

HP MSR93x Router Series



Key features

- Converged high-performance routing, switching, security, SIP, and 300 Kpps performance
- Integrated GbE WAN and LAN, ADSL2+, and optional serial port
- Integrated 4G LTE and 3G/dual 3G wireless WAN (WWAN) as well as IEEE 802.11b/g/n WLAN
- Embedded encryption, NAT, DVPN, GDVPN, security features
- Unified OS, zero-touch solution, and single-pane-of-glass management

Product overview

The HP MSR93x Router Series is a high-performance, small-branch router that delivers integrated routing, switching, security, SIP, embedded IEEE 802.11b/g/n WLAN connectivity, integrated 4G LTE and 3G, serial port, ADSL2+ (annex A/M, annex B/J, ADSL2+ over POTS, and ADSL2+ over ISDN), and an optional dual 3G WAN—all in a single box.

The MSR93x Router Series solutions deliver up to 300 Kpps forwarding with comprehensive IPv4 and IPv6 routing, MPLS, QoS, firewall, Network Address Translation (NAT), VPN, switching, voice, and wireless capabilities in a compact, fixed form factor. Moreover, this router series is based on open standards for seamless integration within small-branch deployments.

Features and benefits

Quality of Service (QoS)

- Traffic policing
 - Supports Committed Access Rate (CAR) and line rate
- Congestion management
 - Supports FIFO, PQ, CQ, WFQ, CBQ, and RTPQ
- Weighted random early detection (WRED)/random early detection (RED)
 - Delivers congestion avoidance capabilities using queue management algorithms
- Other QoS technologies
 - Support traffic shaping, FR QoS, and MP QoS/LFI

Management

- Industry-standard CLI with a hierarchical structure
 - Reduces training time and expenses, and increases productivity in multivendor installations
- Management security
 - Restricts access to critical configuration commands; offers multiple privilege levels with password protection; ACLs provide Telnet and SNMP access; local and remote syslog capabilities allow logging of all access
- SNMPv1, v2, and v3
 - Provide complete support of SNMP; provide full support of industry-standard management information base (MIB) plus private extensions; SNMPv3 supports increased security using encryption
- Remote monitoring (RMON)
 - Uses standard SNMP to monitor essential network functions; supports events, alarm, history, and statistics group plus a private alarm extension group
- FTP, TFTP, and SFTP support
 - Offer different mechanisms for configuration updates; FTP allows bidirectional transfers over a TCP/IP network; trivial FTP (TFTP) is a simpler method using User Datagram Protocol (UDP); Secure File Transfer Protocol (SFTP) runs over an SSH tunnel to provide additional security
- Debug and sampler utility
 - Supports ping and traceroute for both IPv4 and IPv6

- Network Time Protocol (NTP)

Synchronizes timekeeping among distributed time servers and clients; keeps timekeeping consistent among all clock-dependent devices within the network so that the devices can provide diverse applications based on the consistent time

- Information center

Provides a central repository for system and network information; aggregates all logs, traps, and debugging information generated by the system and maintains them in order of severity; outputs the network information to multiple channels based on user-defined rules

Connectivity

- Packet storm protection

Protects against broadcast, multicast, or unicast storms with user-defined thresholds

- Loopback

Supports internal loopback testing for maintenance purposes and an increase in availability; loopback detection protects against incorrect cabling or network configurations and can be enabled on a per-port basis for added flexibility

- Integrated 3G WWAN capability

- Offers models with built-in 3G and dual 3G WWAN connectivity

- Supports up to four antennas in dual 3G models for improved connectivity and throughput

- Comes with a default 3G antenna; additional 3G antennas are also available

- 3G and 4G LTE access

Support popular 3G and 4G LTE USB modems; for a list of supported products, contact your local HP representative

- Multiple Gigabit Ethernet connection options

Provide GbE WAN and GbE LAN ports onboard

- 4G LTE Verizon and global carrier support

Deliver embedded 4G LTE wireless WAN backhaul connectivity with two different carrier chipset options

- Multiple advanced WAN interfaces

Provide traditional connection options including serial, ADSL2+ (Annex A/M, annex B/J, over POTS, or over ISDN), four-pair, and WAN Gigabit Ethernet ports; and offer wireless access with 4G LTE and 3G connectivity

Performance

- Forwarding performance

Provides up to 300 Kpps; and meets current and future bandwidth-intensive application demands for enterprise businesses

- Embedded encryption

Supports up to 100 VPN tunnels and up to 160 Mbps encryption throughput

- Gigabit Ethernet interface

Provides a connection to the network that eliminates the network as a bottleneck

Resiliency and high availability

- Backup center

Acts as a part of the management and backup function to provide backup for device interfaces; delivers reliability by switching traffic over to a backup interface when the primary one fails

- Virtual Router Redundancy Protocol (VRRP)

Allows groups of two routers to back each other up dynamically to create highly available routed environments; and supports VRRP load balancing

- WWAN with integrated 3G

Allows small-branch users to maintain remote office-data connectivity to the data center or headquarters, using integrated carrier connections

Layer 2 switching

- Spanning Tree Protocol (STP)

Supports standard IEEE 802.1D STP, IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) for faster convergence, and IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)

- Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) protocol snooping

Control and manage the flooding of multicast packets in a Layer 2 network

- Port mirroring

Duplicates port traffic (ingress and egress) to a local or remote monitoring port

- Port isolation

Increases security by isolating ports within a VLAN while still allowing them to communicate with other VLANs

- VLANs

Supports IEEE 802.1Q-based VLANs

- sFlow®

Allows traffic sampling

Layer 3 services

- Address Resolution Protocol (ARP)

Determines the MAC address of another IP host in the same subnet; supports static ARPs; gratuitous ARP allows detection of duplicate IP addresses; proxy ARP allows normal ARP operation between subnets or when subnets are separated by a Layer 2 network

- Dynamic Host Configuration Protocol (DHCP)

Simplifies the management of large IP networks and supports client and server; DHCP Relay enables DHCP operation across subnets

- Built-in applications support

- Device management controller (DMC)

Acts as the gateway of a virtual “network training room”

- Wisdom Network (WiNet) technology

Helps manage a large number of scattered network devices centrally

- Remote terminal connection (RTC) and true type terminal (TTY) access

Allows the connection of a terminal to a router through an asynchronous interface for data exchange with a front-end processor (FEP) or another terminal through the router

Layer 3 routing

- Static IPv4 routing

Provides simple manually configured IPv4 routing

- Routing Information Protocol (RIP)

Uses a distance vector algorithm with UDP packets for route determination; supports RIPv1 and RIPv2 routing; includes loop protection

- Open Shortest Path First (OSPF)

Delivers faster convergence; uses this link-state routing Interior Gateway Protocol (IGP), which supports ECMP, NSSA, and MD5 authentication for increased security and graceful restart for faster failure recovery

- Border Gateway Protocol 4 (BGP-4)

Delivers an implementation of the Exterior Gateway Protocol (EGP) utilizing path vectors; uses TCP for enhanced reliability for the route discovery process; reduces bandwidth consumption by advertising only incremental updates; supports extensive policies for increased flexibility; scales to very large networks

