Mimosa Backhaul

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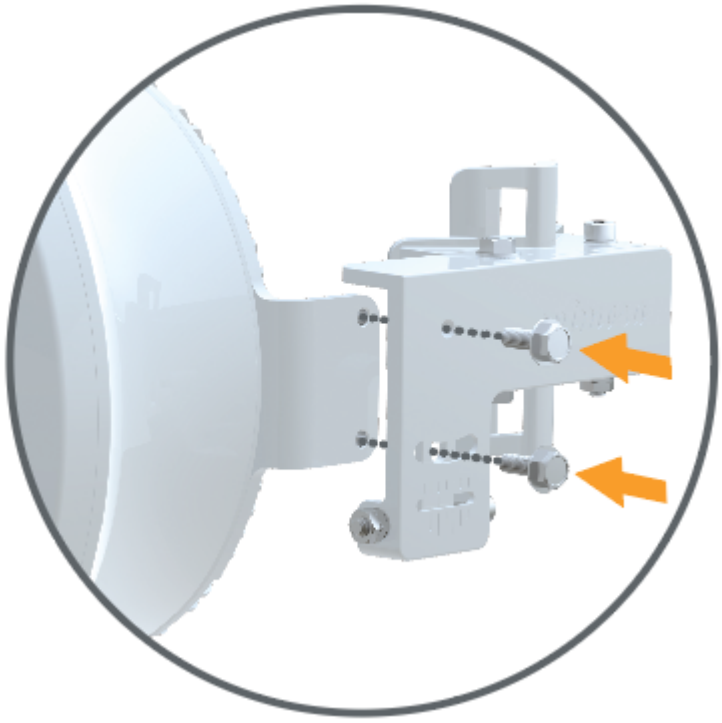
Mounting and Grounding the B24

Only a shielded, outdoor rated CAT 6 FTP Ethernet cable shall be used with all Mimosa products. Mimosa will not warrant any product which has been installed without the use of shielded CAT 6 Ethernet cable and/or proper earth grounding.

This process ensures that the radio is securely attached to a mast/pole up to 90 mm (3.5 inches) in diameter, and grounded to protect against electrical discharge.

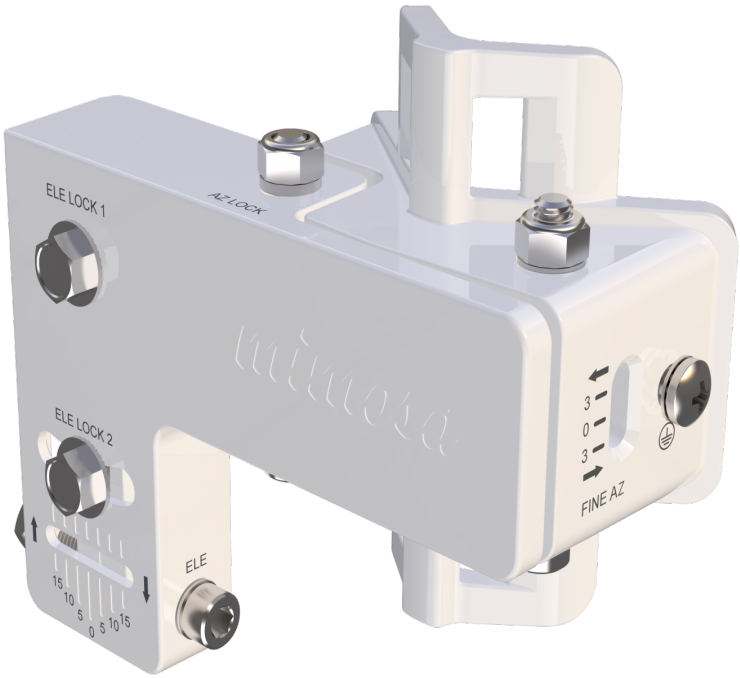
Follow these steps to mount and ground the B24 Radio.

1. Attach the precision alignment mount to the bracket with the provided bolts.

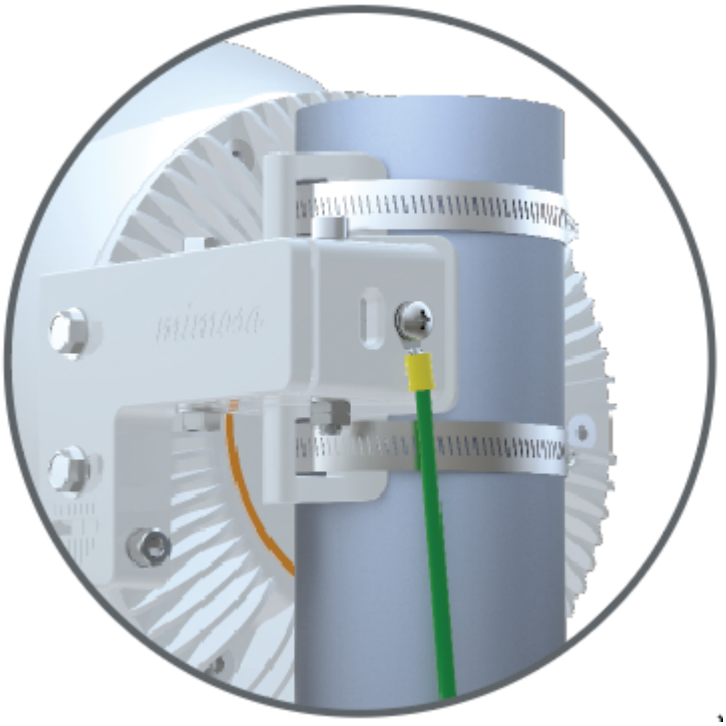


2. Attach the mount to your desired pole using the provided pole clamps.

3. Aim the radio horizontally by sliding the the mount around pole until it is pointing in the desired direction. To fine tune the radio, use the Elevation and Azimuth adjustment allen bolts, then check and tighten each of Elevation and Azimuth locking bolts.



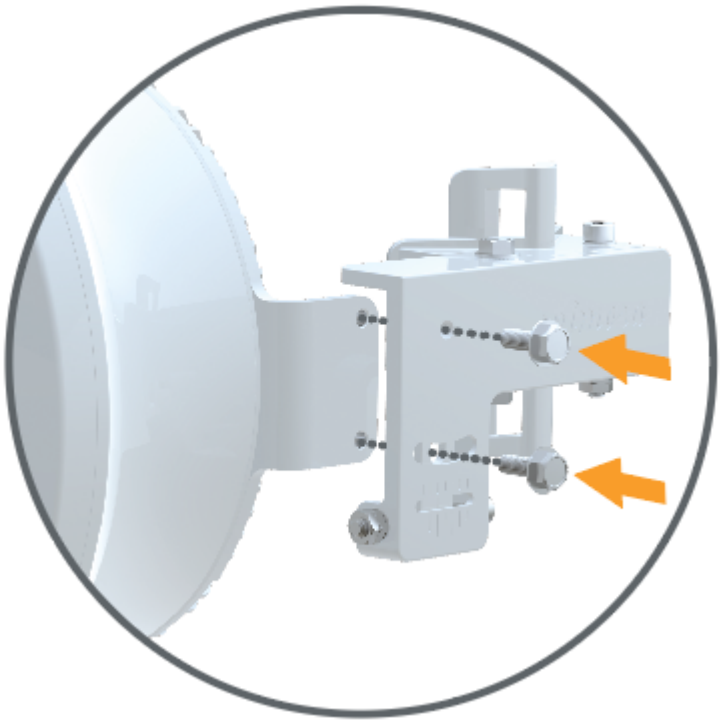
1. Attach a 6 mm^2 (10 AWG) ground wire with a maximum length of 1 m (3.3 feet) between the mounting bracket of the B24 and a suitable grounding location on the tower or structure. The provided grounding screw is M5 x 6mm with 0.8 thread.



Related

B24 Specifications - See specification sheet section entitled, "Physical" for additional mounting hardware details.
Hardware & Materials - Details about what materials are used in each provided part.

Installation, Mounting and Alignment

1. You will need a 10mm wrench, a #5 hex wrench/allen wrench, and a 5/16 nut driver to mount and align the B24. 
2. Take the mounting bracket and attach it to the B24 using the two provided screws. Use your 10mm wrench to tighten the screws down. When you're ready to adjust elevation, these two screws will need to be loosened up. 
3. Add both hose clamps to the B24 mount when you're ready to mount to a pole, j-mount, etc.
4. Once on the pole, tighten down your hose clamps most of the way so that they hold the radio up on the pole.

5. Before tightening your hose clamps down all the way, go ahead and point your B24 toward the other end of the link (coarse alignment). Once you have your radios pointed, go ahead and tighten down the hose clamps.
6. If you have planned this link out in the Mimosa Design Tool, you will know the -+ degree of the elevation. Go ahead and set your mount to around the correct angle. Keep in mind that each tick mark for elevation is 5 degrees.
7. Power up the B24 radio so that you can connect to the radio GUI through 2.4GHz Wi-Fi or Ethernet. Once the radios are powered up, you should be able to tell if the radios are linked up or not by looking at the LED light  on the back. If you have a blue flashing light, your link is connected.
8. Regardless if your link is connected or not, log into the radio and access the radio GUI. On the Dashboard page, you will see the Signal Meter. If connected, you'll have a signal level listed. Please make sure you are only adjusting one radio at a time. Also make sure you are not adjusting azimuth and elevation at the same time. You want to complete one before starting the other.
9. Now that the radio is powered up, and you're logged into the radio, you can start the fine adjustment process. Loosen up the hex head screw labeled "AZ LOCK" using your #5 hex wrench and your 10mm wrench. Failure to loosen this screw will prevent you from adjusting the horizontal/azimuth on your B24 mount.
10. Now take your hex wrench and insert it into the hex screw labeled "FINE AZ". Turning clockwise will move your radio to the left, while turning counter-clockwise will move your radio to the right. Pick a direction and start turning. Watch the signal meter to see if your signal is getting better or worse.

Even if your signal is getting better or worse, continue turning for a few more turns to determine if you're connected to a side lobe or not. If you are the signal will get worse and then much, much better.

11. Once you have adjusted left and right, move back to where you had the best signal.
12. To adjust elevation, make sure to loosen the two 10mm bolts labeled "ELE LOCK". If you recall, these were the two bolts used to attach the mount to the B24.
13. Take your hex wrench and insert it into the hex screw labeled "ELE". Turning clockwise will reduce the elevation of your radio, while turning counter-clockwise will increase the elevation of your radio. Pick a direction and start turning. Watch the signal meter to see if your signal is getting better or worse. Even if your signal is getting better or worse, continue turning for a few more turns to determine if you're connected to a side lobe or not. If you are the signal will get worse and then much, much better.
14. Once you have adjusted left and right, move back to where you had the best signal.
15. Now that you have adjusted one end of the link, follow the same steps to align the other end of the link.
16. Once both radios have been aligned, go ahead and gently tighten the "AZ LOCK" screw and the "ELE LOCK" screws. Once these are tightened down, and you've confirmed your signal levels, you will have completed installation and alignment of your radio link.

General

Product Applicability: B5, B5c, B5-Lite, C5c PTP, B11, B24

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This 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; and
(2) this device must accept any interference received, including interference that may cause undesired operation.

Note that user changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

RF Exposure Warning

The radiated output power of this device is below the FCC radio frequency exposure limits. Nevertheless, the device should be used in such a manner that the potential for human contact during the normal operation is minimized. In order to avoid the possibility of exceeding the FCC radio frequency exposure limit, human proximity to the access point should be more than 20 cm.

Industry Canada Compliance

This device complies with Industry Canada’s license-exempt RSSs. Operation is subject to the following two conditions:
(1) This device may not cause interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'ISED applicables aux appareils radio exempts de licence.
L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Follow all safety precautions as dictated by your local regulator in installation.

Accessing the Graphical User Interface

Accessing the graphical user interface (GUI) requires that the radio first be connected to power. The Power over Ethernet (PoE) connection process describes the steps to do this. Note that the GUI will be available approximately one minute after applying power.

The GUI can be accessed in three ways to facilitate set-up and management.

1. Locally through the built-in 2.4 GHz wireless management network (B5/B5c and B11 Only)
2. Through the local Ethernet interface (LAN), or the fiber (SFP) if applicable
3. Remotely through the Point to Point wireless link

Via 2.4 GHz Management Network

On any device with 2.4 GHz 802.11n capability, go to the wireless network listing and connect to the Local Network Management wireless network (SSID): "mimosaMXXX". The default passphrase for the 2.4 GHz connection is "mimosanetworks". Once connected, type 192.168.25.1 into your browser. Please note that both the Local Network Management SSID and passphrase are configurable by the user, so their values could be different from the default values.

Via Ethernet interface or in-band over the Point to Point link

By default, the device IP address is 192.168.1.20 and can be accessed via the Ethernet port using this IP address in any standard Web browser. To access the device via a locally connected computer initially (on the same LAN or directly to the Ethernet port), the computer’s IP address must be on the same subnet as the above address. Once you have modified the IP address (static or is DHCP) of the device for remote management purposes (in-band over wireless or over the Ethernet interface), the new specified IP address must be used to access the device. This is important to do in order to avoid IP address conflicts with other devices on the network. Current IP addresses of different Mimosa devices on the network can be identified using terminal-based discovery. It is highly recommended to change the default password to a unique and secured password.

Logging In

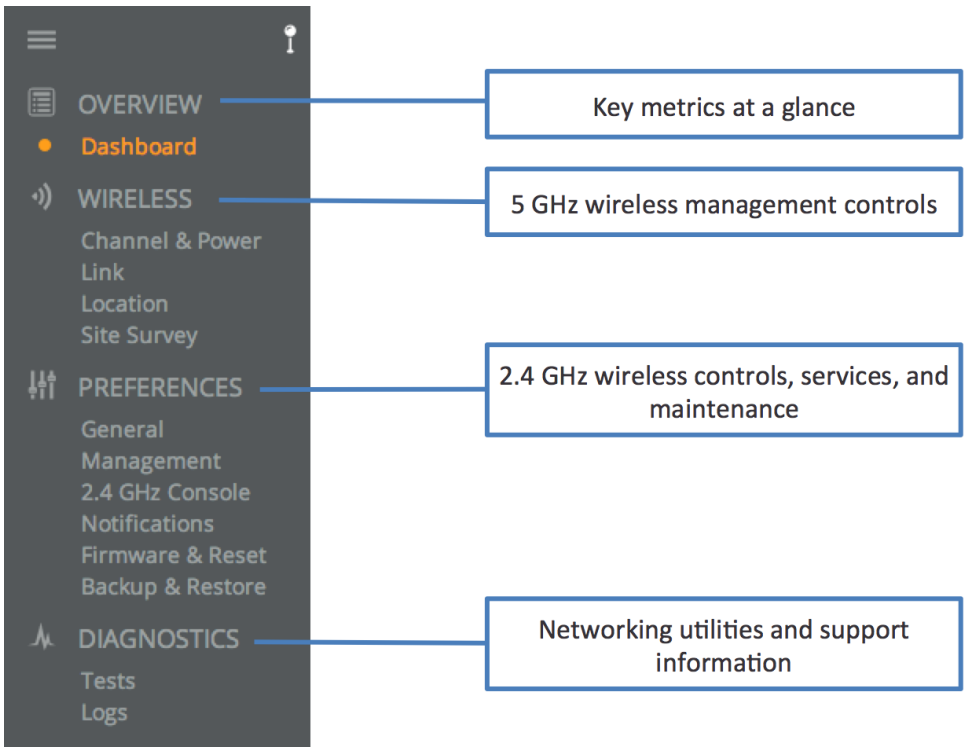
After connecting via one of the three access methods, the GUI will prompt you to log-in with a password. The default password is "mimosa", and should be changed immediately after login to protect your network since it gives the user read / write privileges. The password can be changed within the Preferences > General > Set Password panel of the GUI.

User Interface Overview

When you first log in, you'll notice that there is a title bar with the device name shown in the top-right corner, a navigation pane on the left, and a large content pane on the right. The default page shown in the content pane is the Dashboard, which shows a summary of overall performance at a glance, and highlights both radio and link parameters that affect link health.

On the left navigation pane, there are four prominent sections: Overview, Wireless, Preferences, and Diagnostics. Each of these sections contains one or more links to pages containing task-related data, controls, and tools used to administer the radio...and you can return the Dashboard at any time by clicking on the Dashboard link in the Overview section.

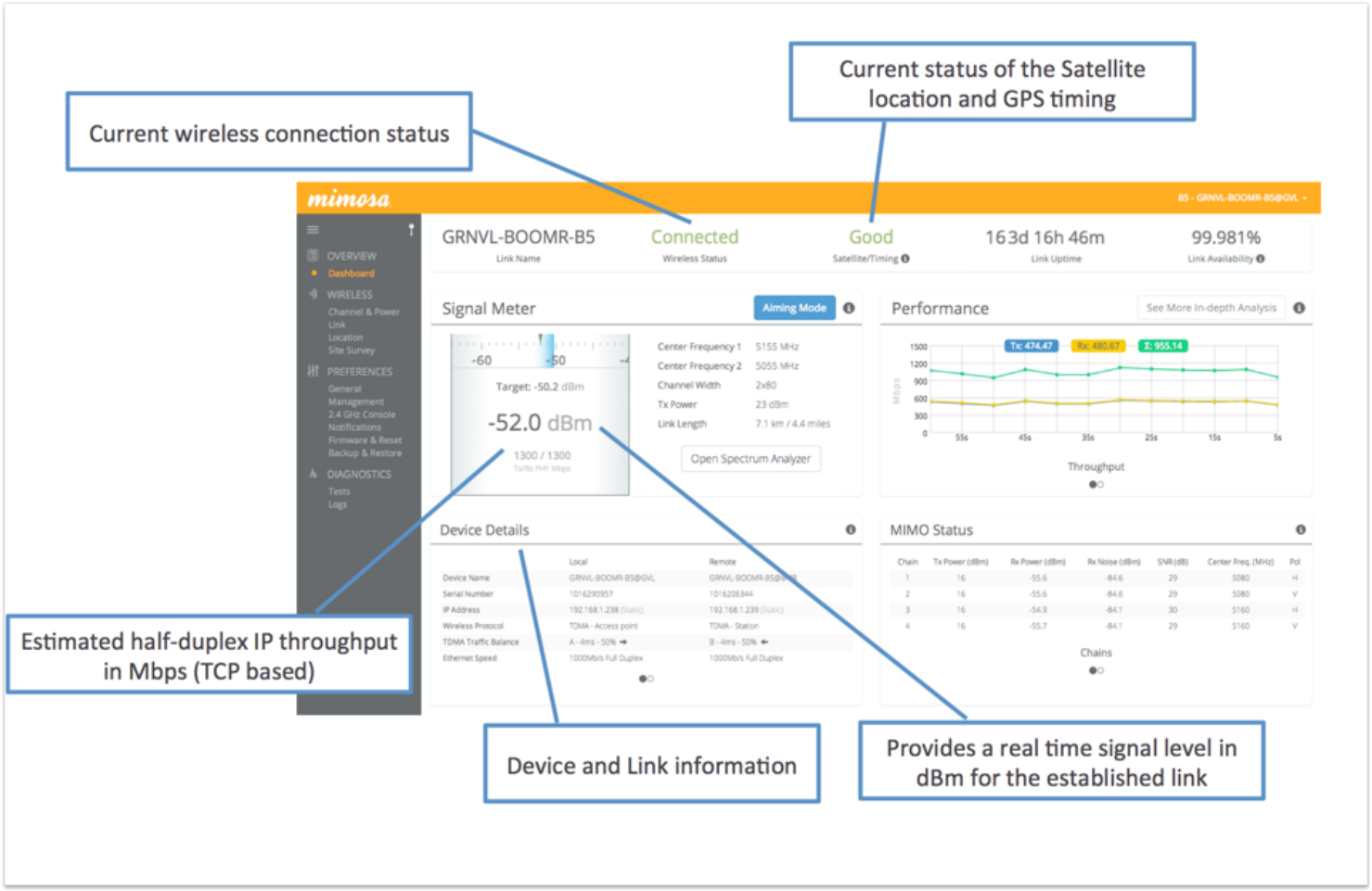
The pin in the top corner of the left navigation pane allows you to "pin" open the navigation menu for easier access. Else, the menu contracts to provide more workspace within the GUI. Note that the 2.4 GHz Console menu item is not present on the B5-Lite.


OVERVIEW
Dashboard
WIRELESS
Channel & Power
Link
Location
Site Survey
PREFERENCES
General
Management
2.4 GHz Console
Notifications
Firmware & Reset
Backup & Restore
DIAGNOSTICS
Tests
Logs
Key metrics at a glance
5 GHz wireless management controls
2.4 GHz wireless controls, services, and maintenance
Networking utilities and support information

The Dashboard

The Dashboard contains several panels used to group related items. The status panel at the top of the page shows the link SSID, the link status, GPS signal quality*, Link Uptime since association, and Link Availability since the last reboot. Two of the values on this panel contain an information icon that shows more information when you click or hover over it with your mouse cursor. On other panels, detailed help text can be found by clicking on the information icon in the upper right hand corner.

* Applies to B5/B5c, B11, and B24 only; does not apply to B5-Lite or C5c PTP.



Reading the Signal Meter

Connected Link

Received signal strength is shown in large text in the center of the control, and as a green indicator in the top dial. The blue shaded bar and text immediately below the dial represent target signal strength based on distance and other information exchanged between radios. The objective is to align the green indicator with the blue bar as a guideline during antenna aiming.
The resulting half-duplex PHY rates shown at the bottom of the Signal Meter control are correlated with the MCS, and represent raw data across the link without protocol overhead. The Max Throughput values include TDMA window size and MAC layer efficiency.
The following settings and values that affect link health are listed for reference:

B5/B5c

- Channel 1 Center Frequency - True center of the first frequency range (no offset).
- Channel 2 Center Frequency - True center of the second frequency range (no offset).
- Channel Width - Number of channels used (1 or 2), and the width of each channel (20, 40 or 80 MHz).
- Tx Power - Total transmit power level (dBm).
- Link Length - Distance between local and remote radios (when connected).

B5-Lite/C5c PTP

- Center Frequency - True center of the frequency range (no offset).
- Channel Width - The width of the channel (20, 40 or 80 MHz).
- Tx Power - Total transmit power level (dBm).
- Link Length - Distance between local and remote radios (when connected).

B11

- Center Frequency 1 - True center of the first frequency range (no offset).
- Center Frequency 2 - True center of the second frequency range (no offset).
- Channel Width - Number of channels used (1 or 2), and the width of each channel (20, 40 or 80 MHz).
- Tx Power - Total transmit power level (dBm).
- Link Length - Distance between local and remote radios (when connected).

