



GETTING STARTED GUIDE



Cisco Aironet 1800s Active Sensor

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1 About this Guide

This guide provides instructions on how to install and configure your Cisco Aironet 1800s Active Sensor. This guide also provides mounting instructions and limited troubleshooting procedures.

The Cisco Aironet 1800s Active Sensor is referred to as the *network sensor*, or *sensor* in this document.

2 About the Network Sensor

The wireless Cisco Aironet 1800s Active Sensor is a part of Cisco's Wireless Service Assurance solution. The Wireless Service Assurance platform has three components, namely, Wireless Performance Analytics, Real-time Client Troubleshooting, and Proactive Health Assessment.

The Cisco Aironet 1800s Active Sensor is an 802.11 a/b/g/n/ac (Wave 2) sensor, with internal antennas and an Ethernet backhaul. The network sensor can be mounted, in a vertical orientation, on a wall or a desk and supports 2x2:2 SS MU-MIMO applications. The sensor is capable of joining an infrastructure access point as a client. The sensor can be used to monitor, measure, and troubleshoot overall wireless network performance.

The 1800s wireless network sensor is available as a base unit with the following power modules which can be plugged into the base unit:

- USB adapter module (AIR-MOD-USB-xx)
- AC adapter module (AIR-MOD-AC)
- PoE/Ethernet module (AIR-MOD-POE)

Network Sensor Model Numbers and Regulatory Domains

The Cisco Aironet 1800s Active Sensor model has the model number format AIR-AP1800S-x-K9, where the 'x' placeholder represents the regulatory domain. The 'x' can be any one of the supported regulatory domains as listed at:

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

Network Sensor Features

A full listing of the network sensor's features and specification are provided in the *Cisco Aironet 1800s Active Sensor Data Sheet*, at the following URL:

<http://www.cisco.com/c/en/us/products/collateral/wireless/aironet-active-sensor/nb-09-air-act-sen-dat-a-sheet-cte-en.html>

The features of the Cisco Aironet 1800s Active Sensor are as follows:

- The only supported mode of operation is as a network sensor for Wireless Service Assurance.
- Two integrated omnidirectional 2.4 GHz single band and 5 GHz single band antennas. Peak antenna gain is approximately 3 dBi and 5 dBi in 2.4 GHz and 5 GHz bands respectively.
- Radio features supported are:
 - 2.4 GHz and 5 GHz concurrent radios
 - 2 GHz radio with 2TX x 2RX and two spatial streams SU-MIMO
 - 5 GHz radio with 2TX x 2RX 802.11ac Wave 2 capable with two spatial streams SU-MIMO and MU-MIMO
 - 802.11ac based Transmit Beamforming
 - Quality of Service (QoS)
 - Radio Resource Management (RRM)
 - BandSelect
 - Bluetooth Low Energy 4.0
- Hardware external interfaces:
 - One 10/100/1000 BASE-T (Ethernet) Uplink Interface with inline power capability, Auto-MDIX (automatically support either straight through or crossover cables), and 802.3af/at PoE.
 - UART console port connection using a custom console cable AIR-CONSADPT=. For RJ45 connectivity to the port, you will require a custom UART-RJ45 adapter.
- Depending on the model of the network sensor and the mounting option chosen, it can be powered using:
 - USB power 5V, 1.5A.
 - AC power, from Cisco-supplied AC Adapter, providing 120~240VAC, 50~60Hz power.
 - PoE power from a network device supplying 802.3af Class 0 power or greater. You can use Cisco power injectors AIR-PWRINJ5 (for 802.3af) or AIR-PWRINJ6 (for 802.3at).

For more information on power and mounting options, see [Installation Overview, page 11](#).

- Reset button. For information on how to use the Reset button, see [“Using the Reset Button” section on page 34](#).

- One multi-color LED status indicator. See the “[Network Sensor Status LED](#)” section on page 32 for information on the colors of the LED status indicator.

3 Safety Instructions

Translated versions of the following safety warnings are provided in the translated safety warnings document that is shipped with your network sensor. The translated warnings are also in the *Translated Safety Warnings for Cisco Aironet Network Sensors*, which is available on Cisco.com.



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

SAVE THESE INSTRUCTIONS



Warning

Read the installation instructions before using, installing or connecting the system to the 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 (overcurrent) 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 to be especially qualified for such use. Statement 245B



Warning

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



Caution

This product and all 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

This equipment is suitable for use in environment air spaces (plenums) 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, CSA C22.2. External power supply, power adapter and/or power injector, if provided, are not suitable installation in air spaces.



Note

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

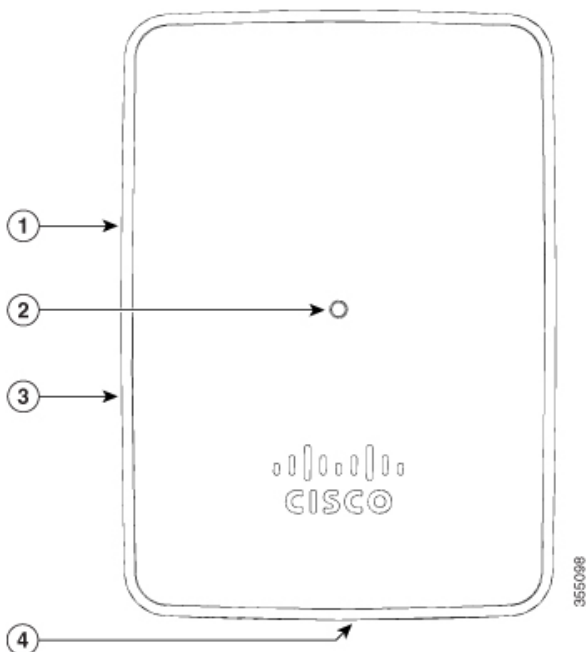
4 Unpacking the 1800s Network Sensor

To unpack the network sensor, follow these steps:

-
- Step 1** Unpack and remove the network sensor and the mounting accessories, from the shipping box.
- Step 2** Return any packing material to the shipping container and save it for future use.
- Step 3** Verify that you have received the items listed below. If any item is missing or damaged, contact your Cisco representative or reseller for instructions.
- The network sensor base unit.
 - One of the optional power modules, selected when you ordered the network sensor. These modules be ordered separately also.
-

