Cisco Dual LTE Multi-element Multi-band Indoor Antenna Installation Guide

This document provides the description, supported features, and installation instructions of the Cisco Dual LTE-Multi-element Multi-band Indoor (LTE-ANTM-I-2-W) Antenna.

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Caution Read the information in Safety Precautions before installing or replacing antennas.

This document contains the following sections:
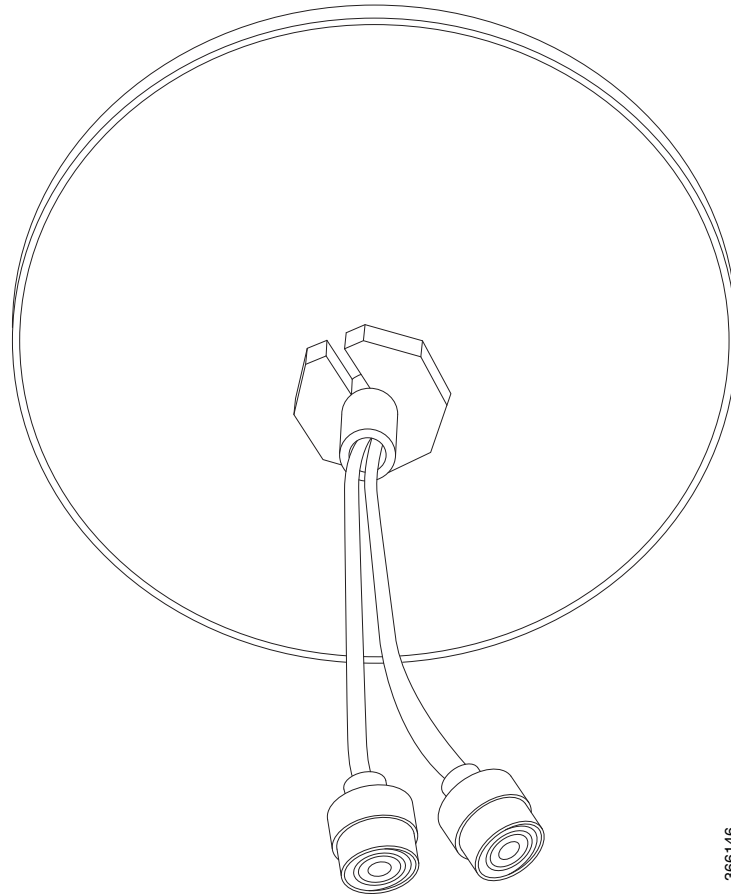
Overview of the LTE-ANTM-I-2-W Antenna

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. However, coverage area also becomes important when you use wireless client devices to communicate with a wireless device.

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LTE-ANTM-I-2-W antenna is an integrated 2-in-1- indoor and outdoor antenna. It comes with two Long Term Evolution (LTE) antennas in a single radome. This antenna provides an integrated solution to support multiple antennas. As customers migrate to 4G-LTE technology to take advantage of MiMo, this 2-in-1 antenna integrates two colocated 4G Planar inverted-F antenna within a single radome. The following figure shows the LTE-ANTM-I-2-W antenna.

Figure 1   **LTE-ANTM-I-2-W Antenna**

Parts List

The shipment of your antenna includes the following items:

- One Antenna Unit
- Installation Guide

Features of the LTE-ANTM-I-2-W Antenna

The LTE-ANTM-I-2-W antenna supports the following features:

- No tune, multiband coverage, dual 4G LTE.

- Metal 7/8-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.

- High-performance, low-loss cable, and high-quality connectors for maximum Radio Frequency (RF) system efficiency.

- UV-resistant white radome.

Technical Specifications

Table 1 lists the specifications for the RF antenna.

