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# M9000

802.11a/b/g Outdoor Layer-3 MESH AP

- 2.4 / 5 GHz
- 802.11 a/b/g
- MESH

**PRODUCT DESCRIPTION**

EnGenius Mesh AP is designed with IEEE 802.11a/b/g standards and addressed on providing high performance mesh network. The product encased in the IP-68 protection enclosure and delivers the maximum scalability, high reliability at outdoor environment. Compared with expensive T1/E1 leased lines, the Mesh network offers a cost-effective last-mile connection.

EnGenius Mesh AP provides wireless connection over self-adaptation mesh backhaul (5GHz). The mesh AP can operate at both 2.4GHz for long range and 5GHz to reduce the frequency interference. The detachable antenna design allows users to use various antennas for different deployment.

The M9000, including advanced OLSR (Optimal Link State Routing) protocol, is the industry and scalable mesh routing algorithm. It allows data to be transferred with the optimal path. WAN interface for Internet connection with Gateway mode; Power over Ethernet for both Gateway mode and Relay mode.

EnGenius Mesh AP provides the highest security mechanism to protect data information over wireless. The security feature include AES backhaul link, WPA2 client access, SSL for web management. To simplify the administration task throughout the large area, this product also provides centralized management software. This software is built based on SNMP protocol and can be installed in computer.

M9000 Datsheet Version 11102010

*Theoretical wireless signal rate based on IEEE standard of 802.11 a, b, g, n chipset used. Actual throughput may vary.Network conditions and environmental factors lower actual throughput rate.
** All specifications are subject to change without notice

BUSINESS CLASS
M9000

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# Datasheet
# M9000

| Features | Benefits |
|---|---|
| Dual Radio for independent Backhaul and local access | Allow operators to set up at both 2.4GHz for long range and 5GHz to reduce the frequency interference. |
| Self Configuration and Healing | Automatically search and link with gateway AP and other nearest node Mesh AP for Ease of Deployment & Management |
| EnGenius Business Class High Power Technology | Get more coverage and distance to save the installation fee |
| Lightning Protector in both antenna ports and Ethernet port | Prevent a lightning stroke to damage the internal equipments |
| Wide temperature range and robust mechanical design (IP68) | Delivers reliable, top performance in the most demanding environments to Avoid water invaded and weather corroded |
| Power over Ethernet (PoE) | Easy installation and cost-effective |
| Support dynamic routing (layer3) | OLSR protocol provides optimized path of routing. The routing mechanism automatically finds the optimal link once the link status is changed or broken. |
| Supports NAT (Network Address Translation)/NAPT | Shares single Internet account and provides a type of firewall by hiding internal IP addresses for keeping hacker out |
| Static Route Support | Forwarding data in a network via a fixed path in multi-subnet |
| Support Multiple SSID for client access mode | Distinguish separate networks within the same wireless space to provide secure connection |
| Support VLAN (Wired, Wireless) | Reduce the size of each broadcast domain, which in turn reduces network traffic and increases network security |
| Support 802.1x (EAP-TLS/TTLS/SIM/PEAP), 802.11i (WPA/WPA2, AES), Both End-to-end VPN and VPN pass-thru mechanisms | Provide mutual authentication (Client and dynamic encryption keys to enhance security |
| Hide SSID | Avoids unallowable users sharing bandwidth, increases efficiency of the network |
| Support MAC Address access control list | Ensures secure network connection |
| Support WMM Extension | Improve the user experience for audio, video, and voice applications by prioritizing data traffic |
| Bandwidth control | Enables operators to specify the maximum line bandwidth that a particular transfer operation can use |
| Support SNMP v2c/v3 | Allow users to operate with existing network management tools |
| Centralized management software | Easy to manage volume Mesh AP via central control system to save the management cost |



