Cisco 819 Non-Hardened 4G LTE 2.0 Machine-to-Machine Integrated Services Routers with Wi-Fi

The Cisco® 819 Non-Hardened 4G LTE Integrated Services Routers (ISR) are the smallest Cisco IOS® Software routers with support for integrated fourth-generation (4G LTE) wireless WAN (mobile broadband backhaul) and WLAN capabilities (Figure 1). They are rapidly deployable, highly available, reliable, and secure, and are designed specifically for machine-to-machine (M2M) applications. Markets that benefit from these applications include small business, financial, healthcare, and retail. Fully integrated with Cisco IOS Software, the Cisco 819 4G LTE ISRs deliver enterprise-class features, including highly secure data, voice, and video communications to stationary and mobile network nodes across wired and wireless links. The Cisco 819 4G LTE 2.0 M2M is the industry leader to bring enterprise grade wireline like functionality such as Quality of Service (QoS) for cellular, Multi-Virtual Route Forwarding (Multi-VRF), advanced VPN, and Unified Communications solutions over LTE.

Figure 1. Cisco 819 Non-Hardened 4G LTE 2.0 Integrated Services Router with dual 802.11a/g/n radio WiFi



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A critical component of the Cisco M2M architecture, the Cisco 819 4G LTE ISRs serve as the single, horizontal platform that enhances the Cisco implementation of “any device, anywhere” across multiple industries, including small business, small remote branch, banking, retail, healthcare, and government. It also provides the ability to extend Cisco product-based networks to small branch offices with a relatively low incremental investment, as well as to enable managed services offerings based on Cisco architecture.

Cisco Mobile IP delivers transparent roaming across multiple wireless networks capable of covering wide geographic areas. Additionally, the Cisco 819 ISR supports enterprise class built-in Wireless LAN (WLAN) capability. The Cisco 819GW platforms concurrently support both 4G LTE for wireless WAN backhaul and Cisco dual radio WLAN on the same platform. The 802.11a/b/g/n 2X3 MIMO built-in Cisco 3500 Access Point (AP) in the Cisco 819, comes with Cisco’s CleanAir technology, to create a self-healing, self-optimizing WLAN. Moreover, with the advantage of dual radio, the integrated AP can serve both as an access point and as a client to a wireless mesh network. This provides another source for WAN diversity along with Gigabit Ethernet, serial, and cellular. The AP ClientLink feature improves reliability and coverage for legacy devices and dynamic frequency selection (DFS allows detecting and avoiding interference with radar signals to comply with regulatory domains. Cisco 819 ISR with integrated 4G LTE and 802.11 a/b/g/n AP. More information on the Cisco 3500 Access Point is available at http://www.cisco.com/en/US/prod/collateral/wireless/ps5678/ps10981/data_sheet_c78-594630.html

Product Overview

The Cisco 819 4G LTE ISRs support the latest Third-Generation Partnership Project (3GPP) Release 8 Category 3 LTE standards. They provide persistent, reliable LTE connectivity with fallback and transparent handoff to earlier technologies. The following models are available:

- **C819GW-LTE-GA-EK9:** Multimode Cisco LTE 2.0 for carriers that operate LTE 800 MHz (band 20), 900 MHz (band 8), 1800 MHz (band 3), 2100 MHz (band 1), or 2600 MHz (band 7) networks; backward-compatible with UMTS and HSPA+: 850 MHz (band 5), 900 MHz (band 8), 1900 MHz (band 2), and 2100 MHz (band 1).
- **C819GW-LTE-MNA-AK9:** Multimode Cisco LTE 2.0 for carriers that operate LTE 700 MHz (band 17), 1900 MHz (band 2 PCS), 850 MHz (band 5), 700 MHz (band 13), 1900 MHz (band 25 extended PCS) networks; 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 EVDO Rev A/CDMA 1x BC0, BC1, BC10.

