

# MWS100 Mobile Wireless System



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USA*



### FCC Notice

*This wireless network device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: 1. This device may not cause harmful interference. 2. This device must accept any interference received, including interference that may cause undesired operation. This wireless network device has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This wireless network device generates, uses, and radiates radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this wireless network device does cause harmful interference to radio or television reception, which can be determined by turning the wireless network device off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Reorient or relocate the receiving antenna; Increase the separation between the wireless network device and the affected receive; Connect the wireless network device into an outlet on a circuit different from that to which the receiver is connected; Consult the dealer or an experienced radio/TV technician for help.*

### European Community (EC) Directives and Conformity

*This wireless network device is in conformity with the Essential Requirements of R&TTE Directive 1999/5/EC of the European Union.*

### Non-Modification Statement

*Unauthorized changes or modifications to Strix devices are not permitted. Modifications to Strix devices will void the warranty and may violate FCC or other regulations.*

### RF Exposure Requirements

*To ensure compliance with FCC RF exposure requirements, the antenna used for this wireless network device must be installed to provide a separation distance of a minimum of 40cm or more from all persons, and must not be co-located or operated in conjunction with any other antenna or radio transmitter. Installers and end-users must follow these installation instructions.*

### Professional Installation Only

*This unit must be installed by a trained professional installer only.*

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# 1 Introduction

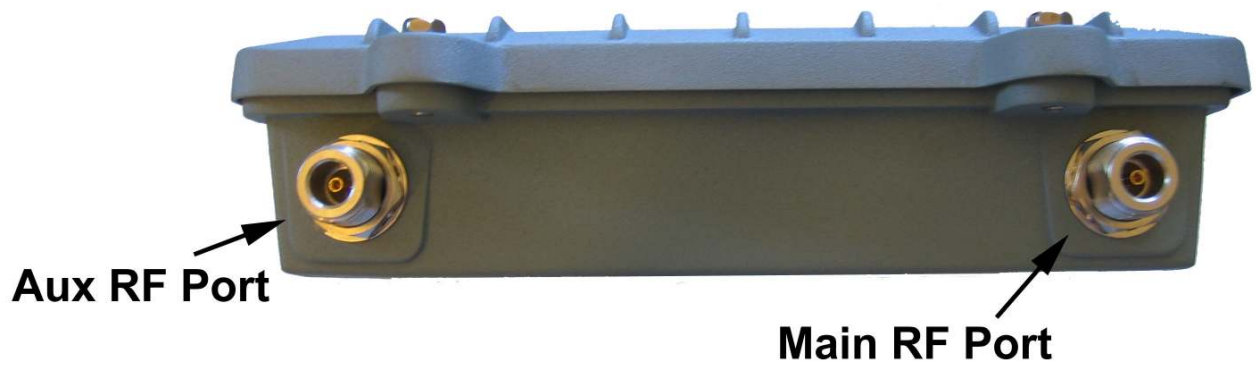
The MWS100 is intended for mobile wireless broadband applications and is designed for indoor, outdoor and in-vehicle applications. The MWS100 is a member of the Strix Access/One<sup>®</sup> Edge product family, and interoperates with Strix Access/One<sup>®</sup> Mesh Nodes. Within a region where Strix Access/One<sup>®</sup> Mesh Nodes are deployed, the MWS100 provides broadband data access and seamless roaming between nodes, even at high vehicle speeds.

The MWS100 contains two 802.11-type radios. One is an 802.11g radio that operates in the 2.4 GHz band. The other is an 802.11a radio that operates in *either* the 5 GHz band *or* the 4.9 GHz U.S. Public Safety band. One of these radios will operate as a Wireless Station (STA) and be used to connect wirelessly to a Strix Access/One<sup>®</sup> Mesh Network. The other radio may optionally be used as a Wireless Access Point (AP). An Ethernet connector is also provided for connection to other devices.