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Datasheet
M9000

| TECHNICAL SPECIFICATION | |
|---|---|
| **> Hardware Specification** | |
| MCU | Intel IXP425, 533MHz |
| RF | Atheros AR5413 |
| Memory | 64MB SDRAM |
| Flash | 16MB |
| Physical Interface | One 10/100 Fast Ethernet RJ-45 |
| Power Requirements | Active Ethernet (Power over Ethernet, IEEE802.3af)- 48 VDC/0.375A |
| Regulation Certifications | FCC Part 15B & 15C, R&TTE Directive 1999/5/EC, EN300 328, EN301 489, EN60950 |
| **> RF Specification** | |
| Frequency Band | 802.11a:<br>5.15~5.35GHz,<br>5.47~5.725GHz, 5.725~5.825GHz<br>802.11b/g:<br>U.S., Europe and Japan product covering 2.4 to 2.484 GHz, programmable for different country regulations |
| Media Access Protocol | Carrier sense multiple access with collision avoidance (CSMA/CA) |
| Modulation Technology | OFDM: BPSK, QPSK, 16-QAM, 64-QAM<br>DBPSK, DQPSK, CCK |
| Operating Channels | **802.11b/g**<br>11 for North America, 14 for Japan, 13 for Europe<br>**802.11a**<br>US/Canada:12 non-overlapping channel (5.15~5.35GHz, 5.725~5.825GHz)<br>Europe:19 non-overlapping channel (5.15~5.35GHz, 5.47~5.825GHz)<br>Japan:4 non-overlapping channel (5.15~5.25GHz)<br>China:5 non-overlapping channel (5.725~5.85GHz) |
| Receive Sensitivity (Typical) | **802.11a**: -88dBm @ 6Mbps, -70dBm @ 54Mbps<br>**802.11g**: -90 dBm @ 6Mbps, -74 dBm @ 54Mbps<br>**802.11b**: -95 dBm @ 1Mbps, -90 dBm @ 11Mbps |



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| | |
|---|---|
| Available transmit power | |

| Frequency | FCC | ETSI |
|---|---|---|
| 4.92~5.08 GHz | 17 dBm @6~36Mbps<br>16 dBm @48Mbps<br>15 dBm @54Mbps | 20 dBm @6~24Mbps<br>18 dBm @36Mbps<br>16 dBm @48Mbps<br>15 dBm @54Mbps |
| 5.18~5.32 GHz | 17 dBm @6~36Mbps<br>16 dBm @48Mbps<br>15 dBm @54Mbps<br>( 5.18~5.24 GHz ) | 20 dBm @6~24Mbps<br>18 dBm @36Mbps<br>16 dBm @48Mbps<br>15 dBm @54Mbps |
| 5.26~5.32 GHz | 20 dBm @6~24Mbps<br>18 dBm @36Mbps<br>16 dBm @48Mbps<br>15 dBm @54Mbps | |
| 5.52~5.70 GHz | | 19 dBm @6~24Mbps<br>17 dBm @36Mbps<br>15 dBm @48Mbps<br>14 dBm @54Mbps |
| 5.745~5.825GHz | 18 dBm @6~24Mbps<br>16 dBm @36Mbps<br>14 dBm @48Mbps<br>13 dBm @54Mbps | 18 dBm @6~24Mbps<br>16 dBm @36Mbps<br>14 dBm @48Mbps<br>13 dBm @54Mbps |
| 2.412~2.462 GHz<br>(IEEE802.11g) | 25 dBm @6~24Mbps<br>23 dBm @36Mbps<br>22 dBm @48Mbps<br>21 dBm @54Mbps | 25 dBm @6~24Mbps<br>23 dBm @36Mbps<br>22 dBm @48Mbps<br>21 dBm @54Mbps |
| 2.412~2.462 GHz<br>(IEEE802.11b) | 25 dBm @1~11Mbps | 25 dBm @1~11Mbps |

| | |
|---|---|
| Antenna x 2 | 2 x N-type (female) connector dual band external omni antenna |

