



Cisco Multiband Panel Outdoor 4G MIMO Antenna (ANT-4G-PNL-OUT-N)

This chapter describes the technical specifications and installation instructions for the Cisco Multiband Panel Outdoor 4G MIMO antenna, hereafter referred to as *the antenna*. The antenna is a dual-port antenna designed to cover cellular 4G bands. The supported bands are:

- LTE700/Cellular/PCS/AWS/MDS
- global GSM900/GSM1800/UMTS/LTE2600
- WiMAX 2300/2500

The antenna supports the following Cisco Connected Grid and IR800 Industrial Integrated Services routers:

- CGR 1120
- CGR 1240
- CGR 1240
- IR809
- IR829



Caution Read the information in “[Safety Precautions](#)” section on [page 6-20](#) before installing or replacing antennas.

The topics included are:

- [Antenna Overview, page 6-2](#)
- [Technical Specifications, page 6-3](#)
- [Installing the Antenna, page 6-18](#)
- [Obtaining Documentation and Submitting a Service Request, page 6-22](#)

Antenna Overview

- [Antenna Features, page 6-2](#)
- [Antenna Model, page 6-2](#)
- [Antenna Assembly, page 6-2](#)

Antenna Features

The antenna features:

- 3G, 4G, and WiMAX 2300/2500 operation
- 698–960, 1710–2700 MHz band support
- 4G directional panel, dual-polarized/MIMO
- Indoor or outdoor location
- Wall mount or mast mount installation
- Dual type N female connector

Antenna Model

Table 6-1 Cisco Multiband Panel Outdoor 4G MIMO antenna

Antenna Model	Description
ANT-4G-PNL-OUT-N	Cisco Multiband Panel Outdoor 4G MIMO antenna

Antenna Assembly

Figure 6-1 Cisco ANT-4G-PNL-OUT-N Antenna



Technical Specifications

- [Radio Frequency Specifications, page 6-3](#)
- [Antenna Radiation Patterns, page 6-3](#)
- [Environmental Specifications, page 6-17](#)
- [Mechanical Specifications, page 6-18](#)
- [Power Specifications, page 6-18](#)

Radio Frequency Specifications

Table 6-2 *Antenna Radio Frequency Specification*

Specification	Description
Antenna type	4G directional panel, dual-polarized/MIMO
Frequency	• 698 to 960MHz • 1710 to 2700 MHz
Nominal impedance	50 ohms
VSWR	2.0:1 Maximum
Gain	The gain values (dBi) for each frequency range are: • 698 to 960 MHz—8.0 to 10.0 dBi • 1710 to 2170 MHz—6.0 to 8.5 dBi • 2200 to 2400 MHz—6.5 to 9.5 dBi • 2500 to 2700 MHz—8.5 to 9.5 dBi
3 dB beamwidth (vertical plane)	• 55 to 70 degrees—698 to 960 MHz • 53 to 98 degrees—1710 to 2200 MHz • 60 to 70 degrees—2200 to 2500 MHz • 55 to 70 degrees—2500 to 2700 MHz
3 dB beamwidth (horizontal plane)	• 55 to 70 degrees—698 to 960 MHz • 50 to 90 degrees—1710 to 2200 MHz
F/B ratio	• > 15 dB, typical 20 dB—698 to 960 MHz • > 17 dB, typical 23 dB—1700 to 2700 MHz
Isolation	• > 30 dB
Polarization	Slant +/- 45 degrees
Radiation Pattern	Directional

Antenna Radiation Patterns

- [698 MHz Antenna Radiation Pattern, page 6-4](#)

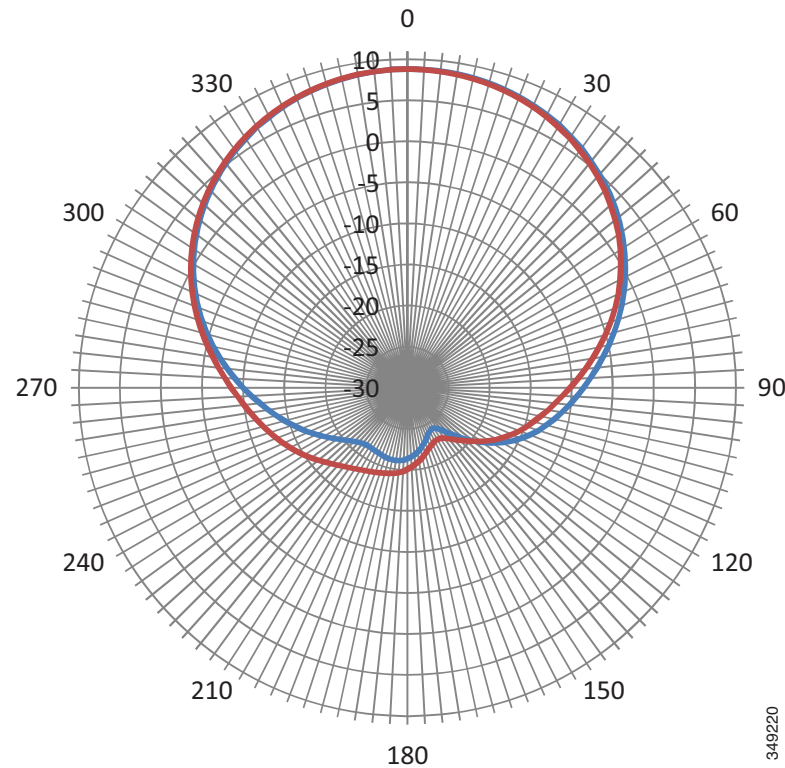
- [880 MHz Antenna Radiation Pattern, page 6-6](#)
- [960 MHz Antenna Radiation Pattern, page 6-8](#)
- [1710 MHz Antenna Radiation Pattern, page 6-10](#)
- [1950 MHz Antenna Radiation Pattern, page 6-12](#)
- [2170 MHz Antenna Radiation Pattern, page 6-14](#)
- [2700 MHz Antenna Radiation Pattern, page 6-16](#)

