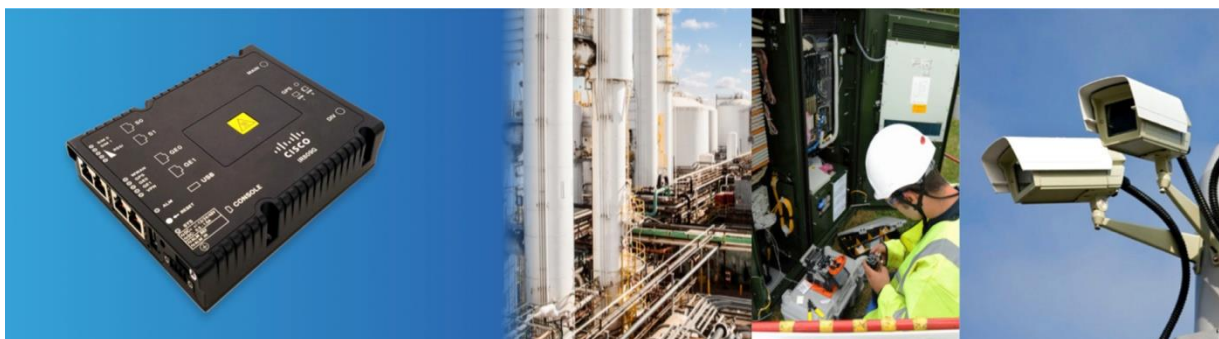


Cisco 809 Industrial Integrated Services Routers



Cisco® 809 Industrial Integrated Services Routers, referred to here as the IR809, are compact, ruggedized routers designed for deployment in harsh industrial environments.

The IR809 is Cisco's smallest multimode 3G and 4G LTE wireless router, making it an excellent solution for distribution automation and remote asset management across multiple industrial vertical markets (Figure 1). The IR809 has an integrated 9.6 to 60V DC power input and is designed to withstand hostile environments, including shock, vibration, dust, and humidity, and supports a wide temperature range (–40 to 60°C and type-tested at 85°C for 16 hours). The IR809 brings together:

- Enterprise-class wireline-like services, such as quality of service (QoS)
- Cisco advanced virtual private network (VPN) technologies (such as Dynamic Multipoint VPN [DMVPN] and Flexible VPN [FlexVPN])
- Multiple Virtual Routing and Forwarding (VRF) instances for cellular highly secure data, voice, and video communications
- Cisco IOx, an open, extensible environment for hosting applications at the network edge

The IR809 also extends connectivity to include low-power wide-area (LPWA) access using the Cisco Interface Module for LoRaWAN.

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



Product Overview

The Cisco 809 Industrial Integrated Services Routers support the latest Third-Generation Partnership Project (3GPP) Release 9 Category 3 and Category 4 LTE standards. The routers provide persistent, reliable LTE connectivity transparent hand-offs between LTE and 3G networks.

The following models are available:

- **IR809G-LTE-NA-K9:** Multimode 4G, 3G, and 2G connectivity to cellular networks operating in LTE 1900 MHz (band 2 PCS), 1700/2100 MHz (band 4 AWS), 850 MHz (band 5), 700 MHz (band 17), and 1900 MHz (band 25 extended PCS) frequencies; backward-compatible with UMTS and HSPA+, at 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 4G, 3G, and 2G connectivity to cellular networks operating in LTE 700 MHz (band 13), 1700/2100 MHz (band 4 AWS), and 1900 MHz (band 25 extended PCS) frequencies; backward-compatible with EVDO Rev A/CDMA 1x BC0, BC1, and BC10.
- **IR809G-LTE-LA-K9:** Multimode 4G and 3G connectivity to cellular networks operating in FDD LTE 2100 MHz (band 1), 1800 MHz (band 3), 850 MHz (band 5), 2600 (band 7), 900 (band 8), 850 (band18, band19), 1500 (band 21), 700 (band 28), and TDD LTE 2600 (band 38), 1900 (band 39), 2300 (band 40), and 2500 (band 41); backward-compatible with WCDMA 2100 MHz (band 1), 850 MHz (band 5), 800 MHz (band 6, band 19), 900 MHz (band 8), 1700 MHz (band 9), and TD-SCDMA 1900 MHz (band 39).
- **IR809G-LTE-GA-K9:** Multimode 4G, 3G, and 2G connectivity to cellular networks operating in LTE 800 MHz (band 20), 900 MHz (band 8), 1800 MHz (band 3), 2100 MHz (band 1), and 2600 MHz (band 7) frequencies; backward-compatible with UMTS and HSPA+ at 850 MHz (band 5), 900 MHz (band 8), 1900 MHz (band 2), and 2100 MHz (band 1).

