Cisco Aironet 2.4 GHz and 5 GHz Dual-Band Polarization-Diverse Directional Array Antenna (AIR-ANT2566D4M-R and AIR-ANT2566D4M-RS)

Last Updated: February 06, 2020

This document describes the Cisco Aironet 2.4 GHz and 5 GHz Dual-Band Polarization-Diverse Directional Array Antennas (AIR-ANT2566D4M-R and AIR-ANT2566D4M-RS), and provides electrical specifications and mounting instructions.

Both antennas are four-port polarization-diverse arrays that operate over the 2.4 GHz and 5 GHz Wi-Fi bands. They ship with an articulating mount for use on flat surfaces and masts, and are adjustable in both horizontal and vertical planes. The radome can be painted using commonly available non-conductive spray paints, such as Krylon or Rust-Oleum.

Both antennas are designed for use in indoor and outdoor environments with an approved Cisco Aironet or Catalyst series access point that requires four dual-band antennas. The AIR-ANT2566D4M-RS antenna includes circuitry to enable self-identification of the antenna by the Cisco Catalyst 91xx Series access points.

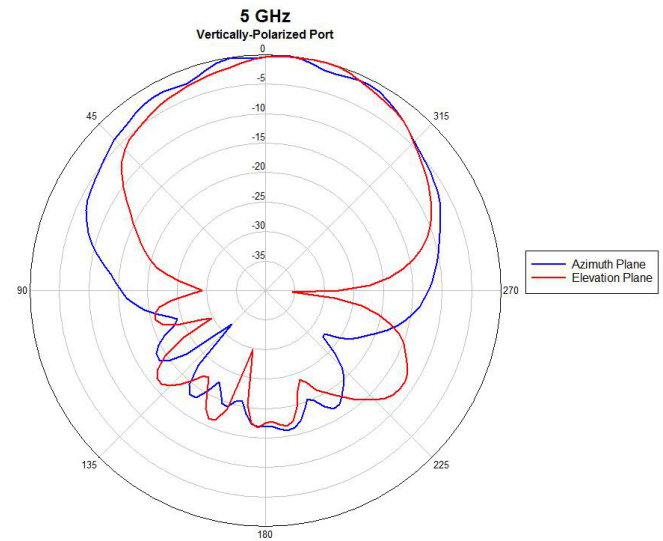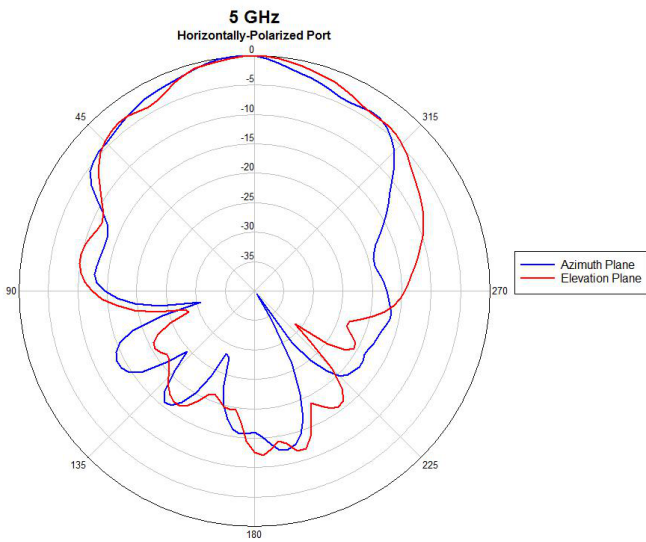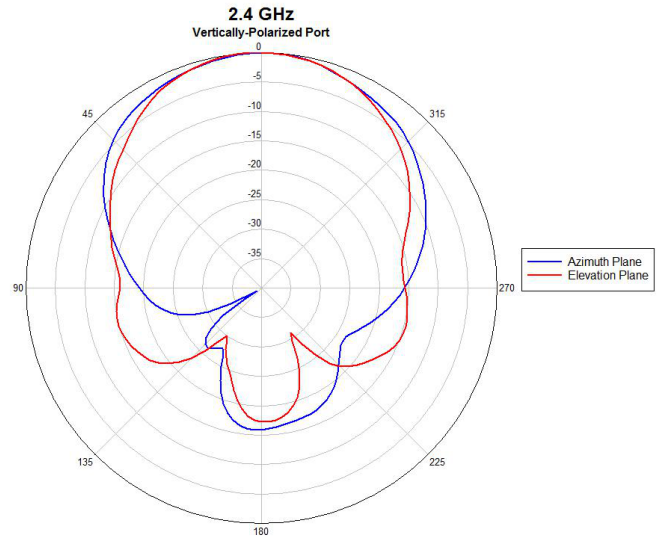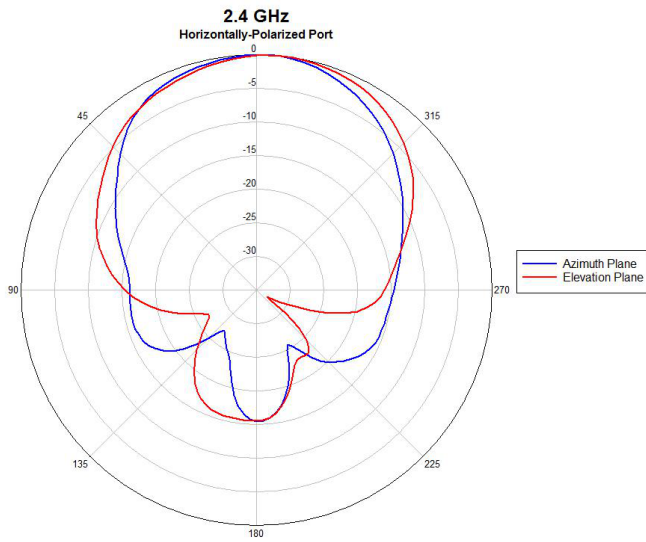The following information is provided in this document:

Cisco Systems, Inc.
www.cisco.com

Technical Specifications

Antenna Type	Dual-Band Polarization-Diverse Directional Array	
Operating Frequency Ranges	2.4–2.5 GHz	5.15–5.925 GHz
Nominal Input Impedance	50 Ohms	50 Ohms
Voltage Standing Wave Ratio (VSWR)	2:1	2:1
Peak Gain	6 dBi	6 dBi
Polarization (Ports A & C)	Vertical	Vertical
Polarization (Ports B & D)	Horizontal	Horizontal
Nominal Elevation Plane 3-dB Beamwidth	65°	60°
Nominal Azimuth Plane 3-dB Beamwidth	65°	55°
Front-to-Back Ratio	> 12 dB	> 20 dB
Port-to-Port Isolation	> 30 dB	> 30 dB
> or = to 30° Elevation Peak Gain	3 dBi	
Connector Type	RP-TNC (with coupling ring)	
Cable Length	3 ft	
Length	10 in. (25.4 cm)	
Width	10 in. (25.4 cm)	
Height	1.61 in. (4.1 cm)	
Weight	2.5 lbs. (1.13 kg)	
Water/Foreign Body Ingress	IP-67	
Operational Wind	100 MPH	
Operating Temperature Range	-40° C to 70° C	
Storage Temperature Range	-40° C to 85° C	

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Azimuth and Elevation Radiation Patterns

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Safety Precautions

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

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, read and follow these safety precautions. *They may save your life!*

- If you are installing an antenna for the first time, for your own safety as well as that of others, seek professional assistance. Your Cisco sales representative can explain which mounting method to use for the size and type of antenna you are about to install.

