Cisco LTE Advanced 3.0 Network Interface Modules Wireless WAN Cards

The Cisco® Fourth-Generation Long-Term Evolution (LTE) Advanced Network Interface Modules (NIMs) for Cisco 4000 Series Integrated Services Routers (ISRs) and ENCS 5400 Series provide the next generation of wireless WAN primary, backhaul, IWAN, and backup solutions.

Product Overview

LTE Advanced can provide either primary connectivity or backup communications, offering network resiliency for business continuity. With greater agility and speed to deployment than wired solutions, LTE Advanced can reduce network cost and complement wire-line public and private network access. Practical applications of LTE Advanced for organizations include parallel networks, primary connection, failover, in-vehicle connectivity, network convergence, and last-mile diversity. The LTE Advanced NIMs with the Cisco 4000 Series ISRs and ENCS 5400 Series lead 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 LTE Advanced NIMs (Figure 1) provide an enterprise-class, multimode LTE Advanced wireless WAN (WWAN) solution. With Cisco ISRs, LTE Advanced is a powerful primary WAN access solution. Businesses can now run applications such as interactive video and telepresence on a primary LTE Advanced connection that is up to 150 times faster than 3G links, with far lower latency. These LTE Advanced modules support the latest Third-Generation Partnership Project (3GPP) Release 10 Category 6 LTE Advanced standards. Cisco multimode LTE Advanced WWAN NIMs provide persistent, reliable LTE Advanced 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 LTE Advanced WWAN NIMs are tightly integrated with the services provided on the award-winning Cisco 4000 Series ISRs and ECS 5400 Series, which deliver highly secure data, voice, video, NFVs, and mobility services. The Cisco LTE Advanced WWAN NIMs are supported on the modular Cisco 4200, 4300, and 4400 Series ISRs and ENCS 5400 Series with Network Function Virtualization and services.

Enterprises are looking for ways to reduce deployment time, enable comprehensive media services, increase revenue, and improve business continuity. The Cisco LTE Advanced 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 LTE Advanced fast data rates, these NIMs offer a primary WAN link solution capable of running comprehensive branch-office services, including voice and video services.

Carrier aggregation makes it possible for carriers to transmit data to a device like a wireless router over multiple network bands at once, through a single "aggregated data pipe." LTE Advanced with carrier aggregation utilizes multiple frequency bands at once, devices switch frequency bands in just a few milliseconds. Additionally, even if one band drops, the device stays connected via the second band in the aggregated data pipe.

The Cisco LTE Advanced 3.0 WWAN NIMs include the following models:

- **Cisco LTE Advanced 3.0 NIM-LTEA-EA:** Multimode LTE Advanced 3.0 for carriers that operate FDD LTE 700-MHz (band 12), 700-MHz (band 29), 800-MHz (band 20), 850-MHz (band 5 CLR), 850-MHz (bands 26 Low), 900-MHz (band 8), 1800-MHz (band 3), 1900-MHz (band 2), 1900-MHz (PCS band 25), 1700-MHz and 2100-MHz (band 4 AWS), 2100-MHz (band 1), 2300-MHz (band 30), or 2600-MHz (band 7) networks. The multimode Cisco LTE Advanced 3.0 NIMs are backward compatible with Universal Mobile Telecommunications Service (UMTS) and Dual-Carrier High-Speed Packet Access Plus (DC-HSPA+): 850-MHz (band 5), 900-MHz (band 8), 1800-MHz (band 3), 1900-MHz (band 2), 1700-MHz and 2100-MHz (band 4 AWS), and 2100-MHz (band 1).
  - Multimode LTE Advanced 3.0 for carriers that operate TDD LTE 2500-MHz (band 41).
  - Multimode LTE Advanced 3.0 for carrier aggregation band combinations: 1+8; 2+(2,5,12,13,29); 3+(7,20); 4+(4,5,12,13,29); 7+(7,20); 12+30, 5+30, and 41+41.
- **Cisco LTE Advanced 3.0 NIM-LTEA-LA:** Multimode LTE 3.0 for carriers that operate FDD LTE 700-MHz (band 28), 850-MHz (band 5 CLR), 850-MHz (bands 18 and 19 Low), 900-MHz (band 8), 1500-MHz (band 21), 1800-MHz (band 3), 2100-MHz (band 1), or 2600-MHz (band 7) networks; the multimode Cisco LTE Advanced 3.0 NIMs are backward-compatible with UMTS and DC-HSPA+: 800 MHz (band 19 Japan), 850 MHz (band 5), 850 MHz (band 6 Japan), 900 MHz (band 8), 1800 MHz (band 9), 2100 MHz (band 1), and TD-SCDMA 39.
  - Multimode LTE Advanced 3.0 for carriers that operate TDD LTE 1900 MHz (band 39), 2300 MHz (band 40), 2500 MHz (band 41), or 2600 MHz (band 38).
  - Multimode LTE Advanced 3.0 for carrier aggregation band combinations: 1+(8,18,19,21); 3+(5,7,19,28); 7+(5,7,28); 19+21, 38+38, 39+39, 40+40, and 41+41.