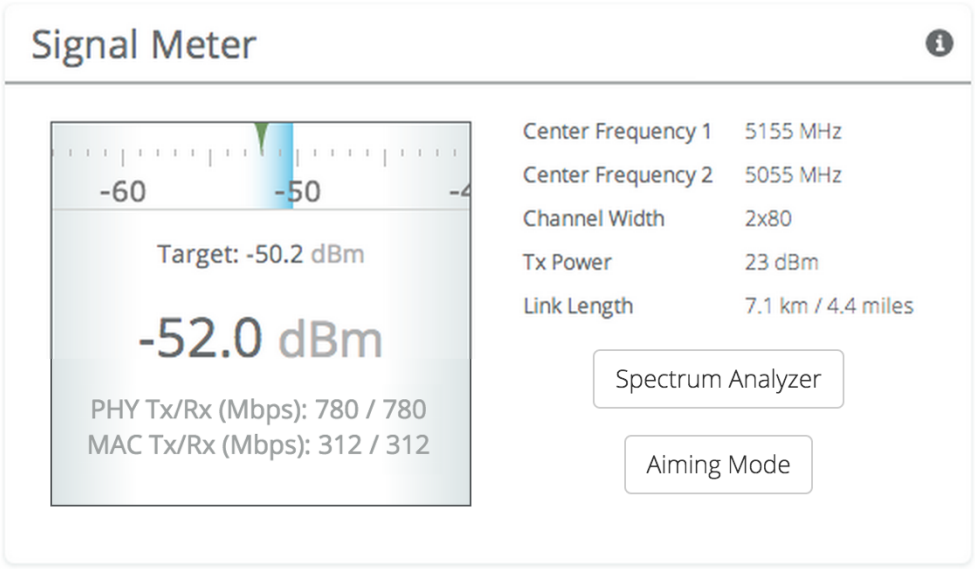
B24

- Center Frequency 1 - True center of the first frequency range (no offset).
- Center Frequency 2 - True center of the second frequency range (no offset).
- Channel Width - Number of channels used (1 or 2), and the width of each channel (20, 40 or 80 MHz).
- Tx Power - Total transmit power level (dBm).
- Link Length - Distance between local and remote radios (when connected).

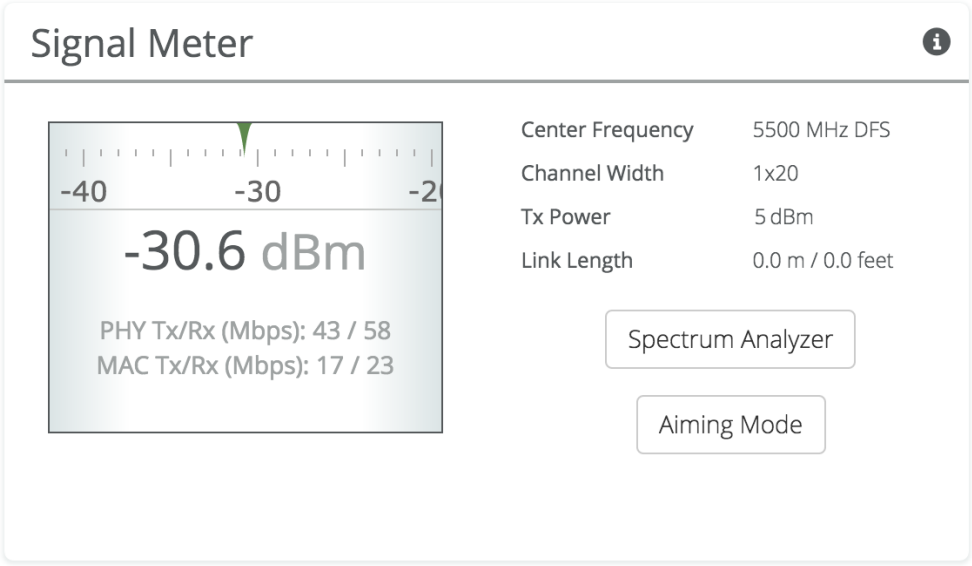
Click the Spectrum Analyzer button to access the Spectrum Analyzer, which can also be found on the Channel & Power page. This will not disturb the link.

When a link is not associated, the signal strength and PHY rates are replaced by an indicator of "Disconnected". Once associated, click the Aiming Mode button on the Dashboard to open a new window that refreshes once per second for a 5-minute period. The Aim Heading indicates the direction in which the front of the device should be pointed based exchange of coordinates. The green arrow and blue shaded region on the dial indicator represent current and target signal levels, respectively. Note that the dial indicator does not represent azimuth. Azimuth may need to be adjusted in either direction to meet the target.

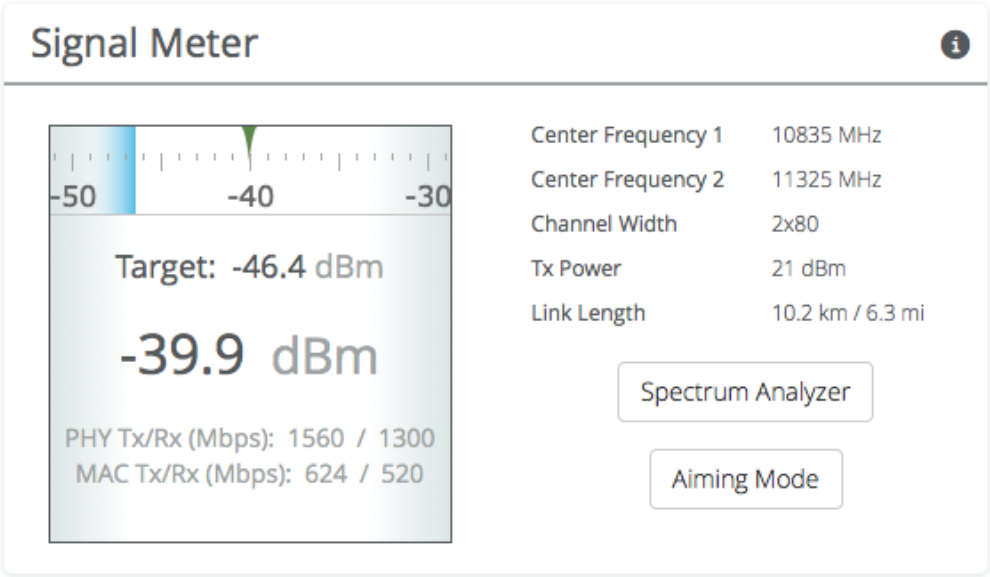
B5/B5c Signal Meter



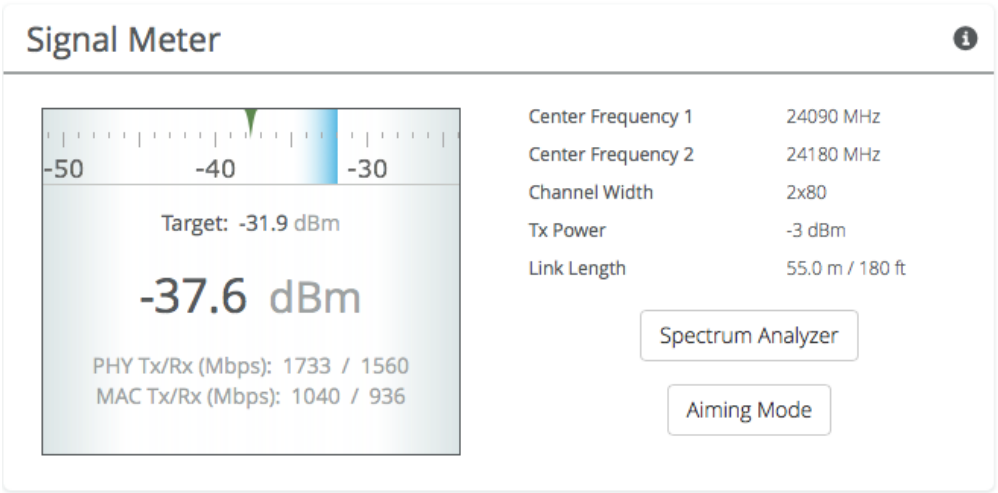
B5-Lite Signal Meter



B11 Signal Meter



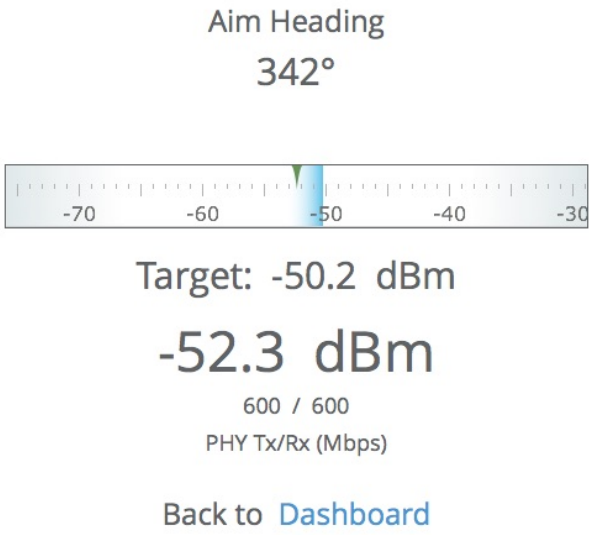
B24 Signal Meter



Antenna Aiming Mode

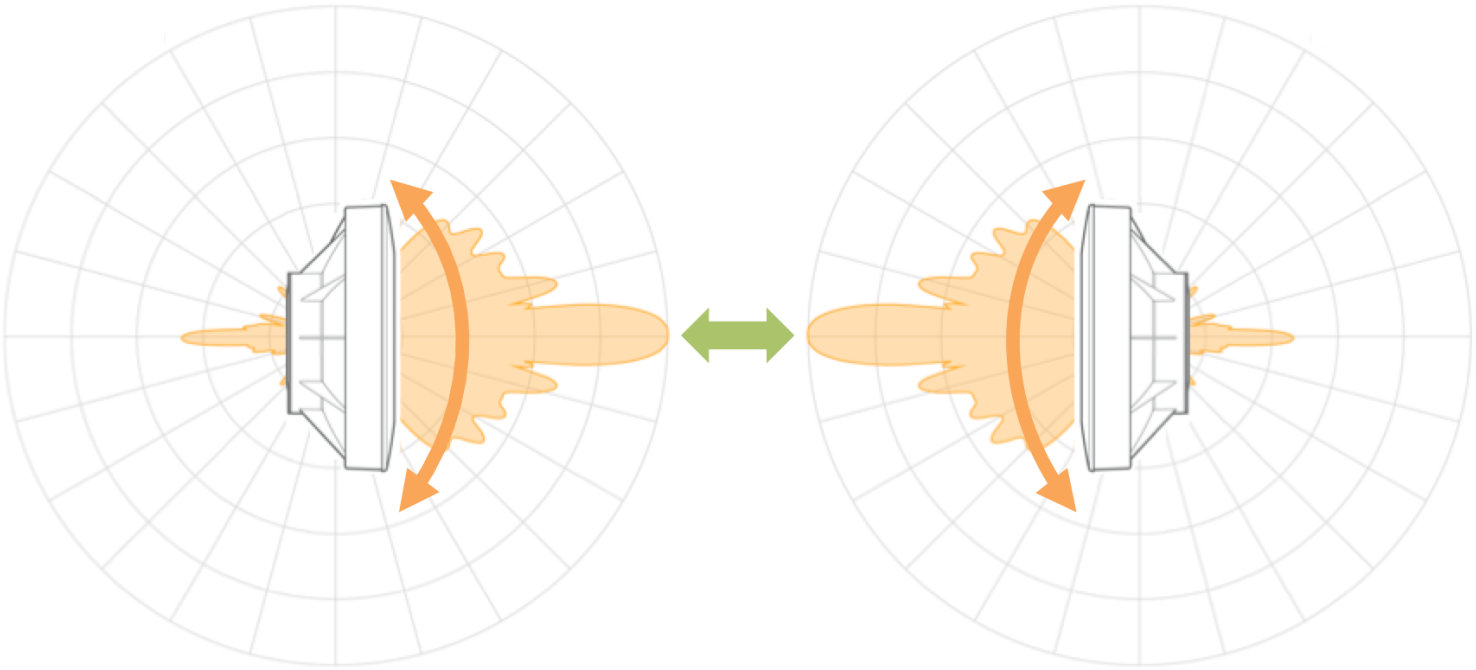
Product Availibility: B5/B5c, B11, B24
Once associated, click the Aiming Mode button on the Dashboard to open a new window that refreshes once per second for a 5-minute period. The Aim Heading indicates the direction in which the front of the device should be pointed based exchange of coordinates. The green arrow and blue shaded region on the dial indicator represent current and target signal levels, respectively. Note that the dial indicator does not represent azimuth. Azimuth may need to be adjusted in either direction to meet the target.

Note that the target signal level will be incorrect if the antenna gain value is inaccurate (B5c and B11).



Antenna Aiming Procedure

1. While viewing the Aiming Mode screen, move the local antenna on one axis at a time (first azimuth and then elevation) in 6mm (1/4 inch) increments.
2. Wait 2-3 seconds for the signal to settle after each movement. Signal strength may increase or decrease after each movement. Increases in signal strength will move the green arrow and blue shaded region closer together. Decreases in signal strength will move them farther apart. The point of maximum signal strength indicates optimal antenna alignment for each axis.
3. Repeat the steps 1 and 2 above on the remote antenna. The signal strength should match the outputs from the Mimosa Design application. If not, please consult the Low Rx Power troubleshooting guide.

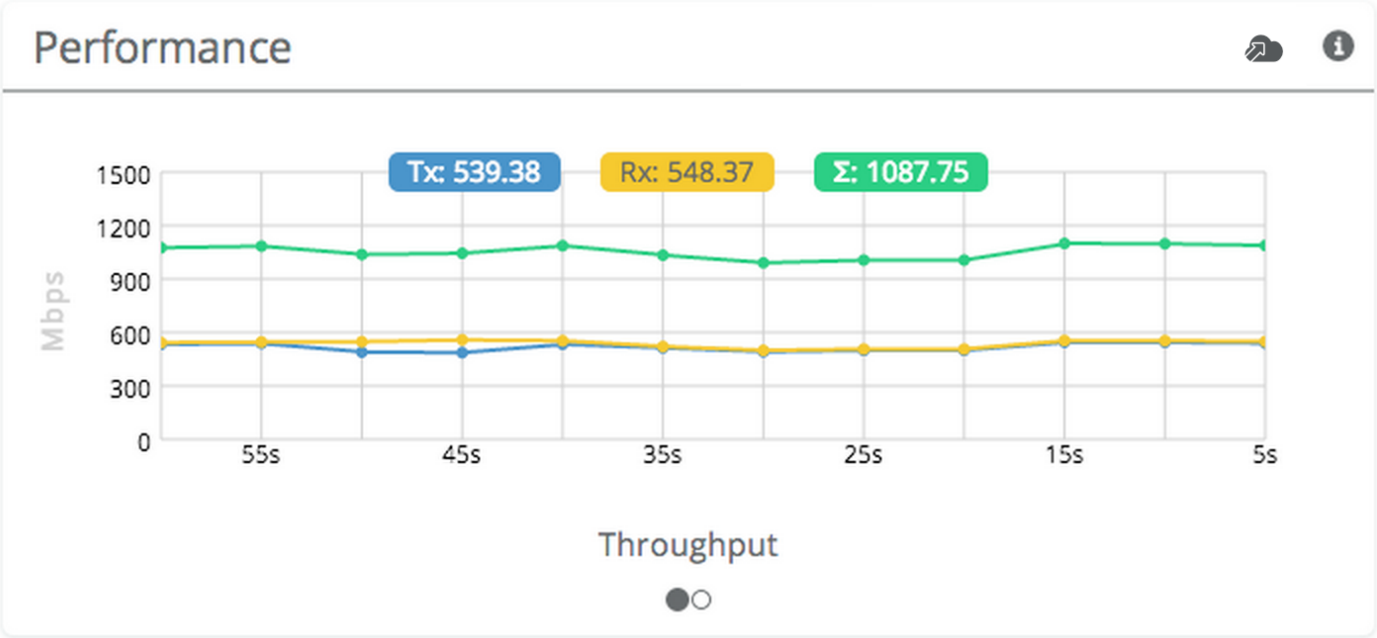


Tip: Use a pen (or a piece of tape) to place an alignment mark on both the antenna mount and the mounting pole. The gap between the marks will serve as a visual aid to show how far the antenna has turned in either direction.

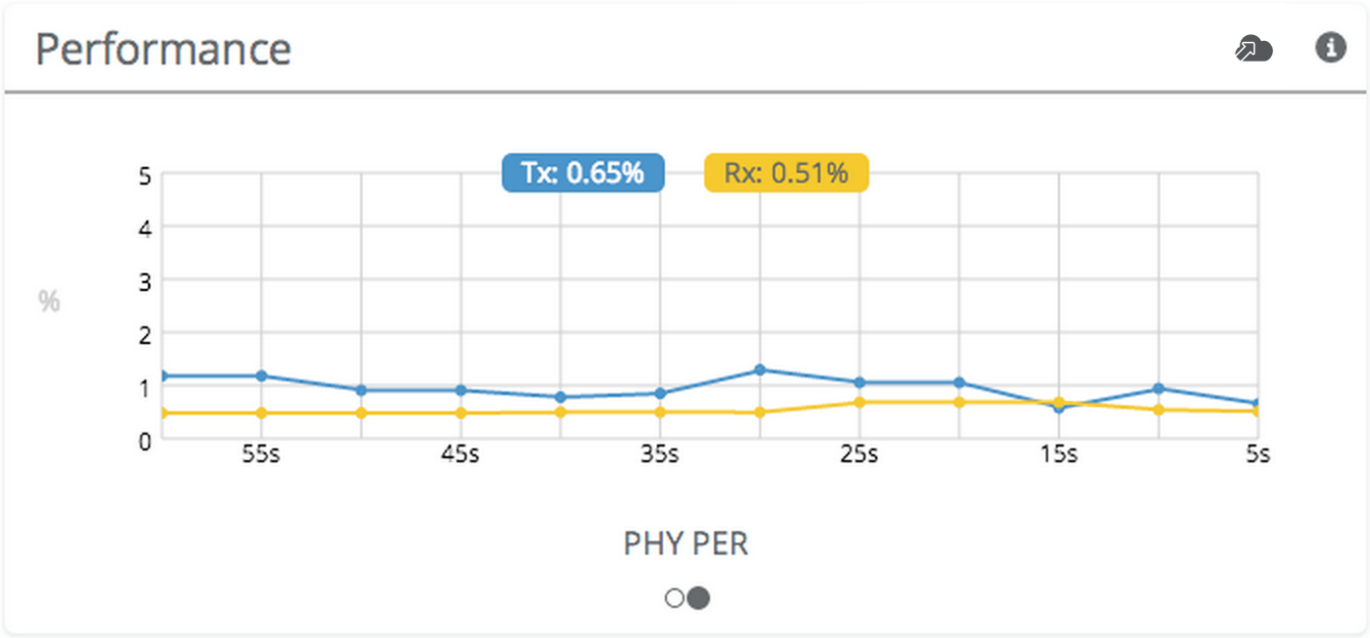
Reading the Performance Charts

IP Throughput and Packet Error Rate (PER) are charted over 60 seconds in 5-second intervals. The newest data shows up on the right and scrolls to the left over time. You can toggle between the charts by clicking on the navigation circles at the bottom of the panel. If enabled, click on the cloud icon to view historical data within the Manage application.

The IP Throughput graph plots three lines representing transmit, receive, and aggregate (summed) throughputs at the datagram (or packet) layer excluding any protocol or encapsulation overhead. The results here may differ from those measured using speed test tools, due to protocol overhead and encapsulation. Note that internal Bandwidth test results are excluded.



The Packet Error Rate (PER) is the number of packets with errors divided by the total number of packets sent within a 5-second period. Ideally, this value should be below 2%, while higher values indicate the presence of interference. Tx PER is an indication that the local radio did not receive an ACK from the remote radio, so is forced to retransmit the same information again. Rx PER is a value sent from the remote radio to the local radio in management frames.



Note: PER will be higher upon initial association, and will usually settle within 30-60 seconds. This is because association requires that the radios “listen” more carefully for their link partner until they are linked, and this listening period is subject to more interference until Automatic Gain Control (AGC) and Rate Adaptation (RA) adjust parameters to accommodate the conditions. PER values are exchanged between radios asynchronously, so the values may not match exactly when referencing both radios at the same time.

Reading Device Details

The Device Details panel shows two summary tables for the local and remote device configurations and their status. Click on the navigation circles at the bottom of the panel to toggle between the two tables.

The table shows the following for both Local and Remote devices:

B5/B5c

- Device Name - The friendly name given to each device. (Set in *Preferences* > *General* > *Naming*)
- Serial Number - The unique identifier for the device assigned at the factory.
- IP Address - The IP address of each device and how it was assigned. (Set in *Preferences* > *Management*)
- Wireless Protocol - The MAC level protocol. (Set in Wireless > *Link* > *MAC Configuration*)
- TDMA Traffic Balance - Identifies the "gender" of the radio, the duration for each TDMA time slot, and ratio of bandwidth allocated for transmission. (Set in Wireless > *Link* > *MAC Configuration*)
- Ethernet Speed - Data rate and duplex mode of the wired Ethernet interface.
- Firmware - The latest firmware version applied to each device. (Set in *Preferences* > *Update & Reboot*)
- Internal Temp - Temperature inside the device case (operating range: -40 °C to +60 °C).
- 2.4 GHz MAC - The unique identifier for the 2.4 GHz radio.
- 5 GHz MAC - The unique identifier for the 5 GHz radio.
- Ethernet MAC - The unique identifier for the physical Ethernet interface.
- Last Reboot - The date and time at which each device last rebooted.

B5-Lite/C5c PTP

- Device Name - The friendly name given to each device. (Set in *Preferences* > *General* > *Naming*)
- Serial Number - The unique identifier for the device assigned at the factory.
- IP Address - The IP address of each device and how it was assigned. (Set in *Preferences* > *Management*)
- Wireless Protocol - The MAC level protocol. (Set in Wireless > *Link* > *MAC Configuration*)
- TDMA Traffic Balance - Identifies the "gender" of the radio, the duration for each TDMA time slot, and ratio of bandwidth allocated for transmission. (Set in Wireless > *Link* > *MAC Configuration*)
- Ethernet Speed - Data rate and duplex mode of the wired Ethernet interface.
- Firmware - The latest firmware version applied to each device. (Set in *Preferences* > *Update & Reboot*)
- CPU Temp - Temperature on the device CPU (operating range: -40 °C to +110 °C).
- 5 GHz MAC - The unique identifier for the 5 GHz radio.
- Ethernet MAC - The unique identifier for the physical Ethernet interface.
- Last Reboot - The date and time at which each device last rebooted.

