The Motorola RFS 4000 802.11n wireless services controller integrates wired, wireless and security networking features into a compact and easy-to-use form factor, enabling organizations to create survivable branch networks using a single platform. The RFS 4000 is also available with an integrated dual radio dual band 802.11n access point** that features extensive coverage and performance — meeting all the needs of SME/SMB. Supports 3X3 MIMO with conducted transmit power of 27.7dBm and superior receive sensitivity—provides best in class range, coverage and application performance. In addition, the RFS 4000 Series offers built-in applications such as Locationing for Wi-Fi and RFID* as well as Hotspot and VoWLAN/Video Services.

**EXTREMELY SIMPLE TO DEPLOY AND MANAGE — NO LOCAL IT SUPPORT REQUIRED**

Multiple features combine to eliminate the need for onsite IT support for deployment and day-to-day management, including: built-in intelligence that allows the network to identify and automatically address network issues; zero touch installation; and the integration of all wired and wireless networking infrastructure into a single device that is easily managed back in the NOC via auto-discovery and auto-configuration.

**ADVANCED SERVICES FOR THE SMART BRANCH**

The RFS 4000 not only offers wired and wireless networking and security services, but also value-added and productivity applications. An integrated customizable Secure Guest Access application with distributed or

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**PRODUCT SPEC SHEET**

**RFS 4000 SERIES**

**802.11N INTEGRATED SERVICES CONTROLLER**

**TRUE CONVERGENCE OF WIRED AND WIRELESS SERVICES FOR BRANCH FACILITIES**

The Motorola RFS 4000 802.11n wireless services controller integrates wired, wireless and security networking features into a compact and easy-to-use form factor, enabling organizations to create survivable branch networks using a single platform. The RFS 4000 is also available with an integrated dual radio dual band 802.11n access point** that features extensive coverage and performance — meeting all the needs of SME/SMB. Supports 3X3 MIMO with conducted transmit power of 27.7dBm and superior receive sensitivity—provides best in class range, coverage and application performance. In addition, the RFS 4000 Series offers built-in applications such as Locationing for Wi-Fi and RFID* as well as Hotspot and VoWLAN/Video Services.

**ALWAYS ON SECURE NETWORKING**

The RFS 4000 offers multiple features that ensure reliability and survivability of branch networking services in virtually any situation. The RFS 4000 protects against access point and mesh node failure with SMART RF, a feature that keeps users on-Net with automatic optimization and healing. Motorola’s patent pending clustering mechanism protects against wireless switch failure and offers Active/Active or Active/Standy controller redundancy options. In the event of a WAN outage, a 3G ExpressCard guarantees Internet services by providing WAN backhaul options. With the Integrated Dual Radio Dual band form factor, the RFS 4000 is the only Services Controller in the Industry that offers concurrent access in the 2.4 and 5 GHz bands, with mesh capabilities in a multi-cell environment. Also, as a hallmark of Motorola Enterprise WLAN and Security Solutions, one the of radios in the RFS 4000 can be utilized to provide 24x7x365 IDS/IPS, Spectrum Analysis and Advanced Troubleshooting capabilities — while the other radio can provide concurrent access to wireless users.

Finally, the RFS 4000 Series displays true convergence by securing both the wireless and wired network with its Integrated Stateful L2-7 Wired/Wireless Firewall, Integrated IDS/IPS engine for Rogue Detection and Containment, Anomaly Analysis engine, DoS Attack protection and Ad-Hoc Network Detection.

**FEATURES**

**A converged platform of features & functionality**

The RFS 4000 is a fully integrated 802.11n wireless services controller, 802.11n access point, wired switch with 5 POE ports rolled into one, with IPSEC VPN/ firewall/WIPS security, RADIUS & DHCP server, location & RFID engines*, 3G failover, and more

**WING Architecture**

Improve business process flow with one platform for wireless voice, video, data and multiple RF technologies — such as RFID*, Wi-Fi (including 802.11n) and 4G technologies in the future; rich enterprise-class functionality includes seamless roaming across L2/L3 deployments, resilient failover capabilities, comprehensive security, toll-quality voice and other value-added services. Learn more at motorola.com/wing5.

