Cisco 4G Indoor Ceiling-Mount Omnidirectional Antenna (4G-ANTM-OM-CM)

This document outlines the specifications and describes the 4G-ANTM-OM-CM multiband omnidirectional ceiling-mount antenna and contains the following sections:

- Overview
- System Requirements
- Installation Notes
- Safety Instructions
- Installation Instructions
- Obtaining Documentation

Overview

The 4G-ANTM-OM-CM antenna is a ceiling-mount omnidirectional antenna that operates in any of the 3G or 4G bands. These bands cover the following frequencies: 700, 800, 900, 1700, 1800, 1900, 2100, and 2600 MHz.

This antenna is designed for use with Cisco 3G cellular Enhanced High-Speed WAN Interface Cards (EHWICs) and is compatible with Cisco 3G cellular products using a threaded Neill-Concelman (TNC) Male connector.
Figure 1 shows a front view of the 4G-ANTM-OM-CM antenna. The green circle around the Cisco logo means that this is a 4G antenna.

**Figure 1**  Cisco 4G-ANTM-OM-CM Antenna (Front View)
Figure 2 shows a side view of the 4G-ANTM-OM-CM antenna.

Figure 2   Cisco 4G-ANTM-OM-CM Antenna (Side View)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mounting screws and anchors (#6 x 1–1/4&quot;) for mounting on a hard ceiling</td>
</tr>
<tr>
<td>2</td>
<td>Self-adhesive screw covers</td>
</tr>
<tr>
<td>3</td>
<td>Flat washer (wide series)</td>
</tr>
<tr>
<td>4</td>
<td>Curved spring washer</td>
</tr>
<tr>
<td>5</td>
<td>Mounting nut</td>
</tr>
<tr>
<td>6</td>
<td>Antenna cable</td>
</tr>
<tr>
<td>7</td>
<td>TNC male connector</td>
</tr>
<tr>
<td>8</td>
<td>Thread (3/4”–16)</td>
</tr>
</tbody>
</table>
Figure 3 shows a top view of the 4G-ANTM-OM-CM antenna.

Figure 3  Cisco 4G-ANTM-OM-CM Antenna (Top View)

Technical Specifications

The following table lists the technical specifications for the 4G-ANTM-OM-CM antenna.
<table>
<thead>
<tr>
<th>Antenna type</th>
<th>Low profile, ceiling-mount omnidirectional</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating frequency range</strong></td>
<td></td>
</tr>
<tr>
<td>698–806 MHz</td>
<td></td>
</tr>
<tr>
<td>824–894 MHz</td>
<td></td>
</tr>
<tr>
<td>925–960 MHz</td>
<td></td>
</tr>
<tr>
<td>1575 MHz</td>
<td></td>
</tr>
<tr>
<td>1710–1885 MHz</td>
<td></td>
</tr>
<tr>
<td>1920–1980 MHz</td>
<td></td>
</tr>
<tr>
<td>2110–2170 MHz</td>
<td></td>
</tr>
<tr>
<td>2500–2690 MHz</td>
<td></td>
</tr>
<tr>
<td><strong>Nominal Impedance</strong></td>
<td>50 Ohms</td>
</tr>
<tr>
<td><strong>Voltage Standing Wave Ratio (VSWR)</strong></td>
<td>2.0:1</td>
</tr>
<tr>
<td>3.01:1 or less for GPS</td>
<td></td>
</tr>
<tr>
<td><strong>Gain</strong></td>
<td></td>
</tr>
<tr>
<td>700–960 MHz (1 and 1.5 dBi)</td>
<td></td>
</tr>
<tr>
<td>1700–2200 MHz (1.7 and 3.2 dBi)</td>
<td></td>
</tr>
<tr>
<td>2500–2700 MHz (3 and 4 dBi)</td>
<td></td>
</tr>
<tr>
<td><strong>Radiation Pattern:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Vertical plane (-3 dB beam-width)</strong></td>
<td>700–960 MHz (80 and 95 degrees)</td>
</tr>
<tr>
<td>1700 MHz (80 and 90 degrees)</td>
<td></td>
</tr>
<tr>
<td>1800 MHz (75 and 95 degrees)</td>
<td></td>
</tr>
<tr>
<td>1900 MHz (65 and 90 degrees)</td>
<td></td>
</tr>
<tr>
<td>2100 MHz (50 and 65 degrees)</td>
<td></td>
</tr>
<tr>
<td>2500–2700 MHz (50 and 65 degrees)</td>
<td></td>
</tr>
<tr>
<td><strong>Azimuth plane ripple</strong></td>
<td>3.5 dB over all frequencies</td>
</tr>
<tr>
<td><strong>Efficiency</strong></td>
<td>70–85% over all supported frequencies</td>
</tr>
<tr>
<td><strong>Connector type</strong></td>
<td>TNC-Male</td>
</tr>
<tr>
<td><strong>Polarization</strong></td>
<td>Linear (vertical)</td>
</tr>
<tr>
<td><strong>Power withstanding</strong></td>
<td>3 W</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>0.7 lb (0.34 kg)</td>
</tr>
<tr>
<td><strong>Color</strong></td>
<td>White</td>
</tr>
<tr>
<td><strong>Flammability</strong></td>
<td>UL94 V0</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td>Indoor</td>
</tr>
<tr>
<td><strong>Mounting</strong></td>
<td>Nut, flat washer, curved spring washer, #6 x 1-1/4” mounting screws and anchors to be used for mounting to a hard ceiling, self adhesive screw covers.</td>
</tr>
<tr>
<td><strong>Operating temperature</strong></td>
<td>-22° to 158°F (-30° to 70°C)</td>
</tr>
<tr>
<td><strong>Storage temperature</strong></td>
<td>-40° to 185°F (-40° to 85°C)</td>
</tr>
</tbody>
</table>
Figure 4 shows the azimuth plane patterns for the 700 MHz band for the 4G-ANTM-OM-CM antenna.