The IR809 routers offer a broad range of features for industrial and enterprise Internet of Things (IoT), as listed in Figure 2.

Figure 2. Cisco 809 Industrial Integrated Services Routers Offer a Broad Range of Features

	LTE connectivity: LTE offers a cost-effective alternative in areas where broadband services either are not available or are very expensive. Quality of service (QoS): QoS enables differentiated treatment of traffic for mission-critical services and load balancing for a better user experience.
	Supervisory control and data acquisition (SCADA) applications: DNP3 serial-to-DNP3/IP translation and IEC 60870 T101-to-IEC 60870 T104 protocol translation serves as a SCADA gateway and Raw Socket transport for managing remote terminal units (RTUs).

	Smart-grid compliant: The routers are IEEE 1613 and IEC 61850-3 certified for distribution automation and secondary substation deployments.
	Industrial security: Services include area firewall and VPN services, which require no additional hardware or client software.
	GPS. The routers support remote tracking asset management in a distributed network.
	Fog computing, management, and automation: Enable remote monitoring and control at the edge and improve process efficiency by moving the intelligence to the edge rather than the cloud.
	Network management: Tools such as Cisco IoT Field Network Director, Cisco Prime™, and Cisco Application Policy Infrastructure Controller Enterprise Module (APIC-EM) simplify deployment of a secure network head end using the Cisco Industrial Operations Kit.
	Multiple packet data network (PDN) feature: 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 mission-critical traffic emerging from the sensors and devices connected to the router.

	4G LTE multiple-bearer QoS for cellular: The IR809 supports 4G LTE multiple bearers, enabling differentiated treatment of traffic based on the QoS policies. The QoS feature depends on a service provider's ability to classify and enforce QoS policies and hence requires providers to launch this service in their networks.
	Multi-VRF: The IR809 supports the multi-VRF feature, which allows customers to configure and maintain more than one instance of a routing and forwarding table within the same customer edge (CE) device. For service providers, this feature enables them to support two or more VPNs, and the IP addresses can overlap several VPNs.

Business Benefits and Application Examples

Industrial customers are looking for real-time monitoring and control of industrial assets to help increase operation efficiency.

Utilities

Utilities are seeking the capability 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 SCADA traffic backhauling. Devices that enable this connectivity need to be able to be remotely monitored and configured. They also need to support traditional serial interfaces to interconnect with existing monitoring devices.

Oil and Gas

Oil and gas companies 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 (NOC).

Transportation

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

Primary Features and Benefits

Table 1 lists the features and benefits of the IR809.

Table 1. Features and Benefits of Cisco 809 Industrial Integrated Services Routers