**> Antenna Specifications**

| | | |
|---|---|---|
| Electrical Properties | Impedance | 50 ohm |
| | Frequency Range | 0~6 GHz |
| | V.S.W.R | ≦1.5 |
| | Working Voltage | ≦1000 Vrms |
| | Dielectric Withstanding | ≦2500 Vrms |
| | Voltage Insulation Resistance | ≧5000 Megohms |
| | Contact Resistance | Center contact : 1.0 Milliohms (Max)<br>Outer contact : 0.2 Milliohms (Max) |
| Environmental Ratings | Operating Temperature | -65°C ~ +165°C |
| Material Specifications | Material data | Material |



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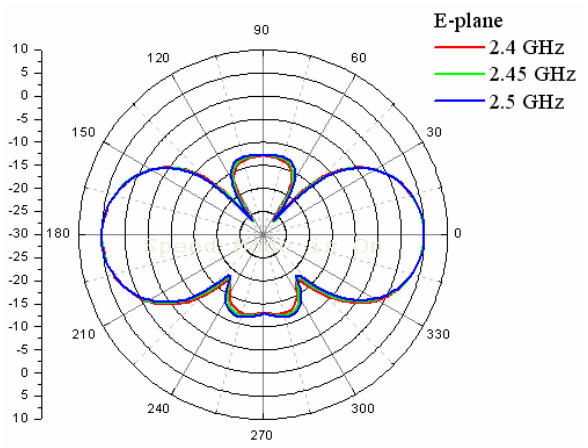
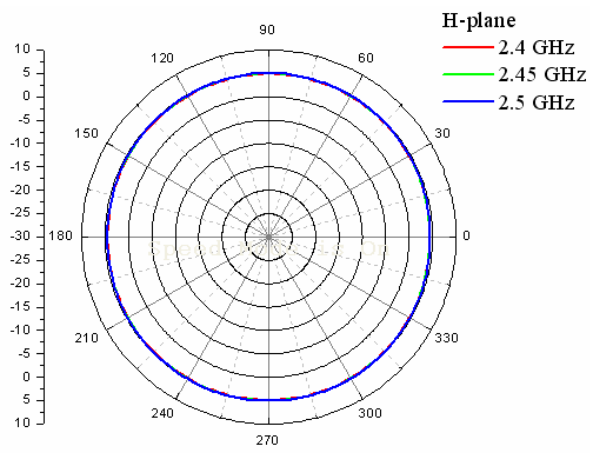
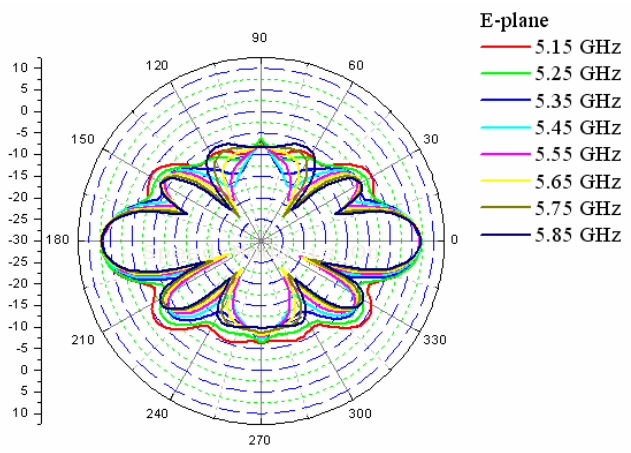
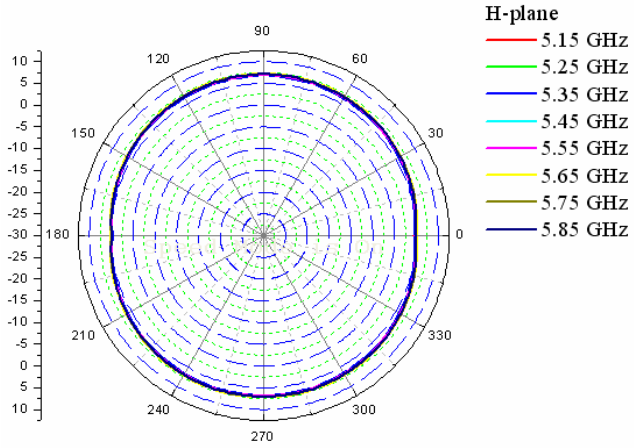
| | | |
|---|---|---|
| | Body | Brass |
| | Center Contact | Brass |
| | Insulator | Teflon or Delrin |