The Cisco 819 4G LTE ISRs include a broad range of enterprise-class features:

- Security services, including firewall, intrusion prevention, VPN, and Cisco ISR Web Security with ScanSafe, which requires no additional hardware or client software. This enables branch offices, manufacturing sites, hospitals, and banks, for example, to intelligently redirect web traffic to the cloud to enforce granular security and acceptable use policies over user web traffic. With this solution, you can deploy market-leading web security quickly and easily to protect branch office users from web-based threats, such as viruses, while saving bandwidth, money, and resources.
- Cisco WAN optimization system, consisting of Wide Area Application Services (WAAS) Express routers and Wide Area Application Engines (WAEs) that work together to optimize TCP traffic in your network. When client and server applications attempt to communicate with each other, the network intercepts the traffic and acts on behalf of the client application and the destination server.

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- Additional WAN options such as Serial and Gigabit Ethernet WAN interfaces and a 4-port 10/100 Fast Ethernet managed switch for LAN connectivity. Quality-of-service (QoS) features are included for optimizing voice and video applications.
- Cisco Configuration Professional, a web-based configuration tool that simplifies setup and deployment. Centralized management capabilities give network managers visibility into and control over the network configurations at remote sites.
- 4G LTE wireless WAN (WWAN) data services. With enhanced data rates and improved latency (30 milliseconds or less), WWAN services are an ideal way to supplement traditional wire-line services. 4G LTE WWAN data services have average data rates well in excess of ISDN speeds, 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 Cisco 819 4G LTE ISRs offer a primary WAN link capable of running comprehensive branch-office services, including voice and video services. The 4G LTE WWAN data services can also be used as a cost-effective 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.
- **Multiple-PDN:** This feature allows configuration of multiple active (Access Point Name) APN so that Internet traffic can be kept separate from the corporate traffic. (Available early Q4, 2016)
- **4G LTE multiple-bearer QoS for cellular:** The Cisco 819 4G LTE supports 4G LTE multiple-bearer QoS. Detailed information on the bearer is part of show CLI, SNMP-MIBs etc. The QoS feature is service provider (SP) dependent, and requires SP to launch this service. (Available early Q4, 2016)
- **Multi-VRF for cellular:** 4G LTE C819s now support Multi-VRF for cellular network. Multi-VRF is a Cisco proprietary implementation over and above the 3GPP spec 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 (SP) dependent, and requires SP to launch this service.
- **Enterprise grade Unified Communication solutions over LTE:** The 4G LTE C819s supports voice and video and can be integrated with Cisco Unified Communications cloud or premises-based infrastructure.

Business Benefits and Application Examples

Businesses are looking for ways to reduce costs, increase revenue, and improve business continuity. The 4G LTE wireless connectivity, which is 10 to 15 times faster and has 5 times lower latency than 3G links, allows a small enterprise branch office or remote office to set up comprehensive media services in a matter of hours, without worrying about availability of broadband services and the need to lay down lines. Wireless carriers offer flexible, usage-based data plans that can be customized to meet the needs and price points of the business customer. As WAN backup alternatives, 3G and 4G LTE wireless offer greater WAN diversity and resiliency because they are independent of the local terrestrial infrastructure. The Cisco 819 4G LTE ISRs enable businesses to stay productive during service provider downtime or a network failure.

Ability to Host Networks in Motion

The Cisco 819 4G LTE ISRs use standards-based Mobile IP features in Cisco IOS Software to host networks in motion. Transition to different wireless networks is transparent to the users and devices (such as laptops, smart devices, and surveillance cameras), and applications maintain continuous connectivity without the user's manual intervention as WAN links change. In addition to allowing a single node or device to stay connected, the Cisco 819 4G LTE ISRs allow an entire mobile network or subnet to stay connected. The dual radio WLAN on the 819 can serve as both a client and an access-point.

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Retail VPN

Retail stores migrating from dialup connections for point-of-sale transactions can use the WWAN capability of the Cisco 819 4G LTE ISRs for low-cost broadband access, with the required security to comply with payment-card-industry and other data security requirements. Multiple devices and applications can then be added to the store network to take advantage of the increased bandwidth and to enable highly secure mobility and enhance productivity.