Features	Benefits
IoT Enablement	
Compact ruggedized form factor	Designed for hostile outdoor remote assets monitoring and machine-to-machine (M2M) communications and integrated 9.6 to 60V DC power supply.
Raw socket transport and SCADA	Raw Socket can be used to transport SCADA data from RTUs. This method is an alternative to the Block Serial Tunnel (BSTUN) protocol. The IR809 provides DNP3 serial-to-DNP3/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) SCADA applications. • 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 software platform 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, wall mount, and DIN rail mount.
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.
Increased performance to run concurrent services	• Performance allows customers to take advantage of broadband network speeds while running highly secure, concurrent data, voice, video, wireless, and IoT services.
Enhanced security	• An integrated stateful and application inspection firewall provides network perimeter security. Hardware-assisted high-speed IP Security (IPsec), Triple Data Encryption Standard (3DES), and next-generation encryption protocols such as Advanced Encryption Standard (AES) and Secure Hash Algorithm (SHA) offer data privacy over the Internet. • Intrusion prevention enforces security policies in a larger enterprise or service provider network.
Multiple WAN and LAN Connections	
Two Gigabit Ethernet interfaces	• Allows multiple Ethernet device connectivity in a small office or other remote location with the capability to designate a port as the network edge. • Provides VLANs for Layer 3 IP subinterfaces. • Provides inter-VLAN routing capabilities.
Two serial interfaces	• These two asynchronous serial interfaces (one RS-232 port and one RS-232/RS485 port) can be used with Raw Socket, protocol translation, and IOx applications to provide two serial connections to local RTUs for SCADA transport and RTU management.
LoRaWAN	• Extends IR809 connectivity to include LPWA access using Cisco Interface Module for LoRaWAN. For more information, see http://www.cisco.com/c/en/us/products/routers/interface-module-lorawan.
Transparent Roaming Between Wireless Networks	
Dual subscriber-identity-module (SIM) support	• The dual SIM feature provides reliability and multihoming capabilities over LTE and HSPA 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 feature enables mission-critical applications to stay connected even when roaming between networks. • Assigned IP addresses to the home network are maintained in private and public networks. • Both Proxy Mobile IP (PMIPv6) and Network Mobility (NEMO) are supported.
Cisco IOS Mobile network features	• This feature 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. IR809G-LTE-LA-K9 does not support 2G.

Features	Benefits
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 public networks are used. • 3DES and AES encryption provide highly secure VPNs when data is transmitted and received over public networks. • The next-generation protocol suites enable users to monitor potential malicious activity on the network. • IPsec over IPv4 & IPv6, IPsec stateful failover, VRF-aware IPsec, DMVPN, FlexVPN and PMIPv6.
Routing	• Enables advanced routing capabilities using Enhanced Interior Gateway Routing Protocol (EIGRP), Multiprotocol Border Gateway Protocol (MP-BGP), IPv4 and IPv6 on all interfaces including cellular, IPv4/IPv6 Multicast, Generic Routing Encapsulation (GRE) and multipoint GRE (MGRE), Network Address Translation (NAT), Domain Name System (DNS) proxy and spoofing, IP service-level agreement (SLA), and QoS.
QoS features	• Provides traffic precedence to delay-sensitive and mission-critical services. • Facilitates low-latency routing of delay-sensitive industrial applications. • Supported on all LAN and WAN interfaces including cellular. • Provides LTE QoS with support for up to 8 concurrent bearers on each cellular WAN interface for traffic classification and prioritization.
Management and manageability	• Network managers can remotely manage and monitor networks with Simple Network Management Protocol Versions 1, 2, and 3 (SNMPv1, v2, and v3); Telnet; and HTTP/HTTPS and Secure Shell Version 2 (SSHv2). They can also manage and monitor networks locally through a console port. • Support for extensive 3G and 4G LTE-based MIBs allows 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 IR809 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 the router to self-monitor the LTE WAN link and automatically recover from a radio link failure. • Network management tools such as Cisco IoT Field Network Director, Cisco Prime, and APIC-EM simplify deployment of a secure network head end using the Cisco Industrial Operations Kit.

Product Specifications

Table 2 provides 4G LTE specifications for the IR809.

Table 2. 4G LTE Specifications for Cisco 809 Industrial Integrated Services Routers

Region Theaters	IR809G-LTE-GA-K9	IR809G-LTE-NA-K9	IR809G-LTE-VZ-K9	IR809G-LTE-LA-K9
Bands	LTE bands 1, 3, 7, 8, and 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), and band 25 extended PCS 1900	LTE band 13 (700), band 4 AWS (1700/2100), and band 25 extended PCS (1900)	LTE bands 1, 3, 5, 7, 8, 18, 19, 21, 28, and 38–41
Theoretical download and upload speeds¹	100 and 50 Mbps	100 and 50 Mbps	100 and 50 Mbps	150 and 50 Mbps
Australia	Yes	No	No	Yes
Europe	Yes	No	No	No
Middle East	Yes	No	No	No
Latin America (LATAM) and Asia-Pacific (APAC)	Yes (Please refer to Product Approval Status tool.)	Yes (Please refer to Product Approval Status tool.)	No	Yes (Please refer to Product Approval Status tool.)
United States	No	Yes (ATT)	Yes (Verizon)	No
Canada	No	Yes	No	No