**> Antenna Radiation Pattern**




## SOFTWARE FEATURES

**> General**

| | |
|---|---|
| Topology | Infrastructure |
| Protocol / Standard | IEEE 802.3 (Ethernet)<br>IEEE 802.3u (Fast Ethernet)<br>IEEE 802.3af |



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| | |
|---|---|
| | IEEE 802.11a (5GHz WLAN)<br>IEEE 802.11b/g (2.4GHz WLAN)<br>RFC 768 UDP<br>RFC 791 IP<br>RFC 792 ICMP<br>RFC 793 TCP<br>RFC 826 ARP<br>RFC 1034, 1035 DNS<br>RFC 1058 RIP<br>RFC 1119 SNTPv2<br>RFC 1541 / 2131 / 3046 DHCP client / Server<br>RFC 1631 NAT<br>RFC 2068 / 2616 HTTP<br>RFC 2516 PPPoE<br>RFC 2865,2866 RADIUS |
| Operation Mode | - Gateway<br>- Relay<br>( Remark : In Relay mode, Ethernet functionality will be disabled except power feeding ) |
| LAN | - DHCP Client<br>- DHCP Relay |
| WAN | - Fixed IP<br>- PPPoE<br>- DHCP client |
| Wireless | - Auto Channel Selection<br>- Transmission Rate<br>11a/g : 54, 48, 36, 24, 18, 12, 9, 6 Mbps<br>11b : 11, 5.5, 2, 1 Mbps<br>- Distance Control (Ack timeout) |
| Security | - Authentication :<br>802.11i (WPA, WPA2)<br>802.1x (including EAP-TLS/TTLS)<br>- Encryption : Open, WEP-64/128, TKIP, AES<br>- MAC address access control list<br>- 802.1Q VLAN Support<br>- MSSID Support in client access mode<br>- VPN pass-through / End to end VPN (PPTP)<br>- Hidden SSID<br>- HTTP login<br>- HTTPS login |
| QoS | - WMM<br>- Bandwidth control |
| **> Management** | |
| Configuration | Web-based configuration (HTTP)/HTTPS/SSH |



