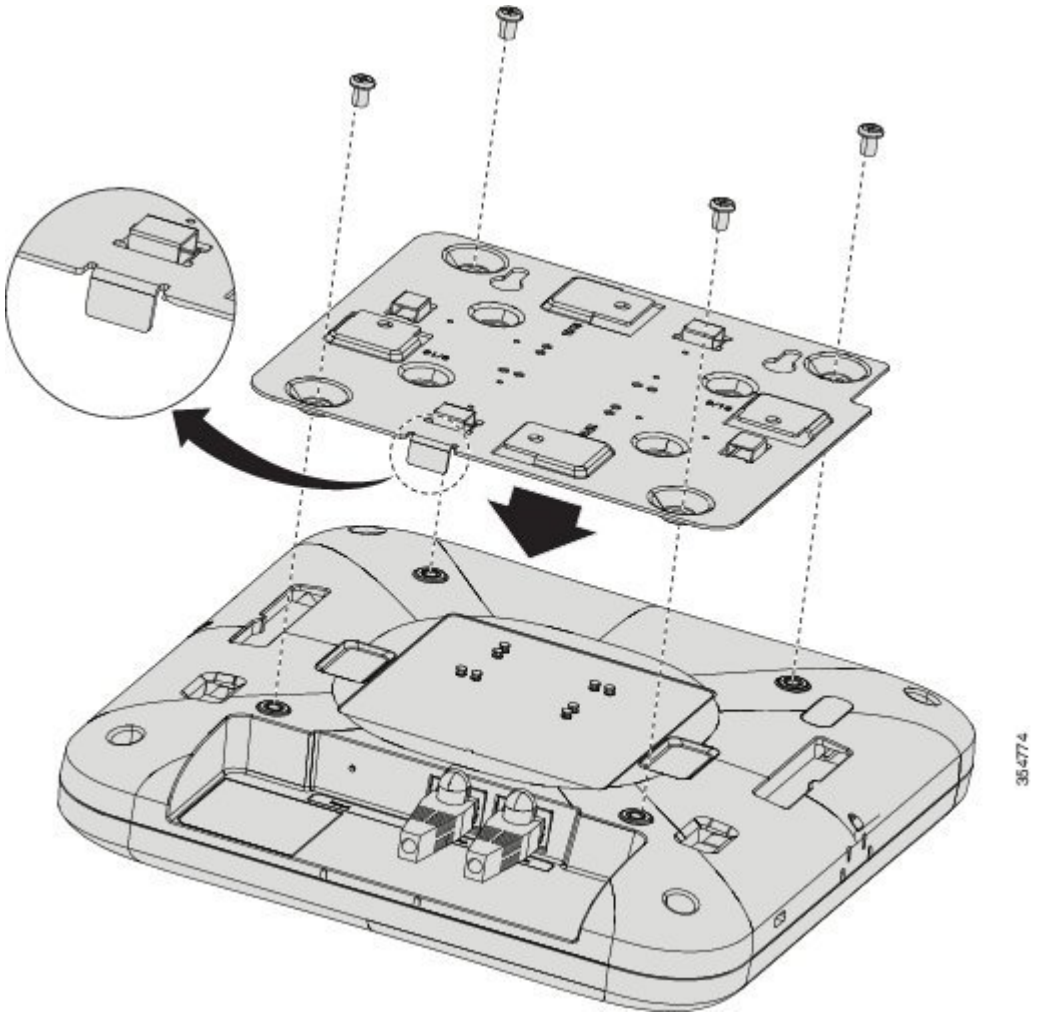
Mounting the Cisco Beacon Point

The following sections provide information about the different ways in which Cisco Beacon Point can be mounted:

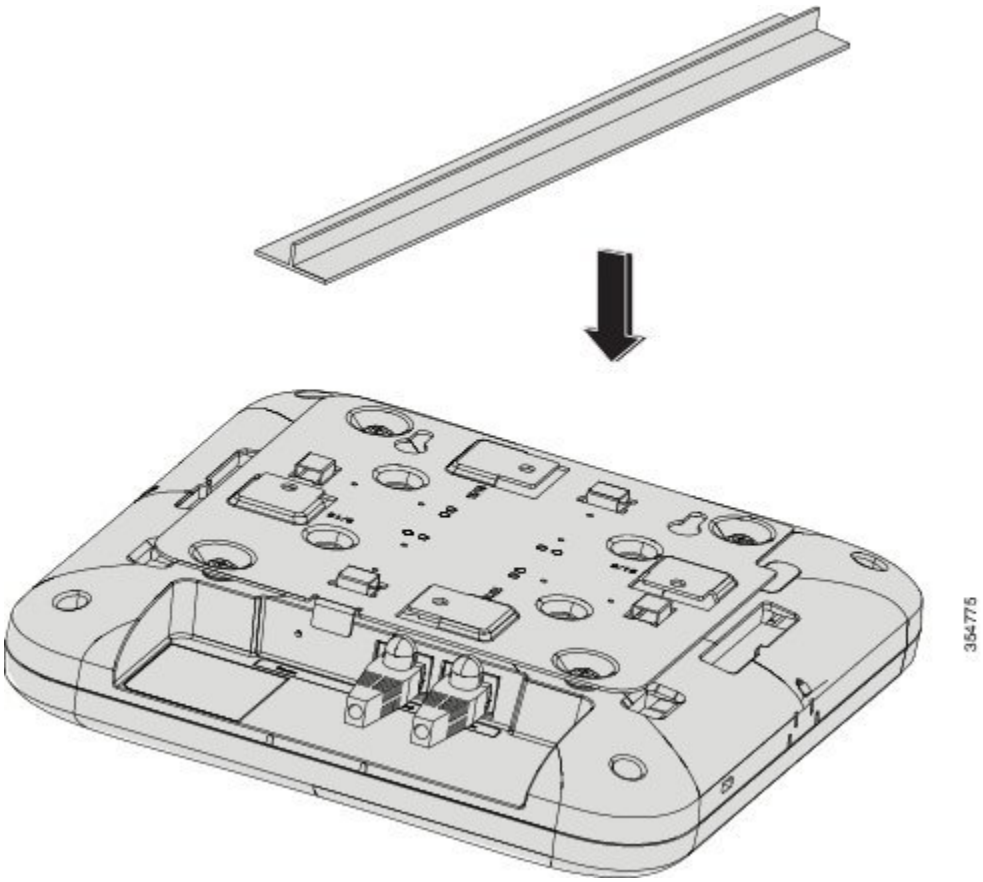
Mounting a Cisco Beacon Point to a T-bar

Mount a Cisco Beacon Point to a T-bar using a mounting bracket, AIR-AP-BRACKET-4. This bracket is shipped with a Cisco Beacon Point. You can order a spare, if required.