Feature	Description
Important 4G LTE features	• Single and dual LTE WAN support for WAN redundancy, high reliability, and enhanced throughput • LTE QoS with support for up to 8 concurrent bearers on each cellular WAN interface for traffic classification and prioritization • Multiple Packet Data Networks (PDNs) • Automatic switchover and failover between primary and backup links • IPv4 and IPv6 support • Multichannel interface processor (MIP) profile configuration • Send and receive Short Message Service (SMS; maximum 160 characters) • 4G and 3G MIB with extension and traps • Remotely initiated data callback using 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) • Capability for the two SIMs to operate in active-backup mode
Global Positioning System (GPS) 	• GPS antenna: SMA connector (separate active GPS with SMA antenna option) • Standalone GPS; needs line of sight • Configuration of multiple profiles • Assisted GPS (will be supported in future Cisco IOS Software release)
SMS 	• Send and receive SMS (maximum 160 characters)
MIBs 	• Enhanced 3G MIB with 4G MIB extension (4G LTE parameters are covered with 3G MIB and 3G MIB extension) • ENTITY MIB • IF MIB • 3G wireless WAN (WWAN) MIB persistence
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]).
Programming interfaces	• Cisco IOS Software CLI
Wireless technologies supported (performance and throughput)	IR809G-LTE-GA-K9 Cisco LTE 800 MHz (band 20), 900 MHz (band 8), 1800 MHz (band 3), 2100 MHz (band 1), and 2600 MHz (band 7) at Category 3 LTE speeds¹. 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 CAT 20 (42.2 Mbps) and UL up to CAT 6 (5.76 Mbps) • DC-HSPA+ speed DL with CAT 24 (42.2 Mbps) and UL up to CAT 6 (5.76 Mbps) IR809G-LTE-NA-K9 Cisco LTE 1900 MHz (band 2 PCS), 1700/2100 MHz (band 4 AWS), and 700 MHz (band 17) at Category 3 LTE speeds¹. 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 CAT 20 (42.2 Mbps) and UL up to CAT 6 (5.76 Mbps) • DC-HSPA+ speed DL with CAT 24 (42.2 Mbps) and UL up to CAT 6 (5.76 Mbps) IR809G-LTE-VZ-K9 Cisco LTE 700 MHz (band 13), 1700/2100 MHz (band 4 AWS), and 1900 MHz (band 25 extended PCS) at Category 3 LTE speeds¹. Backward compatibility: • EVDO Rev A/CDMA 1x BC0, BC1, and BC10

Feature	Description
	IR809G-LTE-LA-K9 Cisco LTE FDD 2100 MHz (band 1), 1800 MHz (band 3), 850 MHz (band 5), 2600 (band 7), 900 (band 8), 850 (band18, band19), 1500 (band 21), and 700 (band 28); and TDD LTE 2600 (band 38), 1900 (band 39), 2300 (band 40), and 2500 (band 41) at Category 4 LTE speeds ¹ (peak downlink rate: 150 Mbps; peak uplink rate: 50 Mbps) Backward compatibility: • UMTS and HSPA+: 2100 MHz (band 1), 850 MHz (band 5), 800 MHz (band 6 and band 19), 900 MHz (band 8), 1700 MHz (band 9), and TD-SCDMA 1900 MHz (band 39)
LED indicators for 4G	• Received-signal-strength indication (RSSI; green) • WWAN (green) • SIM status (green and yellow) • GPS (green and yellow) • SYS (green and yellow) • VPN (green)

¹ LTE CAT 3 and CAT 4 download and upload speeds depend on specific carrier channel bandwidth and carrier LTE network provisioning.

