Cisco 809 Industrial Integrated Services Routers

The Cisco® 809 Industrial Integrated Services Routers is a compact ruggedized router designed for deployment in harsh industrial environments. The 809 is Cisco's smallest multimode 3G and 4G LTE wireless router, making it an ideal solution for distribution automation and remote asset management across multiple industrial verticals. The 809 has an integrated 9.6-60 VDC power input and is designed to withstand hostile environments, including shock, vibration, dust, and humidity, and supports a wide temperature range (-40°C to +60°C). The IR809 brings together enterprise-grade wireline-like services, such as quality of service (QoS), Cisco Dynamic Multipoint VPN (DMVPN), and Multi-VRF for cellular, highly secure data, voice, and video communications and Cisco IOx, an open, extensible environment for hosting applications at the network edge.

Figure 1.   Cisco 809 Industrial Integrated Services Router with 4G LTE

Product Overview

The Cisco 809 Industrial Integrated Services Routers support the latest 3rd Generation Partnership Project (3GPP) Release 9 Category 3 LTE standards. They provide persistent, reliable LTE connectivity transparent handoffs between LTE and 3G networks.

The following models are available:

- **IR809G-LTE-NA-K9:** Multimode Cisco LTE 2.0 for carriers operating in LTE 700 MHz (band 17), 1900 MHz (band 2 PCS), or 1700/2100 MHz (band 4 AWS) frequencies; backward-compatible with UMTS and HSPA+: 850 MHz (band 5), 900 MHz (band 8), 1900 MHz (band 2 PCS), and 1700/2100 MHz (band 4 AWS).

- **IR809G-LTE-VZ-K9:** Multimode Cisco LTE 2.0 for carriers operating in LTE 700 MHz (band 13), 1700/2100 MHz (band 4 AWS), or 1900 MHz (band 25 extended PCS) frequencies; backward-compatible with EVDO Rev A/CDMA 1x BC0, BC1, BC10.

- **IR809G-LTE-GA-K9:** Multimode Cisco LTE 2.0 for carriers operating in LTE 800 MHz (band 20), 900 MHz (band 8), 1800 MHz (band 3), 2100 MHz (band 1), or 2600 MHz (band 7) frequencies; backward-compatible with UMTS and HSPA+: 850 MHz (band 5), 900 MHz (band 8), 1900 MHz (band 2), and 2100 MHz (band 1).

The Cisco 809 Industrial Integrated Services Routers offer a broad range of features for industrial and enterprise Internet of Things (IoT):

- **Accelerometer and gyroscope**: Monitor speed and angular momentum for automotive applications and detect tampering.
- **GPS:** Enables real-time location tracking of remote assets.
- **Zero-touch provisioning:** This provisioning uses network management tools, such as the IoT Field Network Director, and simplifying deployment of a secure network head-end using a Cisco Industrial Operations Kit.
- **Security services:** Services included area firewall, intrusion prevention, VPN, and Cisco Web Security with ScanSafe, which requires no additional hardware or client software. This security service can, for example, intelligently redirect web traffic to the cloud to enforce granular security and acceptable use policies over user web traffic. With this solution, businesses can deploy the market-leading web security solution quickly and easily to protect assets from web-based threats, such as viruses, while saving bandwidth, money, and resources.
- **4G LTE wireless WAN (WWAN) data services**: With enhanced data rates and improved latency (30 milliseconds or less), WWAN services provide an ideal way to supplement traditional wire-line services. These 4G LTE WWAN data services have average data rates with theoretical limits of 100 Mbps on the downlink and 50 Mbps on the uplink. Actual data speed depends on the service provider's network. With 4G LTE data rates, the 809s offer a primary WAN link capable of running multiple services, including voice and video. The 4G LTE WWAN data services can also be used as a cost-effective alternative in areas where broadband wireline services are either not available or very expensive.
- **Multiple-PDN (Packet Data Network):** This feature allows the router to connect to different access point names (APNs) enabling traffic segregation. For example, public internet traffic can be kept separate from corporate traffic.
- **4G LTE multiple-bearer QoS for cellular:** The 809s support 4G LTE multiple bearers, enabling differentiated treatment of traffic based on QoS policies. The QoS feature depends on the service provider's ability to classify and enforce QoS policies and hence requires the providers to launch this service in their networks.
- **Multi-VRF for cellular:** The 809s support Multi-VRF for cellular network. Multi-VRF is a Cisco proprietary implementation over and above the 3GPP specification and requires Cisco ASR5K Packet Gateway (P-GW) as the head-end at the service provider's network. The Multi-VRF feature is service provider dependent, and requires service providers to launch this service.