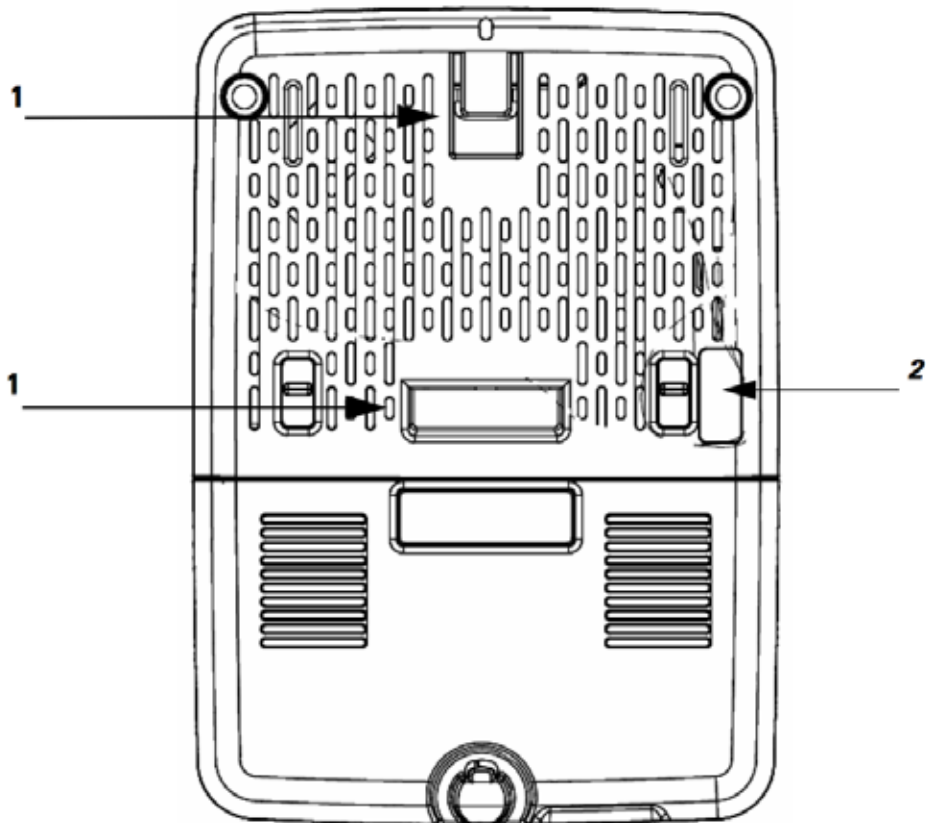
5 Ports and Connectors on the 1800s

Figure 1 Face of the Sensor – Status LED and Ports Location



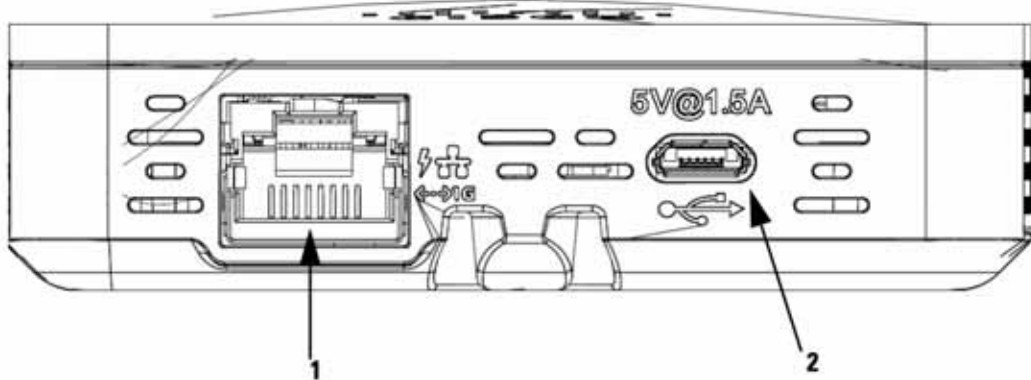
1	Reset button, on the right side of the sensor. For information on how to use the Reset button, see “Using the Reset Button” section on page 34.
2	Status LED. For more information, see the “Network Sensor Status LED” section on page 32.
3	Kensington security lock slot, on the right side of the sensor. For the Cisco Aironet 1800s Active Sensor having an AIR-MOD-POE PoE/Ethernet module plugged-in, the base of the sensor has a USB port and the PoE port (Gigabit Ethernet uplink port).
4	For the Cisco Aironet 1800s Active Sensor having an AIR-MOD-AC EU-specification AC adapter module plugged-in, the base of the sensor will have a power on-off switch.

Figure 2 Back of the Sensor – Console Port



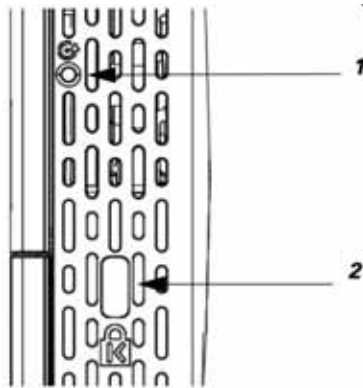
1	Recesses on the back of the sensor into which the hooks on the wall-mount bracket slide and click into place.	2	RS-232 console interface port, hidden under a mylar label. You need to use the custom console cable AIR-CONSADPT=.
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Figure 3 Base of the Network Sensor – With AIR-MOD-POE PoE/Ethernet Module



1	10/100/1000 BASE-T (Ethernet) Uplink Interface with inline power capability, Auto-MDIX (automatically support either straight through or crossover cables), and 802.3af/at PoE-In	2	USB port for powering the sensor, using 5V, 1.5A power.
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Figure 4 Reset Button and Kensington Security Lock on the Right Side



1	Reset button, on the right side of the sensor. For information on how to use the Reset button, see “Using the Reset Button” section on page 34.	2	Kensington security lock slot
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6 Installation Overview

Installing the network sensor involves these operations:

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- Step 1** [Mounting and Powering the Network Sensor, page 12](#)
 - Step 2** [Configuring the Network Sensor for Wireless Service Assurance, page 26](#)
 - Step 3** [Upgrading the Network Sensor Software via Cisco DNA Center, page 29](#)
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7 Mounting and Powering the Network Sensor

The sensor can be mounted either in a vertical orientation, on a wall or a desk. You can also mount the sensor on an electrical or network box. The mounting and powering options are provided in the following table.