- Intermediate system to intermediate system (IS-IS)
Uses a path vector Interior Gateway Protocol (IGP), which is defined by the ISO organization for IS-IS routing and extended by IETF RFC 1195 to operate in both TCP/IP and the OSI reference model (Integrated IS-IS)
- Static IPv6 routing
Provides simple manually configured IPv6 routing
- Dual IP stack
Maintains separate stacks for IPv4 and IPv6 to ease the transition from an IPv4-only network to an IPv6-only network design
- Routing Information Protocol next generation (RIPng)
Extends RIPv2 to support IPv6 addressing
- OSPFv3
Provides OSPF support for IPv6
- BGP+
Extends BGP-4 to support Multiprotocol BGP (MBGP), including support for IPv6 addressing
- IS-IS for IPv6
Extends IS-IS to support IPv6 addressing
- IPv6 tunneling
Allows IPv6 packets to traverse IPv4-only networks by encapsulating the IPv6 packet into a standard IPv4 packet; supports manually configured, 6 to 4, and Intra-Site Automatic Tunnel Addressing Protocol (ISATAP) tunnels; is an important element for the transition from IPv4 to IPv6
- Policy routing
Allows custom filters for increased performance and security; supports ACLs, IP prefix, AS paths, community lists, and aggregate policies
- BGP-4+ support
Utilizes the BGP-4 (RFC 4271) exterior routing protocol for routing integrity and reliability between different autonomous systems

Security

- Access control list (ACL)
Supports powerful ACLs for both IPv4 and IPv6; ACLs are used for filtering traffic to prevent unauthorized users from accessing the network, or for controlling network traffic to save resources; rules can either deny or permit traffic to be forwarded; rules can be based on a Layer 2 header or a Layer 3 protocol header; rules can be set to operate on specific dates or times

- Terminal Access Controller Access-Control System (TACACS+)
Delivers an authentication tool using TCP with encryption of the full authentication request, providing additional security
- Network login
Allows authentication of multiple users per port using the IEEE 802.1X standard
- Remote Authentication Dial In User Service (RADIUS) login
Eases security access administration by using a password authentication server
- NAT enablement
Facilitates one-to-one NAT, many-to-many NAT, and NAT control—enabling NAT-PT to support multiple connections; supports blacklisting in the NAT/NAT-PT; and enables a limit on the number of connections, session logs, and multiple instances
- SSHv2
Uses external servers to safely log in to a remote device or MSRs from a remote location; protects against IP spoofing and plain text password interception, with authentication and encryption; and increases the security of SFTP transfers
- Unicast Reverse Path Forwarding (URPF)
Allows normal packets to be forwarded correctly, but discards the attaching packets due to lack of a reverse path route or an incorrect inbound interface; and helps prevent source spoofing and distributed attacks
- IPSec VPN
Supports DES, 3DES, and AES 128/192/256 encryption as well as MD5 and SHA1 authentication
- DVPN
Collects, maintains, and distributes dynamic public addresses through the VPN Address Management (VAM) protocol, making the VPN establishment available between enterprise branches that use dynamic addresses to access the public network; compared to traditional VPN technologies, the DVPN technology is more flexible and has richer features, such as NAT traversal of DVPN packets, AAA identity authentication, IPSec protection of data packets, and multiple VPN domains

Convergence

- Internet Group Management Protocol (IGMP)

Utilizes Any-Source Multicast (ASM) or Source-Specific Multicast (SSM) to manage IPv4 multicast networks; supports IGMPv1, v2, and v3

- Protocol Independent Multicast (PIM)

Defines modes of Internet IPv4 and IPv6 multicasting to allow one-to-many and many-to-many transmission of information; supports PIM Dense Mode (DM), Sparse Mode (SM), and Source-Specific Mode (SSM)

- Multicast Source Discovery Protocol (MSDP)

Allows multiple PIM-SM domains to interoperate; is used for inter-domain multicast applications

- Multicast Border Gateway Protocol (MBGP)

Allows multicast traffic to be forwarded across BGP networks and kept separate from unicast traffic

- Internet Group Management Protocol (IGMP) snooping and proxy

- Monitor and observe IGMP network traffic, allowing the network device to listen in on the IGMP conversation between hosts and routers—enabling better IP multicast stream control
- Allow a multicast router to learn multicast group membership information; and enables it to forward multicast packets

- Multicast VPN and bidirectional protocol-independent multicasting (PIM)

- Allow rich multicast services such as video conferencing and data sharing amongst enterprise VPN-based deployments
- Improve scalability of various applications through the use of bidirectional PIM

Integration

- Embedded NetStream

Improves traffic distribution using powerful scheduling algorithms, including Layer 4 to 7 services; monitors the health status of servers and firewalls

- Embedded VPN firewall

- Provides enhanced stateful packet inspection and filtering
- Delivers advanced VPN services with Triple DES (3DES) and Advanced Encryption Standard (AES) encryption at high performance and low latency
- Offers Web content filtering and application prioritization and enhancement

Additional information

- Green initiative support

Provides support for RoHS and WEEE regulations

- OPEX savings

Simplify and streamline deployment, management, and training using a common operating system, thereby cutting costs as well as reducing the risk of human errors associated with having to manage multiple operating systems across different platforms and network layers

- Faster time to market

Allows new and custom features to be brought rapidly to market through engineering efficiencies, delivering better initial and ongoing stability

Warranty and support

- 1-year Warranty 2.0

Advance hardware replacement with next-business-day delivery (available in most countries)

- Electronic and telephone support (for Warranty 2.0)

Limited electronic and 24x7 telephone support is available from HP for the entire warranty period; to reach our support centers, refer to hp.com/networking/contact-support; for details on the duration of support provided with your product purchase, refer to hp.com/networking/warrantysummary

- Software releases

To find software for your product, refer to hp.com/networking/support; for details on the software releases available with your product purchase, refer to hp.com/networking/warrantysummary

HP MSR93x Router Series

Specifications



	HP MSR930 Router (JG511B)	HP MSR930 3G Router (JG513B)	HP MSR931 Router (JG514A) HP MSR931 Router (JG514B)
I/O ports and slots	1 RJ-45 autosensing 10/100/1000 WAN port 4 RJ-45 autosensing 10/100/1000 LAN ports	1 RJ-45 autosensing 10/100/1000 WAN port 4 RJ-45 autosensing 10/100/1000 LAN ports	1 RJ-45 autosensing 10/100/1000 WAN port 4 RJ-45 autosensing 10/100/1000 LAN ports 1 Serial port
AP/Wireless characteristic		3G	
Physical characteristics			
Dimensions	9.06(w) x 6.3(d) x 1.72(h) in. (23 x 16 x 4.36 cm)	9.06(w) x 6.3(d) x 1.72(h) in. (23 x 16 x 4.36 cm)	11.81(w) x 7.87(d) x 1.74(h) in. (30 x 20 x 4.42 cm)
Weight	3.97 lb (1.8 kg)	3.97 lb (1.8 kg)	5.95 lb (2.7 kg)
Memory and processor	RISC @ 533 MHz, 256 MB DDR3 SDRAM, 128 MB NAND flash	RISC @ 533 MHz, 256 MB DDR3 SDRAM, 128 MB NAND flash	RISC @ 533 MHz, 256 MB DDR3 SDRAM, 128 MB NAND flash
Performance			
Throughput	300 Kpps (64-byte packets)	300 Kpps (64-byte packets)	300 Kpps (64-byte packets)
Routing table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
Forwarding table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
Environment			
Operating temperature	32°F to 104°F (0°C to 40°C)	32°F to 104°F (0°C to 40°C)	32°F to 104°F (0°C to 40°C)
Operating relative humidity	5% to 90%, noncondensing	5% to 90%, noncondensing	5% to 90%, noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	5% to 90%, noncondensing	5% to 90%, noncondensing	5% to 90%, noncondensing
Shock and vibration	Anti-Seismic ETS 300 019-2-3 HALT: 0~40Grms	Anti-Seismic ETS 300 019-2-3 HALT: 0~40Grms	Anti-Seismic ETS 300 019-2-3 HALT: 0~40Grms
Altitude	Up to 6,561 ft (2 km)	Up to 6,561 ft (2 km)	Up to 6,561 ft (2 km)
Electrical characteristics			
Maximum heat dissipation	20 BTU/hr (21.1 kJ/hr)	20 BTU/hr (21.1 kJ/hr)	20 BTU/hr (21.1 kJ/hr)
AC voltage	100–240 Vac	100–240 Vac	100–240 Vac
Maximum power rating	24 W	24 W	24 W
Notes	Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.