**Wireless Intrusion Detection/Protection System**

The integrated IDS/IPS provides defense against over-the-air attacks by leveraging the dual-band sensing capabilities of the 802.11n APs. An Advanced WIPS modules provides further protection for the wireless network with wired side detection and containment of rogue APs over the air**.
Centralized authentication enables a branch network to offer hotspot services for guests. A real-time locationing system for Wi-Fi and RFID alike allows centralized asset tracking and monitoring. Storage via USB allows the RFS 4000 to be used for software image distribution for wireless clients in a branch network. Support for VoWLAN provides cost-effective voice services throughout the wireless enterprise, enabling push-to-talk and more for employees inside the four walls as well as outside. The rich feature set provides granular control over the many wireless networking functions required to deliver high performance, persistent, clear connections with toll-quality voice. Quality of Service (QoS) ensures superior performance for voice and video services. WMM Admission Control, including TSPEC, SIP Call Admission Control, and 802.11k radio resource management, ensures dedicated bandwidth for voice calls as well as better control over active voice calls for a variety of VoIP handsets.

END-TO-END SUPPORT
As an industry leader in mobility, Motorola offers the experience gained from deploying mobility solutions all over the globe in many of the world’s largest enterprises. Leverage this expertise through Motorola Enterprise Mobility Services, which provides the comprehensive support programs you need to deploy and maintain your RFS 4000 at peak performance. Motorola recommends protecting your investment with Service from the Start Advance Exchange Support, a multi-year program that provides the next-business-day device replacement, technical software support and software downloads you need to keep your business running smoothly and productively. This service also includes Comprehensive Coverage, which covers normal wear and tear, as well as internal and external components damaged through accidental breakage — significantly reducing your unforeseen repair expenses.

For more information, visit us on the web at www.motorola.com/rfs4000 or access our global contact directory at www.motorola.com/enterprisemobility/contactus

RFS 4000 Series: True wired/wireless convergence for a smart branch network

Secure Guest Access (Hotspot)
Provides secure guest access for wired* and wireless clients. Built-in captive portal, customizable login/welcome pages, URL redirection for user login, usage-based charging, dynamic VLAN assignment of clients. DNS white list, GRE tunneling of traffic to central site*, API support for interoperability with custom web portals*

Real Time Locationing System (RTLS)*
Provides rich locationing services to enable real-time enterprise asset-tracking through support for 802.11, RFID and third party locationing solutions — including industry leaders AeroScout, Ekahau, and Newbury Networks. Standards-based support for: EPC Global ALE interface for processing and filtering data from all active and passive tags, and EPC Global LLRP interface for passive RFID tag support

3G connectivity for failover or rapid deployment
Support for 3G wireless WAN backhaul with various off the shelf 3G PCI Express cards traffic when the primary WAN Link fails

Enhanced End-to-End Quality of Service (QoS)
Enhances voice and video capabilities; prioritizes network traffic to minimize latency and provide optimal quality of experience over the wire and over the air; SIP Call Admission Control and Wi-Fi Multimedia Extensions (WMM-Power Save) with Admission Control enhances multimedia application support and improves battery life and capacity
RFS 4000 network architecture — enabling branch mobility

The RFS 4000 enables distributed enterprises to provide any size branch office with high performance, comprehensive, cost-effective and secure wireless and wired networking services.

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**RFS 4000 SPECIFICATIONS**

**PACKET FORWARDING**
- 802.1D-1999 Ethernet bridging; 802.11-, 802.3 bridging; 802.1Q VLAN tagging and trunking; proxy ARP; IP packet steering-redirection

**WIRELESS NETWORKING**
- Wireless LAN: Supports 24 WLANs; multi-ESS/ESSID traffic segmentation; VLAN to ESSID mapping; auto assignment of VLANs (on RADIUS authentication); power save protocol polling; pre-emptive roaming; VLAN Pooling and dynamic VLAN adjustment; IGMP Snooping
- Bandwidth management: Congestion control per WLAN; per user based on user count or bandwidth utilization; bandwidth provisioning via AAA server

Layer 2 or Layer 3 deployment of access points
Layer 3 Mobility (Inter-Subnet Roaming)

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**IPv6 client support**

**Thin Access Ports**
- Supports 6 802.11a/b/g AP 300 thin access points for L2 or L3 deployment per; 6* 36** AP 650s per controller **; Legacy support*: AP100 for L2 deployments only

**Adaptive AP**
- Supports adoption of 6 adaptive AP 51X1 802.11a/b/g and 36 ** 802.11a/b/g/n access points in adaptive mode per RFS 4000 Integrated Services Controller; multiple country configuration support; Legacy support*: AP 4131 Access Point conversion for L2 deployments only

**NETWORK SECURITY**
- Role-based wired/wireless firewall (L2-L7) with stateful inspection for wired and wireless traffic; Active firewall sessions — 50,000 per RFS 4000 Integrated Services Controller; protects against IP Spoofing and ARP Cache Poisoning
- Access Control Lists (ACLs): L2/L3/L4 ACLs

