



Cisco Dual LTE-Single GPS Multi-band Antenna Installation Guide

This document provides the description, supported features, and installation instructions of the Cisco Dual LTE-Single GPS Multi-band (4G-LTE-ANTM-O-3) Antennas.



Caution

Read the information in [Safety Precautions](#) before installing or replacing antennas.

This document contains the following sections:

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Overview of the 4G-LTE-ANTM-O-3 Antenna

Deciding which antenna to use involves multiple factors, such as coverage area, maximum distance, indoor location, outdoor location, and antenna height.

When an antenna is used indoors, the building construction, ceiling height, and internal obstructions must be considered. In outdoor environments, obstructions such as trees, vehicles, buildings, and hills must be considered. Distance is the primary factor when using outdoor-wireless communications. However, coverage area also becomes important when you use wireless client devices to communicate with a wireless device.



4G-LTE-ANTM-O-3 antenna is an integrated 3-in-1- indoor and outdoor antenna. It comes with two Long Term Evolution (LTE) antennas and one Global Positioning System (GPS) antenna in a single radome. [Figure 1](#) shows the 4G-LTE-ANTM-O-3 antenna.

Figure 1 **4G-LTE-ANTM-O-3 Antenna**



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Parts List

The shipment of your antenna includes the following items:

- One Antenna Unit
- Two SMA-Female to TNC-Male Adapters
- Installation Guide

Features of the 4G-LTE-ANTM-O-3 Antenna

The 4G-LTE-ANTM-O-3 antenna supports the following features:

- No tune, multiband coverage, dual 4G LTE, and GPS L1 frequencies.
- Metal 5/8-inch stud mount with serrated face nut provides single cable exit for easier installation or antenna replacement.
- Attractive low-profile housing for added overhead clearance.
- IP67-compliant design provides maximum protection against water or dust under severe environmental conditions.
- High-performance, low-loss cable, and high-quality connectors for maximum Radio Frequency (RF) system efficiency.
- UV-resistant red, blue, black, or white radome.

Technical Specifications

Table 1 lists the specifications for the RF antenna.

Table 1 **Specifications of RF antenna**

Operating Frequencies	698-960 MHz 1710-2700 MHz
Polarization	Vertical, linear
Nominal Impedance	50 Ohms
Gain ¹ (Typical)	2.5 dBi
Maximum Power	3 Watts
VSWR ²	< 2.5:1
Elevation Plane (3 dB Beamwidth)	30° (nominal)
Azimuth Plane (3 dB Beamwidth)	Omni-directional
Connector type	SMA-Male
Cable	4 ft RG174 VW-1 compliant
Height	90 mm
Base Diameter	137 mm
Color	White, Black, Red or Blue
Flammability	UL-94 V0
Environment	Indoor and outdoor
Mounting	5/8 inch lug with serrated face nut, optional adhesive backing (peel-off), 17 sq. inches area (minimum) on a flat smooth surface, 5/8 inch diameter hole through mounting surface
Operating and storage temperature	-40 to +85 degree C
Ingress Protection ³	IP67

1. Total gain, free space test when mounted on a 1-foot diameter ground plane with unused ports loaded.
2. Free space Voltage Standing Wave Ratio (VSWR) over all operating frequency ranges when mounted on a 1-foot diameter ground plane with unused ports loaded.
3. When mounted per installation instructions.

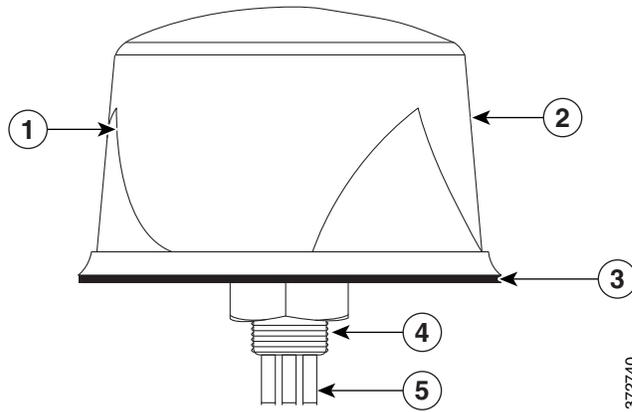
Table 2 lists the specifications for the GPS Antenna.

Table 2 Specifications of the GPS Antenna

Frequency Band	1575.42 MHz (GPS L1)
Amplifier Gain	26 dBc ± 3 dB
Nominal Impedance	50 Ohms
Output VSWR	1.5:1 typical
DC Current	20 mA nominal; < 30 mA @ -40°C to +85° C
DC Voltage	3.3-5 V
Noise Figure	1.8 dB typical
Filtering	> 40 dB rejection @ ± 50 MHz from center frequency

Figure 2 shows the parts of 4G-LTE-ANTM-O-3 Antenna.

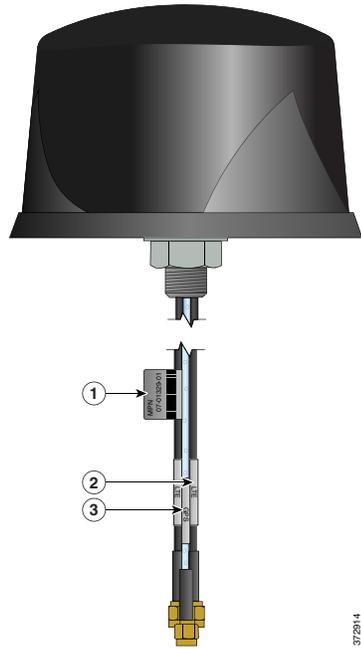
Figure 2 Parts of 4G-LTE-ANTM-O-3 Antenna



1	GPS and 2 LTE antennas inside	4	Mounting stud
2	Radome available in 4 colors: White, Black, Red or Blue (Indoor or Outdoor)	5	Cables
3	Gasket		

Figure 3 shows the antenna with cable labels.

