Cisco Aironet 13.5-dBi Yagi Mast Mount Antenna (AIR-ANT1949)

Overview

This document describes the 13.5-dBi Yagi mast mount antenna and provides instructions for mounting it. The antenna operates in the 2.4- to 2.5-GHz frequency range and is designed for point-to-point communications. The antenna is a completely enclosed 16-element, vertically polarized directional Yagi and is designed to be mounted outdoors on a mast. The antenna can also be used indoors and can be mounted on a flat vertical surface, such as a wall.
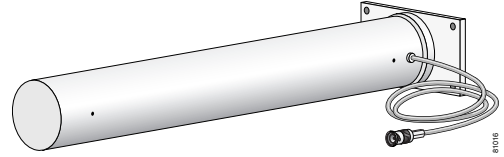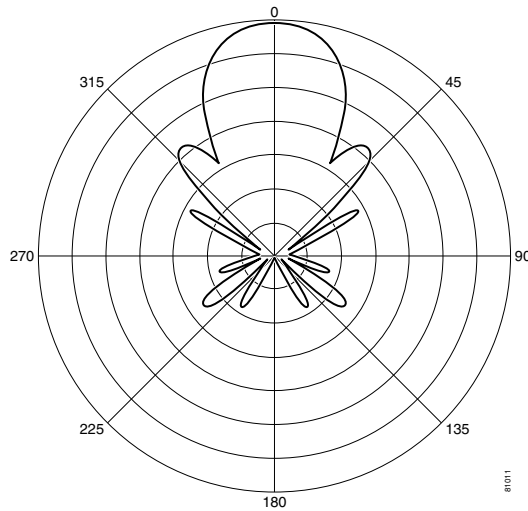
The following information is provided in this document.

Technical Specifications
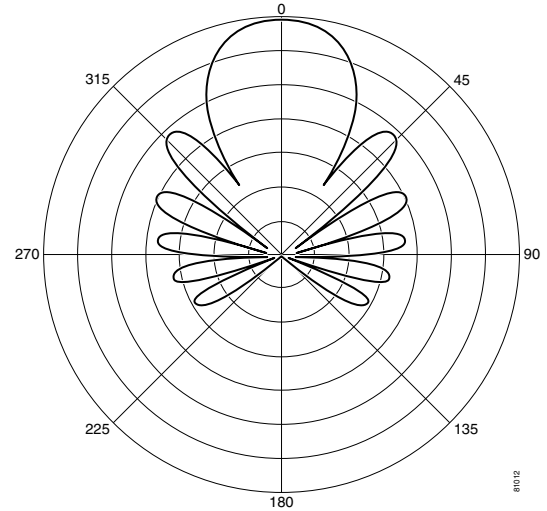
Antenna type	Yagi
Operating frequency range	2400 – 2484 MHz
Nominal input impedance	50 Ohms
1.5:1 VSWR bandwidth	2400 – 2485 MHz
Environment	Outdoor/indoor
Gain	13.5 dBi
Polarization	Vertical
H-Plane (3dB bandwidth)	30°
V-Plane (3dB bandwidth)	30°
Cable length and type	3 ft. (0.91 m) Plenum rated RG-58
Dimensions (H x W)	16.5 in. x 3 in. (41.9 cm x 7.6 cm)
Wind rating	125 MPH (201.2 KMH)

Azimuth Radiation Pattern

Elevation Radiation Pattern

System Requirements

This antenna is designed for use with Cisco Aironet access points and bridges but can be used with any 2.4-GHz Cisco Aironet radio device that uses a reverse-polarity threaded naval connector (RP-TNC).

Safety Precautions

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   **In order to comply with FCC radio frequency (RF) exposure limits, antennas should be located at a minimum of 7.9 inches (20 cm) or more from the body of all persons.** Statement 332

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 Notes

General Installation Instructions for Mast-Mounted Antennas

The following instructions are common to most mast-mounted installations.

Step 1 Assemble your new antenna on the ground at the installation site.

Step 2 Attach the antenna to the mast and connect its coaxial cable while you are on the ground.