- Select your installation site with safety as well as performance in mind. Remember that electric power lines and phone lines look alike. For your safety, assume that any overhead line can kill you.

- Call your electric power company. Tell them your plans and ask them to come and look at your proposed installation. This is a small inconvenience considering your life is at stake.

- 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 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.

- When installing your antenna, remember:
  - *Do not* use a metal ladder.
  - *Do not* work on a wet or windy day.
  - *Do* dress properly—shoes with rubber soles and heels, rubber gloves, long sleeved shirt or jacket.

- 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 completes an electrical path through the antenna and the installer: *You!*

- 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.

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

For a listing of all the warning statements and their translations, see *Translated Safety Warnings for Cisco Aironet Access Points* at:

http://www.cisco.com/c/en/us/td/docs/wireless/access_point/warnings/reference/guide/ap_warn1.html

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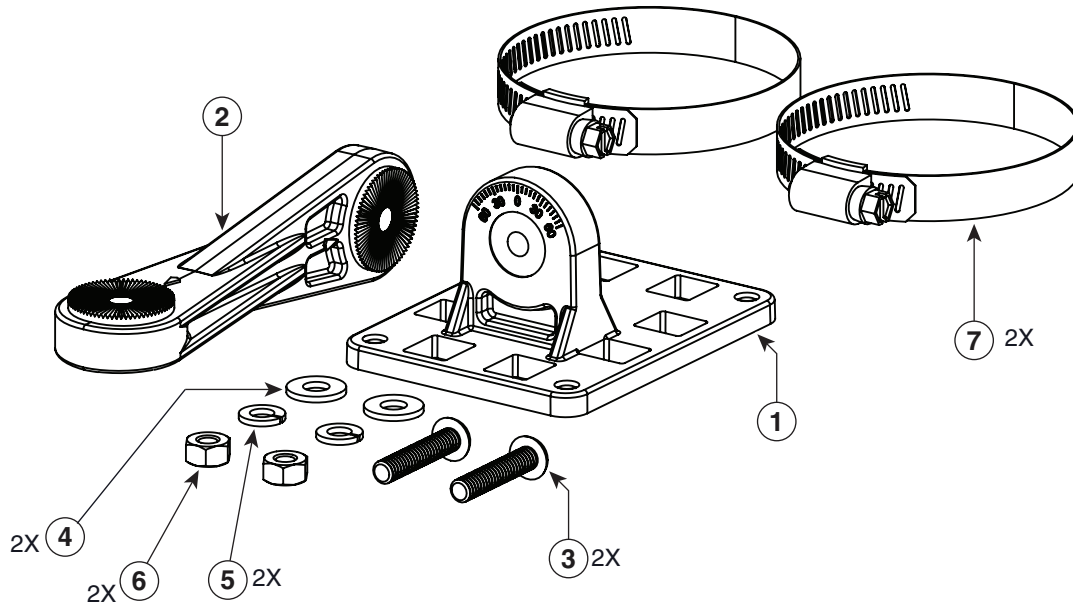
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Installation Notes

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

- Install the antenna vertically and mount it with the cables pointing 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 can pass through and still maintain adequate signal strength. Consider the following before choosing the location for your antenna:

  - Signals penetrate paper and vinyl walls with little change to signal strength.

  - Signals penetrate only one or two solid and precast concrete walls without degrading signal strength.

  - Signals penetrate three or four concrete and wood block walls without degrading signal strength.

  - Signals penetrate five or six walls constructed of drywall or wood without degrading signal strength.

  - Signals are likely to reflect off a thick metal wall and may not penetrate it at all.

  - Signals are likely to reflect off a chain link fence or wire mesh spaced between 1 and 1 1/2 inch. (2.5 and 3.8 cm). The fence acts as a harmonic reflector that blocks the 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.

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Contents of the Antenna and Bracket Kit

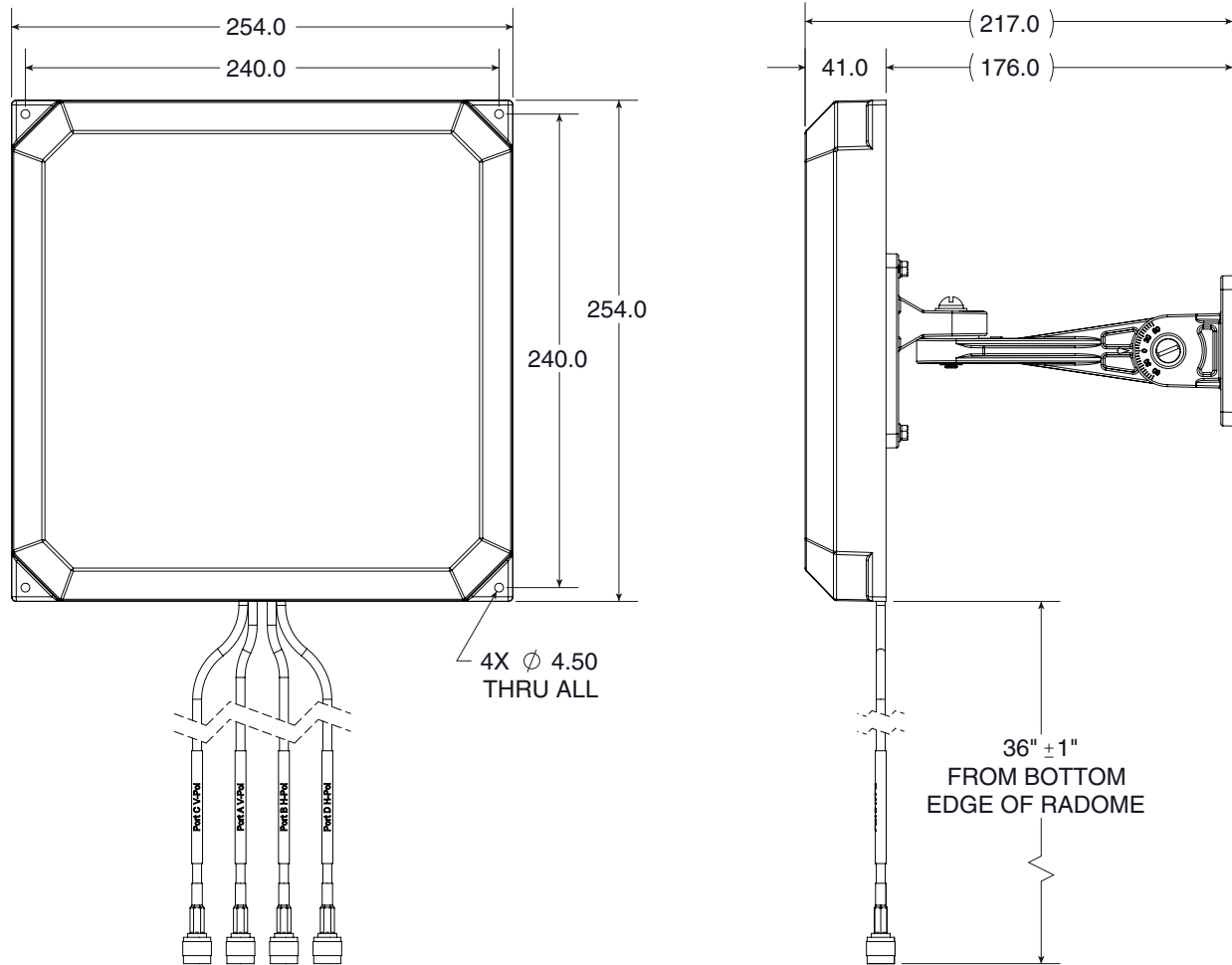*Figure 1*   *Contents of the Antenna Bracket Kit*

