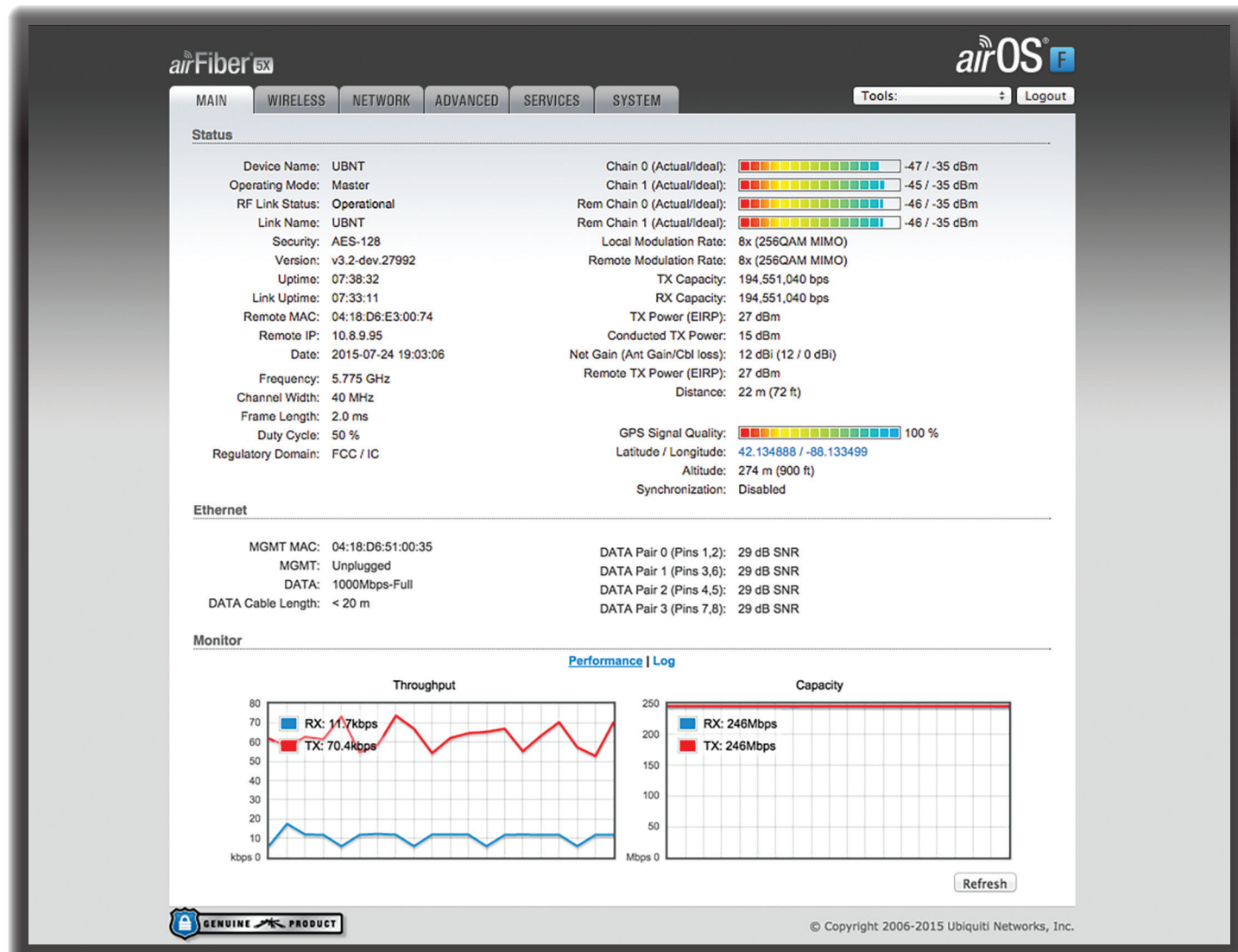
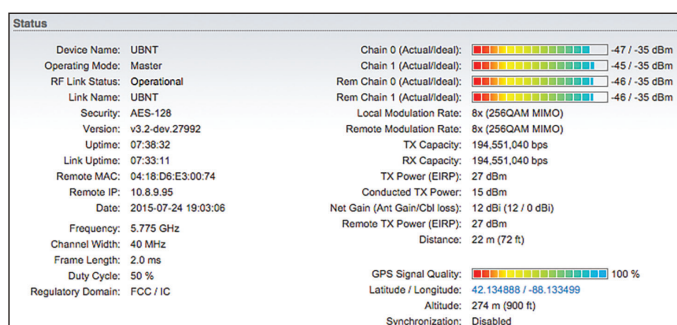




Chapter 4: Main Tab

The *Main* tab displays a summary of the link status information, current values of the basic configuration settings, network settings and information, and traffic statistics.

Status



Device Name Displays the customizable name or identifier of the device. The Device Name (also known as host name) is displayed in registration screens and discovery tools.

Operating Mode Displays the mode of the AirFiber X radio: *Slave*, *Master*, or *Reset*.

RF Link Status Displays the status of the AirFiber X radio: *RF Off*, *Syncing*, *Beaconing*, *Registering*, *Enabling*, *Listening*, *Operational*, *DFS CAC*, or *RADAR Detected*.