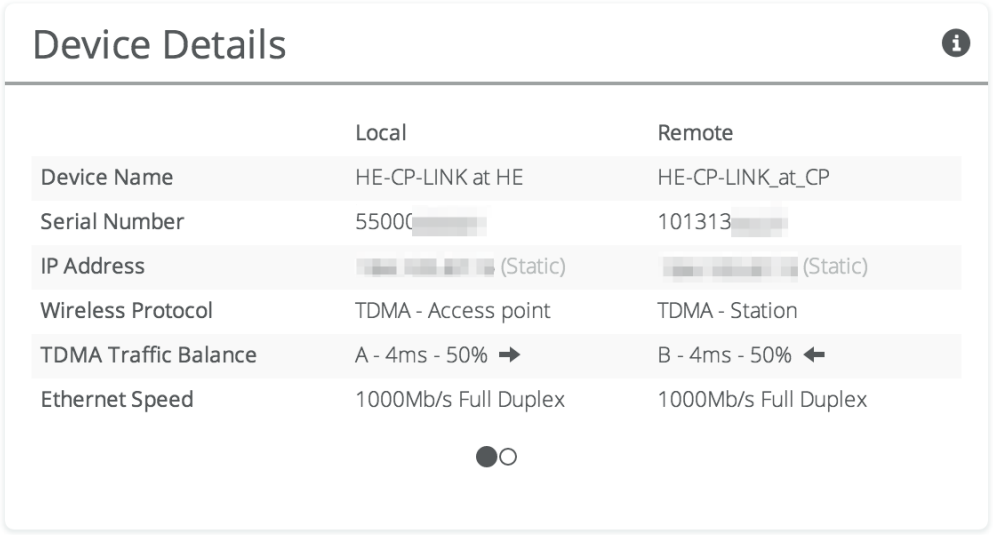
B11

- Device Name - The friendly name given to each device. (Set in *Preferences* > *General* > *Naming*)
- Serial Number - The unique identifier for the device assigned at the factory.
- IP Address - The IP address of each device and how it was assigned. (Set in *Preferences* > *Management*)
- Wireless Protocol - The MAC level protocol. (Set in Wireless > *Link* > *MAC Configuration*)
- TDMA Traffic Balance - Identifies the "gender" of the radio, the duration for each TDMA time slot, and ratio of bandwidth allocated for transmission. (Set in Wireless > *Link* > *MAC Configuration*)
- Ethernet Speed - Shows data rate and duplex mode if the link is up else "Link Down". Shows "Off" if the interface is not enabled.

- SFP Speed - Shows data rate and duplex mode if the link is up else "Link Down". Shows "Off" if the interface is not enabled.
- Network Interface - Shows the interface enabled; "Ethernet" or "SFP".
- Firmware - The latest firmware version applied to each device (Set in *Preferences* > *Update & Reboot*).
- Internal Temp - Temperature inside the device casing (operating range: -40 °C to +60 °C).
- 11 GHz MAC - The unique identifier for the 10/11 GHz radio.
- 2.4 GHz MAC - The unique identifier for the 2.4 GHz radio.
- Ethernet MAC - The unique identifier for the physical Ethernet interface.
- SFP MAC - The unique identifier for the physical SFP interface.
- Last Reboot - The date and time at which each device last rebooted.

B24

- Device Name - The friendly name given to each device. (Set in *Preferences* > *General* > *Naming*)
- Serial Number - The unique identifier for the device assigned at the factory.
- IP Address - The IP address of each device and how it was assigned. (Set in *Preferences* > *Management*)
- Wireless Protocol - The MAC level protocol. (Set in Wireless > *Link* > *MAC Configuration*)
- TDMA Traffic Balance - Identifies the "gender" of the radio, the duration for each TDMA time slot, and ratio of bandwidth allocated for transmission. (Set in Wireless > *Link* > *MAC Configuration*)
- Ethernet (RJ45) Status - Shows data rate and duplex mode if the link is up else "Link Down". Shows "Off" if the interface is not enabled.
- Fiber (SFP) Status - Shows data rate and duplex mode if the link is up else "Link Down". Shows "Off" if the interface is not enabled.
- Network Interface - Shows the interface enabled; "Ethernet (RJ45)", "Fiber (SFP)" or "Failover Ethernet (RJ45)".
- Firmware - The latest firmware version applied to each device (Set in *Preferences* > *Update & Reboot*).
- Internal Temp - Temperature inside the device casing (operating range: -40 °C to +90 °C).
- 2.4 GHz MAC - The unique identifier for the 2.4 GHz radio.
- 24 GHz MAC - The unique identifier for the 24 GHz radio.
- Ethernet MAC - The unique identifier for the physical Ethernet (RJ45) interface.
- SFP MAC - The unique identifier for the physical Fiber (SFP) interface.
- Last Reboot - The date and time at which each device last rebooted.



Device Details

	Local	Remote
Firmware	0.4.0-45	0.4.0-45
Internal Temp	42.1°C / 107.8°F	27°C / 80.6°F
2.4 GHz MAC	20:B5:C6:00:07:51	20:B5:C6:00:04:DE
5 GHz MAC	20:B5:C6:00:07:50	20:B5:C6:00:04:DD
Ethernet MAC	20:B5:C6:00:07:4F	20:B5:C6:00:04:DC
Last Reboot	2014-12-08 17:36:48 (UTC +0000)	2014-12-08 17:35:31 (UTC +0000)

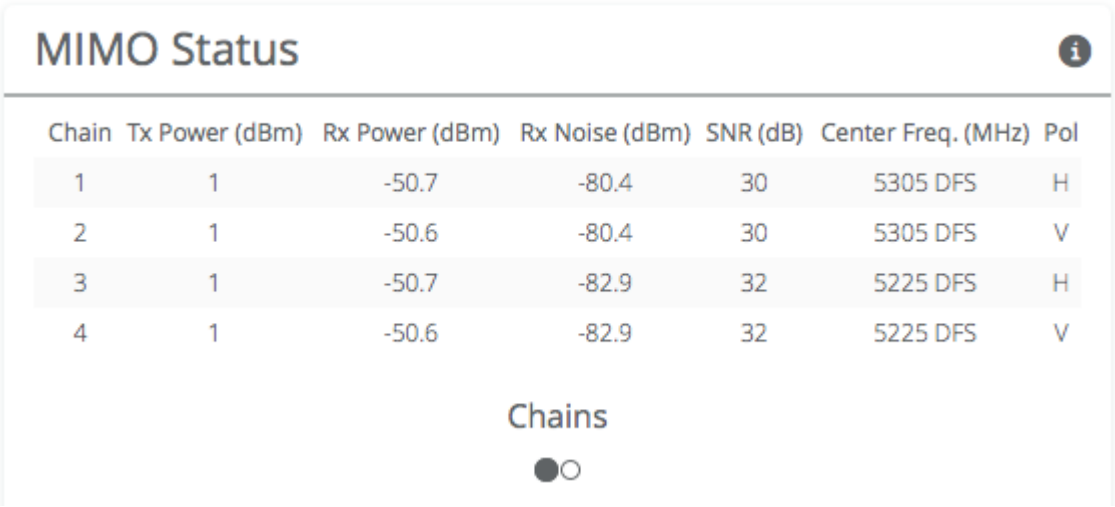
Reading MIMO Status Tables

The MIMO Status panel contains two tables: Chains and Streams. Chains represent the physical medium (RF Tx/Rx values), while Streams represent data. Chains and Streams are not necessarily correlated one to one because the Rate Adaptation algorithm may periodically increase or decrease the number of data streams sent over the physical medium when reacting to interference.

The Chains table describes each chain's power, noise, SNR, frequency and polarization.
The Streams table describes each stream's MCS index, PHY rates and Rx Error Vector Magnitude (EVM).
Each table can be selected by clicking on the navigation circles at the bottom of the panel.

Chains

The Chains table contains 6 values: Tx Power, Rx Power, Rx Noise, SNR, Center Frequency and Polarization. Each channel is assigned two chains (horizontal and vertical). If two channels are selected, Channel 1 uses Chains 1 & 2, while Channel 2 uses Chains 3 & 4.



Tx Power is the amount of power applied to each of the MIMO chains.

> Tx Power can be shared evenly (preferred), or unevenly (if necessary), between channels. The Tx power per channel is divided evenly per chain. Example: 4 dBm Tx power on Channel 1 results in 1 dBm each on Chains 1 & 2.

Rx Power is the incoming signal level from the remote radio. Larger values are better (e.g. -50 dBm is better than -60 dBm).

Rx Noise is a combination of the thermal noise floor plus interference detected by the local radio. Smaller values are better (e.g. -90 dBm is better than -80 dBm). Noise sources can be either in close proximity to the local radio, or they can be remote transmitters pointed back at the local radio.

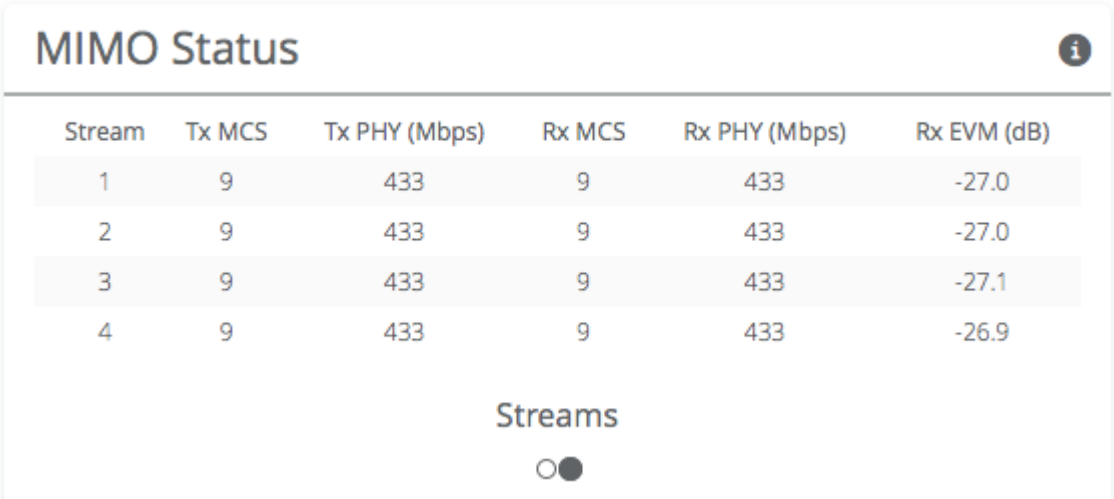
The signal-to-noise ratio (SNR) is the difference between the Rx Power and Rx Noise, and is a measure of how well the local receiver can detect signals from the remote transmitter and clearly discern them from noise. Higher values are better (e.g. 30 dB is better than 10 dB).

If two channels are selected, you may observe that SNR is much lower on one channel than the other. This could be because the Tx Power is set lower on the remote transmitter, or because of higher interference levels on the channel. To resolve this, increase Tx Power or change the channel that has lower SNR.

Chains 1 & 3 have horizontal polarization, and Chains 2 & 4 have vertical polarization. Chains with the same polarization are combined internal to the radio before exiting to the antenna connectors.

Streams

The Streams table contains the Tx MCS index, Tx PHY rate, Rx MCS index, Rx PHY rate, and the Rx EVM for each stream.



The Tx MCS is an indicator of how well the remote radio can receive data from the local transmitter. The Rx MCS indicates how well the local radio is receiving data from the remote transmitter.

> The Modulation Coding Scheme (MCS) represents how much data can be sent at a time, so directly affects potential throughput represented by the PHY rate. The higher the MCS index (ranging from 0-9), the more data that can be sent per transmission. A disadvantages of higher MCS indices is that they require higher SNR since they are more vulnerable to noise.

The Error Vector Magnitude (EVM) indicates the difference between the actual and expected amplitude and phase of an incoming signal. Smaller values are better (e.g. -30 dB is better than -10 dB).

Rate Adaptation dynamically adjusts both the MCS and the number of streams depending on RF conditions. Poor RF conditions (i.e. interference) causes PER to increase. PER and MCS are inversely correlated meaning that as PER

increases, MCS decreases and vice versa.

Single channel mode usually uses 2 streams, but may drop to one stream if RF conditions are poor. Dual channel mode uses up to 4 streams. You may also see the number of streams change periodically because of tests that Rate Adaptation performs to optimize performance. This is expected and normal.

Related:

Backhaul FAQ: What SNR is required for each MCS?
Backhaul FAQ: What is the sensitivity for each MCS index?
Backhaul FAQ: What's a good EVM?

Reading the Spectrum Analyzer

The Spectrum Analyzer actively scans the spectrum in the background to report on interference sources that may impact link performance.

Click the Local, Remote, or Combined buttons to each radio's spectrum individually or simultaneously. Note that the remote side data may be as much as 5 minutes behind the local radio. Click on the half circle icon in the upper right to toggle the graph's background color between black and white.

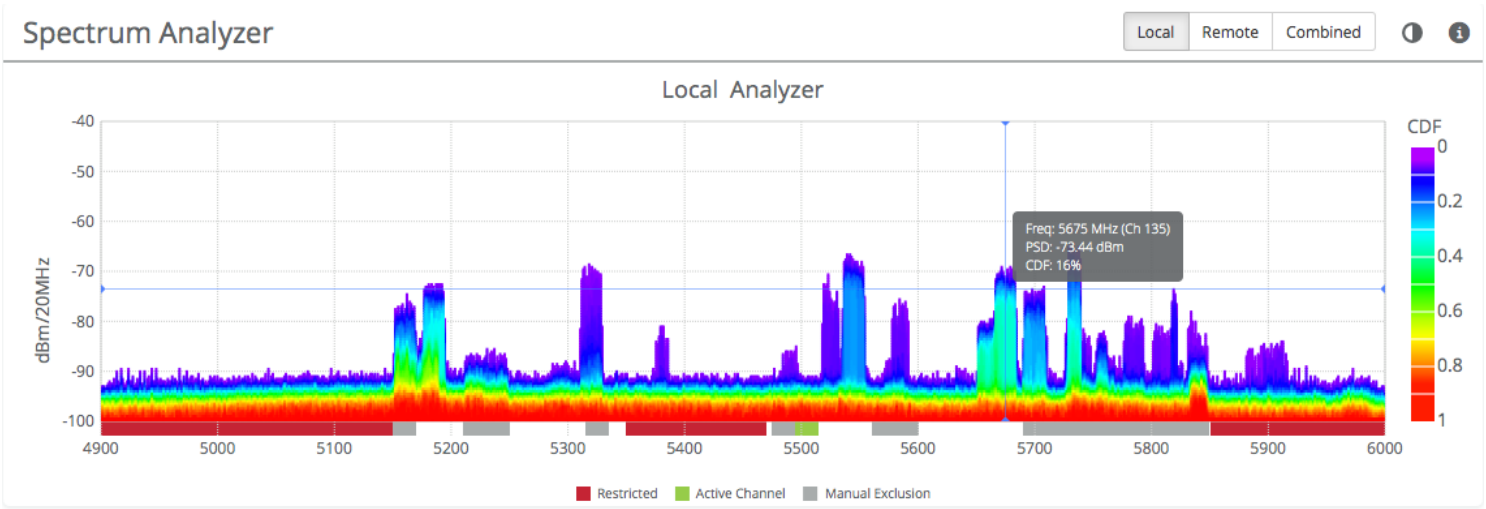
Channels in use have higher Power Spectral Density (PSD) on the vertical axis, and are shaded in different colors to represent how often the signals are likely to be on the same frequency at the same amplitude.

The legend to the right of the graph explains the color code for the Cumulative Distribution Function (CDF). The color red suggests the highest probability (1 = 100%), while purple represents the lowest probability (0 = 0%).

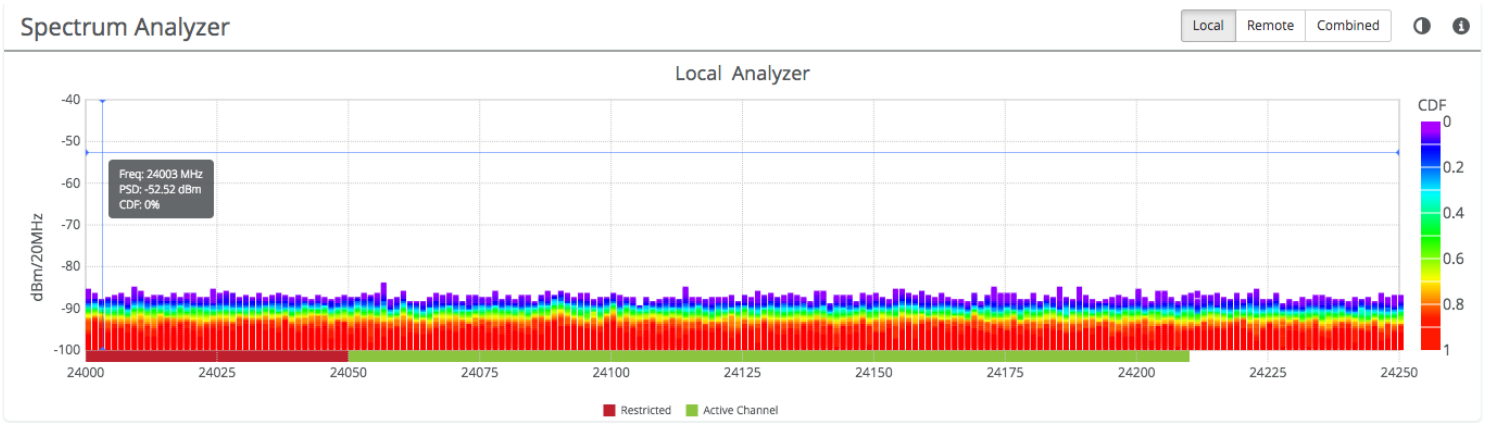
Cross hairs appear on the graph beneath the mouse pointer along with an information box containing the frequency (channel), PSD, and CDF values.

There are three types of markings, or bars, immediately beneath the graph’s horizontal axis that indicate frequency ranges that are restricted, manually excluded, or in active use by this link. Note that traffic from the Active Channel is excluded from the display so that noise can be detected.

> Note: Buttons on the upper right of the graph show the spectrum for the local radio, the remote radio or a combined view.



B24 Spectrum Analyzer

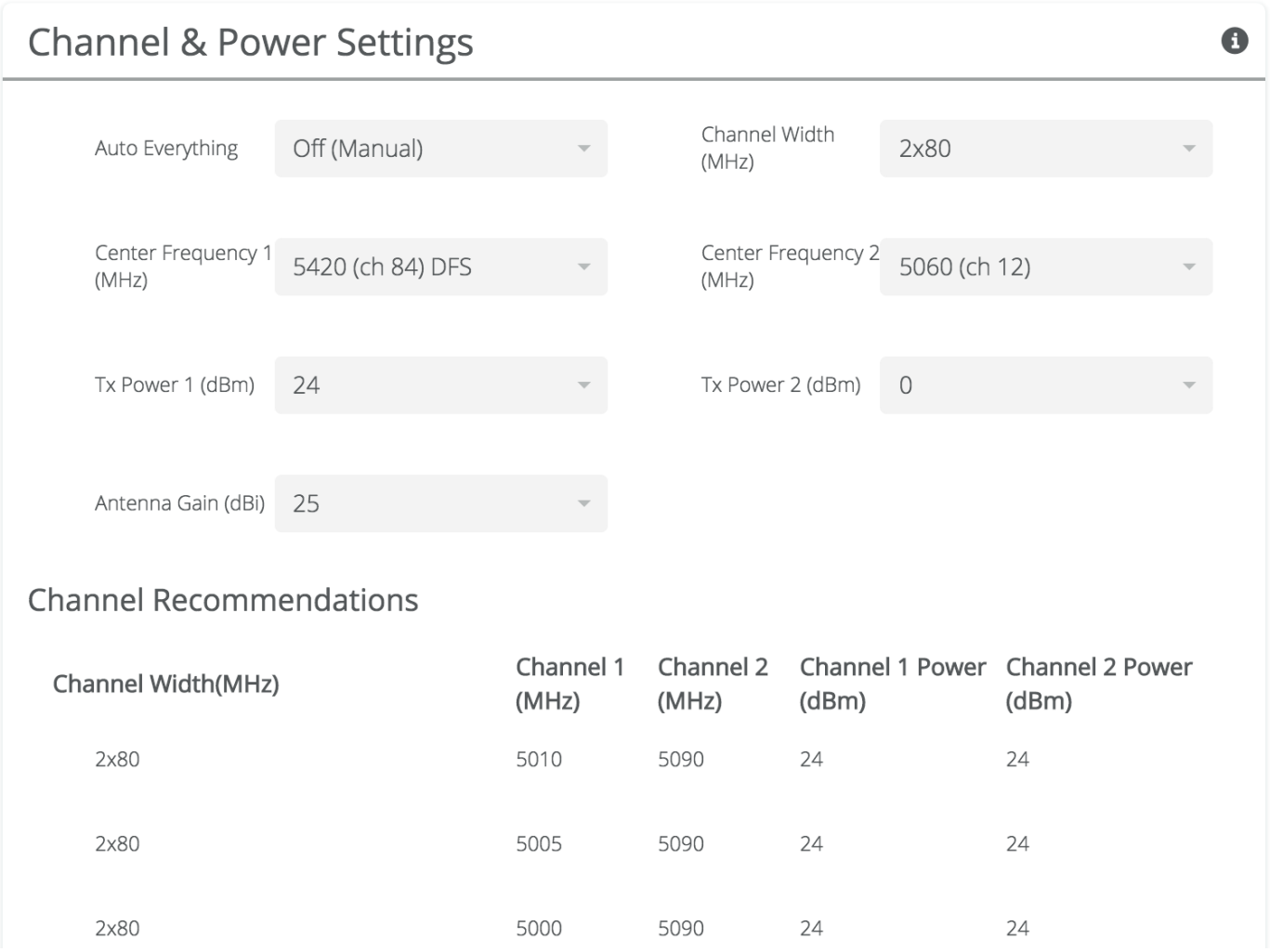

Spectrum Analyzer
Local
Remote
Combined
Local Analyzer
CDF
0
0.2
0.4
0.6
0.8
1
-40
-50
-60
-70
-80
-90
-100
dBm/20MHz
Freq: 24003 MHz
PSD: -52.52 dBm
CDF: 0%
24000
24025
24050
24075
24100
24125
24150
24175
24200
24225
24250
Restricted
Active Channel

Managing Channel & Power Settings

The Channel and Power Settings panel allows for either automatic or manual changes to frequency, channel width, and power for either one or two channels.