1	One of two articulating mount flanges required for the installation. The other flange comes attached to the back of the antenna.	5	1/4-inch split-lock washers. Two are included in the kit.
2	Articulating mount arm.	6	1/4-20 Hex nuts. Two are included in the kit.
3	1/4 20 x 1.25-inch stainless steel screws. Two are included in the kit.	7	one of two worm-gear type hose clamps. Each has a range of 50–135mm
4	1/4 inch flat washers. Two are included in the kit.		

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Dimensions of the Antenna and Brackets

The dimensions noted in the following illustrations are all in mm, unless noted otherwise.

Figure 2   *Dimensions of the Antenna with Brackets and Cables*

254.0

240.0

254.0

240.0

4X ⌀ 4.50
THRU ALL

Port C V-Pol Port A V-Pol Port B H-Pol Port D H-Pol

217.0

41.0

176.0

36" ± 1"
FROM BOTTOM
EDGE OF RADOME

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Figure 3   *Locations of Screw Holes and Pressure Vent at the Back of the Antenna*

62.0

83.1

4X M4x0.7 THREADED
INSERT

PRESSURE RELEASE
VENT

353894

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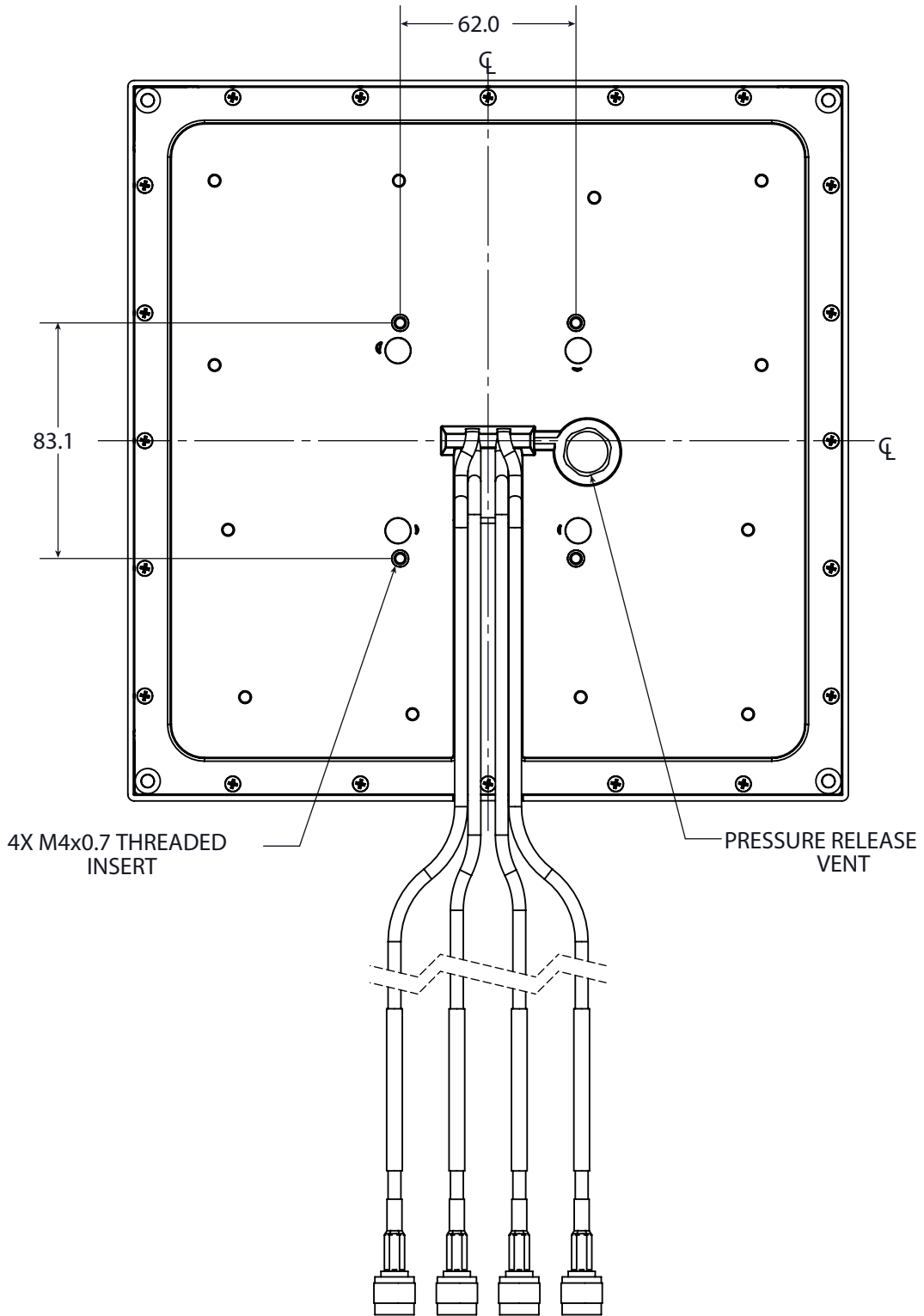
Figure 4   *Locations of the Screw Holes on the Articulating Mount Flange*

