Cisco Aironet Four-Element Dual-Band Omnidirectional Antenna (AIR-ANT2451V-R)

This document outlines the specifications, describes the AIR-ANT2451V-R antenna, and provides instructions for mounting it. The antenna is a four-element dual-band antenna that operates in the 2.4- and 5-GHz frequency ranges. The antenna is designed for use in an indoor environment.

The following information is provided in this document.

Technical Specifications

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Antenna type	Omnidirectional
Operating frequency range	2400–2500 MHz 5150–5850 MHz
Nominal input impedance	50 Ohms
2:1 VSWR bandwidth	2400–2500 MHz 5150–5850 MHz
Peak gain (dBi)	2.4-GHz band: 2 5-GHz band: 3
Polarization	Linear
E-plane 3-dB beamwidth (degrees)	2.4-GHz band: 80 5-GHz band: 50
H-plane 3-dB beamwidth	Omnidirectional
Cable length and type	18 in. (45.7-cm) plenum rated
Connectors	Right angle RP-TNC male
Length	8.5 in. (21.5-cm)
Width	6 in. (15.2-cm)
Height	0.93 in. (2.4-cm)
Radome material	UV stable ABS
UL rating	UL-94 V0
Operating temperature range	–32°F to 122°F (0°C to 50°C)
Storage temperature range	–4°F to 149°F (–20°C to 65°C)
Environment	Indoor
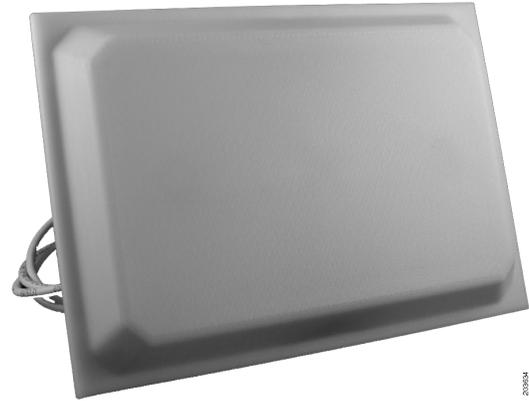
2.4-GHz Element 1 E- and H-Plane Patterns
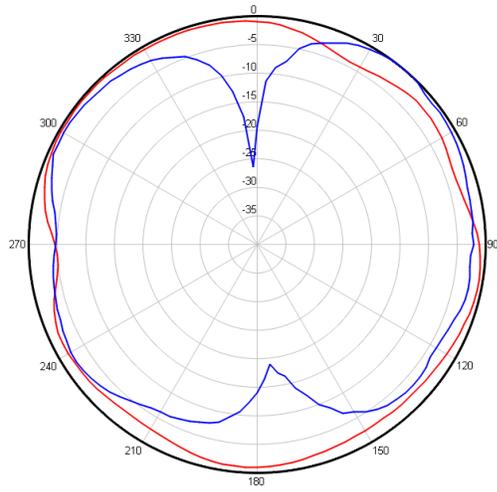
2.4-GHz Element 2 E- and H- Plane Patterns
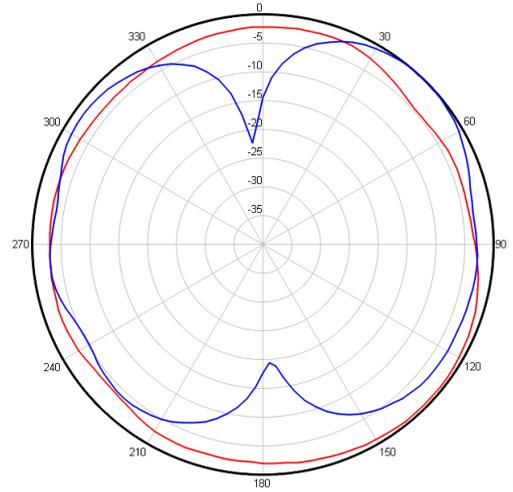
5-GHz Element 1 E- and H-Plane Patterns
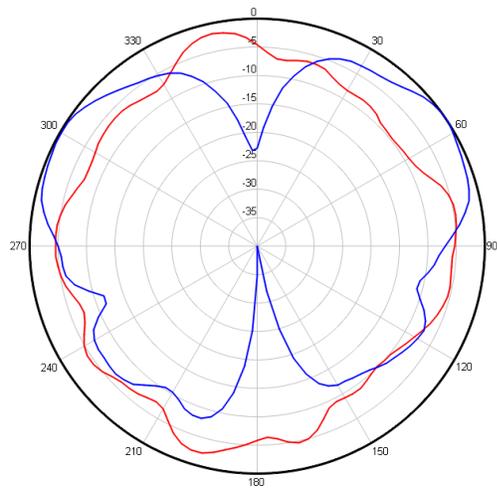
5-GHz Element 2 E- and H- Plane Patterns
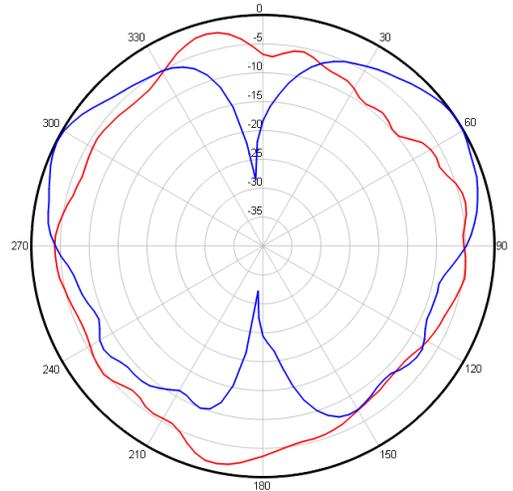
System Requirements

