Cisco 4G LTE 2.0 Network Interface Modules

The Cisco® Fourth-Generation (4G) Long-Term Evolution (LTE) Network Interface Modules (NIMs) for Cisco 4000 Series Integrated Services Routers (ISRs) provide the next generation of wireless WAN primary and backup solutions.

Product Overview

4G LTE can provide either primary connectivity or backup communications, offering network resiliency for business continuity. With greater agility and speed to deployment than wired solutions, 4G LTE can reduce network cost, and it complements wireline public and private network access. Practical applications of 4G LTE for organizations include parallel networks, primary connection, failover, in-vehicle connectivity, network convergence, and last-mile diversity. The 4G LTE NIM with the Cisco 4000 series Integrated Services Router leads the industry in bringing enterprise grade functions such as Quality of Service (QoS), Multi-Virtual Route Forwarding (Multi-VRF) , advanced VPN, and Unified Communications solutions over LTE.

The Cisco 4G LTE NIMs (Figure 1) provide an enterprise-class 4G multimode LTE wireless WAN (WWAN) solution. With Cisco ISRs, 4G LTE is a powerful primary WAN access solution. Businesses can now run applications such as interactive video and telepresence on a primary 4G LTE connection, which is up to 50 times faster with far lower latency than third-generation (3G) links. These 4G modules support the latest Third-Generation Partnership Project (3GPP) Release 9 LTE standards. Cisco 4G multimode LTE WWAN NIMs provide persistent, reliable LTE connectivity with fallback and transparent handoff to earlier technologies. The cards provide bandwidth to support high-definition (HD) and peer-to-peer (P2P) video calls, providing customers with an excellent mobile broadband experience. The Cisco 4G LTE WWAN NIMs are tightly integrated with the services provided on the award-winning Cisco 4000 Series ISR devices, which deliver secure data, voice, video, and mobility services. The Cisco 4G LTE WWAN NIMs are supported on the modular Cisco 4200, 4300 and 4400 Series ISR devices.

Enterprises are looking for ways to reduce deployment time, enable comprehensive media services, increase revenue, and improve business continuity. The Cisco 4G LTE WWAN NIMs, when coupled with a service provider's wireless data plan, provide a rapidly deployable, high-bandwidth, reliable, and secure solution for branch offices and remote sites. With 4G LTE data rates, the Cisco 4G LTE WWAN NIMs offer a primary WAN link solution capable of running comprehensive branch-office services, including voice and video services.

The Cisco LTE WWAN NIMs include the following models:

- Cisco LTE 2.0 NIM for Global (NIM-4G-LTE-GA): Multimode LTE for carriers that operate LTE on 800-MHz (band 20), 900-MHz (band 8), 1800-MHz (band 3), 2100-MHz (band 1), or 2600-MHz (band 7) networks; the multimode LTE Global (Europe, Australia, etc.) NIMs are backward-compatible with 3G Dual-Cell-high-speed packet access plus (DC-HSPA+), high-speed packet access plus (HSPA+), high-speed packet access (HSPA), Universal Mobile Telecommunications Service (UMTS), Enhanced Data GSM Environment (EDGE), and General Packet Radio Service (GPRS).

- Cisco LTE 2.0 NIM for North America (NIM-4G-LTE-NA): Multimode LTE for carriers that operate LTE on PCS 1900-MHz (band 2), 850 MHz (band 5), 1700- or 2100-MHz (band 4 AWS), or 700-MHz (band 17); the multimode LTE North America (AT&T, Canada) NIMs are backward-compatible with DC-HSPA+, HSPA+, HSPA, UMTS, EDGE, and GPRS
- Cisco LTE 2.0 NIM for Sprint (NIM-4G-LTE-ST) and Cisco LTE 2.0 4G NIM for Verizon (NIM-4G-LTE-VZ): Multimode LTEs for carriers that operate LTE on 700-MHz (band 13), 1700- or 2100-MHz (band 4 AWS), or extended PCS 1900-MHz (band 25); the multimode NIMs are backward-compatible with EVDO A/CDMA 1X BC0, BC1, and BC10

Figure 1. Cisco 4G LTE WWAN NIM for Cisco 4000 Series ISR

With enhanced data rates and improved latency, WWAN services are an ideal way to replace or supplement traditional wire-line services. 4G LTE WWAN data services offered today have theoretical limits of CAT3 100 Mbps on the downlink and 50 Mbps on the uplink. The actual data speed depends on the service provider's network. 4G LTE WWAN data services are an alternative in areas in which broadband services are either not available or very expensive. Cisco is building on these performance milestones and adding support for wireless to our wide variety of WAN interface alternatives.

Main Business Benefits

- Primary connectivity: The Cisco multimode 4G LTE WWAN NIM provides persistent, reliable LTE connectivity with fallback and transparent handoff to earlier technologies. It enables high-performance, secure, reliable, and transparent multimedia applications anywhere and anytime and allows customers to deploy and manage the same device for multiple applications, simplifying deployment and management. For businesses requiring rapid setup or temporary connectivity, 4G LTE WWAN offers the capability to

deploy a new site quickly. Using the integrated services available on the Cisco ISRs, Cisco 4G LTE WWAN NIMs can provide instant and mobile communications during disasters and service outages.