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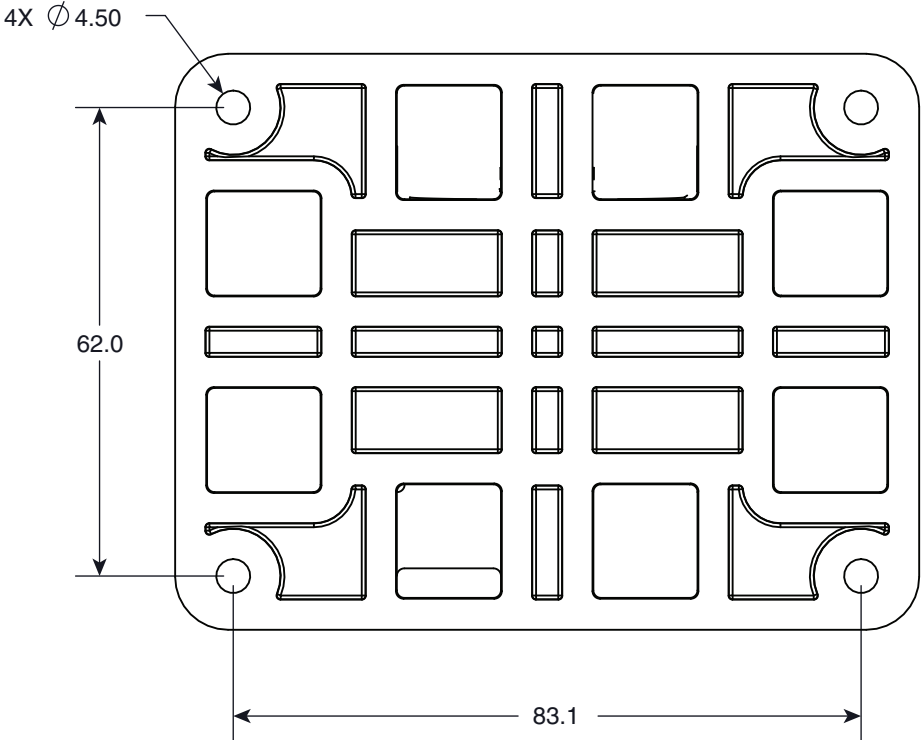
Installing the Antenna

You can install the antenna on a wall or ceiling (must be a flat surface), or on a pole with a minimum diameter of 2 inches (5.08 cm) and a maximum diameter of 5 inches (12.7 cm). The antenna and one mounting flange are connected together when shipped.

To install the antenna:

Step 1   Decide on a mounting location. See the "Deciding on a Mounting Location" section on page 10.

Step 2   Ensure that you have the requisite tools and fasteners ready. See the "Tools and Equipment Required" section on page 11.

Step 3   Proceed with mounting the antenna. When mounting the antenna, assemble the bracket hardware, connect the antenna and bracket to the mounting surface, and adjust the antenna orientation.

The mounting options available are:

a.   Mounting on a Wall or Ceiling, page 12.

b.   Mounting on a Pole or Mast, page 17.

c.   Flush Mounting on a Wall Without Mount Brackets, page 19.

Step 4   (Optional) Paint the antenna. See the "Painting the Antenna" section on page 21.

Deciding on a Mounting Location

The antenna should be mounted clear of any obstructions to the side or front of the enclosure, which contains the radiating elements. Keep in mind that this antenna should be aimed at the intended coverage area. Therefore, you should mount the antenna such that the desired mechanical tilt is achieved. If possible, mount the antenna near the access point so that you can use the shortest possible connecting cables.

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Caution   For outdoor installations, install the antenna with cables exiting downward. This will help prevent water from accumulating around the cable exit points.

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Tools and Equipment Required

⚠️
Warning   **The fasteners and the mounting surface should be capable of maintaining a minimum pullout force of 150 pounds (68 kg) to support the weight of the antenna and bracket along with the potential wind loading on the antenna.**

⚠️
Warning   **The pole or mast must be rigid enough to hold the weight of the antenna along with the associated forces produced by wind loads. Also, the pole or mast must be structurally strong enough to withstand the clamping force of the hose clamps.**

Before you start with mounting the antenna, go through the mounting procedure for each kind of installation and ensure that you have all tools and fasteners mentioned therein ready. The following is a general list of fasteners and tools which are not included in the antenna and brackets kit.

- To loosen and tighten the adjustment bolts on the brackets, you need a flat-blade screwdriver.
- To mount the antenna on a wall or ceiling, you need four mounting 4 mm or #8 screws or bolts and wall anchors.
- To mount the antenna on a pole or mast, you will need either or both of these supplies:
    - Slotted screwdriver to tighten the screws on the hose clamps
    - A 5/16 inch (8mm) socket or box wrench
- You may also need the following tools and equipment, which are not provided as part of the kit:
    - A drill and drill bit
    - A pencil
    - A small mallet or hammer, to hammer
    - A Phillips screwdriver

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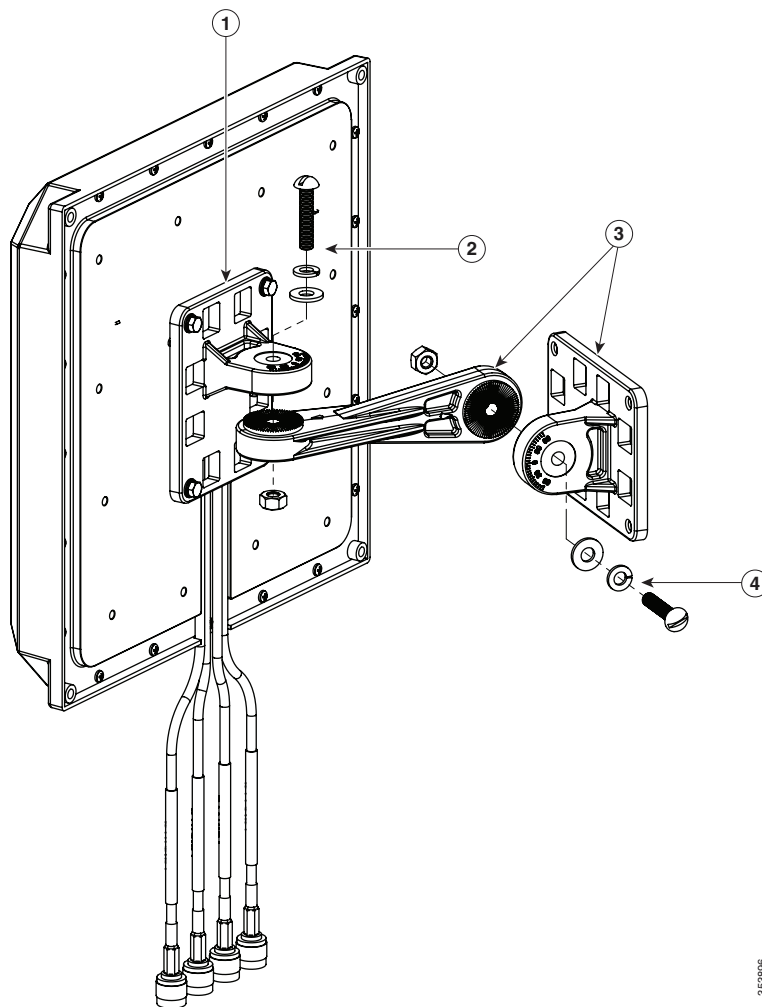
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Mounting on a Wall or Ceiling