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Table 1   Specifications of RF antenna

Operating Frequencies	698-960 MHz
	806-960 MHz
	1447-1511 MHz
	1710-2170 MHz
Polarization	Linear or vertical
Nominal Impedance	50 Ohms
Gain[1] (Typical)	698-960 MHz—3.4 dBi
	806-960 MHz—3.4 dBi
	1447-1511 MHz—3 dBi
	1710-2170 MHz—5.94 dBi
Maximum Power	3 Watts
VSWR[2]	≤ 1.8:1 @ 698-806 MHz
	≤ 1.6:1 @ 806-960 MHz
	≤ 2.0:1 @ 1447-1511 MHz
	≤ 1.5:1 @ 1710-2170 MHz
Elevation Plane (3 dB Beamwidth)	N/A
Azimuth Plane (3 dB Beamwidth)	Omnidirectional
Connector type	TNC-Male
Cable	7.9 inches, R670-141 SXE Plenum
Height	1.9 inches
Base Diameter	8.6 OD x 1.9 H in (218 x 47 mm)
Color	White
Flammability	UL 94-V0 listed materials and Plenum rated cable
Environment	Indoor
Mounting	60 sq. inches area (minimum) on a flat smooth surface, 7/8 inch diameter hole through mounting surface

Table 1   ***Specifications of RF antenna***

Operating and storage temperature	-30 to +70 degree C (Operating)
	-30 to +80 degree C (Storage)
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.

Supported Antennas

Table 2 lists the supported antennas.

Table 2   ***Supported Antennas***

Part Number	Description
LTE-ANTM-I-2-W	Indoor or outdoor low-profile antenna with 4-foot dongle, white radome.

Supported Antenna Accessories

When using the cables, ensure that cable loss for determining the system operation is taken into account.

Table 3 lists the supported antenna accessories.

Table 3   ***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 4 lists the antenna options by deployment type.

Table 4   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.	• 4G-CAB-LMR240-25 • 4G-CAB-LMR240-50 • 4G-CAB-LMR240-75 • 4G-CAB-ULL-20 • 4G-CAB-ULL-50

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.**

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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 LTE-ANTM-I-2-W 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 4 inches deep (cable bending) and 4 inches in diameter (hand or tool access) below the mounting surface to allow sufficient clearance for the mounting stud, hardware, and cables.

- Ensure that the diameter of the hole is 7/8 inch.

Step 2 Drill a hole through the mounting surface where the center of the antenna is located, as shown in Figure 2.

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

Figure 2 Drill the Mounting Surface
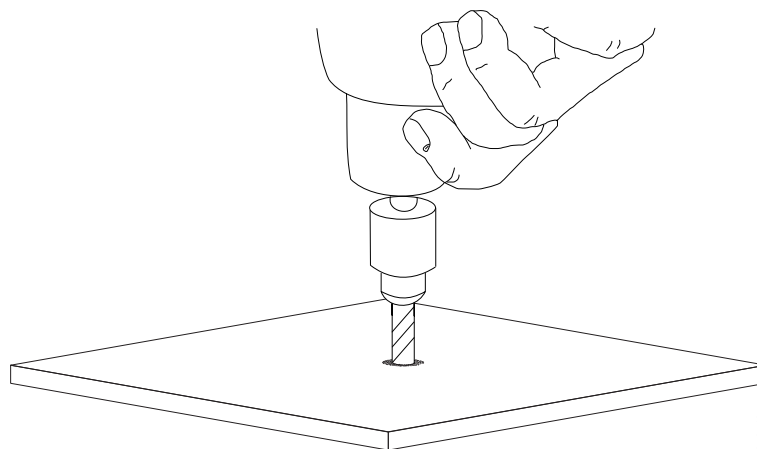
Step 3 Clean the mounting surface around the hole. The surface must be free of any debris, which would otherwise prevent the antenna's inner foam gasket from adhering to or the outer rubber gasket from forming a seal.

Step 4 Remove the nut from the mounting stud and cables one by one.

Step 5 Insert the cable 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.