This antenna is designed for use with Cisco Aironet access points and bridges but can be used with any 2.4-GHz or 5-GHz Cisco Aironet radio device that utilizes an RP-TNC connector. The antenna can be mounted on suspended ceiling tiles having a thickness between ½ in. (1.27-cm) and 1in. (2.54-cm). It can also be mounted on the Plexiglass door of an access point enclosure.

Safety Instructions

Follow these safety instructions when installing your antenna.

- Plan your installation procedure carefully and completely before you begin.

- If you are installing an antenna for the first time, for your own safety as well as others, seek professional assistance. Consult your dealer, who can explain which mounting method to use for the location where you intend to install the antenna.

- Select your installation site with safety, as well as performance, in mind. Remember that electric power cables and telephone lines look alike. For your safety, assume that any line is an electric power line until determined otherwise.

- Call your local power company or building maintenance organization if you are unsure about cables close to your mounting location.

- When installing your antenna, do not use a metal ladder. Do dress properly: shoes with rubber soles and heels, rubber gloves, and a long sleeved shirt or jacket.

- If an accident or emergency occurs with the power lines, call for qualified emergency help immediately.

Installation Notes

Because antennas transmit and receive radio signals, they are susceptible to RF obstructions and common sources of interference that can reduce throughput and range of the device to which they are connected. Follow these guidelines to ensure the best possible performance:

- Mount the antenna to utilize its propagation characteristics. A way to do this is to orient the antenna horizontally as high as possible at or near the center of its coverage area.

- Keep the antenna away from metal obstructions such as heating and air-conditioning ducts, large ceiling trusses, building superstructures, and major power cabling runs. If necessary, use a rigid conduit to lower the antenna away from these obstructions.

- The density of the materials used in a building's construction determines the number of walls the signal must pass through and still maintain adequate coverage. Consider the following before choosing the location to install your antenna:

  - Paper and vinyl walls have very little affect on signal penetration.

  - Solid and pre-cast concrete walls limit signal penetration to one or two walls without degrading coverage.

  - Concrete and wood block walls limit signal penetration to three or four walls.

  - A signal can penetrate five or six walls constructed of drywall or wood.

  - A thick metal wall causes signals to reflect off, causing poor penetration.

– A wire mesh spaced between 1 and 1 1/2 in. (2.54- and 3.81-cm) acts as a harmonic reflector that blocks a 2.4-Ghz radio signal.

- Install the antenna away from microwave ovens and 2-GHz cordless phones. These products can cause signal interference because they operate in the same frequency range as the device to which your antenna is connected.

- Install the antenna horizontally to maximize signal propagation.

Choosing a Mounting Location

The antenna should be mounted clear of any obstructions to the sides of the radiating elements. Generally, the higher an antenna is above the floor, the better it performs. If possible, mount the antenna on the ceiling panel within 12 in. (30.5-cm) of the access point so you can connect its cables directly to the access point. If you must mount the antenna farther away from the access point, try to make the distance as short as possible.

Installing the Antenna

You can install the antenna on a ceiling tile having a thickness between ½ in. (1.27-cm) and 1 in. (2.54-cm).

Tools and Equipment Required

You need the following tools and equipment, which are not provided.