Network Sensor and plugged-in Power Module	Power Supply Option(s)	Mounting Option(s)
Cisco Aironet 1800s Active Sensor with PoE/Ethernet module AIR-MOD-POE	<ul style="list-style-type: none"> • AC power, using the AC-USB adapter AIR-MOD-USB, supplying 5V DC, 1.5A power. • PoE, 802.3af Class 0 power or greater, from: <ul style="list-style-type: none"> – a network device or power injector. – Cisco power injectors AIR-PWRINJ5 (for 802.3af) or AIR-PWRINJ6 (for 802.3at). 	Vertical mounting on a wall or desk, using AIR-AP-BRACKET-NS. See Mounting the Sensor using AIR-AP-BRACKET-NS, page 13. Cisco recommends that you use only the Cisco supplied AC-USB adapter AIR-MOD-USB, (7.5 W, supplying 5V DC, 1.5A power), for powering the AP through the USB port. Other power supply devices which do not meet the specifications of the Cisco supplied device, can cause silent reboots or crashes.
Cisco Aironet 1800s Active Sensor with USB adapter module AIR-MOD-USB-xx	AC power, using the AC-USB adapter AIR-MOD-USB-xx, supplying 5V DC, 1.5A power.	
Cisco Aironet 1800s Active Sensor with AC adapter module AIR-MOD-AC	AC power from a wall socket power outlet, through the AC Adapter module, providing 120~240VAC, 50~60Hz power.	The AC adapter module also functions as a mounting cradle, thereby mounting the sensor on a wall socket power outlet. See Mounting the Sensor using AIR-MOD-AC Cradle, page 17.

Mounting the Sensor using AIR-AP-BRACKET-NS

The sensor can be mounted, in a vertical orientation, on a wall or desk, to a height of 3 feet, using the wall-mount bracket AIR-AP-BRACKET-NS.

To mount the sensor, follow these instructions:

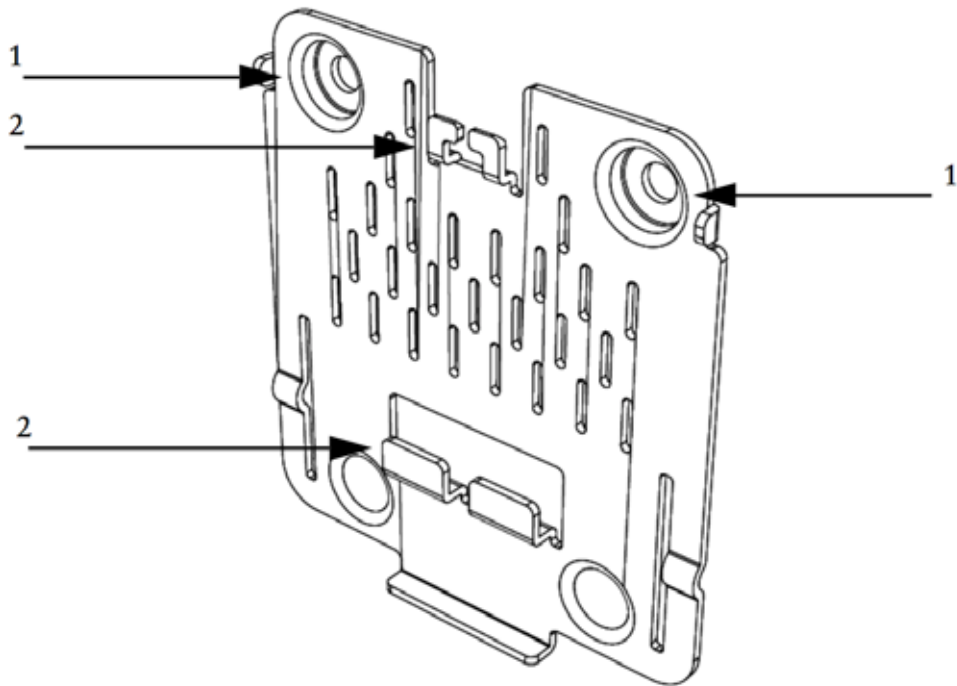
- Step 1** Identify the location for mounting the sensor.
 - Step 2** Use the wall-mount bracket AIR-AP-BRACKET-NS, as a template to mark the two screw-hole locations for fastening the bracket to the wall or desk.
 - Step 3** At the marked locations, drill a hole into the wall or desk.
 - Step 4** Fasten the AIR-AP-BRACKET-NS to the wall using two 18mm screws.
 - Step 5** Hold the back of the sensor against the wall, above the bracket, and then slide the sensor down onto the bracket, till it clicks into place. The hooks on the bracket will click into the recesses on the back of the sensor.
 - Step 6** Proceed with connecting the data and power cables.
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The sensor can be powered using:

- AC power, using the AC-USB adapter AIR-MOD-USB, supplying 5V DC, 1.5A power.
- PoE, 802.3af Class 0 power or greater, from:
 - a network device or power injector.
 - Cisco power injectors AIR-PWRINJ5 (for 802.3af) or AIR-PWRINJ6 (for 802.3at).

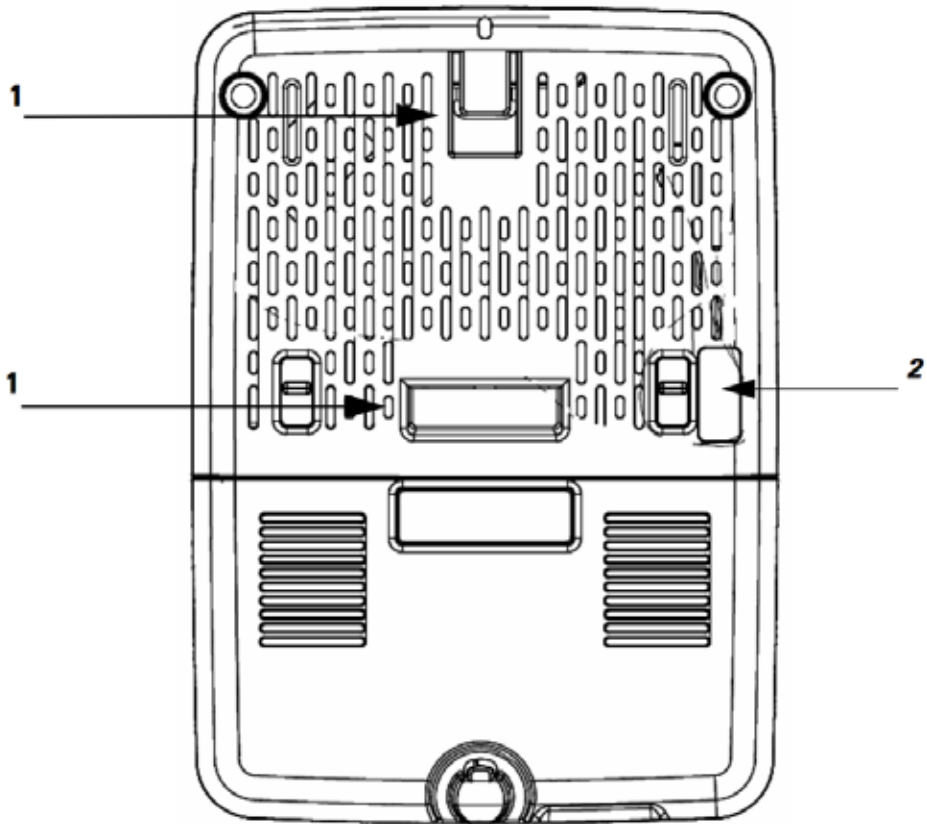
The PoE and USB ports are located on the base of the sensor. When both AC power and PoE power is available, the PoE power takes precedence.