Figure 4  Azimuth Plane Patterns for the 700 MHz Band
Figure 5 shows the azimuth plane patterns for the 800 MHz band for the 4G-ANTM-OM-CM antenna.

Figure 5  Azimuth Plane Patterns for the 800 MHz Band
Figure 6 shows the azimuth plane patterns for the 900 MHz band for the 4G-ANTM-OM-CM antenna.
Figure 7 shows the azimuth plane patterns for the 1700 MHz band for the 4G-ANTM-OM-CM antenna.

Figure 7  Azimuth Plane Patterns for the 1700 MHz Band
Figure 8 shows the azimuth plane patterns for the 1800 MHz band for the 4G-ANTM-OM-CM antenna.

Figure 8   Azimuth Plane Patterns for the 1800 MHz Band
Figure 9 shows the azimuth plane patterns for the 1900 MHz band for the 4G-ANTM-OM-CM antenna.

**Figure 9  Azimuth Plane Patterns for the 1900 MHz Band**
Figure 10 shows the azimuth plane patterns for the 2100 MHz band for the 4G-ANTM-OM-CM antenna.

**Figure 10  Azimuth Plane Patterns for the 2100 MHz Band**
Figure 11 shows the azimuth plane patterns for the 2600 MHz band for the 4G-ANTM-OM-CM antenna.

Figure 11  Azimuth Plane Patterns for the 2600 MHz Band
Figure 12 shows the elevation plane patterns (\(\Phi = 0\) degree plane cut) for the 700 MHz band for the 4G-ANTM-OM-CM antenna.

Figure 12  Elevation Plane Patterns (\(\Phi = 0\) degree Plane Cut) for the 700 MHz Band
Figure 13 shows the elevation plane patterns (\(\Phi = 0\) degree plane cut) for the 800 MHz band for the 4G-ANTM-OM-CM antenna.

Figure 13  Elevation Plane Patterns (\(\Phi = 0\) degree Plane Cut) for the 800 MHz Band
Figure 14 shows the elevation plane patterns (Phi = 0 degree plane cut) for the 900 MHz band for the 4G-ANTM-OM-CM antenna.

**Figure 14**  Elevation Plane Patterns (Phi = 0 degree Plane Cut) for the 900 MHz Band
Figure 15 shows the elevation plane patterns (\(\Phi = 0\) degree plane cut) for the 1700 MHz band for the 4G-ANTM-OM-CM antenna.

**Figure 15  Elevation Plane Patterns (\(\Phi = 0\) degree Plane Cut) for the 1700 MHz Band**
Figure 16 shows the elevation plane patterns (Phi = 0 degree plane cut) for the 1800 MHz band for the 4G-ANTM-OM-CM antenna.

**Figure 16** Elevation Plane Patterns (Phi = 0 degree Plane Cut) for the 1800 MHz Band
Figure 17 shows the elevation plane patterns (Phi = 0 degree plane cut) for the 1900 MHz band for the 4G-ANTM-OM-CM antenna.
Figure 18 shows the elevation plane patterns (Phi = 0 degree plane cut) for the 2100 MHz band for the 4G-ANTM-OM-CM antenna.