Business Benefits and Application Examples

Industrial customers are looking for real-time monitoring and control of industial assets to drive higher operational efficiency.

Utilities

Utilities are looking to have the ability to monitor thousands of miles of electrical or water infrastructure often located in harsh environments through 3G and 4G cellular networks to provide remote assets monitoring, and reliable and secure supervisory control and data acquisition (SCADA) traffic backhauling. Devices that enable this connectivity need to be able to be remotely monitored and configured, and need to support legacy serial interfaces to interconnect with legacy monitoring devices.

Oil and Gas

Oil and gas companies have the need to monitor pipeline infrastructure across wide geographic areas and remote locations using 3G and 4G cellular networks to collect data from remote terminal units and securely transport SCADA traffic to a Network Operations Center.

Transportation

Highways and transportation agencies require reliable always-on communication between speed cameras, monitoring cameras, ticket terminals, etc. Wireless devices to support such a continuous communication need to support 3G and 4G networks to assure good wide coverage, support continuous operation in very harsh environment, and be very compact for deployment in roadside cabinets, as well as support serial interfaces to existing legacy devices.

Primary Features and Benefits

Table 1 lists the features and benefits of Cisco 809 Industrial Integrated Services Routers.

Table 1.   Features and Benefits

Features	Benefits
IoT Enablement	
Compact Ruggedized Form Factor	Designed for hostile outdoor remote assets monitoring and M2M communications and integrated 9-54 VDC power supply
Raw socket transport and SCADA	Raw socket can be used to transport SCADA data from remote terminal units (RTUs). This method is an alternative to the Block Serial Tunnel (BSTUN) protocol. The 809 provides DNP3 serial to IP translation and IEC 60870 T101 to IEC 60870 T104 protocol translation to serve as a SCADA gateway to do the following: ● Receive data from RTUs (T101 or DNP3 serial) and relay configuration commands from the Control Center (T104 or DNP3 IP) RTUs. ● Receive configuration commands from the Control Center and relay RTU data to the Control Center. ● Terminate incoming T104 or DNP3 IP requests from the Control Center when an RTU is offline.
Cisco IOx Application Support	Provides an open, extensible environment for hosting OS and applications at the network edge.
IoT Field Network Director	Available as an optional Industrial Operations Kit. This is a software platform that manages a multiservice network and security infrastructure for IoT applications such as transportation, smart grid, services, distribution automation, and substation automation.
Multiple mounting options	● Supports a variety of mounting options - floor mount and wall mount - and offers DC power options allowing for deployment flexibility.
Lightweight, compact size with low power consumption	● Can be deployed in many different environments where space, heat dissipation, and low power consumption are critical factors.