Note: Most of the RF Link Statuses map to specific flash rates of the *Link Status* LED (See “**LEDs**” on [page 2](#) for more details.)

Status	Flash Rate of LED
RF Off	Off
Syncing	Short Flash (1:3 on/off cycle)
DFS countries only:	
• DFS CAC	
• RADAR Detected	Normal Flash (1:1 on/off cycle)
Beaconing	
Registering	Long Flash (3:1 on/off cycle)
Operational	On

The following applies to the AF-5X only:

When the AF-5X operates in a DFS country and within a valid DFS band for that country, it performs a Channel Availability Check (CAC) before operating. The rules vary by country and frequency, but in general:

- **FCC domains** If the AF-5X operates in a DFS band (5.2 GHz or 5.4 GHz band), the AF-5X performs a 60-second check on the *Master* only.
- **ETSI domains** For most frequencies, the AF-5X performs a 60-second check on the *Master* and *Slave*; however, if it operates in the 5600-5650 MHz range, then the AF-5X performs a 10-minute check.

While the AF-5X is performing this check, the *RF Link Status* displays *DFS CAC*, and the *RF Link Timeout* is displayed.

If radar is detected, the *RF Link Status* displays *RADAR Detected*, and the *RF Link Timeout* is displayed.

RF Link Timeout (Available only if the *RF Link Status* is *DFS CAC* or *RADAR Detected*.) During the *DFS CAC* or *RADAR Detected* state, the *RF Link Timeout* counts down the time remaining before the AirFiber X radio can move to the next RF link state.

Link Name Displays the name of your link.

Security AES-128 is enabled at all times.

Version Displays the airFiber Configuration Interface software version.

Uptime This is the total time the device has been running since the latest reboot (when the device was powered up) or software upgrade. The time is displayed in days, hours, minutes, and seconds.

Link Uptime This is the total time the airFiber link has been continuously operational. The time is displayed in days, hours, minutes, and seconds.

Remote MAC Displays the Management Ethernet MAC address of the remote AirFiber X radio.

Remote IP Displays the Management Ethernet IP address of the remote airFiber X radio.

Date Displays the current system date and time. The date and time are displayed in YEAR-MONTH-DAY HOURS:MINUTES:SECONDS format. The system date and time is retrieved from the Internet using NTP (Network Time Protocol). The NTP Client is enabled by default on the *Services* tab. The AirFiber X radio doesn't have an internal clock, and the date and time may be inaccurate if the NTP Client is disabled or the device isn't connected to the Internet.

Frequency (Available if split frequencies are not enabled.) Displays the current frequency. The AirFiber X radio uses the radio frequency specified to transmit and receive data.

TX Frequency (Available if split frequencies are enabled.) Displays the frequency that the airFiber X radio uses to transmit data.

RX Frequency (Available if split frequencies are enabled.) Displays the frequency that the airFiber X radio uses to receive data.

Channel Width Size of the channel in MHz.

Frame Length Displays the currently configured frame length of the radio: *2.0ms*, *2.5ms*, *4.0ms*, or *5ms*. Longer frame lengths result in higher throughput for a given configuration, but also result in slightly higher latency.

Duty Cycle Displays the duty cycle.

Regulatory Domain Displays the regulatory domain (*FCC/IC*, *ETSI*, or *Other*), as determined by country selection.

Chain 0/1 (Actual/Ideal) Displays the actual and ideal power levels (in dBm) of the received signal for each chain.

The actual number indicates the current RX signal strength. The ideal number is the RX signal strength of a perfectly aligned link. These two numbers indicate exactly how many dB out of alignment the system is.

When the link is aimed correctly, the bar graphs are full-scale. If the bar graphs are not full-scale, they indicate that your link is not optimally aimed.

Rem Chain 0/1 (Actual/Ideal) Displays the actual and ideal power levels (in dBm) of the received signal for each chain of the remote airFiber X radio. The bar graphs will display as full-scale once the link is aimed correctly.

Local Modulation Rate Displays the modulation rate:

- 8x (256QAM MIMO)
- 6x (64QAM MIMO)
- 4x (16QAM MIMO)
- 2x (QPSK MIMO)
- 1x (½ Rate QPSK xRT™*)
- ¼x (¼ Rate QPSK xRT)

*xtreme Range Technology

If *Automatic Rate Adaptation* is enabled on the *Wireless* tab, then *Local Modulation Rate* displays the current speed in use and depends on the *Maximum Modulation Rate* specified on the *Wireless* tab and current link conditions.

Remote Modulation Rate Displays the modulation rate of the remote airFiber X radio:

- 8x (256QAM MIMO)
- 6x (64QAM MIMO)
- 4x (16QAM MIMO)
- 2x (QPSK MIMO)
- 1x (½ Rate QPSK xRT)
- ¼x (¼ Rate QPSK xRT)

TX Capacity Displays the potential TX throughput, how much the airFiber X radio can send, after accounting for the modulation and error rates.

RX Capacity Displays the potential RX throughput, how much the airFiber X radio can receive, after accounting for the modulation and error rates.