Figure 5 Wall and Desk Mounting Bracket AIR-AP-BRACKET-NS



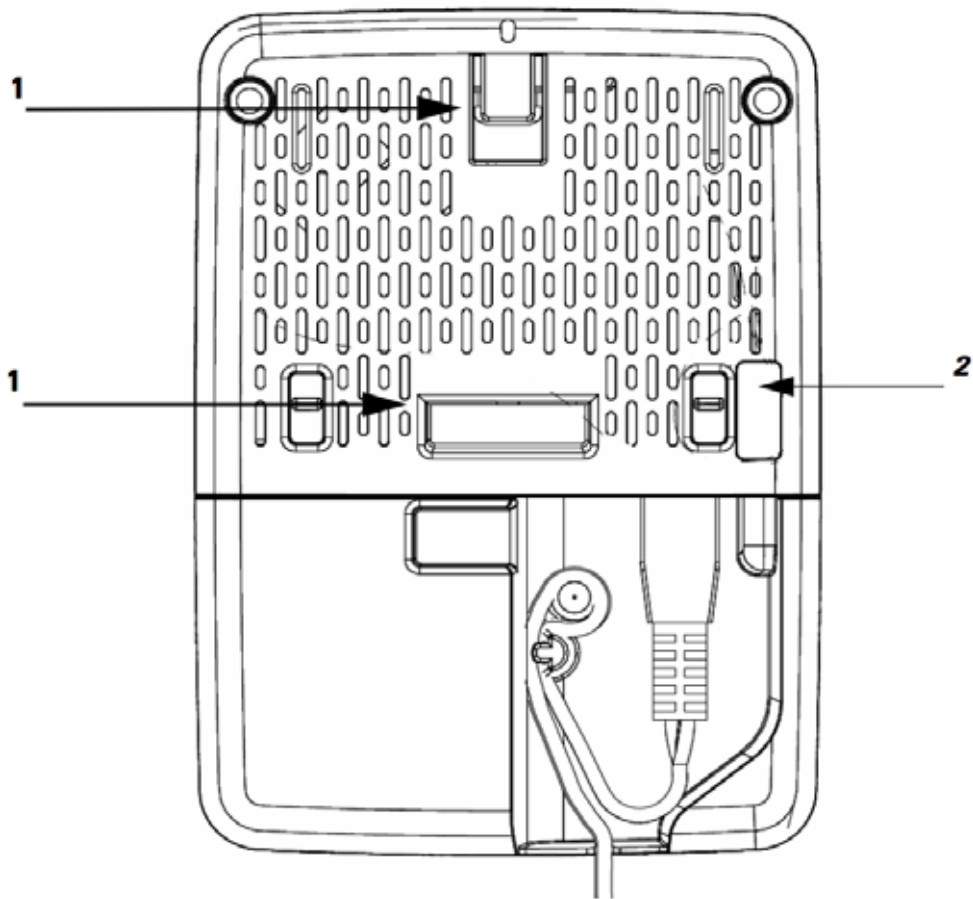
1	Screw holes for fastening the bracket to the wall or desk.	2	Hooks which click into the recesses on the back the sensor, for mounting the sensor on the bracket.
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Figure 6 Back of the Sensor – With PoE/Ethernet Module AIR-MOD-POE



1	Recesses on the back of the sensor into which the hooks on the wall-mount bracket slide and click into place.	2	RS-232 console interface port, hidden under a mylar label. You need to use the custom console cable AIR-CONSADPT=.
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Figure 7 Back of the Sensor – With USB adapter module AIR-MOD-USB-xx

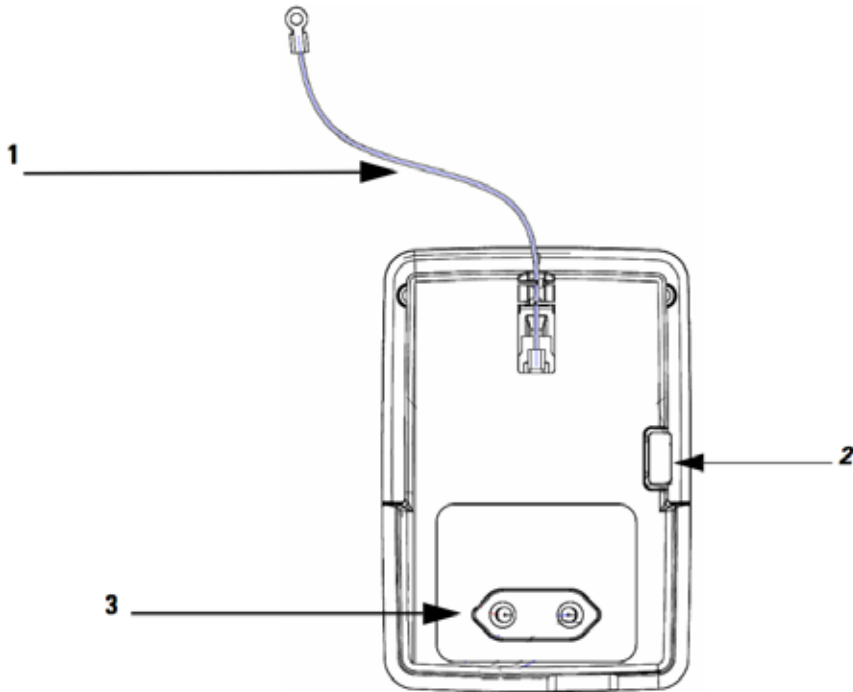


1	Recesses on the back of the sensor into which the hooks on the wall-mount bracket slide and click into place.	2	RS-232 console interface port, hidden under a mylar label. You need to use the custom console cable AIR-CONSADPT=.
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Mounting the Sensor using AIR-MOD-AC Cradle

The AIR-MOD-AC AC adapter module also functions as a mounting cradle, using which you can plug-in (and thereby, mount) the sensor into a wall socket power outlet. You can additionally secure the sensor by fastening the security wire to the wall or desk.