Step 3 If you lose control of the mast while raising it, make sure that it does not fall in the wrong direction. Use a durable non-conductive rope secured at each 2-foot level as the mast is raised. Have an assistant tend the rope, ready to pull the mast clear of any hazards (such as power lines) if it begins to fall.

Step 4 Use the mounting bracket provided with the antenna.

Step 5 If the installation will use guy wires:

  a. Install guy anchor bolts.

  b. Estimate the length of guy wire and cut it before raising the mast.

  c. Attach guy wires to a mast using guy rings.

Step 6 Carefully connect the antenna and mast assembly to its mounting bracket and tighten the clamp bolts.

  a. For a guyed installation, you must have at least one assistant to hold the mast upright while you attach and tighten the guy wires to the anchor bolts.

Step 7 Attach the provided self-adhering DANGER label at eye level on the mast.

Step 8 Install ground rods to remove any static electricity buildup and connect a ground wire to the mast and ground rod. Use ground rods designed for that purpose, not a spare piece of pipe.

Grounding the Antenna

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

1. Use No. 10 AWG copper or No. 8 or larger copper-clad steel or bronze wire as ground wires for both mast and lead-in. Securely clamp the wire to the bottom of the mast.

2. Secure the lead-in wire to an antenna discharge unit and the mast ground wire to the building with stand-off insulators spaced from 4 ft (1.2 m) to 8 ft (2.4 m) apart.

3. Mount the antenna discharge unit as closely as possible to where the lead-in wire enters the building.

4. Drill a hole in the building's wall as closely 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 any obstructions or other hazards.

5. Pull the cable through the hole and form a drip loop close to where it enters the building.

6. Thoroughly waterproof the lead-in area.

7. Install a lightning arrestor.

8. Connect the lead-in cable to the equipment.

Choosing a Mounting Location

The antenna is designed to create a directional broadcast pattern. To achieve this pattern, the antenna should be mounted clear of any obstructions to the sides of the radiating element. If the mounting location is on the side of a building or tower, the antenna pattern is degraded on the building or tower side.

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.

Step 1 Measure the height of your antenna.

Step 2 Add this length to the length of your tower or mast and then double this total for the minimum recommended safe distance.

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

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 direct as possible.

Tools and Equipment Required

A mast mounting installation kit is shipped with the antenna. To install the antenna on a mast, you need the following tools and equipment.

- A 7/16-in. (11.1 mm) wrench

- Cable ties or electrical tape

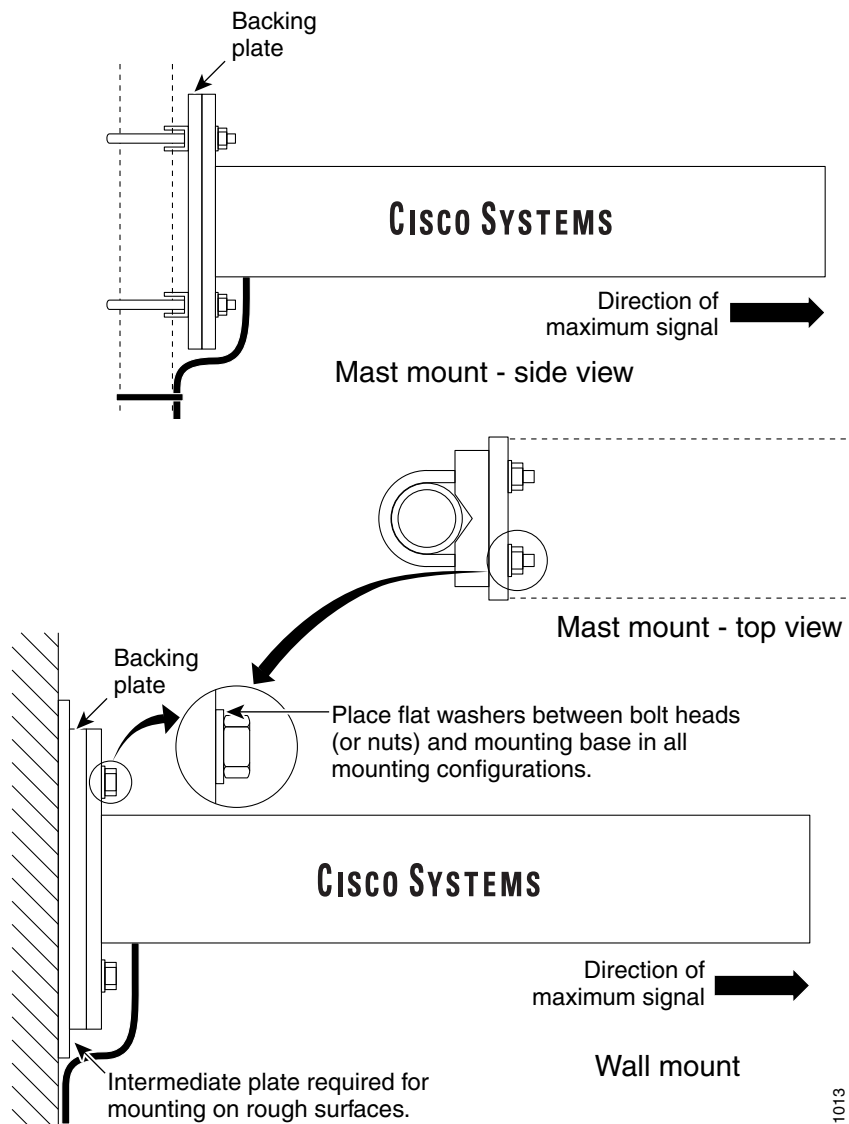- Coaxial cable weatherproofing material (such as CoaxSeal)