698 MHz Antenna Radiation Pattern

- [698 MHz Antenna Radiation Pattern—Horizontal Plane, page 6-4](#)
- [698 MHz Antenna Radiation Pattern—Vertical Plane, page 6-5](#)

698 MHz Antenna Radiation Pattern—Horizontal Plane

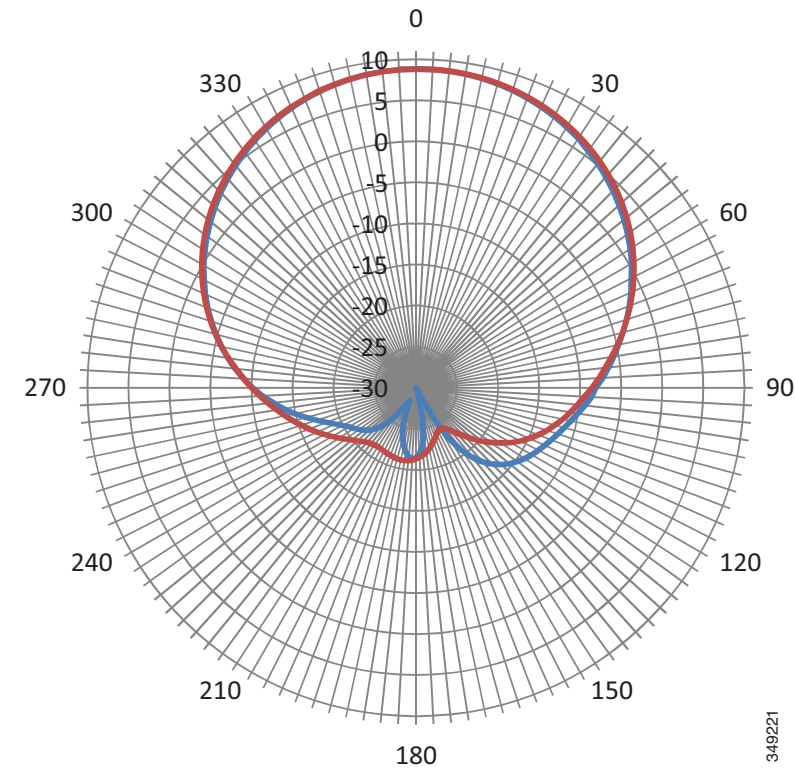
Figure 6-2 698 MHz Antenna Radiation Pattern—Horizontal Plane



Line Color	Description
Blue (—)	Port 1
Red (—)	Port 2

698 MHz Antenna Radiation Pattern—Vertical Plane

Figure 6-3 698 MHz Antenna Radiation Pattern—Vertical Plane



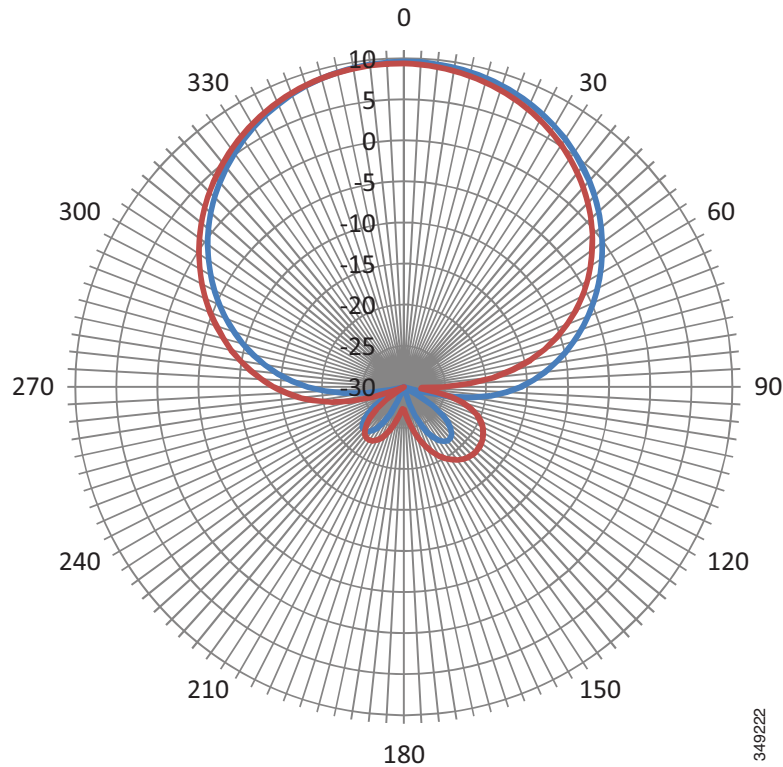
Line Color	Description
Blue (—)	Port 1
Red (—)	Port 2