Figure 8 Back of the Sensor - With AC Adapter Module AIR-MOD-AC



1	Security wire which can be used to secure the sensor by fastening it to the wall.	EU-specification AC adapter module AIR-MOD-AC.
2	RS-232 console interface port, hidden under a mylar label. You need to use the custom console cable AIR-CONSADPT=.	3 The AC adapter module/cradle provided differs in design according to regional power supply standards. See the “AC Cradle Options for Different Power Supply Standards and Regions” section on page 20.

Figure 9 *Assembling and Routing the Security Wire – Front and Rear Views*

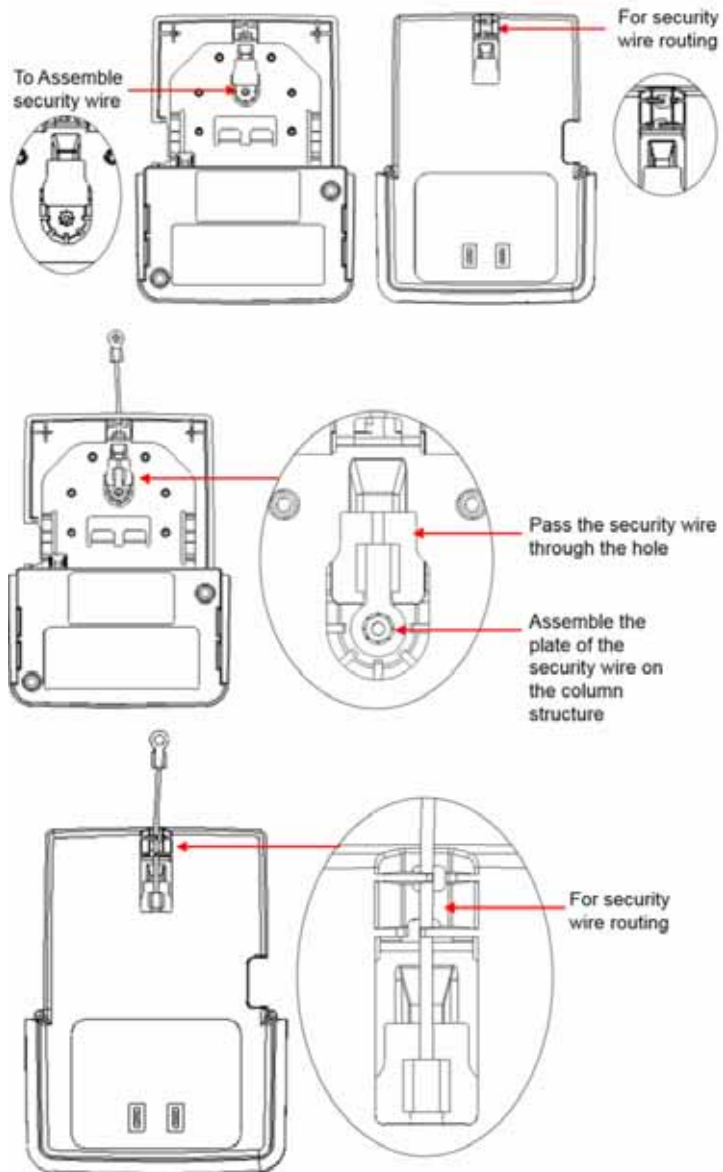
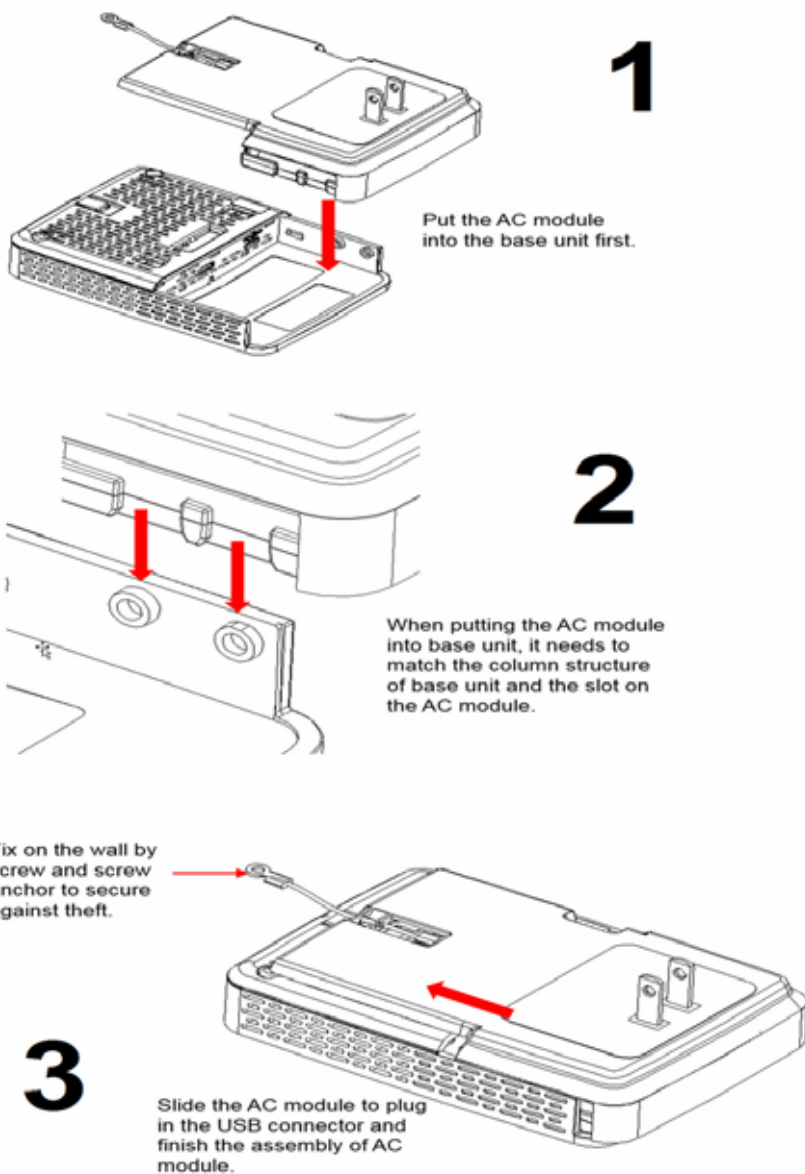