- A suitable hole cutter capable of creating a 1-in. (2.54-cm) hole in a suspended ceiling tile.

Note We recommend a hole saw, which is available in most home improvement centers and hardware stores.

- A step ladder high enough to access your ceiling safely.

Installing the Antenna

The antenna is installed to a suspended ceiling tile with a supplied 1 in. (2.54-cm) plastic nut. See Figure 1 for details. It can also be mounted on the Plexiglass door of an access point enclosure. See Figure 2 for details.

The antenna terminates with a right-angle RP-TNC plug after a short, 18 in. (45.7-cm) cable. The mating connector to the antenna on the access point is an RP-TNC jack.

Mounting the Antenna on a Ceiling Tile

Figure 1   *Ceiling Tile Mounting Details*
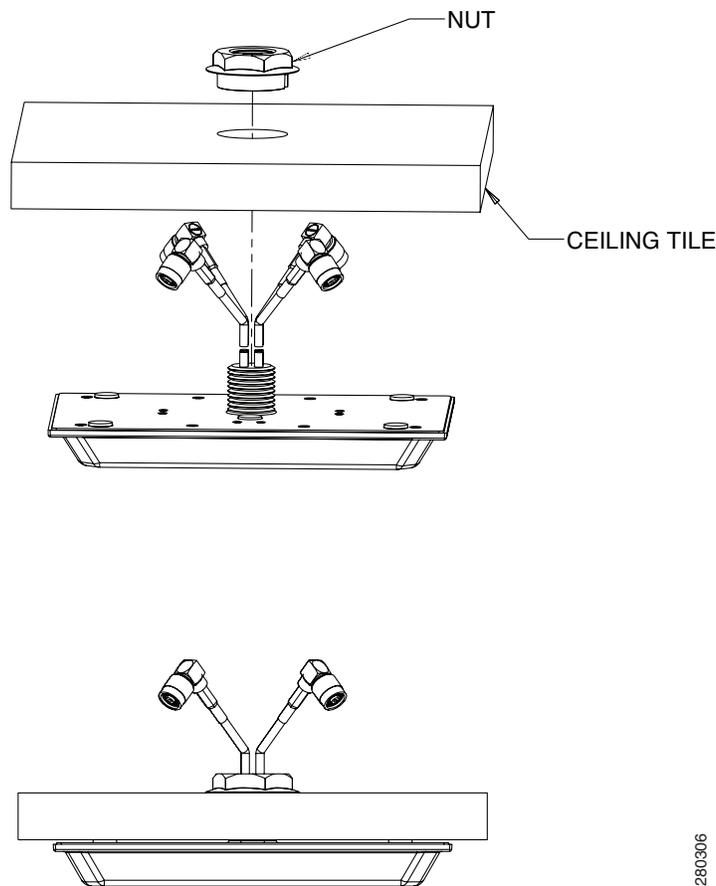
Follow these steps to mount the antenna on a suspended ceiling tile.

Step 1   Mark the location on the ceiling tile where you will mount the antenna.

Step 2   Remove the ceiling tile from the ceiling grids.

Step 3   Use a 1-in. (2.54-cm) hole cutter to create a hole in the ceiling tile.

Step 4   Insert the antenna cables, one at a time, through the hole in the ceiling tile.

Step 5   Insert the antenna cables, one at a time, through the hole in the plastic nut as shown in Figure 1.

> **Note**   Do not use the rubber gasket when you mount the antenna on a ceiling tile. The gasket is not required for ceiling tile installations.

**Step 6**   Make sure that the antenna is properly positioned on the ceiling tile and then tighten the plastic nut hand-tight.

Step 7   Reinstall the ceiling tile.

Step 8   Connect the antenna cables to the access point.

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> **Note** The 5-GHz antenna cables are identified by a blue collar near the connectors. Make sure that you connect these cables to the 5-GHz antenna connection on the access point.