TX Power (EIRP) Displays the current average transmit output power (in dBm) of the airFiber X radio.



Note: If “(Limited)” is displayed, the transmit output power has been limited to a value less than the selected value, to comply with regulatory region requirements. For a list of maximum output power values by country and region, refer to **“Frequency Ranges and Power Levels per Country/Region” on page 50.**

Conducted TX Power Displays the conducted transmit power out of the radio before any antenna gain.

Net Gain Displays the airFiber X radio’s net antenna gain, which is the antenna gain minus cable loss. Antenna gain (the gain of the antenna being used) and cable loss (the loss in the cable from the radio to the antenna) are set using the *Antenna Gain* and *Cable Loss* fields on the *Wireless* tab.

Remote TX Power (EIRP) Displays the current average transmit output power (in dBm) of the remote airFiber X radio.

Distance Displays the distance between the airFiber X radios.

GPS Signal Quality Displays Global Positioning System (GPS) signal quality as a percentage value on a scale of 0-100%.

Latitude/Longitude Based on GPS tracking, reports the device’s current latitude and longitude. Clicking the link opens the reported latitude and longitude in a browser using Google Maps™ (<http://maps.google.com>).

Altitude Based on GPS tracking, reports the device’s current altitude relative to sea level.

Synchronization airFiber uses GPS to synchronize the timing of its transmissions. By default, this option is disabled.

Ethernet

Ethernet	
MGMT MAC: 04:18:DB:51:00:28	DATA Pair 0 (Pins 1,2): open at 1 m (3 ft)
MGMT: 100Mbps-Full	DATA Pair 1 (Pins 3,6): open at 1 m (3 ft)
DATA: No Link	DATA Pair 2 (Pins 4,5): open at 1 m (3 ft)
DATA Cable Length: N/A	DATA Pair 3 (Pins 7,8): open at 0 m (0 ft)

MGMT MAC Displays the MAC address of the *Management* port.

MGMT Displays the speed and duplex of the *Management* port.

DATA Displays the speed and duplex of the *Data* port.

DATA Cable Length Displays the Ethernet cable length from radio to remote port. This is displayed only for cables longer than 20 m.

DATA Pair 0 (Pins 1,2) If the cable is functioning properly, displays the SNR of the twisted pair; if the cable has a fault, displays the fault (“open” or “short”) and the distance at which the fault has occurred. If the remote port is administratively shut down, this field displays “normal”.

DATA Pair 1 (Pins 3,6) If the cable is functioning properly, displays the SNR of the twisted pair; if the cable has a fault, displays the fault (“open” or “short”) and the distance at which the fault has occurred. If the remote port is administratively shut down, this field displays “normal”.

DATA Pair 2 (Pins 4,5) If the cable is functioning properly, displays the SNR of the twisted pair; if the cable has a fault, displays the fault (“open” or “short”) and the distance at which the fault has occurred. If the remote port is administratively shut down, this field displays “normal”.

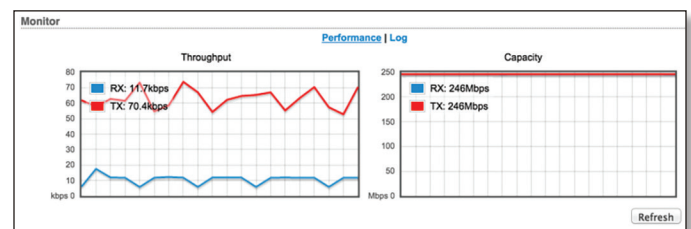
DATA Pair 3 (Pins 7,8) If the cable is functioning properly, displays the SNR of the twisted pair; if the cable has a fault, displays the fault (“open” or “short”) and the distance at which the fault has occurred. If the remote port is administratively shut down, this field displays “normal”.

Monitor

There are two monitoring tools accessible via the links on the *Main* tab. The default is *Performance*, which is displayed when you first open the *Main* tab.

Performance

Throughput and *Capacity* charts display the current and potential data traffic.



Throughput

Throughput displays the current data traffic on the *Data* port in both graphical and numerical form. The chart scale and throughput dimension (Bps, Kbps, Mbps) change dynamically depending on the mean throughput value. The statistics are updated automatically.

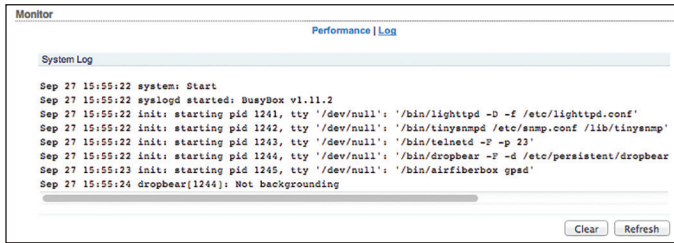
Capacity

Capacity displays the potential data traffic on the *Data* port in both graphical and numerical form. The chart scale and throughput dimension (Bps, Kbps, Mbps) change dynamically depending on the mean throughput value. The statistics are updated automatically.

Refresh If there is a delay in the automatic update, click **Refresh** to manually update the statistics.