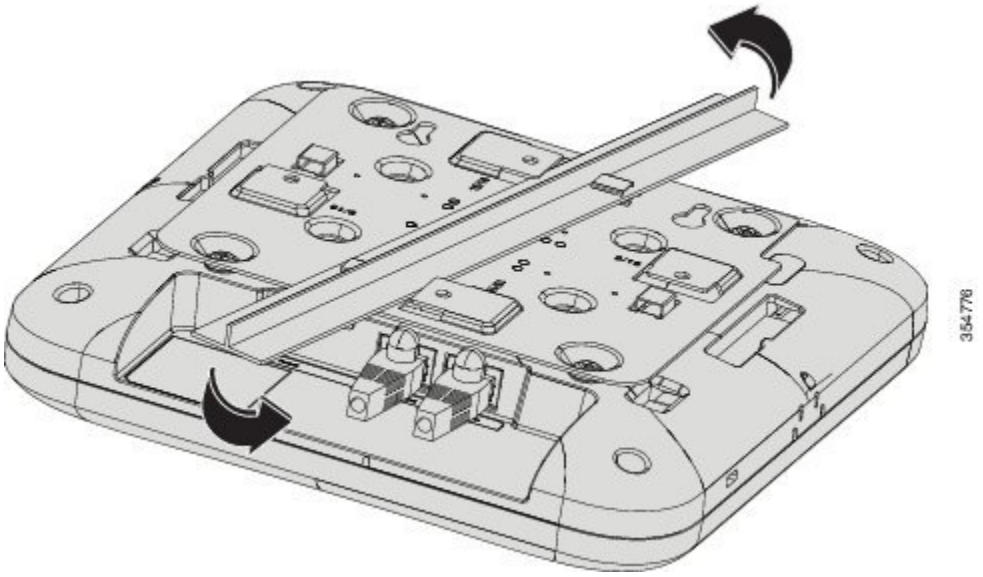
Step 1 Install the AIR-AP-BRACKET-4 bracket to a Cisco Beacon Point using the four wafer-head screws provided.

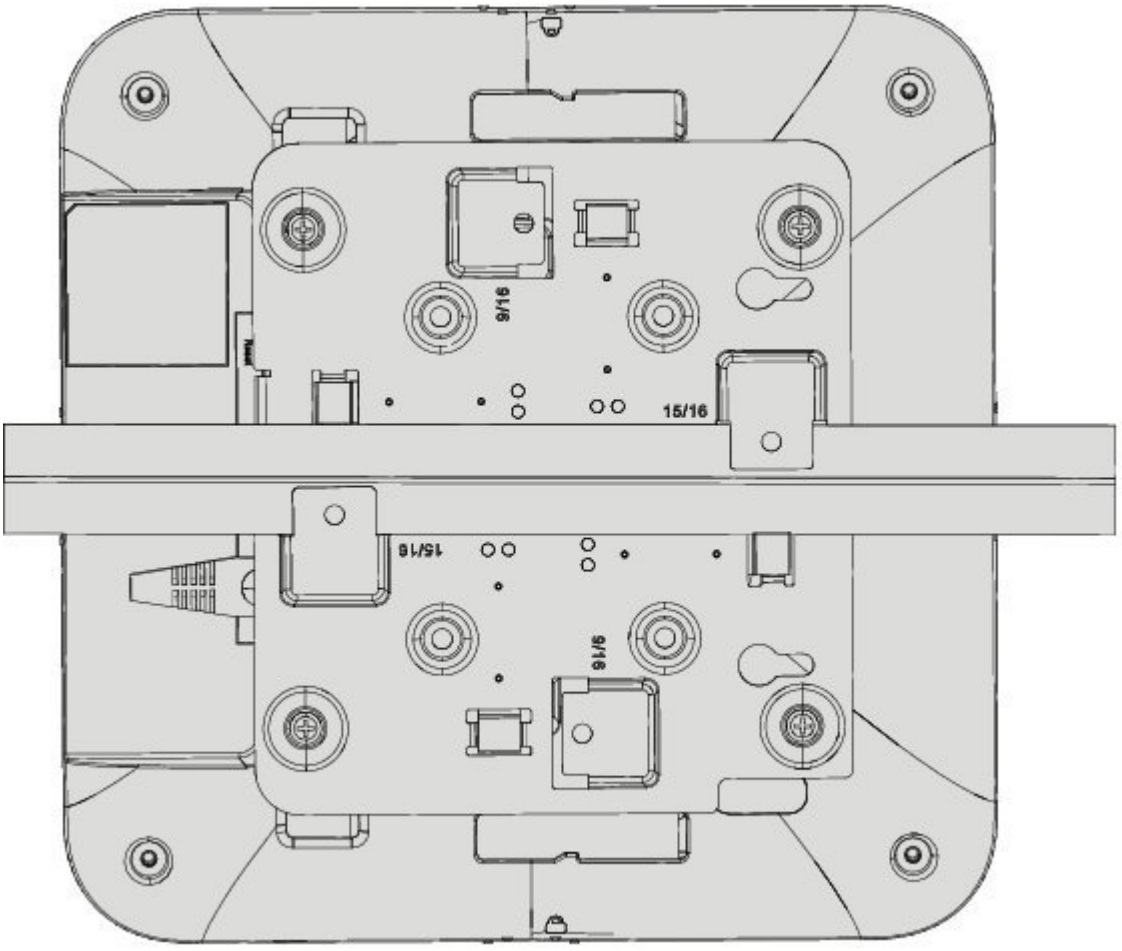


Step 2 Line up the T-bar with Cisco Beacon Point such that the tab on the bracket is aligned with the wall of Cisco Beacon Point with the input-output ports.