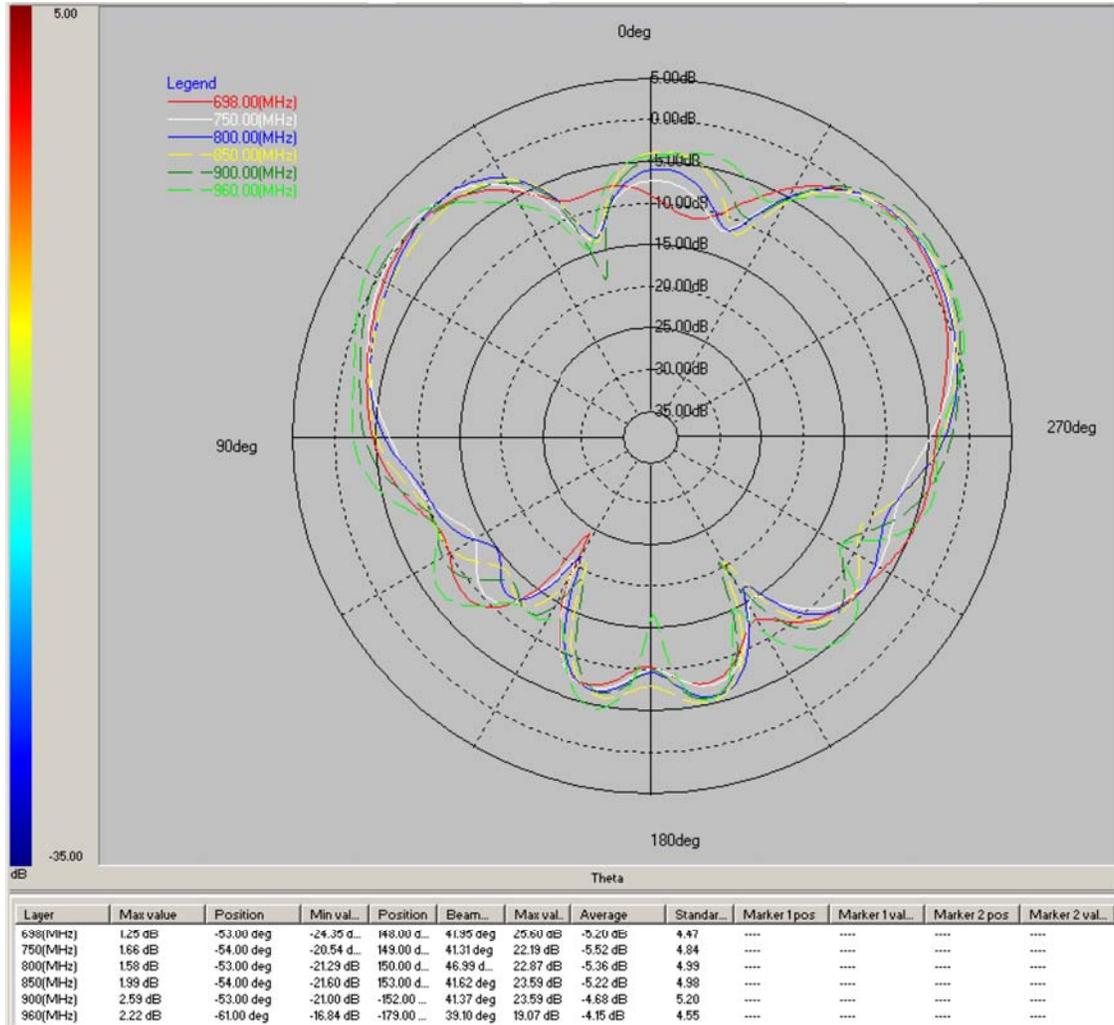
Figure 3 *The Antenna with Cable Labels*



1	MPN LABEL	2	LTE-ID LABEL 2EA
3	GPS ID LABEL		

Figure 4 shows the Low Band 698-960 MHz EL (PHI=0).

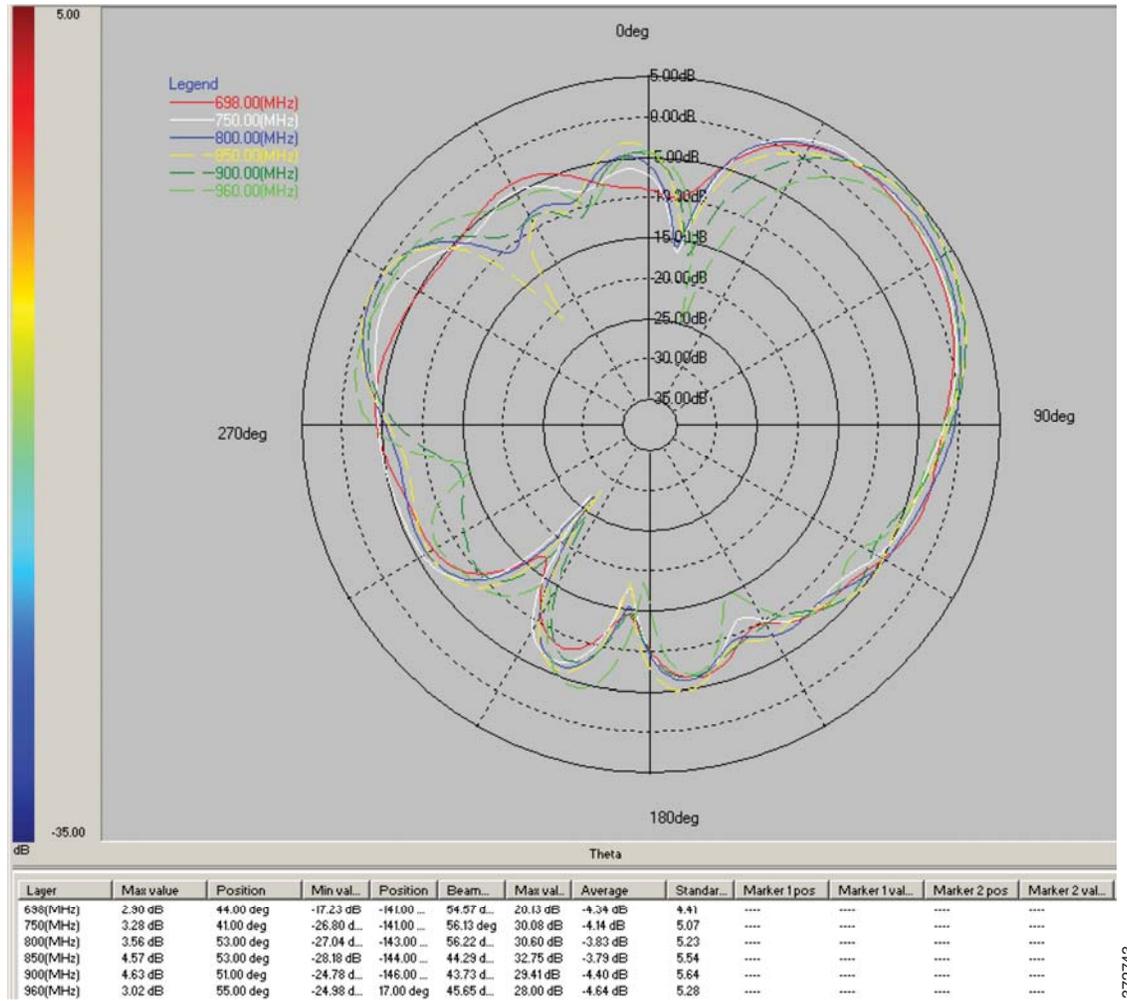
Figure 4 Low band 698-960 MHz EL (PHI=0)