Table 3 lists the software features supported on IR809.

Table 3. Cisco IOS Software Features on Cisco 809 Industrial Integrated Services Routers

Feature	Description
Cisco IOS Software requirements	• Cisco IOS Software feature set: Universal Cisco IOS Software image • Cisco IOS Software Release 15.6(3)M2 or later and modem firmware Release 5.5.58 or later
IPv4 and IPv6 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 • Layer 2 Tunneling Protocol (L2TP) • Layer 2 Tunneling Protocol Version 3 (L2TPv3) • Network Address Translation (NAT) • Dynamic Host Configuration Protocol (DHCP) server, relay, and client • Dynamic DNS (DDNS) • DNS proxy • DNS spoofing • Access control lists (ACLs) • IPv4 and IPv6 multicast • Open Shortest Path First (OSPF) • Border Gateway Protocol (BGP) • 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)
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 Solution client and server • NAT transparency • Dynamic Multipoint VPN (DMVPN) • Tunnel-less Group Encrypted Transport VPN • Flex VPN • IPsec stateful failover • VRF-aware IPsec • IPsec over IPv6

Feature	Description
	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 Integrated Threat Control • Control-plane policing (CoPP) • 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 • Class-Based Weighted Random Early Detection (CBWRED) • Resource Reservation Protocol (RSVP) • Real-Time Transport Protocol (RTP) header compression (cRTP) • Differentiated Services (DiffServ) • QoS preclassify and prefragmentation • Hierarchical QoS (HQoS)
Management features	• Cisco IoT Field Network Director and Industrial Operations Kit • Cisco Application Policy Infrastructure Controller Enterprise Module (APIC-EM) • Cisco Universal Plug and Play (UPnP)¹ • Cisco Configuration Professional Express¹ • Cisco Configuration Engine support • Cisco AutoInstall • IP service-level agreement (IP SLA) • Cisco IOS Embedded Event Manager (EEM) • Telnet, SNMPv3, SSH Protocol, CLI, and HTTP management • RADIUS and TACACS+ • Cisco Prime • Jasper Control center
High-availability features	• Virtual Router Redundancy Protocol (VRRP) (RFC 2338) • Hot Standby Router Protocol (HSRP) • Multigroup HSRP (MHSRP) • Dual SIM support for cellular failover
IPv6 features	• IPv6 addressing architecture • IPv6 unicast and multicast forwarding • IPv6 ACLs • IPv6 over cellular • IPv6 routing • IPv6 domain name resolution

¹ Future Cisco IOS Software release.

Table 4 lists the system specifications, and Table 5 lists antenna specifications for the IR809.

Table 4. System Specifications for Cisco 809 Industrial Integrated Services Routers

Feature	Specification
Memory	
Default and maximum DRAM	2 GB
Default and maximum flash memory	4 GB
IP rating	IP30
Interface Support	
Console	Mini type-B USB; also supports remote 4G LTE diagnostics and monitoring tools
WAN interfaces	WWAN with multimode 4G LTE, 3.7G, 3.5G, 3G, and 2G speeds; IR809G-LTE-LA-K9 does not support 2G
LAN and WAN interfaces	Two 10/100/1000BASE-T Gigabit Ethernet ports
LEDs	- System OK (green and 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 - Support for asynchronous mode with speed up to 115,200 baud
Serial protocol support	SCADA, DNP3, T101-104, Raw Socket TCP and UDP, and SLIP
Physical Characteristics	
Physical dimensions (H x W x D)	1.15 x 5.05 x 6.27 in. (29.21 x 128 x 159.2 mm)
Weight	1 lb 11 oz. (0.77 kg)
Mounting options	Panel and door and DIN rail mount
Mean time between failure (MTBF; ground benign)	440,000 hours or more
Platform power consumption	Idle = 12W Typical = 15W Maximum = 19W
Environmental operating temperature range	–40 to 140°F (–40 to 60°C) in a sealed NEMA cabinet with no airflow –40 to 158°F (–40 to 70°C) in a vented cabinet with 40 linear feet per minute (LFM) of air –40 to 167°F (–40 to 75°C) in a forced air enclosure with 200 LFM of air Type tested at 85°C for 16 hours
Operating altitude	50°C 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
Hazardous locations standards	- ANSI/ISA 12.12.01 (Class 1, Div 2 A-D) - CSA 213 (Class 1, Div 2 A-D) - IEC 60079-0 and -15 IECEx test report (Class I, Zone 2, gas groups IIC) - EN 60079-0 and -15 ATEX certification (Class I, Zone 2, gas groups IIC)
Industry standards	- IEC 61850-1 - IEEE 1613
EMC emissions	FCC 47 CFR Part 15 Subpart C Class A EN 55032/CISPR 32 Class A, EN 55022 Class A VCCI Class A, AS/NZS CISPR 32 Class A CISPR 11 Class A, ICES 003 Class A, CNS 13438 Class A KN 32 Class A, EN 300 386