880 MHz Antenna Radiation Pattern

- [880MHz Antenna Radiation Pattern—Horizontal Plane, page 6-6](#)
- [880MHz Antenna Radiation Pattern—Vertical Plane, page 6-7](#)

880MHz Antenna Radiation Pattern—Horizontal Plane

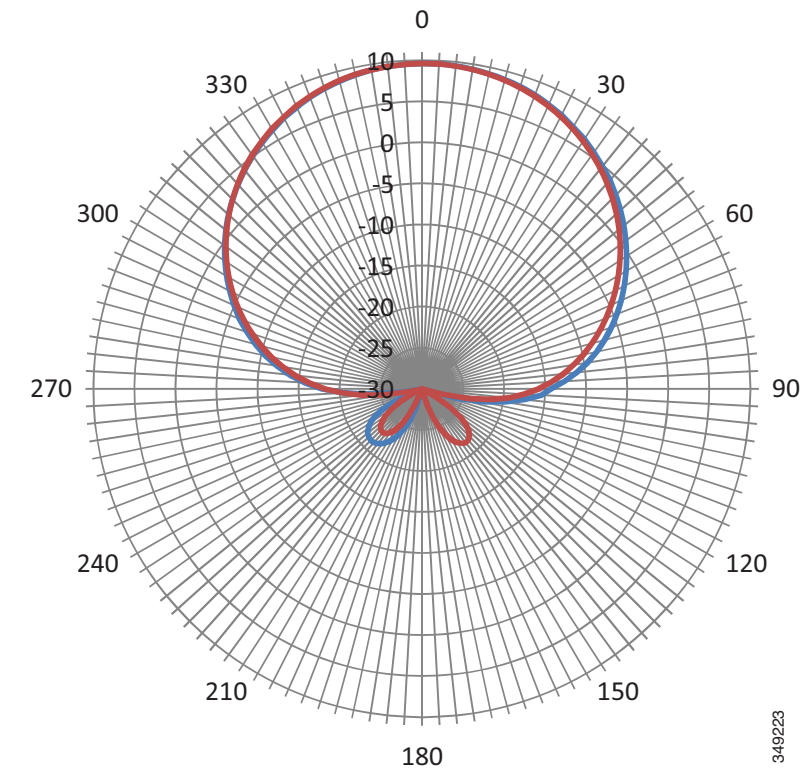
Figure 6-4 880 MHz Antenna Radiation Pattern—Horizontal Plane



Line Color	Description
Blue (—)	Port 1
Red (—)	Port 2

880MHz Antenna Radiation Pattern—Vertical Plane

Figure 6-5 880 MHz Antenna Radiation Pattern—Vertical Plane



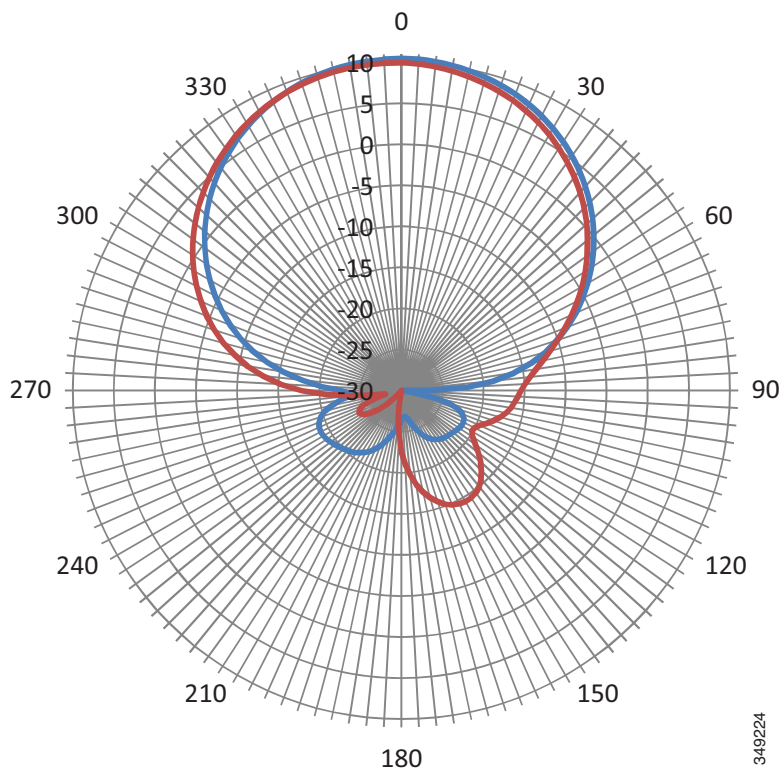
Line Color	Description
Blue (—)	Port 1
Red (—)	Port 2

960 MHz Antenna Radiation Pattern

- [960 MHz Antenna Radiation Pattern—Horizontal Plane, page 6-8](#)
- [960 MHz Antenna Radiation Pattern—Vertical Plane, page 6-9](#)