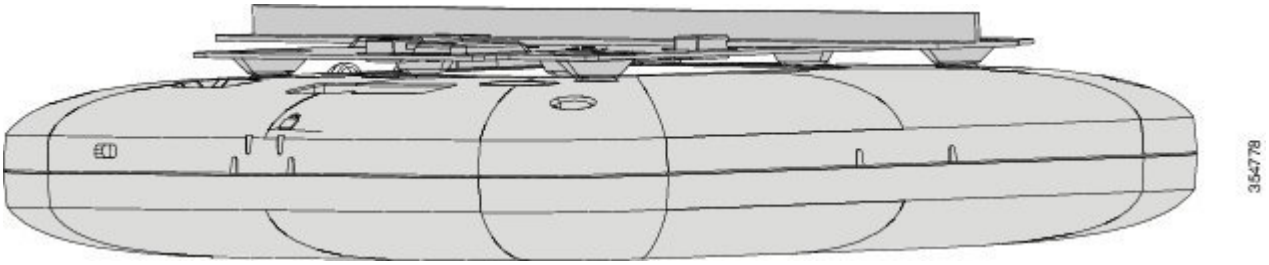


Step 3 Install Cisco Beacon Point to the T-bar. Twist and lock it into place. You should hear a click.





Step 4 Note the orientation and position of Cisco Beacon Point on the floor plan loaded into Cisco Beacon Center.

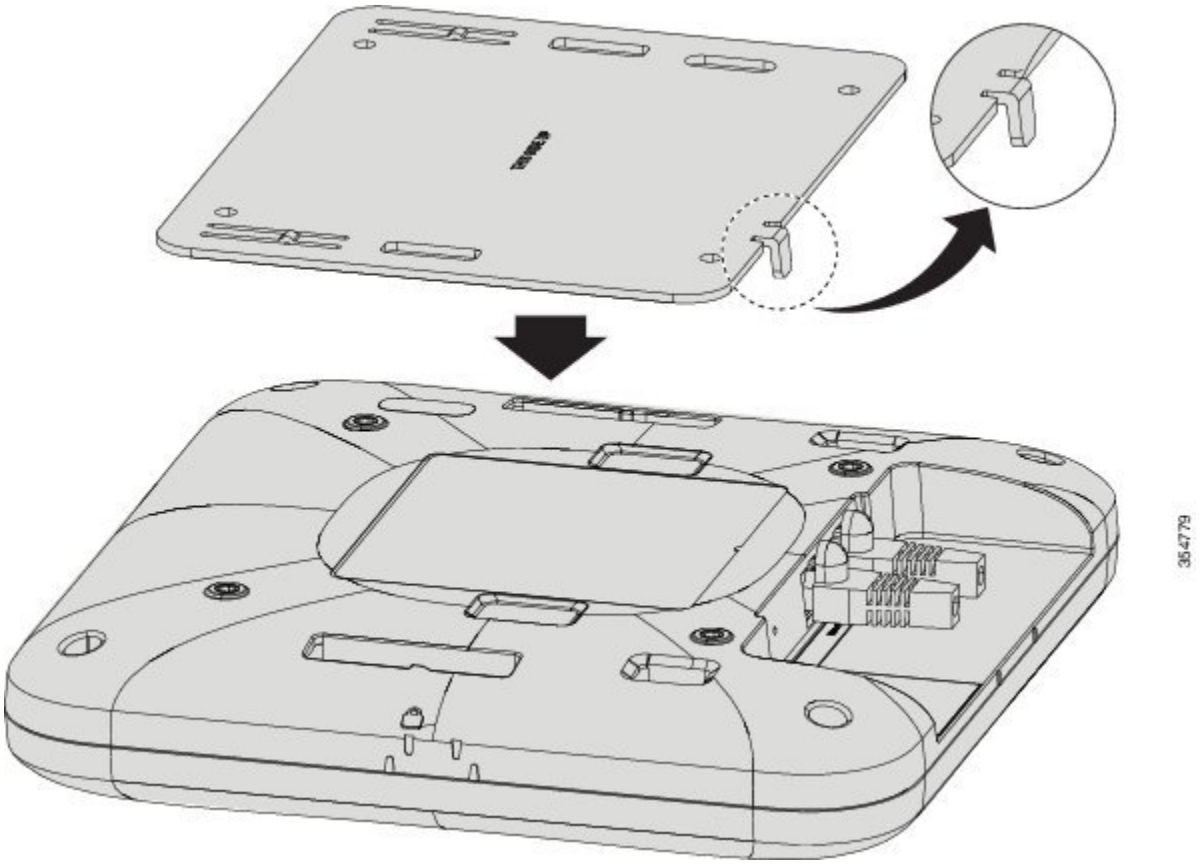


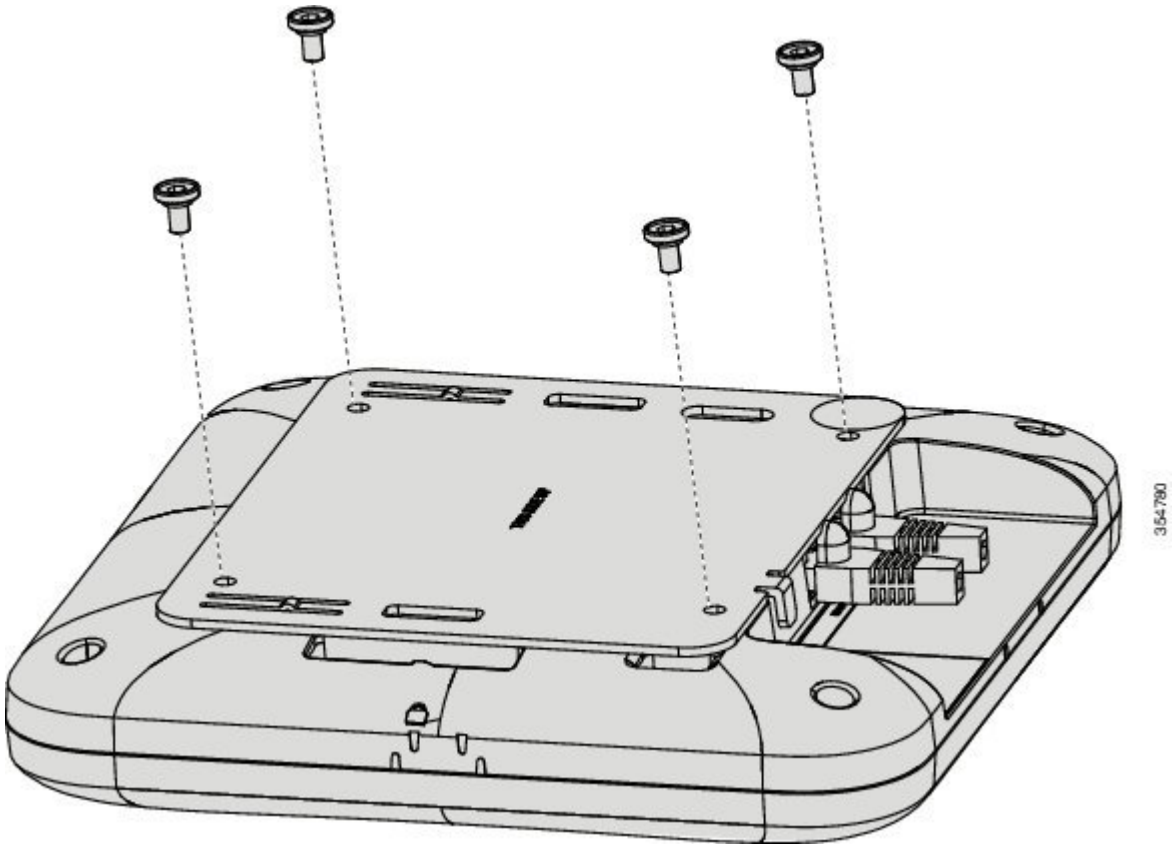
Mounting Cisco Beacon Point to an Existing AIR-AP-BRACKET-1 or AIR-AP-BRACKET-2