Features	Benefits
Increased performance to run concurrent services	● Performance allows customers to take advantage of broadband network speeds while running highly secure, concurrent data, voice, video, and wireless services.
Enhanced security	● An integrated stateful and application inspection firewall provides network perimeter security and high-speed IP Security (IPSec); Triple Data Encryption Standard (3DES) and Advanced Encryption Standard (AES) encryption offer data privacy over the Internet. ● Intrusion prevention enforces security policies in a larger enterprise or service provider network. ● Content filtering offers category-based URL classification and blocking, and thus providing increased productivity and better use of company resources. ● Cisco Cloud Web Security and filtering solution requires no additional hardware or client software. Enables remote locations to intelligently redirect web traffic to the cloud to enforce granular security and acceptable use policies over user web traffic.
Multiple WAN and LAN Connections	
Two Gigabit Ethernet interfaces	● Allows for multiple Ethernet device connectivity in a small office or other remote location with the ability to designate a port as the network edge. ● VLANs allow for secure segmentation of network resources.
Two serial interfaces	● Two serial interfaces (one RS232 port and one RS232/RS485 port) to provide two serial connections to local RTU for SCADA transport and RTU management.
Transparent Roaming Between Wireless Networks	
Dual subscriber-identity-module (SIM) support	● Dual SIM feature provides reliability and multihoming capabilities over LTE and HSPA-based networks.
Cisco IOS® Mobile IP features	● Mobile IP offers transparent roaming for mobile networks, establishing a transparent Internet connection regardless of location or movement. This enables mission-critical applications to stay connected even when roaming between networks. ● Assigned IP addresses to the home network are maintained in private or public networks.
Cisco IOS Mobile network features	● Allows an entire subnet or mobile network to maintain connectivity to the home network while roaming.
Multiple wireless WAN technologies	● Users can use the best wireless (4G LTE, 3.7G, 3.5G, 3G or 2G) technology or network available.
Advanced IP Services in Standards-Based Cisco IOS Software	
Advanced security features	● Authorization and authentication determine which individuals and devices have access to the network. ● Firewall protection provides perimeter security when using public networks. ● 3DES and AES encryption provide for highly secure VPNs when transmitting and receiving data over public networks. ● Intrusion detection monitors potential malicious activity on the network.
QoS features	● Provides traffic precedence to delay-sensitive or prioritized applications. ● Facilitates low-latency routing of delay-sensitive applications, such as streaming video.
IP Multicast	● Allows efficient broadcast of data or video for increased situational awareness, multiuser communications, or surveillance applications.
Management and manageability	● Network managers can remotely manage and monitor networks with SNMP, Telnet, or HTTP, and locally through a console port. ● Support for extensive 3G and 4G LTE-based MIBs allows for centralized management of remote devices and gives network managers visibility into and control over the network configuration at the remote site. ● Network managers can reset to a predesignated golden image, as well as configure an 809 through Cisco IOS Software or through an external reset button. ● Network managers can upgrade 3G, 3.5G, 3.7G, and 4G LTE firmware and router configurations remotely. The tight integration with Cisco IOS Software enables router to self-monitor the LTE WAN link and automatically recover from a radio link failure.

Product Specifications

Table 2: 4G LTE specifications for the Cisco 809 Industrial Integrated Services Routers.

Table 2.   4G LTE Specifications

Region Theaters	IR809G-LTE-GA-K9	IR809G-LTE-NA-K9	IR809G-LTE-VZ-K9
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 2 PCS 1900, band 4 AWS (1700/2100), band 17 (700), band 13 (700), band 25 extended PCS 1900	LTE band 13 (700), band 4 AWS (1700/2100) and band 25 extended PCS (1900)
Theoretical Download/upload speeds[*]	100 and 50 Mbps	100 and 50 Mbps	100 and 50 Mbps
Australia	✓	X	X
Europe	✓	X	X
Middle East	✓	X	X
LATAM and APAC	✓ (Dependent on specific operators supporting the previous LTE bands)	✓ (Dependent on specific operators supporting the previous LTE bands)	X
United States	X	✓ ATT (FW Image Provisioning Switching)	✓ Verizon
Canada	X	✓	X

Item	Specification
4G LTE modem form factor	• Embedded (included with the router) • Upgrade -GA FW Image Switching provisioning from flash (FW-MC7304-LTE-AU or FW-MC7304-LTE-GB) • Upgrade -NA FW Image Switching provisioning from flash (FW-MC7354-LTE-AT or FW-MC7354-LTE-CA)
Important 4G LTE features	• Automatic switch failover between primary and backup link • Multichannel-interface-processor (MIP) profile configuration • CDMA data retry • 3G MIB with 3G MIB extension 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 • Mobile Equipment Personalization (MEP) lock and unlock capabilities • SIM lock and unlock capabilities
Dual SIM support	• High reliability, and cellular multihoming support for dual SIM card socket; compliant with ISO-7816-2 (SIM mechanical)
SMS and Global Positioning System (GPS)	• GPS antenna: SMA connector (separate active GPS with SMA antenna option) • Send and receive SMS (maximum 160 characters) • Standalone GPS, needs line of sight • Configure multiple profile
MIBs	• Enhanced 3G MIB with 4G MIB extension (4G parameters are covered with 3G MIB and 3G MIB extension.) • ENTITY MIB • IF MIB • 3G WWAN MIB persistence