Managed Services

Service providers and value-added resellers can use the Cisco 819 4G LTE ISRs as a platform to offer differentiated business-class security and wireless LAN (WLAN) services for small and medium-sized business (SMB) customers. Superior management capabilities such as Simple Network Management Protocol (SNMP) support for 3G MIB with 4G LTE MIB extension and Cisco Configuration Professional make remote management and provisioning easier.

Primary Features and Benefits

Table 1 lists the features and benefits of the Cisco 819 4G LTE ISRs.

Table 1. Features and Benefits

Features	Benefits
Smallest Cisco ISR in Non-Hardened Form Factor	
Single platform for multiple applications	• This single architecture is uniquely designed for deployments in multiple remote applications such as ATM machines, kiosks, small branch offices, remote teleworker sites, gas stations, and telemetry, and across all industries.
Non-hardened router mounting	• Supports a variety of mounting options, including 35-mm din-rail per EN60715, floor mount, and wall mount, and offers both AC and 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.
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, thus providing increased productivity and better use of company resources. • ScanSafe 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.
Integrated WLAN Access Point	• Integrates the Cisco 3500 802.11 a/b/g/n Access Point for mission-critical applications. By intelligently avoiding interference, the WLAN feature offers performance protection for 802.11n networks to help ensure reliable application delivery. The 2X3 MIMO AP comes with Cisco's CleanAir technology, the industry's first to create a self-healing, self-optimizing wireless network. • With dual radios, the Cisco AP can serve both as an access point and as a client to a wireless mesh network concurrently, providing another source for WAN diversity. • The AP ClientLink feature improves reliability and coverage for legacy devices • Dynamic frequency selection (DFS) allows detecting and avoiding interference with radar signals to comply with regulatory domains. More information on the Cisco 3500 AP is available at: http://www.cisco.com/en/US/prod/collateral/wireless/ps5678/ps10981/data_sheet_c78-594630.html **Note:** Due to new FCC WiFi June 2016 regulation (FCC rules for part 15.409), the WLAN radio used in the ISR's (specifically C819 –A WiFi Domain with AP802 dual 802.11 radio) Cisco will be issuing a new grant for the 5GHz dual 802.11n radio. The specific reason for the change is due to the inability of the radio to detect the various radar pulses (DFS function) over the entire bandwidth of the channels in the 5250-5350 and the 5500-5700 A radio channel bands (which will be disabled). As a consequence the radio will now operate from 5150-5250 and 5745-5850 A radio bands. This will provide a total of nine channels in the 5GHz range.
Multiple WAN and LAN Connections	

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Features	Benefits
Four-port 10/100-Mbps managed switch	• 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. • Multiple LAN and WAN devices can be connected to standard 10/100 Ethernet or serial interfaces.
WAN diversity	• Multiple WAN links are supported: Gigabit Ethernet, serial, and 4G LTE provide for business continuity and WAN diversity. With 4G LTE WWAN, provide transport independent, intelligent path control, application optimization, and secure connectivity on any device, over any connection, and to any cloud.
Transparent Roaming Between Wireless Networks	
Dual subscriber-identity-module (SIM) support	• Dual SIMs provide for high reliability and cellular multihoming support for LTE and HSPA-based networks using common FW technology within the same region (failover). North America dual SIMs provide switchover with different FW technology.
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, or 3G) 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 within 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. (Available early Q4, 2016)
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 ISR 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 and confirm enhancement verification. • Tight integration with Cisco IOS Software allows you to self-monitor the functions of the 3G, 3.5G, 3.7G, and 4G LTE modems and automatically recover from a failure. • Cisco Configuration Professional provides a web-based tool that simplifies setup and deployment. • Intuitive network management tools such as Cisco Prime™ and HP OpenView are supported.
Cisco WAN Optimization	• Cisco WAAS Express routers and WAEs work together to optimize TCP network traffic. When client and server applications attempt to communicate with each other, the network intercepts the traffic and acts on behalf of the client application and the destination server. • WAAS Express is supported on the Serial/Gigabit Ethernet WAN interface and up to 2 Mbps.