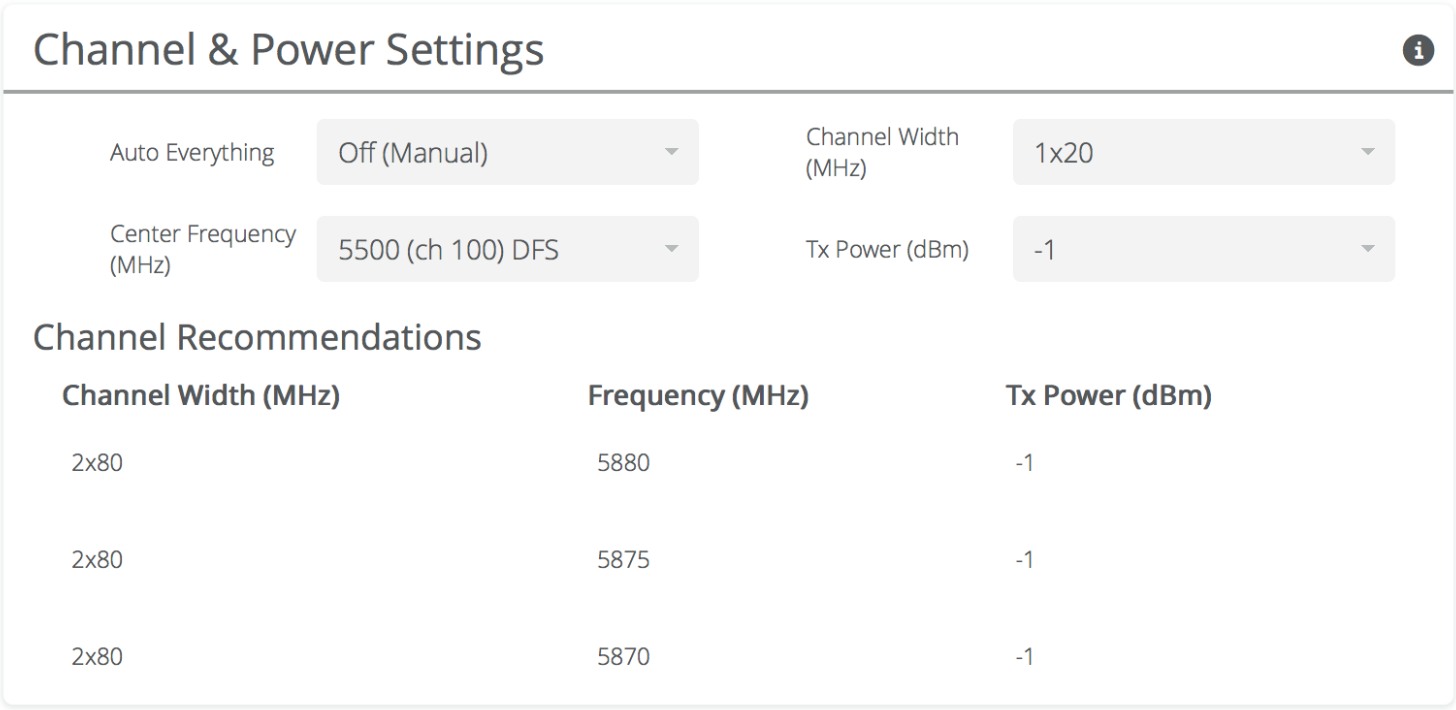
B5/B5c

- Auto Everything - Automatically configure channel, channel width and power to optimize performance based on spectrum data.
- Channel Width (MHz) - In Manual Mode, choose the number of link channels (single or dual) and the channel width for each (Example: 2x80 MHz represents two channels with 80 MHz each, totaling 160 MHz).
- Maximum Channel Width (MHz) - Select the maximum channel width Auto Everything is allowed to use. The decision for single or dual channel modes will be made automatically. For example, selecting 40 MHz as the maximum channel width may result in 1x40 or 2x20 mode. Smaller channel widths may also be selected based on RF conditions. Auto Everything is designed to maintain the highest link bandwidth while maintaining link stability.
- Center Frequency (1 & 2) - In Off (Manual) mode, select the center frequency of the channel used on the link. In all modes, the center frequency represents the absolute center of the selected channel width without any offset, and the center can be moved in 5 MHz increments. If Auto Everything is set to On, the Channel(s) will be automatically set, and not editable.
- Tx Power (1 & 2) - Set the desired transmit power level. The allowed options are determined by a combination of country and chosen frequency. If Channel Width is set to 1xN MHz, Channel 2 will not be used. If Auto Everything is set to On, Tx Power will be automatically set, and not editable. In "FD" mode, Power 1 and Power 2 represent transmit power on the local and remote sides, respectively.
- Local and Remote Antenna Gain (dBi) - For connectorized radios, set the gain according to antenna specifications and subtract out any cable/connector loss. These values will not be shown on radios with integrated antennas.
- Channel Recommendations - List of channel widths, center frequencies, and Tx powers that Auto Everything would choose in order of preference (if enabled).



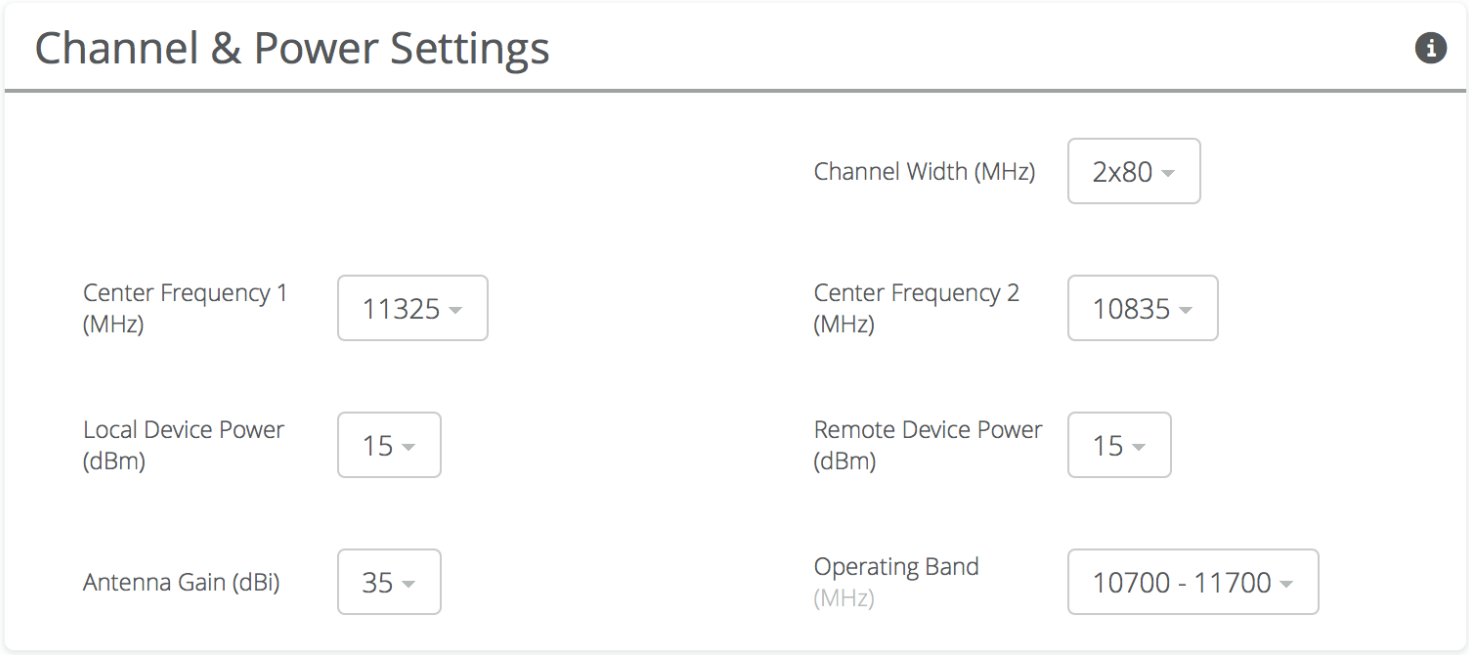
B5-Lite/C5c PTP

- Auto Everything - Automatically configure channel, channel width and power to optimize performance based on spectrum data.
- Channel Width (MHz) - In Manual Mode, choose the channel width (20, 40, or 80 MHz).
- Maximum Channel Width (MHz) - Select the maximum channel width Auto Everything is allowed to use. Smaller channel widths may also be selected based on RF conditions. Auto Everything is designed to maintain the highest link bandwidth while maintaining link stability.
- Center Frequency - In Off (Manual) mode, select the center frequency of the channel used on the link. In all modes, the center frequency represents the absolute center of the selected channel width without any offset, and the center can be moved in 5 MHz increments. If Auto Everything is set to On, the Channel will be automatically set, and not editable.
- Tx Power - Set the desired transmit power level. The allowed options are determined by a combination of country and chosen frequency. If Auto Everything is set to On, the Channel & Tx Power will be automatically set, and not editable.
- Channel Recommendations - List of channels, center frequencies, and Tx powers that Auto Everything would choose in order of preference (if enabled).



B11

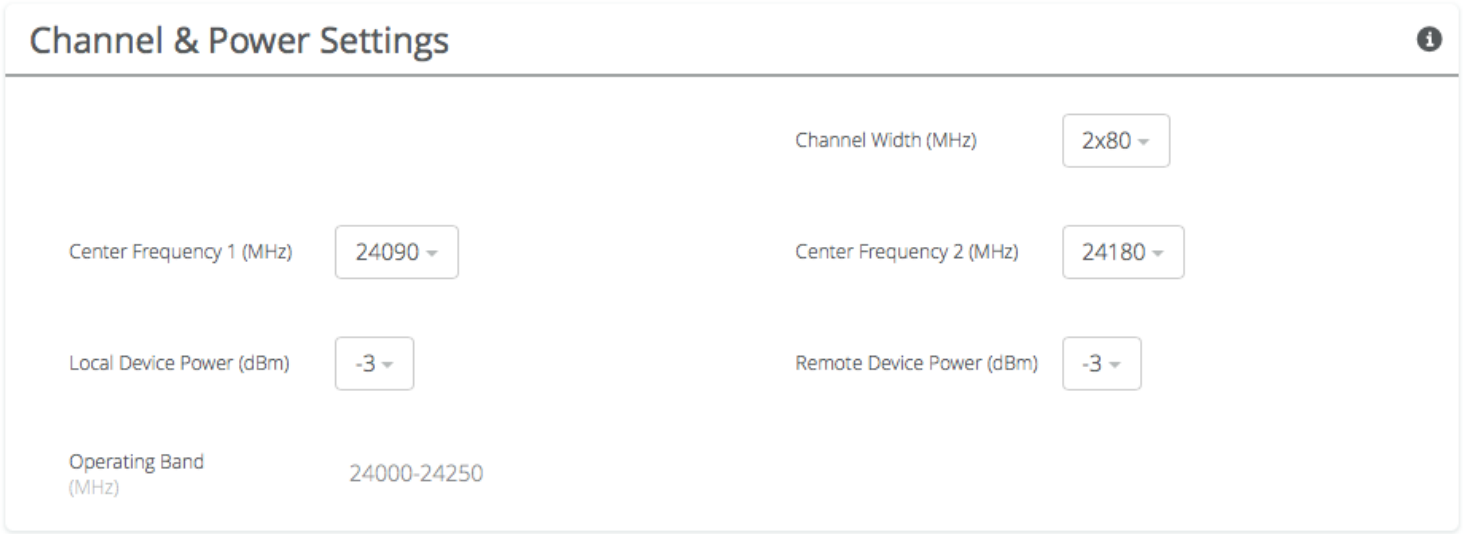
- Channel Width (MHz) - In Manual Mode, choose the channel width (20, 40, or 80 MHz).
- Center Frequency (1 & 2) - Select the center frequency of the channel used on the link. In all modes, the center frequency represents the absolute center of the selected channel width without any offset, and the center can be moved in 5 MHz increments.
- Local and Remote Device Power - Set the desired transmit power levels on the AP.
- Antenna Gain (dBi) - Set the gain according to antenna specifications and subtract out any cable/connector loss.
- Operating Band (MHz) - Select the frequency range in which the radio will operate: 10000-10700 or 10700-11700.



Note: Tx power selections may be limited based on your regulatory domain (refer to the Maximum Power chart for more details).

B24

- Channel Width (MHz) - In Manual Mode, choose the channel width (20, 40, or 80 MHz).
- Center Frequency (1 & 2) - Select the center frequency of the channel used on the link. In all modes, the center frequency represents the absolute center of the selected channel width without any offset, and the center can be moved in 5 MHz increments.
- Local and Remote Device Power - Set the desired transmit power levels on the AP.
- Operating Band (MHz) - Select the frequency range in which the radio will operate: 24000-24250.



Note: Tx power selections may be limited based on your regulatory domain (refer to the Maximum Power chart for more details).

Related

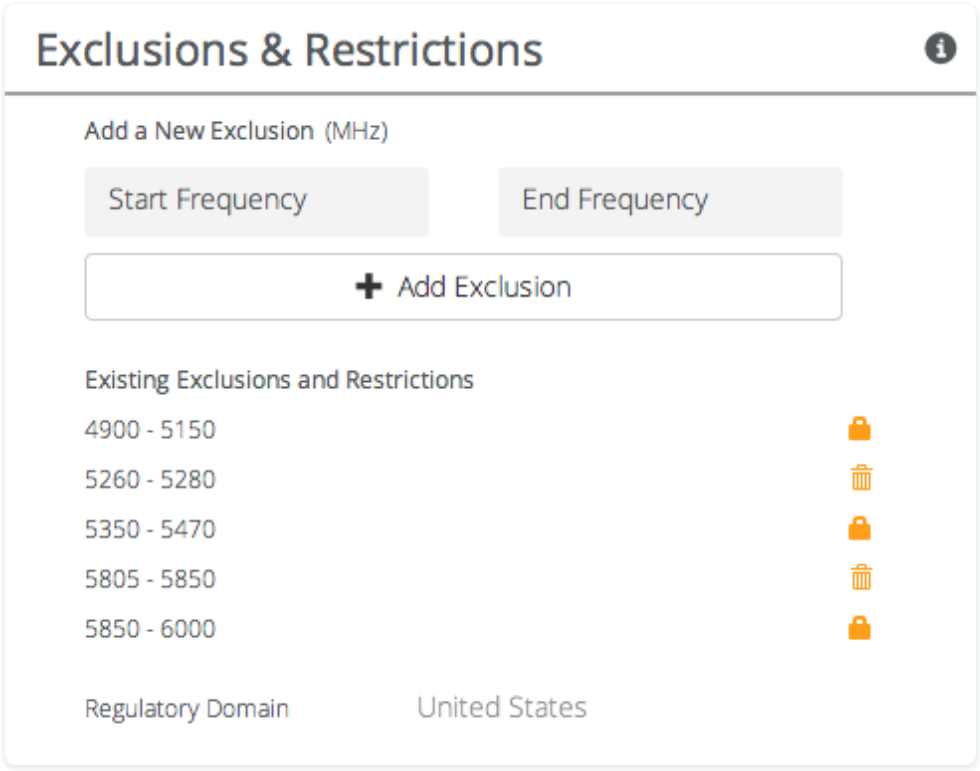
Using TDMA-FD Mode - Application note describing how to apply FD mode in challenging spectrum.

Managing Exclusions & Restrictions

Exclusions list the frequency ranges in which the device should not operate. The Auto Everything feature will avoid these frequency bands. The excluded bands will be shown as shaded regions on the Spectrum Analyzer.

- Start - Specify the lower limit for the exclusion range, not including this frequency.
- End - Specify the upper limit for the exclusion range, not including this frequency.
- Add Exclusions - The button to add the Start and End frequency range to the exclusion list.
- Existing Exclusions and Restrictions - Exclusions can be removed from the list by clicking on the trash icon. The restricted bands with the lock icon cannot be removed. They are protected because of regulatory requirements.
- Regulatory Domain - The country in which the device has been configured to run.

In the United States, if either the AP or STA are within a 60 km radius of a Terminal Doppler Weather Radar (TDWR) location, one or more 30 MHz restrictions are automatically created to avoid the TDWR operating frequencies.



The B24 does not support user added exclusions.

TDMA Configuration Settings

The TDMA Configuration panel contains controls for configuring and fine tuning TDMA performance. One side of the radio link must be set as an Access point, and the other set as a Station. The Station inherits the other settings from the AP, so the other fields are grayed out and not accessible when Station is selected.

B5/B5c

- Wireless Mode - Choose whether the device will act as an Access Point or a Station.
- Gender - Traffic Split - The radio can be configured to allocate bandwidth symmetrically (50/50) or biased towards downstream (75/25) in environments where traffic direction is expected to be heavier in one direction than the other. With an asymmetrical split, the local radio is represented first in the slash notation, (local/remote). For example, in the (75/25) split, the local radio gets 75, while the remote radio gets 25. If "Auto" is selected the radio will automatically determine, based upon traffic flow, which ratio will be used. The radio will continue to evaluate the flow and adjust accordingly.
- TDMA Window - Determines the length of the transmit time slot in milliseconds. If "Auto" is selected as the Gender-Traffic Split, this value is set dynamically.

Note: To enable spectrum reuse, both Gender-Traffic Split and TDMA Window must each be set to the same value for all collocated radios. Further, "Auto" must not be selected as the TDMA Window when radios are collocated.

B5-Lite

- Wireless Mode - Choose whether the device will act as an Access Point or a Station.
- Gender - Traffic Split - The radio can be configured to allocate bandwidth symmetrically (50/50) or biased towards downstream (75/25) in environments where traffic direction is expected to be heavier in one direction than the other. With an asymmetrical split, the local radio is represented first in the slash notation, (local/remote). For example, in the (75/25) split, the local radio gets 75, while the remote radio gets 25. If "Auto" is selected the radio will automatically determine, based upon traffic flow, which ratio will be used. The radio will continue to evaluate the flow and adjust accordingly.
- TDMA Window - Determines the length of the transmit time slot in milliseconds. If "Auto" is selected as the Gender-Traffic Split, this value is set dynamically.

B11

- Wireless Mode - Choose whether the device will act as an Access Point or a Station.
- Gender - Traffic Split - The radio can be configured to allocate bandwidth symmetrically (50/50) or biased towards downstream (75/25) in environments where traffic direction is expected to be heavier in one direction than the other. With an asymmetrical split, the local radio is represented first in the slash notation, (local/remote). For example, in the (75/25) split, the local radio gets 75, while the remote radio gets 25. If "Auto" is selected the radio will automatically determine, based upon traffic flow, which ratio will be used. The radio will continue to evaluate the flow and adjust accordingly.
- TDMA Window - Determines the length of the transmit time slot in milliseconds. If "Auto" is selected as the Gender-Traffic Split, this value is set dynamically.

B24

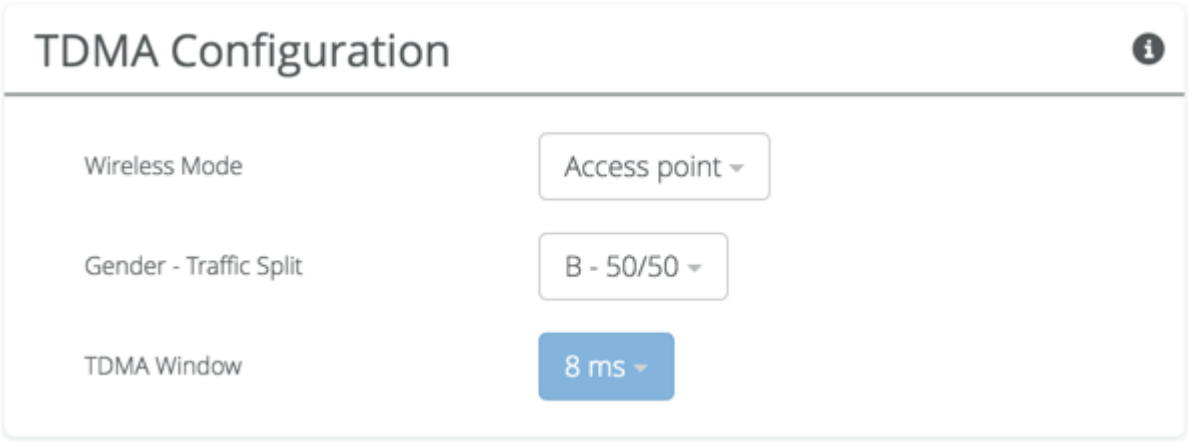
- Wireless Mode - Choose whether the device will act as an Access Point or a Station.
- Gender - Traffic Split - The radio can be configured to allocate bandwidth symmetrically (50/50) or biased

towards downstream (75/25) in environments where traffic direction is expected to be heavier in one direction than the other. With an asymmetrical split, the local radio is represented first in the slash notation, (local/remote). For example, in the (75/25) split, the local radio gets 75, while the remote radio gets 25. If "Auto" is selected the radio will automatically determine, based upon traffic flow, which ratio will be used. The radio will continue to evaluate the flow and adjust accordingly.

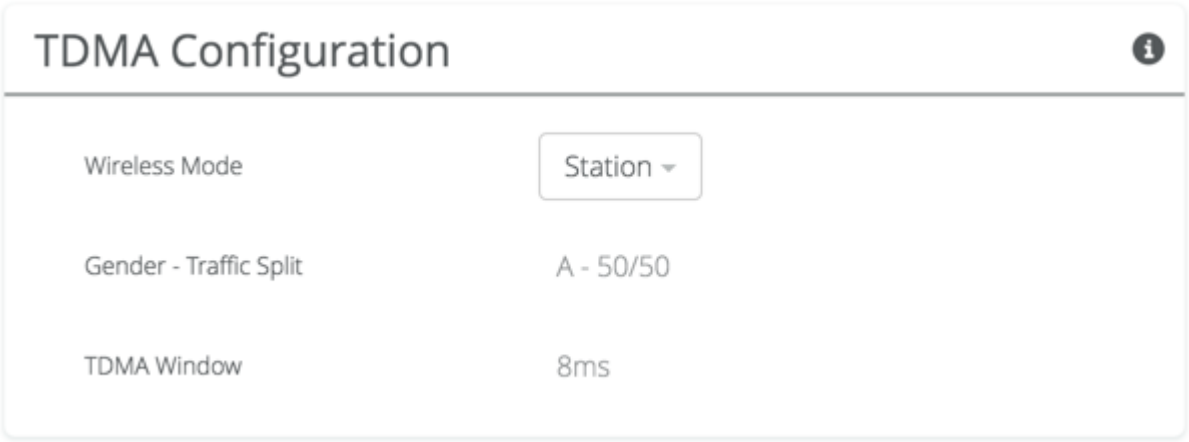
- TDMA Window - Determines the length of the transmit time slot in milliseconds. If "Auto" is selected as the Gender-Traffic Split, this value is set dynamically.