Figure 1. Cisco LTE Advanced WWAN NIM for Cisco 4000 Series ISR and ENCS 5400 Series

With enhanced data rates and improved latency, WWAN services are an ideal way to replace or supplement traditional wire-line services. LTE Advanced WWAN data services offered today have theoretical limits of CAT6 300 Mbps on the downlink and 50 Mbps on the uplink. The actual data speed depends on the service provider's network. LTE Advanced WWAN data services are an alternative in areas where 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 LTE Advanced WWAN NIM provides persistent, reliable LTE Advanced 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, LTE Advanced WWAN offers the capability to deploy a new site quickly. Using the integrated services available on the Cisco ISRs, Cisco LTE Advanced WWAN NIMs can provide instant 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 an LTE Advanced WWAN provides enhanced WAN diversity (Figures 2 and 3). Cisco LTE Advanced WWAN NIMs, combined with the Cisco ISRs, offer the capability to automatically initiate connection over the LTE Advanced WWAN when the primary WAN link is unavailable. In addition, you can use Cisco LTE Advanced WWAN NIMs to provide supplemental bandwidth when the primary WAN link is overloaded (Figure 4).

Figure 2. Cisco LTE Advanced WWAN NIM for WAN Diversity

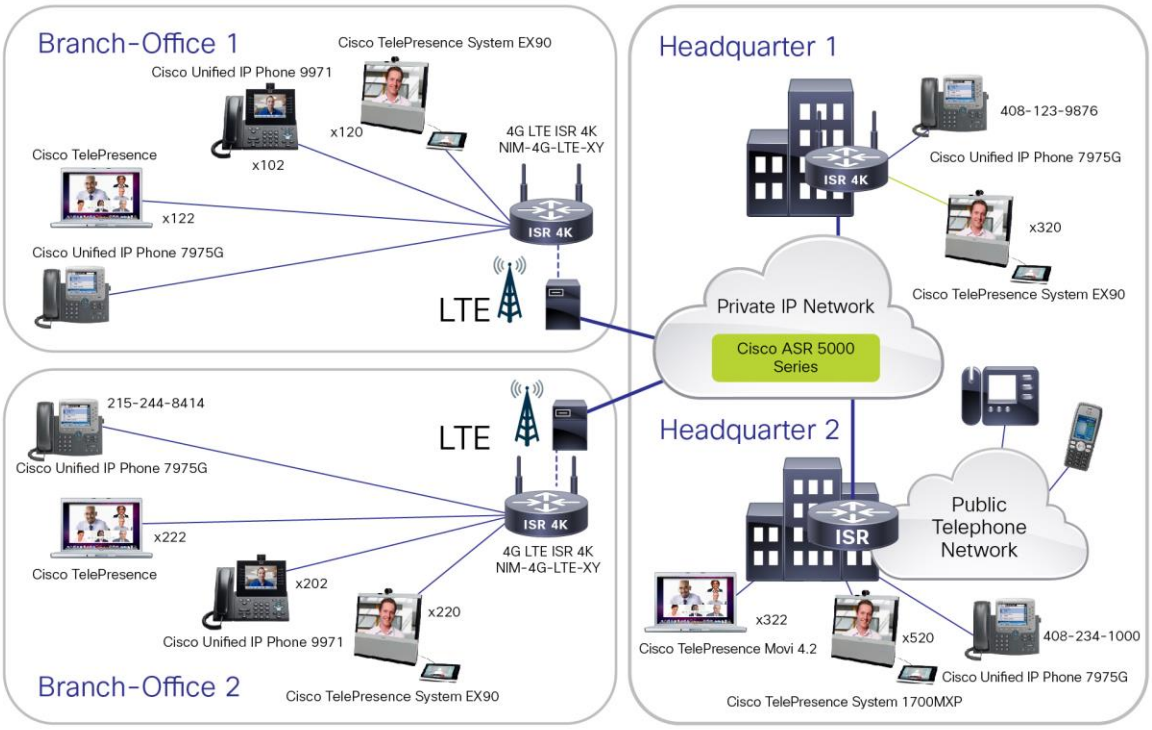


Figure 3. LTE Advanced as a Primary WAN Link

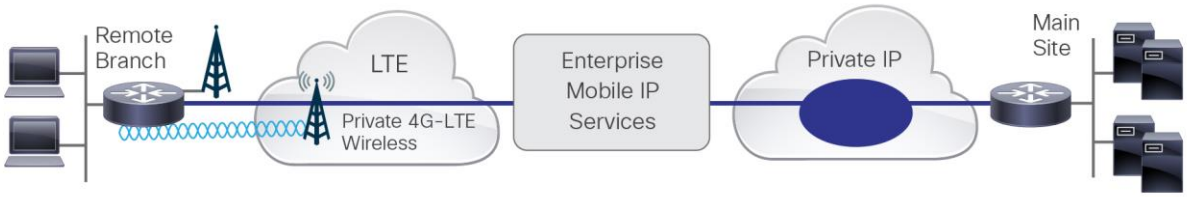
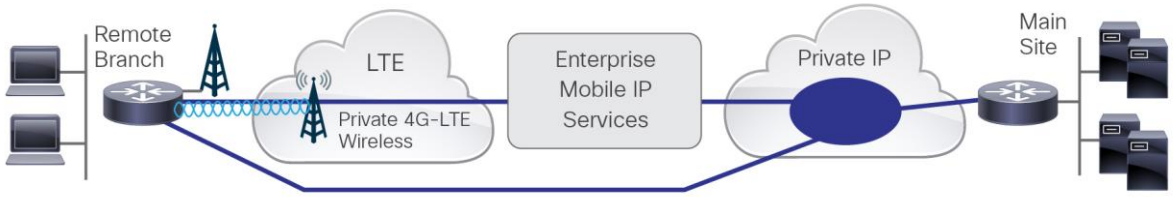