Product Specifications

Table 2 provides 4G LTE specifications for the Cisco 819 4G LTE ISRs.

Table 2. 4G LTE Specifications

Region Theaters	C819GW-LTE-GA-EK9	C819GW-LTE-MNA-AK9
Bands	LTE bands 1, 3, 7, 8, 20 800 (band 20), 900 (band 8), 1800 (band 3), 2100	LTE band 2 PCS 1900, band 4 AWS (1700/2100), band 5 (850), band 17 (700), band 13 (700), band 25

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	(band 1), and 2600 (band 7) MHz	extended PCS 1900
Theoretical Download/upload speeds*	100 and 50 Mbps	100 and 50 Mbps
Australia	X	X
Europe	✓	X
Middle East	✓	X
LATAM & APAC	✓ (Dependent on specific operators supporting the above LTE bands and with –E WiFi domain)	✓ (Dependent on specific operators supporting the above LTE bands and with –A WiFi domain)
United States	X	✓ ATT, Verizon, Sprint (FW Image Provisioning Switching)
Canada	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 –MNA FW Image Switching provisioning from flash (FW-MC7354M-LTE-AT or FW-MC7354-LTE-CA or FW-MC7354M-LTE-VZ or FW-MC7350-LTE-ST)
Important 4G LTE features	• Automatic switch failover between primary and backup link • Multichannel-interface-processor (MIP) profile configuration • CDMA data retry • 3G MIB with 4G LTE 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 • SIM lock and unlock capabilities
Dual SIM support 	• High reliability, and cellular multihoming support for dual mini SIM (2FF) 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) (Available early Q4, 2016) • Send and receive SMS (maximum 160 characters) • Standalone GPS, needs line of sight • Configure multiple profile
MIBs 	• Enhanced 3G MIB with 4G LTE MIB extension (4G parameters are covered with 3G MIB and 4G LTE MIB extension) • ENTITY MIB • IF MIB • 3G 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])
Modem information	• **Modem form factor:** Embedded Peripheral Component Interconnect (PCI) minicard • **C819GW-LTE-GA-EK9:** Sierra Wireless MC7304 with Qualcomm MDM9215 • **C819GW-LTE-MNA-AK9:** Sierra Wireless MC7354 with Qualcomm MDM9615
Programming interfaces	• Cisco IOS Software CLI
Wireless technologies supported (performance and throughput)	**C819GW-LTE-GA-EK9** 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

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Item	Specification
	• 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) **C819GW-LTE-MNA-AK9** Cisco LTE 2.0 1900 MHz (band 2 PCS), 1700/2100 MHz (band 4 AWS), 850 MHz (band 5), 700 MHz (band 17), 700 MHz (band 13), 1700/2100 MHz (band 4 AWS), 1900 MHz (band 25 extended PCS) 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) • EVDO Rev A/CDMA 1x BC0, BC1, BC10
Included antenna	• Two multiband swivel-mount dipole antennae (4G- LTE-ANTM-D) and one extender (4G-AE010-R) are included with all Cisco 819 4G LTE ISRs. • WLAN: Three Cisco Multiband Swivel-Mount Dipole Antennae. (AIR-ANTM2050D-R) are included for all 819 SKUs that have WLAN functionality.
LED indicators for 4G	• Received signal strength indication (RSSI) (green) • WLAN (green/blue/red/white) • WWAN (green) • SIM status (green/yellow) • 3G and 4G LTE service (green/amber) • GPS (green/yellow) • SYS (green/yellow) • ACT (green/off) • For detailed LED Description including for WLAN please see the 819 Deployment Guide.
Carrier support	• For an updated list of carriers that offer services on the Cisco 819 4G LTE ISR, please visit http://www.cisco.com/go/m2m.

Note: LTE CAT3 download/upload speeds depend on specific carrier channel bandwidth and carrier LTE network provisioning.