Note: To enable spectrum reuse, both Gender-Traffic Split and TDMA Window must each be set to the same value for all collocated radios. Further, "Auto" must not be selected as the TDMA Window when radios are collocated and sharing the same frequencies.

Example Access Point Settings



Example Station Settings



Rate Adaptation

- Rate Adaptation Mode - Choose PER (default) or EVM. The PER mode adjusts modulation based on the Tx Packet Error Rate calculated on the local radio. The EVM mode adjusts modulation based on the Error Vector Magnitude reported by the remote radio.
- PHY Rate - Choose Conservative (default) or Aggressive. The Conservative mode results in the lowest PER, but can also prevent higher modulation. The Aggressive mode optimizes modulation, but can also result in higher PER.

The table below describes the PER limit above which Rate Adaptation will reduce modulation to maintain a stable link.

Rate Adaptation Mode	PHY Rate	B5, B5c, B5-Lite PER Allowed	B11 PER Allowed
EVM	Conservative	5	3
	Aggressive	10	5
PER	Conservative	3	3
	Aggressive	5	5

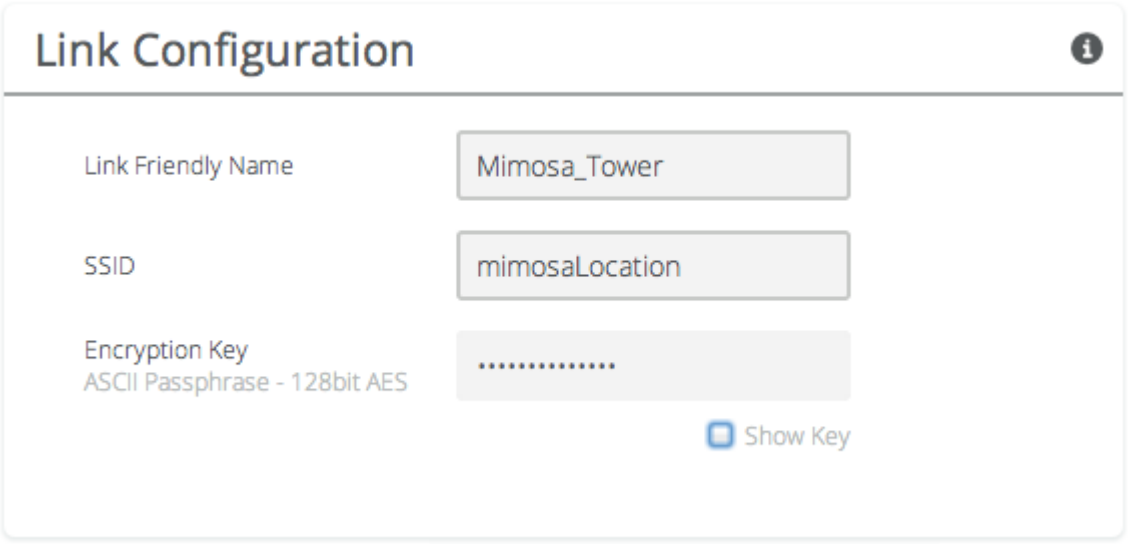
Link Configuration Settings

The Link Configuration panel includes controls to define the SSID and passphrase between radios:

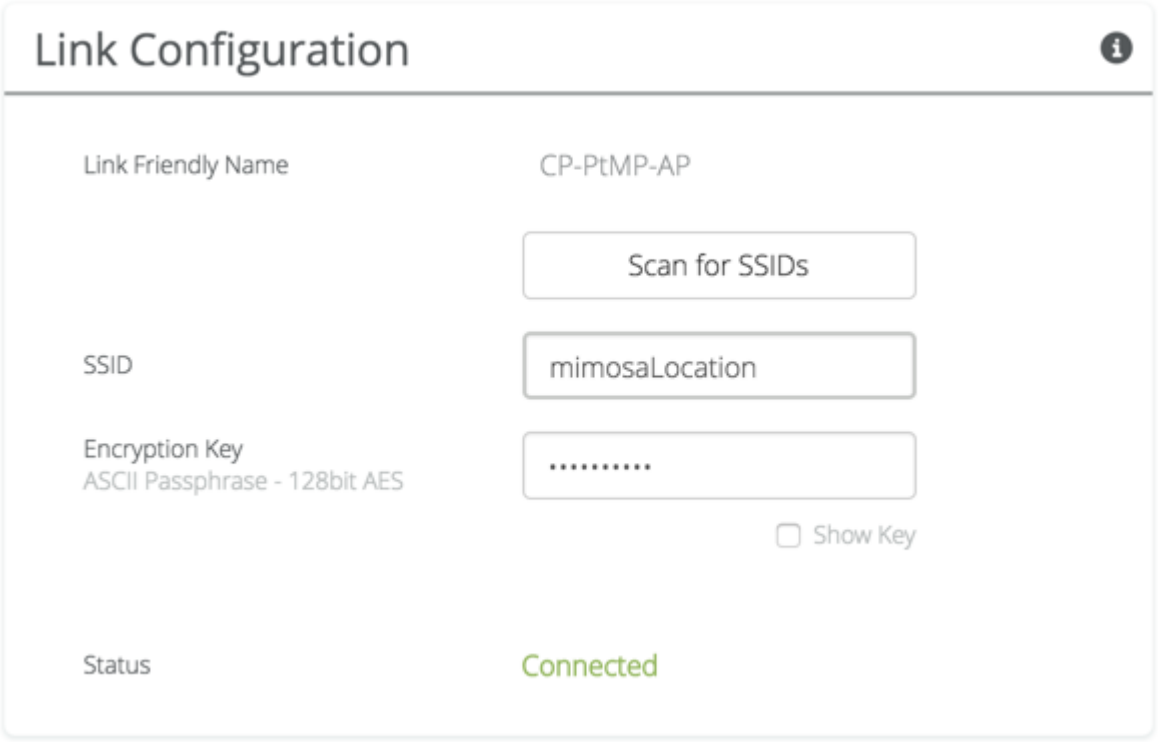
- Link Friendly Name - A friendly name to describe the link between the Access Point (AP) and Station. This name is used to differentiate amongst other links.
- SSID - The wireless link name used by both radios. Both AP and Station must use the same SSID to communicate with each other.
- Encryption Key - Enter the ASCII Passphrase to connect with the broadcasted SSID. Select "Show Key" to see passphrase in plain text. Enter any combination of printable characters. The passphrase should be between 8 to 63 characters in length. The Encryption Key must be the same on both the Access Point and Station for them to communicate with each other.
- Scan for SSIDs - On a radio configured as a Station, click this button to display a list of Access Point SSIDs.
- Status - Indicates whether the AP and Station are "Connected" (associated) or "Not Connected" (disassociated).

Please ensure that the SSID, Encryption Key, and firmware versions are the same. Additionally, ensure that the IP addresses are different, and on the same subnet.

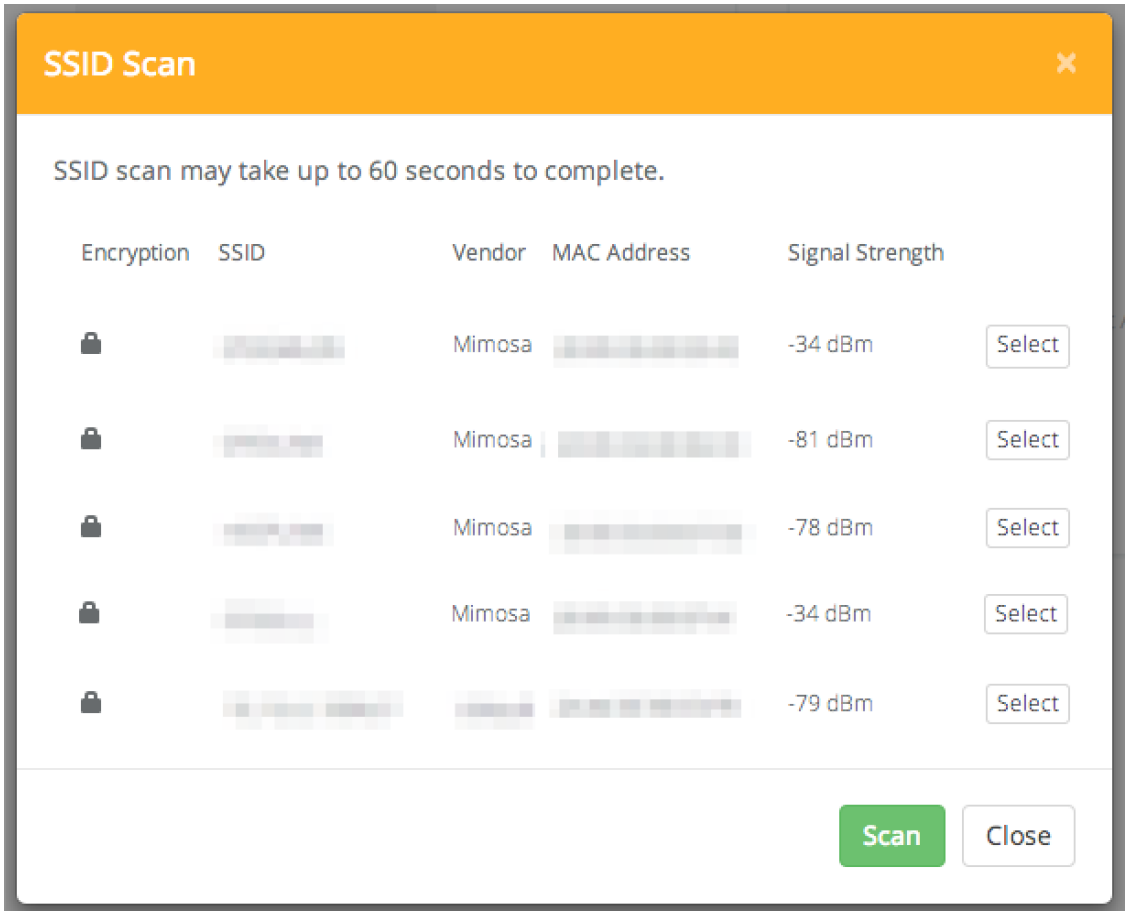
Example Access Point Link Configuration



Example Station Link Configuration



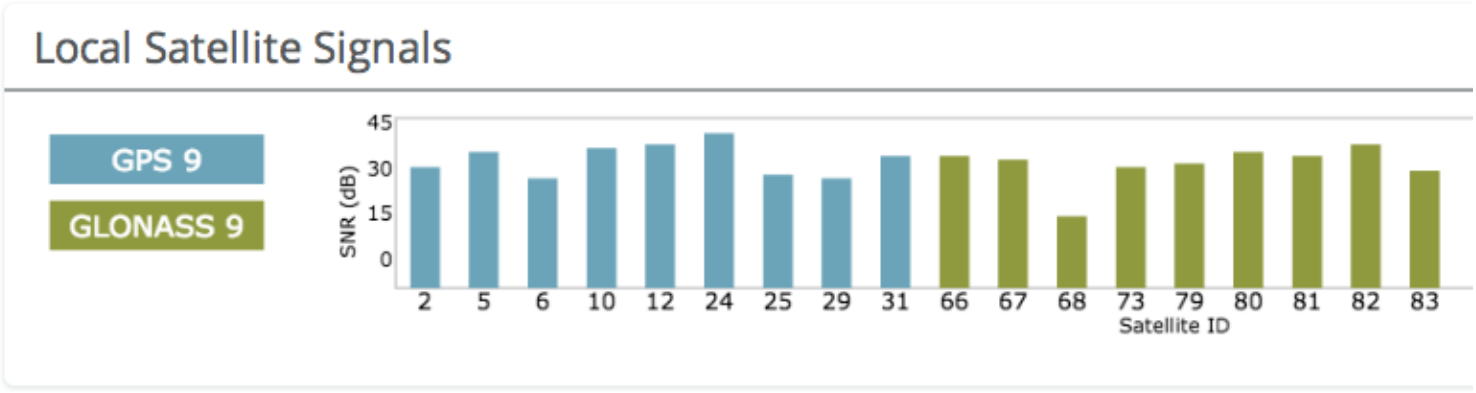
Example SSID Scan after pressing the "Scan for SSIDs" button. To connect to a particular SSID, click the "Select" button.


SSID Scan
SSID scan may take up to 60 seconds to complete.
Encryption
SSID
Vendor
MAC Address
Signal Strength
Mimosa
-34 dBm
Select
Mimosa
-81 dBm
Select
Mimosa
-78 dBm
Select
Mimosa
-34 dBm
Select
-79 dBm
Select
Scan
Close

Interpreting Local Satellite Signals

Product Applicability: B5/B5c, B11, B24

The Local Satellite Signals panel contains a chart showing both GPS and GLONASS satellites in blue and green, respectively, from which the radio can obtain position and timing data used for synchronization. Each numbered column represents a unique satellite with the columns' amplitude representing the signal to noise ratio of the satellite's signal at the radio's receiver. The number of satellites the radio detects and the SNR of each both contribute to clock accuracy.

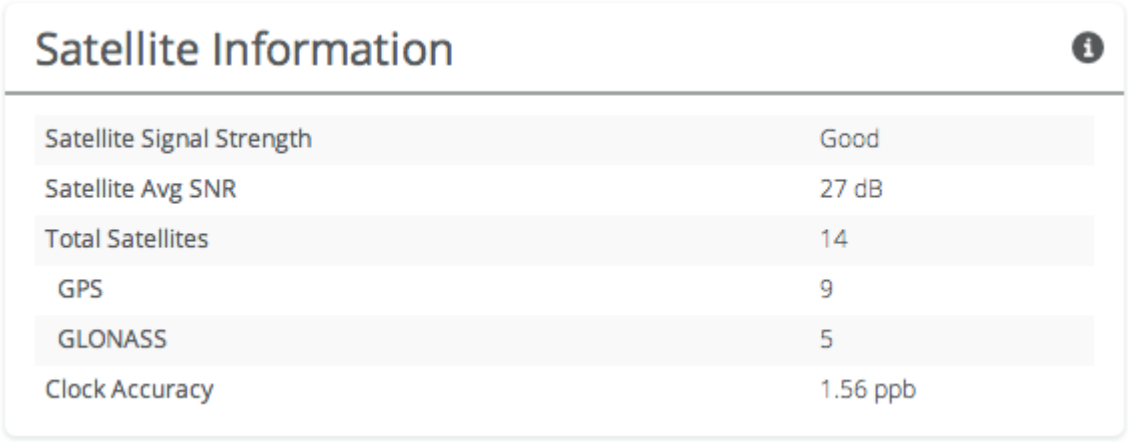


Reading Satellite Information

Product Applicability: B5/B5c, B11, B24

The Satellite Information panel contains values that represent and contribute to clock accuracy. Good GPS signal strength is required for maximum performance, as the GPS is used to synchronize timing between devices.

- Satellite Signal Strength - Qualitative assessment based on all items below; also displayed on the Dashboard.
- Satellite Avg SNR - Average signal to noise ratio amongst satellites.
- Total Satellites - Sum of detected GPS and GLONASS satellites.
  - GPS - Number of GPS satellites detected.
  - GLONASS - Number of GLONASS satellites detected.
- Clock Accuracy - Timing signal accuracy measured in parts per billion (ppb).



Viewing Location Data

Product Applicability: B5/B5c, B11

Status table showing location, altitude, and heading for both the local and remote devices, as well as the link distance between them.

Reading Site Survey Results

The Survey Results status table summarizes the results of a site survey, including the SSIDs broadcast by other devices, their configuration and capabilities. Note that the Site Survey function will only detect other Access Points. Stations are passive, so will not beacon or show up in Site Survey results.

The table provides the following data per device found:

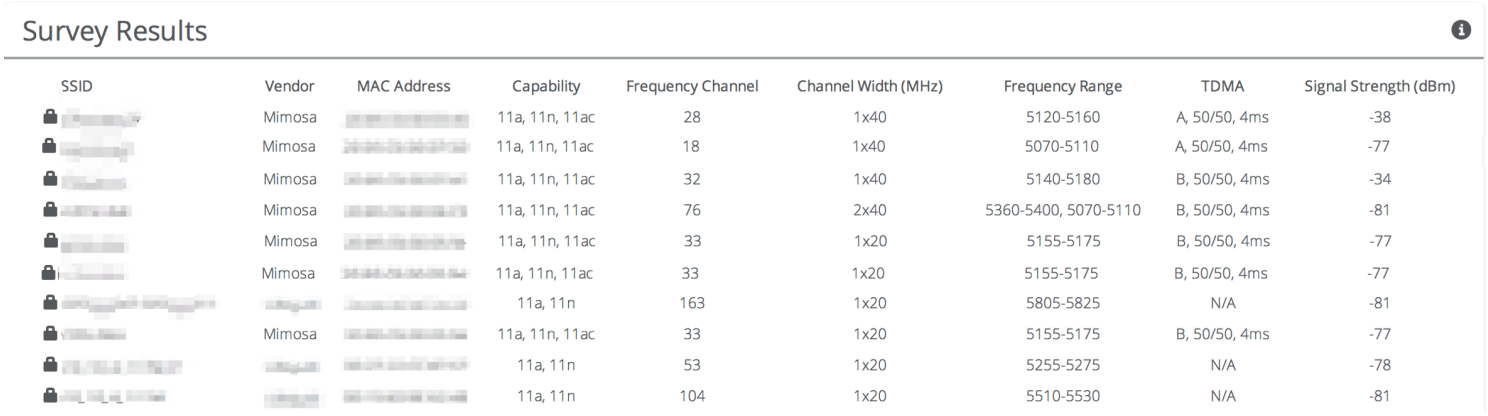
- SSID - The wireless link name advertised by each detected AP.
- Capability - Indicates which 802.11 (Wi-Fi technology standard) is support by the device. Options include A, G, N, AC.
- MAC Address - The device's unique identifier.
- Vendor - The name of the device manufacturer (if known).
- Wi-Fi Channel - Lists the channel on which the device operates.
- Channel Width - The size (in MHz) of the channel on which the device operates.
- Frequency Range - The specific frequency range (in MHz) within the Wi-Fi channel that the device operates.
- Signal Strength - The received power level (in dBm) from each detected AP.

Note: The Site Survey will temporarily interrupt your link. Once started, this process cannot be stopped until complete.

Use the Start Survey button to place the radio into the scan mode to search for 802.11-compatible access points.

The Last Updated field indicates (down to the second) when the last Site Survey was requested.

It is important to note that running a site survey will temporarily take down your link. Once activated, this process cannot be stopped until complete. Please plan accordingly.

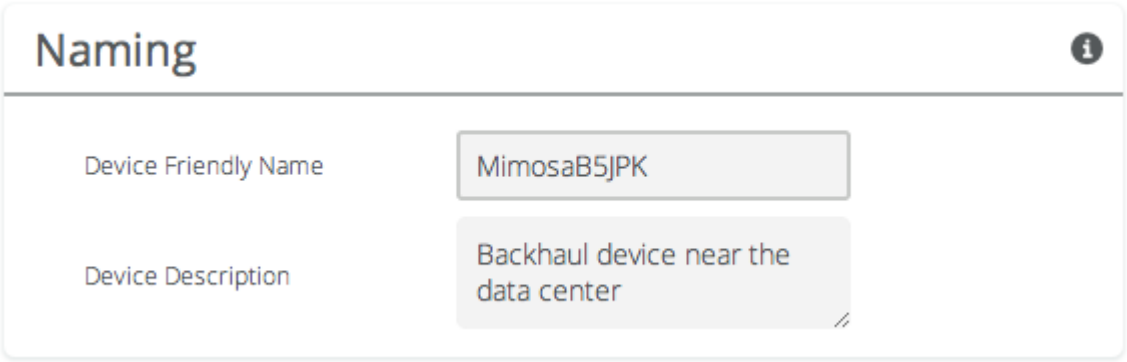

Survey Results

SSID	Vendor	MAC Address	Capability	Frequency Channel	Channel Width (MHz)	Frequency Range	TDMA	Signal Strength (dBm)
[redacted]	Mimosa	[redacted]	11a, 11n, 11ac	28	1x40	5120-5160	A, 50/50, 4ms	-38
[redacted]	Mimosa	[redacted]	11a, 11n, 11ac	18	1x40	5070-5110	A, 50/50, 4ms	-77
[redacted]	Mimosa	[redacted]	11a, 11n, 11ac	32	1x40	5140-5180	B, 50/50, 4ms	-34
[redacted]	Mimosa	[redacted]	11a, 11n, 11ac	76	2x40	5360-5400, 5070-5110	B, 50/50, 4ms	-81
[redacted]	Mimosa	[redacted]	11a, 11n, 11ac	33	1x20	5155-5175	B, 50/50, 4ms	-77
[redacted]	Mimosa	[redacted]	11a, 11n, 11ac	33	1x20	5155-5175	B, 50/50, 4ms	-77
[redacted]	[redacted]	[redacted]	11a, 11n	163	1x20	5805-5825	N/A	-81
[redacted]	Mimosa	[redacted]	11a, 11n, 11ac	33	1x20	5155-5175	B, 50/50, 4ms	-77
[redacted]	[redacted]	[redacted]	11a, 11n	53	1x20	5255-5275	N/A	-78
[redacted]	[redacted]	[redacted]	11a, 11n	104	1x20	5510-5530	N/A	-81

Setting a Device Name and Description

The device name and description are local identifiers for administrative purposes, and are not used as part of the wireless link.

- Device Friendly Name - Name for the local device displayed on the Dashboard.
- Device Description - A more detailed device description (up to 150 characters) for administrative purposes.



Reading the Date/Time & Setting the Install Date

The Time panel shows the current date and time in Coordinated Universal Time (UTC). The Install Date input box can be used for administrative purposes, but it is optional and has no other affect.

B5/B5c

- Current Date (UTC) - Current date as set by GPS.
- Current Time (UTC) - Current time as set by GPS.
- Install Date - Used to track the date that the device was installed.