Figure 4. LTE Advanced as a Backup WAN Link



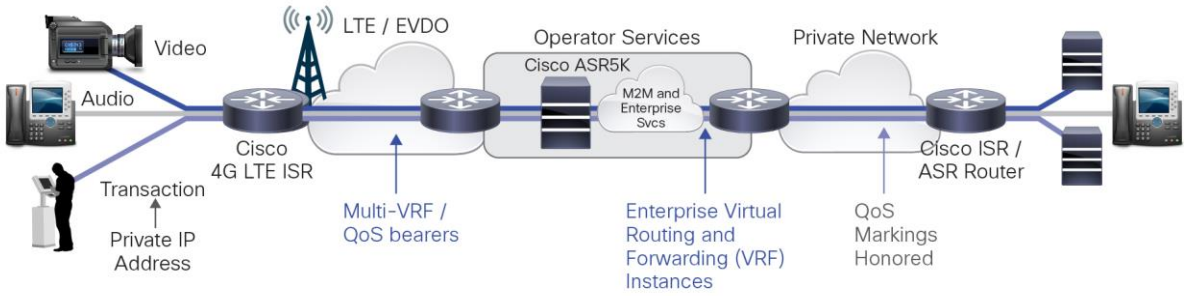
Main Features and Benefits

- **Integrated LTE Advanced WWAN broadband:** With the LTE Advanced WWAN modem integrated into the router, you gain the benefits of simplified installation and management. In addition, the Cisco LTE Advanced WWAN NIMs are tightly integrated with Cisco ISRs and ENCS, 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. LTE Advanced 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 LTE Advanced WWAN infrastructure is often served by separate facilities, providing redundancy for the entire local loop. With LTE Advanced 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 LTE Advanced WWAN NIMs wherever coverage is available.
- **Multiple packet data networks (PDNs):** Configure multiple active access-point names (APNs) so that Internet traffic can be kept separate from the corporate traffic.

Entrerprise-Grade WAN Features for LTE Advanced

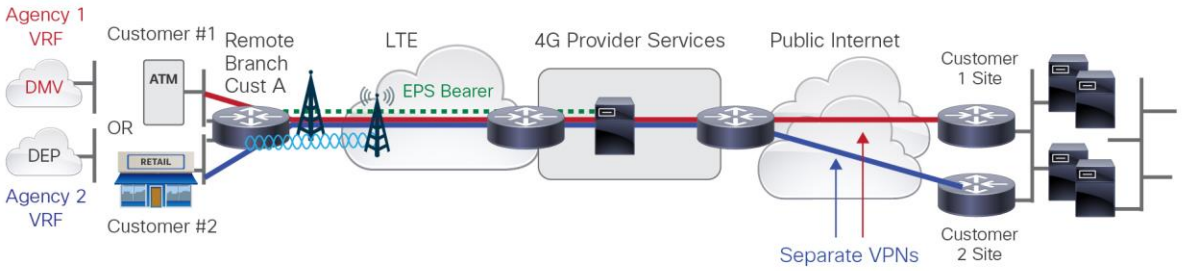
LTE Advanced multiple-bearer QoS for cellular (Figure 5): The LTE Advanced NIM supports LTE Advanced multiple-bearer QoS. Detailed information about the bearer is part of the command-line interface (CLI) show command output, Simple Network Management Protocol (SNMP) MIBs, etc. The QoS feature is service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

Figure 5. LTE Advanced Multiple-Bearer QoS



- **Multi-VRF for cellular:** LTE Advanced NIMs now support Multi-VRF for cellular networks (Figure 6). 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. Multitenant / Agency on Cellular



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

Product Specifications

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

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

Region Theaters	Cisco LTE Advanced 3.0 NIM-LTEA-EA	Cisco LTE Advanced 3.0 NIM-LTEA-LA
Bands	LTE bands 1-5, 7, 12, 13, 20, 25, 26, 29, 30, and 41 FDD LTE 700 MHz (band 12), 700 MHz (band 29), 800 MHz (band 20), 850 MHz (band 5 CLR), 850 MHz (band 26 Low), 900 MHz (band 8), 1800 MHz (band 3), 1900 MHz (band 2), 1900 MHz (PCS band 25), 1700 MHz and 2100 MHz (band 4 AWS), 2100 MHz (band 1), 2300 MHz (band 30), or 2600 MHz (band 7) TDD LTE 2500 MHz (band 41) Carrier aggregation band combinations: 1+8; 2+(2,5,12,13,29); 3+(7,20); 4+(4,5,12,13,29); 7+(7,20); 12+30, 5+30, and 41+41	LTE bands 1, 3, 5, 7, 8, 18, 19, 21, 28, 38, 39, 40, and 41 FDD LTE 700 MHz (band 28), 850 MHz (band 5 CLR), 850 MHz (bands 18 and 19 Low), 900 MHz (band 8), 1500 MHz (band 21), 1800 MHz (band 3), 2100 MHz (band 1), or 2600 MHz (band 7) TDD LTE 1900 MHz (band 39), 2300 MHz (band 40), 2500 MHz (band 41), or 2600 MHz (band 38) Carrier aggregation band combinations: 1+(8,18,19,21); 3+(5,7,19,28); 7+(5,7,28); 19+21, 38+38, 39+39,40+40, and 41+41
Theoretical Category 6 download/upload speeds	300 Mbps/50 Mbps	300 Mbps/50 Mbps
United States	•	
Europe	•	
Canada	•	
Middle East with specific LTE bands/frequencies	•	
Australia		•
Japan		•
China		•
India		•
Southeast Asia		•
Latin America		• Depends on specific operators supporting the LTE bands listed Above
South Korea		•