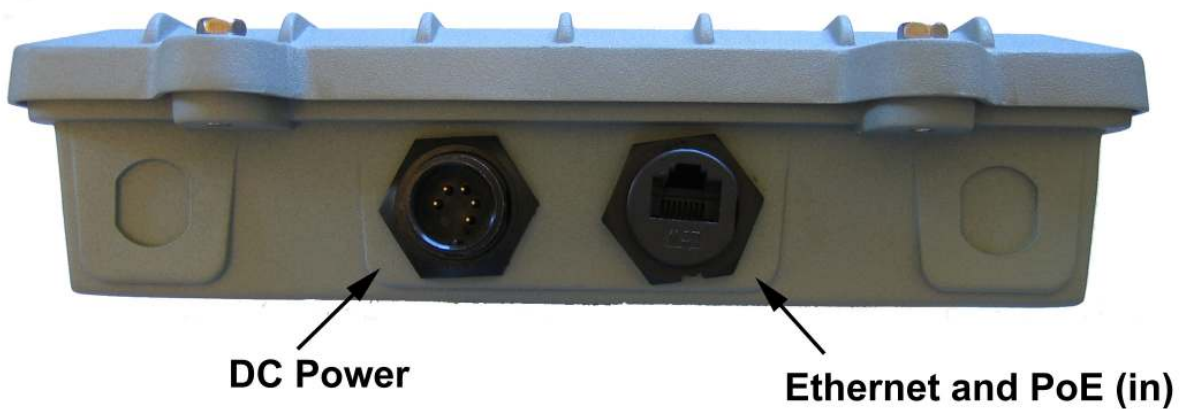
The MWS100 operates as a bridge between its Station Radio, Access Point Radio, and Ethernet Port. This bridging function is accomplished using Layer 2 Network Address Translation (L2NAT). The purpose for this is to allow multiple client devices, each with a unique IP address, to be supported by a single wireless association with the Access/One<sup>®</sup> Mesh Network.

*Note: Different MWS100 models exist for different regions and regulatory domains. Availability of specific bands, channels within those bands, and operating modes varies depending upon the specific MWS100 model.*

## 2 Front Panel Connectors



## 3 Rear Panel Connectors



## 4 Installation

Note: The MWS100 is designed for professional installation. Failure to comply fully with these instructions may void the MWS100 warranty and/or violate local safety or radio regulations.

1. Select a mounting location for the MWS100. The MWS100 is designed for indoor, outdoor and in-vehicle applications. Mount the MWS100 using the chassis mounting holes and hardware suitable for the particular installation.

Note: In the U.S. the 5150-5250MHz band is only available for indoor applications. It is the responsibility of the installer to configure the MWS100 to use this band only when it is installed indoor.

2. Select antennas with gain specifications according to the table below.

Note: The maximum allowable power for each antenna type is noted in the last column. The installer must set the power correctly for the chosen antennas.

<i>Frequency</i>	<i>Antenna Type</i>	<i>Connection Method</i>	<i>Maximum Gain</i>	<i>Maximum Power Setting</i>
2412-2462MHz 5150-5250MHz 5745-5850MHz	Linear Polarized Dome	LMR200 Cable (> 3 ft. length)	4 dBi	Full
2412-2462MHz 5150-5250MHz 5745-5850MHz	Omni-directional	Direct connection to MWS100	3 dBi 5 dBi 5 dBi	Full
2412-2462MHz	Omni-directional	LMR200 Cable (> 3 ft. length)	8 dBi	Full
5745-5850MHz	Omni-directional	LMR200 Cable (> 3 ft. length)	12 dBi	-3dB (23dBm)
4940-4990MHz	Omni-directional	LMR200 Cable (> 3 ft. length)	11 dBi	Full

3. Mount the selected antennas securely following all antenna manufacturer instructions and recommendations. Provide a suitable length of LMR-200 type antenna cable between each antenna and the MWS100. If using only one antenna, connect it to the port labeled "MAIN". Connect a second antenna to the port labeled "AUX".

- Using the supplied fused power cable, connect the BLACK wire to the system ground and then attach the RED wire to the positive DC supply. The MWS100 is designed to operate from a minimum of 11 VDC\* to a maximum of 52 VDC and a maximum current draw of 2 A.

*\* A low-voltage cut-off circuit will automatically power down when the DC voltage falls below 10.5 VDC. Operation will be restored once the DC voltage rises above 11.5 VDC.*

*The MWS100 may also be powered over its Ethernet port (LAN) by a PoE power injector capable of sourcing 16 W.*

- Provide an Ethernet cable for connecting the MWS100 to a computer or router.
- Attach the supplied fused power cable to the PWR connector on the MWS100 rear panel.