- WAN backup: Resilient WAN access is a crucial requirement for branch offices connecting to a corporate site or the Internet. Although DSL, Frame Relay, ISDN, and dialup are common choices for backup if a primary WAN link fails, a nonterrestrial data path such as a 4G LTE WWAN provides enhanced WAN diversity (Figures 2 and 3). Cisco 4G LTE WWAN NIMs, combined with the Cisco ISRs, offer the capability to automatically initiate connection over the 4G LTE WWAN when the primary WAN link is unavailable. In addition, you can use Cisco 4G LTE WWAN NIMs to provide supplemental bandwidth when the primary WAN link is overloaded (Figure 4).

Figure 2. Cisco 4G LTE WWAN NIM for WAN

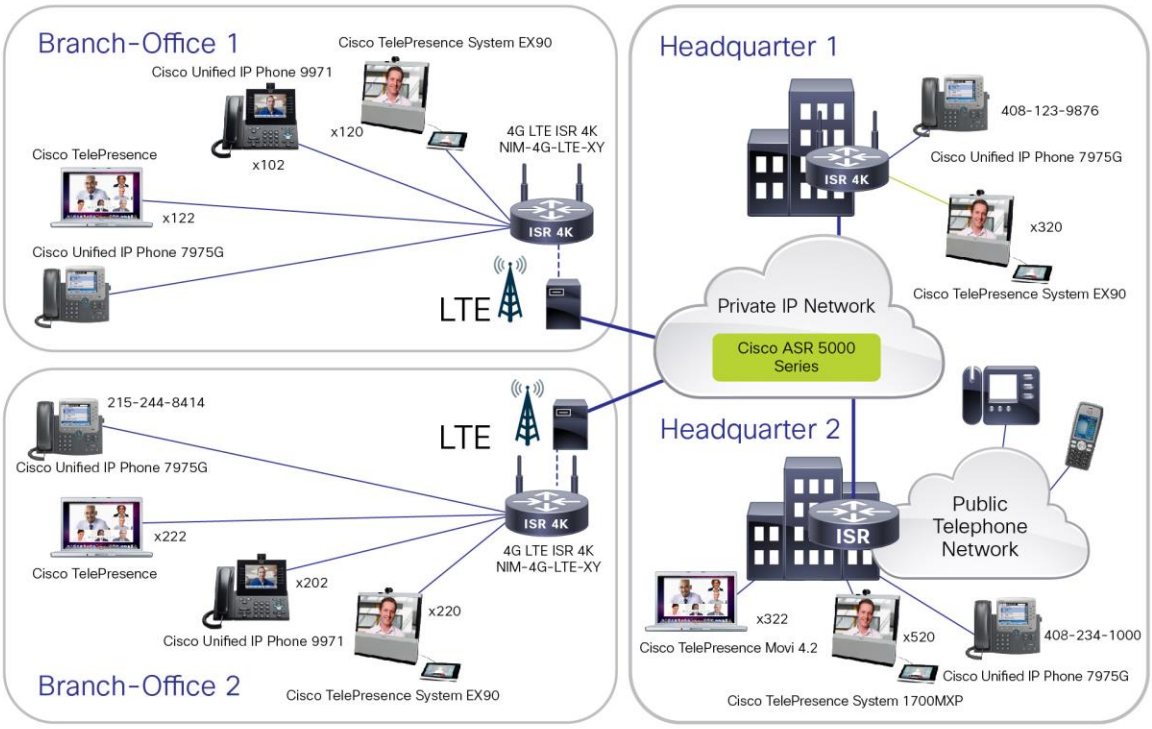


Figure 3. 4G LTE as a Primary WAN Link

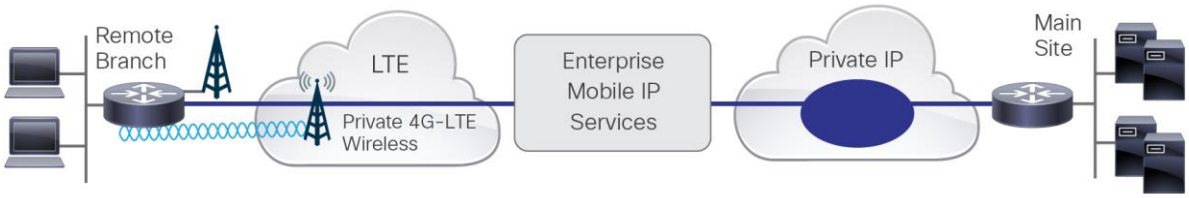
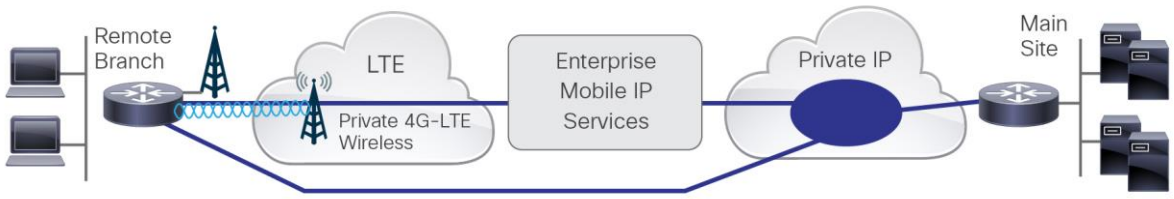