960 MHz Antenna Radiation Pattern—Horizontal Plane

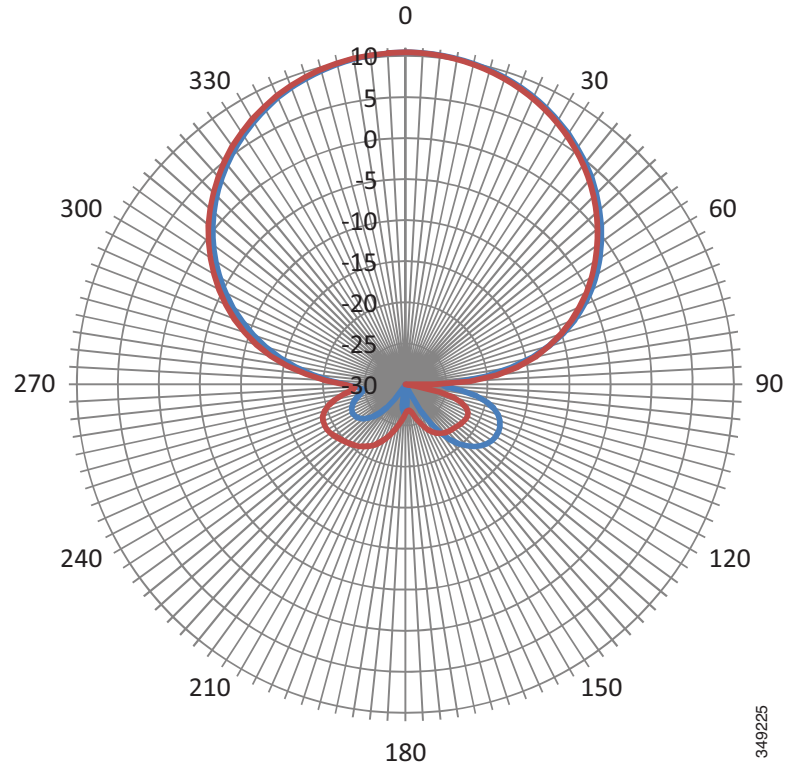
Figure 6-6 960 MHz Antenna Radiation Pattern—Horizontal Plane



Line Color	Description
Blue (—)	Port 1
Red (—)	Port 2

960 MHz Antenna Radiation Pattern—Vertical Plane

Figure 6-7 960 MHz Antenna Radiation Pattern—Vertical Plane



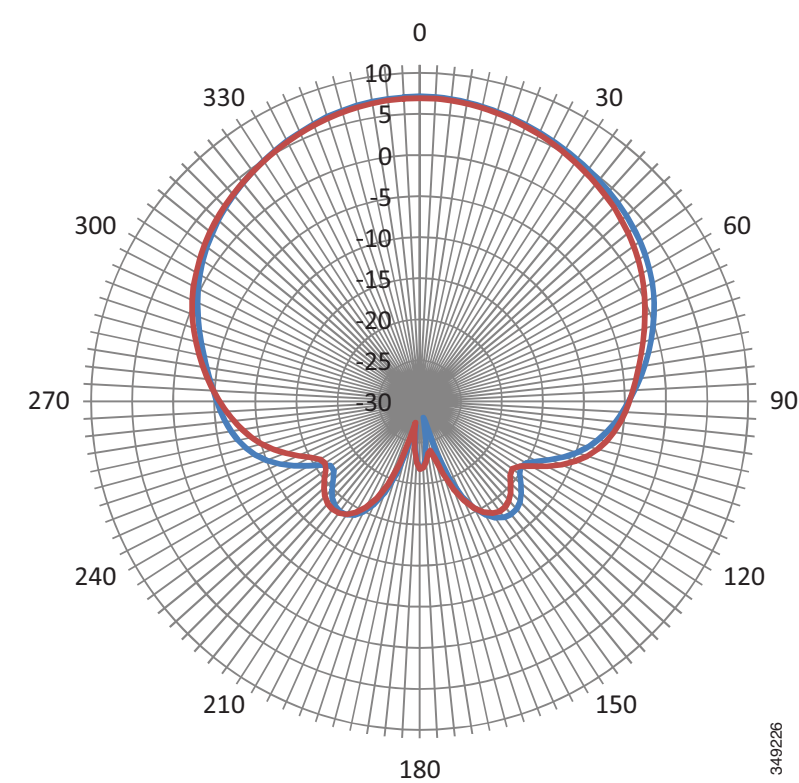
Line Color	Description
Blue (—)	Port 1
Red (—)	Port 2

1710 MHz Antenna Radiation Pattern

- 1710 MHz Antenna Radiation Pattern—Horizontal Plane, page 6-10
- 1710 MHz Antenna Radiation Pattern—Vertical Plane, page 6-11