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Note   The fasteners and mounting surface should be capable of maintaining a minimum pullout force of 150 pounds (68 kg) to support the weight of the antenna along with the potential wind loading on the antenna.

Step 1   Determine the mounting location for the antenna.

Step 2   Attach the free articulating mount flange to the wall or ceiling using four 4 mm or #8 screws and fasteners, through the holes on the bracket.

One of the two required articulating mount flange brackets come attached to the back of the antenna (see Figure 1). The other flange bracket, included in the kit, is the one used in this step.

Step 3   Assemble the bracket hardware, as shown in Figure 5. Use a flat blade screwdriver to tighten the 1/4 20 x 1.25" screws on the brackets.

Step 4   Orient the antenna correctly (note the arrow on the back of the antenna that indicates the top of the antenna). Use a flat-blade screwdriver to loosen or tighten the fasteners at the azimuth and elevation-adjustment pivots.

Step 5   Adjust the azimuth (side-to-side position) and elevation (up-and-down position) of the antenna. Loosen the adjustment pivot bolts slightly to allow for adjustment.

The azimuth angle can be adjusted ±90 degrees (Figure 7) and elevation can be adjusted ±55 degrees (Figure 8).

Use the azimuth and elevation markings on the articulating mounting arm and the flange brackets as a guide. See Figure 6.

Step 6   After adjusting the antenna position, tighten the pivot bolts. Tighten all the bolts to not more than 30 lbf.in. (3.4 Nm).

Step 7   Connect the antenna cables to the access point. The antenna ports are labeled A through D. Connect the antenna port A to connector A on the access point, antenna port B to connector B on the access point, and so on.

For the recommended cable type, see the "Recommended Cable" section on page 21.

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Figure 5   *Exploded View of Antenna and Bracket Hardware Assembly*

1	The articulating mount flange bracket that comes attached to the back of the antenna.	3	The end of the articulating mount arm, which attaches to the flange bracket fixed to the wall or ceiling.
2	The azimuth adjustment pivot. Here, a 1/4 20 x 1.25-inch stainless steel screw, a 1/4-inch split-lock washer, a 1/4-inch flat washer, and a 1/4-20 Hex nut (in that order) fasten the articulating mount arm to the flange bracket at the back of the antenna.	4	The elevation adjustment pivot. Here, a 1/4 20 x 1.25-inch stainless steel screw, a 1/4-inch split-lock washer, a 1/4-inch flat washer, and a 1/4-20 Hex nut (in that order) fasten the articulating mount arm to the flange bracket fixed to the wall or ceiling.

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Figure 6 *Close-Up View of the Azimuth and Elevation-Adjustment Pivots*

ANGULAR MARKINGS
EVERY 5°, LABELS AT
30° & 60°

ANGULAR DETENTS
EVERY 5 °

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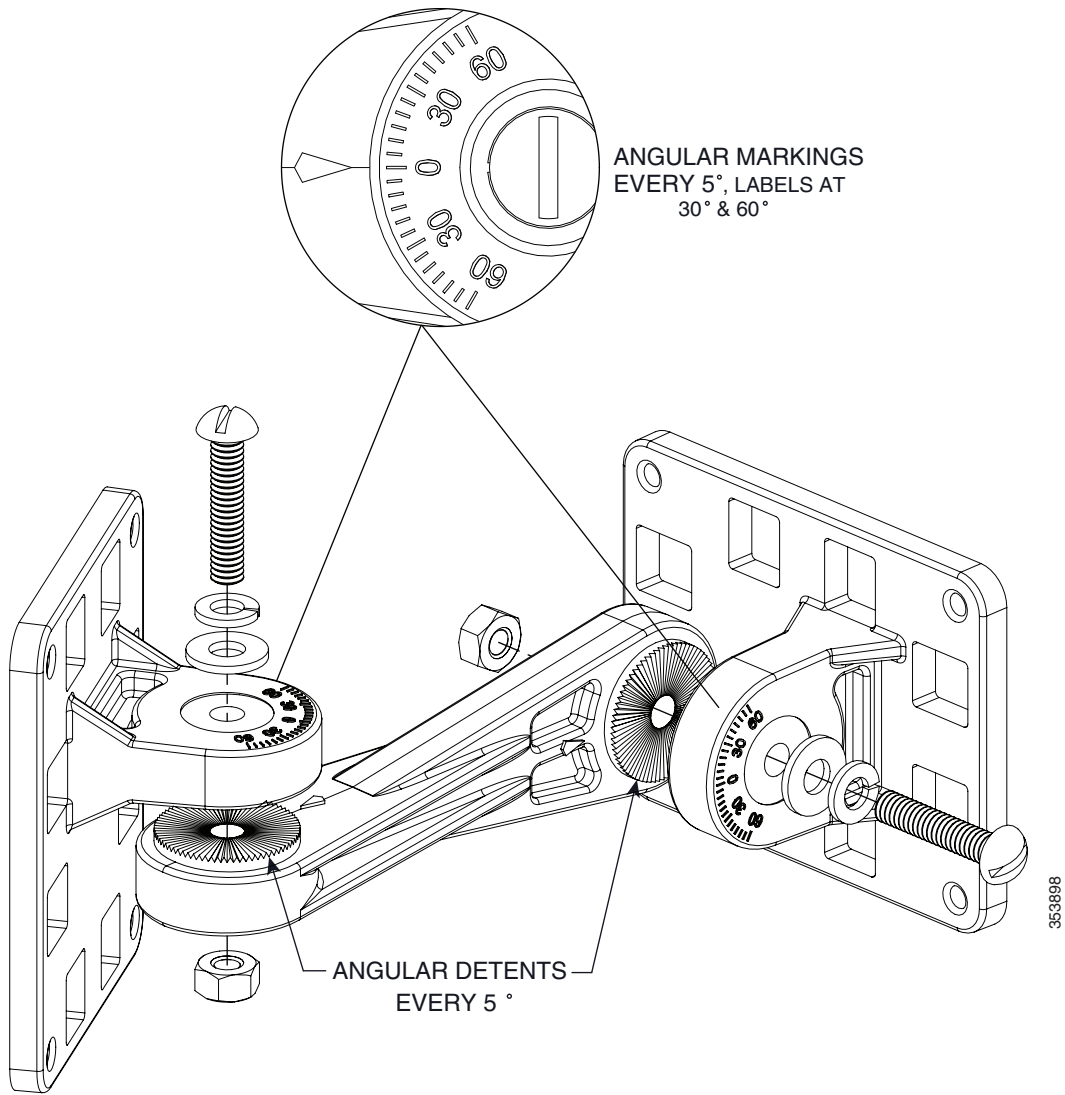
Figure 7   *Azimuth Adjustment*