Figure 4. 4G LTE as a Backup WAN Link



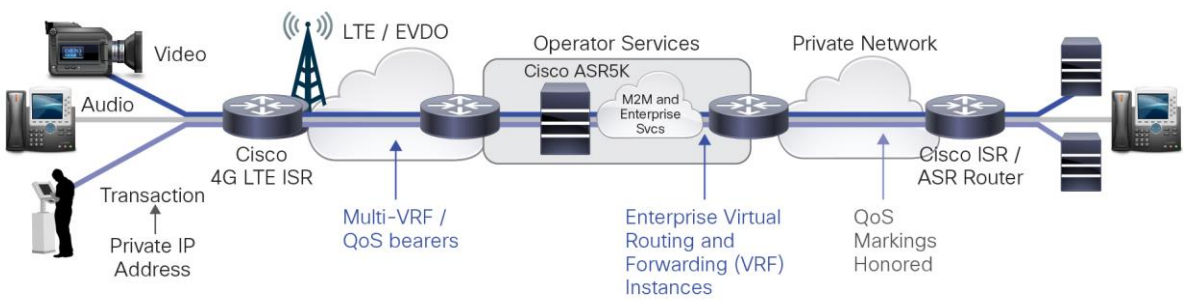
Main Features and Benefits

- **Integrated 4G LTE WWAN broadband:** With the 4G LTE WWAN modem integrated into the router, you gain the benefits of simplified installation and management. In addition, the Cisco 4G LTE WWAN NIMs are tightly integrated with Cisco ISRs, which run the industry-leading Cisco IOS® XE Software, giving access to all the advanced features of Cisco IOS Software such as QoS, intelligent network queuing, and robust security.
- **Performance:** With increasing data use and the proliferation of web-based applications at remote sites, there is an increasing need for high-speed (broadband) data connections to run mission-critical applications at these sites. 4G LTE WWAN services promise low-latency links at high speeds.
- **Short installation time:** Businesses sometimes have to wait weeks or months to get data circuits installed at new locations. For temporary or seasonal sites, wireless data services allow instant connectivity anywhere there is cellular coverage, and rapid deployment allows you to quickly set up networks with WAN connectivity.
- **Network resiliency through WAN diversity:** WAN connectivity is crucial to the functioning of your business, and any downtime means a loss of productivity and lost opportunity. Staying connected and operational during a network outage can be vital. A wireless connection for backup to a remote site provides protection against line outages and an additional level of redundancy, because the 4G LTE WWAN infrastructure is often served by separate facilities, providing redundancy for the entire local loop. With 4G LTE WWAN, Cisco Intelligent WAN (IWAN) provides transport-independent intelligent path control, application optimization, and secure connectivity on any device, over any connection, and to any cloud.
- **Portability:** You can easily relocate wireless routers and Cisco 4G LTE WWAN NIMs wherever coverage is available.
- **Multiple packet data networks (PDNs):** This feature allows configuration of multiple active access-point names (APNs) so that Internet traffic can be kept separate from the corporate traffic.

Entrerprise-Grade WAN Features for 4G LTE

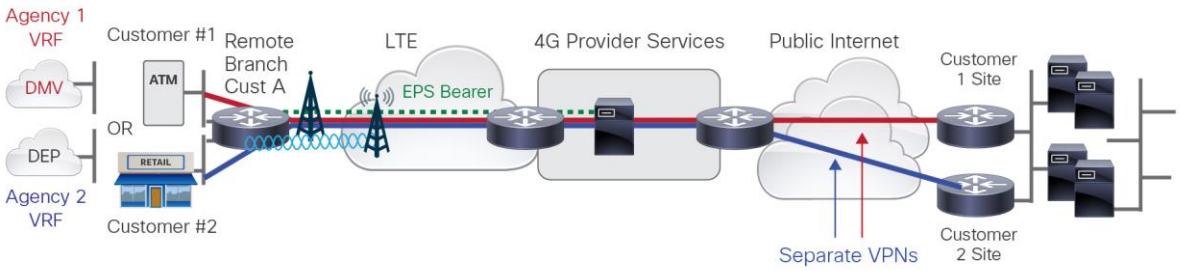
4G LTE multiple-bearer QoS for cellular (Figure 5): The 4G LTE NIM supports 4G LTE multiple-bearer QoS. Detailed information about the bearer is part of the show CLI command output, Simple Network Management Protocol (SNMP) MIBs, etc. The QoS feature is service provider-dependent, and requires the service provider to launch this service.

Figure 5. 4G LTE QoS



- Multi-VRF for cellular: 4G LTE NIMs now support Multi-VRF for cellular networks. Multi-VRF is a Cisco proprietary implementation in addition to the 3GPP specification and requires a Cisco ASR 5000 Packet Gateway (P-GW) as the headend at the service provider's network. The Multi-VRF feature is service provider-dependent, and requires the service provider to launch this service.