Feature	Specification
EMC immunity	CISPR 35, EN 55024 KN 35 EN 61000-4-2, 3, 4, 5, 6, 8, 9, 16, 17, 18, and 29
Radio cellular	AS/NZS: ACMA EMR, and AS/CA S042.1 and 4 Japan: Articles 2 and 9 EN 301 489-1, 7, 24, and 52 EN 301 908 -1, 2, and 13 EN 301 511 EN 50385 MPE FCC 47 CFR Part 22 FCC 47 CFR Part 15 Subpart C FCC 47 CFR Part 2 MPE RSS 102/247
Power specifications	Minimum and maximum voltage: 9.6 to 60V DC input Maximum and minimum current: 2A (9.6V DC) and 0.4A (60V DC)

Table 5. Antenna Specifications for Cisco 809 Industrial Integrated Services Routers

Item	Specification
ANT-3-4G2G1-O	Description: Cisco transportation omnidirectional 3-element antenna for 2G, 3G, and 4G cellular and GPS • MIMO 2 x cellular elements and 1 x GPS active antenna • Vehicular roof stud/nut mounting, qualified to vehicular shock and vibe standards • IP67 waterproof with proper installation on the roof on an 8 x 8" flat mounting surface • Covers 2G, 3G, and 4G cellular bands in 698-2700 MHz frequency range • LTE MIMO support with low correlation coefficient • Low-noise active GPS antenna • Specifications that follow are given with 1-foot diameter ground plane under antenna Cellular electrical specifications (specifications apply to both elements): • Frequency ranges: 698 to 960 MHz and 1710 to 2700 MHz • Typical gain (dBi): 698 to 960 MHz = 2.6 dBi, and 1710 to 2700 MHz = 4.6 dBi • Efficiency: 60% • Polarization: Linear and vertical • Port impedance: 50 ohms • Voltage standing wave ratio (VSWR): < 2.1:1 (698 to 960 MHz) and < 2.0:1 (1710 to 2700 MHz) • Radiation pattern: Omnidirectional • Integrated RF cables: 2 ft, LMR-195 type, TNC (male) GPS electrical specifications: • Frequency range: 1575.42 MHz +/-1 MHz (GPS L1) • Amplifier gain: 27dB +/-3dB • Noise figure: 4dB max • Port impedance: 50 ohms • Output VSWR: < 2.0:1 • Radiation pattern: RHCP • DC voltage: 2.7–12V DC • DC current: < 20 mA over –40 to 85°C temperature range • Integrated RF cable: 17 ft, LMR-100 type, SMA(m) Mechanical and environmental specifications: • Mount style: Vehicular roof or similar; stud and nut mount • Environment: Outdoor, vehicular roof, transportation ruggedized and qualified to subset of SAE1455 and MILSTD 810G • Connectors: 2 x TNC(m) cellular and 1 x SMA(m) GPS • Antenna dimensions: 7.1 in. diameter x 2.4 in. height (18.0 x 6.5 cm), excluding RF cables • Weight: 1.48 lb (0.67 kg) • Operating temperature range: –40 to 70°C • Storage temperature: –40 to 85°C • Maximum power: 10W • Radome: Polycarbonate, UV, black • Material substance compliance: ROHS compliant