Item	Specification
4G LTE 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]).
Modem information	● **Modem form factor:** Embedded Peripheral Component Interconnect (PCI) mini card. ● **IR809G-LTE-GA-K9:** Sierra Wireless MC7304 with Qualcomm MDM9215. ● **IR809G-LTE-NA-AK9:** Sierra Wireless MC7354 with Qualcomm MDM9615 ● **IR809G-LTE-VZ-AK9:** Sierra Wireless MC7350 with Qualcomm MDM9615.
Programming interfaces	● Cisco IOS Software CLI
Wireless technologies supported (performance and throughput)	**IR809G-LTE-GA-K9** Cisco LTE 2.0 800 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, 900, 1900, and 2100 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) **IR809G-LTE-NA-K9** Cisco LTE 2.0 1900 MHz (band 2 PCS), 1700/2100 MHz (band 4 AWS), 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) **IR809G-LTE-VZ-K9** Cisco LTE 2.0 700 MHz (band 13), 1700/2100 MHz (band 4 AWS), 1900 MHz (band 25 extended PCS) Backward compatibility: ● EVDO Rev A/CDMA 1x BC0, BC1, BC10
LED indicators for 4G	● Received-signal-strength indication (RSSI) (green) ● WWAN (green) ● SIM status (green/yellow) ● GPS (green/yellow) ● SYS (green/yellow) ● VPN (green)
Carrier support	● For an updated list of carriers that offer services on the Cisco IR809, visit http://www.cisco.com/go/ir809.

Note: [*] LTE CAT 3 download/upload speeds depend on specific carrier channel bandwidth and carrier LTE network provisioning.

Table 3 lists the software features supported on Cisco 809 Industrial Integrated Services Routers.

Table 3.   Cisco IOS Software Features on 809

Feature	Description
Cisco IOS Software requirements	● Cisco IOS Software feature set: Universal Cisco IOS Software image ● Cisco IOS Software Release - 15.5(3)M, or later, and modem firmware - 5.5.58, or later
IP and IP services features	● Routing Information Protocol Versions 1 and 2 (RIPv1 and RIPv2) ● Generic routing encapsulation (GRE) and multipoint GRE (MGRE) ● Cisco Express Forwarding ● Standard 802.1d Spanning Tree Protocol (STP) ● Layer 2 Tunneling Protocol (L2TP) ● Layer 2 Tunneling Protocol Version 3 (L2TPv3) ● Network Address Translation ● Dynamic Host Configuration Protocol (DHCP) server, relay, and client

Feature	Description
	• Dynamic DNS (DDNS) • DNS Proxy • DNS Spoofing • Access control lists (ACLs) • IPv4 and IPv6 Multicast • Open Shortest Path First (OSPF) • Border Gateway Protocol (BGP) • Performance Routing (PfR) • Enhanced Interior Gateway Routing Protocol (EIGRP) • Virtual Route Forwarding (VRF) Lite • Next Hop Resolution Protocol (NHRP) • Bidirectional Forwarding Detection (BFD) • Web Cache Communication Protocol (WCCP) • Data Link Switching (DLSW)
Security features	**Secure Connectivity:** • Secure Sockets Layer (SSL) VPN for secure remote access • Hardware-accelerated DES, 3DES, AES 128, AES 192, and AES 256 • Public-key-infrastructure (PKI) support • 20 IPSec tunnels • Cisco Easy VPN Client and Server • Network Address Translation (NAT) transparency • Dynamic Multipoint VPN (DMVPN) • Tunnel-less Group Encrypted Transport VPN • Flex VPN • IPSec stateful failover • VRF-aware IPSec • IPSec over IPv6 • Adaptive control technology • Session Initiation Protocol (SIP) application layer gateway **Cisco IOS Firewall:** • Zone-based policy firewall • VRF-aware stateful inspection routing firewall • Stateful inspection transparent firewall • Advanced application inspection and control • Secure HTTP (HTTPS), FTP, and Telnet Authentication Proxy • Dynamic and static port security • Firewall stateful failover • VRF-aware firewall **Content Filtering:** • Subscription-based content filtering with Trend Micro • Support for Websense and SmartFilter • Cisco IOS Software blacklists and whitelists **Integrated Threat Control:** • Intrusion prevention system (IPS) • Control plane policing • Flexible packet matching • Network foundation protection
QoS features	• Low latency queuing (LLQ) • Weighted fair queuing (WFQ) • Class-based WFQ (CBWFQ) • Class-based traffic shaping (CBTS) • Class-based traffic policing (CBTP) • Policy-based routing (PBR) • Class-based QoS MIB • Class of service (CoS)-to-differentiated services code point (DSCP) mapping