± 90°
ADJUSTMENT

AZIMUTH ADJUSTMENT

MAST

353901

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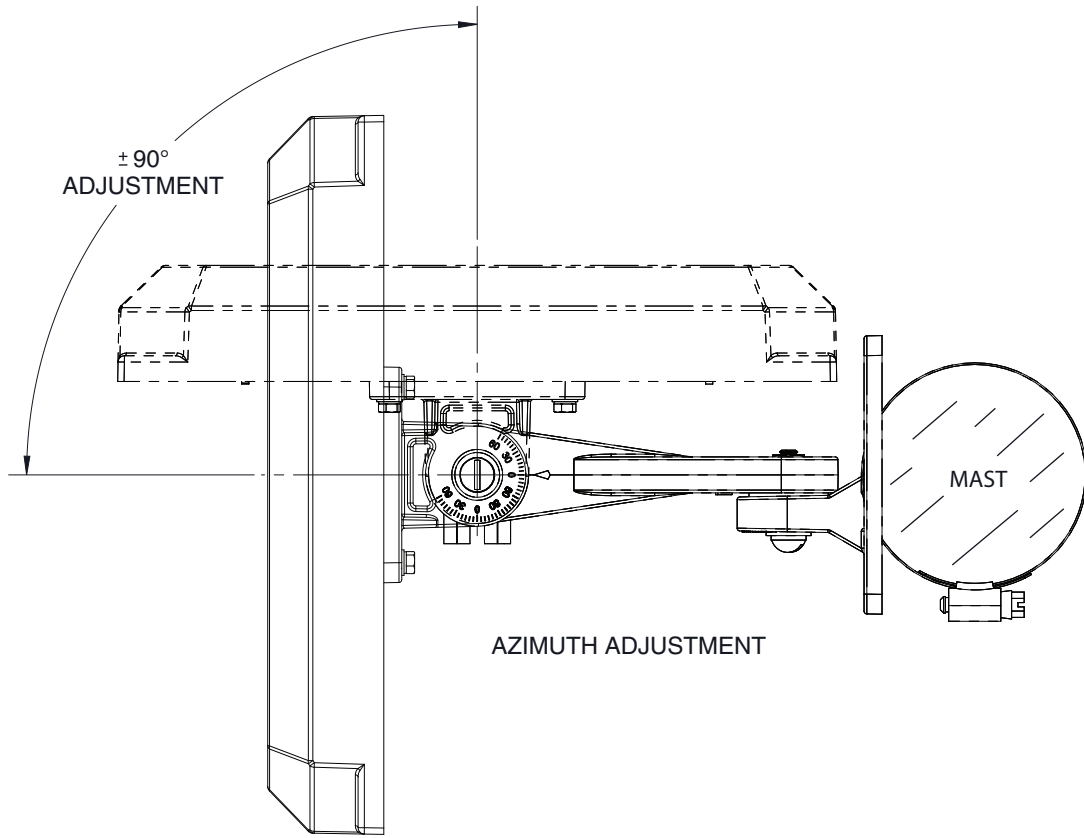
Figure 8   *Elevation Adjustment*