Cisco Aironet 13.5-dBi Yagi Mast Mount Antenna (AIR-ANT1949) ■

> ✎
>
> **Note** The antenna can also be mounted on a wall or other flat vertical surface. Mounting hardware is not provided.

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

Mounting the Antenna

The antenna is provided with a mast mounting kit that allows you to mount the antenna to masts up to 1 5/8 in. in diameter. Figure 1 shows how the antenna should be mounted to a mast or wall.

Figure 1   Antenna Mounting

Follow these instructions to mount the antenna on a mast.

Step 1 Attach the U-bolts, clamps, and backing plate to the antenna as shown in Figure 1.

Step 2 Install a washer and start a locknut on each U-bolt.

Step 3 Position the loose mounting assembly over the mast.

> ✎
> **Note** To ensure correct antenna polarization orientation, make sure the arrows on the antenna are pointed up.

Step 4 Use a 7/16-in (11.1-mm) wrench or suitable adjustable wrench to secure the assembly to the mast. Tighten the locknuts to a point where the antenna does not slide down the mast but is loose enough for you to rotate.

Step 5 Rotate the antenna until it points towards the other WLAN antenna your wireless device is to communicate with.

> ✎
> **Note** The accuracy of the orientation should be within 15 degrees to achieve maximum gain. This is especially important if the path length is over 1 mile (1.6 kilometers). If you use this antenna to connect to several terminals, aim it in the general direction of the group. If the paths are not obstructed or are less than 1 mile (1.6 kilometers), this arrangement should work well.

Step 6 Tighten the locknuts.

> ✎
> **Note** Tighten the locknuts evenly and do not exceed 45 in-lbs of torque on the locknuts.

Step 7 Secure the antenna cable to the mast with cable ties or electrical tape.

Step 8 Apply the danger label to a plainly visible area of the antenna support structure.

> ✎
> **Note** The antenna is **not** DC grounded. It is recommended that you install lightning-protection devices in your system. See the *Installation Instructions for Cisco Aironet Lightning Arrestors*. This document is available on the World Wide Web at the following URL:
>
> http://www.cisco.com/en/US/docs/wireless/lightning_arrestor/installation/guide/hslar.html

Suggested Cable

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

> ✎
> **Note** The higher the frequency, the greater the loss through the cable. Also, the longer the run, the greater the loss.

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 is **not** recommended for sealing outdoor connections.

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.

Subscribe to *What's New in Cisco Product Documentation*, which lists all new and revised Cisco technical documentation as an RSS feed and delivers content directly to your desktop using a reader application. The RSS feeds are a free service.