Table 3 lists the software features supported on the Cisco 819 4G LTE ISRs.

Table 3. Cisco IOS Software Features on Cisco 819 4G LTE ISRs: Advanced IP Features Set (Default)

Feature	Description
Cisco IOS Software requirement	• Cisco IOS Software feature set: Universal Cisco IOS Software image (Advanced IP Services with Full Security license) • **C819GW-LTE-GA-EK9:** Mainline Cisco IOS Software Release 15.5(2)T1 with modem firmware 5.5.58.x or later IOS release with respective modem firmware • **C819GW-LTE-MNA-AK9:** Mainline Cisco IOS Software Release 15.5(3)M with modem firmware 5.5.58.x or later IOS release with respective modem firmware
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 • Layer 2 Tunneling Protocol (L2TP) • Layer 2 Tunneling Protocol Version 3 (L2TPv3) • Network Address Translation • 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)

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Feature	Description
	• 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) • Data-Link Switching (DLSW)
Switch features	• Auto Media Device In/Media Device Cross Over (MDI-MDX) • 16 802.1Q VLANs • MAC filtering • Switched Port Analyzer (SPAN) • Storm control • Smart ports • Secure MAC address • Internet Group Management Protocol Version 3 (IGMPv3) snooping • 802.1X
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 • 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 blocked and allowed lists **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

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Feature	Description
	• Class of service (CoS)-to-differentiated services code point (DSCP) mapping • 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	• 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 (Available early Q4, 2016)
Number of recommended users	20

Table 4 lists the system specifications, and Table 5 lists antenna specifications for the Cisco 819 4G LTE ISRs.

Table 4. System Specifications

Feature	Specification
Memory	
Default and maximum DRAM	1 GB
Default and maximum flash memory	1 GB
Interface Support	
Console or auxiliary port	• RJ-45: Single dual-purpose port, which provides direct connection to a console or external modem for management or backup access point
Mini-USB port (RSVD)	• Mini-USB port to support remote 4G LTE diagnostics and monitoring tools (QUALCOMM CAIT and Spirent UDM)*
WAN interfaces	• Wireless WAN with 4G LTE, 3.7G, 3.5G, and 3G speeds • 10/100/1000 Gigabit Ethernet port • Cisco Smart Serial Interface (sync, async, and bisync)

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Feature	Specification
WLAN Features	• 2x3 multiple-input multiple-output (MIMO) with two spatial streams • Maximal ratio combining (MRC) • Legacy beamforming • 20- and 40-MHz channels • PHY data rates up to 300 Mbps • Packet aggregation: A-MPDU (Tx/Rx), A-MSDU (Tx/Rx) • 802.11 dynamic frequency selection (DFS) • Cyclic shift diversity (CSD) support
LAN interfaces	• Four 10/100 Fast Ethernet ports
System LEDs	• System OK (green/amber) • Activity (green) • Speed and link for Gigabit Ethernet WAN port (green) • Speed and link for all Fast Ethernet LAN ports (green)
Serial WAN interface	• Support for both synchronous and asynchronous modes • Synchronous maximum speed of up to 8 Mbps • Asynchronous maximum speed of up to 115.2 kbps • Support for bisync modes • Support for network clock synchronization
Serial protocol support	• EIA-232, EIA-449, EIA-530, EIA-530A, V.35, and X.21
Cisco Smart Serial Cabling	Cisco Smart Serial connectors and supported cables: **Product Number** / **Cable Type** / **Length** / **Connector Type** CAB-SS-V35MT / V.35 DTE / 10 ft (3m) / Male CAB-SS-V35FC / V.35 DCE / 10 ft (3m) / Female CAB-SS-232MT / EIA/TIA-232 DTE / 10 ft (3m) / Male CAB-SS-232FC / EIA/TIA-232 DCE / 10 ft (3m) / Female CAB-SS-449MT / EIA/TIA-449 DTE / 10 ft (3m) / Male CAB-SS-449FC / EIA/TIA-449 DCE / 10 ft (3m) / Female CAB-SS-X21MT / X.21 DTE / 10 ft (3m) / Male CAB-SS-X21FC / X.21 DCE / 10 ft (3m) / Female CAB-SS-530MT / EIA/TIA-530 DTE / 10 ft (3m) / Male CAB-SS-530AMT / EIA/TIA-530A DTE / 10 ft (3m) / Male
Physical Characteristics	
Physical dimensions (H x W x D)	Cisco C819GW-4G 1.67 x 7.7 x 9.0 in. (42 x 196 x 229 mm)
Weight	Cisco C819GW-4G 2.3 lb (1.0 kg)
Mean time between failure (MTBF—Ground Benign)	**C819GW-LTE-GA-EK9:** 263,000 hours **C819GW-LTE-MNA-AK9:** 253,000 hours
Maximum platform power consumption	Cisco C819GW-LTE 19 watts
Environmental operating range	Cisco C819GW-LTE 5° to 122°F (-15° to 50°C) (functional up to 55C non 3GPP compliant)
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
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