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Figure 5 shows the Low Band 698-960MHz EL (PHI=90).

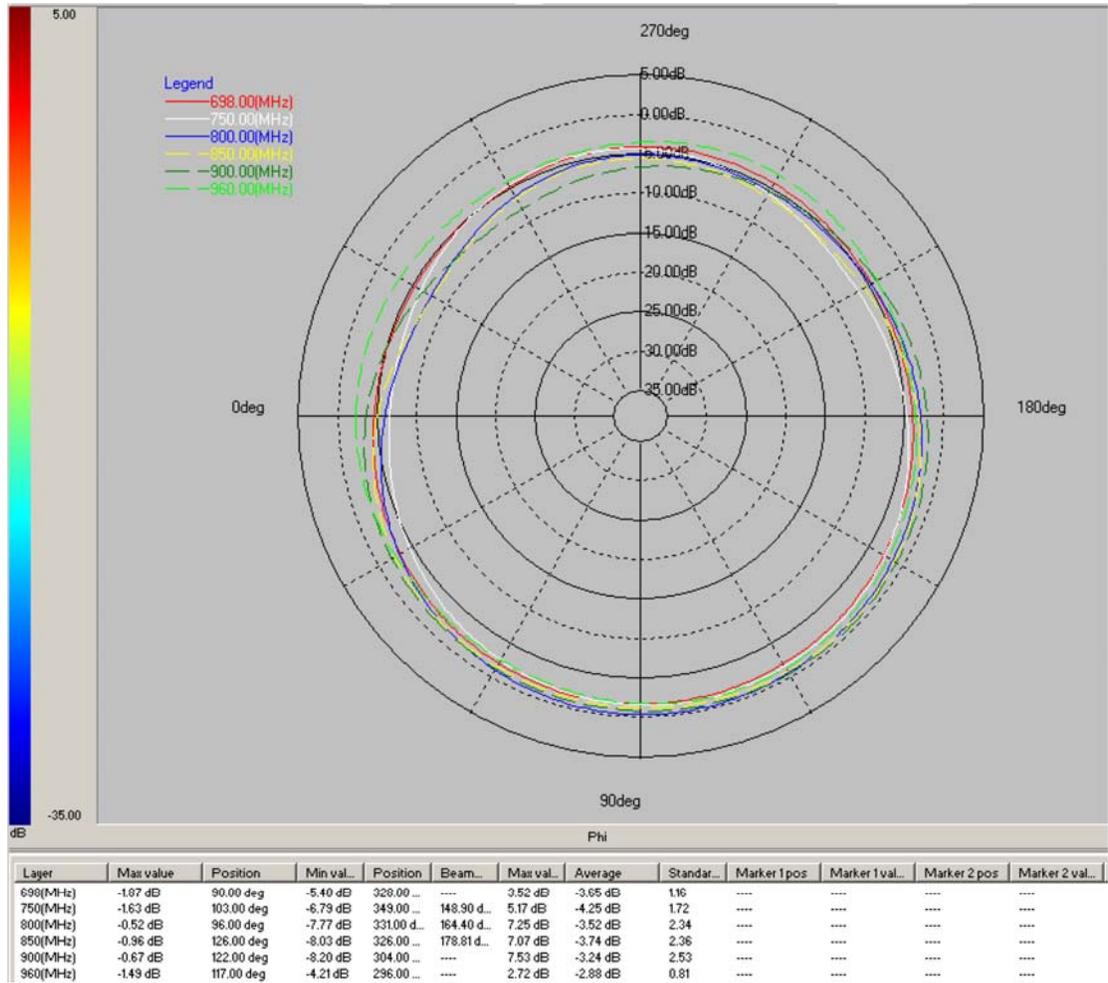
Figure 5 Low band 698-960MHz EL (PHI=90)



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Figure 6 shows the Low Band 698-960MHz AZ (THETA=90).