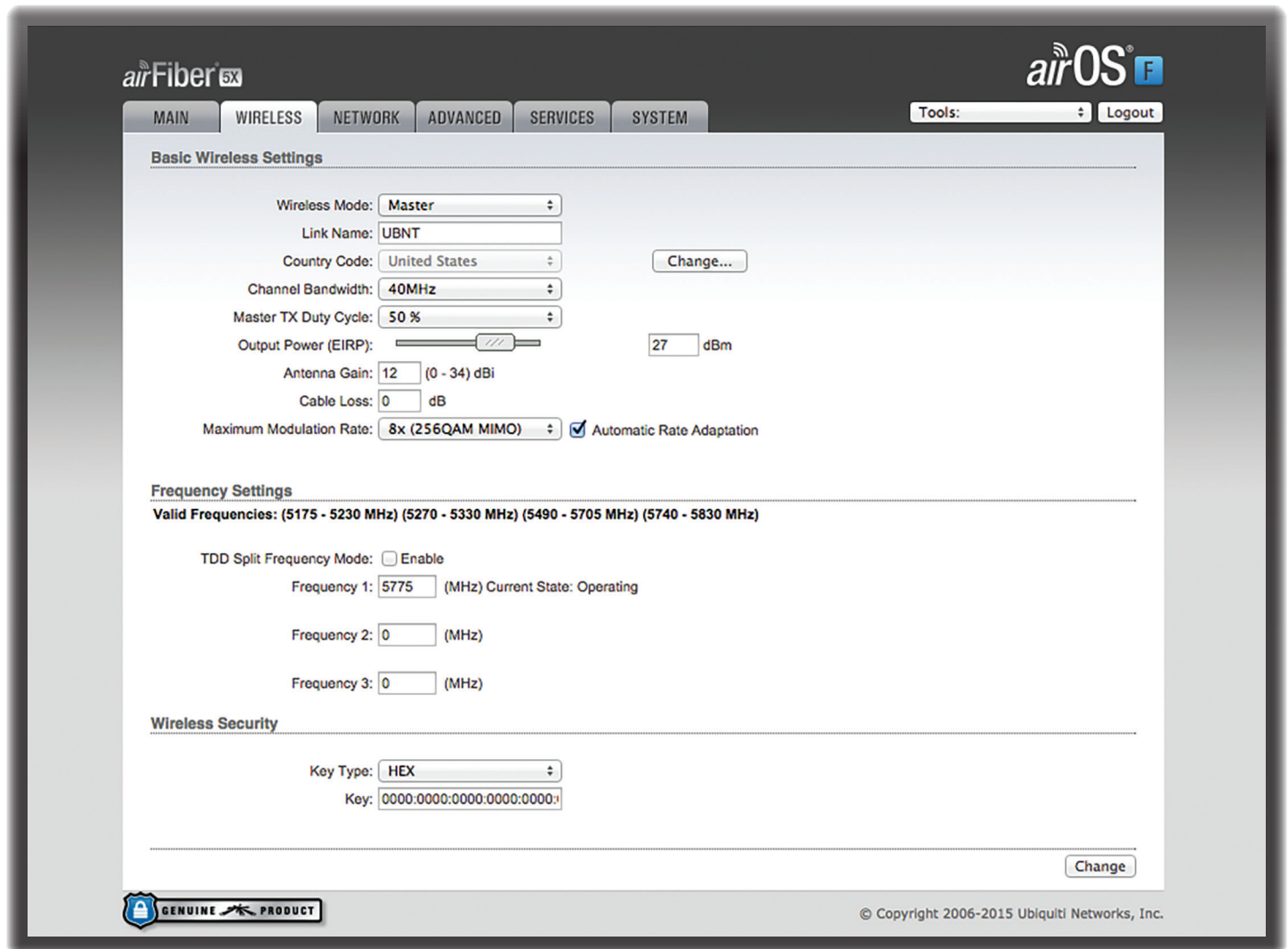
Log

When logging is enabled (see [“System Log” on page 27](#) to enable logging), this option lists all registered system events. By default, logging is not enabled.



Clear To delete all entries in the system log, click **Clear**.

Refresh To update the log content, click **Refresh**.



Chapter 5: Wireless Tab

The *Wireless* tab contains options to set up the wireless part of the link. This includes wireless mode, link name, frequencies, output power, speed, and wireless security.

Change To save or test your changes, click **Change**.

A new message appears. You have three options:

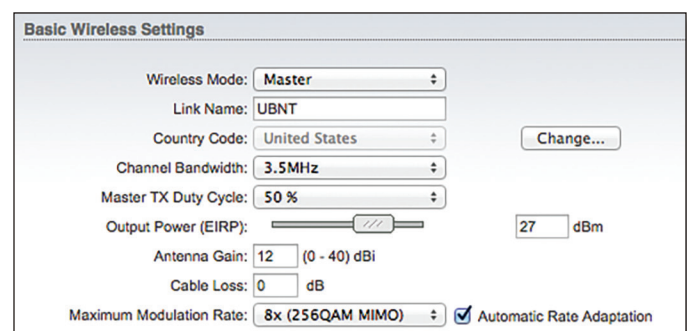
- **Apply** To immediately save your changes, click **Apply**.
- **Test** To try the changes without saving them, click **Test**. To keep the changes, click **Apply**. If you do not click **Apply** within 180 seconds (the countdown is displayed), the airFiber X radio times out and resumes its earlier configuration.
- **Discard** To cancel your changes, click **Discard**.