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Feature	Specification
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	**AC Power Adapter:** • Maximum power consumption: 25W • Meets efficiency Level V • Input voltage and currents supported: 100–264 VAC <0.5A • Maximum output power rating: 20W • For IP 41 - need additional enclosure **DC Power Adapter:** • Maximum power consumption: 26W • Input voltage and currents supported: 10 VDC minimum, 13.8 VDC nominal, 36 VDC maximum operating, and 42 VDC absolute maximum • Maximum output power rating: 20W • IP 41 compliant • Default: PWR2-20W-AC AC power supply

Table 5. Antenna Specifications

Item	Specification
Included antenna	Two multiband 4G LTE swivel-mount dipole antennae (4G-LTE-ANTM-D) and one extender (4G-AE010-R)
Diversity (dual antennae) MIMO	**C819GW-LTE:** Diversity supported multiple input/multiple output (MIMO 2X2)
Antenna 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 & 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
Antenna 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

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Item	Specification
	• **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 4G- LTE-ANTM-D	**Description:** • Cisco 4G LTE and 3G omnidirectional dipole antenna • Articulating joint; can be rotated 360 degrees and is capable of maneuvering into three stop positions: 0 degrees, 45 degrees, and 90 degrees • Plug threaded TNC connector: Directly mount the antenna on any Cisco 4G LTE or Cisco 3G wireless ISR enhanced high-speed WAN interface card (EHWIC) 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 4G LTE WWAN) **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 • **Voltage standing wave ratio (VSWR):** < 2.5:1 or less • **Characteristic impedance:** 50 ohms **Mechanical Specifications:** • **Antenna dimensions (L x W x D):** 9 x 1.2 x 7/16 in. (229 x 30.5 x 11 mm) • **Temperature rating:** –22° to 158°F (–30° to 70°C) • **Antenna base and random color:** Cisco Raven Black
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
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

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Item	Specification
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 • **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

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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) • **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 Outside dimensions):** 3.4 x 7.9 in. (87 x 200 mm)
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

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Item	Specification
	Mechanical Specifications: Mount style: Wall or mast mount • **Environment:** Outdoor • **Connector:** Dual type-N socket (direct connect or dual 12 in. [30 cm]) • **Antenna length (height):** 11.6 in. (2.95 cm) • **Temperature range (operating):** –22° to 158°F (–30° to 70°C) • **Storage temperature:** –40° to 185°F (–40° to 85°C) • **Wind rating:** 160 km per hr • **IP rating:** IP 54 • **Radome:** Polycarbonate, UV resistant, white Material substance compliance: **ROHS compliant**
CGR-LA-NM-NF* **CGR-LA-NF-NF***	**Description: Cisco Lightning Arrestor** • Broadband operation • DC continuity for outdoor powering • Reversed installation **Permanently installed gas capsule** **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 MHz 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°F to 185°F (-40°C 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

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Ordering Information

For Cisco 819 4G LTE ISR ordering information, please visit the Cisco Ordering home page and refer to Tables 6 and 7.