Step 6   Position the antenna onto the mounting surface with the provided hexagonal unit and tighten the nut hand-tight, as shown in the following figure. Tighten it further using a wrench torque to 1.5-2Nm (13.3 – 17.7in-lbf). Visually inspect the outer rubber antenna gasket to ensure that it has been compressed and sealed tightly against the mounting surface and radome.

Figure 3   *Tighten the Nut after the Antenna is fully seated*
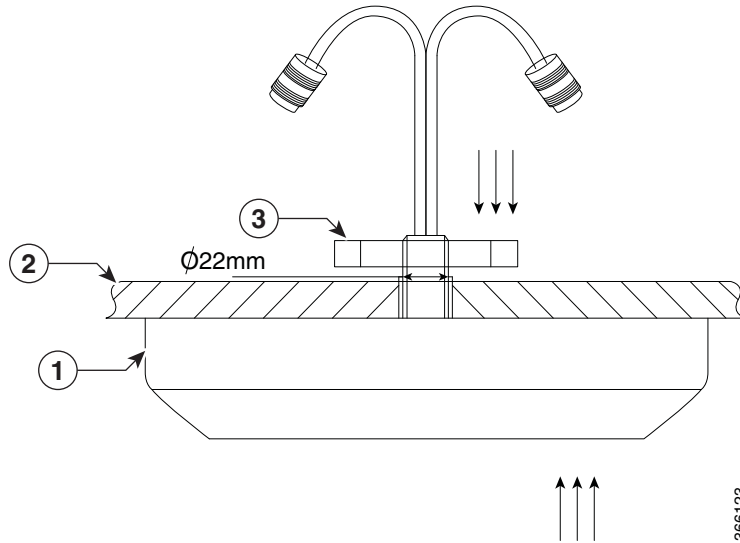
| 1	Antenna	2	Hexagonal unit

Deployment Scenarios

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 Cisco 819 series router.

Connecting the Antenna to Cisco 819 Series Router

The antenna ports and the front panel details of the Cisco 819 series router are shown in the following figures.

Figure 4   *Insert Base of Antenna into Router Antenna Port*
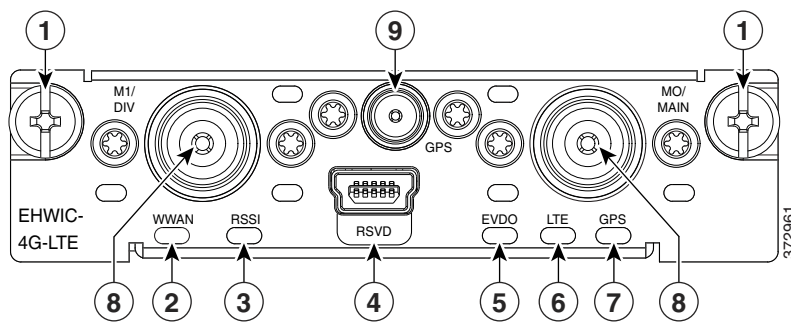
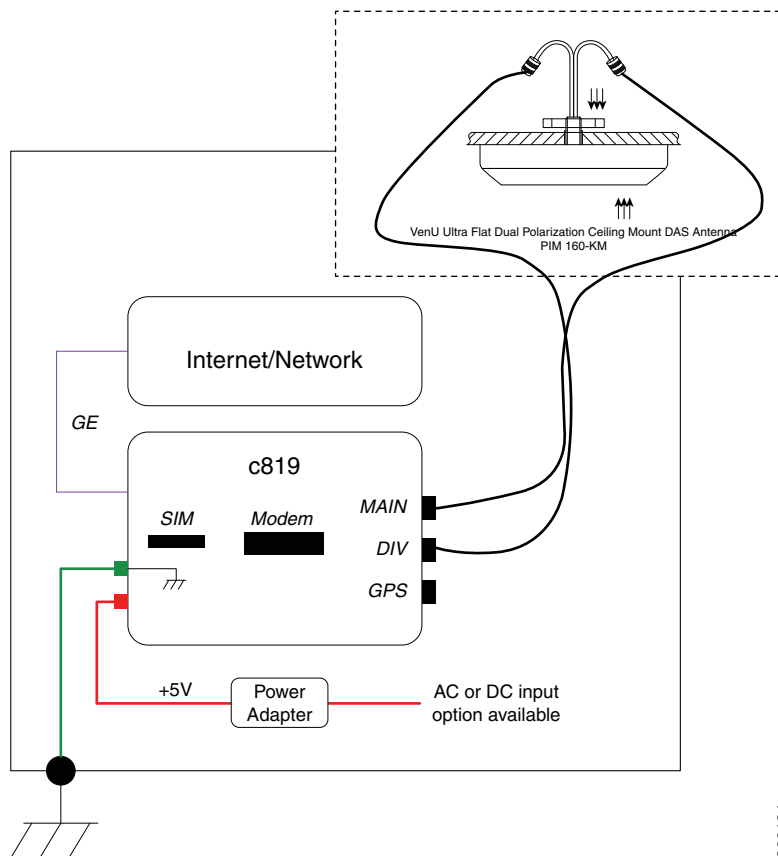| 1	Mounting Screws	6	LED—LTE
2	LED—WWAN	7	LED—GPS[1]
3	LED—RSSI[2]	8	Antenna Connectors—M1/DIV, M0/MAIN
4	RSVD (reserved) port, USB 2.0 mini type B	9	Antenna Connector—GPS
5	LED—EVDO[3]		