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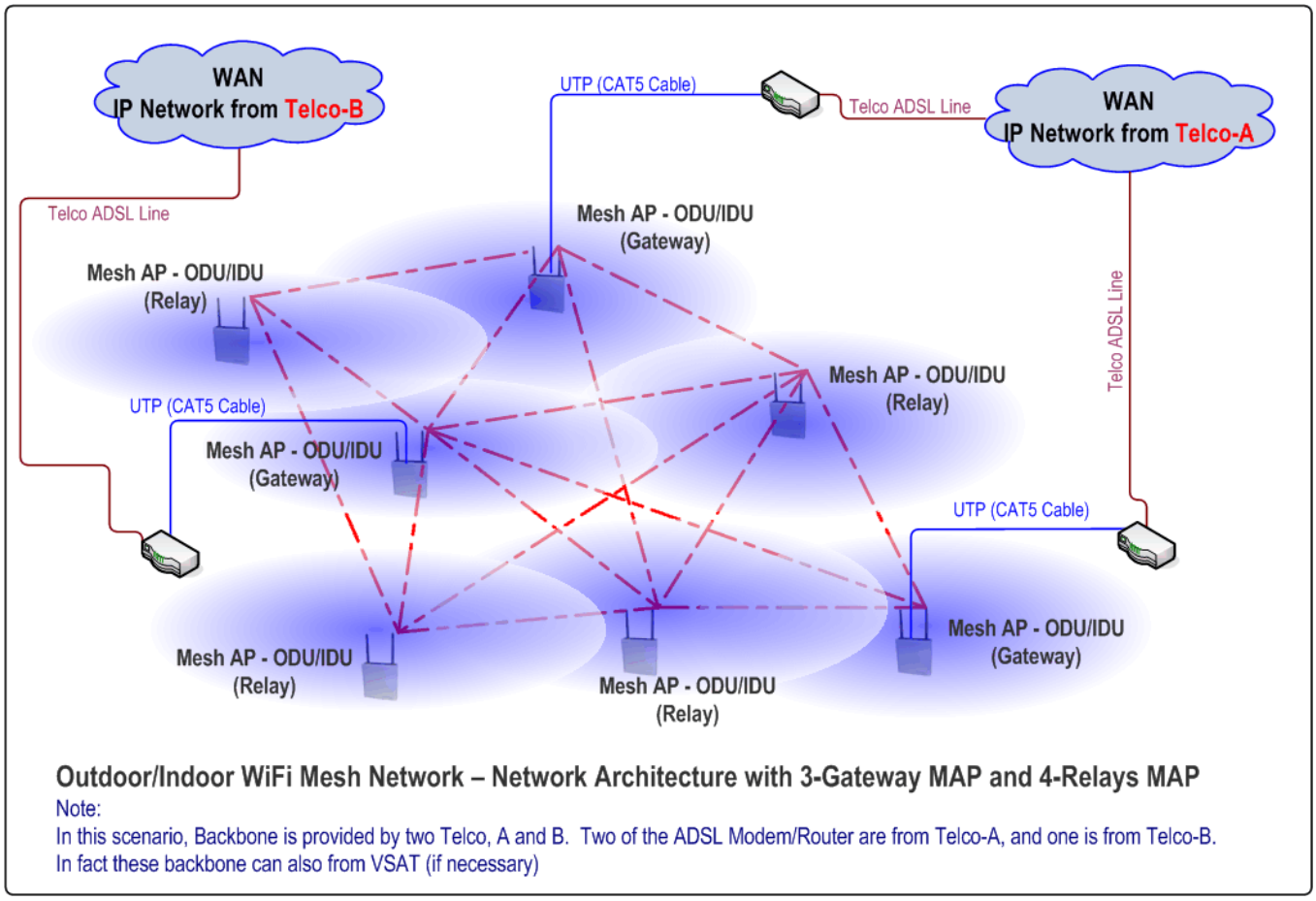
| | |
|---|---|
| Windows Management Utility Features | - MESH AP discovery<br>- MESH AP status<br>- MESH AP setup, upgrade, reboot<br>- User status, activity |
| Firmware Upgrade | Firmware upgrade via utility / HTTPS |
| Administrator Setting | Administrator password change |
| Reset Setting | Reboot and Reset to Factory Default |
| System monitoring | Status, Statistics and Event Log |
| SNMP | V2c, V3 (MIB) |

**Application**




**Outdoor/Indoor WiFi Mesh Network – Network Architecture with 3-Gateway MAP and 4-Relays MAP**

Note:
In this scenario, Backbone is provided by two Telco, A and B. Two of the ADSL Modem/Router are from Telco-A, and one is from Telco-B.
In fact these backbone can also from VSAT (if necessary)



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Datasheet
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| ENVIRONMENT AND PHYSICAL | |
|---|---|
| Temperature Range | Operating: -20°C~70°C<br>Storage: -30°C to 80°C |
| Humidity (non-condensing) | 0% ~ 90% typical |
| Protection Rating | IP68 |
| Dimensions | 260mm (L) x 175mm (W) x 65mm (H) |
| Weight | 650g |

| PACKAGE CONTENT |
|---|
| ► 1 x 802.11a/b/g Layer-3 MESH AP (M9000) |
| ► 1 x PoE Injector |
| ► 1 x Power Adaptor |
| ► 1 x Mounting kit |
| ► 1 x 1.8m Grounding Cable |
| ► 2 x N-type Dual Band Antennas |
| ► 1 x CD-ROM with User's Manual, NMS and Reset Tool |



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