	HP MSR930 Router (JG511B)	HP MSR930 3G Router (JG513B)	HP MSR931 Router (JG514A) HP MSR931 Router (JG514B)
Safety	UL 60950-1; CAN/CSA 22.2 No. 60950-1; AS/NZS 60950; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1-03; EN 60950-1/A11; FDA 21 CFR Subchapter J	UL 60950-1; CAN/CSA 22.2 No. 60950-1; AS/NZS 60950; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1-03; EN 60950-1/A11; FDA 21 CFR Subchapter J	UL 60950-1; CAN/CSA 22.2 No. 60950-1; AS/NZS 60950; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1-03; EN 60950-1/A11; FDA 21 CFR Subchapter J
Emissions	ANSI C63.4; EN 55022 Class B; ICES-003 Class B; ETSI EN 300 386 V1.3.3; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-3-2:2006; EN 61000-3-3:1995+A1:2001+A2:2005; EMC Directive 2004/108/EC; EN 55024:1998+A1:2001+A2:2003; EN 61000-4-11:2004; EN 61000-4-8:2001; AS/NZS CISPR 22 Class B; FCC (CFR 47, Part 15) Class B	ANSI C63.4; EN 55022 Class B; ICES-003 Class B; ETSI EN 300 386 V1.3.3; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-3-2:2006; EN 61000-3-3:1995+A1:2001+A2:2005; EMC Directive 2004/108/EC; EN 55024:1998+A1:2001+A2:2003; EN 61000-4-11:2004; EN 61000-4-8:2001; AS/NZS CISPR 22 Class B; FCC (CFR 47, Part 15) Class B	ANSI C63.4; EN 55022 Class B; ICES-003 Class B; ETSI EN 300 386 V1.3.3; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-3-2:2006; EN 61000-3-3:1995+A1:2001+A2:2005; EMC Directive 2004/108/EC; EN 55024:1998+A1:2001+A2:2003; EN 61000-4-11:2004; EN 61000-4-8:2001; AS/NZS CISPR 22 Class B; FCC (CFR 47, Part 15) Class B
Telecom	FCC part 68; TIA-968-B; CS03 Part 8; AS/ACIF S043; G.992.1/2/3/5	FCC part 68; TIA-968-B; CS03 Part 8; AS/ACIF S043; G.992.1/2/3/5	FCC part 68; TIA-968-B; CS03 Part 8; AS/ACIF S043; G.992.1/2/3/5
Management	IMC—Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB	IMC—Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB	IMC—Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB
Notes		Supports HSPA+ SIM card not included Default antennas: 1 Maximum antennas: 2 Optional antenna cable also available for remote location 3G firmware changes through CLI For regional carrier certifications please contact your local HP sales representative	
Services	Refer to the HP website at hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	Refer to the HP website at hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	Refer to the HP website at hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

HP MSR93x Router Series

Specifications (continued)



	HP MSR931 3G Router (JG515A)	HP MSR931 Dual 3G Router (JG531B)	HP MSR930 Wireless Router (JG512A) HP MSR930 Wireless 11n (NA) Router (JH012B)
I/O ports and slots	1 RJ-45 autosensing 10/100/1000 WAN port 4 RJ-45 autosensing 10/100/1000 LAN ports 1 serial port	1 RJ-45 autosensing 10/100/1000 WAN port 4 RJ-45 autosensing 10/100/1000 LAN ports 1 serial port	1 RJ-45 autosensing 10/100/1000 WAN port 4 RJ-45 autosensing 10/100/1000 LAN ports
AP/Wireless characteristic Radios (built-in)	3G	3G	802.11b/g/n
Physical characteristics Dimensions	11.81(w) x 7.87(d) x 1.74(h) in. (30 x 20 x 4.42 cm)	11.81(w) x 7.87(d) x 1.74(h) in. (30 x 20 x 4.42 cm)	9.06(w) x 6.3(d) x 1.72(h) in. (23 x 16 x 4.36 cm)
Weight	5.95 lb (2.7 kg)	5.95 lb (2.7 kg)	2.65 lb (1.2 kg)
Memory and processor	RISC @ 533 MHz, 256 MB DDR3 SDRAM, 128 MB NAND flash	RISC @ 533 MHz, 256 MB DDR3 SDRAM, 128 MB NAND flash	RISC @ 533 MHz, 256 MB DDR3 SDRAM, 128 MB NAND flash
Performance Throughput	300 Kpps (64-byte packets)	300 Kpps (64-byte packets)	300 Kpps (64-byte packets)
Routing table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
Forwarding table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
Environment Operating temperature	32°F to 104°F (0°C to 40°C)	32°F to 104°F (0°C to 40°C)	32°F to 104°F (0°C to 40°C)
Operating relative humidity	5% to 90%, noncondensing	5% to 90%, noncondensing	5% to 90%, noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	5% to 90%, noncondensing	5% to 90%, noncondensing	5% to 90%, noncondensing
Shock and vibration	Anti-Seismic ETS 300 019-2-3 HALT: 0~40Grms	Anti-Seismic ETS 300 019-2-3 HALT: 0~40Grms	Anti-Seismic ETS 300 019-2-3 HALT: 0~40Grms
Altitude	Up to 6,561 ft (2 km)	Up to 6,561 ft (2 km)	Up to 6,561 ft (2 km)
Electrical characteristics Maximum heat dissipation	20 BTU/hr (21.1 kJ/hr)	20 BTU/hr (21.1 kJ/hr)	20 BTU/hr (21.1 kJ/hr)
AC voltage	100–240 Vac	100–240 Vac	100–240 Vac
Maximum power rating	24 W	24 W	24 W
Notes	Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.

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Safety	UL 60950-1; CAN/CSA 22.2 No. 60950-1; AS/NZS 60950; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1-03; EN 60950-1/A11; FDA 21 CFR Subchapter J	UL 60950-1; CAN/CSA 22.2 No. 60950-1; AS/NZS 60950; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1-03; EN 60950-1/A11; FDA 21 CFR Subchapter J	UL 60950-1; CAN/CSA 22.2 No. 60950-1; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1-03; EN 60950-1/A11; AS/NZS 60950-1
Emissions	ANSI C63.4; EN 55022 Class B; ICES-003 Class B; ETSI EN 300 386 V1.3.3; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-3-2:2006; EN 61000-3-3:1995+A1:2001+A2:2005; EMC Directive 2004/108/EC; EN 55024:1998+A1:2001+A2:2003; EN 61000-4-11:2004; EN 61000-4-8:2001; AS/NZS CISPR 22 Class B; FCC (CFR 47, Part 15) Class B	ANSI C63.4; EN 55022 Class B; ICES-003 Class B; ETSI EN 300 386 V1.3.3; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-3-2:2006; EN 61000-3-3:1995+A1:2001+A2:2005; EMC Directive 2004/108/EC; EN 55024:1998+A1:2001+A2:2003; EN 61000-4-11:2004; EN 61000-4-8:2001; AS/NZS CISPR 22 Class B; FCC (CFR 47, Part 15) Class B	ANSI C63.4; EN 55022 Class B; ICES-003 Class B; ETSI EN 300 386 V1.3.3; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-3-2:2006; EN 61000-3-3:1995+A1:2001+A2:2005; EMC Directive 2004/108/EC; EN 55024:1998+A1:2001+A2:2003; EN 61000-4-11:2004; EN 61000-4-8:2001; AS/NZS CISPR 22 Class B; FCC (CFR 47, Part 15) Class B
Telecom	FCC part 68; TIA-968-B; CS03 Part 8; AS/ACIF S043; G.992.1/2/3/5	FCC part 68; TIA-968-B; CS03 Part 8; AS/ACIF S043; G.992.1/2/3/5	FCC part 68; TIA-968-B; CS03 Part 8; AS/ACIF S043; G.992.1/2/3/5
Management	IMC—Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB	IMC—Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB	IMC—Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB
Notes	Supports HSPA+ SIM card not included Default antennas: 1 Maximum antennas: 2 Optional antenna cable also available for remote location 3G firmware changes through CLI For regional carrier certifications please contact your local HP sales representative	Supports HSPA+ SIM cards not included Default antennas: 2 Maximum antennas: 4 Optional antenna cable also available for remote location 3G firmware changes through CLI For regional carrier certifications please contact your local HP sales representative	Supports 802.11b/g/n Default antennas: 2 Maximum antennas: 2
Services	Refer to the HP website at hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	Refer to the HP website at hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	Refer to the HP website at hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