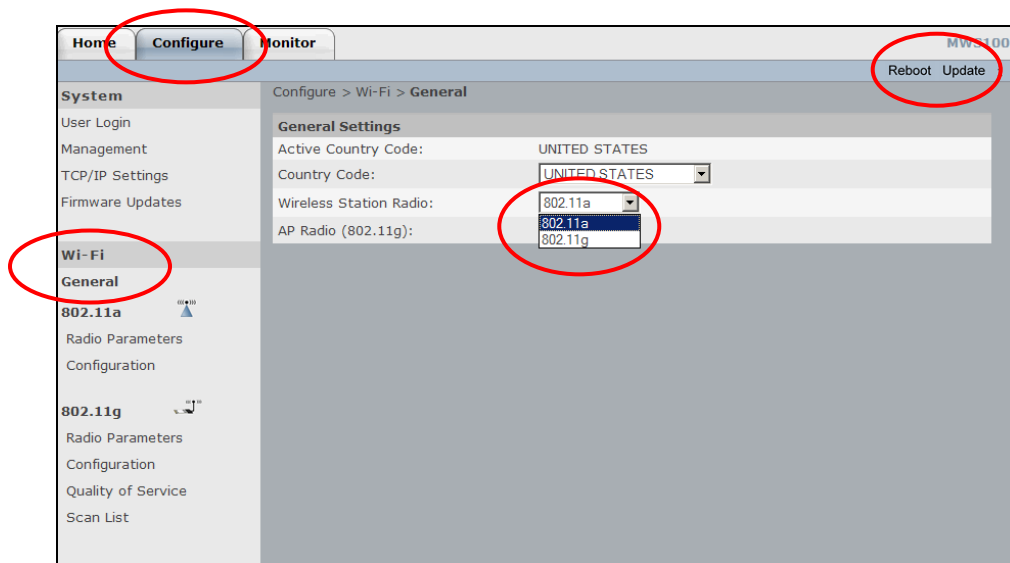


## 5 Wireless Station Configuration

MWS100 configuration screens may be accessed by connecting its LAN port to a computer running Microsoft Internet Explorer Version 7. The default address of <http://169.254.1.250> may be used. The username for configuration is “Admin” (without the quotes). The default password is “Admin” (also without quotes).

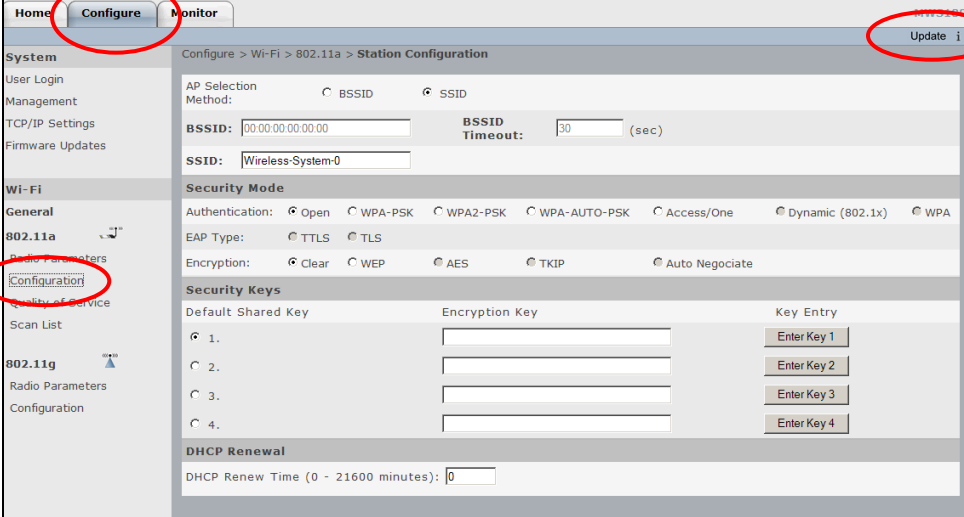
*Important: After changing any parameter on any configuration screen, an “Update” button will appear near the upper-right corner of the screen. This must be pressed for any change to take effect. Some changes require that the MWS100 be re-booted. This is indicated by the appearance of a “Reboot” button, which must be pressed for the change to take effect.*

The first step to configure an MWS100 is to select which radio will be used as a Wireless Station to connect to the Strix Access/One® mesh network. The 11a radio is the default for this. This may be changed from the “Configure → WiFi → General” screen.



Press the “Update” button if Station Radio selection is changed, followed by the “Reboot” button.