±55°
ADJUSTMENT

MAST

ELEVATION ADJUSTMENT

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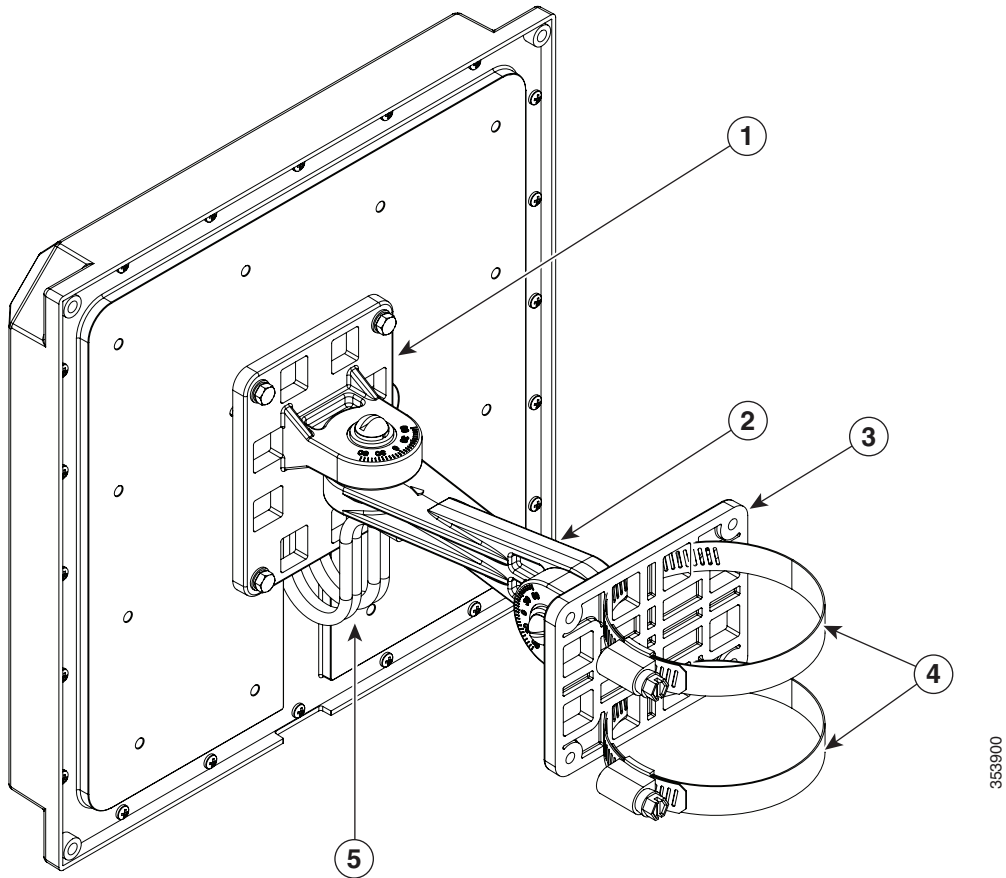**16**
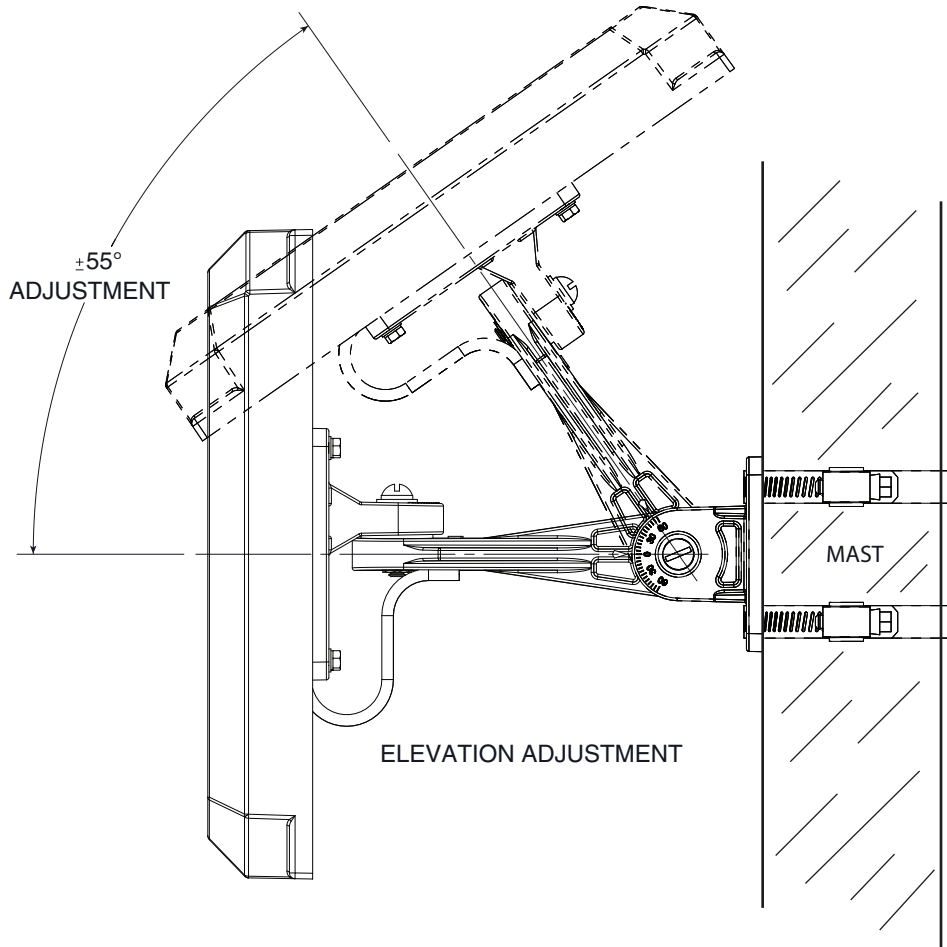
Mounting on a Pole or Mast

> **Note** The pole or mast must be rigid enough to hold the weight of an antenna along with the associated forces produced by wind loads. In addition, the mast must be structurally strong enough to withstand the clamping force of the hose clamps.

Step 1 Determine the mounting location for the antenna on the pole or mast.

Step 2 Position and mount the mounting flange bracket on to the pole or mast using the hose clamps provided in the kit. The hose clamps should pass through the slots on the free mounting flange bracket.

One of the two required articulating mount flange brackets come attached to the back of the antenna (see Figure 1). The other flange bracket, included in the kit, is the one used in this step.

Step 3 Tighten the hose clamps only to the extent that they can hold the flange bracket and the antenna in place until the antenna is positioned at its final position. Use a slotted screwdriver to tighten the screws on the hose clamps.

Step 4 Assemble the antenna and bracket to the flange bracket. See Figure 5.

Step 5 Position the antenna, mounting bracket, and hose clamps on the mast. See Figure 9 for reference.

Step 6 Tighten the hose clamps until the antenna is fully secure on the mast. Ensure that the antenna cannot rotate about the mast.

Step 7 After the antenna is secured on the mast, adjust the azimuth (side-to-side position) and elevation (up-and-down position) of the antenna. Loosen the adjustment pivot bolts slightly to allow for adjustment.

Azimuth angle can be adjusted ±90 degrees (Figure 7) and elevation can be adjusted ±55 degrees (Figure 8).

You can use the azimuth and elevation markings on the articulating mounting arm and the flange brackets as a guide. See Figure 6.

Step 8 After you adjust the antenna position, tighten the adjustment bolts. Tighten all the bolts to not more than 30 lbf.in. (3.4 Nm).

Step 9 Connect the antenna cables to the access point. The antenna ports are labeled A through D. Connect the antenna port A to connector A on the access point, antenna port B to connector B on the access point, and so on.

For the recommended cable type, see the "Recommended Cable" section on page 21.

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Figure 9   *Antenna Bracket Hose Clamp Assembly for Pole Mounting*

1	Articulating mount flange attached to the back of the antenna.	4	Worm-gear-type hose clamp (50–135mm) for mounting the assembly on a pole or mast.
2	Articulating mount arm.	5	Cables connecting the antenna to an access point.
3	Articulating mount flange that is fastened to the pole or mast using hose clamps.		

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Flush Mounting on a Wall Without Mount Brackets