1710 MHz Antenna Radiation Pattern—Horizontal Plane

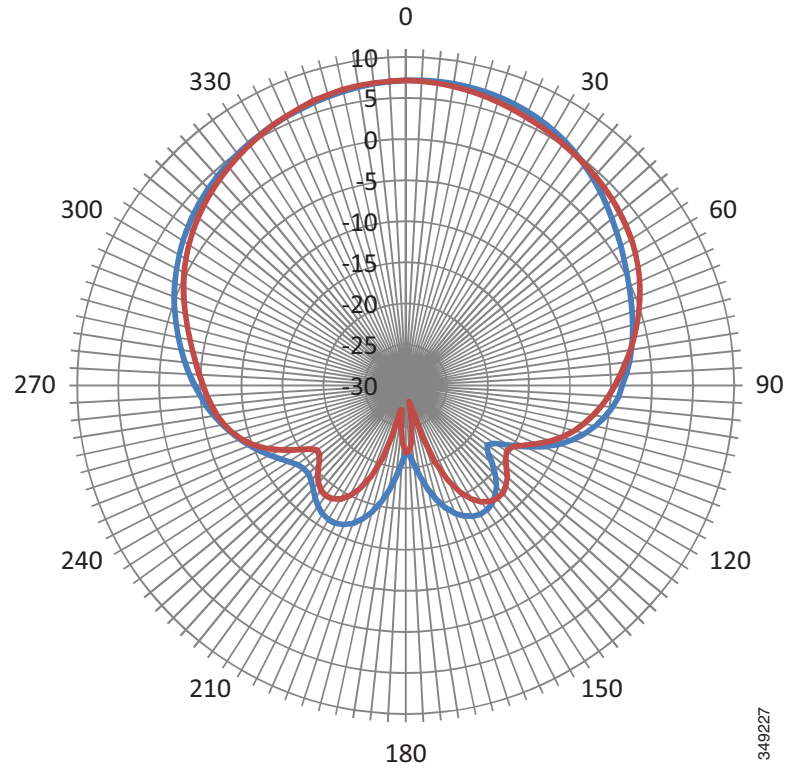
Figure 6-8 1710 MHz Antenna Radiation Pattern—Horizontal Plane



Line Color	Description
Blue (—)	Port 1
Red (—)	Port 2

1710 MHz Antenna Radiation Pattern—Vertical Plane

Figure 6-9 1710 MHz Antenna Radiation Pattern—Vertical Plane



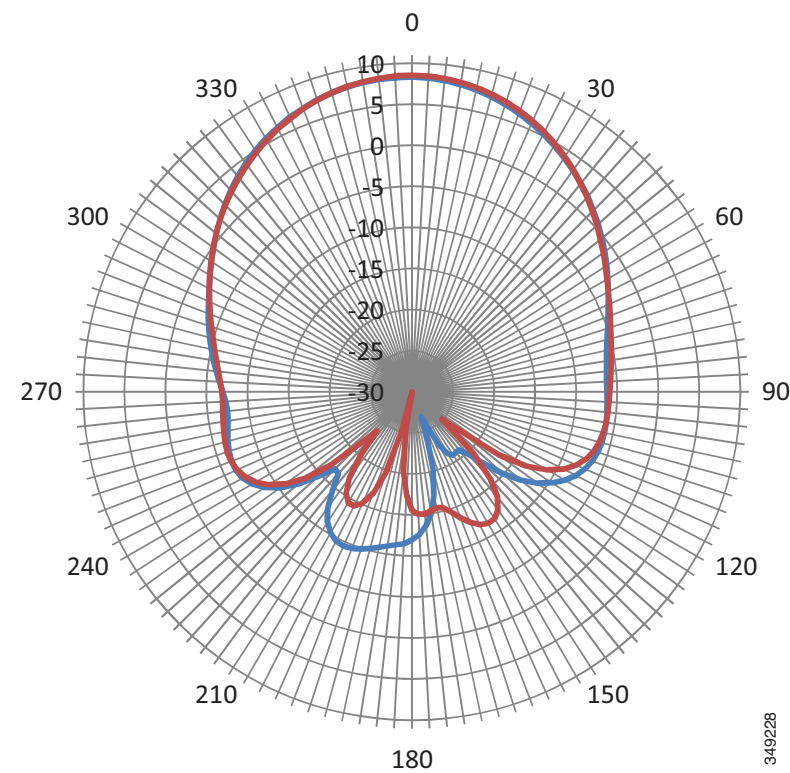
Line Color	Description
Blue (—)	Port 1
Red (—)	Port 2

1950 MHz Antenna Radiation Pattern

- 1950 MHz Antenna Radiation Pattern—Horizontal Plane, page 6-12
- 1950 MHz Antenna Radiation Pattern—Vertical Plane, page 6-13

1950 MHz Antenna Radiation Pattern—Horizontal Plane

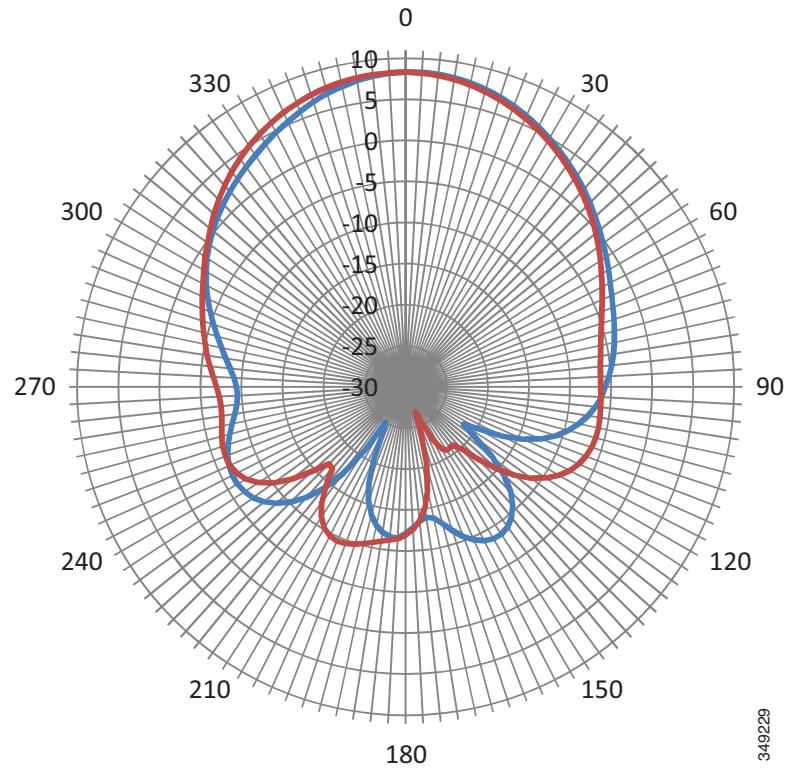
Figure 6-10 1950 MHz Antenna Radiation Pattern—Horizontal Plane