B5-Lite

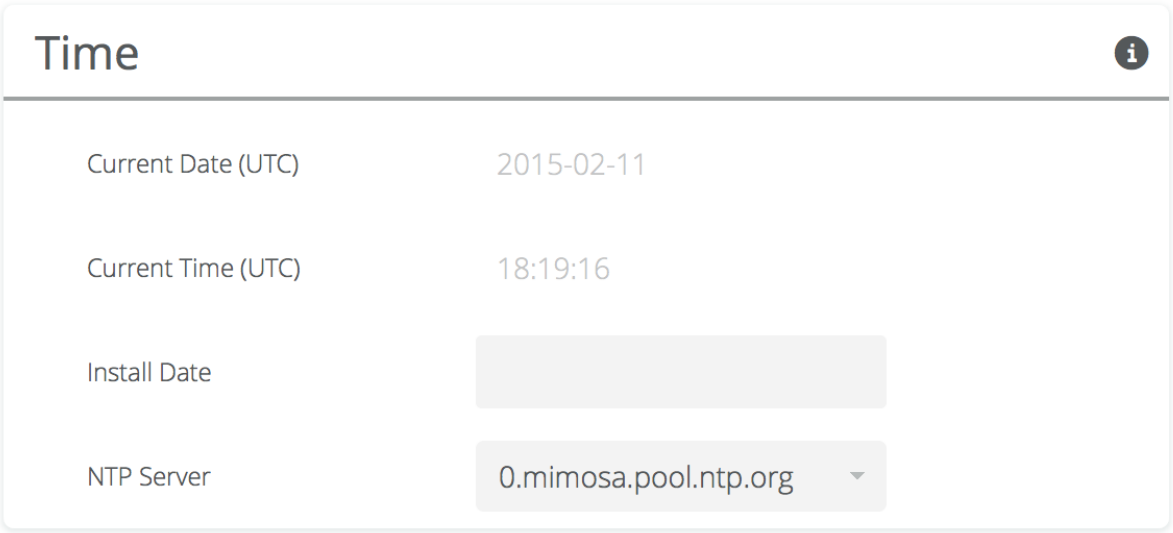
- Current Date (UTC) - Current date as set by the NTP Server.
- Current Time (UTC) - Current time as set by the NTP Server.
- Install Date - Used to track the date that the device was installed.
- NTP Server - Domain name or IP address of network time server.

B11

- Current Date (UTC) - Current date as set by GPS.
- Current Time (UTC) - Current time as set by GPS.
- Install Date - Used to track the date that the device was installed.

B24

- Current Date (UTC) - Current date as set by GPS.
- Current Time (UTC) - Current time as set by GPS.
- Install Date - Used to track the date that the device was installed.



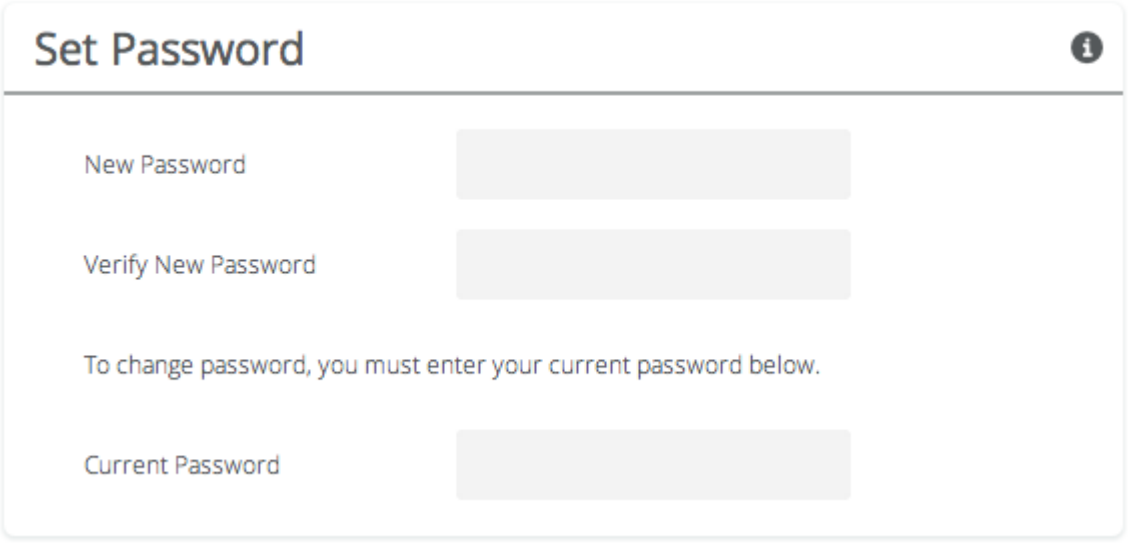
Setting a Password

Enter the new password in both the New Password and Verify New Password input boxes to validate that they were typed correctly. To finalize the change, enter the existing password and then save. The default password should be changed during device configuration to protect your network.

- New Password - Enter the new password.
- Verify New Password - Re-enter the new password (to confirm).
- Current Password - Enter the existing password (as a security measure).

The Password rules are as follows for choosing a password:

- It must be between 6 to 64 characters.
- It can use capital (A-Z) or lower case (a-z) characters, excluding space.
- Valid special characters for the password include ! " # $ % & ' ( ) * + , - . / : ; < = > ? [ ] ^ _ ` { | } ~
- The password cannot be blank.
- The password may not have a leading or trailing space.
- There is no complexity required for the password.



General Miscellaneous Settings

The Miscellaneous panel contains general functionality not described elsewhere.

B5/B5c

- LED Brightness - Changes the intensity of the status indicator lights on the device exterior. The Auto option adjusts the amount of light based upon ambient conditions. Manual options include Low, Medium, High and Off.
- Unlock Code - Displays the code used to unlock the device.

B5-Lite

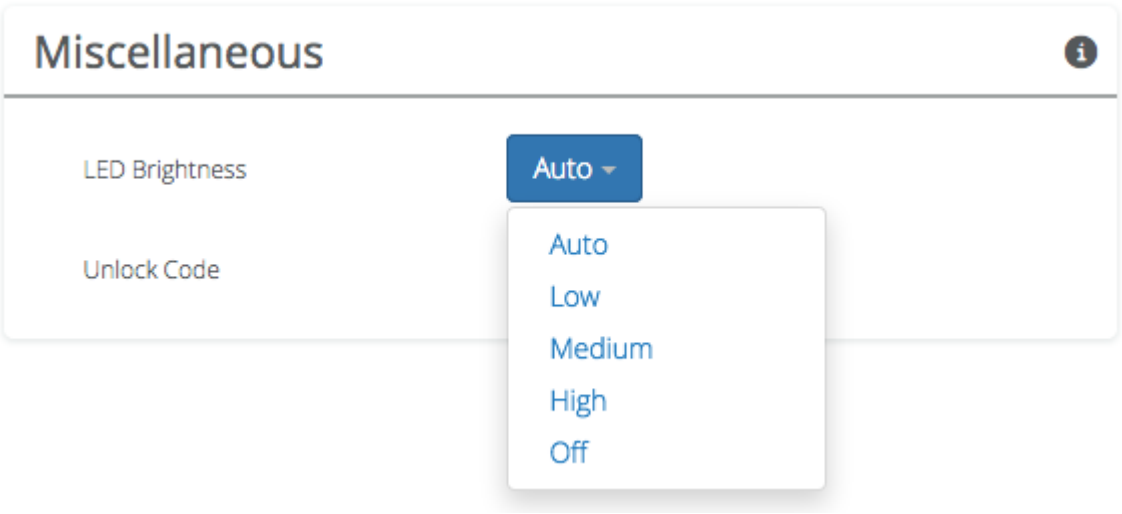
- Unlock Code - Displays the code used to unlock the device.

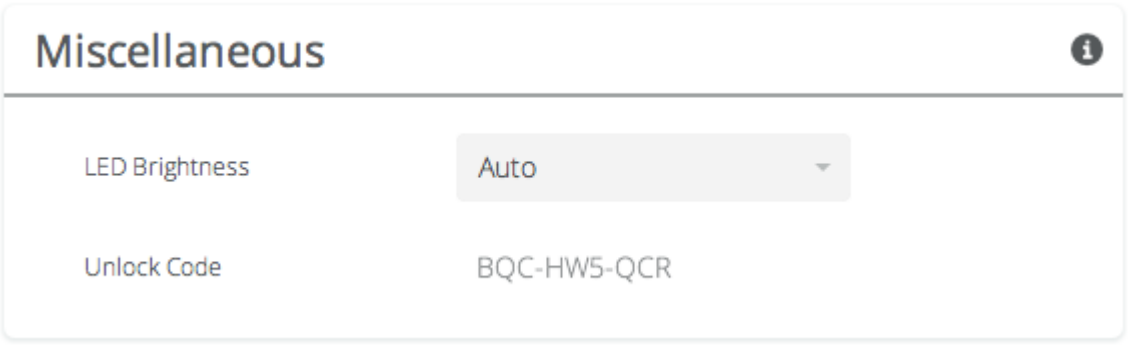
B11

- LED Brightness - Changes the intensity of the status indicator lights on the device exterior. The Auto option adjusts the amount of light based upon ambient conditions. Manual options include Low, Medium, High and Off.
- Unlock Code - Displays the code used to unlock the device.

B24

- LED Brightness - Changes the intensity of the status indicator lights on the device exterior. The Auto option adjusts the amount of light based upon ambient conditions. Manual options include Low, Medium, High and Off.
- Unlock Code - Displays the code used to unlock the device.





Related

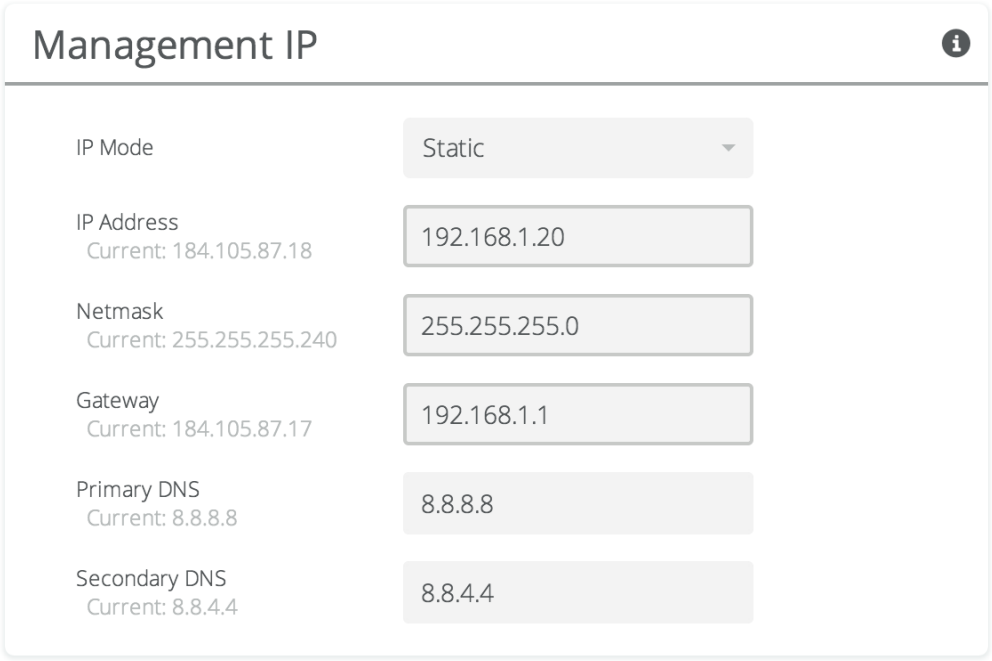
Change Unlock Country - Replace an existing unlock code to enable another regulatory domain

Setting the Management IP Address

The Management IP panel contains controls for setting the device's network address, subnet, gateway and DNS servers.

- IP Mode - Select the preferred mode of network addressing: Static or DHCP+Static Failover. If Static is chosen, the device will always use the IP address that has been assigned. If DHCP+Static Failover is chosen, and a DHCP server is available, then the addresses are automatically assigned by the DHCP server. If a DHCP server is unavailable, the device will use the static IP address listed below.
- IP Address - The network address used to manage the device.
- Netmask - The subnet mask that defines the network subnet.
- Gateway - The gateway address for the subnet.
- Primary DNS - The first DNS server IP Address. Default is 8.8.8.8.
- Secondary DNS - The backup DNS server IP Address. Default is 8.8.4.4.

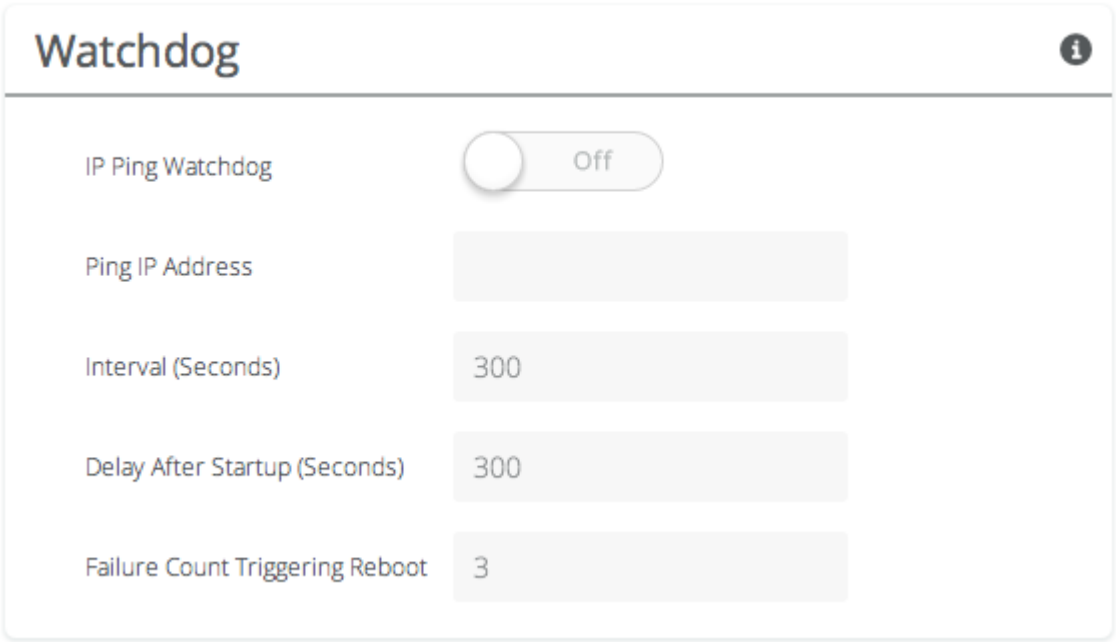
⚠ Note that the wired Ethernet interface is configured by default to use DHCP with a static failover to the IP address like in the screen capture below.



Enabling Watchdog

The Watchdog panel contains controls to monitor a remote host and reboot the local device under configurable failure conditions.

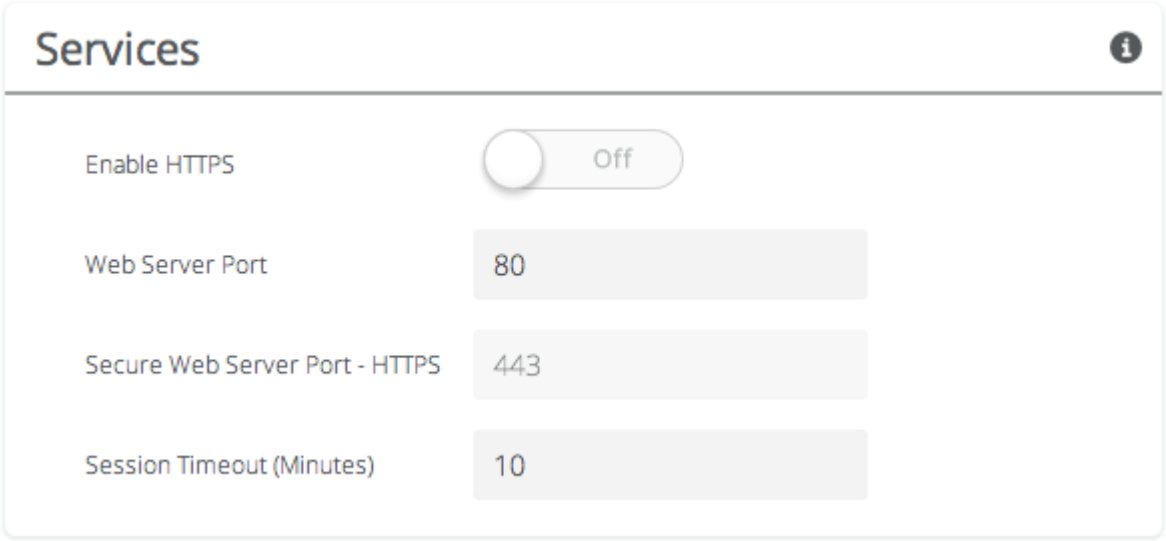
- IP Ping Watchdog - Enables the IP Ping Watchdog feature, which reboots the device if it cannot ping a certain IP after a number of retry attempts.
- Ping IP Address - Enter the IP address of the device to ping.
- Interval - Set the number of seconds (1-3600) between ping attempts.
- Delay After Startup - Set the delay in number of seconds (1-3600) between device start up and the first ping attempt.
- Failure Count Triggering Reboot - Set the number of failed ping attempts (1-100) before rebooting the device. WARNING: rebooting will take the device offline.



Management Services

The Services panel holds controls to secure management traffic by specifying how it should be served over the network.

- Enable HTTPS - Use SSL to access the web interface of this device.
- Web Server Port - Indicate which TCP port will be used for the web server. This web server is for the web interface.
- Secure Web Server Port - Indicate which TCP port will be used for the secure web server.
- Session Timeout - Set the number of minutes (0-60) of inactivity that will be allowed on the interface before automatic log-out for sessions. If set to "0", the session will have no timeout.



Following an automatic session timeout, logging back into the device will take you to the Dashboard screen.

Management Miscellaneous Settings

The Miscellaneous panel contains controls to enable Mimosa Cloud Management and to select the Ethernet Port data rate, either automatically or manually.

B5/B5c

- Mimosa Cloud Management - Enables the device to use Mimosa Cloud Management tools. Data will be collected and stored the Mimosa Cloud.
- Ethernet Port - Set the Ethernet port transfer rate or allow it to be automatically determined. Manually selectable options are 10, 100, or 1000BaseT at either full or half duplex. Note that Auto or 1000BaseT/Full is recommended so that the Ethernet port does not create a bottleneck.
- Autoneg Mode - Select an autonegotiation mode for Ethernet: Auto, Manual Slave, Manual Master, Preferred Slave, Preferred Master. Auto mode is recommended. Manual options may improve interoperability with some routers and switches.
- Rapid Port Shutdown (RPS) - Enabling this option disables the logical link of the Ethernet port for 2 seconds once every 5 minutes if the wireless link disassociates. This function becomes active only after initial association, and repeats the off/on cycle until the link re-associates. This speeds convergence of routing and switching protocols used in the network.
- Flow Control - Enables PAUSE frames (part of 802.3x standard) to manage the transmission rate between upstream senders and the Ethernet Interface.
- Firewall - Enable this option to protect the management interface from denial of service attacks. Changing this value requires a reboot.

B5-Lite

- Mimosa Cloud Management - Enables the device to use Mimosa Cloud Management tools. Data will be collected and stored the Mimosa Cloud.
- Ethernet Port - Set the Ethernet port transfer rate or allow it to be automatically determined. Manually selectable options are 10, 100, or 1000BaseT at either full or half duplex. Note that Auto or 1000BaseT/Full is recommended so that the Ethernet port does not create a bottleneck.
- Autoneg Mode - Select an autonegotiation mode for Ethernet: Auto, Manual Slave, Manual Master, Preferred Slave, Preferred Master. The Manual Slave option improves interoperability with some routers and switches.
- Rapid Port Shutdown (RPS) - Enabling this option disables the logical link of the Ethernet port for 2 seconds once every 5 minutes if the wireless link disassociates. This function becomes active only after initial association, and repeats the off/on cycle until the link re-associates. This speeds convergence of routing and switching protocols used in the network.
- Flow Control - Enables PAUSE frames (part of 802.3x standard) to manage the transmission rate between upstream senders and the Ethernet Interface.
- Firewall - Enable this option to protect the management interface from denial of service attacks. Changing this value requires a reboot.

B11

- Mimosa Cloud Management - Enables the device to use Mimosa Cloud Management tools. Data will be collected and stored the Mimosa Cloud.
- Rapid Port Shutdown (RPS) - Enabling this option disables the logical link of the Ethernet port for 2 seconds once every 5 minutes if the wireless link disassociates. This function becomes active only after initial

association, and repeats the off/on cycle until the link re-associates. This speeds convergence of routing and switching protocols used in the network.
- Flow Control - Enables PAUSE frames (part of 802.3x standard) to manage the transmission rate between upstream senders and the Ethernet Interface.
- Firewall - Enable this option to protect the management interface from denial of service attacks. Changing this value requires a reboot.

B24

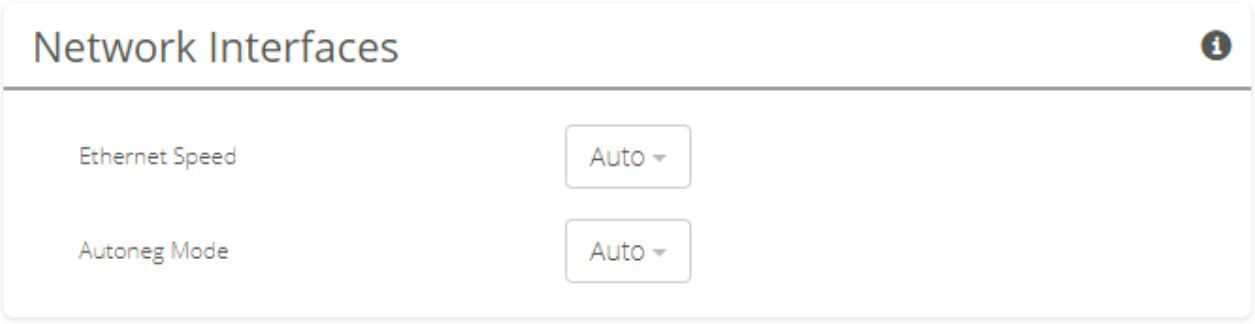
- Mimosa Cloud Management - Enables the device to use Mimosa Cloud Management tools. Data will be collected and stored the Mimosa Cloud.
- Rapid Port Shutdown (RPS) - Enabling this option disables the logical link of the Ethernet port for 2 seconds once every 5 minutes if the wireless link disassociates. This function becomes active only after initial association, and repeats the off/on cycle until the link re-associates. This speeds convergence of routing and switching protocols used in the network.
- Flow Control - Enables PAUSE frames (part of 802.3x standard) to manage the transmission rate between upstream senders and the Ethernet Interface.
- Firewall - Enable this option to protect the management interface from denial of service attacks. Changing this value requires a reboot.