You can flush mount the antenna on a wall. For this, you will need to discard the articulating mount flange brackets from the installation.
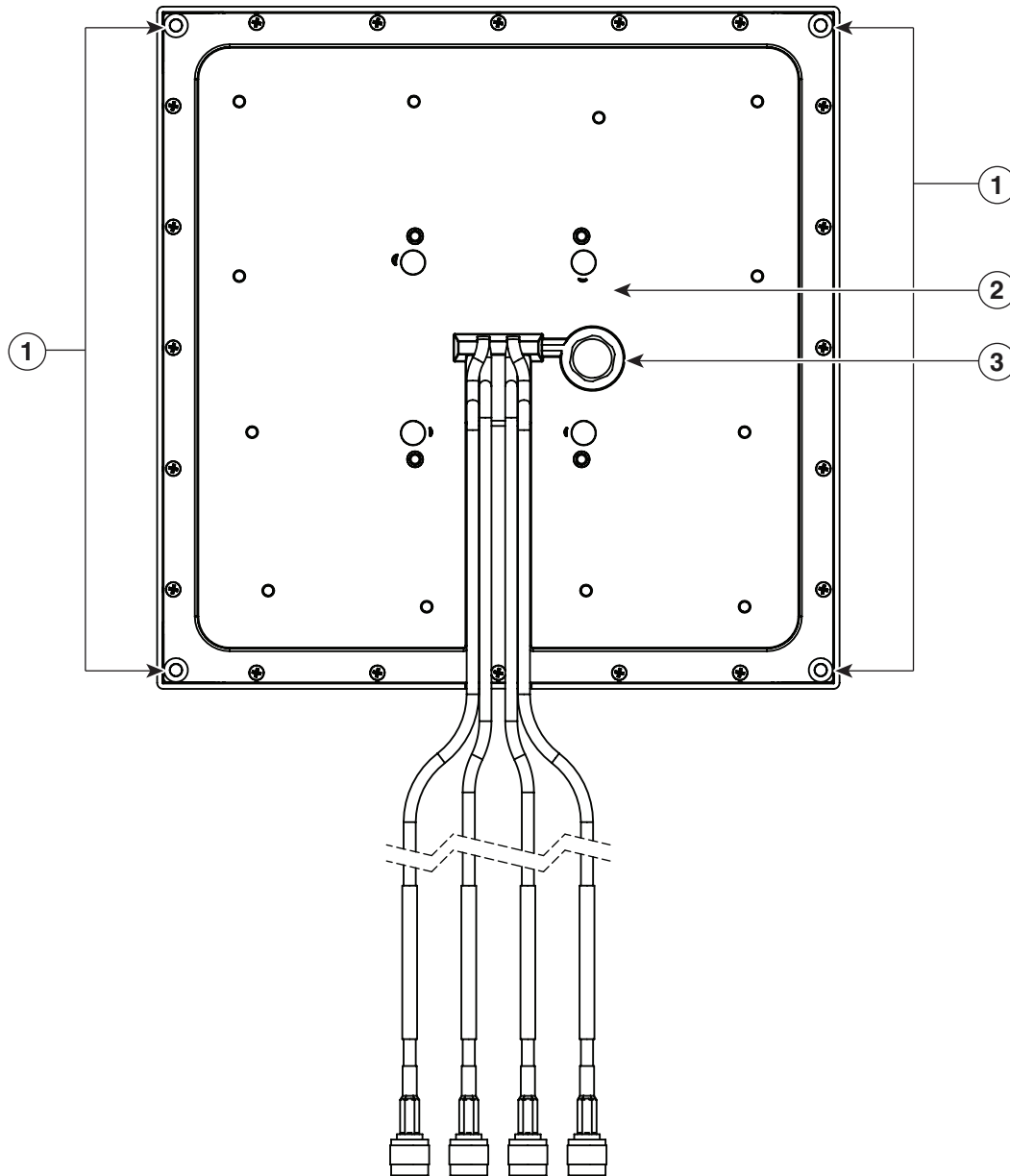
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Note   The following procedure describes how to mount the antenna on a drywall. If you intend to install your antenna on another surface other than a drywall, the following procedure may vary slightly and you should procure the necessary hardware.

Step 1   Remove the articulating mount flange bracket that comes attached to the back of the antenna.

Step 2   Determine the location where you will mount the antenna.

Step 3   Use the antenna as a template to mark the location of the four mounting holes. See Figure 10 for the locations of the holes.

Step 4   Using a drill and #29 drill bit, drill four holes at the locations you have marked in Step 3. For drywall installations a #29 (0.136 inch or 45 mm) drill bit is enough. Other surfaces may require a different size.

Step 5   Insert 8-inch plastic wall anchors into each hole.

Step 6   Using a mallet or small hammer, properly seat the plastic anchors into the wall.

Step 7   Align the antenna's mounting holes with the anchors.

Step 8   Insert an 8 x 1¼-inch screw, through each mounting hole and into its anchor.

Step 9   Tighten the screws using a Phillips screwdriver. Do not overtighten.

Step 10   Connect the antenna cables to the access point. The antenna ports are labeled A through D. Connect the antenna port A to connector A on the access point, antenna port B to connector B on the access point, and so on.

For the recommended cable type, see the "Recommended Cable" section on page 21.

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Figure 10   *Back of the Antenna with Flush Mounting Screw-Holes Locations*

1	Screw holes for flush mounting on a wall. Each hole takes an 8 x 1¼-inch screw. See Figure 2 for the distances between these holes.	3	Pressure release vent.
2	Spot where the preinstalled articulating flange mount was removed from.		

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Connecting the Antenna to the Access Point

The AIR-ANT2566D4M-R has four cables with orange labels. The four cables can be connected to any of the four ports on the access point.

The AIR-ANT2566D4M-RS includes circuitry to enable self-identification of the antenna by the Cisco Catalyst 91xx Series access points. The antenna has three cables with orange labels and one cable with a purple label. The self identifying function is indicated by the purple label on this cable. Ensure that this antenna cable is connected to Port A on the AP, which is also designated by purple text around the RP-TNC connector. The AIR-ANT2566D4M-RS antenna has a built-in EEPROM that can be read by the AP to automatically configure the antenna type and gain in the wireless controller.

Recommended Cable

This antenna comes with four 3-ft long cables with RP-TNC connectors. If you need a longer cable reach, use AIR-CAB005LL-R= to extend the length by an additional 5 feet.

Note   A 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 cable, the greater the loss).

Painting the Antenna

Painting the antenna and the bracket does not affect its performance if you use standard exterior-grade, oil-based, or latex paint. Do not use metallic or metallic-flake paints, which will degrade antenna performance.

Note   Before painting the antenna, cover the pressure-release vent on the rear, lower-left of the antenna with masking tape to prevent clogging. Ensure that you remove the tape afterwards.

We recommend that you use Krylon Fusion for Plastic or Rust-Oleum for Plastic (which might require a primer coat). For best results, follow the surface preparation suggestions from the paint manufacturer.

Communications, Services, and Additional Information

- To receive timely, relevant information from Cisco, sign up at Cisco Profile Manager.
- To get the business impact you're looking for with the technologies that matter, visit Cisco Services.
- To submit a service request, visit Cisco Support.
- To discover and browse secure, validated enterprise-class apps, products, solutions and services, visit Cisco Marketplace.
- To obtain general networking, training, and certification titles, visit Cisco Press.
- To find warranty information for a specific product or product family, access Cisco Warranty Finder.

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Cisco Bug Search Tool

Cisco Bug Search Tool (BST) is a web-based tool that acts as a gateway to the Cisco bug tracking system that maintains a comprehensive list of defects and vulnerabilities in Cisco products and software. BST provides you with detailed defect information about your products and software.

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