Figure 10 Assembling AC module with Base Unit



AC Cradle Options for Different Power Supply Standards and Regions

Figure 11 Sensor with AC Cradle for AU Region



Figure 12 Sensor with AC Cradle for CN Region



Figure 13 Sensor with AC Cradle for EU Region



Figure 14 Sensor with AC Cradle for SA Region



Figure 15 Sensor with AC Cradle for UK Region



Figure 16 Sensor with AC Cradle for US Region



8 Configuring the Network Sensor for Wireless Service Assurance

The sensor is configured and managed by the Cisco Digital Network Architecture (DNA) Center which also does the following:

- Collects statistics and data from the sensors, infrastructure APs, and clients, and displays real time information based on the data collected.
- Interfaces with Cisco Cloud Service, to send the collected data at regular intervals, to enable the cloud service to display historical information about the wireless network health.

Each network sensor establishes a management and control connection to the Cisco DNA Center over the intermediate IPv4/IPv6 network.

The Cisco DNA Center operates as a control center that determines the current task for each network sensor. In addition to configuring network sensors, the controller also collects, aggregates, parses, and presents statistics and results returned from each network sensor.

The Cisco DNA Center uses the data from the sensor for basic connectivity troubleshooting, RF performance troubleshooting, and Wireless QoE troubleshooting. The controller also periodically sends wireless network information to the Cisco Cloud Service's Performance Analytics function. The cloud-based Network Assurance Collector collects historical network assurance data, which is scheduled by the controller and collected by the network sensors.

For detailed information on configuring the network sensor, see the [Cisco Aironet Sensor Deployment Guide](#).

For information on the role of the Cisco DNA Center in Wireless Service Assurance, see the [Cisco Digital Network Architecture Center User Guide](#).

9 Provisioning the Network Sensor via Cisco PnP

The network sensor is provisioned via Cisco Network Plug and Play (PnP) and not through the Cisco WLC. The sensor can discover the Cisco PnP server through either of the following two methods:

- [Using DHCP Option 43](#)
- [DNS Discovery](#)

Using DHCP Option 43

DHCP option 43 is configured on the CLI of a Cisco router that acts as a DHCP server. It consists of a string value in the format indicated below:

```
ip_dhcp_pool pnp_device_pool
```

The option 43 string has the following components, delimited by semicolons:

- **5A1N**;—Specifies the PnP DHCP suboption, active operation, version 1, no debug information.
- **B<x>**;—IP address type:
 - B1 = hostname
 - B2 = IPv4 (default)
- **I<xxx.xxx.xxx.xxx>**;—IP address or hostname of the APIC-EM controller (following a capital *i*).
- **J<xxxx>**—Port number to use to connect to the APIC-EM controller.

The default is port 80 for HTTP and port 443 for HTTPS.

- **K<x>**;—Transport protocol to be used between the Cisco Plug and Play IOS Agent and the server:
 - K4 = HTTP (default)
 - K5 = HTTPS
- **T<trustpool_Bundle_URL>**;—(Optional) Specifies the external URL of the trustpool bundle if it is to be retrieved from a different location than the default, which is the APIC-EM controller, which gets the bundle from the Cisco InfoSec cloud (<http://www.cisco.com/security/pki/>).

For example, to download the bundle from a TFTP server at 10.30.30.10, specify the parameter like below:

```
Ttftp://10.30.30.10/ios.p7b
```



Note If you are using trustpool security and you do not specify the T parameter, the device retrieves the trustpool bundle from the APIC-EM controller.

- **Z<xxx.xxx.xxx.xxx>**;—IP address of the NTP server. This parameter is mandatory when using trustpool security to ensure that all devices are synchronized.

Here is a sample ASCII string to configure DHCP Option 43:

```
5A1D;B2;I<IP address of PnP server>;J80;K4
```

DNS Discovery

If DHCP discovery fails to get the IP address of the APIC-EM controller, for example, because option 43 is not configured, the Cisco Plug and Play IOS Agent falls back on a DNS lookup method. PnP Discovery via DNS involves the following steps:

Step 1 Create a host file on the DNS server with the host name *pnpserver* and the IP address of the PNP server.

Based on the network domain name returned by the DHCP server, it constructs a fully qualified domain name (FQDN) for the APIC-EM controller, using the preset hostname *pnpserver*. The NTP server name is based on the preset hostname *pnpntpserver*.

Step 2 Add option 15 to the DHCP scope with the domain name and option 6 with the DNS server.

For more information on Cisco PnP server discovery, visit the *Solution Guide for Cisco Network Plug and Play* at the following URL:

http://www.cisco.com/c/en/us/td/docs/solutions/Enterprise/Plug-and-Play/solution/guidexml/b_pnp-solution-guide.html

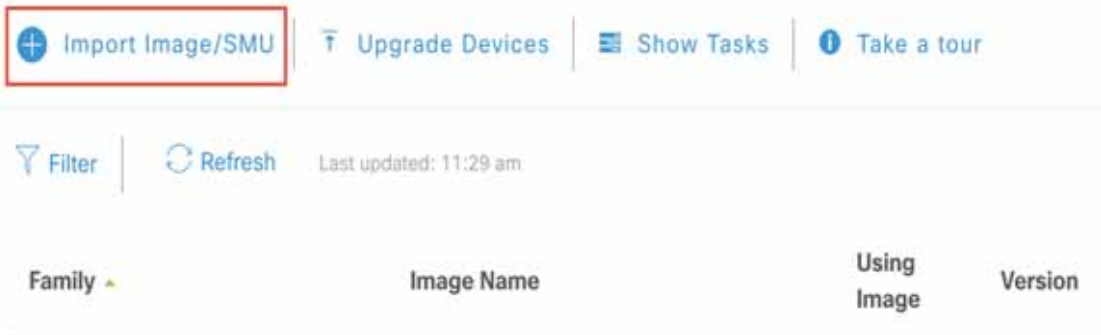
10 Upgrading the Network Sensor Software via Cisco DNA Center

Follow the below instructions to upgrade the software on the network sensor by downloading the desired software image from Cisco.com and adding it to the Cisco DNA Center repository:

Step 1 From the DNA Center home page, click **Image Repository** at the bottom of the page or navigate to **Design > Image Repository**.

