Cisco 4G LTE Hardware Installation Guide

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This document provides an overview of the hardware and installation information for Cisco EHWIC-4G-LTEs. Cisco EHWIC-4G-LTEs are single-wide 4G Wireless WAN (WWAN) EHWICs supported on Cisco Integrated Services Routers Generation 2 (ISRs G2).

Contents

Americas Headquarters:
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

Hardware Overview

Cisco EHWIC-4G-LTEs operate over Fourth-Generation Long-Term Evolution (4G LTE) cellular networks and Third-Generation (3G) cellular networks.

Cisco EHWIC-4G-LTEs are single-wide EHWICs supported on Cisco 1900 Series, 2900 Series, and 3900 Series ISRs G2.

The following sections describe the Cisco EHWIC-4G-LTEs:

Cisco 4G WWAN EHWICs

Table 1 describes the Cisco 4G WWAN EHWIC product SKUs.

Table 1 Cisco 4G EHWIC by Mode, Operating Region, and Frequencies

Cisco 4G EHWIC	Description	Mode	Operating Regions	Frequency Band
EHWIC-4G-LTE-V	EHWIC-4G-LTE-V is a dedicated Multimode LTE for Verizon Wireless networks and it is backwards compatible with these technologies: • Evolved High-Rate Packet Data (EHRPD) • Single Carrier Evolution Data Optimized (1x EVDO) Revision A • Single Carrier Radio Transmission Technology (1xRTT)	LTE—EVDO Revision A (DOrA)	North America	• For LTE: 700 MHz (band 13) • For CDMA 1xRTT and 1xEVDO Revision A – 800 MHz – 1900 MHz
EHWIC-4G-LTE-A	EHWIC-4G-LTE-A is a dedicated Multimode LTE for AT&T Wireless networks and it is backwards compatible with these technologies: • Universal Mobile Telecommunications System (UMTS) • High Speed Packet Access + (HSPA+) • HSPA • Global System for Mobile communications (GSM) • Exchanged Data rates for GSM Evolution (EDGE) • General Packet Radio Services (GPRS)	LTE—HSPA+/ HSPA/UMTS/ EDGE/GPRS	North America	For LTE: • 700 MHz (band 17) • AWS (band 4) • 2100 MHz (band 1) For UMTS, HSPA+ and HSPA: • 800 MHz • 850 MHz • 1900 MHz • 2100 MHz For GSM, EDGE and GPRS: • 850 MHz • 900 MHz • 1800 MHz • 1900 MHz

Cisco 4G EHWIC	Description	Mode	Operating Regions	Frequency Band
EHWIC-4G-LTE-G	EHWIC-4G-LTE-G is a Dedicated Multimode LTE for global wireless networks and it is backwards compatible with these technologies: • UMTS • HSPA+ • HSPA • GSM • EDGE • GPRS	LTE—HSPA+/ HSPA/UMTS/ EDGE/GPRS	Global	For LTE: • 800 MHz (band 20) • 900 MHz (band 8) • 1800 MHz (band 3) • 2100 MHz (band 1) • 2600 MHz (band 7) For UMTS/HSPA+/HSPA: • 900 MHz • 2100 MHz For GSM/EDGE/GPRS: • 900 MHz • 1800 MHz • 1900 MHz
EHWIC-4G-LTE-JP	EHWIC-4G-LTE-JP is a dedicated multimode 4G LTE for NTT Docomo Japan, and is based on the Sierra Wireless MC7700 modem. EHWIC-4G-LTE-JP is backward compatible with these technologies: • UMTS • HSPA+	LTE—UMTS/ HSPA+	Japan	For LTE: 2100 MHz (band 1) For UMTS/HSPA+: • 2100 MHz (band 1) • 1900 MHz (band 2) • 850 MHz (band 5)
EHWIC-4G-LTE-BE	EHWIC-4G-LTE-BE is a dedicated multimode LTE for Canada, and is based on Sierra Wireless MC7700 modem. EHWIC-4G-LTE-BE is backward compatible with these technologies: • UMTS • HSPA+	LTE—UMTS/ HSPA+	Canada	For LTE: AWS band 4 For UMTS/HSPA+: • 2100 MHz (band 1) • 1900 MHz (band 2) • 850 MHz (band 5)