Mount a Cisco Beacon Point to an existing Cisco AIR-AP-BRACKET-1 or AIR-AP-BRACKET-2 using the mounting bracket AIR-AP-VBLE-ADPTR. The AIR-AP-VBLE-ADPTR kit includes four Torx shoulder screws, which must be ordered separately from Cisco.

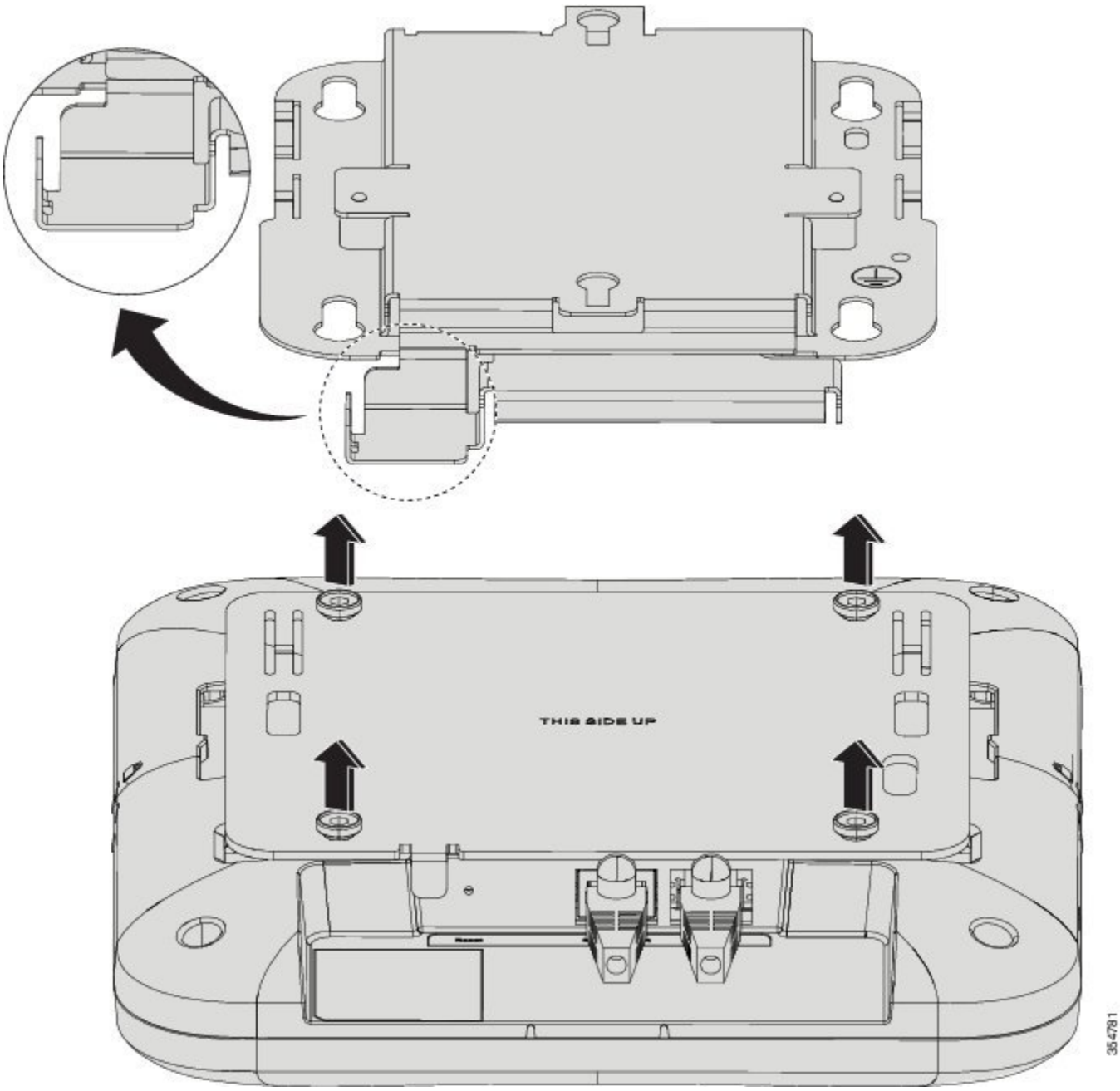
Note Use this method only if you do not want to replace your existing brackets with the bracket provided with your Cisco Beacon Point.

Step 1 Install AIR-AP-VBLE-ADPTR bracket using the four Torx shoulder screws provided with the Cisco Beacon Point. Ensure that the THIS SIDE UP marking on the AIR-AP-VBLE-ADPTR is facing upwards.