Write down the settings you configure on the *Wireless* tab. You will need to enter the same settings on the airFiber X radio at the other end of your PtP link. The exceptions are as follows:

- **Wireless Mode** Configure one airFiber X radio as the *Master* and the other as the *Slave*.

Basic Wireless Settings

In this section, configure the basic wireless settings, such as wireless mode, link name, country code, frequencies, output power, speed, and gain.



Wireless Mode By default, the Wireless Mode is *Slave*. You must configure one airFiber X radio as **Master** because each PtP link must have one *Master*.

Link Name Enter a name for your PtP link. This name must be the same on both Master and Slave radios in order for them to connect.

Country Code Each country has its own power level and frequency regulations. *To ensure the airFiber X radio operates under the necessary regulatory compliance rules, you must select the country where your device will be used.* The frequency settings and output power limits will be tuned according to the regulations of the selected country. For details, refer to this table, **“Frequency Ranges and Power Levels per Country/Region” on page 50.**

This radio is restricted to use with a license and to use only in certain EU countries or geographical areas of EU countries.

- **Change** To select a new country, click **Change**.



Note: U.S. product versions are locked to the U.S. Country Code to ensure compliance with FCC regulations.

- **Country** Select the new country.
- **I agree to these terms of use** Check this box; you must agree to the *Terms of Use* to use the product.
- **Accept** Saves your change.
- **Cancel** Discards your change.

Channel Bandwidth Select the appropriate channel size:

- AF-2X and AF-3X: **3.5, 5, 7, 10, 14, 20, 28, 30, 40, 50, or 56 MHz**
- AF-5X only: **5, 10, 20, 30, 40, or 50 MHz**



Note: The available channel bandwidths depend on the regulatory requirements of the currently selected country or region.

Frame Length (Available on AF-2X and AF-3X only.) Use this to specify the frame length of the radio: **default, 2.0ms, 2.5ms, 4.0ms, or 5ms.** The frame length must be the same on both Master and Slave radios. The *default* value corresponds to *5ms* for the 3.5 MHz and 5 MHz bandwidths, or *2.0ms* for all other bandwidths.



Note: The AF-5X uses a frame length of 2.0ms (this value cannot be changed).

Master TX Duty Cycle Use this to change the duty cycle of the RF link (the Master's TX percentage). Choose one of the following values: **25%, 33%, 50%, 67%, or 75%.**

Output Power (EIRP) Defines the maximum average transmit output power (in dBm) of the airFiber X radio. To specify the output power, use the slider or manually enter the output power value. The transmit power level maximum is limited according to country regulations.



Note: The *Antenna Gain* and *Cable Loss* should be configured before the *Output Power*. This is because the range of the *Output Power* field is affected by the *Antenna Gain* and *Cable Loss* values – changing the antenna gain or cable loss adjusts the maximum and minimum values you can select using the *Output Power* slider. Since the *Output Power* already includes the antenna gain and cable loss, it represents EIRP; therefore, the value of *Output Power* is actually the total power the radio is transmitting over the air. The current transmit power is displayed by the TX Power EIRP setting on the *Main* tab.



Note: The airFiber X radio may limit the output power to a value less than the value specified by this field, to comply with regulatory region requirements. For a list of maximum output power values by country and region, refer to **“Frequency Ranges and Power Levels per Country/Region” on page 50.**

Antenna Gain Enter the gain in dBi of the antenna that is used in your installation. An improper value could cause DFS false detections when operating on DFS frequencies.

Cable Loss Enter the cable loss in dB of the cable that is used in your installation. An improper value could cause DFS false detections when operating on DFS frequencies.

Maximum Modulation Rate or Modulation Rate Higher modulations support greater throughput but generally require stronger RF signals and a higher Signal-to-Noise Ratio (SNR). By default, *Automatic Rate Adaptation* is enabled, and *Maximum Modulation Rate* is displayed. This allows the airFiber X radio to automatically adjust the modulation rate to changing RF signal conditions. Under certain conditions, you may prefer to lock the *Maximum Modulation Rate* to a lower setting to improve link performance.

When *Automatic Rate Adaptation* is disabled, *Modulation Rate* is displayed. Lock the *Modulation Rate* to the setting of your choice.

Select one of the available modulation rates:

- **8x (256QAM MIMO)**
- **6x (64QAM MIMO)**
- **4x (16QAM MIMO)**
- **2x (QPSK MIMO)**
- **1x (½ Rate QPSK xRT)**
- **¼x (¼ Rate QPSK xRT)**

Frequency Settings

The *Valid Frequencies* for your *Country Code* selection are displayed. Ensure that you use frequencies that comply with the local country regulations.