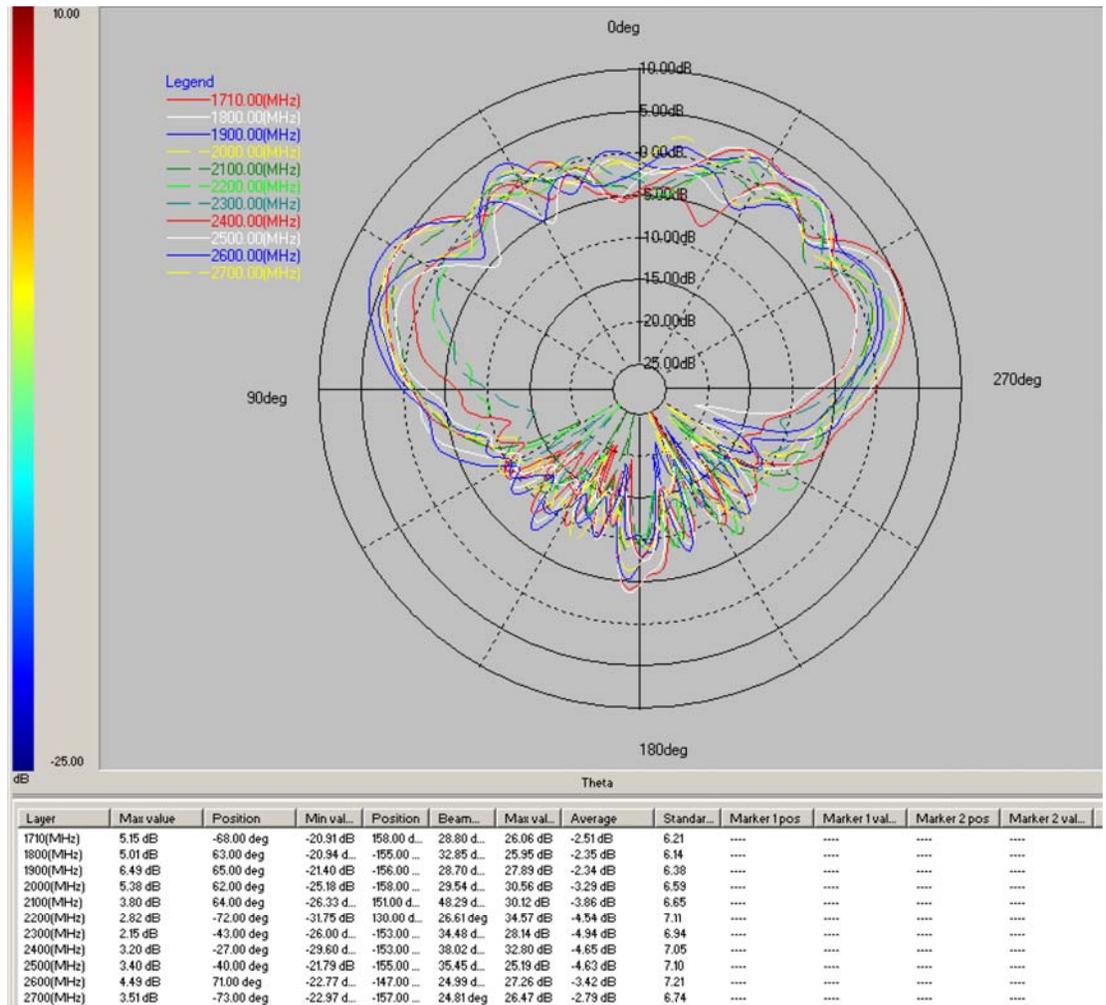
Figure 6 Low Band 698-960MHz AZ (THETA=90)



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Figure 7 shows High Band 1710-2700MHz EL (PHI=0).

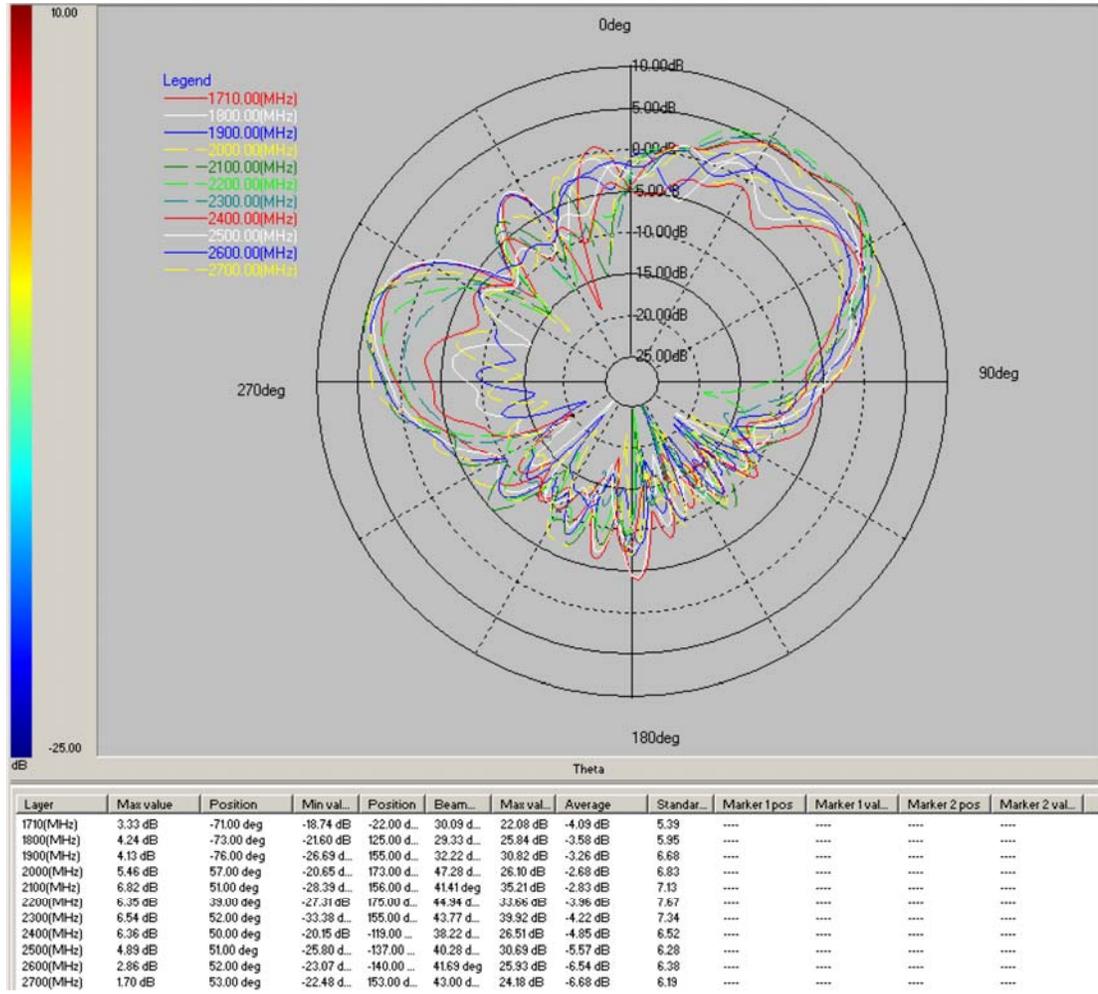
Figure 7 High Band 1710-2700MHz EL (PHI=0)