Feature	Description
	● Class-based weighted random early detection (CBWRED) ● Network-based application recognition (NBAR) ● Link fragmentation and interleaving (LFI) ● Resource Reservation Protocol (RSVP) ● Real-Time Transport Protocol (RTP) header compression (cRTP) ● Differentiated services (DiffServ) ● QoS preclassify and prefragmentation ● Hierarchical QoS (HQoS)
Management features	● IoT Field Network Director and Industrial Operations Kit ● Cisco Configuration Professional ● Cisco Configuration Express ● Cisco Configuration Engine support ● Cisco AutoInstall ● IP service-level agreement (IP SLA) ● Cisco IOS Embedded Event Manager (EEM) ● Cisco Prime ● Cisco Security Manager ● Telnet, SNMPv3, Secure Shell (SSH) Protocol, CLI, and HTTP management ● RADIUS and TACACS+ ● Out-of-band management with external modem through virtual auxiliary port
High-availability features	● Virtual Router Redundancy Protocol (VRRP) (RFC 2338) ● Hot Standby Router Protocol (HSRP) ● Multigroup HSRP (MHSRP) ● Dial backup with external modem through virtual auxiliary port ● Dual SIM support for cellular multihoming
Metro Ethernet features	● Ethernet operations, administration, and maintenance (OAM) ● Ethernet Local Management Interface (LMI) ● IP SLA for Ethernet
IPv6 features	● IPv6 addressing architecture ● IPv6 name resolution ● IPv6 statistics ● IPv6 translation: transport packets between IPv6-only and IPv4-only endpoints (NAT-PT) ● Internet Control Message Protocol Version 6 (ICMPv6) ● IPv6 DHCP
Number of recommended users	20

Table 4 lists the system specifications, and Table 5 lists antenna specifications for the 809.

Table 4.　　System Specifications

Feature	Specification
Memory	
Default and maximum DRAM	2 GB
Default and maximum flash memory	8 GB eMMC (4GB usable)
IP rating	IP30
Interface Support	
Console	● Mini type-B USB; also supports remote 4G LTE diagnostics and monitoring tools
WAN interfaces	● Wireless WAN with multimode 4G LTE, 3.7G, 3.5G, 3G and 2G speeds
LAN interfaces	● Two 10/100/1000 Base-T Gigabit Ethernet ports