Your firewall must be configured for outbound access to enable Mimosa Cloud Management.

Network Interfaces

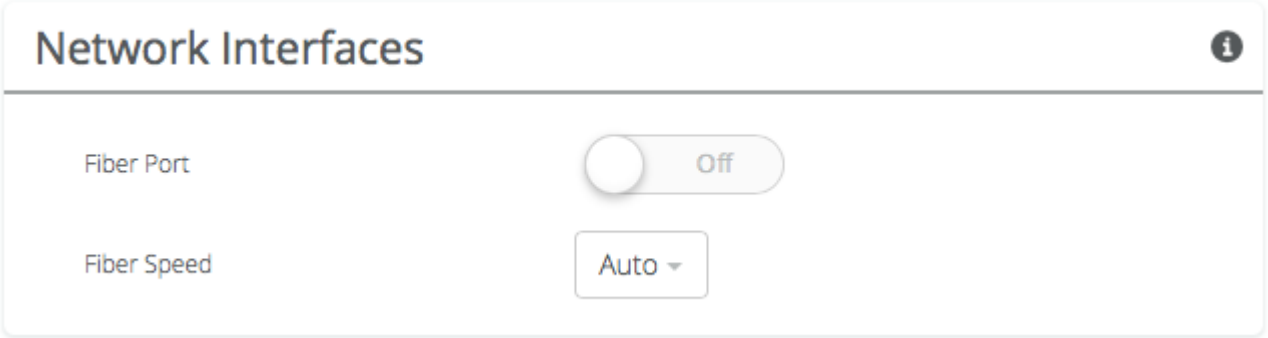
B5

- Ethernet Speed - Set the Ethernet port transfer rate or allow it to be automatically determined. Manually selectable options are 10, 100, or 1000BaseT at either full or half duplex. Note that Auto or 1000BaseT/Full is recommended so that the Ethernet port does not create a bottleneck.
- Autoneg Mode - On B5/B5c or B5-Lite, select an autonegotiation mode for Ethernet: Auto, Manual Slave, Manual Master, Preferred Slave, Preferred Master. The Manual Slave option improves interoperability with some routers and switches.



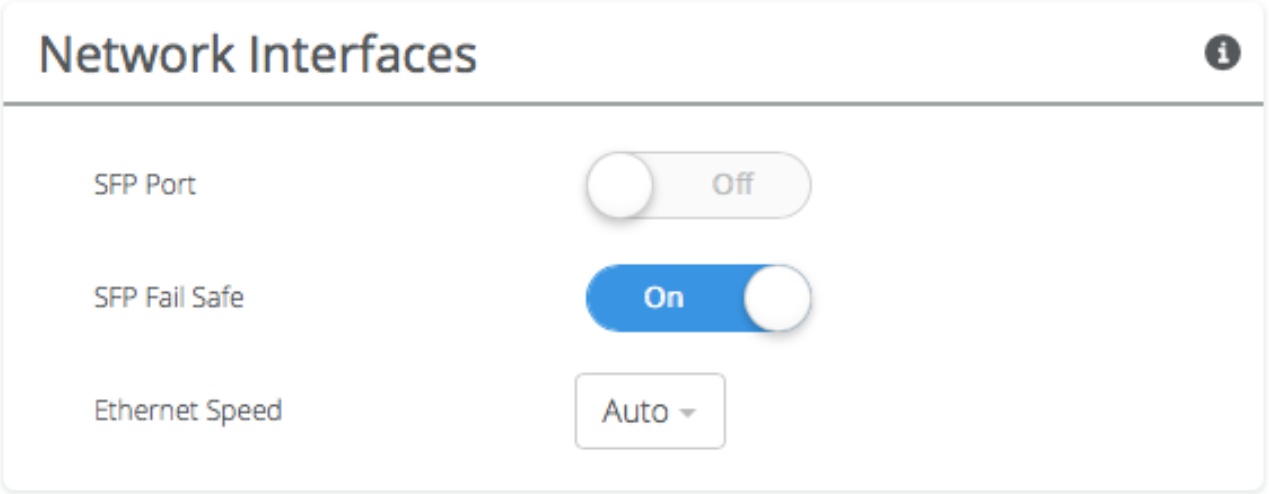
B11

- Fiber Port - Enable this option to route all data through this port with optical fiber and a small form-factor pluggable (SFP) media adapter. After enabling the Fiber Port, the Ethernet cable must remain connected to supply power, but it does not pass data. If fiber is enabled and connectivity is lost, the radio may still be accessed via the 2.4 GHz wireless interface.
- Fiber Speed - Set the port transfer rate or allow it to be automatically determined. Manually selectable options are 10, 100, or 1000BaseT at either full or half duplex. Note that Auto is recommended so that the Ethernet port does not create a bottleneck.



B24

- Fiber (SFP) Port - When Fiber (SFP) is ON, SFP is used for data and management. Fiber (SFP) Fail Safe option is only available when Fiber (SFP) is ON. When Fiber (SFP) is OFF, by default, Ethernet (RJ45) is used for both data and management traffic.
- Fiber (SFP) Fail Safe - When Fiber (SFP) link goes down, data and management traffic will fail-over to Ethernet (RJ45) and traffic will pass through Ethernet (RJ45) if available. If Fiber (SFP) Fail Safe is OFF, and if Fiber (SFP) goes down, all traffic will be blocked.
- Ethernet (RJ45) Speed - This drop-down allows the user to select one of the following options: Auto, 10, 100, 1000BaseT (at full or half duplex). Auto setting is recommended.



VLAN Management

The VLAN Management panel allows the administrator to enable a VLAN (Virtual Local Area Network) for management traffic. When enabled, all Web Management traffic must originate from a device on that VLAN.

- Enable - Use the slider control to turn VLAN Management on or off.
- ID - The VLAN ID (valid options are 1-4094)

You can still connect locally via the 2.4 GHz management console on a B5 or B5c.

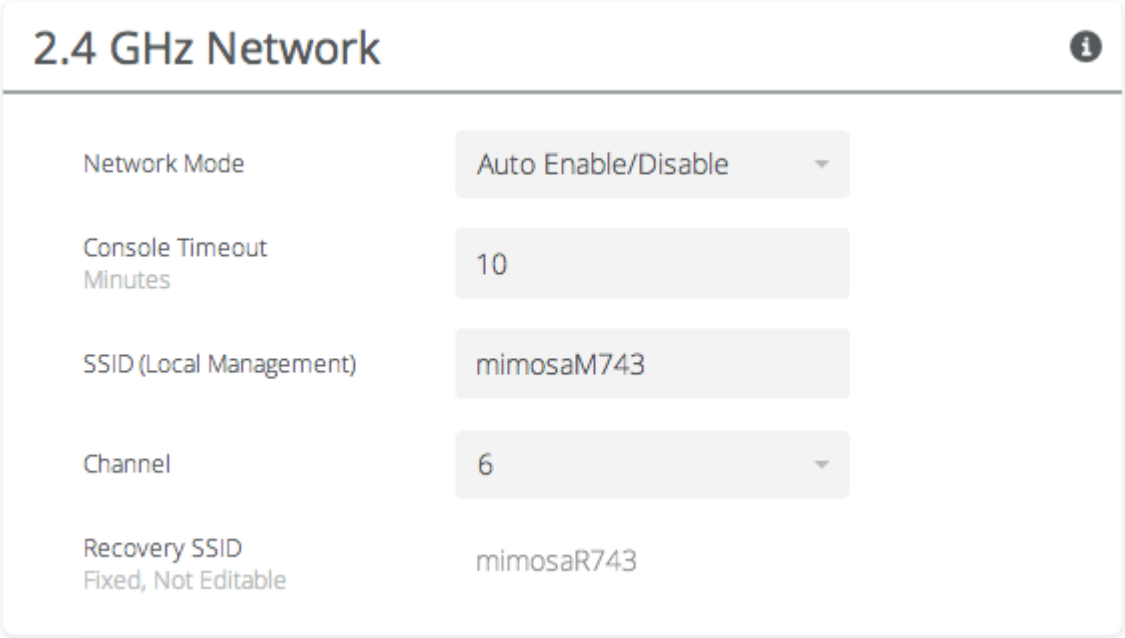
Enabling the 2.4 GHz Network

Product Applicability: B5/B5c, B11

The 2.4 GHz wireless interface allows local browser-based configuration with any Wi-Fi capable device. This is a low power interface that performs best if accessed within 60 meters (~200 feet) of the radio. It is completely separate from the link and has no performance impact on throughput if activated.

- Network Mode - Choose to automatically or manually enable or disable the 2.4 GHz management network. The automatic mode turns the 2.4 GHz management network on for a limited time (defined in Console Timeout) after boot and then turns it off if there is no activity. If a user associates with the radio within the timeout period, they will not be disconnected.
- Console Timeout - Set the number of minutes (1-60) of inactivity that will be allowed on the 2.4 GHz interface before turning it off in Auto mode.
- SSID (Local Management) - Set the SSID name for the 2.4 GHz local management interface.
- Channel - Select the channel on which the 2.4 GHz wireless network will operate.
- Recovery SSID - This is an non-editable recovery SSID that allows the device to be reset to factory defaults. This is available for 5 minutes after device boot. Disabling the 2.4 GHz management network will not impact availability of this option. The serial number of the device must be known in order to perform the factory reset.

Note: If you turn off the 2.4 GHz management radio, you can still access the device through the wired LAN interface, or in-band through the 5 GHz wireless link. During the B5/B5c device reset process, the 2.4 GHz wireless interface is briefly re-enabled, and then disabled after a timeout.

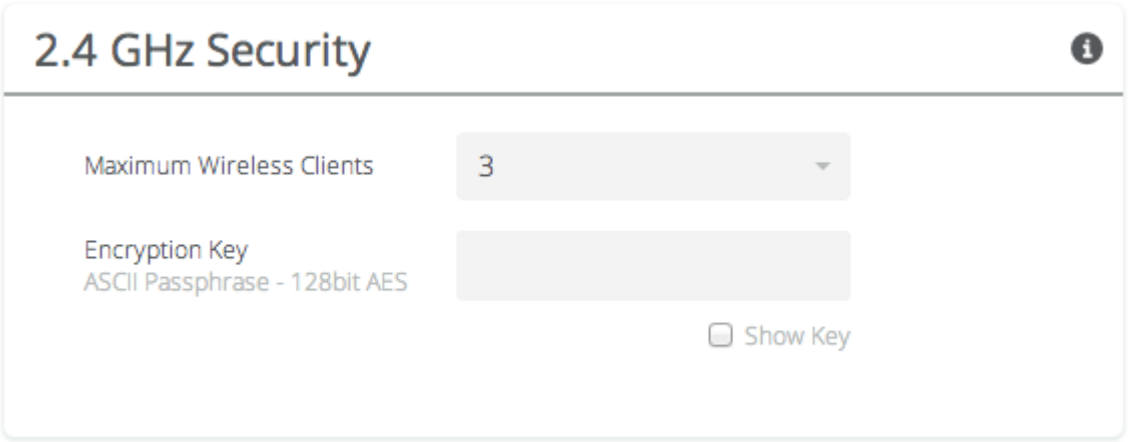


Setting 2.4 GHz Network Security

Product Applicability: B5/B5c, B11, B24

The 2.4 GHz Security panel contains controls for managing access to the local wireless management network.

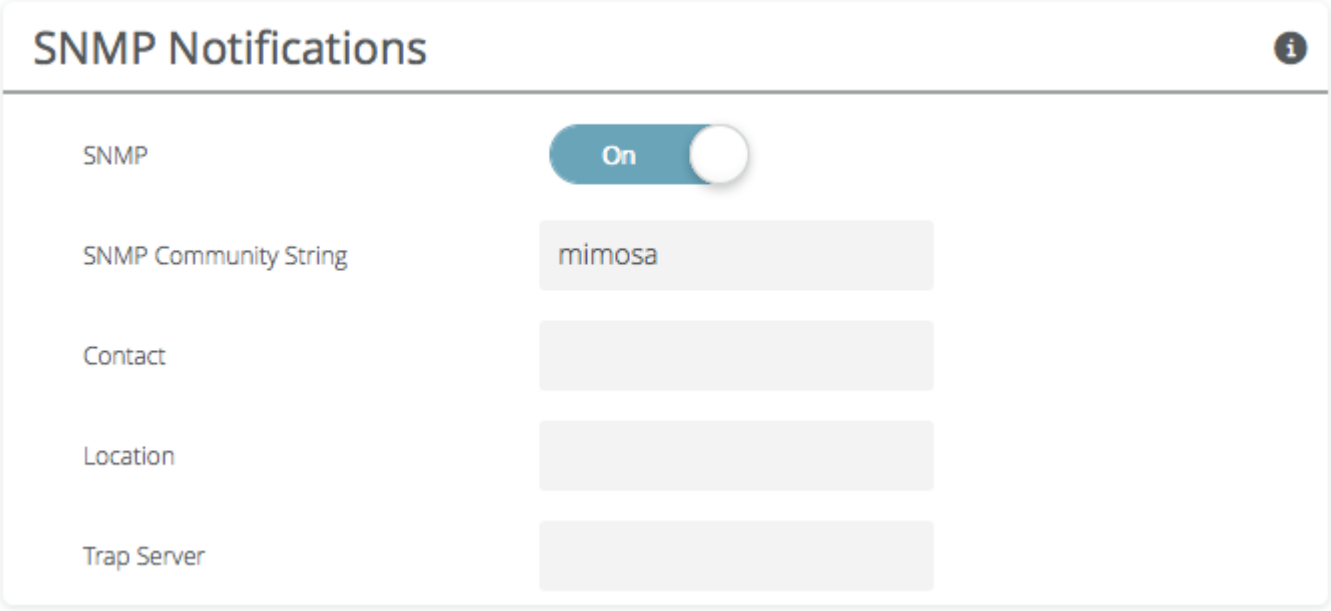
- Maximum Wireless Clients - Limit the maximum number of wireless clients that can simultaneously access the 2.4 GHz management interface.
- Encryption Key - Enter an ASCII Passphrase for gaining access to the 2.4 GHz management interface.
- Show Key (checkbox) - Check to display the Encryption Key in clear text for verification before saving the change.



Enabling SNMP Notifications

Enable the SNMP service to allow SNMP requests and enable push notifications to a remote server.

- SNMP - Enable or disable SNMP service on the local device.
- SNMP Community String - Enter a string for use during client authentication.
- Contact - Specify an (optional) administrative contact for the SNMP system.
- Location - Specify the (optional) physical location for the SNMP system.
- Trap Server - Define the server to receive the notifications.



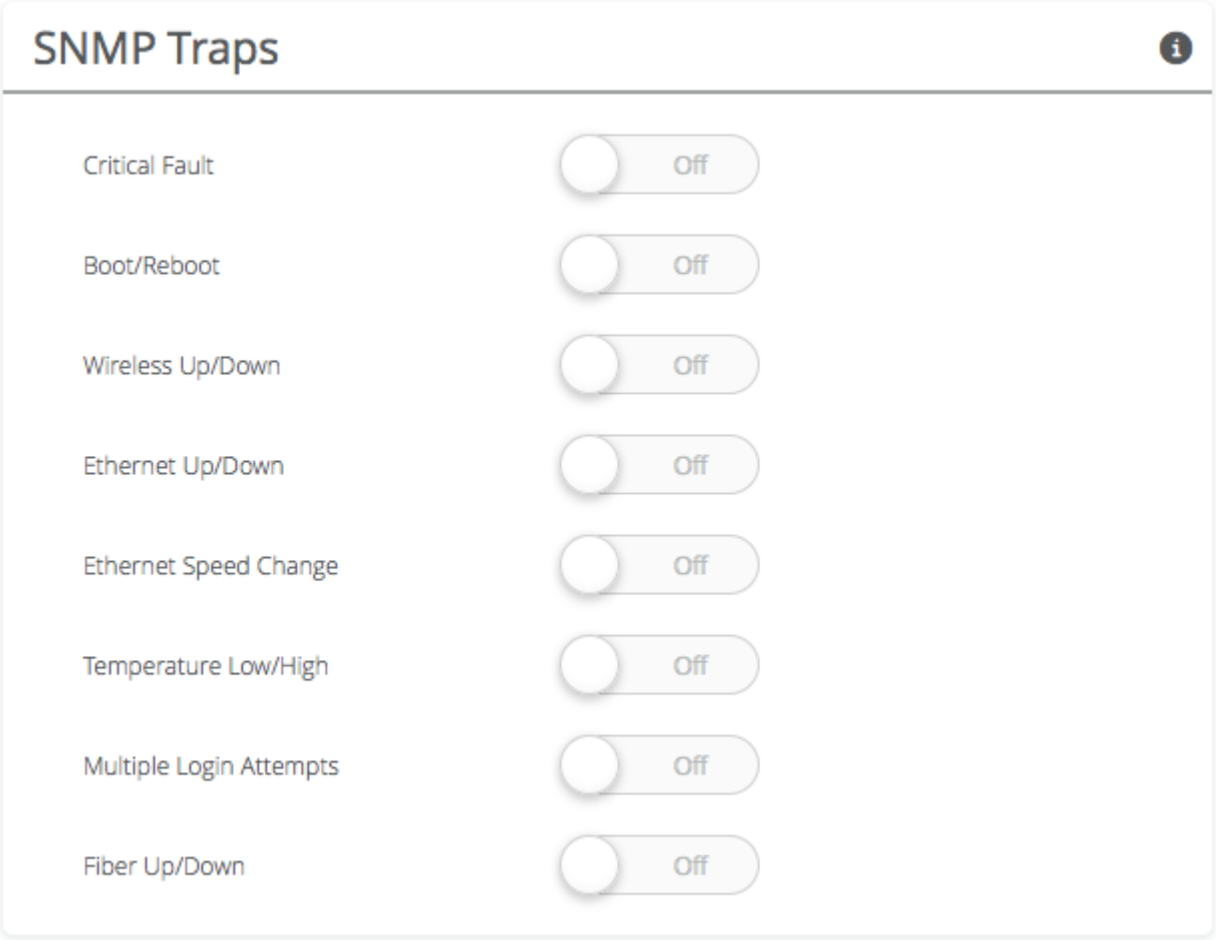
Related

SNMP Usage Examples: Get / Walk / Table - Sample commands for retrieving values
SNMP Object Names - Query values using SNMP Object Names defined within the Mimosa MIB file
SNMP Traps - Configure outgoing notifications for specific events
SNMP Traps OIDs - OIDs associated with the SNMP Traps
SNMP MIB Download - Available values in standard Management Information Base (MIB) format
SNMP OID Reference - Summarized list of available values and where to find them on the GUI

Configuring SNMP Traps

Define which traps (or notifications) are sent to the remote SNMP server.

- Critical Fault - Notification created if the device is forced to reboot.
- Boot/Reboot - Notification created if the system boots or reboots.
- Wireless Up/Down - Notification created if the device connects to (Wireless Up) or disconnects from (Wireless Down) another device.
- Ethernet Up/Down - Notification created if the Ethernet Port is connected (Ethernet Up) or disconnected (Ethernet Down).
- Ethernet Speed Change - Notification created when the Ethernet port changes from one speed (10, 100, or 1000BaseT) to another.
- Temperature Low/High - Notification created if the temperature falls outside of the safe range for the product.
- Multiple Login Attempts - Notification created if multiple failed login attempts are made from the same IP Address.
- Fiber Up/Down - Notification created when the SFP port is connected (Fiber) or disconnected (Down).



Related

SNMP Usage Examples: Get / Walk / Table - Sample commands for retrieving values

SNMP Object Names - Query values using SNMP Object Names defined within the Mimosa MIB file

SNMP Notifications - Enabling SNMP on Mimosa Backhaul products

SNMP Traps OIDs - OIDs associated with the SNMP Traps

SNMP MIB Download - Available values in standard Management Information Base (MIB) format

SNMP OID Reference - Summarized list of available values and where to find them on the GUI

SNMP Traps OIDs

Trap	Type	OID	Object	Description
Critical Fault	Mimosa Specific Trap	1.3.6.1.4.1.43356.2.0.1	mimosaCriticalFault	Notification created if the device is forced to reboot.
Boot/Reboot	Standard Trap	Warm Start: .1.3.6.1.6.3.1.1.5.2 Cold Start: .1.3.6.1.6.3.1.1.5.1	snmpColdStart snmpWarmStart	Notification created if the system boots or reboots.
Wireless Up/Down	Standard Trap	Up: .1.3.6.1.6.3.1.1.5.4 Down: .1.3.6.1.6.3.1.1.5.3	snmpLinkUp snmpLinkDown	Notification created if the device connects to (Wireless Up) or disconnects from (Wireless Down) another device.
Ethernet Up/Down	Standard Trap	Up: .1.3.6.1.6.3.1.1.5.4 Down: .1.3.6.1.6.3.1.1.5.3	snmpLinkUp snmpLinkDown	Notification created if the Ethernet Port is connected (Ethernet Up) or disconnected (Ethernet Down).
Ethernet Speed Change	Mimosa Specific Trap	1.3.6.1.4.1.43356.2.0.4	mimosaEthernetSpeedChange	Notification created when the Ethernet port changes from one speed to another.
Temperature Low/High	Mimosa Specific Trap	Low: .1.3.6.1.4.1.43356.2.0.2 High: .1.3.6.1.4.1.43356.2.0.3	mimosaTempWarning mimosaTempStatus	Notification created if the temperature falls outside of the safe range for the product.
Multiple Login Attempts	Standard Trap	.1.3.6.1.6.3.1.1.5.5	snmpAuthenticationFailure	Notification created if multiple failed login attempts are made from the same IP Address.