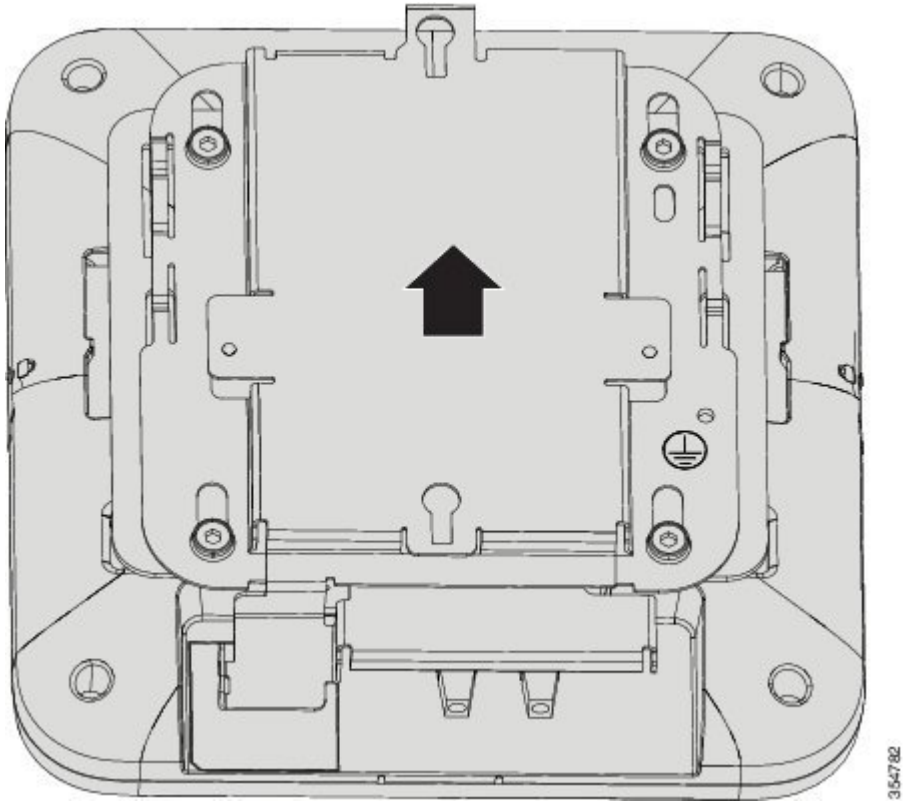




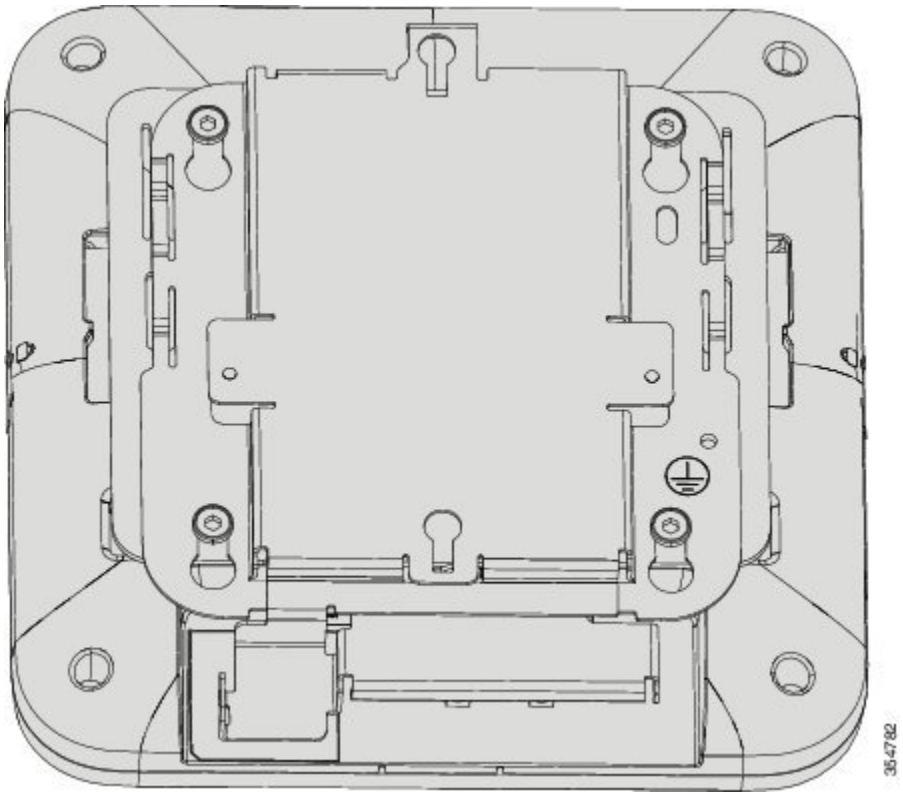
Step 2 Mount Cisco Beacon Point to the existing Cisco AIR-AP-BRACKET-1 or AIR-AP-BRACKET-2. Ensure that the tab is facing down and aligned with the wall of Cisco Beacon Point containing input-output ports ports.



Step 3 Slide until Cisco Beacon Point locks to the bracket.



Step 4 Make a note the orientation and position of the Cisco Beacon Point on the floor plan loaded into the Cisco Beacon Center.