HP MSR93x Router Series

Specifications (continued)



	HP MSR930 4G LTE/3G CDMA Router (JG596A)	HP MSR933 Router (JG516A)	HP MSR933 3G Router (JG517A)
I/O ports and slots	1 RJ-45 autosensing 10/100/1000 WAN port 4 RJ-45 autosensing 10/100/1000 LAN ports	1 RJ-45 autosensing 10/100/1000 WAN port 4 RJ-45 autosensing 10/100/1000 LAN ports 1 G.SHDSL (8-wire) port	1 RJ-45 autosensing 10/100/1000 WAN port 4 RJ-45 autosensing 10/100/1000 LAN ports 1 G.SHDSL (8-wire) port
AP/Wireless characteristic			
Radios (built-in)	3G, 4G LTE		3G
Physical characteristics			
Dimensions	9.06(w) x 6.3(d) x 1.72(h) in. (23 x 16 x 4.36 cm)	11.81(w) x 7.87(d) x 1.74(h) in. (30 x 20 x 4.42 cm)	11.81(w) x 7.87(d) x 1.74(h) in. (30 x 20 x 4.42 cm)
Weight	3.97 lb (1.8 kg)	3.97 lb (1.8 kg)	3.97 lb (1.8 kg)
Memory and processor	RISC @ 533 MHz, 256 MB DDR3 SDRAM, 128 MB NAND flash	RISC @ 533 MHz, 256 MB DDR3 SDRAM, 128 MB NAND flash	RISC @ 533 MHz, 256 MB DDR3 SDRAM, 128 MB NAND flash
Performance			
Throughput	Up to 300 Kpps (64-byte packets)	Up to 300 Kpps (64-byte packets)	Up to 300 Kpps (64-byte packets)
Routing table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
Forwarding table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
Environment			
Operating temperature	32°F to 104°F (0°C to 40°C)	32°F to 104°F (0°C to 40°C)	32°F to 104°F (0°C to 40°C)
Operating relative humidity	5% to 90%, noncondensing	5% to 90%, noncondensing	5% to 90%, noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	5% to 90%, noncondensing	5% to 90%, noncondensing	5% to 90%, noncondensing
Shock and vibration	Anti-Seismic ETS 300 019-2-3 HALT: 0~40Grms	Anti-Seismic ETS 300 019-2-3 HALT: 0~40Grms	Anti-Seismic ETS 300 019-2-3 HALT: 0~40Grms
Altitude	Up to 6,561 ft (2 km)	Up to 6,561 ft (2 km)	Up to 6,561 ft (2 km)
Electrical characteristics			
Maximum heat dissipation	20 BTU/hr (21.1 kJ/hr)	20 BTU/hr (21.1 kJ/hr)	20 BTU/hr (21.1 kJ/hr)
AC voltage	100–240 Vac	100–240 Vac	100–240 Vac
Maximum power rating	24 W	24 W	24 W
	Notes Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.

	HP MSR930 4G LTE/3G CDMA Router (JG596A)	HP MSR933 Router (JG516A)	HP MSR933 3G Router (JG517A)
Safety	UL 60950-1; CAN/CSA 22.2 No. 60950-1; AS/NZS 60950; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1-03; EN 60950-1/A11; FDA 21 CFR Subchapter J	UL 60950-1; CAN/CSA 22.2 No. 60950-1; AS/NZS 60950; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1-03; EN 60950-1/A11; FDA 21 CFR Subchapter J	UL 60950-1; CAN/CSA 22.2 No. 60950-1; AS/NZS 60950; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1-03; EN 60950-1/A11; FDA 21 CFR Subchapter J
Emissions	ANSI C63.4; EN 55022 Class B; ICES-003 Class B; ETSI EN 300 386 V1.3.3; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-3-2:2006; EN 61000-3-3:1995+A1:2001+A2:2005; EMC Directive 2004/108/EC; EN 55024:1998+A1:2001+A2:2003; EN 61000-4-11:2004; EN 61000-4-8:2001; AS/NZS CISPR 22 Class B; FCC (CFR 47, Part 15) Class B	ANSI C63.4; EN 55022 Class B; ICES-003 Class B; ETSI EN 300 386 V1.3.3; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-3-2:2006; EN 61000-3-3:1995+A1:2001+A2:2005; EMC Directive 2004/108/EC; EN 55024:1998+A1:2001+A2:2003; EN 61000-4-11:2004; EN 61000-4-8:2001; AS/NZS CISPR 22 Class B; FCC (CFR 47, Part 15) Class B	ANSI C63.4; EN 55022 Class B; ICES-003 Class B; ETSI EN 300 386 V1.3.3; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-3-2:2006; EN 61000-3-3:1995+A1:2001+A2:2005; EMC Directive 2004/108/EC; EN 55024:1998+A1:2001+A2:2003; EN 61000-4-11:2004; EN 61000-4-8:2001; AS/NZS CISPR 22 Class B; FCC (CFR 47, Part 15) Class B
Telecom	FCC part 68; TIA-968-B; CS03 Part 8; AS/ACIF S043; G.992.1/2/3/5	FCC part 68; TIA-968-B; CS03 Part 8; AS/ACIF S043; G.992.1/2/3/5	FCC part 68; TIA-968-B; CS03 Part 8; AS/ACIF S043; G.992.1/2/3/5
Management	IMC—Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB	IMC—Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB	IMC—Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB
Notes	<p>For local 4G LTE/3G carrier certification, please contact your regional sales team. This router has the Sierra Wireless MC7750 AirPrime Series</p> <ul style="list-style-type: none"> • Module embedded with support the following specs: Air Interface: LTE/EV-DO LTE Freq. Bands: 700 (B13) MHz CDMA 1xRTT/EV-DO RevA: 800/1900 MHz • This model (JG665A) is certified with Verizon Wireless 4GLTE networks • Carrier SIM card not included • Default Antennas: 2 • Maximum Antennas: 2 • Optional antenna cable extensions available HP MSR 3G RF 2.8m Antenna Cable (JG522A) HP MSR 3G RF 6m Antenna Cable (JG666A) HP MSR 3G RF 15m Antenna Cable (JG667A) • Only 4G Antenna (JG669A HP MSR 4G 5W TNC Antenna) is supported 		<p>Supports HSPA+SIM card included</p> <p>Default antennas: 1</p> <p>Maximum antennas: 2</p> <p>Optional antenna cable also available for remote location</p> <p>3G firmware changes through CLI</p> <p>For regional carrier certifications please contact your local HP sales representative</p>
Services	Refer to the HP website at hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	Refer to the HP website at hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	Refer to the HP website at hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