The screenshot shows the Cisco DNA Center home page. At the top left is the Cisco DNA Center logo. Below it is a navigation bar with a search icon and three menu icons. The main content area features a heading "What can DNA Center do? Take a Tour." followed by two links: "Need to add functionality to DNA Center? Add applications" and "Want to learn more about DNA Center? Watch video". Below this are four main sections: "Design", "Policy", "Provision", and "Assurance". Each section has a brief description and a list of key features. The "Design" section is highlighted with a red box. Below these sections is a "Tools" section containing eight tool cards: "Discovery", "Inventory", "Topology", "Image Repository", "Command Runner", "License Manager", "Template Editor", and "Telemetry". The "Image Repository" card is highlighted with a red box. On the right side of the page, there is a vertical "Feedback" button. At the bottom right corner, the number "423568" is displayed.

Step 2 On the top of the **Image Repository** page, click **Import Image/SMU**.



Step 3 On the **Import Image/SMU** pop-up window, choose either of the following methods to import the desired network sensor software image file, and then click **Import**.

- a. Select the location of the software image file, you downloaded from Cisco.com, on your computer.

You can download the software image file from [Cisco.com](https://www.cisco.com) by navigating to **Downloads Home > Products > Wireless > Access Points > Aironet 1800 Series > Aironet 1800s Network Sensor**.

- b. Provide the direct URL (http or ftp) to the software image file.

The software image file is now imported in to the Cisco DNA Center **Image Repository**. It will appear listed, on the **Image Repository** page under the **Family** column, as **Cisco 1800S Unified Access Point (Sensor)**.

Step 4 In the **Image Repository** table, navigate to this imported sensor image file and mark it as a **Golden Image** by clicking the ★ corresponding to it.

To locate the sensor image, click the ▼ icon adjacent to the entry for **Cisco 1800S Unified Access Point (Sensor)** to display details of the imported image which appear in the **Image Name** column.



Note

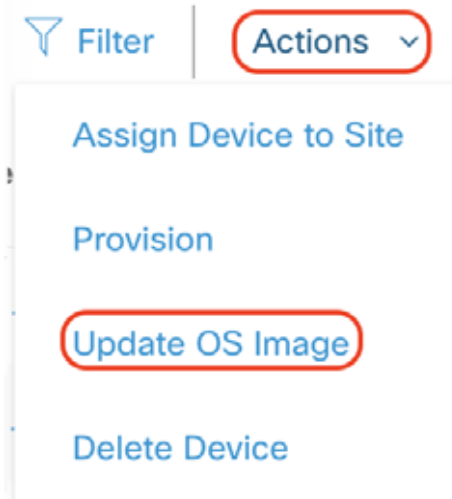
Only one star can be selected at a time. This helps the repository identify which image you want to download to the sensor.

Step 5 Now, on the top left of the **Image Repository** page, click **Upgrade Device**.
The **Device Inventory** popup appears.



Step 6 On the **Device Inventory** page, select the device name corresponding to the Cisco 1800S network sensor you wish to upgrade.

Step 7 Navigate to **Actions** above the **Device Inventory** table and choose **Update OS Image**.
The **Update Devices** confirmation popup appears.



Step 8 On the **Update Devices** popup, review the information listed under the **Device** and **Target Version** columns to verify the sensor and software image details. Click either the **Now** or **Later** radio buttons to schedule the network sensor update and then click **Apply**.

This completes the network sensor software image update via Cisco DNA Center.

11 Troubleshooting and Resetting the Network Sensor

Network Sensor Status LED



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

The network sensor status LED indicates various conditions which are described in [Table 1](#).

Table 1 LED Status Indications

Message Type	LED State	Message Meaning
Boot loader status sequence	Blinking Green	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 the operating system of the sensor
Initialization successful		
Operating status	Blinking Amber	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.	Access point location command invoked from controller web interface.
	Blinking Red	Ethernet link is not operational.

Table 1 LED Status Indications (continued)

Message Type	LED State	Message Meaning
Boot loader warnings	Blinking Amber	Configuration recovery in progress (Reset button pushed for 2 to 3 seconds)
	Red	Ethernet failure or image recovery (Reset button pushed for 20 to 30 seconds)
	Blinking Green	Image recovery in progress (Reset button released)
Boot loader errors	Red	DRAM memory test failure
	Blinking Red and Amber	FLASH file system failure
	Blinking Red and off	One 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
Cisco Network Sensor Operating System errors	Red	Software failure; try disconnecting and reconnecting unit power
	Cycling through Red, Green, Amber and off.	General warning; insufficient inline power

Ethernet Port LEDs

The Ethernet port has two LEDs for showing link (Green) and activity (Amber) status. They are integrated on the RJ45 connector. For a description of the statuses they indicate, see the following table.

	10M Link	10M Active	100M Link	100M Active	1000M Link	1000M Active
Link (Green) LED State	Off	Off	Off	Off	On	On
Activity (Amber) LED State	On	Blinking	On	Blinking	On	Blinking

Commands to Test Network Sensor Connectivity

Use the following CLI commands at the sensor console to troubleshoot issues:

- Check status of heartbeat and last successful connectivity between sensor and Cisco DNA Center:
show dot11 sensor heartbeat status
- Check sensor connectivity status with Cisco DNA Center:
show dot11 sensor-stats
- Check sensor provisioning status:
show npinfo

For more troubleshooting commands, visit the *Cisco Aironet Sensor Deployment Guide* at the following URL:

http://www.cisco.com/c/en/us/td/docs/wireless/controller/technotes/8-5/b_Cisco_Aironet_Sensor_Deployment_Guide.html

Using the Reset Button

Using the Reset button (see [Figure 4](#)) you can:

- Reset the network sensor to its default factory-shipped configuration.
- Clear the network sensor internal storage, including all configuration files and the regulatory domain configuration.

To use the Reset button, press, and keep pressed, the Reset button on the network sensor during the network sensor boot cycle. Wait until the status LED changes to Amber. Then:

- To reset the network sensor to the default factory-shipped configuration, keep the Reset button pressed for less than 20 seconds. The network sensor configuration files are cleared.
This resets all configuration settings to factory defaults, including passwords, encryption keys, the IP address, and the SSID.
- To clear the network sensor 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 network sensor status LED changes from Amber to Red, and all the files in the network sensor storage directory are cleared.

If the Reset button is pressed for more than 60 seconds, it is assumed to be a faulty condition and no changes are made.