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Continued on back
Wireless IDS/IPS: Multi-mode rogue AP detection, Rogue AP Containment, 802.11n Rogue Detection, Ad-Hoc Network Detection, Denial of Service protection against wireless attacks, client blacklisting, excessive authentication association; excessive probes, excessive disassociation/deauthentication; excessive decryption errors; excessive authentication failures; excessive 802.11 replay; excessive crypto IV failures (TKIP/CCMP replay); Suspicious AP. Authorized device in ad-hoc mode, unauthorized AP using unauthorized SSID, EAP Flood, False AP Flood, ID theft, ad-hoc advertising Unauthorized SSID.

GeoFencing: Add location of users as a parameter that defines access control to the network.

WIPS sensor conversion: Supported on all dependent and Independent/Adaptive Access Points.

Anomaly Analysis: Source Media Access Control (MAC) = Dest MAC. Provides origin authentication, integrity, confidentiality and replay protection of management frames for Motorola's AP 300 access point.

Authentication: Access Control Lists (ACLs); pre-shared keys (PSK); 802.1x/EAP—transport layer security (TLS), tunneled transport layer security (TLS); protected EAP (PEAP); Kerberos Integrated AAA (RADIUS Server with native support for EAP-TLS, EAP-PEAP); Includes a built in user name/password database; supports LDAP, and EAP-SIM

Transport encryption: WEP 40/128 (RC4), KeyGuard, WPA—TKIP, WPA2-CCMP (AES), WPA2-1 TKIP.

802.11n+: Provides origin authentication, integrity, confidentiality and replay protection of management frames for Motorola's AP 300 access point.

IPSec VPN gateway: Supports DES, 3DES and AES-128 and AES-256 encryption, with site-to-site and client-to-site VPN capabilities.

Secure guest access: Provides secure guest access for wired and wireless clients, built-in captive portal, customizable login/welcome pages, URL redrection for user login, usage-based charging, dynamic VLAN assignment of clients, DNS white list, GRE tunneling of traffic to central site, API support for interoperability with custom web portals support for external authentication and billing systems.

Wireless RADIUS Support (Standard and Motorola Vendor Specific Attributes): User-Based VLANs (Standard), MAC Based Authentication (Standard) User-Based QoS (Motorola VSA) Location Based Authentication (Motorola VSA) Allowed ESSID (Motorola VSA).

NAC support with third party systems from Microsoft, Symantec and Bradford

REAL TIME LOCATIONING SYSTEM (RTLS)*:

RSSI based triangulation for Wi-Fi assets
Tags supported: Ekahau, Aerocast, Gen 2 Tags

QUALITY OF SERVICE:

Wi-Fi Multimedia extensions: WMM-power save with TSPEC Admission Control; WMM-6-APSD
IGMP snooping: Optimizes network performance by preventing flooding of the broadcast domain
SP Call Admission Control: Controls the number of active SP sessions initiated by a wireless VoIP phone
802.11k: Provides radio resource management to improve client throughput (11kt client required)
Classification and marking: Layer 1-4 packet classification; 802.1p VLAN priority; DiffServ/TOS

SYSTEM RESILIENCY AND REDUNDANCY:

Active-Standy: Active:Active and N+1 redundancy with access port and Wireless Client load balancing; Critical Resource monitoring
Virtual IP*: Single virtual IP (per VLAN) for a switch/controller cluster to use as the default gateway by mobile devices or wired infrastructure. Seamless fail-over of associated services e.g. DHCP Server.
SMART RF: Network optimization to ensure user quality of experience at all times by dynamic adjustments to channel and power (on detection of RF interference or loss of RF coverage/neighbor recovery). Available for both thin APs and Adaptive APs.
Dual Firmware bank supports Image Failover capability

SYSTEM EXTENSIBILITY:

ExpressCard™ Slot: Driver support for 3G wireless cards for WAN backhaul


Verizon (NALA) — V770 Express Card

Sprint (NALA) – Sprint Noveltei Merlin C777 Express card

Rogers Wireless (Canada) – Sierra Wireless AirCard® 503

Vodafone (EMEA) – Noveltei Merlin XU870

Vodafone (EMEA) – Vodafone E7330 3G Expresscard

Telstra (Australia) – Sierra Wireless AirCard® 503, Telstra Turbo 7 series Expresscard (Aircard 880E)