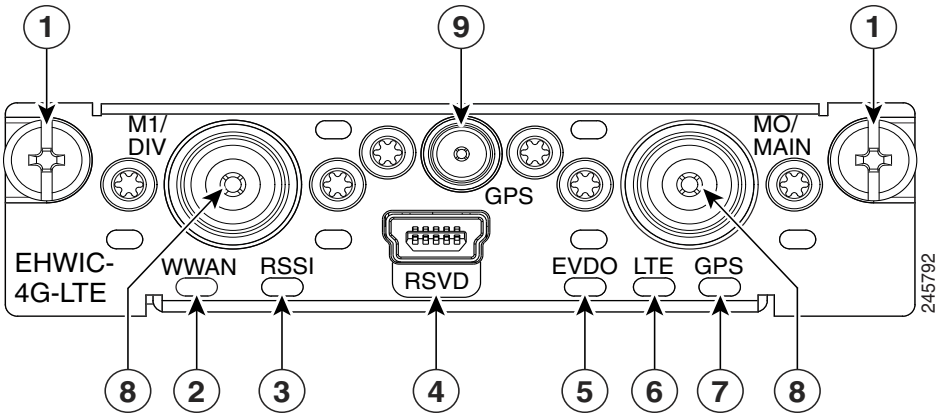
Cisco EHWIC-4G-LTE Ports and LEDs

This section contains the following subsections:

EHWIC-4G-LTE-V Ports and LEDs

Figure 1 shows the EHWIC-4G-LTE-V front panel. Table 2 lists the EHWIC-4G-LTE-V ports and LED indicators and describes their behavior. The LEDs provide a visual indication of your available services.

Figure 1 Front Panel of the Cisco EHWIC-4G-LTE-V



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

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

Table 2 Cisco EHWIC-4G-LTE-V Ports and LED Indicators

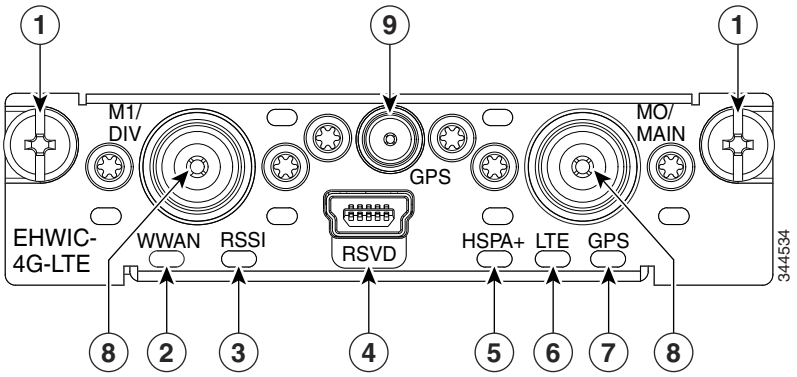
Ports, Connectors, and LEDs	Description
RSVD (Port)	The reserved (RSVD) diagnostic port is not required for normal activation or operation. This port supports modem debug or provisioning. See the "Modem Troubleshooting Using the Diagnostic Port" section in *Configuring Cisco 4G LTE Wireless WAN EHWIC* for details.
Antenna Connectors (Connectors)	M1/DIV—Diversity antenna connector, female TNC[1]. M0/MAIN—Main antenna connector, female TNC. GPS—GPS antenna connector, female SMA[2]. See the "Supported Cisco Antennas and Cables" section on page 9 for details.
WWAN (LED)	Indicates the EHWIC modem status. **Solid green**—Indicates the modem is receiving power and is associated and authenticated but not receiving or transmitting data. **Fast green blink**—Indicates the modem is receiving power and is associated and authenticated. The blink rate is proportional to the transmitted and received data rate. **Slow green blink**—Indicates the modem is receiving power but is not associated or authenticated and is searching for service. Check the antenna, cable, SIM card, or the user account with your service provider. **Off**—Indicates the modem is in reset mode.
RSSI (LED)	Indicates the level of signal strength received by the EHWIC software. **Solid green**—Indicates a high RSSI (greater than –69 dBm). **Medium green blink**—Indicates a medium-level RSSI (from –89 dBm to –69 dBm). **Slow green blink**—Indicates a low-level RSSI (from –99 dBm to –89 dBm). **Off**—Indicates the RSSI is less than –99 dBm. Check for proper antenna attachment. Adjust antenna placement and orientation. **Solid amber**—Indicates no service is detected. Relocate the equipment.
EVDO (LED)	Indicates either HSDPA or EVDO is in service. **Solid green**—Indicates HSDPA is in service. **Blinking green**—Indicates EVDO service is in use. **Off**—Indicates that neither HSDPA nor EVDO services are in use.
LTE (LED)	Indicates whether LTE is in service. **Solid green**—Indicates LTE is in service. **Off**—Indicates LTE service is not being used.
GPS (LED)	Indicates whether the GPS is in service. **Solid green**—GPS is active. **Off**—Indicates the GPS is not active or not detected.

1. TNC = Threaded Neill-Concelman.
2. SMA = Subminiature version A.

EHWIC-4G-LTE-A, EHWIC-4G-LTE-G, EHWIC-4G-LTE-JP, and EHWIC-4G-LTE-BE Ports and LEDs

Figure 2 shows the EHWIC-4G-LTE-A, EHWIC-4G-LTE-G, EHWIC-4G-LTE-JP, and EHWIC-4G-LTE-BE front panel. Table 3 lists the EHWIC-4G-LTE-A, EHWIC-4G-LTE-G, EHWIC-4G-LTE-JP, and EHWIC-4G-LTE-BE ports and LED indicators and describes their behavior.