Figure 6. Multi-tenant / Agency on Cellular



- Enterprise grade Unified Communications solutions over LTE: The 4G NIM supports voice and video and can be integrated with Cisco Unified Communications cloud or premises-based infrastructure.
- **Public Land Mobile Network (PLMN Search):** UE presents end user with available PLMN search manually. UE can optimize PLMN search procedure using stored information such as RF carriers and cell parameters.

Product Specifications

Table 1 provides specifications for the Cisco 4G LTE WWAN NIMs, and Table 2 provides antenna specifications.

Table 1. Specifications for Cisco 4G LTE WWAN NIMs Among Region Theaters

Region Theaters	Cisco LTE 2.0 NIM for Global (NIM-4G-LTE-GA)	Cisco LTE 2.0 NIM for Verizon (NIM-4G-LTE-VZ)	Cisco LTE 2.0 NIM for Sprint (NIM-4G-LTE-ST)	Cisco LTE 2.0 NIM for North America (NIM-4G-LTE-NA)
Bands	LTE bands 1, 3, 7, 8, 20 (800 [band 20], 900 [band 8], 1800 [band 3], 2100 [band 1], and 2600 [band 7] MHz)	LTE band 4 AWS (1700 and 2100) and band 13 (700)	LTE band 25 extended PCS 1900	LTE band 2 PCS 1900, band 5 (850), and band 4 AWS (1700/2100) and band 17 (700)
Theoretical Download/upload speeds	100 Mbps/50 Mbps	100 Mbps/50 Mbps	100 Mbps/50 Mbps	100 Mbps/50 Mbps
Europe	•	X	X	X
United States	X	• Verizon	• Sprint	• ATT
Australia	•	X	X	X
Canada	X	X	X	•
Middle East, and some Latin American and Asian Countries with specific LTE bands and frequencies	X	X	X	X

Please note: LTE CAT 3 download/upload speeds depend on specific carrier channel bandwidth and carrier LTE network provisioning. Cisco LTE 2.0 NIM performance also depends on specific Cisco 4000 ISR platform scalability with services.

Item	Specification
External interfaces	Cisco LTE 2.0 Micro-USB interface for use with diagnostics and monitoring tools Two TNC connectors with main and multiple-input/multiple-output (MIMO) RF port for antenna connection Separate active Global Positioning System (GPS) with security management appliance (SMA) Support for main and MIMO antenna connector
Form factor	Cisco LTE 2.0 single-wide NIM for Cisco 4000 ISR platforms • Embedded (included with the router) • Upgrade firmware image switching provisioning from flash memory for –GA SKU (FW-MC7304-LTE-AU or FW-MC7304-LTE-GB) • Upgrade firmware image switching provisioning from flash memory for –NA SKU (FW-MC7354-LTE-AT or FW-MC7354-LTE-CA)
Physical dimensions (H x W x D)	1.25 x 3.5 x 7.3 in. (3.18 x 8.89 x 18.54 cm)
Weight	9.5 oz (270 grams)
Subscriber Identity Module (SIM) card	4G LTE SIM card socket (Mini-SIM)
Power	4W without traffic
Supported platforms	Modular Cisco 4200, 4300 and 4400 Series Cisco 4000 ISRs
Weight	9.5 oz (270 grams)
Software compatibility	Modular Cisco 4200, 4300 and 4400 Series ISRs supported with Cisco IOS Software release: • Cisco IOS Software feature set: Universal Cisco IOS XE 3.16 Software image or later • Cisco LTE 2.0 4G NIM for Global (NIM-4G-LTE-GA), Verizon (NIM-4G-LTE-VZ), Sprint (NIM-4G-LTE-ST), North America (NIM-4G-LTE-NA): Mainline Cisco IOS XE Software Release 3.16 with modem firmware 5.5.58.0 or later; firmware for –GA SKU: FW-MC7304-LTE-AU or FW-MC7304-LTE-GB selection option, firmware for –NA SKU: FW-MC7354-LTE-AT or FW-MC7354-LTE-CA selection option Main features Include: • Automatic switch failover between primary and backup links • Multichannel-interface-processor (MIP) profile configuration • Third-generation (3G) SNMP Version 2 (SNMPv2) MIBs and traps • Remotely initiated data callback using voice • Remotely initiated data callback using Short Message Service (SMS) • Remote firmware upgrade over 4G LTE • Virtual diagnostic monitoring • SIM lock and unlock capability • Mobile routing: Enterprise Dynamic Mobile Network Routing (DMNR) based on Cisco Network Mobility (NEMO) • Receive diversity: For all supported bands (MIMO on LTE) • Density: Maximum NIM slots (scalability depends on specific Cisco 4000 Series ISR)
SMS, GPS, and multiple profile	• GPS antenna: SMA connector (separate standalone active GPS with SMA option) • Send and receive SMS (maximum 160 characters) • Configure multiple profile
MIBs	• 3G MIB • Entity MIB • IF MIB • 3G WWAN MIB persistence • Enhanced 3G MIB for 4G MIB extension
Network management and diagnostics	• In-band and out-of-band management using Telnet (Cisco IOS Software command-line interface [CLI]) and SNMP, including MIB II and other extensions • Industry-standard 4G LTE diagnostics and monitoring tools (QUALCOMM CDMA Air Interface Tester [CAIT] and Spirent Universal Diagnostic Monitor [UDM])