TDD Split Frequency Mode This option lets you configure separate frequencies for TX and RX. To configure split frequencies, enable this option and select a different RX frequency on each side of the link. This feature is useful if both sides of the link do not have a common, clean frequency. It is important for the RX frequency to be clean; if different frequencies are clean on each end of the link, select the clean RX frequency on each end.

Frequency Settings
Valid Frequencies: (2410 - 2474 MHz)

TDD Split Frequency Mode: ☒ Enable

TX Frequency: (MHz)

RX Frequency: (MHz)

AF-2X Split Frequency Settings

Frequency Settings
Valid Frequencies: (3655 - 3695 MHz)

TDD Split Frequency Mode: ☒ Enable

TX Frequency: (MHz)

RX Frequency: (MHz)

AF-3X Split Frequency Settings

Frequency Settings
Valid Frequencies: (5175 - 5230 MHz) (5740 - 5830 MHz)

TDD Split Frequency Mode: ☒ Enable

TX Frequency: (MHz)

RX Frequency: (MHz)

AF-5X Split Frequency Settings

 **Note for AF-5X only:** Split frequency mode is not available in DFS bands because the RX frequency must match the TX frequency to allow the receiver to scan for DFS on the TX frequency. In regions where both DFS and non-DFS frequencies are available, enabling split frequencies will disable any DFS band frequencies. In regions where only DFS frequencies are available, there will be no option to turn on split frequencies.

Frequency Enter a valid frequency. The current state is displayed.

 **Note:** The Master and Slave should have the same *Frequency* setting.

Wireless Security

airFiber uses 128-bit, AES (Advanced Encryption Standard) encryption at all times.

Wireless Security

Key Type:

Key:

Key Type Specifies the character format.

- **HEX** By default, this option uses hexadecimal characters. 0-9, A-F, or a-f are valid characters.
- **ASCII** ASCII uses the standard English alphabet and numeric characters (0-9, A-Z, or a-z).

Key Select the format of the MAC address.

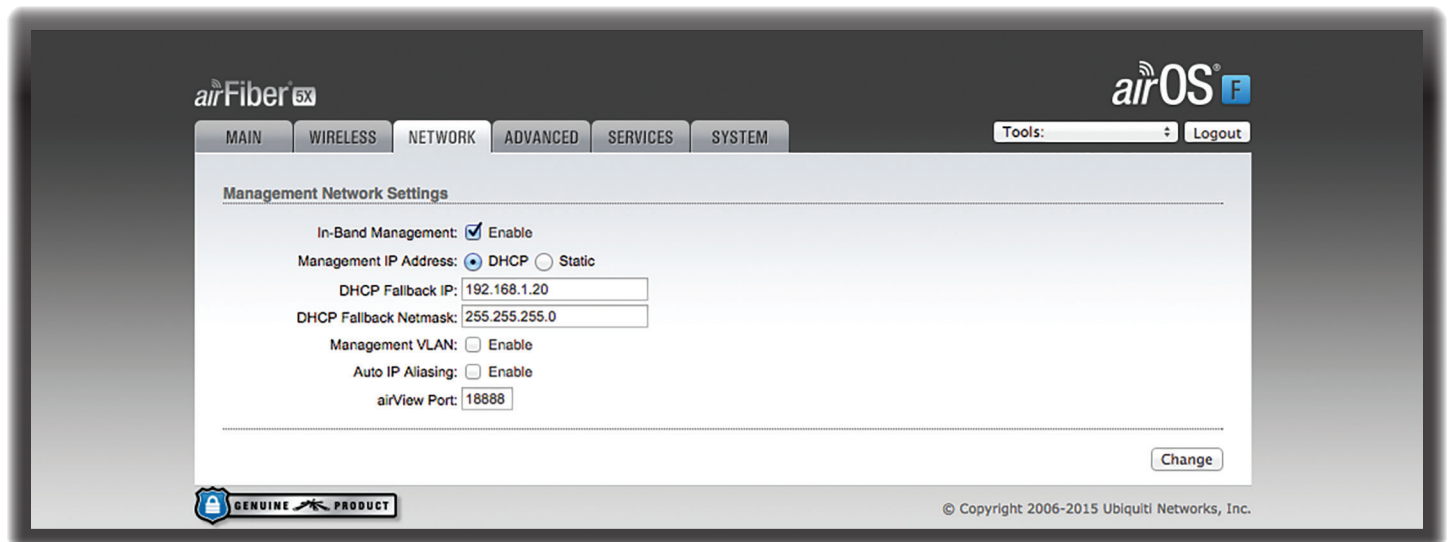
- **HEX** Enter 16 bytes (eight, 16-bit HEX values). You can omit zeroes and use colons, similar to the IPv6 format. The default is:

0000:0000:0000:0000:0000:0000:0000:0000



Note: The airFiber Configuration Interface supports IPv6 formats excluding dotted quad and "::<" (double-colon) notation.

- **ASCII** Enter a combination of alphanumeric characters. Using 128-bit SHA1 (Secure Hash Algorithm 1), the airFiber X radio hashes the ASCII key to create a 128-bit key for AES.