Feature	Specification
LEDs	• System OK (green/amber) • WWAN (green) • Speed and link for Gigabit Ethernet WAN port (green) • Speed and link for all Fast Ethernet LAN ports (green)
Serial interface	• 1 RS-232 and 1 RS-232/RS-485 • Supports asynchronous mode with speed up to 115.2K
Serial protocol support	• SCADA, DNP3, T101-104
Physical Characteristics	
Physical dimensions (H x W x D)	1.25 x 5 x 6.25 in (31.75 x 127 x 158.75 mm)
Weight	1 lb 11 oz. (0.77 kg)
Mounting options	Panel/Door mount
Mean time between failure (MTBF - Ground Benign)	440, 370 hours
Maximum platform power consumption	29W
Environmental operating range	-40° to 140°F (-40° to 60°C)
Operating altitude	50ºC up to 5000 ft (above 5000 ft derate maximum operating temperature 1.50°C per 1000 ft) Maximum altitude: 10,000 ft
Standard safety certifications	• UL 60950-1, 2nd edition • CAN/CSA C22.2 No. 60950-1, 2nd edition • EN 60950-1, 2nd edition • CB to IEC 60950-1, 2nd edition with all group differences and national deviations • EN50155 and IEC61850 • NUP T2 shock testing, non-NEBS 3396
EMC emissions	EN55022/CISPR22, CFR 47 Part 15, ICES003, VCCI-V-3, AS/NZS CISPR22, CNS13438, EN300-386, EN61000-3-2, EN61000-3-3, and EN61000-6-1
EMC immunity	EN55024/CISPR24, (EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-11), and EN300-386
Radio immunity	EN301 489-1, EN 301 489-7, and EN301 489-24
Cellular radio	EN 301 908-1, EN 301 908-2, EN 301 511, 47 CFR Part 22, 47 CFR Part 24 and EN 301 908-13
Power specifications	Nominal voltage: 12V/24V/48V DC Min/max voltage: 9.6-60V DC input Max, Min current: 3A, 0.5A

Table 5. Antenna Specifications

Item	Specification
ANT-3-4G2G1-O	**Description: Cisco Quinta 3 element 3-in-1 transportation antenna** • 2x 4G cellular, 1xGPS • Color: Black radome • RoHS compliant • Environment: Outdoor
ANT-4G-OMNI-OUT-N	**Description: Cisco outdoor omnidirectional antenna for 2G, 3G, and 4G LTE cellular** • UV-stable radome • Mast-mounting bracket • Applicable for both 2G and 3G 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

Item	Specification
	• 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. (0.68 kg)
	• Dimensions (H x Outside dimensions): 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
ANT-4G-PNL-OUT-N	**Description - Cisco multiband panel outdoor 4G LTE antenna:**
	• Supports 3G and 4G LTE 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 female (direct connect or dual 12 in (30 cm))
	• Antenna length (height): 11.6" (2.95 cm)
	• Temperature Range (Operating): -22 to 158-degrees F (-30 to 70-degrees C)
	• Storage temperature: -40 to +85° C
	• Wind rating: 160 Km/H
	• IP rating: IP 54
	• Radome: polycarbonate, UV resistant, white
	• Material substance compliance: ROHS compliant

Item	Specification
ANT-4G-SR-OUT-TNC	**Description - Cisco integrated 4G LTE low-profile outdoor saucer antenna:** ● Applicable for both 3G and 4G LTE solutions ● Domestic LTE 700 band and global LTE 2600 band ● Domestic cellular and global GSM ● Weatherproof UV stable radome ● Performance optimized ● Excellent flame rating **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) ● Nominal impedance: 50 ohms ● VSWR (maximum): 2.0:1 (698 to 960 MHz) and 2.0:1 (1710 to 2700 MHz) **Mechanical specifications:** ● H-plane 3 dB beam width: omnidirectional ● Polarization: linear and vertical ● 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 Outside dimensions)**:** 3.4 x 7.9 in. (87 x 200 mm)
ANT-4G-DP-IN-TNC	**Description: Cisco indoor swivel-mount dipole antenna** ● Low-profile blade style sheath ● Applicable for both 3G and 4G solutions ● Domestic LTE 700 and global LTE 2600 bands ● Domestic cellular and global GSM ● Conformance to RoHS ● Complete cellular and 3G/4G data communications in a single antenna **Electrical Specifications:** ● Operating frequency ranges: 698 to 806 MHz, 824 to 894 MHz, 880 to 960 MHz, 1710 to 1880 MHz, 1850 to 1990 MHz, 1920 to 2170MHz, 2100 to 2500 MHz and 2500 to 2690 MHz ● Peak gain: 0.5 dBi (698 to 960 MHz) and 2.2 dBi (1710 to 2700 MHz) ● Average efficiency: 55% (698 to 960 MHz) 73% (1710 to 2700 MHz) ● Maximum input power: 3 watts ● Voltage standing wave ratio (VSWR): < 2.5:1 ● Characteristic impedance: 50 ohms ● Polarization: linear **Mechanical Specifications:** ● Type: dipole ● Antenna dimensions (L x W x D): 229 mm x 30.5 mm x 15 mm ● Mount style: direct mount ● Environment: indoor ● RF Connector: TNC (m) ● Antenna weight: 49 g ● Temperature rating: -31 to 158 degrees F (-35 to +70 degrees C) ● Material substance compliance: RoHS compliant