Item	Specification
Modem information	• Modem form factor: Embedded Peripheral Component Interconnect (PCI) minicard • Cisco LTE 2.0 NIM for Global (NIM-4G-LTE-GA): Sierra Wireless MC7304 with Qualcomm MDM9215 • Cisco LTE 2.0 NIM for North America (NIM-4G-LTE-NA): Sierra Wireless MC7354 with Qualcomm MDM9615 • Cisco LTE 2.0 NIM for Verizon (NIM-4G-LTE-VZ) and Cisco LTE 2.0 4G NIM for Sprint (NIM-4G-LTE-ST): Sierra Wireless MC7350 with Qualcomm MDM9615
Carrier support	For an updated list of carriers that offer services with Cisco 4G LTE WWAN NIM, please visit http://www.cisco.com/go/4g.
Update	OTA-DM (Firmware upgrade process is similar to Cisco IOS Software upgrade and not through OTA-DM)
Programming interfaces	Cisco IOS XE Software CLI
Wireless technologies supported	**Cisco LTE 2.0 NIM for Global (NIM-4G-LTE-GA)** • LTE 800 MHz (band 20), 900 MHz (band 8), 1800 MHz (band 3), 2100 MHz (band 1), and 2600 MHz (band 7) Backward compatibility: • UMTS and HSPA+: 850 (band 5), 900 (band 8), 1900 (band 2), and 2100 (band 1) MHz • Quad-band EDGE, GPRS, and GSM: 800, 900, 1800, and 1900 MHz • HSPA+ speed DL up to CAT20 (42.2 Mbps) and UL up to CAT6 (5.76 Mbps) • DC-HSPA+ speed DL with CAT24 (42.2 Mbps) and UL up to CAT6 (5.76 Mbps) **Cisco LTE 2.0 NIM for North America (NIM-4G-LTE-NA)** • LTE 1900 MHz (band 2 PCS), 850 MHz (band 5), 1700/2100 MHz (band 4 AWS), and 700 MHz (band 17) Backward compatibility: • UMTS and HSPA+: 850 (band 5), 900 (band 8), 1700/2100 (band 4 AWS), 1900 (band 2), and 2100 (band 1) MHz • Quad-band EDGE, GPRS, and GSM: 800, 900, 1800, and 1900 MHz • HSPA+ speed DL up to CAT20 (42.2 Mbps) and UL up to CAT6 (5.76 Mbps) • DC-HSPA+ speed DL with CAT24 (42.2 Mbps) and UL up to CAT6 (5.76 Mbps) **Cisco LTE 2.0 NIM for Verizon (NIM-4G-LTE-VZ) and Cisco LTE 2.0 4G NIM for Sprint (NIM-4G-LTE-ST)** • LTE 700 MHz (band 4 AWS), 1700/2100 MHz (band 4 AWS), and 1900 MHz (band 25 extended PCS) • Backward compatibility: • EVDO Rev A/CDMA 1x BC0, BC1, BC10
LED indicators	**WWAN LED (connection status indication)** • Enable (EN): Indicates module state (Green: Good, Amber: Failure) • Received Signal Strength Indicator (RSSI) • WWAN: Modem state • Service: Cellular service (Green: 4G LTE, Blue: 3G, EVDO, and HSPA+; Amber: 2G) • GPS: GPS status
Approvals and compliance	**Safety** • UL 60950-1,CAN/CSA-C22.2 No. 60950-1, EN 60950-1, IEC 60950-1, AS/NZS 60950.1, FCC Part 2.1093, RSS-102, and EN 50385 **EMC** • FCC Part 15, Industry Canada ICES-003, EN 301 489-01, EN 301 489-07, EN 301 489-24, EN55022 (CISPR22), EN55024 (CISPR24), EN300-386, EN 61000-3-2, EN 61000-3-3, AS/NZS CISPR 22, CNS13438, and VCCI V-3 **Radio** • FCC Part 2, FCC Part 22, FCC Part 24, RSS 129 and RSS 133, RSS 132 and RSS 133, EN 301 511 GSM, EN 301 908-1, and EN 301 908-2