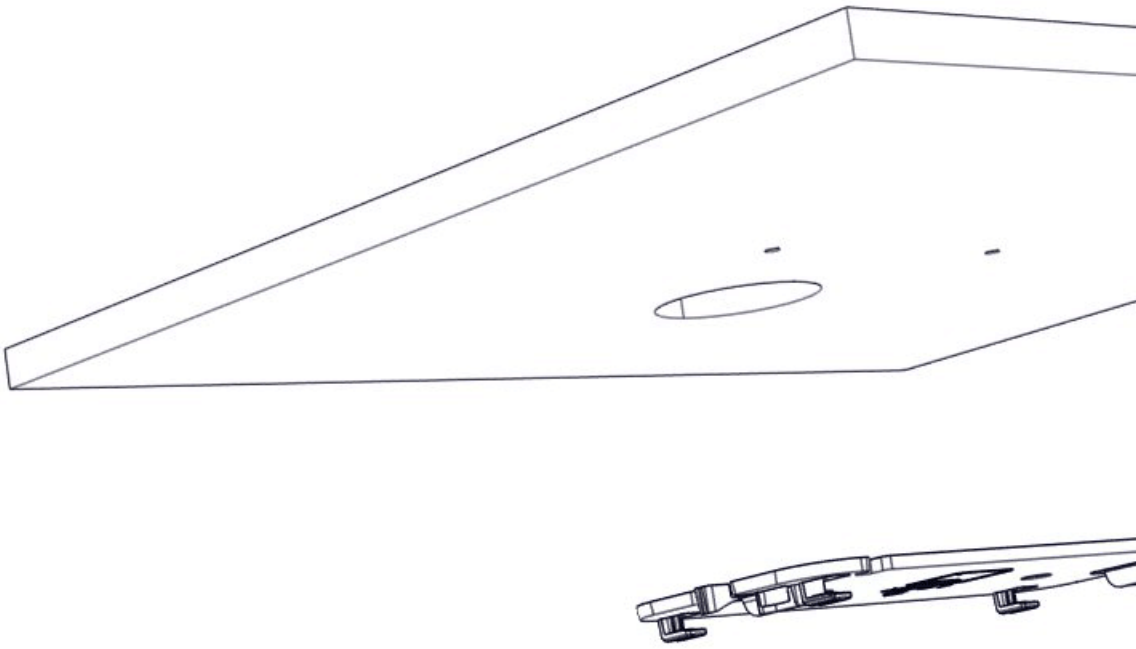


Mounting to an Acoustic Tile

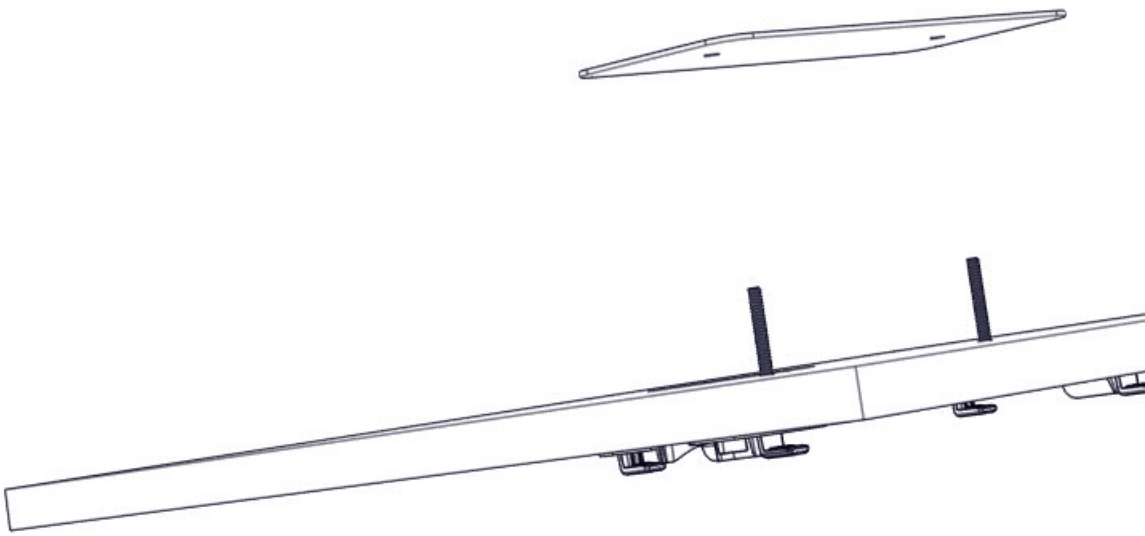
Before you begin

Acoustic Tile Mounting mounting is performed using a mounting bracket Acoustic Tile Bracket, which can be used to mount a Cisco Beacon Point array. This bracket is shipped with theCisco Beacon Point. You can order a spare, if required.

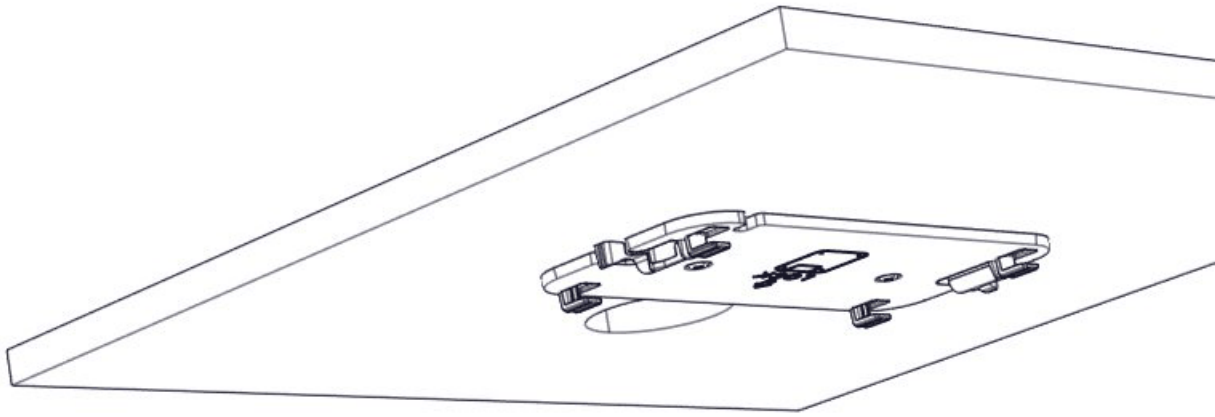
Step 1 Install the Acoustic Tile Bracket bracket to the acoustic tile using the two screws provided. Use screws which have a head diameter of 7mm and a length of 40mm. Tighten the screws to secure the bracket to the tile.

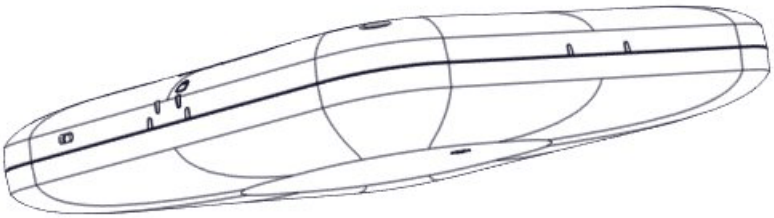


Step 2 Position the Cisco Beacon Point below the installed Acoustic Tile Bracket bracket.