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Figure 8 shows High Band 1710-2700MHz EL (PHI=90).

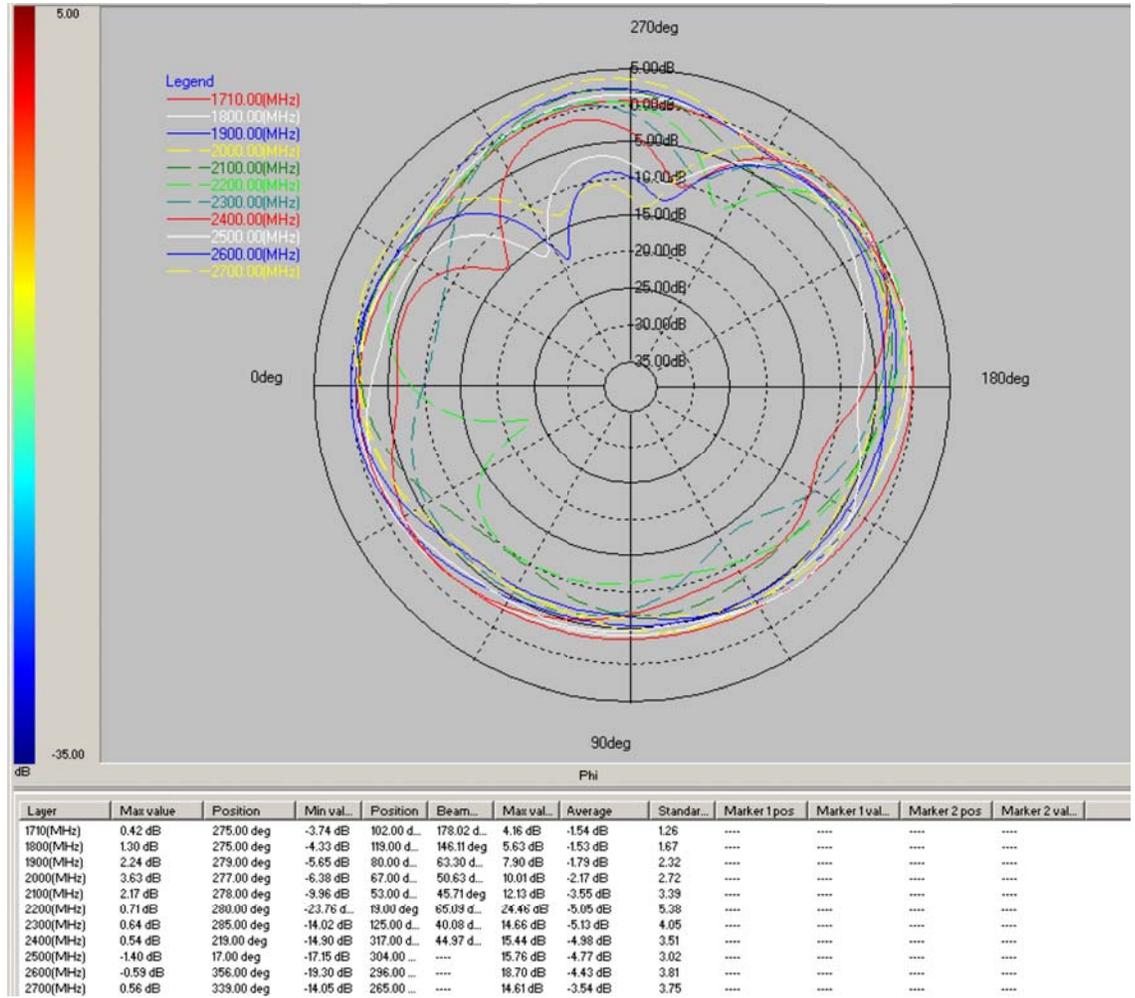
Figure 8 High Band 1710-2700MHz EL (PHI=90)



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Figure 9 shows High Band 1710-2700MHz AZ (THETA=90).

Figure 9 High Band 1710-2700MHz AZ (THETA=90)



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Supported Antennas

Table 3 lists the supported antennas.

Table 3 *Supported Antennas*

Part Number	Description
4G-LTE-ANTM-O-3-W	Indoor or outdoor low-profile antenna with 4-foot dongle, white radome.
4G-LTE-ANTM-O-3-B	Indoor or outdoor low-profile antenna with 4-foot dongle, black radome.
4G-LTE-ANTM-O-3-R	Indoor or outdoor low-profile antenna with 4-foot dongle, red radome.
4G-LTE-ANTM-O-3-C	Indoor or outdoor low-profile antenna with 4-foot dongle, blue radome.

Supported Antenna Accessories

Table 4 lists the supported antenna accessories.