Table 2. Antenna Specifications

Item	Specification
Diversity (dual antenna) MIMO	• Cisco LTE 2.0 NIM for Global (NIM-4G-LTE-GA), North America (NIM-4G-LTE-NA), Verizon (NIM-4G-LTE-VZ), and Sprint (NIM-4G-LTE-ST)
Multiband indoor omnidirectional antenna ceiling mount (4G-ANTM-OM-CM)	**Electrical Specifications** • Frequency range: 698 to 960 MHz, 1575 MHz, and 1710 to 2690 MHz • Gain: 1 and 1.5 decibels relative to isotropic (dBi) (700 to 960 MHz), 1.7 and 3.2 dBi (1700 to 2200 MHz), 3 and 4 dBi (2500 to 2700 MHz) • Maximum power: 50W • Connector: TNC male • Voltage standing wave ratio (VSWR): 2.0:1 and 3.01:1 or less for GPS • Nominal impedance: 50 ohms • Polarization: Linear vertical **Mechanical Specifications** • Radome material: White ABS • Dimensions (outside dimensions [OD] x height [H]): 5.64 x 2.0 in. (143.3 x 50.8 mm) • Weight: 6.0 oz (170.1g) • Temperature rating: –40 to 185°F) (–40 to 85°C) • Can be used with the following cable extensions: 3G-CAB-ULL-20 and 3G-CAB-ULL-50
Multiband swivel-mount dipole antenna (4G- LTE-ANTM-D)	**Description** • Articulating joint; can be rotated 360 degrees and is capable of maneuvering into three stop positions: 0, 45, and 90 degrees • Plug-threaded TNC connector: Directly mount the antenna on any Cisco 4000 or Cisco 3000 Series wireless ISR NIM with a TNC connector; the threads on the connector must comply with the ANSI 7/16-28 UNEF 2B thread specification • Multiband swivel-mount dipole antenna • Faceplate mount (dual units included with all Cisco 4000 Series ISR WWAN NIMs) **Electrical Specifications** • Operating frequency ranges: 698 to 806 MHz, 824 to 894 MHz, 925 to 960 MHz, 1710 to 1885 MHz, 1920 to 1980 MHz, 2110 to 2170 MHz, and 2500 to 2690 MHz • Maximum peak gain: 2 dBi • Maximum input power: 3W • Connector: TNC plug • VSWR: <2.5:1 or less • Characteristic impedance: 50 ohms **Mechanical Specifications** • Antenna dimensions (L x W x D): 9 x 1.2 x 7/16 in. (229 x 30.5 x 11 mm) • Temperature rating: –22 to 158°F (–30 to 70°C) • Antenna base and random color: Cisco Raven Black
Single-unit antenna extension base (4G-AE015-R)	**Description** • Dimensions: Single-unit antenna extension base (15 ft [457.2 cm]) **Electrical Specifications** • Frequency range: 6 GHz • Attenuation: Less than 3 dB at or below 2.5 GHz • Base connector: TNC socket • Pigtail connector: TNC plug **Mechanical Specifications** • Base material: Cisco gray UL94 V0 PC/ABS plastic • Dimensions: 2.8 x 2.4 x 1.8 in. (7.1 x 6.1 x 4.6 cm) • Weight: 6 oz (0.17 kg) • Cable: 15 ft (457.2 cm) nonplenum rated Pro-Flex Plus 195

Item	Specification
Single-unit antenna extension base (4G-AE010-R)	**Description** • 10-ft [304.8-cm] cable included **Electrical Specifications** • Frequency range: 6 GHz • Attenuation: Less than 3 dB at or below 2.5 GHz • Base connector: TNC socket • Pigtail connector: TNC plug **Mechanical Specifications** Base material: UL 94 V0PC and ABS plastic Dimensions: 2.8 x 2.4 x 1.8 in. (7.1 x 6.1 x 4.6 cm) Weight: 6 oz (0.17 kg) Cable: 10 ft (304.8 cm) nonplenum rated Pro-Flex Plus 195
Outdoor omnidirectional antenna for 2g, 3G, and 4G cellular (ANT-4G-OMNI-OUT-N*)	**Description** • UV-stable radome • Mast-mounting bracket • Applicable for both 3G and 4G solutions • Domestic LTE 700 band and global LTE 2600 band • Domestic cellular and global GSM • WiMAX 2300 and 2500 **Electrical Specifications** • Frequency ranges: 698 to 960 MHz, 1710 to 2170 MHz, and 2300 to 2700 MHz • Nominal gain (dBi): 698 to 960 MHz = 1.5 dBi, and 1710 to 2700 MHz = 3.5 dBi • 3-dB beam width (E plane): 698 to 960 MHz = 81 degrees, 1710 to 2170 MHz = 75 degrees, and 2300 to 2700 MHz = 100 degrees • 3-dB beam width (H plane): 360 degrees, omnidirectional • Polarization: Vertical and linear • Normal impedance: 50 ohms • VSWR: <2.5:1 (698 to 960 MHz) and <2.0:1 (1710 to 2690 MHz) • Radiation pattern: Omnidirectional **Mechanical Specifications** • Mount style: Mast mount, upright position only • Environment: Outdoor • Connector: N-type socket • Antenna length (height): 9.8 x 1 in. (24.9 x 2.45 cm) • Weight: 1.5 lb (.68 kg) • Dimensions (H x OD): 9.8 x 1 in. (248 x 24.5 mm) • Operating temperature range: –22 to 158°F (¬30 to 70°C) • Storage temperature: –40 to 185°F (–40 to 85°C) • Maximum power: 20W • Radome: Polycarbonate, UV, white • Material substance compliance: ROHS compliant
Integrated 4G low-profile outdoor saucer antenna (ANT-4G-SR-OUT-TNC)	**Description** • Applicable for both 3G and 4G solutions • Domestic LTE 700 band and global LTE 2600 band • Domestic cellular and global GSM • Weatherproof UV stable radome • Performance optimized • Excellent flame rating