Line Color	Description
Blue (—)	Port 1
Red (—)	Port 2

1950 MHz Antenna Radiation Pattern—Vertical Plane

Figure 6-11 1950 MHz Antenna Radiation Pattern—Vertical Plane



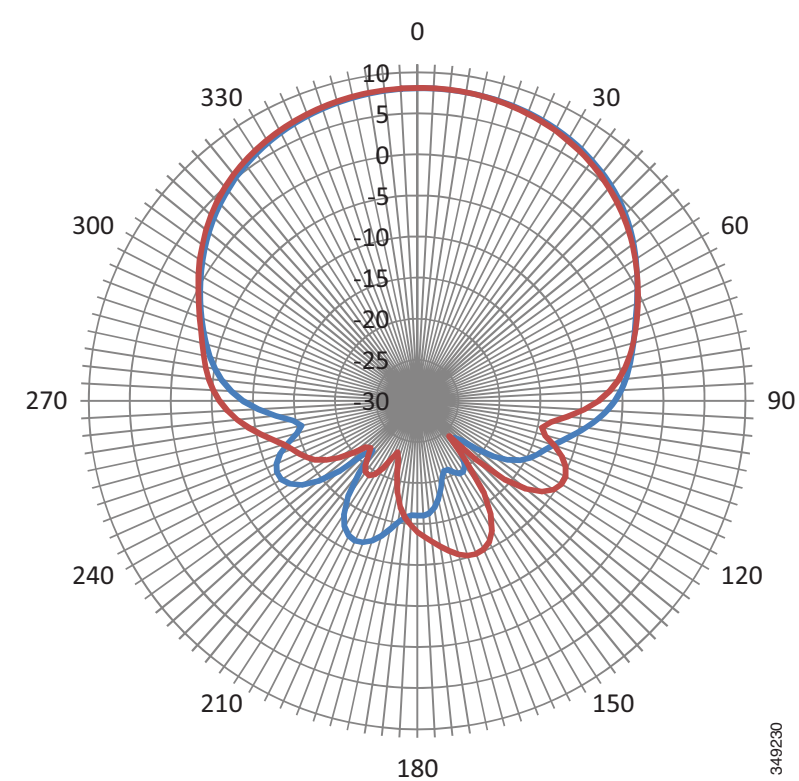
Line Color	Description
Blue (—)	Port 1
Red (—)	Port 2

2170 MHz Antenna Radiation Pattern

- 2170 MHz Antenna Radiation Pattern—Horizontal Plane, page 6-14
- 2170 MHz Antenna Radiation Pattern—Vertical Plane, page 6-15

2170 MHz Antenna Radiation Pattern—Horizontal Plane

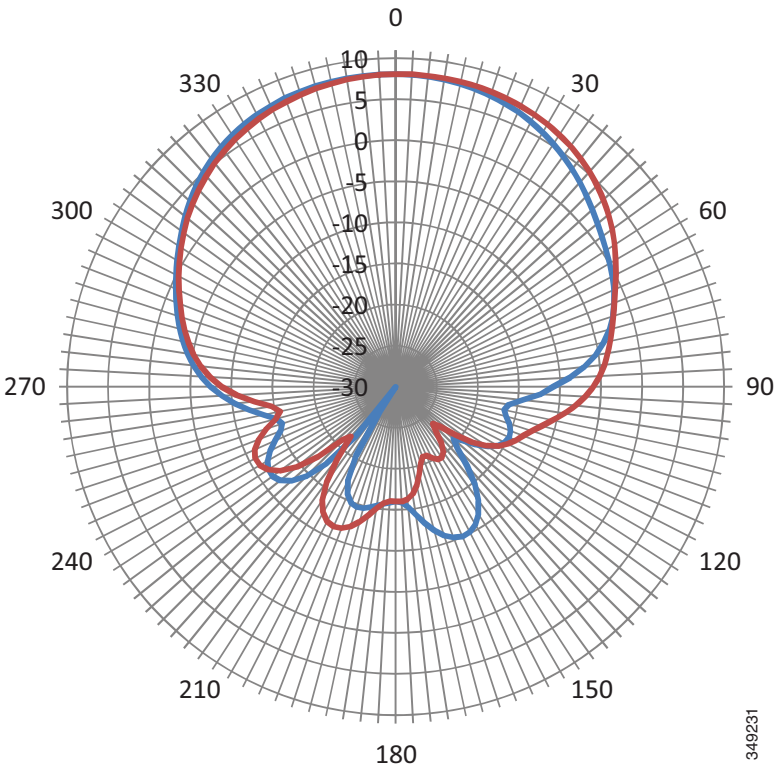
Figure 6-12 2170 MHz Antenna Radiation Pattern—Horizontal Plane