Mounting the Antenna on the Plexi glass Door of an Access Point Enclosure

Figure 2   *Access Point Enclosure Door Mounting Details*
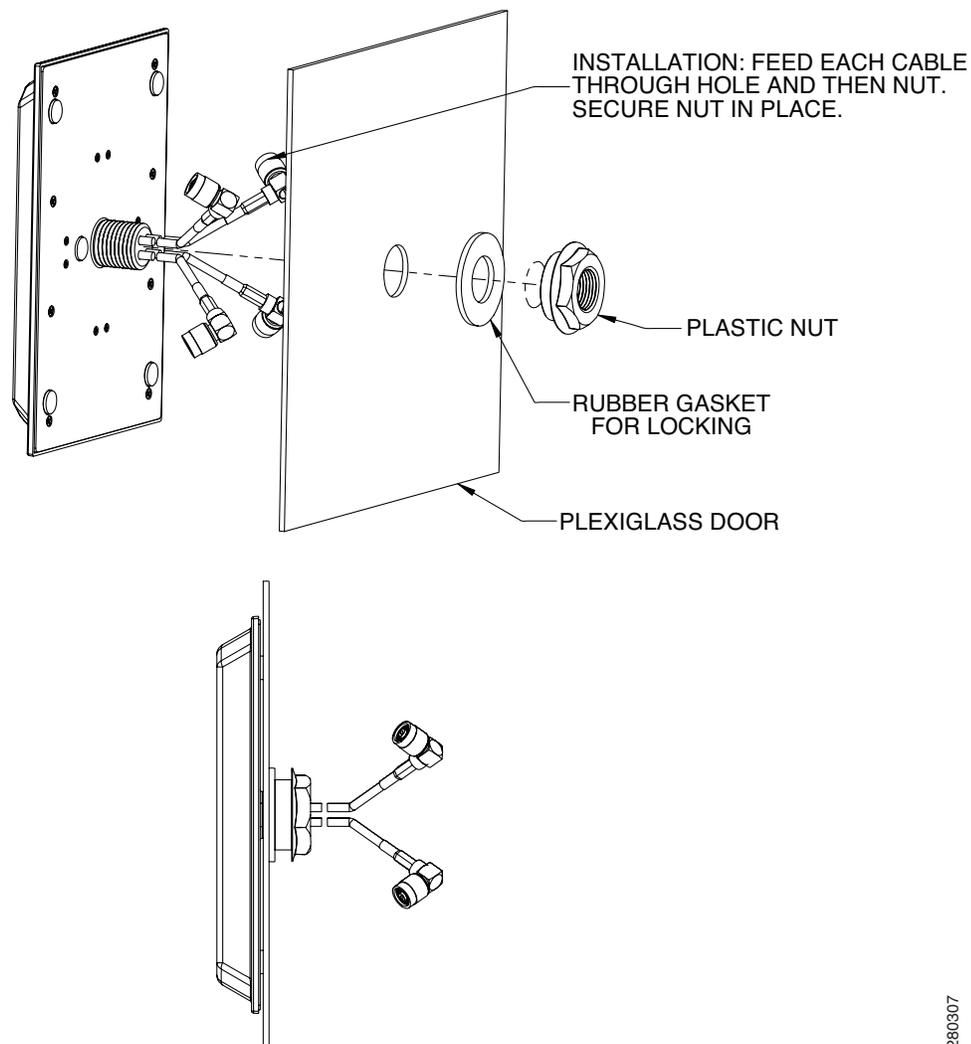
Step 1   Mark the location on the Plexiglas part of the enclosure door where you will create the antenna mounting hole.

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> **Note** The location should be such that the antenna is centered on the Plexiglass part of the enclosure door.

Step 2 Use a 1-in. (2.54-cm) hole cutter to carefully create a hole in the enclosure door.

Step 3 Insert the antenna cables, one at a time, through the hole in the enclosure door.

Step 4 Insert the antenna cables, one at a time, through the holes in the rubber gasket and plastic nut as shown in Figure 2.

> **Note** Be sure to use the rubber gasket when you mount the antenna on the Plexiglass door. The gasket locks the nut when you tighten it and helps keep the antenna firmly in position on the door.

Step 5 Make sure that the antenna is properly positioned on the door and then tighten the plastic nut hand-tight.

Step 6 Connect the antenna cables to the access point.

> **Note** The 5-GHz antenna cables are identified by a blue collar near the connectors. Make sure that you connect these cables to the 5-GHz antenna connection on the access point.

Suggested Cable

Cisco recommends a high-quality, low-loss cable for use with the antenna.

> **Note** Coaxial cable loses efficiency as the frequency increases, resulting in signal loss. The cable should be kept as short as possible because cable length also determines the amount of signal loss (the longer the run, the greater the loss).

Obtaining Documentation, Obtaining Support, and Security Guidelines

For information on obtaining documentation, obtaining support, providing documentation feedback, security guidelines, and also 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/en/US/docs/general/whatsnew/whatsnew.html