Item	Specification
ANT-4G-OMNI-OUT-N ¹	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 • 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. (24.8 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 ¹	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: 8.0 to 10.0 dBi (698 to 960 MHz) and 6.0 to 9.5 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 in. (2.95 cm) • Temperature range (operating): -22 to 158°F (-30 to 70°C) • Storage temperature: -40 to 85°C • Wind rating: 160 km per hour • IP rating: IP 55 • Radome: Polycarbonate, UV resistant, white • Material substance compliance: ROHS compliant

Item	Specification
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 and 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) and 73% (1710 to 2700 MHz) • Maximum input power: 3W • VSWR: < 2.5:1 • Characteristic impedance: 50 ohms • Polarization: Linear Mechanical specifications • Type: Dipole • Antenna dimensions (L x W x D): 229 x 30.5 x 15 mm • Mount style: Direct mount • Environment: Indoor • RF connector: TNC (m) • Antenna weight: 49g • Temperature rating: –31 to 158°F (–35 to 70°C) • Material substance compliance: RoHS compliant
GPS-ACT-ANTM-SMA	Description: Cisco 4G indoor/outdoor active GPS antenna • Maximum input power: 1W • Connector: SMA male • VSWR: 2:1 or less • Characteristic impedance: 50 ohm antenna base • Radome color: Black • Antenna dimensions (L x W x H): 1.7 x 1.4 x 0.55 in. (44 x 36 x 14 mm) • Operating temperature: –40 to 185°F (–40 to 85°C) • Operating frequency ranges: 1574.42 to 1576.42 • MHz polarization: RHCP • Maximum peak gain (at Boresight): 4 dBi • Shocks: 50G • Drop test: 10 x 3 axis per 1m drop 6 axis • Cable length: 17 ft (5.18m) • Mount bracket: Metal • Anchor: 1 inch. The anchor drill size is 3/16. • Screws: 3 stainless-steel screws that are self-drilling pan head #2 Phillips.
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) nonplenum rated Pro-Flex Plus 195

Item	Specification
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 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

¹ -N antenna works with -N cables and -N lighting arrestor.

Ordering Information

For more information about ordering the IR809, visit the [Cisco Ordering homepage](#) and refer to Tables 6 and 7.

Table 6. Ordering Information for Cisco 809 Industrial Integrated Services Routers

Product	Description
Cisco IR809G 4G LTE Integrated Services Routers	
IR809G-LTE-LA-K9	Compact Cisco IR809 Ruggedized Secure Multi-Mode 4G LTE Industrial Integrated Services Router for Australia, Asia (including Japan) and Latin America; LTE FDD bands 1, 3, 5, 7, 8, 18, 19, 21, 28 and TDD LTE band 38, 39, 40, 41 bands with carrier aggregation, UMTS/HSPA+ bands and TD-SCDMA band 39 with ETSI compliance
IR809G-LTE-GA-K9	Compact Cisco IR809 Ruggedized Secure Multi-Mode 4G LTE Industrial Integrated Services Router for Europe; LTE 800/900/1800/2100/2600 MHz, 850/900/1900/2100 MHz UMTS/HSPA+ bands with ETSI compliance
IR809G-LTE-NA-K9	Compact Cisco IR809 Ruggedized Secure Multi-Mode 4G LTE Industrial Integrated Services Router 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) with FCC compliance
IR809G-LTE-VZ-K9	Compact Cisco IR809 Ruggedized Secure Multi-Mode 4G LTE Industrial Integrated Services Router 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 with FCC compliance
Power Supplies and Mounting Brackets	
PWR-IE50W-AC	AC power adapter with 110/220V AC and 88-300V DC input (Temperature: -40C to 60C)
IR809-DINRAIL¹	DIN rail kit for the IR809 (available in future)
IR809-VM-DINRAIL²	Vertical-mount DIN rail kit for the IR809 (available in future)
Cisco 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
FW-7430-LTE-AU	Cisco LTE modem firmware for Telstra (Australia)
FW-7430-LTE-JP	Cisco LTE modem firmware for NTT DoCoMo (Japan)
FW-7430-LTE-SB	Cisco LTE modem firmware for Softbank (Japan)
FW-7430-LTE-KD	Cisco LTE modem firmware for KDDI (Japan)

