



## Cisco Aironet 7-dBi Diversity Patch Antenna (AIR-ANT5170P-R)

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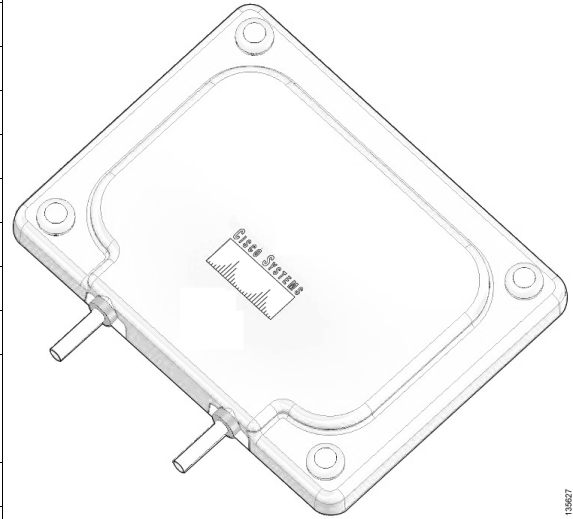
This document outlines the specifications, describes the AIR-ANT5170P-R 7-dBi diversity patch antenna, and provides instructions for mounting it. The antenna operates in the 5-GHz frequency range and is designed for use in both indoor and outdoor environments.

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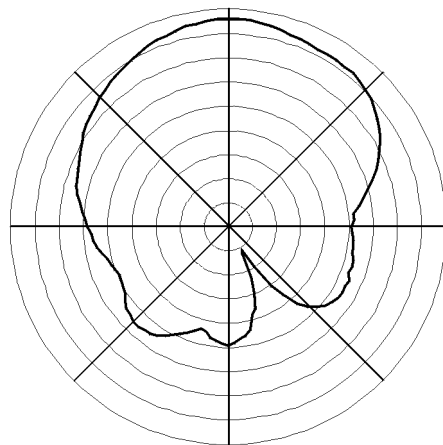
# Technical Specifications

Antenna type	Diversity patch
Operating frequency range	5150–5850 MHz
Nominal input impedance	50 Ohms
2:1 VSWR bandwidth	5150–5850 MHz
Peak gain	7.0 dBi
Polarization	Vertical
E-plane 3-dB beamwidth	50°
H-plane 3-dB beamwidth	70°
Front-to-back ratio	18 dB
Cable length and type	36 in. (91.4 cm) Plenum rated, UV stable
Connector type	RP-TNC plug
Length	5.7 in. (14.5 cm)
Width	4.3 in. (10.9 cm)
Height	0.7 in. (1.8 cm)
Weight	8 oz (0.2 kg)
Operating temperature range	-22°F - 158°F (-30°C - 70°C)
Storage temperature range	-40°F - 185°F (-40°C - 85°C)
Wind rating	80 mph (128.7 kph)



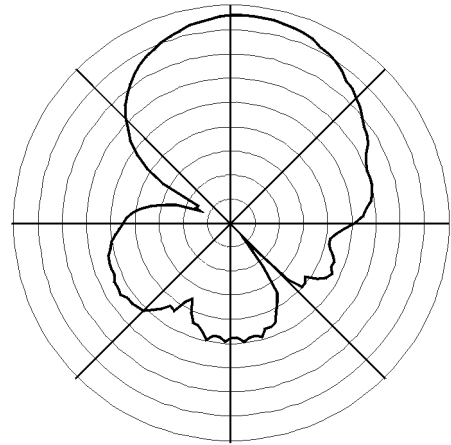
133627

**H-Plane Pattern**



133716

**E-Plane Pattern**



133719

# System Requirements

This antenna is designed for use with Cisco Aironet access points and bridges but can be used with any 5-GHz Cisco Aironet radio device that uses an RP-TNC connector.

## Safety Precautions



Warning

Installation of this antenna near power lines is dangerous. For your safety, follow the installation directions.



Warning

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.



Warning

In order to comply with international radio frequency (RF) exposure limits, dish antennas should be located at a minimum of 8.7 inches (22 cm) or more from the bodies of all persons. Other antennas should be located a minimum of 7.9 inches (20 cm) or more from the bodies of all persons.



Warning

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



Warning

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



Warning

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

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

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

1. If you are installing an antenna for the first time, for your own safety as well as others, seek professional assistance. Your Cisco sales representative can explain which mounting method to use for the size and type antenna you are about to install.
2. Select your installation site with safety, as well as performance in mind. Remember: electric power lines and phone lines look alike. For your safety, assume that any overhead line can kill you.

3. Call your electric power company. Tell them your plans and ask them to come look at your proposed installation. This is a small inconvenience considering your life is at stake.
4. Plan your installation carefully and completely before you begin. Successful raising of a mast or tower is largely a matter of coordination. Each person should be assigned to a specific task, and should know what to do and when to do it. One person should be in charge of the operation to issue instructions and watch for signs of trouble.
5. When installing your antenna, remember:
  - a. **Do not** use a metal ladder.
  - b. **Do not** work on a wet or windy day.
  - c. **Do** dress properly—shoes with rubber soles and heels, rubber gloves, long sleeved shirt or jacket.
6. If the assembly starts to drop, get away from it and let it fall. Remember, the antenna, mast, cable, and metal guy wires are all excellent conductors of electrical current. Even the slightest touch of any of these parts to a power line complete an electrical path through the antenna and the installer: **you!**
7. If any part of the antenna system should come in contact with a power line, **don't touch it or try to remove it yourself. Call your local power company.** They will remove it safely.
8. If an accident should occur with the power lines call for qualified emergency help immediately.