Figure 18  Elevation Plane Patterns (Phi = 0 degree Plane Cut) for the 2100 MHz Band
Figure 19 shows the elevation plane patterns (\(\Phi = 0\) degree plane cut) for the 2600 MHz band for the 4G-ANTM-OM-CM antenna.

Figure 19  Elevation Plane Patterns (\(\Phi = 0\) degree Plane Cut) for the 2600 MHz Band
Figure 20 shows the elevation plane patterns (Phi = 90 degree plane cut) for the 700 MHz band for the 4G-ANTM-OM-CM antenna.

Figure 20  Elevation Plane Patterns (Phi = 90 degree Plane Cut) for the 700 MHz Band
Figure 21 shows the elevation plane patterns (Phi = 90 degree plane cut) for the 800 MHz band for the 4G-ANTM-OM-CM antenna.

Figure 21  Elevation Plane Patterns (Phi = 90 degree Plane Cut) for the 800 MHz Band
Figure 22 shows the elevation plane patterns (\(\Phi = 90\) degree plane cut) for the 900 MHz band for the 4G-ANTM-OM-CM antenna.

**Figure 22**  Elevation Plane Patterns (\(\Phi = 90\) degree Plane Cut) for the 900 MHz Band
Figure 23 shows the elevation plane patterns (\(\Phi = 90\) degree plane cut) for the 1700 MHz band for the 4G-ANTM-OM-CM antenna.

**Figure 23  Elevation Plane Patterns (\(\Phi = 90\) degree Plane Cut) for the 1700 MHz Band**
Figure 24 shows the elevation plane patterns (Phi = 90 degree plane cut) for the 1800 MHz band for the 4G-ANTM-OM-CM antenna.

Figure 24  Elevation Plane Patterns (Phi = 90 degree Plane Cut) for the 1800 MHz Band
Figure 25 shows the elevation plane patterns (\(\Phi = 90\) degree plane cut) for the 1900 MHz band for the 4G-ANTM-OM-CM antenna.

**Figure 25** Elevation Plane Patterns (\(\Phi = 90\) degree Plane Cut) for the 1900 MHz Band
Figure 26 shows the elevation plane patterns (Phi = 90 degree plane cut) for the 2100 MHz band for the 4G-ANTM-OM-CM antenna.

Figure 26  Elevation Plane Patterns (Phi = 90 degree Plane Cut) for the 2100 MHz Band
Figure 27 shows the elevation plane patterns (\(\Phi = 90\) degree plane cut) for the 2600 MHz band for the 4G-ANTM-OM-CM antenna.

**Figure 27  Elevation Plane Patterns (\(\Phi = 90\) degree Plane Cut) for the 2600 MHz Band**

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**System Requirements**

The 4G-ANTM-OM-CM antenna requires a Cisco 3G EHWIC that uses a TNC-Male connector.

**Installation Notes**

**NOTE:** This antenna is designed to be mounted indoors on a ceiling. The antenna is mountable to ceiling tiles less than 1” thick or to hard ceilings with the included installation accessories.

Follow these guidelines to ensure the best possible performance:

The antenna must be mounted to a ceiling to maximize its omnidirectional propagation characteristics. Mounting it on a wall may noticeably decrease the antenna range and overall performance.

- Wherever possible, mount the EHWIC and antenna where the wireless devices would be within sight and avoid physical obstructions. Barriers along the line of sight between antenna and EHWIC degrades the wireless radio signals.
The density of the materials used in a building’s construction determines the number of walls the signal must pass through and still maintain adequate coverage. Consider the following before choosing the location to install your antenna:

- Paper and vinyl walls have very little effect on signal penetration.
- Solid and precast concrete walls limit signal penetration to one or two walls without degrading coverage.
- Concrete and wood block walls limit signal penetration to three or four walls.
- A signal can penetrate five or six walls constructed of drywall or wood.
- A thick metal wall or wire-mesh stucco walls causes signals to reflect back and cause poor penetration.

Avoid mounting the antenna next to a column or vertical support that could create a shadow zone and reduce the coverage area.

Keep the antenna away from reflective metal objects such as heating and air-conditioning ducts, large ceiling trusses, building superstructures, and major power cabling runs. If necessary, use an extension cable to relocate the antenna away from these obstructions.