Line Color	Description
Blue (—)	Port 1
Red (—)	Port 2

2170 MHz Antenna Radiation Pattern—Vertical Plane

Figure 6-13 2170 MHz Antenna Radiation Pattern—Vertical Plane



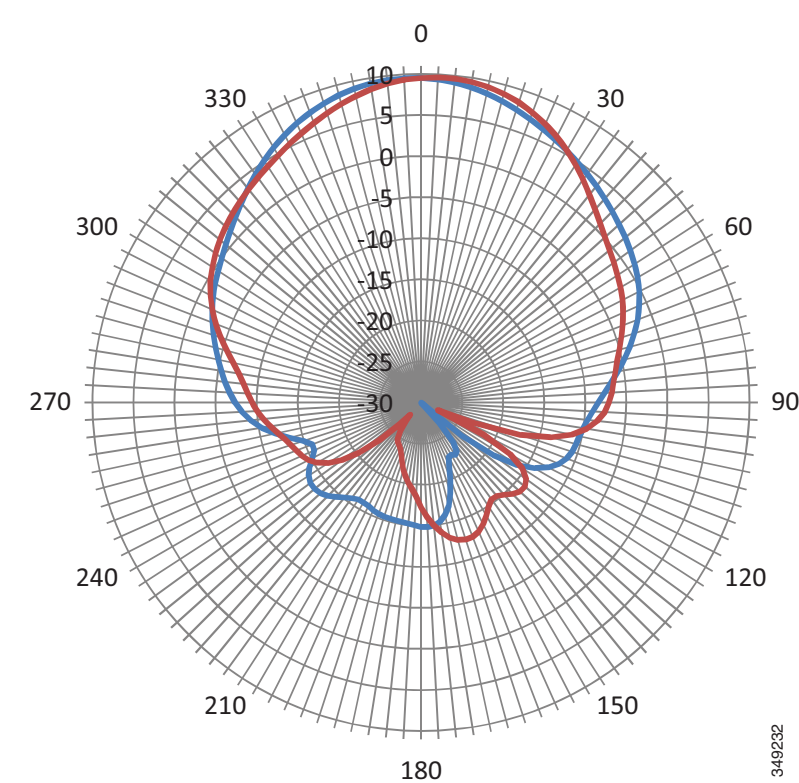
Line Color	Description
Blue (—)	Port 1
Red (—)	Port 2

2700 MHz Antenna Radiation Pattern

- 2700 MHz Antenna Radiation Pattern—Horizontal Plane, page 6-16
- 2700 MHz Antenna Radiation Pattern—Vertical Plane, page 6-17

2700 MHz Antenna Radiation Pattern—Horizontal Plane

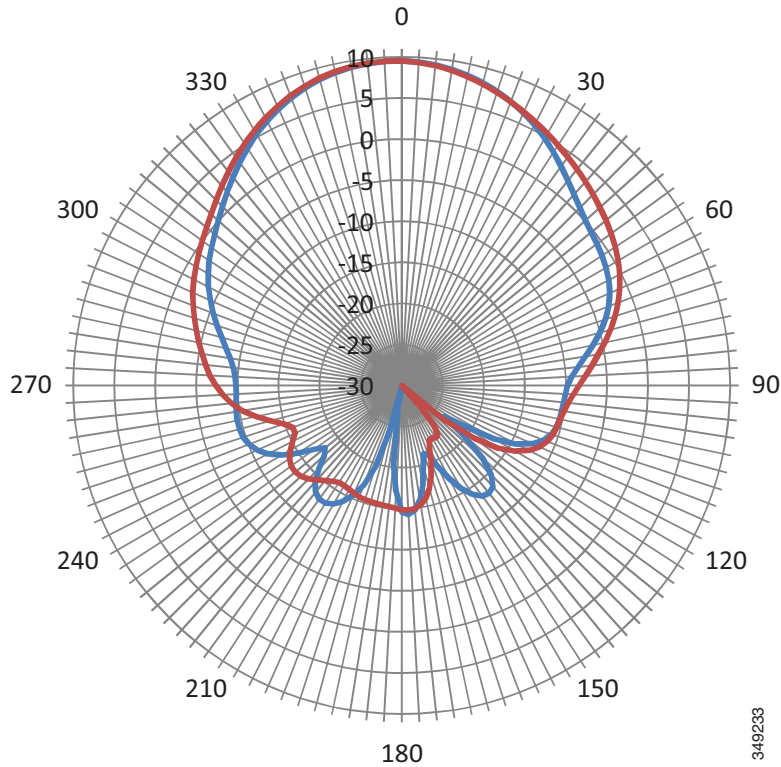
Figure 6-14 2700 MHz Antenna Radiation Pattern—Horizontal Plane



Line Color	Description
Blue (—)	Port 1
Red (—)	Port 2

2700 MHz Antenna Radiation Pattern—Vertical Plane

Figure 6-15 2700 MHz Antenna Radiation Pattern—Vertical Plane



Line Color	Description
Blue (—)	Port 1
Red (—)	Port 2

Environmental Specifications

Table 6-3 Environmental Specifications for the Cisco ANT-4G-PNL-OUT-N Antenna

Specification	Description
Operating temperature range	-40 to 158°F (-40 to 70°C)
Storage temperature range	-40 to 185°F (-40 to +85°C)

Mechanical Specifications

Table 6-4 *Mechanical Specifications for the Cisco ANT-4G-PNL-OUT-N Antenna*

Specification	Description
Mount style	Wall or mast mount
Location	Indoor or outdoor
Connector	Dual type N female direct connect
Dimensions (width x length x height)	11.61 x 11.61 x 3.23 in. (29.5 x 29.5 x 82 cm)
Weight	3.22 lbs (1.46 kg)
Wind rating	160 km/hr (93 mph)
IP rating	IP55
Radome	Polycarbonate, UV resistant, white
Material substance compliance	ROHS compliant