## Installation Guidelines

Because the 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 best take advantage of its propagation characteristics. Mount it as high as possible and oriented so that the cables are pointing down (towards the ground).
- 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 in which to install your antenna:
  - Dry 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, causing poor penetration.
- Install the antenna away from 5-GHz cordless phones. These products can cause signal interference because they operate in the same frequency range as the device your antenna is connected to.

## Site Selection

Before attempting to install your antenna, determine where you can best place the antenna for safety and performance.

Follow these steps to determine a safe distance from wires, power lines, and trees.

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- Step 1** Measure the height of your antenna.
- Step 2** Double this height for the minimum recommended safe distance.



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**Caution** If you are unable to maintain this safe distance, stop and get professional help.

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Generally, the higher an antenna is above the ground, the better it performs. Good practice is to install your antenna about 5 to 10 ft (1.5 to 3 m) above the roof line and away from all power lines and obstructions. If possible, find a mounting place directly above your wireless device so that the lead-in cable can be as short as possible.

## Installing the Antenna

The antenna is designed to be installed on a flat, vertical surface indoors or outdoors. A mounting hardware kit is provided with the antenna.

## Tools and Equipment Required

A mounting installation kit is shipped with the antenna and consists of the following hardware:

- Four #8 screws
- Four #8 plastic anchors
- Four flanged washers
- Four end caps

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

- A Phillips screwdriver
- A drill
- A 3/16-in. (4.7 mm) drill bit (for drywall installation; other surfaces may require a different type and size)
- A pencil
- A small mallet or hammer

The following sections contain typical procedures for installing the antenna on a mast. Your installation may vary. Before you begin, you may want to refer to Figure 1.

## Mounting on a Vertical Surface

Follow these steps to mount your antenna on a vertical surface. This procedure describes mounting the antenna on a drywall surface. If you are mounting the antenna on any other type of surface, your procedure may vary slightly.

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- Step 1** Determine the location in which you will mount the antenna.
  - Step 2** Use the antenna as a template to mark the locations of the four mounting holes.
  - Step 3** Use a drill and a 3/16-in. (4.7 mm) drill bit to drill four holes at the locations you marked in Step 2.
  - Step 4** Start a plastic anchor into each hole.
  - Step 5** Use a mallet or small hammer to seat the anchors into the wall.
  - Step 6** Install a flanged washer on each #8 screw. Make sure the flange end of the washer faces out.
  - Step 7** Align the antenna's mounting holes with the anchors.


**Caution**

Make sure the antenna cables are pointing down (towards the ground) to ensure proper orientation. If the antenna is not mounted properly, degraded performance could result.

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- Step 8** Holding the antenna in place, start the #8 screw into each antenna mounting hole.
  - Step 9** Use a Phillips screwdriver to secure the antenna to the wall. Do not overtighten.
  - Step 10** Install the end caps onto the flanged washers.


**Caution**

If you install additional lengths of antenna cable, be sure to install a suitable strain relief. The antenna may be damaged if you do not eliminate the extra weight of the cable. The antenna is not designed to support the weight of a cable longer than the installed 3-ft (91.4 cm) cable.

## Antenna Cable Information


**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 causes signal loss (the longer the run, the greater the loss).


**Note**

The antenna cable has a 0.5 in. (12.7 mm) bend radius. Sharply bending or crimping the cable may cause a degradation in performance.

The antenna terminates with a RP-TNC plug after a short, 3-ft (0.91-m) cable. The mating connector to the antenna is an appropriate RP-TNC jack. The connector on the opposite end will vary according to the type of equipment used.

After the cable is attached to the antenna, make sure that the connections are sealed (if outdoors) to prevent moisture and other weathering elements from affecting performance. Cisco recommends using a coax seal (such as CoaxSeal) for outdoor connections. Silicon sealant or electrical tape are **not** recommended for sealing outdoor connections.

## Grounding the Antenna

Follow these steps to ground the antenna in accordance with national electrical code instructions.

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- Step 1** Use No. 10 AWG copper or No. 8 or larger copper-clad steel or bronze wire as ground wires. Securely clamp the wire to a good earth ground.
  - Step 2** Secure the lead-in wire to an antenna discharge unit and the ground wire to the building with stand-off insulators spaced from 4 ft (1.2 m) to 8 ft (2.4 m) apart.
  - Step 3** Mount the antenna discharge unit as close as possible to where the lead-in wire enters the building.
  - Step 4** Drill a hole in the building's wall as close as possible to the equipment to which you will connect the lead-in cable.



### Caution

There may be wires in the wall. Make sure your drilling location is clear of any obstructions or other hazards.

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- Step 5** Pull the cable through the hole and form a drip loop close to where it enters the building.
  - Step 6** Thoroughly waterproof the lead-in area.
  - Step 7** Install a lightning arrester.
  - Step 8** Connect the lead-in cable to the equipment.
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## 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* at: <http://www.cisco.com/c/en/us/td/docs/general/whatsnew/whatsnew.html>.

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