Figure 2 Front Panel of Cisco EHWIC-4G-LTE-A, EHWIC-4G-LTE-G, EHWIC-4G-LTE-JP, and EHWIC-4G-LTE-BE



1	Mounting screws	**2**	LED—LTE
3	LED—WWAN	**4**	LED—GPS
5	LED—RSSI	**6**	Antenna connectors—M1/DIV, M0/MAIN
7	RSVD (reserved) port, USB 2.0 mini type B	**8**	Antenna connectors—GPS
9	LED—HSPA+		

Table 3 Cisco EHWIC-4G-LTE-A, EHWIC-4G-LTE-G, EHWIC-4G-LTE-JP, and EHWIC-4G-LTE-BE Ports and LED Indicators

Ports, Connectors, or LEDs	Description
RSVD (Port)	The reserved (RSVD) diagnostic port is not required for normal activation or operation. This port supports modem debug or provisioning. See the "Modem Troubleshooting Using the Diagnostic Port" section in *Configuring Cisco 4G LTE Wireless WAN EHWIC* for details.
Antenna Connectors (Connector)	M1/DIV—Diversity antenna connector, female TNC[1]. M0/MAIN—Main antenna connector, female TNC. GPS—GPS antenna connector, female SMA[2]. See the "Supported Cisco Antennas and Cables" section on page 9 for details.

Table 3 Cisco EHWIC-4G-LTE-A, EHWIC-4G-LTE-G, EHWIC-4G-LTE-JP, and EHWIC-4G-LTE-BE Ports and LED Indicators (continued)

Ports, Connectors, or LEDs	Description
WWAN (LED)	Indicates the EHWIC modem status. **Solid green**—Indicates the modem is receiving power and is associated and authenticated but not receiving or transmitting data. **Fast green blink**—Indicates the modem is receiving power and is associated and authenticated. The blink rate is proportional to the transmitted and received data rate. **Slow green blink**—Indicates the modem is receiving power but is not associated or authenticated and is searching for service. Check the antenna, cable, SIM card, or the user account with your service provider. **Off**—Indicates the modem is in reset mode.
RSSI (LED)	Indicates the level of signal strength received by the EHWIC software. **Solid green**—Indicates a high RSSI (greater than –69 dBm). **Medium green blink**—Indicates a medium-level RSSI (from –89 dBm to –69 dBm). **Slow green blink**—Indicates a low-level RSSI (from –99 dBm to –89 dBm). **Off**—Indicates the RSSI is less than –99 dBm. Check for proper antenna attachment. Adjust antenna placement and orientation. **Solid amber**—Indicates no service is detected. Relocate the equipment.
HSPA+ (LED)	Indicates HSPA+ is in service. **Solid green**—Indicates HSPA+ is in service. **Off**—Indicates that a non-HSPA+ is in service or that there is no service.
LTE (LED)	Indicates whether LTE is in service. **Solid green**—Indicates LTE is in service. **Off**—Indicates LTE service is not being used.
GPS (LED)	Indicates whether the GPS is in service. **Solid green**—Indicates the GPS is active. **Off**—Indicates the GPS is not active or not detected.

1. TNC = Threaded Neill-Concelman.
2. SMA = Subminiature version A.

Supported Cisco Antennas and Cables

Table 4 lists the Cisco antennas that are supported for use on the Cisco 4G WWAN EHWIC.

Table 4 Supported Antennas

Cisco Part Number	Description	Maximum Gain and Frequency Ranges	Notes
4G-LTE-ANTM-D	Indoor 4G dipole omnidirectional	2 dBi • 698–806 MHz • 824–894 MHz • 925–960 MHz • 1710–1885 MHz • 1920–1980 MHz • 2110–2170 MHz • 2500–2690 MHz	Multiband dipole antenna. For more information, see *Cisco 4G/3G Omnidirectional Dipole Antenna (4G-LTE-ANTM-D)*.
4G-ANTM-OM-CM	Indoor ceiling-mount omni-directional	698 MHz–2690 MHz	Multiband omnidirectional ceiling-mount antenna. For more information, see *Cisco 4G Indoor Ceiling-Mount Omnidirectional Antenna (4G-ANTM-OM-CM)*.
ANT-4G-OMNI-OUT-N	Multiband outdoor omnidirectional stick antenna	1.5 dBi • 698–960 MHz 3.5 dBi • 1710–2710 MHz • 2300–2700 MHz	Multiband outdoor omnidirectional stick antenna. For more information, see *Cisco Outdoor Omnidirectional Antenna for 2G/3G/4G Cellular (ANT-4G-OMNI-OUT-N)*.
ANT-4G-SR-OUT-TNC	Multiband outdoor omnidirectional saucer antenna	1.5 dBi (peak gain with 10-foot cable) or 0.8 dBi (peak gain with 15-foot cable) • 698–960 MHz 3.7 dBi (peak gain with 10-foot cable) or 0.2 dBi (peak gain with 15-foot cable) • 1710–2700 MHz	Low-profile outdoor saucer antenna. For more information, see *Cisco Integrated 4G Low-Profile Outdoor Saucer Antenna (ANT-4G-SR-OUT-TNC)*.
4G-AE010-R	Extension base with integral 10-foot cable	0.7–6.0 GHz	This is the default antenna extension base. For more information, see *Cisco Single-Port Antenna Stand for Multiband TNC Male-Terminated Portable Antenna (Cisco 4G-AE015-R, Cisco 4G-AE010-R)*.