1. GPS = Global Positioning System.

2. RSSI = Received Signal Strength Indicator.

3. EVDO = Evolution-Data Optimized.

Figure 5   *Front Panel Details of Cisco 819 4G LTE ISR*
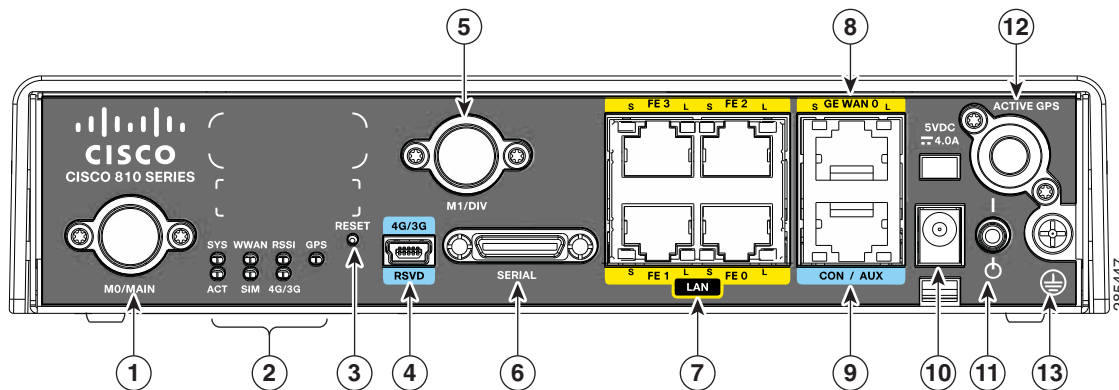
1	4G Antenna connector—M0/MAIN	8	GE WAN port
2	LEDs	9	Antenna Connector—GPS Console/Aux port
3	Reset button	10	Power input
4	4G/3G port	11	Power switch
5	4G Antenna connector—M1/DIV	12	Active GPS antenna connector
6	Serial port	13	Ground
7	FE port		

The following diagram describes how to connect the antenna to Cisco 819 series router inside a building. The connection from the main, diversity of the router is via cables to an externally mounted, low profile, ceiling mount integrated antenna.

VenU Ultra Flat Dual Polarization Ceiling Mount DAS Antenna
PIM 160-KM

Internet/Network

GE

c819

SIM   Modem   MAIN
              DIV
              GPS

+5V   Power
       Adapter

AC or DC input
option available

366124

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

Obtain Documentation and Submit 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*.

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