HP MSR93x Router Series

Specifications (continued)



	HP MSR935 Router (JG518B)	HP MSR935 Wireless Router (JG519A) HP MSR935 Wireless 11n (NA) Router (JH013A)	HP MSR935 3G Router (JG520A)
I/O ports and slots	1 RJ-45 autosensing 10/100/1000 WAN port 4 RJ-45 autosensing 10/100/1000 LAN ports 1 ADSL2+ Annex A/M port	1 RJ-45 autosensing 10/100/1000 WAN port 4 RJ-45 autosensing 10/100/1000 LAN ports 1 ADSL2+ Annex A/M port	1 RJ-45 autosensing 10/100/1000 WAN port 4 RJ-45 autosensing 10/100/1000 LAN ports 1 ADSL2+ Annex A/M port
AP/Wireless characteristic Radios (built-in)		802.11b/g/n	3G
Physical characteristics Dimensions	11.81(w) x 7.87(d) x 1.74(h) in. (30 x 20 x 4.42 cm)	11.81(w) x 7.87(d) x 1.74(h) in. (30 x 20 x 4.42 cm)	11.81(w) x 7.87(d) x 1.74(h) in. (30 x 20 x 4.42 cm)
Weight	3.97 lb (1.8 kg)	3.97 lb (1.8 kg)	3.97 lb (1.8 kg)
Memory and processor	RISC @ 533 MHz, 256 MB DDR3 SDRAM, 128 MB NAND flash	RISC @ 533 MHz, 256 MB DDR3 SDRAM, 128 MB NAND flash	RISC @ 533 MHz, 256 MB DDR3 SDRAM, 128 MB NAND flash
Performance Throughput	Up to 300 Kpps (64-byte packets)	Up to 300 Kpps (64-byte packets)	Up to 300 Kpps (64-byte packets)
Routing table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
Forwarding table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
Environment Operating temperature	32°F to 104°F (0°C to 40°C)	32°F to 104°F (0°C to 40°C)	32°F to 104°F (0°C to 40°C)
Operating relative humidity	5% to 90%, noncondensing	5% to 90%, noncondensing	5% to 90%, noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	5% to 90%, noncondensing	5% to 90%, noncondensing	5% to 90%, noncondensing
Shock and vibration	Anti-Seismic ETS 300 019-2-3 HALT: 0~40Grms	Anti-Seismic ETS 300 019-2-3 HALT: 0~40Grms	Anti-Seismic ETS 300 019-2-3 HALT: 0~40Grms
Altitude	Up to 6,561 ft (2 km)	Up to 6,561 ft (2 km)	Up to 6,561 ft (2 km)
Electrical characteristics Maximum heat dissipation	20 BTU/hr (21.1 kJ/hr)	20 BTU/hr (21.1 kJ/hr)	20 BTU/hr (21.1 kJ/hr)
AC voltage	100–240 Vac	100–240 Vac	100–240 Vac
Maximum power rating	24 W	24 W	24 W
Notes	Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.

	HP MSR935 Router (JG518B)	HP MSR935 Wireless Router (JG519A) HP MSR935 Wireless 11n (NA) Router (JH013A)	HP MSR935 3G Router (JG520A)
Safety	UL 60950-1; CAN/CSA 22.2 No. 60950-1; AS/NZS 60950; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1-03; EN 60950-1/A11; FDA 21 CFR Subchapter J	UL 60950-1; CAN/CSA 22.2 No. 60950-1; AS/NZS 60950; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1-03; EN 60950-1/A11; FDA 21 CFR Subchapter J	UL 60950-1; CAN/CSA 22.2 No. 60950-1; AS/NZS 60950; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1-03; EN 60950-1/A11; FDA 21 CFR Subchapter J
Emissions	ANSI C63.4; EN 55022 Class B; ICES-003 Class B; ETSI EN 300 386 V1.3.3; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-3-2:2006; EN 61000-3-3:1995+A1:2001+A2:2005; EMC Directive 2004/108/EC; EN 55024:1998+A1:2001+A2:2003; EN 61000-4-11:2004; EN 61000-4-8:2001; AS/NZS CISPR 22 Class B; FCC (CFR 47, Part 15) Class B	ANSI C63.4; EN 55022 Class B; ICES-003 Class B; ETSI EN 300 386 V1.3.3; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-3-2:2006; EN 61000-3-3:1995+A1:2001+A2:2005; EMC Directive 2004/108/EC; EN 55024:1998+A1:2001+A2:2003; EN 61000-4-11:2004; EN 61000-4-8:2001; AS/NZS CISPR 22 Class B; FCC (CFR 47, Part 15) Class B	ANSI C63.4; EN 55022 Class B; ICES-003 Class B; ETSI EN 300 386 V1.3.3; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-3-2:2006; EN 61000-3-3:1995+A1:2001+A2:2005; EMC Directive 2004/108/EC; EN 55024:1998+A1:2001+A2:2003; EN 61000-4-11:2004; EN 61000-4-8:2001; AS/NZS CISPR 22 Class B; FCC (CFR 47, Part 15) Class B
Telecom	FCC part 68; TIA-968-B; CS03 Part 8; AS/ACIF S043; G.992.1/2/3/5	FCC part 68; TIA-968-B; CS03 Part 8; AS/ACIF S043; G.992.1/2/3/5	FCC part 68; TIA-968-B; CS03 Part 8; AS/ACIF S043; G.992.1/2/3/5
Management	IMC—Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB	IMC—Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB	IMC—Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB
Notes	Supports ADSL2+ Annex A/M	Supports 802.11b/g/n Default antennas: 2 Maximum antennas: 2	Supports HSPA+ SIM card included Default antennas: 1 Maximum antennas: 2 Optional antenna cable also available for remote location 3G firmware changes through CLI For regional carrier certifications please contact your local HP sales representative
Services	Refer to the HP website at hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	Refer to the HP website at hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	Refer to the HP website at hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

HP MSR93x Router Series

Specifications (continued)



	HP MSR936 Wireless Router (JG597A)	HP MSR930 4G LTE/3G WCDMA Global Router (JG665A)	HP MSR930 4G LTE/3G WCDMA ATT Router (JG704A)
I/O ports and slots	1 RJ-45 autosensing 10/100/1000 WAN port 4 RJ-45 autosensing 10/100/1000 LAN ports 1 ADSL2+ Annex B/J ISDN backup port	1 RJ-45 autosensing 10/100/1000 WAN port 4 RJ-45 autosensing 10/100/1000 LAN ports	1 RJ-45 autosensing 10/100/1000 WAN port 4 RJ-45 autosensing 10/100/1000 LAN ports
AP/Wireless characteristic			
Radios (built-in)	802.11b/g/n	3G, 4G LTE	3G, 4G LTE
Physical characteristics			
Dimensions	11.81(w) x 7.87(d) x 1.74(h) in. (30 x 20 x 4.42 cm)	9.06(w) x 6.3(d) x 1.72(h) in. (23 x 16 x 4.36 cm)	9.06(w) x 6.3(d) x 1.72(h) in. (23 x 16 x 4.36 cm)
Weight	3.97 lb (1.8 kg)	3.97 lb (1.8 kg)	3.97 lb (1.8 kg)
Memory and processor	RISC @ 533 MHz, 256 MB DDR3 SDRAM, 128 MB NAND flash	RISC @ 533 MHz, 256 MB DDR3 SDRAM, 128 MB NAND flash	RISC @ 533 MHz, 256 MB DDR3 SDRAM, 128 MB NAND flash
Performance			
Throughput	Up to 300 Kpps (64-byte packets)	Up to 300 Kpps (64-byte packets)	Up to 300 Kpps (64-byte packets)
Routing table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
Forwarding table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
Environment			
Operating temperature	32°F to 104°F (0°C to 40°C)	32°F to 104°F (0°C to 40°C)	32°F to 104°F (0°C to 40°C)
Operating relative humidity	5% to 90%, noncondensing	5% to 90%, noncondensing	5% to 90%, noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	5% to 90%, noncondensing	5% to 90%, noncondensing	5% to 90%, noncondensing
Shock and vibration	Anti-Seismic ETS 300 019-2-3 HALT: 0~40Grms	Anti-Seismic ETS 300 019-2-3 HALT: 0~40Grms	Anti-Seismic ETS 300 019-2-3 HALT: 0~40Grms
Altitude	Up to 6,561 ft (2 km)	Up to 6,561 ft (2 km)	Up to 6,561 ft (2 km)
Electrical characteristics			
Maximum heat dissipation	20 BTU/hr (21.1 kJ/hr)	20 BTU/hr (21.1 kJ/hr)	20 BTU/hr (21.1 kJ/hr)
AC voltage	100–240 Vac	100–240 Vac	100–240 Vac
Maximum power rating	24 W	24 W	24 W
	Notes Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.