Table 4 *Supported Antenna Accessories*

Part Number	Cable Length	Maximum Insertion Loss
4G-CAB-LMR240-25	25 ft (7.5 m)	2.1 dB @ 700 MHz 4.0 dB @ 2.6 GHz
4G-CAB-LMR240-50	50 ft (15 m)	4.1 dB @ 700 MHz 7.4 dB @ 2.6 GHz
4G-CAB-LMR240-75	75 ft (23 m)	6.1 dB @ 700 MHz 11.0 dB @ 2.6 GHz
4G-CAB-ULL-20	20 ft (6 m)	0.90 dB @ 700 MHz 1.8 dB @ 2.6 GHz
4G-CAB-ULL-50	50 ft (15 m)	2.2 dB @ 700 MHz 4.3 dB @ 2.6 GHz

Antenna Options by Deployment Type

Table 5 lists the antenna options by deployment type.

Table 5 *Antenna Options by Deployment Type*

Deployment Type	Description	Antenna Accessories Required
Indoor	The antenna is installed indoors on a grounded metal surface and attached directly to a router.	None
Indoor, with extension	The antenna is installed on a grounded metal surface and attached to a router with extension cables.	<ul style="list-style-type: none"> • 4G-CAB-LMR240-25 • 4G-CAB-LMR240-50 • 4G-CAB-LMR240-75 • 4G-CAB-ULL-20 • 4G-CAB-ULL-50
Outdoor flush	The antenna is installed outdoors to a grounded metal surface and attached directly to a router mounted indoors.	None

Safety Precautions

This section contains the following warning statements. A warning means danger. You are in a situation that could cause bodily injury. Before working on an equipment, be aware of the hazards involved with electrical circuitry and standard safety practices to prevent accidents.

Statement 1052—Installing and Grounding the Antenna



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, refer to national and local codes (for example, U.S.:NFPA 70, National Electrical Code, Article 810, Canada:Canadian Electrical Code, Section 54).

Statement 1024—Ground Conductor



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 1025—Use Copper Conductors Only

**Warning**

Use copper conductors only.

Statement 1046—Installing or Replacing the Unit

**Warning**

When installing or replacing the unit, the ground connection must always be made first and disconnected last.

**Caution**

For your physical safety, and to help you install your antenna successfully, 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 of 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 and 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.

Installation Instructions

The following section contains steps for installing the 4G-LTE-ANTM-O-3 antenna:

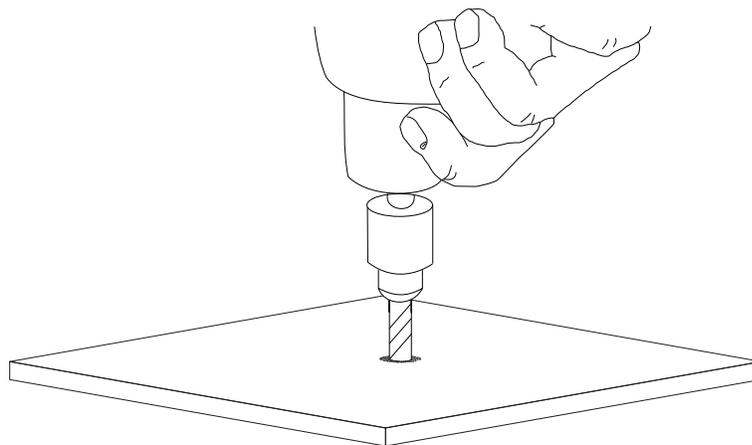
- Step 1** While choosing the location, keep the following in mind:
- Attempt to center the antenna on a flat plane.
 - Attempt to position the antenna so that it has 8 inches of flat plane in any given direction.
 - Attempt to space at least 16 inches from an adjacent antenna or metallic structure and choose a location with gentle surface curves to ensure proper sealing.
 - Ensure that there is a space that is 2 inches deep and 2 inches in diameter below the mounting surface to allow sufficient clearance for the mounting stud, hardware, and cables.
 - Ensure that the diameter of the hole is 5/8 inch.

- Step 2** Drill a hole through the mounting surface where the center of the antenna is located, as shown in [Figure 10](#).



Note Ensure that the hole is deburred of sharp edges to prevent cable damage during installation.

Figure 10 **Drill the Mounting Surface**



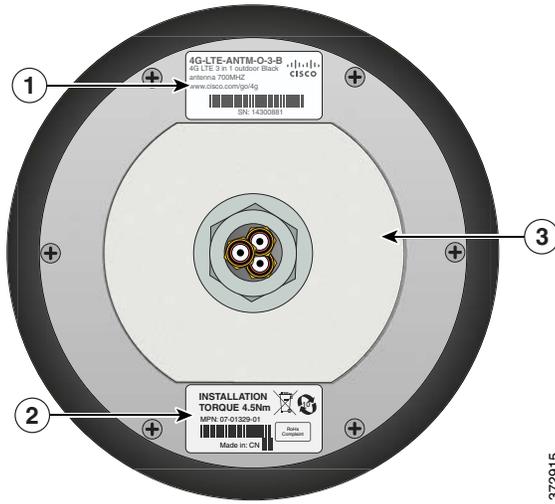
- Step 3** Clean the mounting surface around the hole. The surface must be free of any debris, which would otherwise prevent the antenna's inner foam gasket from adhering to or the outer rubber gasket from forming a seal.
- Step 4** Remove the nut from the mounting stud and cables one by one.
- Step 5** Insert the mounting stud through the hole and then thread the cables through the serrated face nut one by one.



Note It is important that the orientation of the serrated face nut should be correct. Otherwise, the serrated part of the lock nut will not bite into the mounting stud.

Figure 11 shows the bottom view of the antenna.