General Use – Noveltei Merlin XU870, Option GE 0302, Sierra Wireless AirCard® 504

MANAGEMENT:

Command line interface (serial, telnet, SSH); secure Web-based GUI (SSL) for the wireless switch and the cluster; SNMP v1/v2/v3; SNMP traps—4x user configurable options; Syslog, Firmware, Config upgrade via TFTP, FTP & SFTP (clients); simple network time protocol (SNTP), text-based switch configuration files; DHCP client (server/relay), switch auto-configuration and firmware updates with DHCP options; multiple user roles (for switch access); MIBs (MIB-II, Ethernet), wireless switch common monitoring and configuration; Email notifications for critical alarms; MU naming capability

PHYSICAL CHARACTERISTICS:

Form factor: 1U Rack Mount Tray available for the RFS4010, 2U Rack Mount Tray available for the RFS411

Dimensions: RFS 4010: 17.5 in. x 12 in. x 26 in. D Antenna facade: 289.2mm x 340mm x 20.5mm

Weight: RFS 4010: 4.75 lbs / 2.15 kg RFS 4011: 4.9 lbs Antenna facade: 1.45 lb

Physical interfaces: 1x Uplink Port, 2x 10/100/1000 Cu/Gigabit SFP interface 2x 10/100/1000 Cu Ethernet Ports, 802.3af and 802.3at Draft 1x USB 2.0 Host 1x ExpressCard™ Slot 1x Serial Port (RJ45 style)

Antenna Connections: RFS 4011: RP-SMA

MTBF: >65,000 Hours

POWER REQUIREMENTS:

AC input voltage: 100-240 VAC 50/60Hz

Operating Voltage: 44 to 57 VDC

Operating Current: 2.5A(max) @48 VDC or 2.2A(max) @ 54 VDC

Max Power Consumption: 120W for RFS 4010, 150W for RFS 411

USER ENVIRONMENT:

Operating temperature: 32°F to 104°F /0°C to 40°C

Storage temperature: -40°F to 158°F /-40°C to 70°C

Operating humidity: 5% to 85% (w/o condensation)

Storage humidity: 5% to 85% (w/o condensation)

Heat dissipation: 1200 BTU/hr for RFS 4010, 190 BTU/hr for RFS 4011

Max Operating Altitude: 3000m

RECOMMENDED ENTERPRISE MOBILITY SERVICES:

Customer Services: Service from the Start Advance Exchange Support

RFS 4000 Part Numbers:

RFS4010-00010-WR: 6 Port RFS 4000 Integrated Services Controller
RFS-4010-MTKTU-WR: 1RU Mounting Kit
RFS-4011-MTKT2U-WR: 2RU Mounting Kit
RFS-4011-11110-US: RFS 4000 Services Controller with Integrated Dual Radio Access Point for US
RFS-4011-11110-WORLD: RFS 4000 Services Controller with Integrated Dual Radio Access Point for Worldwide (excluding US)

ML-2452-PTA4M3X3-1: 3X3 MIMO Facade Antenna for the RFS 4011

RFS-4000-ADAP-LIC**: 6 Adaptive Licenses for RFS4000
RFS-4000-ADWIP-LIC**: Advanced Wireless Intrusion Protection License for RFS4000
## RFS 4011 802.11n MIMO Capabilities:

- 3x3 MIMO with 2 Spatial Streams
- 20 MHz and 40 MHz Channels
- 300 Mbps Data Rates per Radio
- Packet Aggregation (AMSDU, AMPDU)
- Reduced Interframe Spacing
- MIMO Power Save (Static and Dynamic)

## Radio Specifications for RFS 4011:

**Wireless medium:** Direct Sequence Spread Spectrum (DSSS), Orthogonal Frequency Division Multiplexing (OFDM) and Spatial multiplexing (MIMO)

**Network standards:** IEEE 802.11a/b/g/n, 802.11d and 802.11i WPA2, WMM and WMM-UAPSD

**Data rates supported:**
- 802.11b/g: 1, 2, 5.5, 11, 6, 9, 12, 18, 24, 36, 48, and 54 Mbps
- 802.11a: 6, 9, 12, 18, 24, 36, 48, and 54 Mbps
- 802.11n: MCS 0-15 up to 300 Mbps