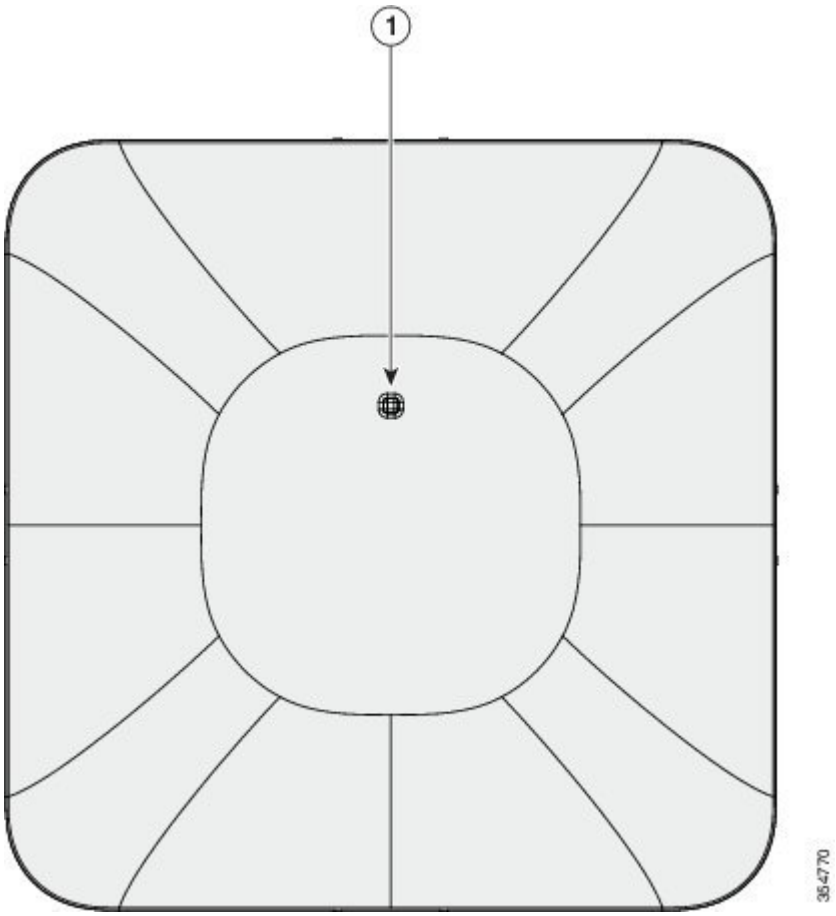
Step 3 Slide to lock the Cisco Beacon Point to the bracket. You should hear a click.





Checking the Cisco Beacon Point LEDs

Figure 4: Face of Cisco Beacon Point



1	Location of the Status LED

Note Small variations in color intensity and hue will be present from unit to unit. This is within the normal range of the LED manufacturer's specifications, and is not a defect.

Cisco Beacon Point status LED indicates various conditions, which are described in the table below:

Table 5: Cisco Beacon Point LED Status Indication

LED Color	Cisco Beacon Point LED Status
Blinking red	Cisco Beacon Point beginning a boot reset.
Alternating green and yellow	Cisco Beacon Point booting.
White	Cisco Beacon Point connecting to Cisco Beacon Center.

LED Color	Cisco Beacon Point LED Status
Green	Cisco Beacon Point configured by Cisco Beacon Center.
Blinking orange	Cisco Beacon Point upgrading.
Alternating green and purple	Locating a Cisco Beacon Point in Cisco Beacon Center.
Blinking amber	Cisco Beacon Point failure mode.
OFF turning to red	**Reset to factory default** button pressed by the user.
White turning to OFF	Cisco Beacon Point about to reset.

Powering on a Cisco Beacon Point

Cisco Beacon Point can be powered on in the following ways:

- Power over Ethernet (PoE) using a switch on the Eth0 port.
- External PoE injector (AIR-PWRINJ5) on the Eth0 port.

When Cisco Beacon Point is powered ON accurately, the Cisco Beacon Point LED turns from blink red to solid green. In case of errors, refer to the Checking the Cisco Beacon Point LEDs, on page 18 for information about the LED blinking states.

Safety Warnings, Caution Notices, and Notes

Warning 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 with each warning to locate its translation in the translated safety warnings that accompanied this device.

Statement 1071

Warning Read the installation instructions before you connect the system to its power source. (**Statement 1004**)

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

Warning This product relies on the building's installation for short-circuit (over-current) protection. Ensure that the protective device is rated not greater than 20A (**Statement 1005**)

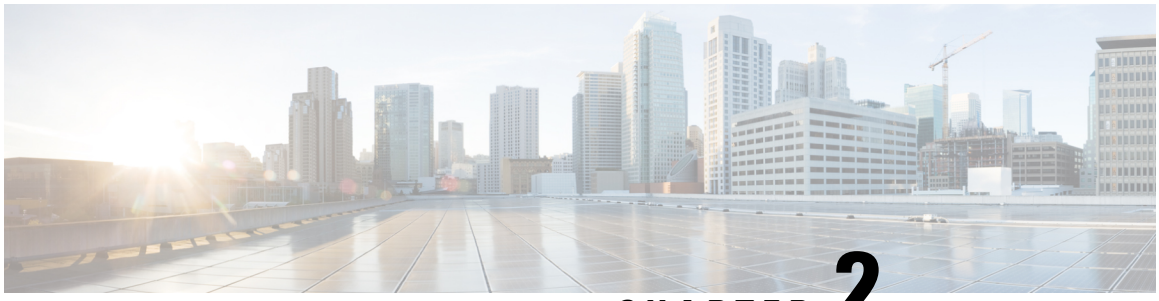
Warning Do not operate your wireless network device near unshielded blasting caps or in an explosive environment unless the device has been modified for such use. (**Statement 245B**)

Caution The fasteners you use to mount a Cisco Beacon Point on a ceiling must be capable of maintaining a minimum pullout force of 20 lbs (9 kg) and must use a minimum of four holes on the mounting bracket, or a minimum of two holes when mounting on a network box.

Caution This product and all the interconnected equipment must be installed indoors within the same building, including the associated LAN connections, as defined by Environment A of the IEEE 802.3af/at Standard.

Note Cisco Beacon Point is suitable for use in environmental air space in accordance with Section 300.22.C of the National Electrical Code and Sections 2-128, 12-010(3), and 12-100 of the Canadian Electrical Code, Part 1, C22.1. You should not install the power injector in air-handling spaces

Note Use only with listed Information Technology Equipment (ITE). For more information on ITE, refer to Article 645 of the latest National Electrical Code (NEC).