Figure 11 Bottom View of the Antenna

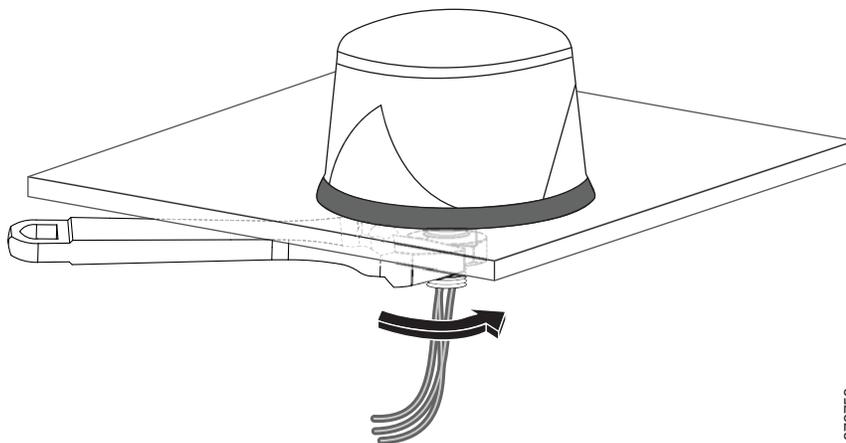


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1	Product ID and Serialization Label	2	MPN and Torque Label
3	Liner		

Step 6 Position the antenna onto the mounting surface and tighten the nut hand-tight, as shown in Figure 12. Tighten it further using a wrench until the antenna is fully seated. Visually inspect the outer rubber antenna gasket to ensure that it has been compressed and sealed tightly against the mounting surface and radome.

Figure 12 Tighten the Nut after the Antenna is fully seated



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Deployment Scenarios

Figure 13 shows the deployment of the 4G-LTE-ANTM-O-3 antenna on an ATM with a single router.



Note

All the three antenna cables are SubMiniature version A (SMA-male) connectors, but the MAIN and the Diversity (DIV) of the router has the Threaded Neill–Concelman (TNC-female) connectors, and the GPS has an SMA-female connector. In this case, an SMA-female to TNC-male adapter needs to be used to connect the SMA-male connectors to the MAIN and DIV of the router because they cannot be connected to the SMA-male connectors directly.

Figure 13 Deployment of an Antenna with One Router

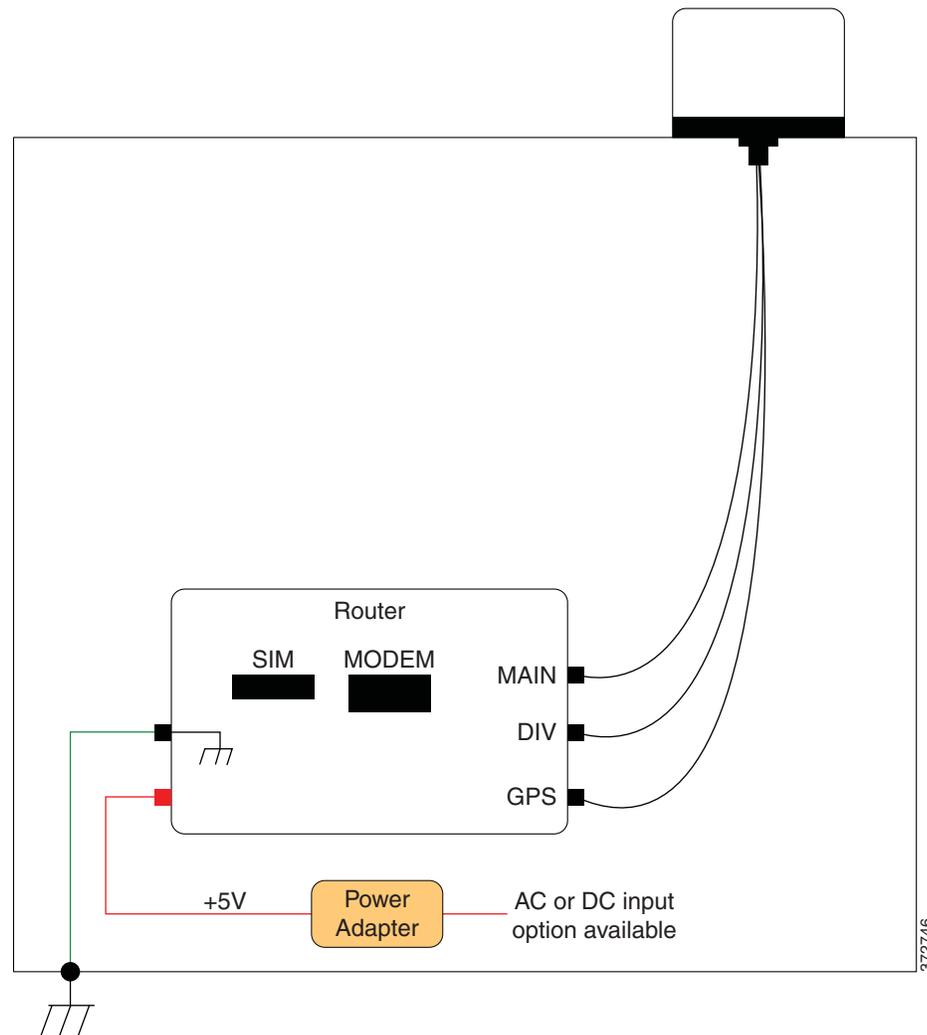
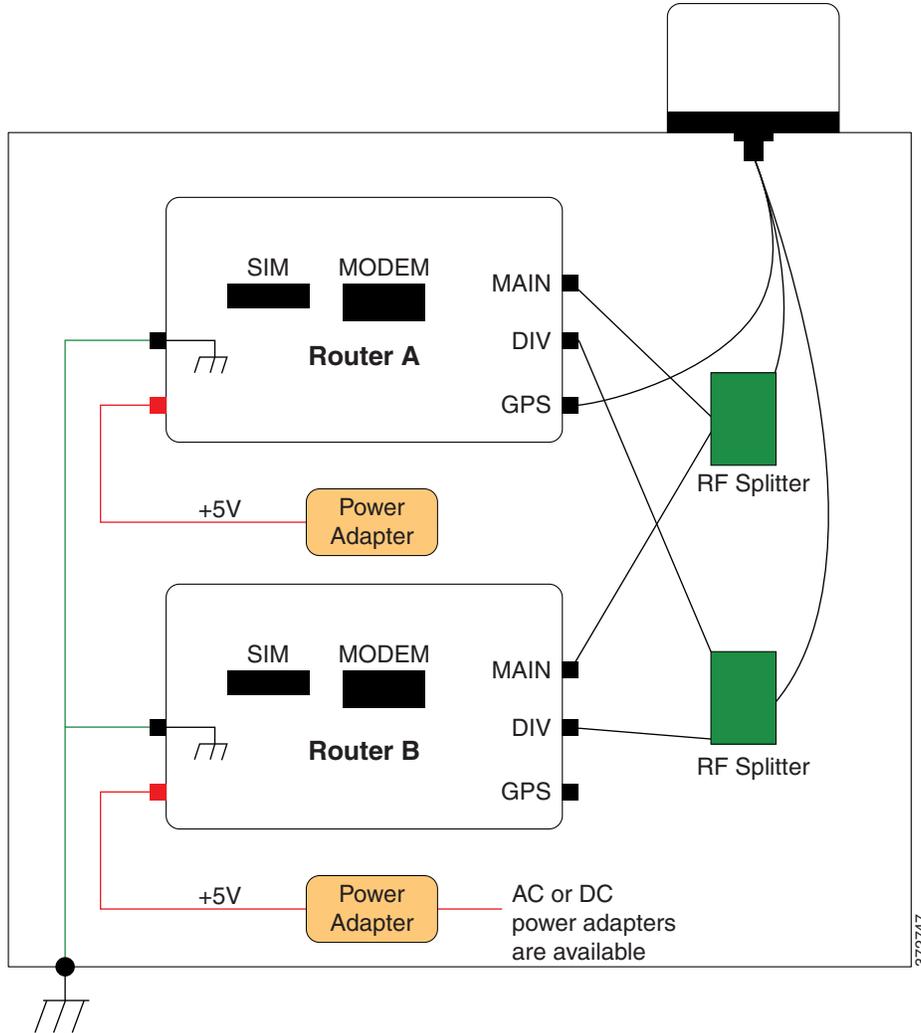