The next step is to configure the selected Station radio to connect to the network. This is performed on the “Configure → Wi-Fi → Station Configuration” screen. The default AP Selection Method is “SSID” and is correct for most applications. Enter the SSID used by the network for MWS100 applications, and then select the Security Mode and Security Keys associated with that SSID. This information should be available from the operator of the Strix Access/One® Mesh network.



The screenshot displays the configuration interface for the MWS100. The top navigation bar includes 'Home', 'Configure', and 'Monitor' tabs, with 'Configure' selected. The main content area is titled 'Configure > Wi-Fi > 802.11a > Station Configuration'. The left sidebar shows a tree view with 'Configure' selected, and '802.11a' expanded to show 'Configuration'. The main configuration area includes:

- AP Selection Method:** Radio buttons for BSSID and SSID (SSID is selected).
- BSSID:** Text input field containing '00:00:00:00:00:00'.
- BSSID Timeout:** Text input field containing '30' (sec).
- SSID:** Text input field containing 'Wireless-System-0'.
- Security Mode:** Radio buttons for Open, WPA-PSK, WPA2-PSK, WPA-AUTO-PSK, Access/One, Dynamic (802.1x), and WPA (WPA is selected).
- EAP Type:** Radio buttons for TTLS and TLS (TTLS is selected).
- Encryption:** Radio buttons for Clear, WEP, AES, TKIP, and Auto Negotiate (AES is selected).
- Security Keys:** A table with columns for Default Shared Key, Encryption Key, and Key Entry. Four keys are listed, each with an 'Enter Key' button.
- DHCP Renewal:** Text input field for DHCP Renew Time (0 - 21600 minutes) containing '0'.

The 'Update' button in the top right corner is circled in red.

After setting the Station radio parameters, press the “Update” button.

## 6 Wireless Access Point Configuration

The Access Point radio may now be configured on the “Configure → Wi-Fi → AP Configuration” screen. Set the SSID which client radios will use to connect to the MWS100. The default behavior is for this SSID to be broadcast. This may be overridden with the “Suppress SSID” checkbox. Enter Security Mode and Keys. Access may be further restricted to specific client MAC addresses by pressing the “Manage ACL” button to define an Access Control List.

The screenshot displays the MWS100 configuration interface. At the top, there are three tabs: 'Home', 'Configure', and 'Monitor'. The 'Configure' tab is active and circled in red. Below the tabs, the breadcrumb path is 'Configure > Wi-Fi > 802.11g > AP Configuration'. The left sidebar has a 'Wi-Fi' section with '802.11g' selected, and under it, 'Configuration' is also circled in red. The main content area shows the 'AP Configuration' screen with the following fields and options:

- SSID:** MyNetMobile
- Suppress SSID:**
- Security Mode:**
  - Authentication:  Open,  WPA-PSK,  WPA2-PSK,  WPA-AUTO-PSK,  Access/One
  - Encryption:  Clear,  WEP,  AES,  TKIP,  Auto Negotiate
- Security Keys:**

Default Shared Key	Encryption Key	Key Entry
<input checked="" type="radio"/> 1.	<input type="text"/>	<input type="button" value="Enter Key 1"/>
<input type="radio"/> 2.	<input type="text"/>	<input type="button" value="Enter Key 2"/>
<input type="radio"/> 3.	<input type="text"/>	<input type="button" value="Enter Key 3"/>
<input type="radio"/> 4.	<input type="text"/>	<input type="button" value="Enter Key 4"/>
- Manage Access Control List:**

After setting the AP radio parameters, press the “Update” button, then press the “Reboot” button.

## 7 Configuration and Status Monitoring

Configuration settings may now be verified on the “Home” screen. This screen shows the connection status of the MWS100 Station radio as well as that of the MWS100 Access Point. Check to ensure that the MWS100 Station radio has associated to a Strix Access/One® Mesh node with the correct SSID. Then, using a standard Wi-Fi client device (such as a laptop computer), ensure that it can associate with the MWS100 Access Point radio.