Table 4 Supported Antennas (continued)

Cisco Part Number	Description	Maximum Gain and Frequency Ranges	Notes
4G-AE015-R	Extension base with integral 15-foot cable	0.7–6.0 GHz	Single-port antenna extension base with 15-foot cable. For more information, see *Cisco Single-Port Antenna Stand for Multiband TNC Male-Terminated Portable Antenna (Cisco 4G-AE015-R, Cisco 4G-AE010-R)*.
4G-ACC-OUT-LA	Lightning Arrestor	800–2200 MHz	4G lightning arrestor kit for use on Cisco 4G wireless devices. For more information, see *Cisco 4G Lightning Arrestor (4G-ACC-OUT-LA)*.
CGR-LA-NF-NF	Lightning Arrestor	800–2200 MHz	4G lightning arrestor kit for use on Cisco 4G wireless devices. For more information, see *Lightning Arrestor for the Cisco 1240 Connected Grid Router*.

Note You can use the RG-174/U type cables to adapt the modem external antenna connection to any of the EHWIC cables and antennas.

Note To comply with FCC requirements for colocation of radio frequency (RF) products, if two or more cellular EHWICs are installed in one chassis, the antennae connected to each card must be located a minimum of 7.9 inches (20 cm) away from the antennae connected to any other card in the system.

Table 5 lists loss information and operating frequency levels for the ultra-low-loss (ULL) LMR 200 cables and LMR 400 cables available from Cisco for use with Cisco 4G Wireless WAN EHWICs and Cisco 4G Wireless WAN ISR platforms.

Table 5 Cisco Extension Cables for Use with 4G EHWICs

Cisco Product Number	Cable Length	Maximum Insertion Loss	Frequency (MHz)	Color	Plenum Rated?[1]
4G-CAB-ULL-20	20 ft (6 m)	1.8 dB	700–2600 MHz	Black	Yes
4G-CAB-ULL-50	50 ft (15 m)	4.2 dB	700–2600 MHz	Black	Yes
4G-CAB-LMR240-25	25 ft (7.5 m)	2.1 dB @ 700 MHz 4.0 dB @ 2.6 GHz	800–1000 MHz 1700–2600 MHz	Black	Yes
4G-CAB-LMR240-25N	25 ft (7.5 m)	2.1 dB @ 700 MHz 4.0 dB @ 2.6 GHz	700–1000 MHz 1700–2600 MHz	Black	No
4G-CAB-LMR240-50	50 ft (15 m)	4.1 dB @ 700 MHz 7.4 dB @ 2.6 GHz	800–1000 MHz 1700–2600 MHz	Black	Yes
4G-CAB-LMR240-75	75 ft (23 m)	6.1 dB @ 700 MHz 11.0 dB @ 2.6 GHz	800–1000 MHz 1700–2600 MHz	Black	Yes
CAB-L400-20-TNC-N	20 ft (6 m)	1.75 dB	700–2600 MHz	Black	No
CAB-L400-50-TNC-N	50 ft (15 m)	4.0 dB	700–2600 MHz	Black	No