Table 6. Ordering Information

Product	Description
Cisco 819G Non-Hardened 4G LTE Integrated Services Routers	
C819GW-LTE-GA-EK9	Compact Cisco 819 Non-Hardened 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 and Dual WiFi Radio with ETSI
C819GW-LTE-MNA-AK9	Compact Cisco 819 Non-Hardened Secure Multi-Mode 4G LTE M2M ISR with Qualcomm MDM9615 for North America, LTE 700/850/1900 (1700/2100 AWS) and 1900 extended PCS, 850/900/1900 (1700/2100) MHz UMTS/HSPA+ bands, EVDO Rev A/CDMA 1x BC0, BC1, BC10 and Dual WiFi Radio with FCC
Power Supplies and Mounting Brackets	
PWR2-20W-AC	AC power adapter for the Cisco 810 level ISRs (default)
PWR2-20W-12VDC	12V DC power adapter for vehicle for the Cisco 810 level ISRs
PWR2-20W-24VDC	24V DC power adapter for vehicle for the Cisco 810 level ISRs
ACS-810-DM	Desktop and DIN-Rail mounting kit for the Cisco 810 level ISRs
ACS-810-FWM	Floor mount and wall mount kit for the Cisco 810 level ISRs
C810-POE-SPL	C810 POE+ power supply splitter
IOS Software and Licenses	
S84GUK9-15502T	Cisco 810 level IOS Universal Data (default)
S84GNPEK9-15502T	Cisco 810 level IOS Universal Data with no payload encryption
S84GUK9-15503M	Cisco 810 level IOS Universal Data (default)
S84GNPEK9-15503M	Cisco 810 level IOS Universal Data with no payload encryption
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-MC7354M-LTE-AT	Cisco ATT MC7354 modem image switching provisioning firmware
FW-MC7354-LTE-CA	Cisco Canada MC7354 modem image switching provisioning firmware
FW-MC7354M-LTE-VZ	Cisco Verizon MC7350 modem image switching provisioning firmware
FW-MC7350-LTE-ST	Cisco Sprint MC7350 modem image switching provisioning firmware
SL-810-AIS	Cisco 810 level Advanced IP Services license (default)
SL-810-ADVSEC	Cisco 810 level Advanced Security Software license (default)
SL-810-AIS-NPE	Cisco 810 level Advanced IP Services license with no payload encryption (default with NPE IOS image)
SL-810-ADVSEC-NPE	Cisco 810 level Advanced Security Software license with no payload encryption (default with NPE IOS image)

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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)
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)
C819 Power Cable Lock 25 units spare	C819-PWRCAB-LCK25= (Spare)
Multiband Omni-Directional Stick Outdoor 4G Antenna	ANT-4G-OMNI-OUT-N
Multiband Low-Profile Saucer Outdoor 4G Antenna	ANT-4G-SR-OUT-TNC
Multiband Panel Outdoor 4G Antenna	ANT-4G-PNL-OUT-N
50-ft (15 m) Ultra Low Loss LMR 400 Cable TNC-N Connector	CAB-L400-50-TNC-N
20-ft (6 m) Ultra Low Loss LMR 400 Cable with TNC-N Connector	CAB-L400-20-TNC-N
20-ft (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

For More Information

For more information about the Cisco 819 ISRs, visit http://www.cisco.com/go/m2m or contact your local Cisco account representative.

For more information regarding the Cisco 800 Series ISRs and options, contact your Cisco representative or go to http://www.cisco.com/go/isr.

For –N antenna and cable installation guidance, visit http://www.cisco.com/en/US/docs/routers/connectedgrid/antennas/installing/overview.html

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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 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, please visit http://www.cisco.com/go/services.

Warranty Coverage and Technical Service Options

The Cisco 819 Integrated Services Routers come with the Cisco 1-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 Cisco 819 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 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 • Operating system 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 will be 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; please review the appropriate service descriptions for details.

[2]Cisco operating system updates include maintenance releases, minor updates, and major updates within the licensed feature set.

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