Chapter 6: Network Tab

The *Network* tab allows you to configure settings for the management network. There are two ways to access the airFiber Configuration Interface:

- **Management Port** Enabled by default. Use a direct connection to the *Management* port for out-of-band management.
- **In-Band Management** Enabled by default. In-band management is available through the local *Data* port or the *Data* port at the other end of the link.

The *Management* port and in-band management share the default IP address of 192.168.1.20.

Change To save or test your changes, click **Change**.

A new message appears. You have three options:

- **Apply** To immediately save your changes, click **Apply**.
- **Test** To try the changes without saving them, click **Test**. To keep the changes, click **Apply**. If you do not click **Apply** within 180 seconds (the countdown is displayed), the airFiber X radio times out and resumes its earlier configuration.
- **Discard** To cancel your changes, click **Discard**.

Management Network Settings

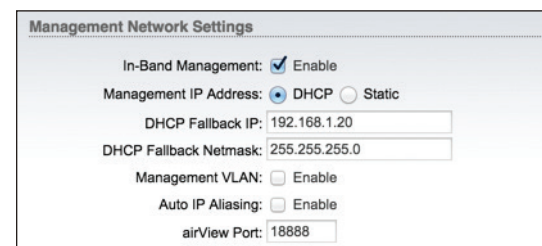
In-Band Management Enabled by default. In-band management is available through the local *Data* port or the *Data* port at the other end of the link.

Note: If *In-Band Management* is enabled, ensure that each airFiber X radio in a link has a unique *IP Address*. If the airFiber X radios use the same *IP Address*, you may lose access via the *Data* ports.

Management IP Address The airFiber X radio can use a static IP address or obtain an IP address from its DHCP server.

- **DHCP** Keep the default, *DHCP*, to use DHCP reservation on your router to assign a unique *IP Address*. The local DHCP server assigns a reserved IP address, gateway IP address, and DNS address to the airFiber X radio.

Note: If you select the *DHCP* option, ensure that you use DHCP reservation because if you do not know the IP address, then the only way to manage the airFiber X radio is to reset the airFiber X radio to its factory default settings. (Press and hold the **Reset** button for more than five seconds.) Its default *Management IP Address* is reset to 192.168.1.20.



- **DHCP Fallback IP** Specify the IP address the airFiber X radio should use if a DHCP server is not found.
- **DHCP Fallback Netmask** Specify the netmask the airFiber X radio should use if a DHCP server is not found.
- **Static** Assign static IP settings to the airFiber X radio.

Note: IP settings should be consistent with the address space of the airFiber X radio's network segment.

airView Port The port number associated with the airView spectrum analyzer tool. The default value is 18888. For detailed information on the airView tool, refer to **“airView” on page 33.**

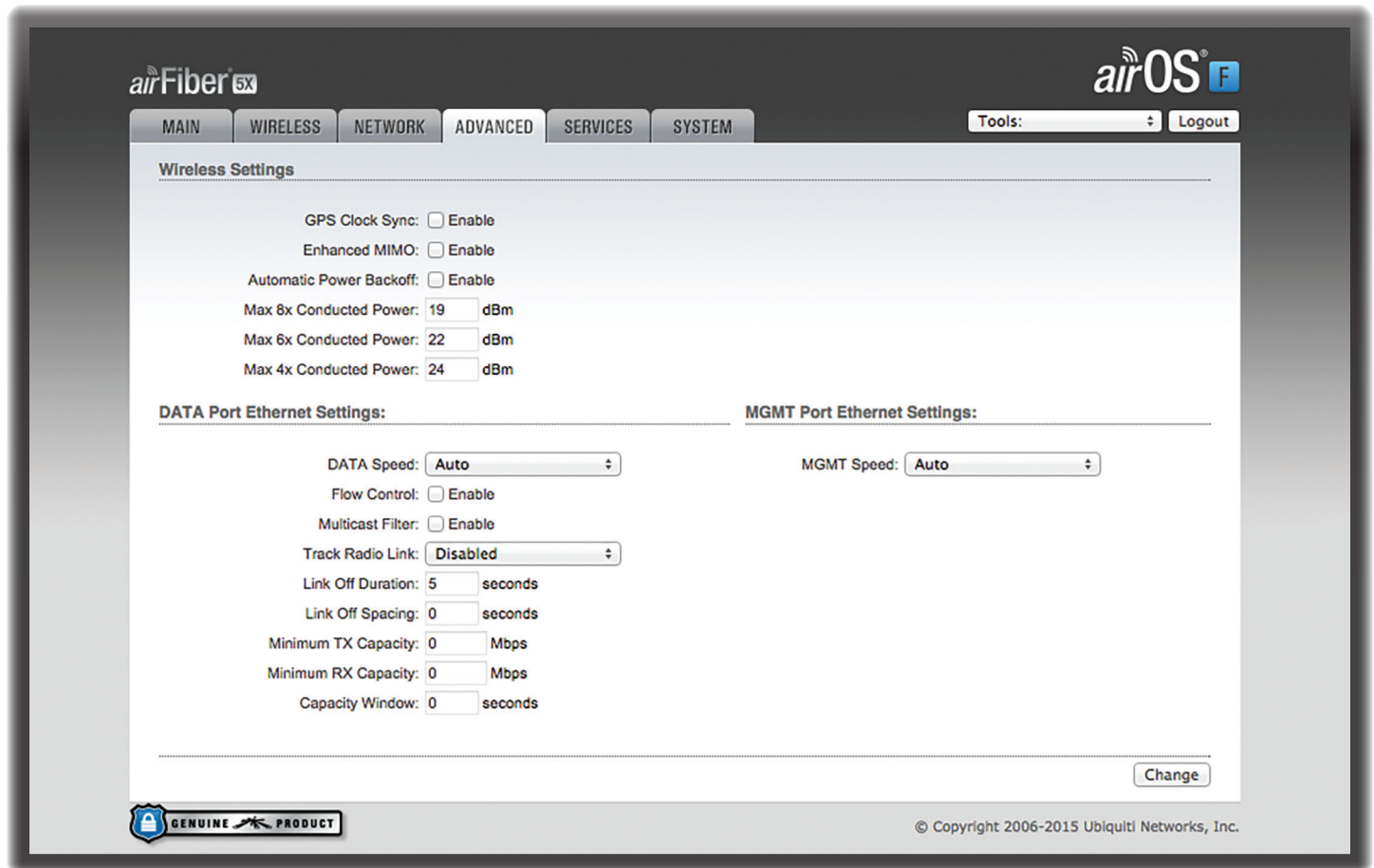
- **IP Address** Specify the IP address of the airFiber X radio. This IP will be used for device management purposes.
- **Netmask** When the netmask is expanded into its binary form, it provides a mapping to define which portions of the IP address range are used for the network devices and which portions are used for host devices. The netmask defines the address space of the airFiber X radio's network segment. The 255.255.255.0 (or "/24") netmask is commonly used on many Class C IP networks.
- **Gateway IP** Typically, this is the IP address of the host router, which provides the point of connection to the Internet. This can be a DSL modem, cable modem, or WISP gateway router. The airFiber X radio directs data packets to the gateway if the destination host is not within the local network.
- **Primary DNS IP** Specify the IP address of the primary DNS (Domain Name System) server.
- **Secondary DNS IP** Specify the IP address of the secondary DNS server. This entry is optional and used only if the primary DNS server is not responding.