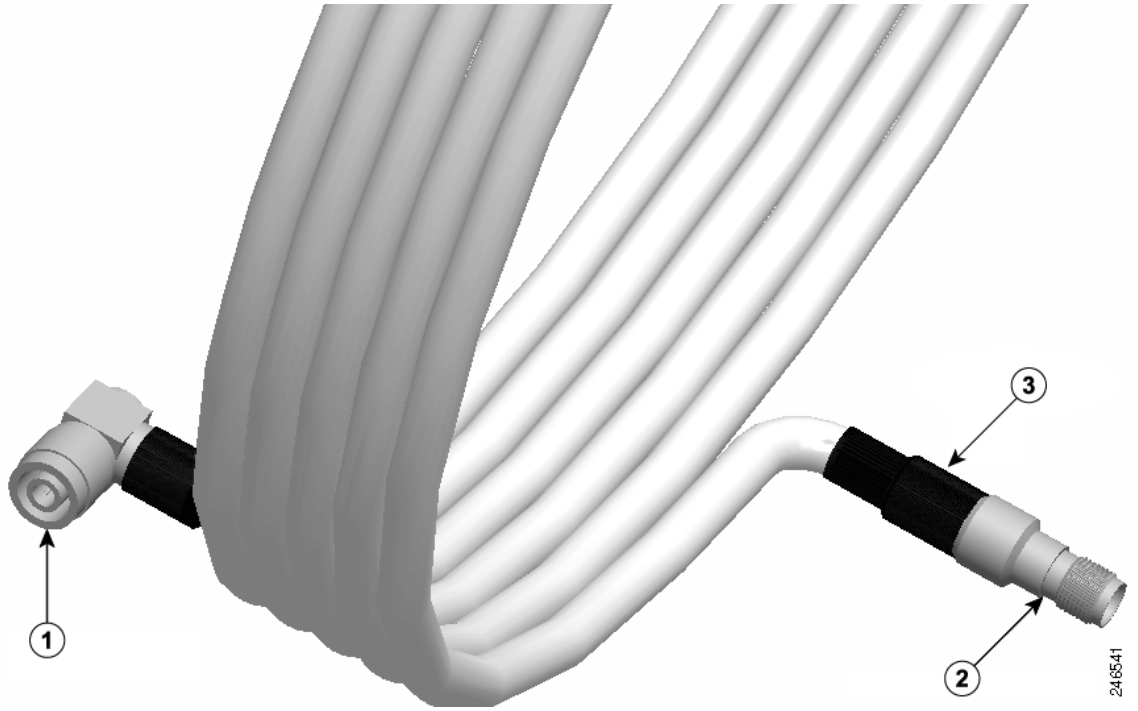
Table 5 Cisco Extension Cables for Use with 4G EHWICs (continued)

Cisco Product Number	Cable Length	Maximum Insertion Loss	Frequency (MHz)	Color	Plenum Rated?[1]
CAB-L400-20-N-N	20 ft (6 m)	2.75 dB	700–2600 MHz	Black	No
4G-AE010-R	10 ft (3 m)	1.4 dB @ 700 MHz 2.0 dB @ 1.9 GHz 2.1 dB @ 2.1 GHz 2.3 dB @ 2.5 GHz 2.4 dB @ 2.7 GHz	700–2600 MHz	Black	No
4G-AE015-R	15 ft (4.6 m)	2.3 dB @ 700 MHz 3.3 dB @ 1.9 GHz 3.7 dB @ 2.1 GHz 4.0 dB @ 2.5 GHz	700–2600 MHz	Black	No

1. Cable can be routed within building plenum spaces.

Figure 3 shows the ULL coaxial cable recommended for Cisco 4G Wireless WAN EHWICs.

Figure 3 Typical Coaxial Cable

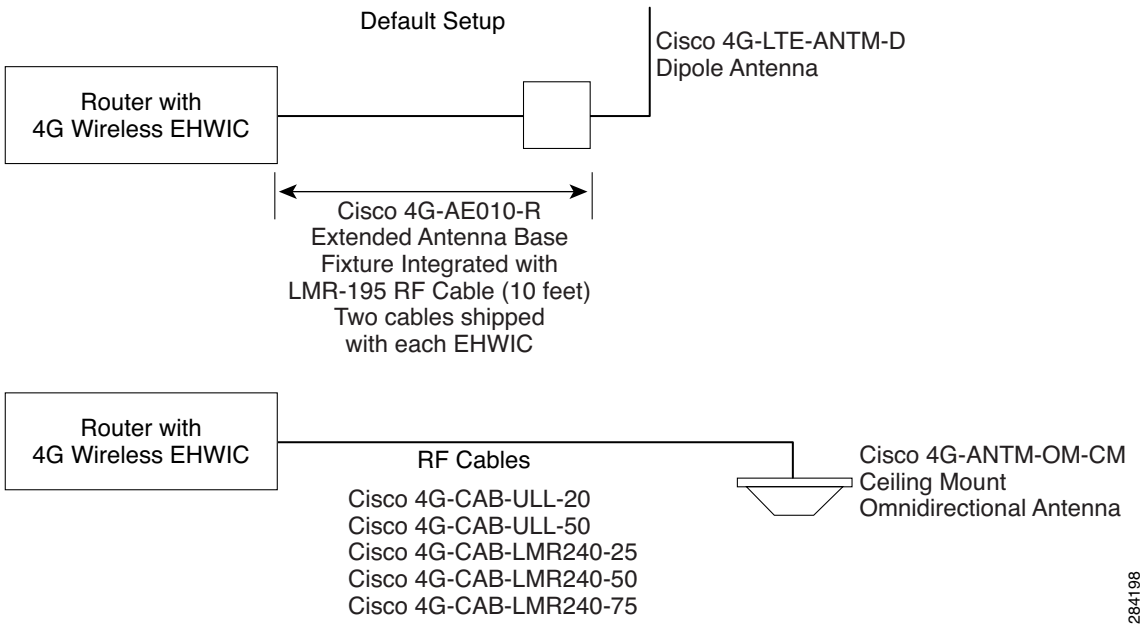


1	TNC Male RA[1]	**3**	Heat Shrink Tube
2	TNC Female Straight		

1. RA = Right Angle.

Figure 4 shows some antenna options for the Cisco 4G Wireless WAN EHWICs.