CAUTION: Install the EHWIC and any antennas away from appliances that share the same frequency bands. Microwave ovens, cordless telephones, and security monitors can temporarily interfere with wireless performance.

CAUTION: We recommend you avoid installing wireless antennas in or near rack-mounted installations that include networking equipment and computer servers whose radiated noise emissions can severely degrade radio performance.

Safety Instructions

Follow these safety instructions when installing your antenna:

- Plan your installation procedure carefully and completely before you begin.

- If you are installing an antenna for the first time, for your own safety as well as that of others, seek professional assistance. Consult your dealer, who can explain which mounting method to use for the location where you intend to install the antenna.

- Choose your installation site with safety as well as performance in mind. Remember that electric power cables and telephone lines look alike. For your safety, assume that any line is an electric power line until determined otherwise.

- Call your local power company or building maintenance organization if you are unsure about cables close to your mounting location.

- When installing your antenna, do not use a metal ladder. Do dress properly: shoes with rubber soles and heels, rubber gloves, and a long-sleeved shirt or jacket.

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

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

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

CAUTION: 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

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

CAUTION: Do not use this product near water; for example, near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement, or near a swimming pool. Statement 1035
CAUTION: Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations. Statement 1036

CAUTION: Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface. Statement 1037

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

CAUTION: Do not locate the 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, because 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

CAUTION: 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

Installation Instructions

To install the Cisco 4G-ANTM-OM-CM antenna on a ceiling:

1. Drill a 3/4” diameter hole in the ceiling where you want to mount the antenna.

2. (Optional) Drill three pilot holes and insert the supplied screw anchors.

   NOTE: You can secure the antenna in place using only the mounting nut. However, for additional support, you can also use the supplied mounting screws. To use the mounting screws, you must first drill three pilot holes and insert the supplied screw anchors in place.

   a. Insert the antenna’s cable and thread through the hole you drilled in Step 1 until the base of the antenna is flush with the ceiling.

   b. Using a pencil or pen, mark the screw positions on the ceiling.

   c. Remove the antenna from the ceiling.

   d. Using a 3/16” drill bit, drill three holes for the screw anchors.

   e. Properly insert the three screw anchors into the pilot holes.

3. Insert the antenna’s cable and thread through the hole you drilled in Step 1 until the base of the antenna is flush with the ceiling.

4. From above the ceiling:

   a. Thread the supplied flat washer through the antenna’s cable and thread.

   b. Thread the supplied spring washer through the antenna’s cable and thread.

   c. Thread the supplied mounting nut through the antenna’s cable.

   d. Attach the mounting nut to the antenna’s thread by manually turning the nut clockwise until the antenna is secured in place.

   e. (Optional) Insert the mounting screws, then cover them with the white screw covers.

5. Connect the antenna’s cable to one of the supported extension cables.
To extend the coaxial cable included with your antenna, we recommend an ultra-low-loss coaxial cable for installation flexibility without a significant loss in range. The following table lists insertion loss information about ULL extension coaxial cables available from Cisco.

<table>
<thead>
<tr>
<th>Cisco Product Number</th>
<th>Cable Length</th>
<th>Frequency Range</th>
<th>Insertion Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>3G-CAB-ULL-20</td>
<td>20 foot (6 m)</td>
<td>500-2000 MHz</td>
<td>-1.50 dB, maximum</td>
</tr>
<tr>
<td>3G-CAB-ULL-50</td>
<td>50 foot (15 m)</td>
<td>500-2000 MHz</td>
<td>-3.50 dB, maximum</td>
</tr>
<tr>
<td>3G-CAB-LMR240-25</td>
<td>25 foot (7.5 m)</td>
<td>2200 MHz</td>
<td>-3.50 dB, maximum</td>
</tr>
<tr>
<td>3G-CAB-LMR240-50</td>
<td>50 foot (15 m)</td>
<td>2200 MHz</td>
<td>-6.90 dB, maximum</td>
</tr>
<tr>
<td>3G-CAB-LMR240-75</td>
<td>75 foot (23 m)</td>
<td>2200 MHz</td>
<td>-10.50 dB, maximum</td>
</tr>
</tbody>
</table>
Figure 28 shows the installation instructions. The callouts in this figure correspond to the steps in Installation Instructions.

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.
Cisco.com

You can access the most current Cisco documentation at this URL:

http://www.cisco.com/univercd/home/home.htm

You can access the Cisco website at this URL:

http://www.cisco.com

You can access international Cisco websites at this URL:


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