CHAPTER 2

Declarations of Conformity and Regulatory Information

This chapter provides declarations of conformity and regulatory information for the Cisco Beacon Point. You can find additional information at this location.

- Manufacturers Federal Communication Commission Declaration of Conformity Statement, on page 21
- VCCI Statement for Japan, on page 22
- Guidelines for Operating Cisco Virtual Beacon in Japan, on page 23
- Canadian Compliance Statement, on page 23
- Statement 371—Power Cable and Power Injector, on page 24
- Industry Canada, on page 24
- This Device Meets FCC and International Guidelines for Exposure to Radio Waves, on page 25
- This Device Meets the Industry Canada Guidelines for Exposure to Radio Waves, on page 25
- Cet appareil est conforme aux directives internationales en matière d'exposition aux fréquences radioélectriques, on page 26
- Additional Information on RF Exposure, on page 26
- Declaration of Conformity Statements, on page 27

ManufacturersFederalCommunicationCommissionDeclaration of Conformity Statement

Table 6: Cisco Beacon Point Models and Certification Numbers

Cisco Beacon Point Models	Certification Number
Cisco Beacon Point	LDK102111

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 for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more 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 for help.

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Cisco may void the user's authority to operate the equipment

⚠

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

VCCI Statement for Japan

⚠

Caution This is a Class B product based on the standard of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

この装置は、クラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

VCCI－B

Guidelines for Operating Cisco Virtual Beacon in Japan

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

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

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

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.

Table 7: Antenna Specifications

Antenna Frequency	Antenna Peak Gain	Antenna Impedance
2.4 GHz	5 dBi	50 ohms

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.

Statement 371—Power Cable and Power Injector

When installing the product, please use the provided or designated connection cables/power cables/AC adaptors. Using any other cables/adaptors 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.

Industry Canada

Table 8: Cisco Beacon Point Models and Certification Numbers

Cisco Beacon Models	Certification Number
AIR-VBLE1-K9	2461B-102111

This Device Meets FCC and International Guidelines for Exposure to Radio Waves

Cisco Beacon Point includes a radio transmitter and receiver. It is designed not to exceed the limits for exposure to radio waves (radio frequency electromagnetic fields) recommended by international guidelines. The guidelines were developed by an independent scientific organization (ICNIRP) and include a substantial safety margin designed to ensure the safety of all persons, regardless of age and health.

As such the systems are designed to be operated as to avoid contact with the antennas by the end user. It is recommended to set the system in a location where the antennas can remain at least a minimum distance as specified from the user in accordance to the regulatory guidelines which are designed to reduce the overall exposure of the user or operator.

Table 9: Separation Distance

MPE	Distance	Limit
0.69 mW/cm²	20 cm (7.87 inches)	1.00 mW/cm²

The World Health Organization has stated that present scientific information does not indicate the need for any special precautions for the use of wireless devices. They recommend that if you are interested in further reducing your exposure then you can easily do so by reorienting antennas away from the user or placing he antennas at a greater separation distance then recommended.

This Device Meets the Industry Canada Guidelines for Exposure to Radio Waves

The Cisco Beacon Point includes a radio transmitter and receiver. It is designed not to exceed the limits for exposure to radio waves (radio frequency electromagnetic fields) as referenced in Health Canada Safety Code 6. The guidelines include a substantial safety margin designed into the limit to ensure the safety of all persons, regardless of age and health.

As such the systems are designed to be operated as to avoid contact with the antennas by the end user. It is recommended to set the system in a location where the antennas can remain at least a minimum distance as specified from the user in accordance to the regulatory guidelines which are designed to reduce the overall exposure of the user or operator.

Table 10: Separation Distance

Frequency	MPE	Distance	Limit
2.4 GHz	2.9 W/m²	20 cm (7.87 inches)	5.4 W/m²

Health Canada states that present scientific information does not indicate the need for any special precautions for the use of wireless devices. They recommend that if you are interested in further reducing your exposure you can easily do so by reorienting antennas away from the user, placing the antennas at a greater separation distance than recommended, or lowering the transmitter power output.

Cet appareil est conforme aux directives internationales en matière d'exposition aux fréquences radioélectriques

Cet appareil de la gamme Cisco Beacon Point comprend un émetteur-récepteur radio. Il a été conçu de manière à respecter les limites en matière d'exposition aux fréquences radioélectriques (champs électromagnétiques de fréquence radio), recommandées dans le code de sécurité 6 de Santé Canada. Ces directives intègrent une marge de sécurité importante destinée à assurer la sécurité de tous, indépendamment de l'âge et de la santé.

Par conséquent, les systèmes sont conçus pour être exploités en évitant que l'utilisateur n'entre en contact avec les antennes. Il est recommandé de poser le système là où les antennes sont à une distance minimale telle que précisée par l'utilisateur conformément aux directives réglementaires qui sont conçues pour réduire l'exposition générale de l'utilisateur ou de l'opérateur.

Table 11: Distance d'éloignement

Fréquence	MPE	Distance	Limite
2.4 GHz	2.9 W/m²	20 cm (7.87 inches)	5.4 W/m²

Santé Canada affirme que la littérature scientifique actuelle n'indique pas qu'il faille prendre des précautions particulières lors de l'utilisation d'un appareil sans fil. Si vous voulez réduire votre exposition encore davantage, selon l'agence, vous pouvez facilement le faire en réorientant les antennes afin qu'elles soient dirigées à l'écart de l'utilisateur, en les plaçant à une distance d'éloignement supérieure à celle recommandée ou en réduisant la puissance de sortie de l'émetteur.

Additional Information on RF Exposure

You can find additional information on the subject at the following links:

- Cisco Systems Spread Spectrum Radios and RF Safety white paper at this location.
- FCC Bulletin 56: Questions and Answers about Biological Effects and Potential Hazards of Radio Frequency Electromagnetic Fields.
- FCC Bulletin 65: Evaluating Compliance with the FCC guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.
- You can obtain additional information from the following organizations.
- World Health Organization Internal Commission on Non-Ionizing Radiation Protection at this location.
- United Kingdom, National Radiological Protection Board at this location.
- Cellular Telecommunications Association at this location.
- The Mobile Manufacturers Forum at this location.

Declaration of Conformity Statements

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