Note: LTE Advanced CAT 6 download/upload speeds depend on specific carrier channel bandwidth and carrier LTE Advanced network provisioning. Cisco LTE Advanced 3.0 NIM performance also depends on specific Cisco 4000 ISR platform and ENCS 5400 Series scalability with services. The 4221 and 4321 ISRs may require a higher-performance license to achieve higher LTE Advanced performance throughput, depending on the number and type of services.

Item	Specification
External interfaces	• Cisco LTE Advanced 3.0 • 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 GPS with security management appliance (SMA) • Support for main and MIMO antenna connector
Form factor	Cisco LTE Advanced 3.0 single-wide NIM for Cisco 4000 Series ISRs and ENCS 5400 Series • Embedded (included with the router) • Upgrade firmware image switching provisioning from onboard modem flash memory for –EA SKU (FW-7455-LTE-VZ or FW-7455-LTE-AT or FW-7455-LTE-ST or FW-7430-LTE-GN) and –LA SKU (FW-7430-LTE-AU or FW-7430-LTE-JN or FW-7430-LTE-GN)
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 (270g)
Subscriber Identity Module (SIM) card	LTE Dual SIMs card socket (Micro-SIM 3FF, redundancy failover), Auto SIM carrier capability with correct firmware selection
Power	6W without traffic (Dying Gasp power failure detection 600 ms and notification with SMS messaging)
Supported platforms	Modular Cisco 4200, 4300, and 4400 Series ISRs
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 16.3.2 Software image or later • Cisco LTE Advanced 3.0 NIM-LTEA-EA SKU: FW-7455-LTE-VZ (Verizon) or FW-7455-LTE-AT (ATT) or FW-7430-LTE-ST (Sprint) or FW-7430-LTE-GN (Generic for T-Mobile, Canada, Europe, and Middle East) selection option. • Cisco LTE Advanced 3.0 NIM-LTEA-LA SKU: FW-7430-LTE-AU (Australia) or FW-7430-LTE-JN (Japan) or FW-7430-LTE-GN (Generic) 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 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 profiles
MIBs	• 3G MIB • Entity MIB • IF MIB • Enhanced 3G MIB for 4G MIB extension
Network management and diagnostics	• In-band and out-of-band management using Telnet (Cisco IOS Software CLI) and SNMP, including MIB II and other extensions • Industry-standard LTE Advanced diagnostics and monitoring tools (QUALCOMM Air Interface Tester [CAIT] and Spirent Universal Diagnostic Monitor [UDM])
Modem information	• Modem form factor: Embedded Peripheral Component Interconnect (PCI) minicard • Cisco LTE Advanced 3.0 NIM-LTEA-EA/NIM-LTEA-LA: Sierra Wireless EM7455/EM7430 with Qualcomm MDM9230
Carrier support	For an updated list of carriers that offer services with Cisco LTE WWAN NIM, please visit http://www.cisco.com/go/4g.
Update	Firmware and OEM PRI upgrade process is similar to Cisco IOS Software upgrade and not through OTA-DM