Product	Description
FW-7430-LTE-GN	Cisco LTE modem generic firmware
Operating: Shock	2.39m per second (94 in. per second) at 2 ms
Operating: Vibration	3 to 500 Hz.41 GRMS (2 hours)
Nonoperating: Shock	65 to 80G at 8 ms
Nonoperating: Vibration	3- to 500 Hz 1.12 GRMS (0.5 hour)

¹ Meets IEEE 1613 and IEC 61850-3 standards.

² Not compliant with IEEE 1613 and IEC 61850-3 standards, but has passed the following tests:

Table 7. Antenna Ordering Information for Cisco 809 Industrial Integrated Services Routers

Note: None of the antennas are included by default along with the IR809.

Description	Part Number
Cisco transportation omnidirectional 3-element antenna for 2G, 3G, 4G cellular and GPS	ANT-3-4G2G1-O ANT-3-4G2G1-O= (Spare)
Multiband Omni-Directional Stick Outdoor 4G Antenna	ANT-4G-OMNI-OUT-N1 ANT-4G-OMNI-OUT-N= ¹ (Spare)
Multiband Panel Outdoor 4G Antenna	ANT-4G-PNL-OUT-N1 ANT-4G-PNL-OUT-N= ¹ (Spare)
Indoor swivel-mount dipole antenna	ANT-4G-DP-IN-TNC ANT-4G-DP-IN-TNC= (Spare)
Multi-Band Omnidirectional Antenna-Ceiling Mount	4G-ANTM-OM-CM 4G-ANTM-OM-CM= (Spare)
Standalone active SMA GPS antenna with 17-ft (5 m) extender	GPS-ACT-ANTM-SMA GPS-ACT-ANTM-SMA= (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)
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)
50-ft (15 m) Ultra Low Loss LMR 400 Cable TNC-N Connector	CAB-L400-50-TNC-N ¹ CAB-L400-50-TNC-N= ¹ (Spare)
20-ft (6 m) Ultra Low Loss LMR 400 Cable with TNC-N Connector	CAB-L400-20-TNC-N ¹ CAB-L400-20-TNC-N= ¹ (Spare)
20-ft (6m) Ultra Low Loss LMR 400 Cable with N Connectors	CAB-L400-20-N-N ¹ CAB-L400-20-N-N= ¹ (Spare)
Lightning Arrestor Kit: female to female	CGR-LA-NF-NF CGR-LA-NF-NF= (Spare)
Lightning Arrestor Kit: male to female	CGR-LA-NM-NF CGR-LA-NM-NF= (Spare)

¹ -N antenna works with -N cables and -N lighting arrester.

Cisco Capital Financing to Help You Achieve Your Objectives

Cisco Capital[®] financing can help you acquire the technology you need to achieve your objectives and stay competitive. We can help you reduce capital expenditures (CapEx), accelerate your growth, and optimize your investment dollars and ROI. Cisco Capital financing gives you flexibility in acquiring hardware, software, services, and complementary third-party equipment. And there's just one predictable payment. Cisco Capital financing is available in more than 100 countries. [Learn more.](#)

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 I/O 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 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, adopt new business models, and promote business innovation. Whether you are seeking to transition to a Cisco ONE[™] enterprise networks architecture, solve specific business problems, or improve operation 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 IR809 comes 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 (NBD), 8 x 5 x 4, 24 x 7 x 4, and 24 x 7 x 2 advance hardware replacement¹ and onsite parts replacement and installation available¹ • Ongoing operating system software updates within the licensed feature set² • Proactive diagnostics and real-time alerts on Cisco Smart Call Home-enabled devices
Cisco Smart Foundation Service • NBD 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 the Cisco 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 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.



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