	HP MSR936 Wireless Router (JG597A)	HP MSR930 4G LTE/3G WCDMA Global Router (JG665A)	HP MSR930 4G LTE/3G WCDMA ATT Router (JG704A)
Safety	UL 60950-1; CAN/CSA 22.2 No. 60950-1; AS/NZS 60950; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1-03; EN 60950-1/A11; FDA 21 CFR Subchapter J	UL 60950-1; CAN/CSA 22.2 No. 60950-1; AS/NZS 60950; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1-03; EN 60950-1/A11; FDA 21 CFR Subchapter J	UL 60950-1; CAN/CSA 22.2 No. 60950-1; AS/NZS 60950; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1-03; EN 60950-1/A11; FDA 21 CFR Subchapter J
Emissions	ANSI C63.4; EN 55022 Class B; ICES-003 Class B; ETSI EN 300 386 V1.3.3; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-3-2:2006; EN 61000-3-3:1995+A1:2001+A2:2005; EMC Directive 2004/108/EC; EN 55024:1998+A1:2001+A2:2003; EN 61000-4-11:2004; EN 61000-4-8:2001; AS/NZS CISPR 22 Class B; FCC (CFR 47, Part 15) Class B	ANSI C63.4; EN 55022 Class B; ICES-003 Class B; ETSI EN 300 386 V1.3.3; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-3-2:2006; EN 61000-3-3:1995+A1:2001+A2:2005; EMC Directive 2004/108/EC; EN 55024:1998+A1:2001+A2:2003; EN 61000-4-11:2004; EN 61000-4-8:2001; AS/NZS CISPR 22 Class B; FCC (CFR 47, Part 15) Class B	ANSI C63.4; EN 55022 Class B; ICES-003 Class B; ETSI EN 300 386 V1.3.3; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-3-2:2006; EN 61000-3-3:1995+A1:2001+A2:2005; EMC Directive 2004/108/EC; EN 55024:1998+A1:2001+A2:2003; EN 61000-4-11:2004; EN 61000-4-8:2001; AS/NZS CISPR 22 Class B; FCC (CFR 47, Part 15) Class B
Telecom	FCC part 68; TIA-968-B; CS03 Part 8; AS/ACIF S043; G.992.1/2/3/5	FCC part 68; TIA-968-B; CS03 Part 8; AS/ACIF S043; G.992.1/2/3/5	FCC part 68; TIA-968-B; CS03 Part 8; AS/ACIF S043; G.992.1/2/3/5
Management	IMC—Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB	IMC—Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB	IMC—Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB
Notes	Supports 802.11b/g/n Default antennas: 2 Maximum antennas: 2	For local 4GLTE/3G carrier certification, please contact your regional sales team. This router has the Sierra Wireless MC7710 AirPrime Series Wireless Module <ul style="list-style-type: none"> Module embedded with support the following specs: Air Interface: LTE/HSPA+LTE Freq. Bands: 800/900/1800/2100/2600 MHz WCDMA: 900/2100 MHz GSM/GPRS/EDGE: 900/1800/1900 MHz This model (JG665A) is pre-certified with T-Mobile (EU) and conforms to above specifications for local certifications. Carrier SIM card not included Default Antennas: 2 Maximum Antennas: 2 Optional antenna cable extensions available HP MSR 3G RF 2.8m Antenna Cable (JG522A) HP MSR 3G RF 6m Antenna Cable (JG666A) HP MSR 3G RF 15m Antenna Cable (JG667A) Only 4G Antenna (JG669A HP MSR 4G 5W TNC Antenna) is supported. 	For local 4GLTE/3G carrier certification, please contact your regional sales team. This router has the Sierra Wireless AT&T, NTT Docomo MC7700 AirPrime Series Wireless Module <ul style="list-style-type: none"> Module embedded with support the following specs: Air Interface: LTE/HSPA+LTE Freq. Bands: 700 (B17)/AWS WCDMA: 850/1900/2100 MHz GSM/GPRS/EDGE: 850/900/1800/1900 MHz Regulatory: TELEC Carriers: AT&T, NTT Docomo This model (JG704A) is pre-certified with AT&T, NTT Docomo and conforms to above specifications for local certifications. Carrier SIM card not included Default Antennas: 2 Maximum Antennas: 2 Optional antenna cable extensions available HP MSR 3G RF 2.8m Antenna Cable (JG522A) HP MSR 3G RF 6m Antenna Cable (JG666A) HP MSR 3G RF 15m Antenna Cable (JG667A) Only 4G Antenna (JG669A HP MSR 4G 5W TNC Antenna) is supported.
Services	Refer to the HP website at hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	Refer to the HP website at hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	Refer to the HP website at hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

Standards and Protocols

(applies to all products in series)