Item	Specification
4G-LTE-ANTM-O-3-X	**Description:** ● Multiband low profile indoor or outdoor omnidirectional antenna (IP67 ingress protection) ● Ceiling mount, dual 4G LTE and standalone GPS **Electrical Specifications:** ● Frequency range: 698 to 960 MHz and 1710 to 2700 MHz ● Gain: 2.5 dBi ● Maximum power: 3W ● Connector: SMA with TNC male adapters, and SMA for GPS ● VSWR: < 2.5:1 ● Nominal impedance: 50 ohms ● Polarization: linear vertical **Mechanical Specifications:** ● Radome material: white, black, red, or blue ABS, UL-94 V0 ● Cable: 4 ft RG174 VW-1 compliant ● Height and base diameter: 90 mm and 137 mm ● Temperature rating: -40° to 185°F (-40° to 85°C) ● Mounting: 5/8-inch lug with serrated face nut (5/8-inch diameter hole through mounting surface) ● Can be used with the following cable extensions: 4G-CAB-ULL-20 and 4G-CAB-ULL-50
4G-ANTM-OM-CM	**Description:** ● Multiband indoor omnidirectional antenna ● Ceiling mount **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 ● 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 x height): 5.64 in. x 2.0 in. (143.3 X 50.8 mm) ● Weight: 6.0 oz. (170.1 g ● 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
Antenna extension 4G-AE015-R	**Description:** ● 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) non-plenum rated Pro-Flex Plus 195
Antenna extension 4G-AE010-R	**Description:** ● Single-unit antenna extension base (10 ft. [304.8 cm], one 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

Item	Specification
	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) non-plenum rated Pro-Flex Plus 195

[*] -N antenna works with -N cables and -N lighting arrestor

Ordering Information

For more information about ordering Cisco 809 Industrial Integrated Services Routers, visit the Cisco Ordering home page and refer to Tables 6 and 7.

Table 6.   Ordering Information

Product	Description
Cisco IR809G 4G LTE Integrated Services Routers	
IR809G-LTE-GA-K9	Compact Cisco IR809 Ruggedized Secure Multi-Mode 4G LTE M2M ISR with Qualcomm MDM9215 for Australia and Europe, LTE 800/900/1800/2100/2600 MHz, 850/900/1900/2100 MHz UMTS/HSPA+ bands
IR809G-LTE-NA-K9	Compact Cisco IR809 Ruggedized Secure Multi-Mode 4G LTE M2M ISR with Qualcomm MDM9615 for North America, LTE 700 MHz (band 17), 1900 MHz (band 2 PCS), or 1700/2100 MHz (band 4 AWS) networks; backward-compatible with UMTS and HSPA+: 850 MHz (band 5), 900 MHz (band 8), 1900 MHz (band 2 PCS), and 1700/2100 MHz (band 4 AWS)
IR809G-LTE-VZ-K9	Compact Cisco IR809 Ruggedized Secure Multi-Mode 4G LTE M2M ISR with Qualcomm MDM9615 for Verizon in North America, LTE 700 MHz (band 13), 1700/2100 MHz (band 4 AWS), or 1900 MHz (band 25 extended PCS) networks; backward-compatible with EVDO Rev A/CDMA 1x BC0, BC1, BC10
Power Supplies and Mounting Brackets	
PWR-IE50W-AC	AC power adapter with 110/220V AC and 88-300V DC input (Temperature: -40C to 60C)
IOS Software and Licenses	
SL-IR800-DATA-K9	Cisco 800 Series Industrial Routers Data License
SL-IR800-SNPE-K9	Cisco 800 Series Industrial Routers No Payload Encryption License
SL-IR800-SEC-K9	Cisco 800 Series Industrial Routers Security License
SL-IR800-IPB-K9	Cisco 800 Series Industrial Routers IP Base License
FW-MC7304-LTE-AU	Cisco Australia MC7304 modem image switching provisioning firmware
FW-MC7304-LTE-GB	Cisco Global MC7304 modem image switching provisioning firmware
FW-MC7354-LTE-AT	Cisco ATT MC7354 modem image switching provisioning firmware
FW-MC7354-LTE-CA	Cisco Canada MC7354 modem image switching provisioning firmware
FW-MC7350-LTE-VZ	Cisco Verizon MC7350 modem image switching provisioning firmware