Figure 14 shows the deployment of 4G-LTE-ANTM-O-3 on an ATM with dual routers.

Figure 14 Deployment of an Antenna with Dual Routers



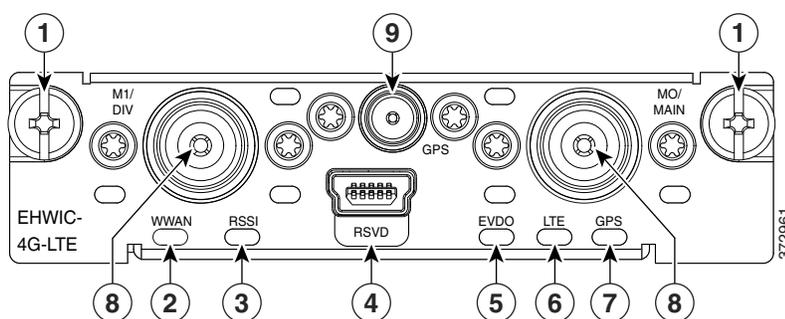
Antenna Ports

This section describes the antenna ports, their locations on the router, and the recommended antenna-installation locations. You can connect an antenna to the ports of a Cisco Enhanced High-Speed WAN Interface Card (EHWIC) or Cisco 819 series router.

Connecting the Antenna to the Cisco 819 Series Router or Cisco EHWIC

The antenna ports are shown in [Figure 15](#), and the front panel details of the Cisco 819 series router are shown in [Figure 16](#).

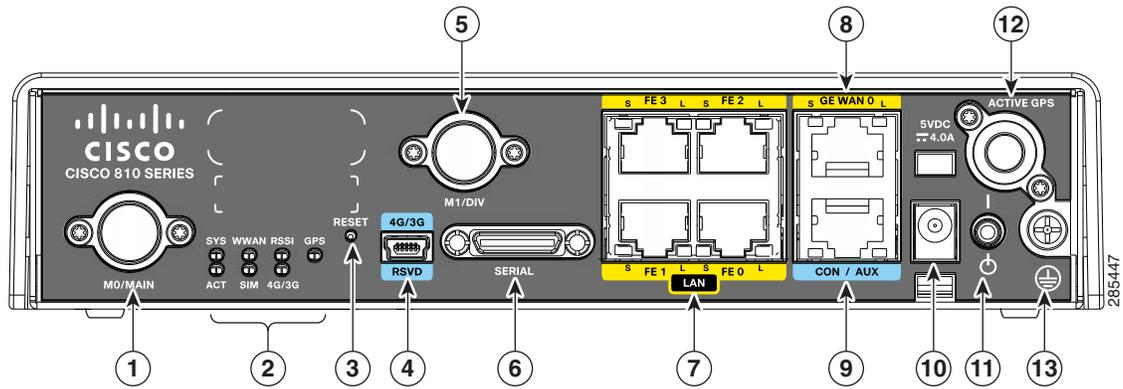
Figure 15 Insert Base of Antenna into Router Antenna Port



1	Mounting Screws	6	LED—LTE
2	LED—WWAN	7	LED—GPS ¹
3	LED—RSSI ²	8	Antenna Connectors—M1/DIV, M0/MAIN
4	RSVD (reserved) port, USB 2.0 mini type B	9	Antenna Connector—GPS
5	LED—EVDO ³		

1. GPS = Global Positioning System.
2. RSSI = Received Signal Strength Indicator.
3. EVDO = Evolution-Data Optimized.

Figure 16 Front Panel Details of Cisco 819 4G LTE ISR



1	4G Antenna connector—M0/MAIN	8	GE WAN port
2	LEDs	9	Antenna Connector—GPS Console/Aux port
3	Reset button	10	Power input
4	4G/3G port	11	Power switch
5	4G Antenna connector—M1/DIV	12	Active GPS antenna connector
6	Serial port	13	Ground
7	FE port		

Related Documentation

- For information about antennas and modules, see:
www.cisco.com/go/cg-modules
- For information about omnidirectional and directional antennas, see:
http://www.cisco.com/en/US/tech/tk722/tk809/technologies_tech_note09186a00807f34d3.shtml

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<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

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