BGP	RFC 1163 Border Gateway Protocol (BGP) RFC 1267 Border Gateway Protocol 3 (BGP-3) RFC 1657 Definitions of Managed Objects for BGPv4 RFC 1771 BGPv4	RFC 1772 Application of the BGP RFC 1773 Experience with the BGP-4 Protocol RFC 1774 BGP-4 Protocol Analysis RFC 1997 BGP Communities Attribute	RFC 1998 An Application of the BGP Community Attribute in Multi-home Routing RFC 2385 BGP Session Protection via TCP MD5 RFC 2439 BGP Route Flap Damping
Denial of service protection	CPU DoS Protection	Rate Limiting by ACLs	
Device management	RFC 1305 NTPv3	RFC 1945 Hypertext Transfer Protocol—HTTP/1.0	RFC 2452 MIB for TCP6 RFC 2454 MIB for UDP6
General protocols	IEEE 802.1: LAN/MAN Bridge and Management IEEE 802.1D MAC Bridges IEEE 802.1p Priority IEEE 802.1Q VLANs IEEE 802.1s (MSTP) IEEE 802.1s Multiple Spanning Trees IEEE 802.1w Rapid Reconfiguration of Spanning Tree IEEE 802.1X: Authenticated VLAN (multiple MAC, multiple VLANs per port) IEEE 802.2: Logical Link Control IEEE 802.3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) access method and physical layer specifications IEEE 802.3ad Link Aggregation (LAG) RFC 768 UDP RFC 783 TFTP Protocol (revision 2) RFC 791 IP RFC 792 ICMP RFC 793 TCP RFC 826 ARP RFC 854 Telnet RFC 855 Telnet Option Specification RFC 856 Telnet RFC 858 Telnet Suppress Go Ahead Option RFC 894 IP over Ethernet RFC 925 Multi-LAN Address Resolution RFC 950 Internet Standard Subnetting Procedure RFC 959 File Transfer Protocol (FTP) RFC 1006 ISO transport services on top of the TCP: Version 3 RFC 1027 Proxy ARP RFC 1034 Domain Concepts and Facilities RFC 1035 Domain Implementation and Specification RFC 1042 IP Datagrams RFC 1058 RIPv1 RFC 1071 Computing the Internet Checksum RFC 1091 Telnet Terminal-Type Option	RFC 1701 Generic Routing Encapsulation RFC 1702 Generic Routing Encapsulation over IPv4 networks RFC 1721 RIP-2 Analysis RFC 1722 RIP-2 Applicability RFC 1723 RIPv2 RFC 1795 Data Link Switching: Switch-to-Switch Protocol AIW DLSw RIG: DLSw Closed Pages, DLSw Standard Version 1 RFC 1812 IPv4 Routing RFC 1829 The ESP DES-CBC Transform RFC 1877 PPP Internet Protocol Control Protocol Extensions for Name Server Addresses RFC 1944 Benchmarking Methodology for Network Interconnect Devices RFC 1973 PPP in Frame Relay RFC 1974 PPP Stac LZS Compression Protocol RFC 1990 The PPP Multilink Protocol (MP) RFC 1994 PPP Challenge Handshake Authentication Protocol (CHAP) RFC 2091 Trigger RIP RFC 2131 DHCP RFC 2132 DHCP Options and BOOTP Vendor Extensions RFC 2166 APPN Implementer's Workshop Closed Pages Document DLSw v2.0 Enhancements RFC 2205 Resource ReSerVation Protocol (RSVP)—Version 1 Functional Specification RFC 2280 Routing Policy Specification Language (RPSL) RFC 2284 EAP over LAN RFC 2338 VRRP RFC 2364 PPP over AAL5 RFC 2374 An Aggregatable Global Unicast Address Format RFC 2451 The ESP CBC-Mode Cipher Algorithms RFC 2453 RIPv2	RFC 3212 Constraint-based LSP setup using LDP (CR-LDP) RFC 3214 LSP Modification Using CR-LDP RFC 3215 LDP State Machine RFC 3268 Advanced Encryption Standard (AES) Cipher suites for Transport Layer Security (TLS) RFC 3277 IS-IS Transient Black Hole Avoidance RFC 3279 Algorithms and Identifiers for the Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile RFC 3280 Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile RFC 3392 Support BGP capabilities advertisement RFC 3526 More Modular Exponential (MODP) Diffie-Hellman groups for Internet Key Exchange (IKE) RFC 3602 The AES-CBC Cipher Algorithm and its use with IPSec RFC 3706 A Traffic-Based Method of Detecting Dead Internet Key Exchange (IKE) Peers RFC 3784 IS-IS TE support RFC 3786 Extending the Number of IS-IS LSP Fragments Beyond the 256 Limit RFC 3847 Restart signaling for IS-IS FRF.1.2 PVC User-to-Network Interface (UNI) Implementation Agreement—July 2000 FRF.10.1: Network-to-Network Frame Relay/ATM SVC Service Interworking Implementation Agreement FRF.11.1 Voice over Frame Relay Implementation Agreement—May 1997—Annex J added March 1999 FRF.15: End-to-End Multilink Frame Relay Implementation Agreement

General protocols

RFC 1122 Host Requirements	RFC 2510 Internet X.509 Public Key Infrastructure Certificate Management Protocols	FRF.16: Multilink Frame Relay UNI/NNI Implementation Agreement
RFC 1141 Incremental updating of the Internet checksum	RFC 2511 Internet X.509 Certificate Request Message Format	FRF.17: Frame Relay Privacy Implementation Agreement
RFC 1142 OSI IS-IS Intra-domain Routing Protocol	RFC 2516 A Method for Transmitting PPP Over Ethernet (PPPoE)	FRF.18: Network-to-Network Frame Relay/ATM SVC Service Interworking Implementation Agreement
RFC 1144 Compressing TCP/IP headers for low-speed serial links	RFC 2644 Directed Broadcast Control	FRF.19: Frame Relay Operations, Administration and Maintenance Implementation
RFC 1195 OSI IS-IS for IP and Dual Environments	RFC 2661 L2TP	FRF.2.1: Frame Relay Network-to-Network (NNI) Implementation Agreement Version 2.1
RFC 1256 ICMP Router Discovery Protocol (IRDP)	RFC 2663 NAT Terminology and Considerations	FRF.20: Frame Relay IP Header Compression Implementation Agreement—June 2001
RFC 1293 Inverse Address Resolution Protocol	RFC 2684 Multiprotocol Encapsulation over ATM Adaptation Layer 5	FRF.3.2: Frame Relay Multiprotocol Encapsulation Implementation Agreement—April 2000
RFC 1315 Management Information Base for Frame Relay DTEs	RFC 2694 DNS extensions to Network Address Translators (DNS_ALG)	FRF.4.1: SVC User-to-Network Interface (UNI) Implementation Agreement
RFC 1332 The PPP Internet Protocol Control Protocol (IPCP)	RFC 2747 RSVP Cryptographic Authentication	FRF.5: Frame Relay/ATM Network Internetworking Implementation Agreement
RFC 1333 PPP Link Quality Monitoring	RFC 2763 Dynamic Name-to-System ID mapping support	FRF.6: Frame Relay Service Customer Network Management Implementation
RFC 1334 PPP Authentication Protocols (PAP)	RFC 2765 Stateless IP/ICMP Translation Algorithm (SIIT)	FRF.7: Frame Relay PVC Multicast Service and Protocol Description—October 1994
RFC 1349 Type of Service	RFC 2766 Network Address Translation-Protocol Translation (NAT-PT)	FRF.8.1: Frame Relay/ATM PVC Service Internetworking Implementation Agreement
RFC 1350 TFTP Protocol (revision 2)	RFC 2784 Generic Routing Encapsulation (GRE)	FRF.9: Data Compression Over Frame Relay Implementation Agreement—January 1996
RFC 1377 The PPP OSI Network Layer Control Protocol (OSINLCP)	RFC 2787 Definitions of Managed Objects for VRRP	ITU-T Recommendation X.29: Public Data Networks: Procedures for the Exchange of Control Information and User Data
RFC 1381 SNMP MIB Extension for X.25 LAPB	RFC 2961 RSVP Refresh Overhead Reduction Extensions	Q.921: ISDN user network interface—Data Link Layer specification
RFC 1471 The Definitions of Managed Objects for the Link Control Protocol of the Point-to-Point Protocol	RFC 2966 Domain-wide Prefix Distribution with Two-level IS-IS	Q.922: Annex A: Core aspects of Q.922 for use with frame relaying bearer service
RFC 1472 The Definitions of Managed Objects for the Security Protocols of the Point-to-Point Protocol	RFC 2973 IS-IS Mesh Groups	Q.931: ISDN user network interface—Layer 3 specification for basic call control
RFC 1490 Multiprotocol Interconnect over Frame Relay	RFC 2993 Architectural Implications of NAT	Q.933: Annex A: Additional procedures for Permanent Virtual Connection (PVC) status management (using Unnumbered Information frames)
RFC 1519 CIDR	RFC 3022 Traditional IP Network Address Translator (Traditional NAT)	X.25: Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE)
RFC 1534 DHCP/BOOTP Interoperation	RFC 3027 Protocol Complications with the IP Network Address Translator	
RFC 1542 Clarifications and Extensions for the Bootstrap Protocol	RFC 3031 Multiprotocol Label Switching Architecture	
RFC 1552 The PPP Internetworking Packet Exchange Control Protocol (IPXCP)	RFC 3036 LDP Specification	
RFC 1577 Classical IP and ARP over ATM	RFC 3046 DHCP Relay Agent Information Option	
RFC 1613 Cisco Systems X.25 over TCP (XOT)	RFC 3065 Support AS confederation	
RFC 1624 Incremental Internet Checksum	RFC 3137 OSPF Stub Router Advertisement	
RFC 1631 NAT	RFC 3209 RSVP-TE Extensions to RSVP for LSP Tunnels	
RFC 1638 PPP Bridging Control Protocol (BCP)	RFC 3210 Applicability Statement for Extensions to RSVP for LSP-Tunnels	
RFC 1661 The Point-to-Point Protocol (PPP)		
RFC 1662 PPP in HDLC-like Framing		
RFC 1695 Definitions of Managed Objects for ATM Management Version 8.0 using SMlv2		