Table 7.   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 (dual included)	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, one cable included)	4G-AE010-R 4G-AE010-R= (Spare)
Single Unit Antenna Extension Base (15-ft cable)	4G-AE015-R 4G-AE015-R= (Spare)

Description	Part Number
50-ft (15m) Ultra Low Loss LMR 400 Cable with TNC Connector	4G-CAB-ULL-50 4G-CAB-ULL-50= (Spare)
20-ft (6m) 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 (5 m)extender	GPS-ACT-ANTM-SMA GPS-ACT-ANTM-SMA= (Spare)
Cisco Quinta 3 element 3-in-1 transportation antenna	ANT-3-4G2G1-O ANT-3-4G2G1-O= (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
Indoor swivel-mount dipole antenna	ANT-4G-DP-IN-TNC
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 (6m) 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

[*] -N antenna works with -N cables and -N lighting arrestor

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For More Information

For more information about the Cisco 809 Industrial Integrated Services Routers, visit http://www.cisco.com/go/ir809 or contact your local Cisco account representative.

For more information about the Cisco IOx platform, visit http://www.cisco.com/go/iox or contact your local Cisco account representative.

Cisco and Partner Services for the Enterprise Networks Architecture

Enable the Cisco Enterprise Networks Architecture and the business solutions that run on it with intelligent, personalized services from Cisco and our partners. Backed by deep networking expertise and a broad ecosystem of partners, these services can help you plan, build, and run a network that enables you to expand geographically, embrace new business models, and promote business innovation. Whether you are looking to transition to a Cisco ONE™ Enterprise Networks Architecture, solve specific business problems, or improve operational efficiency, we

have a service that can help you get the most from your IT environment. For more information, visit http://www.cisco.com/go/services.

Warranty Coverage and Technical Service Options

The Cisco 809 Industrial Integrated Services Routers come with the Cisco 5-year limited hardware warranty. Adding a contract for a technical service offering, such as Cisco SMARTnet® Service, provides benefits not available with the warranty, including access to OS updates, Cisco.com online resources, and Cisco Technical Assistance Center (TAC) support services. Table 8 shows the available technical services.

For information about Cisco warranties, visit http://www.cisco.com/go/warranty.

For information about Cisco Technical Services, visit http://www.cisco.com/go/ts.

Table 8.   Cisco Technical Services for the Cisco 809 Industrial Integrated Services Routers

Technical Services
Cisco SMARTnet Service ● Global access to the Cisco TAC 24 hours a day ● Unrestricted access to the extensive Cisco.com resources, communities, and tools ● Next-business-day, 8 x 5 x 4, 24 x 7 x 4, and 24 x 7 x 2 advance hardware replacement[1] and onsite parts replacement and installation available ● Ongoing operating system software updates within the licensed feature set[2] ● Proactive diagnostics and real-time alerts on Cisco Smart Call Home-enabled devices
Cisco Smart Foundation Service ● Next-business-day advance hardware replacement as available ● Business-hours access to small and medium-sized business (SMB) Cisco TAC (access levels vary by region) ● Access to Cisco.com SMB knowledge base ● Online technical resources through Smart Foundation Portal ● OS software bug fixes and patches

[1] Advance hardware replacement is available in various service-level combinations. For example, 8 x 5 x next business day (NBD) indicates that shipment is initiated during the standard 8-hour business day, 5 days a week (the generally accepted business days within the relevant region), with NBD delivery. Where NBD is not available, same-day shipment is provided. Restrictions apply; review the appropriate service descriptions for details.

[2] Cisco OS updates include maintenance releases, minor updates, and major updates in the licensed feature set.