Item	Specification
	Electrical Specifications • Frequency ranges: 698 to 960 MHz and 1710 to 2700 MHz • Peak gain with 1-ft cable: 1.5 dBi (698 to 960 MHz) and 3.7 dBi (1710 to 2700 MHz) • Peak gain with 15-ft cable: 0.8 dBi (698 to 960 MHz) and 0.2 dBi (1710 to 2700 MHz) • Average efficiency with 1-ft cable: 90% (698 to 960 MHz) and 82% (1710 to 2700 MHz) • Average efficiency with 15-ft cable: 60% (698 to 960 MHz) and 40% (1710 to 2700 MHz) • Polarization: Linear and vertical • Nominal impedance: 50 ohms • VSWR (maximum): 2.0:1 (698 to 960 MHz) and 2.0:1 (1710 to 2700 MHz) • H-plane (3 dB beam width): Omnidirectional **Mechanical Specifications** • Power: 3W • Cable: 15-ft LMR 195 • RF connector: Type N (f); TNC (plug) available • Mount style: Ceiling mount • Radome: PC/ABS, UV stable, black • Material substance compliance: RoHS compliant • Operational temperature: –22 to 158°F (–30 to 70°C) • Storage temperature: –40° to 185°F (–40° to 85°C) • Environment: Indoor • Dimensions (H x OD): 3.4 x 7.9 in. (87 x 200 mm)
Cisco Multiband Panel Outdoor 4G Antenna (ANT-4G-PNL-OUT-N*)	**Description** • Supports 3G and 4G solutions • Supports bands • Wall-mount and mast-mount • Indoor and outdoor • Dual type-N socket connector **Electrical Specifications** • Frequency ranges: 698 to 960 MHz and 1710 to 2700 MHz • VSWR: 2.0:1 maximum • Gain: 5.5 to 10.5 dBi (698 to 960 MHz) and 6.5 to 9.0 dBi (1710 to 2700 MHz) • 3-dB beam width (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, and 55 to 70 degrees = 2500 to 2700 MHz • 3-dB beam width (horizontal plane): 55 to 70 degrees = 698 to 960 MHz and 50 to 90 degrees = 1710 to 2200 MHz • F/B ratio: >15 dB, typical 20 dB = 698 to 960 MHz, and >17 dB, typical 23 dB = 1700 to 2700 MHz • Isolation: >30 dB • Polarization: Slant +/– 45 degrees • Nominal impedance: 50 ohms • Radiation pattern: Directional **Mechanical Specifications** • Mount style: Wall or mast mount • Environment: Outdoor • Connector: Dual type-N socket (direct connect or dual 12 in. (30 cm)) • Antenna length (height): 11.6 in. (2.95 cm) • Temperature range (operating): –22 to 158°F (–30 to 70°C) • Storage temperature: –40 to 185°F (–40 to 85°C) • Wind rating: 160 km per hr • IP rating: IP 54 • Radome: Polycarbonate, UV resistant, white • Material substance compliance: ROHS compliant

Item	Specification
Cisco Lightning Arrestors (CGR-LA-NM-NF* and (CGR-LA-NF-NF*)	**Description** • Broadband operation • DC continuity for outdoor powering • Reversed installation • Permanently installed gas capsule • CGR-LA-NM-NF: Male-to-female connector • CGR-LA-NF-NF: Female-to-female connector **Feature Description** • Arrestor type: Gas discharge tube • Main path connectors: Port 1: Protected, N plug (male); port 2: Unprotected, N jack (female, bulkhead side) • Impedance: 50 ohms • Frequency range: 0 to 5800 MHz • Return loss: Greater than or equal to 20 dB • Insertion loss: Less than or equal to 0.2 dB • RF CW power: Less than or equal to 60W • Surge current handling capability: 10 single, multiple kA (test pulse 8/20 ms) • Residual pulse energy: 250 microsecond typically (test pulse 4 kV 1.2/50 microsecond; 2kA 8/20 microsecond), main path (protected side) • Operating temperature range: –40 to 185°F (–40 to 85°C) • Waterproof rating: IP 67 (according to IEC 60529, data refer to the coupled state) • Mounting and grounding: MH24 (bulkhead) • Material ◦ Housing: Brass ◦ Port 1 center contact: Gold-plated brass ◦ Port 2 center contract: Copper beryllium alloy

* –N antenna works with –N cables and –N lighting arrestor

Ordering Information

To place an order, refer to Tables 3 and 4 and visit the Cisco Ordering home page.