IP multicast	RFC 1112 IGMP RFC 2236 IGMPv2	RFC 2283 Multiprotocol Extensions for BGP-4 RFC 2362 PIM Sparse Mode	RFC 2934 Protocol Independent Multicast MIB for IPv4 RFC 3376 IGMPv3
IPv6	RFC 1981 IPv6 Path MTU Discovery RFC 2080 RIPng for IPv6 RFC 2292 Advanced Sockets API for IPv6 RFC 2373 IPv6 Addressing Architecture RFC 2460 IPv6 Specification RFC 2461 IPv6 Neighbor Discovery RFC 2462 IPv6 Stateless Address Auto-configuration RFC 2463 ICMPv6	RFC 2464 Transmission of IPv6 over Ethernet Networks RFC 2472 IP Version 6 over PPP RFC 2473 Generic Packet Tunneling in IPv6 RFC 2529 Transmission of IPv6 Packets over IPv4 RFC 2545 Use of MP-BGP-4 for IPv6 RFC 2553 Basic Socket Interface Extensions for IPv6	RFC 2740 OSPFv3 for IPv6 RFC 2893 Transition Mechanisms for IPv6 Hosts and Routers RFC 3056 Connection of IPv6 Domains via IPv4 Clouds RFC 3513 IPv6 Addressing Architecture RFC 3596 DNS Extension for IPv6
MIBs	RFC 1213 MIB II RFC 1229 Interface MIB Extensions RFC 1286 Bridge MIB RFC 1493 Bridge MIB RFC 1573 SNMP MIB II RFC 1724 RIPv2 MIB RFC 1757 Remote Network Monitoring MIB	RFC 1850 OSPFv2 MIB RFC 2011 SNMPv2 MIB for IP RFC 2012 SNMPv2 MIB for TCP RFC 2013 SNMPv2 MIB for UDP RFC 2233 Interfaces MIB RFC 2454 IPv6-UDP-MIB RFC 2465 IPv6 MIB	RFC 2466 ICMPv6 MIB RFC 2618 RADIUS Client MIB RFC 2620 RADIUS Accounting MIB RFC 2674 802.1p and IEEE 802.1Q Bridge MIB RFC 2737 Entity MIB (Version 2) RFC 2863 The Interfaces Group MIB RFC 2933 IGMP MIB
Network management	IEEE 802.1D (STP) RFC 1155 Structure of Management Information RFC 1157 SNMPv1 RFC 1905 SNMPv2 Protocol Operations	RFC 2272 SNMPv3 Management Protocol RFC 2273 SNMPv3 Applications RFC 2274 USM for SNMPv3 RFC 2275 VACM for SNMPv3	RFC 2575 SNMPv3 View-based Access Control Model (VACM) RFC 3164 BSD syslog Protocol
OSPF	RFC 1245 OSPF protocol analysis RFC 1246 Experience with OSPF RFC 1587 OSPF NSSA	RFC 1765 OSPF Database Overflow RFC 1850 OSPFv2 Management Information Base (MIB), traps	RFC 2328 OSPFv2 RFC 2370 OSPF Opaque LSA Option RFC 3101 OSPF NSSA
QoS/CoS	IEEE 802.1p (CoS) RFC 2474 DS Field in the IPv4 and IPv6 Headers	RFC 2475 DiffServ Architecture RFC 2597 DiffServ Assured Forwarding (AF)	RFC 2598 DiffServ Expedited Forwarding (EF) RFC 3168 The Addition of Explicit Congestion Notification (ECN) to IP

Security	IEEE 802.1X Port Based Network Access Control RFC 1321 The MD5 Message—Digest Algorithm RFC 2082 RIP-2 MD5 Authentication RFC 2104 Keyed-Hashing for Message Authentication	RFC 2138 RADIUS Authentication RFC 2209 RSVP—Message Processing RFC 2246 Transport Layer Security (TLS) RFC 2716 PPP EAP TLS Authentication Protocol	RFC 2865 RADIUS Authentication RFC 2866 RADIUS Accounting RFC 3567 Intermediate System (IS) to IS Cryptographic Authentication
VPN	RFC 2403—HMAC-MD5-96 RFC 2404—HMAC-SHA1-96 RFC 2405—DES-CBC Cipher algorithm	RFC 2796 BGP Route Reflection—An Alternative to Full Mesh IBGP RFC 2842 Capabilities Advertisement with BGP-4	RFC 2858 Multiprotocol Extensions for BGP-4 RFC 2918 Route Refresh Capability for BGP-4 RFC 3107 Carrying Label Information in BGP-4
IPSec	RFC 1828 IP Authentication using Keyed MD5 RFC 2401 IP Security Architecture RFC 2402 IP Authentication Header RFC 2406 IP Encapsulating Security Payload	RFC 2407—Domain of interpretation RFC 2410—The NULL Encryption Algorithm and its use with IPSec RFC 2411 IP Security Document Roadmap	RFC 2412—OAKLEY RFC 2865—Remote Authentication Dial In User Service (RADIUS)
IKEv1		RFC 2865—Remote Authentication Dial In User Service (RADIUS)	RFC 3748—Extensible Authentication Protocol (EAP)

HP MSR93x Router Series accessories

HP MSR930 3G Router (JG513A)	HP MSR 3G Antenna (JG521A) HP MSR 3G RF 2.8m Antenna Cable (JG522A) HP MSR 3G RF 6m Antenna Cable (JG666A) HP MSR 3G RF 15m Antenna Cable (JG667A)
HP MSR931 3G Router (JG515A)	HP MSR 3G Antenna (JG521A) HP MSR 3G RF 2.8m Antenna Cable (JG522A) HP MSR 3G RF 6m Antenna Cable (JG666A) HP MSR 3G RF 15m Antenna Cable (JG667A)
HP MSR931 Dual 3G Router (JG531A)	HP MSR 3G Antenna (JG521A) HP MSR 3G RF 2.8m Antenna Cable (JG522A) HP MSR 3G RF 6m Antenna Cable (JG666A) HP MSR 3G RF 15m Antenna Cable (JG667A)
HP MSR930 4G LTE/3G CDMA Router (JG596A)	HP MSR 3G RF 6m Antenna Cable (JG666A) HP MSR 3G RF 15m Antenna Cable (JG667A) HP MSR 4G 5W TNC Antenna (JG669A)
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HP MSR930 4G LTE/3G WCDMA Global Router (JG665A)	HP MSR 3G RF 6m Antenna Cable (JG666A) HP MSR 3G RF 15m Antenna Cable (JG667A) HP MSR 4G 5W TNC Antenna (JG669A)
HP MSR930 4G LTE/3G WCDMA ATT Router (JG704A)	HP MSR 3G RF 6m Antenna Cable (JG666A) HP MSR 3G RF 15m Antenna Cable (JG667A) HP MSR 4G 5W TNC Antenna (JG669A)

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