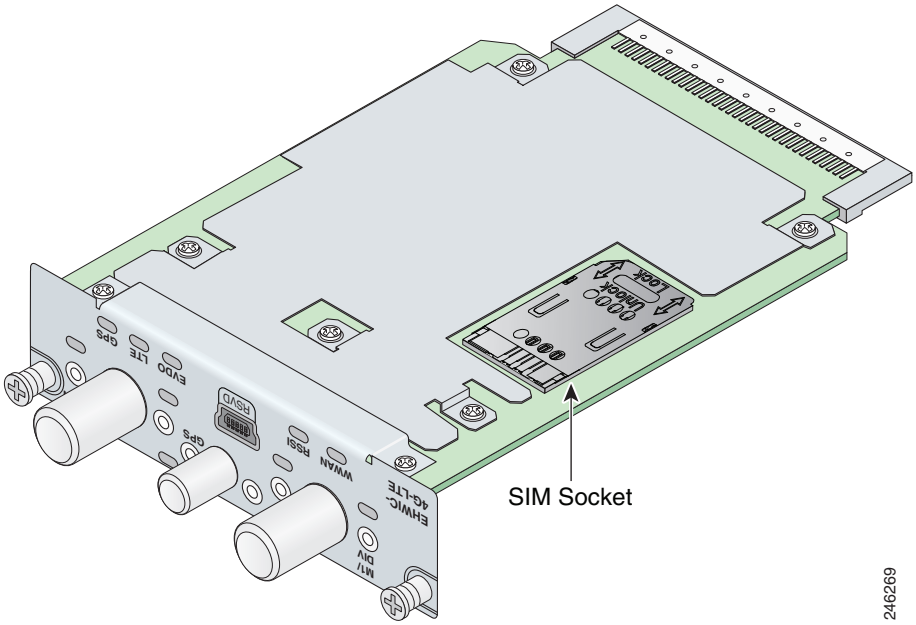
Figure 4 Antenna Options



Installing the SIM card on the Cisco EHWIC-4G-LTE

The SIM card socket is located on the bottom side of the EHWIC, as shown in Figure 5. The cover of the SIM card socket contains a slot into which the SIM card is installed.

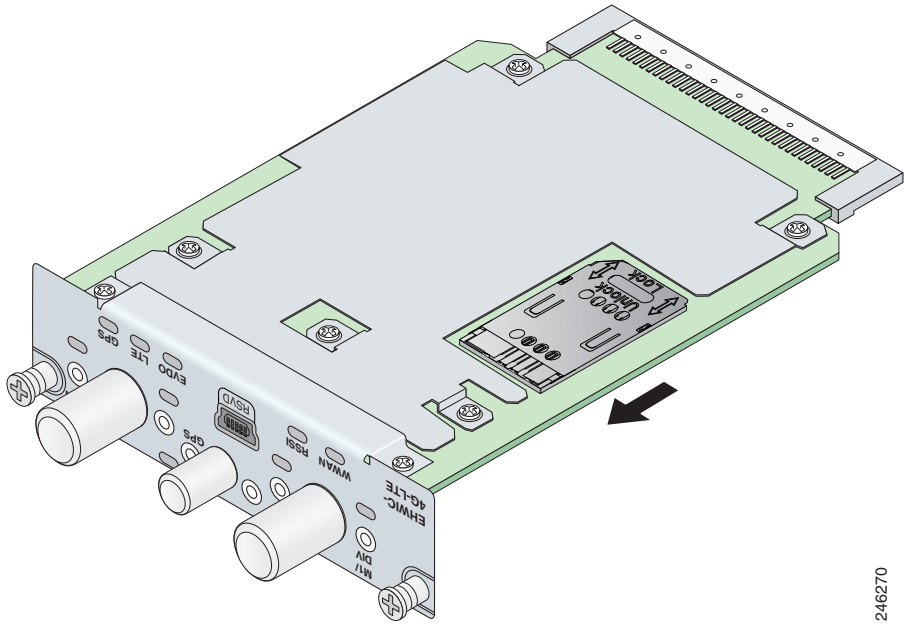
Figure 5 Location of the SIM Socket on the Bottom Side of the EHWIC



Follow these steps to install the SIM card:

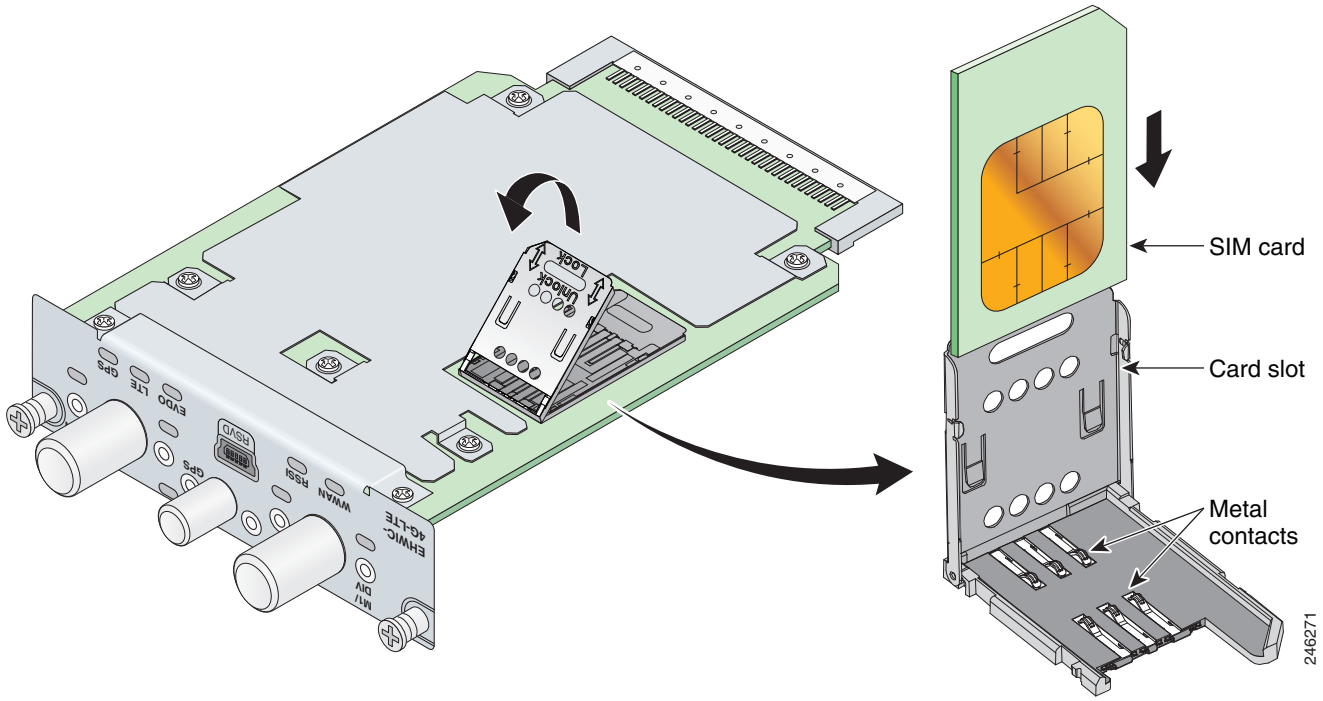
Step 1 To unlock the SIM socket cover, slide the cover toward the faceplate in the direction of the unlock arrow, as shown in Figure 6.

Figure 6 Unlock the SIM Socket Cover



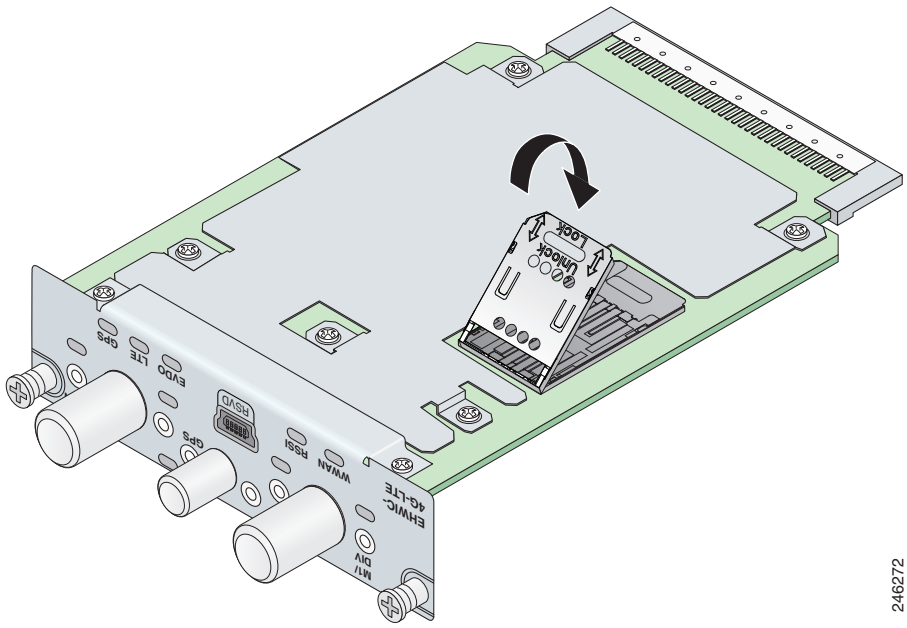
Step 2 Gently lift the cover on its hinges and slide the SIM card into the slot in the cover, as shown in Figure 7.