The screenshot displays the MWS100 configuration interface with the following sections:

- Home | Configure | Monitor** (Navigation tabs)
- Quick Links** (Left sidebar): 802.11a, Wireless Neighbors, Wireless History, Antenna Aimer, 802.11g, Client Monitor, Wireless Neighbors, Actions, Factory Default, Load Firmware, Reboot.
- 802.11a Radio Enabled** (Status section):
  - Associated AP: 00:0E:8E:7B:75:1A (RSSI: -90 dBm)
  - Duration: [ ] sec
  - SSID: MyNet
  - Data Rate: 11 Mbps
  - Operating Channel: 44
  - Noise Level: -101 dBm
- 802.11g Radio Details (Radio Mode: AP) Enabled** (Status section):
  - Associated Users: 0
  - Operating Channel: 2412 MHz (Channel 1)
  - SSID: MyNetMobile
  - Noise Level: -94 dBm
- Top Neighbors** (Table):
 

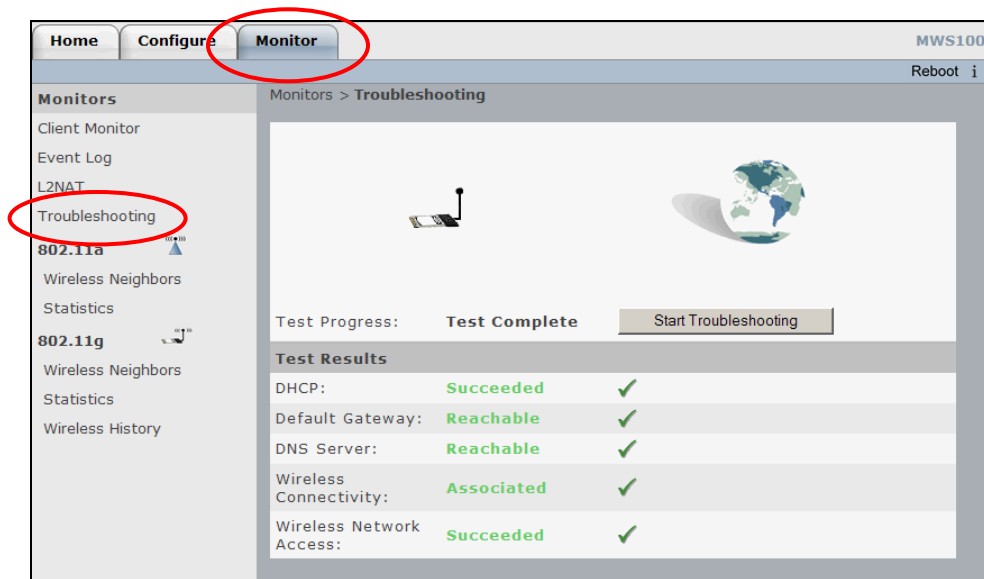
BSSID	SSID	Technology	Channel	Freq (MHz)	RSSI (dBm)	Security
00:0E:8E:7B:75:1A	MyNet	802.11a	44	5220	-53	
00:0E:8E:7B:75:E3	MyNet	802.11a	36	5180	-55	
00:06:5A:00:37:2F	OtherNet	802.11a	149	5745	-58	
00:06:5A:02:05:98	MyNet	802.11a	165	5825	-64	
00:06:5A:00:50:E6	SomeNet	802.11a	153	5765	-65	
00:09:B7:7E:67:59		802.11a	40	5200	-65	
00:06:5A:00:40:C1		802.11a	161	5805	-66	
- System Details** (Table):
 

Name:	MWS100-001fbc	Uptime:	Day 0, 0:01:16
MAC Address:	00:19:33:00:1F:BC	Firmware Version:	2.1.1
IP Address:	169.254.1.250	Boot Version:	10.3

Nearby Wireless Access Points may be viewed on the “Top Neighbors” window of the “Home” screen. This is useful for identifying Strix Access/One® Mesh Nodes that the MWS100 Wireless Station radio may connect to, or for identifying potential sources of interference.

A more complete list of nearby radios may be seen using the “Wireless Neighbors” selection in the “Quick Links” window under either the 802.11a or 802.11g headings.

A wide range of verification, status monitoring, and trouble-shooting tools are available on the “Monitors” screen. The “Troubleshooting” window provides end-to-end network diagnostics, verifying the Wireless Station link and connectivity back to the Default Gateway, DHCP Server, and DNS server.



Other useful monitors are:

**Client Monitor** – Displays information about the clients currently connected to the MWS100 Wireless Access Point.

**Event Log** – Displays a history of Station and Access Point connections and system events.

**L2NAT** – Shows the associations between MAC addresses and IP addresses stored in the Layer 2 Network Address Translation table.

**Statistics** – Various statistics useful for troubleshooting MWS100 operation.

**Wireless History** – Contains a chart showing a 24 hour history of the signal strength of the Access/One® Mesh Network Access Point(s) as seen by the MWS100 Station radio.