Item	Specification
Programming interfaces	Cisco IOS XE Software CLI
Wireless technologies supported	**Cisco LTE Advanced 3.0 NIM-LTEA-EA** • FDD LTE 700 MHz (band 12), 700 MHz (band 29), 800 MHz (band 20), 850 MHz (band 5 CLR), 850 MHz (band 26 Low), 900 MHz (band 8), 1800 MHz (band 3), 1900 MHz (band 2), 1900 MHz (PCS band 25), 1700 MHz and 2100 MHz (band 4 AWS), 2100 MHz (band 1), 2300 MHz (band 30), or 2600 MHz (band 7) • TDD LTE 2500 MHz (band 41) Backward compatibility: • UMTS and HSPA+: 850 MHz (band 5), 900 MHz (band 8), 1800 MHz (band 3), 1900 MHz (band 2), 1700 MHz and 2100-MHz (band 4 AWS), and 2100 MHz (band 1) • HSPA+ speed download up to Category 20 (42.2 Mbps) and upload up to Category 6 (5.76 Mbps) • DC-HSPA+ speed download with Category 26 (62 Mbps) and upload up to Category 8 (11.5 Mbps) **Cisco LTE Advanced 3.0 NIM-LTEA-LA** • FDD LTE 700 MHz (band 28), 850 MHz (band 5 CLR), 850 MHz (bands 18 and 19 Low), 900 MHz (band 8), 1500 MHz (band 21), 1800 MHz (band 3), 2100 MHz (band 1), or 2600 MHz (band 7) • TDD LTE 1900 MHz (band 39), 2300 MHz (band 40), 2500 MHz (band 41), or 2600 MHz (band 38) Backward compatibility: • UMTS and HSPA+: 800 MHz (band 19), 850 MHz (band 5), 850 MHz (band 6), 900 MHz (band 8), 1800 MHz (band 9), and 2100 MHz (band 1) • HSPA+ speed download up to Category 20 (42.2 Mbps) and upload up to Category 6 (5.76 Mbps) • DC-HSPA+ speed download with Category 26 (62 Mbps) and upload up to Category 8 (11.5 Mbps) TD-SCDMA 39 (China Mobile support)
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: LTE Advanced, Blue: 3G, and HSPA+) • 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 301 908-1, and EN 301 908-2

Table 2. Antenna Specifications

Item	Specification
Diversity (dual antenna) MIMO	• Cisco LTE Advanced 3.0 NIM-LTEA-EA and NIM-LTEA-LA
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 (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 ENCS 5400 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 and ENCS 5400 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 radome 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 or 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: 99 mi (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 LTE Advanced WWAN NIMs Ordering Information

Description	Part Number
Cisco LTE Advanced 3.0 NIM for United States, Europe, Canada, and Middle East with Sierra Wireless EM7455/Qualcomm MDM9230, FDD LTE bands 1-5, 7, 8, 12, 13, 20, 25, 26, 29, and 30 and TDD LTE 2500-MHz band 41 with carrier aggregations, and UMTS/HSPA+ bands	NIM-LTEA-EA NIM-LTEA-EA= (Spare)
Cisco LTE Advanced 3.0 4G NIM for Australia, Southeast Asia, Latin America, Japan, China, India, and South Korea with Sierra Wireless EM7430/Qualcomm MDM9230, FDD LTE bands 1, 3, 5, 7, 8, 18, 19, 21, and 28 and TDD LTE bands 38, 39, 40 with carrier aggregations, UMTS/HSPA+ bands and TD-SCDMA 39	NIM-LTEA-LA NIM-LTEA-LA= (Spare)

Table 4. Antenna Ordering Information

Description	Part Number
Multiband 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);
Multiband Integrated 2-in-1 Indoor Antenna	LTE-ANTM-I-2-W
Multiband Swivel-Mount Dipole Antenna – Faceplate Mount	LTE-ANTM-D LTE-ANTM-D= (Spare)
Multiband 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 Omnidirectional 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 LTE Advanced NIMs (including spares) ship with dual 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 LTE Advanced NIMs have a 90-day limited liability warranty.

Cisco and Partner Services for the Branch Office

Services from Cisco and our certified partners can help you transform the branch-office experience and accelerate business innovation and growth in enterprise networks. We have the depth and breadth of expertise to create a clear, replicable, optimized branch-office footprint across technologies. Planning and design services align technology with business goals and can increase the accuracy, speed, and efficiency of deployment. Technical Services can help you improve operational efficiency, save money, and mitigate risk. Optimization services are designed to continuously improve performance and help your team succeed with new technologies. For more information, please visit http://www.cisco.com/go/services.

For More Information

For more information about the Cisco LTE Advanced 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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