Management VLAN If enabled, automatically creates a management Virtual Local Area Network (VLAN).

- **VLAN ID** Enter a unique VLAN ID from 2 to 4094.

Auto IP Aliasing If enabled, automatically generates an IP address for the corresponding WLAN/LAN interface. The generated IP address is a unique Class B IP address from the 169.254.X.Y range (netmask 255.255.0.0), which is intended for use within the same network segment only. The Auto IP always starts with 169.254.X.Y, with X and Y as the last two octets from the MAC address of the airFiber X radio. For example, if the MAC address is 00:15:6D:A3:04:FB, then the generated unique Auto IP will be 169.254.4.251. (The hexadecimal value, *FB*, converts to the decimal value, *251*.)

The Auto IP Aliasing setting can be useful because you can still access and manage devices even if you lose, misconfigure, or forget their IP addresses. Because an Auto IP address is based on the last two octets of the MAC address, you can determine the IP address of a device if you know its MAC address.



Chapter 7: Advanced Tab

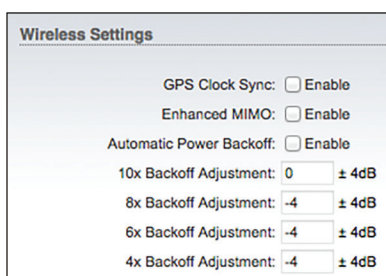
The *Advanced* tab handles advanced wireless and Ethernet settings. These settings should not be changed unless you understand how the changes will affect the airFiber X radio.

Change To save or test your changes, click **Change**.

A new message appears. You have three options:

- **Apply** To immediately save your changes, click **Apply**.
- **Test** To try the changes without saving them, click **Test**. To keep the changes, click **Apply**. If you do not click **Apply** within 180 seconds (the countdown is displayed), the airFiber X radio times out and resumes its earlier configuration.
- **Discard** To cancel your changes, click **Discard**.

Wireless Settings



GPS Clock Sync The airFiber uses GPS to synchronize the timing of its transmissions. By default, this option is disabled.

Automatic Power Backoff This feature allows the radio to automatically adjust the maximum TX power per modulation so that the radio never transmits at a higher power than each modulation rate can decode. The default values in the *Max 8x/6x/4x Conducted Power* fields are values determined to work at all temperatures and all frequencies supported by the radio.

It may, however, be possible to increase the maximum TX power for one or more modulations based on your radio's operating environment. For example, if a radio is running at 6x and trying to switch into 8x operation, you can increase the *Max 8x Conducted Power* value 1 dB at a time to see if the radio can maintain 8x operation (*Automatic Power Backoff* must be enabled to allow the *Max Conducted Power* fields to be edited). The same can be done with 6x and 4x up to the maximum conducted power of the radio.

Max 8x/6x/4x Conducted Power The maximum conducted power for the 8x/6x/4x modulation rates. Each field is editable only if *Automatic Power Backoff* is enabled.