Table 3. Cisco 4G LTE WWAN NIMs Ordering Information

Description	Part Number
Cisco LTE 2.0 4G NIM for Global (Europe, Australia, etc), LTE 800/900/1800/ 2100/2600 MHz, 850/900/1900/2100 MHz UMTS/(DC-) HSPA+ bands	NIM-4G-LTE-GA NIM-4G-LTE-GA= (Spare) NIM-4G-LTE-GA++= (TAA Spare)
Cisco LTE 2.0 4G NIM for North America (AT&T & Canada), LTE 700/850/1900 (1700/ 2100 AWS) MHz, 850/900/1900 (1700/2100) MHz UMTS/(DC-)HSPA+ bands	NIM-4G-LTE-NA NIM-4G-LTE-NA= (Spare) NIM-4G-LTE-NA++= (TAA Spare)
Cisco LTE 2.0 4G NIM for Verizon, LTE 700 (1700/ 2100 AWS) MHz, EVDO Rev A/CDMA 1x BC0, BC1, BC10bands	NIM-4G-LTE-VZ NIM-4G-LTE-VZ= (Spare) NIM-4G-LTE-VZ++= (TAA Spare)
Cisco LTE 2.0 4G NIM for Sprint, LTE 1900 extended PCS MHz, EVDO Rev A/CDMA 1x BC0, BC1, BC10bands	NIM-4G-LTE-ST NIM-4G-LTE-ST= (Spare) NIM-4G-LTE-ST++= (TAA Spare)

Table 4. Antenna Ordering Information

Description	Part Number
Multi-Band Integrated 3-in-1 Indoor/Outdoor IP67 Antenna with GPS	4G-LTE-ANTM-O-3-X 4G-LTE-ANTM-O-3-X= (Spare) X = R (Red); X = B (Black); X = W (White); X = C (Blue);
Multi-Band Swivel Mount Dipole Antenna-Faceplate Mount	4G-LTE-ANTM-D 4G-LTE-ANTM-D= (Spare)
Multi-Band Omnidirectional Antenna-Ceiling Mount	4G-ANTM-OM-CM 4G-ANTM-OM-CM= (Spare)
Single Unit Antenna Extension Base (10-ft cable included)	4G-AE010-R 4G-AE010-R= (Spare)
Single Unit Antenna Extension Base (15-ft cable)	4G-AE015-R 4G-AE015-R= (Spare)
50-ft (15 m) Ultra-Low-Loss LMR 400 Cable with TNC Connector	4G-CAB-ULL-50 4G-CAB-ULL-50= (Spare)
20-ft (6 m) Ultra-Low-Loss LMR 400 Cable with TNC Connector	4G-CAB-ULL-20 4G-CAB-ULL-20= (Spare)
25-ft (7.5 m) Low-Loss LMR 240 Cable with TNC Connector	4G-CAB-LMR240-25 4G-CAB-LMR240-25= (Spare)
50-ft (15 m) Low-Loss LMR 240 Cable with TNC Connector	4G-CAB-LMR240-50 4G-CAB-LMR240-50= (Spare)
75-ft (23 m) Low-Loss LMR 240 Cable with TNC Connector	4G-CAB-LMR240-75 4G-CAB-LMR240-75= (Spare)
Standalone active SMA GPS antenna with 17-ft extender	GPS-ACT-ANTM-SMA GPS-ACT-ANTM-SMA= (Spare)
Multiband Omni-Directional Stick Outdoor 4G Antenna	ANT-4G-OMNI-OUT-N
Multiband Low-Profile Saucer Outdoor 4G Antenna	ANT-4G-SR-OUT-TNC
Multiband Panel Outdoor 4G Antenna	ANT-4G-PNL-OUT-N
50-ft (15 m) Ultra-Low-Loss LMR 400 Cable TNC-N Connector	CAB-L400-50-TNC-N
20-ft (6 m) Ultra-Low-Loss LMR 400 Cable with TNC-N Connector	CAB-L400-20-TNC-N
20-ft (6 m) Ultra-Low-Loss LMR 400 Cable with N Connectors	CAB-L400-20-N-N
Lightning Arrestor Kit: female to female	CGR-LA-NF-NF
Lightning Arrestor Kit: male to female	CGR-LA-NM-NF
4G LTE Lightning Arrestor	4G-ACC-OUT-LA 4G-ACC-OUT-LA= (Spare)

Note: All 4G LTE NIMs (including spares) ship with dual 4G-LTE-ANTM-D and dual extender 4G-AE010-R.
Mobile IP requires a separate APP or AX license.

Service and Support

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco Services help you protect your network investment, optimize network operations, and prepare your network for new applications to extend network intelligence and the power of your business. For more information about Cisco Services, refer to Cisco Technical Support Services and Cisco Advanced Services.

Warranty Information

The Cisco 4G LTE NIMs have a 90-day limited liability warranty.

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For More Information

For more information about the Cisco 4G LTE WWAN NIMs, visit http://www.cisco.com/go/4g or contact your local Cisco account representative.

For configuration guidance, visit:
http://www.cisco.com/c/en/us/td/docs/routers/access/interfaces/NIM/software/configuration/guide/4GLTENIM_SW.html.

For installation guidance (-N antenna and cable), please visit:
http://www.cisco.com/c/en/us/td/docs/routers/access/interfaces/NIM/hardware/installation/guide/4GLTENIM_HIG.html

http://www.cisco.com/en/US/docs/routers/connectedgrid/antennas/installing/Overview.html

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