Power Specifications

Table 6-5 *Power Specifications for the Cisco ANT-4G-PNL-OUT-N Antenna*

Specification	Description
Maximum Voltage	2.0:1
Nominal Impedance	50 ohms
Maximum input power per port	10 watts

Installing the Antenna

The antenna installation includes the following procedures:

- [Contents of the Antenna Kit, page 6-19](#)
- [Safety Warnings, page 6-19](#)
- [Safety Precautions, page 6-20](#)
- [Tools and Equipment Required, page 6-21](#)
- [Preparing the Antenna for Installation, page 6-21](#)
- [Mounting the Antenna, page 6-21](#)
- [Connecting the Lightning Arrestor, page 6-22](#)
- [Connecting the Antenna to the Router, page 6-22](#)

Contents of the Antenna Kit

The antenna kit contains:

- 1 x Cisco ANT-4G-PNL-OUT-N antenna
- 1 x mounting bracket

Safety Warnings



Warning

Avoid using or servicing any equipment that has outdoor connections during an electrical storm. There may be a risk of electric shock from lightning. Statement 1088



Warning

Do not work on the system, or connect or disconnect cables, during periods of lightning activity. Statement 1001



Warning

Do not locate the outdoor 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 (for example, U.S.:NFPA 70, National Electrical Code, Article 810, Canada:Canadian Electrical Code, Section 54). Statement 1052



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. Statement 1024



Warning

Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030



Warning

To report a gas leak, do not use a telephone in the vicinity of the leak. Statement 1039



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. 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**

This product is not intended to be directly connected to the Cable Distribution System. Additional regulatory compliance and legal requirements may apply for direct connection to the Cable Distribution System. This product may connect to the Cable Distribution System ONLY through a device that is approved for direct connection. Statement 1078

Safety Precautions

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

For your safety, read and follow these safety precautions.

- 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.
- Before you install an antenna, contact your Cisco account representative to explain which mounting method to use for the size and type of antenna that you are about to install.
- Find someone to help you—installing an antenna is often a two-person job.
- 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.
- Contact your electric power company. Tell them your plans and ask them to come look at your proposed installation.
- Plan your installation carefully and completely before you begin. Each person involved in an installation 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.
- When installing your antenna, follow these guidelines:
 - Do not use a metal ladder.
 - Do not work on a wet or windy day.
 - Do dress properly—wear shoes with rubber soles and heels, rubber gloves, and a long-sleeved shirt or jacket.
- If the assembly starts to drop, move away from it and let it fall. Because 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.
- If any part of the antenna system should come in contact with a power line, do not touch it or try to remove it yourself. Call your local power company to have it removed safely.
- If an accident should occur with the power lines, call for qualified emergency help immediately.

Tools and Equipment Required

In addition to the parts included in the antenna kit described in the section [Contents of the Antenna Kit, page 6-19](#), you must provide the following tool to install the antenna on the router:

- Phillips screwdriver
- Open-ended wrench
- Electric drill

**Note**

This list does not include the tools and equipment required to assemble and erect the tower, mast, or other structure you intend to mount your antenna on.

Preparing the Antenna for Installation

**Note**

Before mounting the antenna on a mast or wall:

- the antenna must be attached to the mounting bracket.
- the signal cable must be attached to the antenna.

To prepare the antenna for installation:

-
- Step 1** Attach the antenna to the mounting bracket.
- Step 2** To attach the signal cable to the antenna:
- Loosely hand-tighten the antenna nut so that the cable can be attached with ease.
 - Attach the cable to the antenna.
 - Hand tighten the N-connector to the antenna.
 - Tighten the antenna nut securely after the cable is installed.
 - Use weatherproof sealing tape (coax seal) at the connector junction. Start wrapping at the top of the antenna connector, wrap downward 3 times and end about 2 inches downward from the center of the connector junction. Then wrap upwards another 3 times to reach the top of the antenna connector.
- Step 3** Decide if the antenna is to be mounted on a wall or mast. Perform the following steps where relevant:
- If the antenna is going to be mast mounted, install the clamps provided in the mounting bracket. Align the antenna so the top of the metal bracket is even with or slightly above the top of the mast tubing.
 - If the antenna is to be wall mounted, use the screws provided.
 - Use both clamps and screws for extra security if required.
-

Mounting the Antenna

Follow these instructions to mount the antenna:

-
- Step 1** Mark the desired location where you plan to mount the antenna and create a hole to receive the antenna.



Note The rubber washer is not required for ceiling tile installations.

- Step 2** Make sure that the antenna is properly positioned, then tighten the washer and plastic nut to secure the antenna.
-

Connecting the Lightning Arrestor

To install a lightning-protection device, see [Cisco Lightning Arrestors](#), page 1-36 in Chapter 1, “Cisco CGR 1000 and 2000 Series Connected Grid Antennas Overview”.

Connecting the Antenna to the Router

To attach the router-end of the cable to your router, see [Connecting the Antenna to the CGR 1120](#), page 1-33 in Chapter 1, “Cisco CGR 1000 and 2000 Series Connected Grid Antennas Overview”.



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 cable length or run, the greater the loss).

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, 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>

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