Figure 7 Slide SIM card into Slot



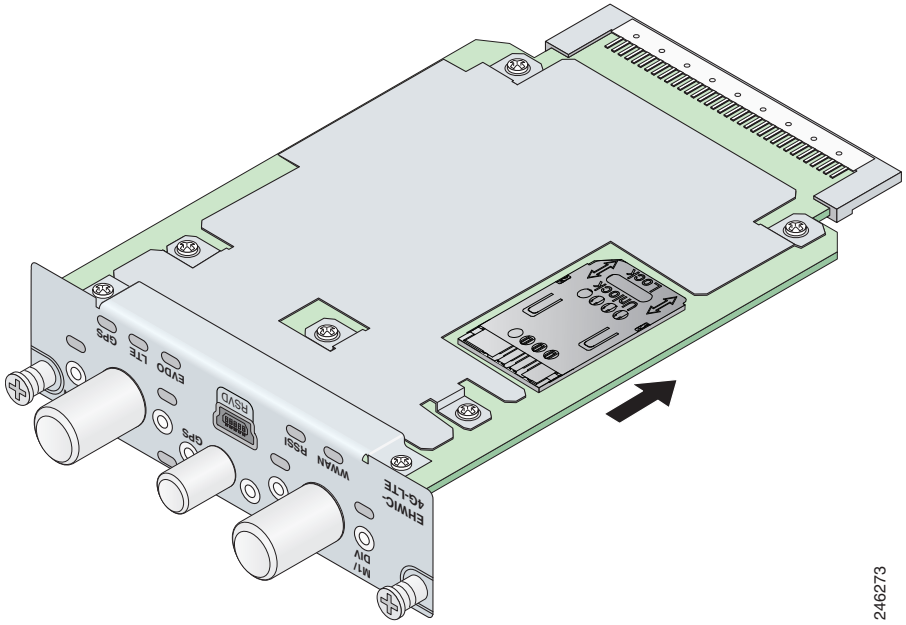
Step 3 Gently push down the cover to close, as shown in Figure 8. The SIM card will come in contact with the metal contacts in the socket.

Figure 8 Close the SIM Socket Cover



Step 4 To lock the cover, slide it away from the faceplate in the direction of the lock arrow, as shown in Figure 9.

Figure 9 Lock the SIM Socket Cover



Installing Cisco EHWIC-4G-LTE

See *Installing Cisco Interface Cards in Cisco Access Routers* for instructions on how to install a single-wide interface card in Cisco access routers.

Additional References

Related Documents

Related Topic	Document Title
Regulatory, compliance, and safety information	• *Cisco Network Modules and Interface Cards Regulatory Compliance and Safety Information* http://www.cisco.com/en/US/docs/routers/access/interfaces/rcsi/IOHrcsi.html
Supported Cisco antennas and cables	• *Installing Cisco Interface Cards in Cisco Access Routers* http://www.cisco.com/en/US/docs/routers/access/interfaces/ic/hardware/installation/guide/inst_ic.html • *Cisco 4G/3G Omnidirectional Dipole Antenna (4G-LTE-ANTM-D)* http://www.cisco.com/en/US/docs/routers/access/wireless/hardware/notes/4G3G_ant.html • *Cisco 4G Indoor Ceiling-Mount Omnidirectional Antenna (4G-ANTM-OM-CM)* http://www.cisco.com/en/US/docs/routers/access/wireless/hardware/notes/antcm4gin.html • *Cisco Outdoor Omnidirectional Antenna for 2G/3G/4G Cellular (ANT-4G-OMNI-OUT-N)* http://www.cisco.com/en/US/docs/routers/connectedgrid/antennas/installing/Outdoor_Omni_for_2G_3G_4G_Cellular.html • *Cisco Integrated 4G Low-Profile Outdoor Saucer Antenna (ANT-4G-SR-OUT-TNC)* http://www.cisco.com/en/US/docs/routers/connectedgrid/antennas/installing/4G_LowProfile_Outdoor_Saucer.html • *Cisco Single-Port Antenna Stand for Multiband TNC Male-Terminated Portable Antenna (Cisco 4G-AE015-R, Cisco 4G-AE010-R)* http://www.cisco.com/en/US/docs/routers/access/wireless/hardware/notes/4Gantex15-10r.html • *Cisco 4G Lightning Arrestor (4G-ACC-OUT-LA)* http://www.cisco.com/en/US/docs/routers/access/wireless/hardware/notes/4Glar.html • *Lightning Arrestor for the Cisco 1240 Connected Grid Router* http://www.cisco.com/en/US/docs/routers/connectedgrid/lightning_arrestor/Lightning_Arrestor_for_the_Cisco_1240_Connected_Grid_Router.html
Software Feature and Configuration	• *Configuring Cisco 4G Wireless WAN EHWIC* http://www.cisco.com/en/US/docs/routers/access/interfaces/software/feature/guide/EHWIC-4G-LTESW.html

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html