12 Related Documentation

All user documentation for the Cisco Aironet 1800s Active Sensor is available at the following URL:
<http://www.cisco.com/c/en/us/support/wireless/aironet-active-sensor/tsd-products-support-series-home.html>

For detailed information and guidelines for configuring and deploying your network sensor in a wireless network, see the following documentation:

- *Cisco Aironet 1800s Active Sensor Data Sheet* at the following URL:

<http://www.cisco.com/c/en/us/products/collateral/wireless/aironet-active-sensor/nb-09-air-act-sen-data-sheet-cte-en.html>

- *Cisco Aironet Sensor Deployment Guide* at the following URL:

http://www.cisco.com/c/en/us/td/docs/wireless/controller/technotes/8-5/b_Cisco_Aironet_Sensor_Deployment_Guide.html

- *Cisco Digital Network Architecture Center User Guide* at the following URL:

https://www.cisco.com/c/en/us/td/docs/cloud-systems-management/network-automation-and-management/dna-center/1-1/user_guide/b_dnac_ug_1_1.html

13 Declarations of Conformity and Regulatory Information

This section provides declarations of conformity and regulatory information for the Cisco Aironet 1800s Active Sensor. You can find additional information at this URL:

www.cisco.com/go/aironet/compliance

Manufacturers Federal Communication Commission Declaration of Conformity Statement



Network Sensor Models

AIR-AP1800S-B-K9

Certification Number

LDK102108

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 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

Warning

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.

警告

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 Aironet 1800s Active Sensor in Japan

This section provides guidelines for avoiding interference when operating Cisco Aironet 1800s Active Sensor 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

208697

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

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 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

Network Sensor Models

AIR-AP1800S-A-K9

Certification Number

2461B-102108

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	3/5 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.

European Community, Switzerland, Norway, Iceland, and Liechtenstein

Network Sensor Models:

AIR-AP1800S-E-K9

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.

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 Diretiva 1999/5/EC.
Română [Romanian]:	Acest echipament este în conformitate cu cerințele esențiale și cu alte prevederi relevante ale Directivei 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 direktív: 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.
Türk [Turkish]:	Bu cihaz 1999/5/EC Direktifi'nin temel gereklerine ve ilgili diğer hükümlerine uygundur.

142730

The following standards were applied:

EMC—EN 301.489-1 v1.9.2; EN 301.489-17 v2.2.1

Health & Safety—EN60950-1: 2006; EN 50385: 2002

Radio—EN 300 328 v 1.8.1; EN 301.893 v 1.7.1

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

This section contains information on compliance with guidelines related to RF exposure.

Generic Discussion on RF Exposure

The Cisco products are designed to comply with the following national and international standards on Human Exposure to Radio Frequencies:

- US 47 Code of Federal Regulations Part 2 Subpart J
- American National Standards Institute (ANSI) / Institute of Electrical and Electronic Engineers / IEEE C 95.1 (99)
- International Commission on Non Ionizing Radiation Protection (ICNIRP) 98
- Ministry of Health (Canada) Safety Code 6. Limits on Human Exposure to Radio Frequency Fields in the range from 3kHz to 300 GHz
- Australia Radiation Protection Standard

To ensure compliance with various national and international Electromagnetic Field (EMF) standards, the system should only be operated with Cisco approved accessories.

This Device Meets International Guidelines for Exposure to Radio Waves

The Cisco Aironet 1800s Active Sensor device 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.

Separation Distance		
MPE	Distance	Limit
0.69 mW/cm ²	20 cm (7.87 inches)	1.00 mW/cm ²

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 the antennas at a greater separation distance than recommended.

This Device Meets FCC Guidelines for Exposure to Radio Waves

The Cisco Aironet 1800s Active Sensor device 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 FCC Part 1.1310. The guidelines are based on IEEE ANSI C 95.1 (92) 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.

The device has been tested and found compliant with the applicable regulations as part of the radio certification process.

Separation Distance		
MPE	Distance	Limit
0.69 mW/cm ²	20 cm (7.87 inches)	1.00 mW/cm ²

The US Food and Drug Administration has stated that present scientific information does not indicate the need for any special precautions for the use of wireless devices. The FCC recommends 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 the antennas at a greater separation distance than recommended or lowering the transmitter power output.

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

The Cisco Aironet 1800s Active Sensor device 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.

Separation Distance			
Frequency	MPE	Distance	Limit
2.4 GHz	2.9 W/m ²	20 cm (7.87 inches)	5.4 W/m ²
5 GHz	3.8 W/m ²		9.2 W/m ²

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 1800s 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.

Distance d'éloignement			
Fréquence	MPE	Distance	Limite
2.4 GHz	2.9 W/m ²	20 cm (7.87 inches)	5.4 W/m ²
5 GHz	3.8 W/m ²		9.2 W/m ²

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 URL: http://www.cisco.com/warp/public/cc/pd/witc/ao340ap/prodlit/rfhr_wi.htm
- 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 URL: www.who.int/emf
- United Kingdom, National Radiological Protection Board at this URL: www.nrp.org.uk
- Cellular Telecommunications Association at this URL: www.wow-com.com
- The Mobile Manufacturers Forum at this URL: www.mmfa.org

Administrative Rules for Cisco Aironet 1800s Active Sensor in Taiwan

This section provides administrative rules for operating Cisco Aironet 1800s Active Sensor in Taiwan. The rules for all network sensors 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

4.7.5 在 5.25-5.35 兆赫頻帶內操作之無線資訊傳輸設備，限於室內使用。

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。

English Translation

Low-power Radio-frequency Devices Technical Specifications

- 4.7 Unlicensed National Information Infrastructure
- 4.7.5 Within the 5.25-5.35 GHz band, U-NII devices will be restricted to indoor operations to reduce any potential for harmful interference to co-channel MSS operations.
- 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.

Operation of Cisco Aironet 1800s Active Sensor in Brazil

This section contains special information for operation of Cisco Aironet 1800s Active Sensor in Brazil.

Network Sensor Models:

AIR-AP1800S-Z-K9

Figure 17 Brazil Regulatory Information



2274-11-1086



(01)07898362232855

000005

Portuguese Translation

Este equipamento não tem direito a proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados.

English Translation

This equipment is not entitled to the protection from harmful interference and may not cause interference with duly authorized systems.

Declaration of Conformity Statements

All the Declaration of Conformity statements related to this product can be found at the following location: <http://www.ciscofax.com>

14 Obtain Documentation and Submit 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 *[What's New in Cisco Product Documentation RSS feed](#)*. The RSS feeds are a free service.

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