### Maximum available transmit power per chain on an RFS 4011:
- 23 dBm

### Maximum available transmit power per RFS 4011:
- 27.7 dBm

## Receiver Sensitivity: Operating Band 2.4GHz

<table>
<thead>
<tr>
<th>Operating Modes</th>
<th>Data Rate</th>
<th>RFS 4011 Radios 1 and 2</th>
<th>Typical Receive Sensitivity (dBm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>802.11b</td>
<td>1 Mb/s</td>
<td>-96</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 Mb/s</td>
<td>-94</td>
<td></td>
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<tr>
<td></td>
<td>5.5 Mb/s</td>
<td>-93</td>
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<tr>
<td></td>
<td>11 Mb/s</td>
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<td>802.11g</td>
<td>6 Mb/s</td>
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<td></td>
<td>9 Mb/s</td>
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<td></td>
<td>12 Mb/s</td>
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<td></td>
<td>18 Mb/s</td>
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<td></td>
<td>24 Mb/s</td>
<td>-90</td>
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<td></td>
<td>36 Mb/s</td>
<td>-87</td>
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<td></td>
<td>48 Mb/s</td>
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<td></td>
<td>54 Mb/s</td>
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<tr>
<td>802.11n</td>
<td>MCS0</td>
<td>-95</td>
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</tr>
<tr>
<td></td>
<td>MCS1</td>
<td>-93</td>
<td></td>
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<tr>
<td></td>
<td>MCS2</td>
<td>-91</td>
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<td></td>
<td>MCS3</td>
<td>-87</td>
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<tr>
<td></td>
<td>MCS4</td>
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<td></td>
<td>MCS6</td>
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<td></td>
<td>MCS7</td>
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<td></td>
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<td>MCS10</td>
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<td></td>
<td>MCS11</td>
<td>-85</td>
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<td>MCS13</td>
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<td>MCS14</td>
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<tr>
<td></td>
<td>MCS15</td>
<td>-75</td>
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</table>

### Receiver Sensitivity: Operating Band 5GHz

<table>
<thead>
<tr>
<th>Operating Modes</th>
<th>Data Rate</th>
<th>RFS 4011 Radios 1 and 2</th>
<th>Typical Receive Sensitivity (dBm)</th>
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</thead>
<tbody>
<tr>
<td>802.11a</td>
<td>6 Mb/s</td>
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<tr>
<td></td>
<td>9 Mb/s</td>
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<tr>
<td></td>
<td>12 Mb/s</td>
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<tr>
<td></td>
<td>18 Mb/s</td>
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<td></td>
<td>24 Mb/s</td>
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<tr>
<td></td>
<td>36 Mb/s</td>
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<td>54 Mb/s</td>
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<tr>
<td>802.11n (HT20)</td>
<td>MCS0</td>
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<td></td>
<td>MCS1</td>
<td>-92</td>
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<td>MCS6</td>
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<td>MCS14</td>
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<tr>
<td></td>
<td>MCS15</td>
<td>-73</td>
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</tr>
</tbody>
</table>

**RFS 4000 Series**

**Receiver Sensitivity:**
- **Operating Band 2.4GHz**
  - **Typical Receive Sensitivity (dBm):**
    - RFS 4011 Radios 1 and 2
    - Operating Modes
    - Data Rate
    - Typical Receive Sensitivity (dBm)

- **Operating Modes:**
  - 802.11b
  - 802.11g
  - 802.11n (HT20)

- **Data Rate:**
  - 1 Mb/s
  - 2 Mb/s
  - 5.5 Mb/s
  - 11 Mb/s
  - 6 Mb/s
  - 9 Mb/s
  - 12 Mb/s
  - 18 Mb/s
  - 24 Mb/s
  - 36 Mb/s
  - 48 Mb/s
  - 54 Mb/s
  - MCS0
  - MCS1
  - MCS2
  - MCS3
  - MCS4
  - MCS5
  - MCS6
  - MCS7
  - MCS8
  - MCS9
  - MCS10
  - MCS11
  - MCS12
  - MCS13
  - MCS14
  - MCS15

- **Typical Receive Sensitivity (dBm):**
  - -96
  - -94
  - -93
  - -90
  - -87
  - -83
  - -82
  - -94
  - -90
  - -87
  - -83
  - -81
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  - -74
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  - -86
  - -84
  - -81
  - -78
  - -74
  - -72
  - -71

**Network Standards:**
- IEEE 802.11a/b/g/n, 802.11d and 802.11i WPA2, WMM and WMM-UAPSD

**Data Rates Supported:**
- 802.11b/g: 1, 2, 5.5, 11, 6, 9, 12, 18, 24, 36, 48, and 54 Mbps
- 802.11a: 6, 9, 12, 18, 24, 36, 48, and 54 Mbps
- 802.11n: MCS 0-15 up to 300 Mbps