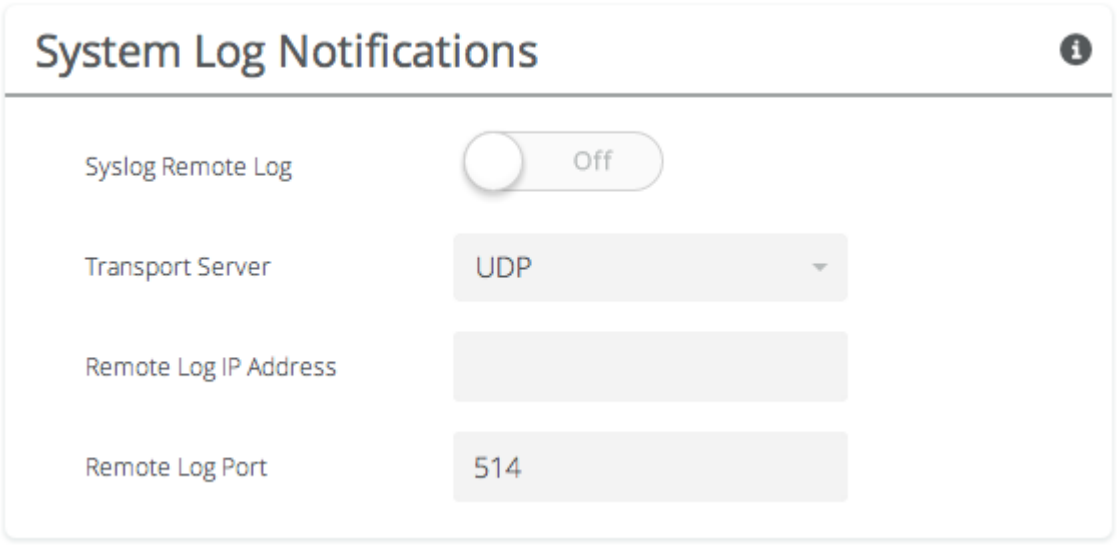
Related

SNMP Usage Examples: Get / Walk / Table - Sample commands for retrieving values
SNMP Object Names - Query values using SNMP Object Names defined within the Mimosa MIB file
SNMP Notifications - Enabling SNMP on Mimosa Backhaul products
SNMP MIB Download - Available values in standard Management Information Base (MIB) format
SNMP OID Reference - Summarized list of available values and where to find them on the GUI

Enabling System Log Notifications

Enable Syslog service on the local device to send traps to a remote Syslog server.

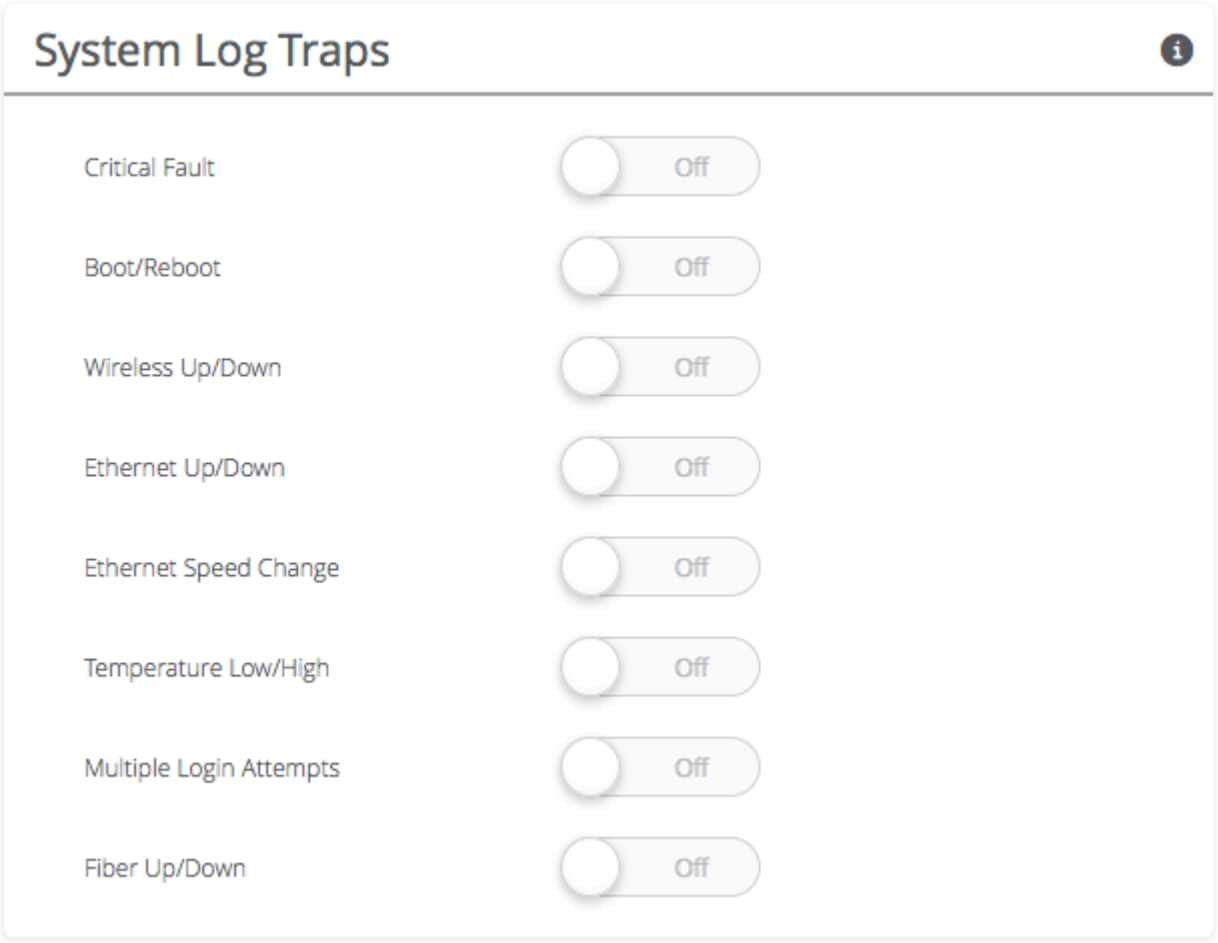
- Syslog Remote Log - Enable or disable Syslog service on the local device.
- Transport Protocol - Choose the desired protocol for the Syslog connection. Note that most devices send UDP messages by default. UDP is an unreliable transmission protocol, thus messages may get lost. Choose TCP for higher reliability if any message loss is unacceptable.
- Remote Log IP Address - List the IP Address of the remote Syslog server to which Notifications will be sent.
- Remote Log Port - List the Port on the remote Syslog server to which Notifications will be sent.



Configuring System Log Traps

Define which traps (or notifications) are sent to the remote server for the System Log.

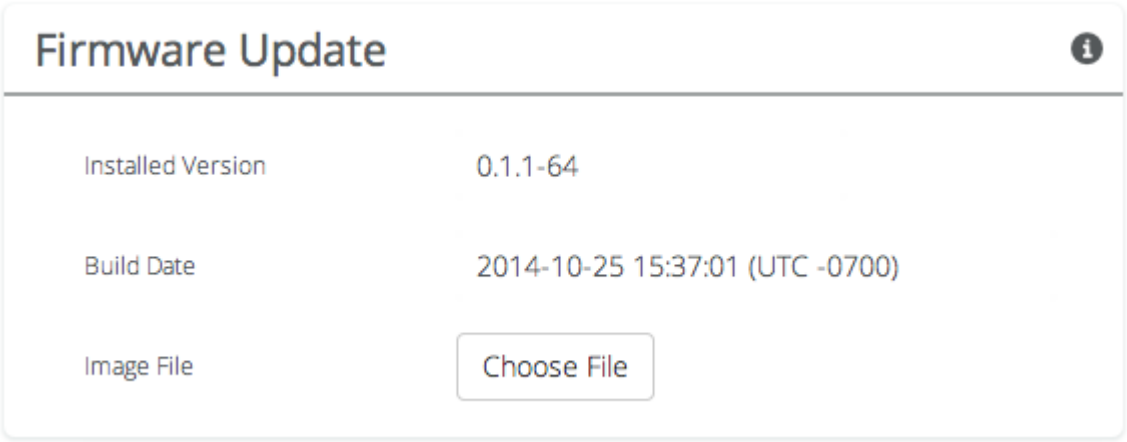
- Critical Fault - Notification created if the device is forced to reboot.
- Boot/Reboot - Notification created if the system boots or reboots.
- Wireless Up/Down - Notification created if the device connects to (Wireless Up) or disconnects from (Wireless Down) another device.
- Ethernet Up/Down - Notification created if the Ethernet Port is connected (Ethernet Up) or disconnected (Ethernet Down).
- Ethernet Speed Change - Notification created when the Ethernet port changes from one speed (10, 100, or 1000 BaseT) to another.
- Temperature Low/High - Notification created if the temperature falls outside of the safe range for the product.
- Multiple Login Attempts - Notification created if multiple login attempts are made from the same IP Address.
- Fiber Up/Down - Notification created when the Fiber port is connected (Fiber) or disconnected (Down).



Performing a Firmware Update

The Firmware Update panel displays the current firmware version and date, and allows the user to upload a new firmware image. The latest firmware image may be downloaded from help.mimosa.co. Alternately, firmware can be pushed to the device automatically through the Manage application at manage.mimosa.co.

- Installed Version - The currently installed firmware version.
- Build Date - The date that the installed firmware was created.
- Image File - Update to the latest firmware. Click the Choose File button to select a file for upload the file.



When performing a Firmware upgrade, it is advisable to reboot and then upgrade the remote side of the link before the local side. If there is a problem during the upgrade you will still have access to one of the radios within the link and can manage the link details.

The firmware update process occurs in four phases:

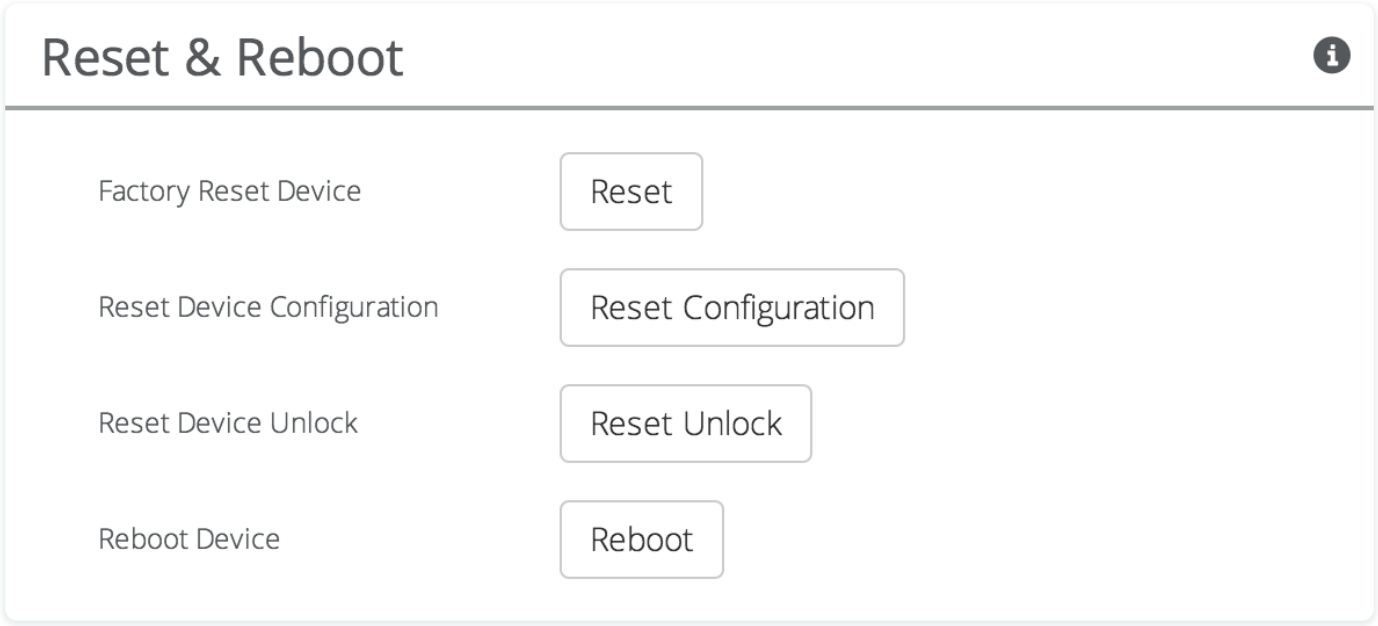
1. Upload - Selecting a firmware image and uploading to the radio
2. Verification - Ensuring that the firmware image is complete and without errors
3. Upgrade - Writing the new firmware image to flash memory
4. Reboot - Restarting with the new firmware image (120 seconds)

Once the remote radio enters the Upgrade phase, it is generally safe to begin the Upload phase to the local radio. Alternately, the Mimosa Manage application offers a parallel upgrade feature which sends the firmware image to both radios, and once both radios receive and verify the image, they upgrade at the same time and reboot in an order that you specify.

Reset & Reboot the Device

Reboot the device or reset it to its original factory settings.

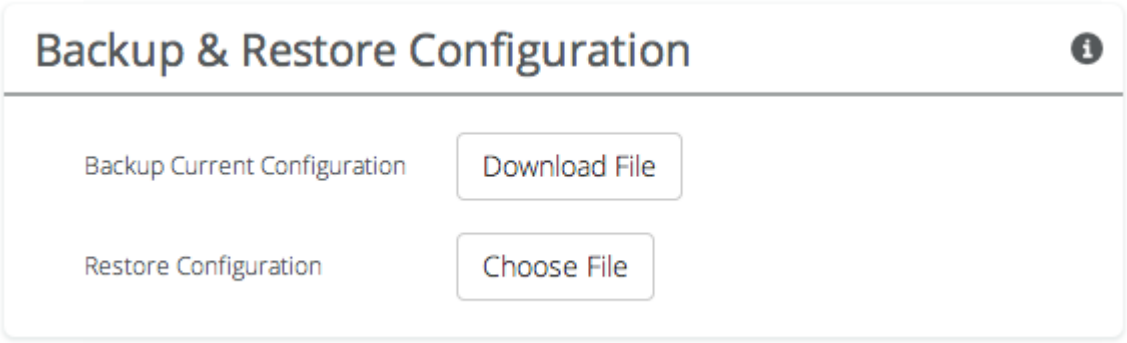
- Factory Reset Device - Clears all configuration settings and locks the device. WARNING: This will delete ALL saved configuration settings and return the device to the locked factory state. You will be required to re-enter your unlock key upon device reset. The current version of firmware will remain, however.
- Reset Device Configuration - Clears all configuration settings. The device will remain unlocked.
- Reset Device Unlock - Locks the device and resets the country code. WARNING: You will be required to re-enter your unlock key upon reset.
- Reboot Device - Restarts the device.



Backup or Restore Configuration Settings

The Backup and Restore Configuration panel contains controls for managing configuration settings files.

- Backup Current Configuration - Perform a configuration backup by downloading the mimosa.conf file.
- Restore Configuration - Click the Choose File button to upload a previously saved mimosa.conf file.



Diagnostic Tests

Three types of tests are available within the Diagnostics section: Ping, Bandwidth and Traceroute.

Ping Test

A low level ICMP test which indicates whether the target host is reachable from the local device.

- Destination Host - The destination IP Address of the device to ping.
- Packet Count - The number of packets to transmit during a ping.
- Packet Size (bytes) - The size of each packet to transmit during a ping.
- Run Test - Click on the Run Test button to ping the destination IP address. Results are shown in the corresponding table.

Bandwidth Test

A manual test to assess maximum throughput when minimal or no traffic is present. This test sends 1500-byte packets using a proprietary UDP-like protocol. Results are shown in corresponding graph on this page. Note that bandwidth test data is excluded from the Dashboard Performance graph. This is because the test is conducted by transmitting packets at a low layer between the two radios. Navigating away from this page will stop the test.

- Test Duration - The length of the bandwidth test in seconds.
- Test - Select one of the following options to assess the maximum throughput:
  - Local to Remote - Unidirectional test from the local device to the remote device
  - Remote to Local - Unidirectional test from the remote device to the local device
  - Transmit then Receive - Bidirectional tests conducted in series
  - Simultaneous - Bidirectional test conducted in parallel

Traceroute Test

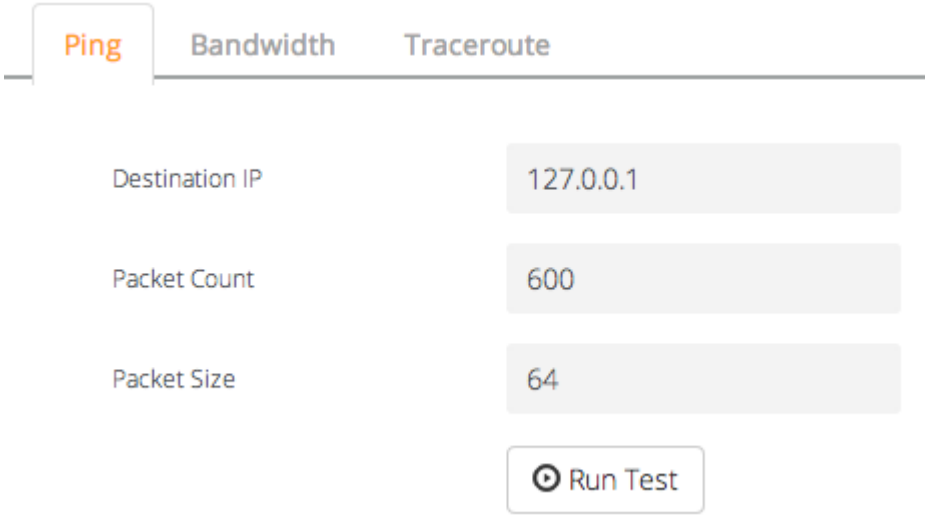
A network utility used to display the path and transit delay between the local device and a given destination across an IP network.

- Destination Host - The destination IP address for traceroute to send packets.
- Resolve IP Address - Indicate whether the system should resolve and print the host name of the destination.
- Max Number of Hops - Choose the maximum number of intermediate devices (e.g. routers) through which packets must pass between source and destination.
- Run Test - Click on the Run Test button to begin the traceroute test. Results are shown in the corresponding table.

Running a Ping Test

A low level ICMP test which indicates whether the target host is reachable from the local device.

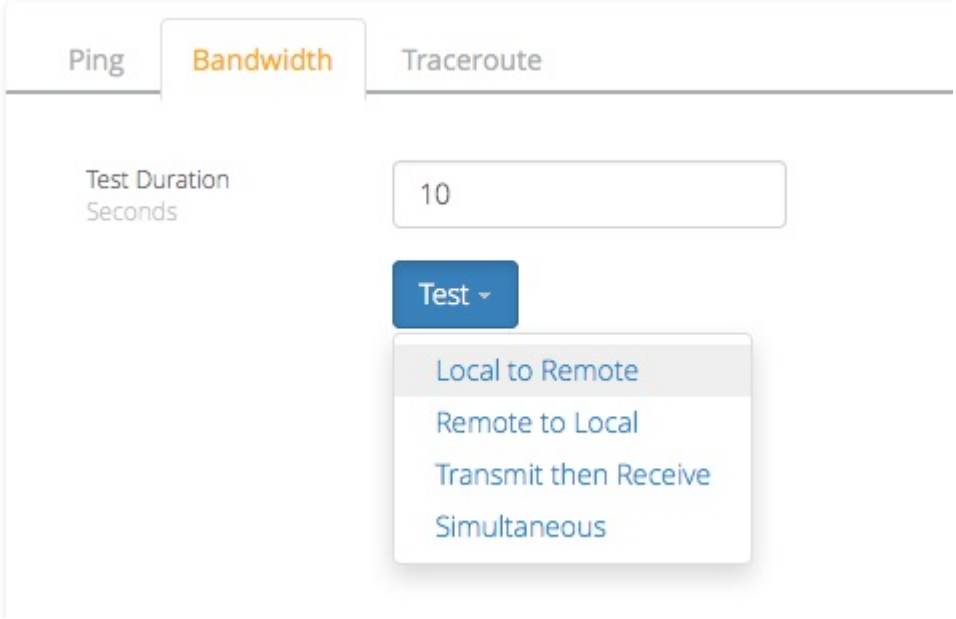
- Destination Host - The destination IP Address of the device to ping.
- Packet Count - The number of packets to transmit during a ping.
- Packet Size (bytes) - The size of each packet to transmit during a ping.
- Run Test - Click on the Run Test button to ping the destination IP address. Results are shown in corresponding table.

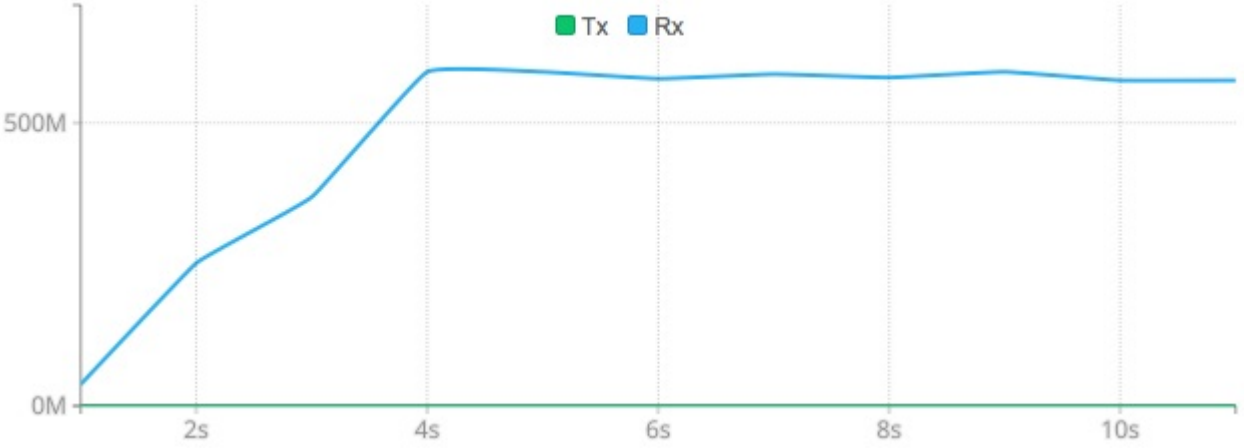


Running a Bandwidth Test

A manual test to assess maximum throughput when minimal or no traffic is present. This test sends 1500-byte packets using a proprietary UDP-like protocol. Results are shown in corresponding graph on this page. Note that bandwidth test data is excluded from the Dashboard Performance graph. This is because the test is conducted by transmitting packets at a low layer between the two radios. Navigating away from this page will stop the test. The bandwidth test is only available when devices are associated in PTP mode.

- Test Duration - The length of the bandwidth test in seconds.
- Test - Select one of the following options to assess the maximum throughput:
  - Local to Remote - Unidirectional test from the local device to the remote device
  - Remote to Local - Unidirectional test from the remote device to the local device
  - Transmit then Receive - Bidirectional tests conducted one after the other
  - Simultaneous - Bidirectional test conducted at the same time





Running a Traceroute Test

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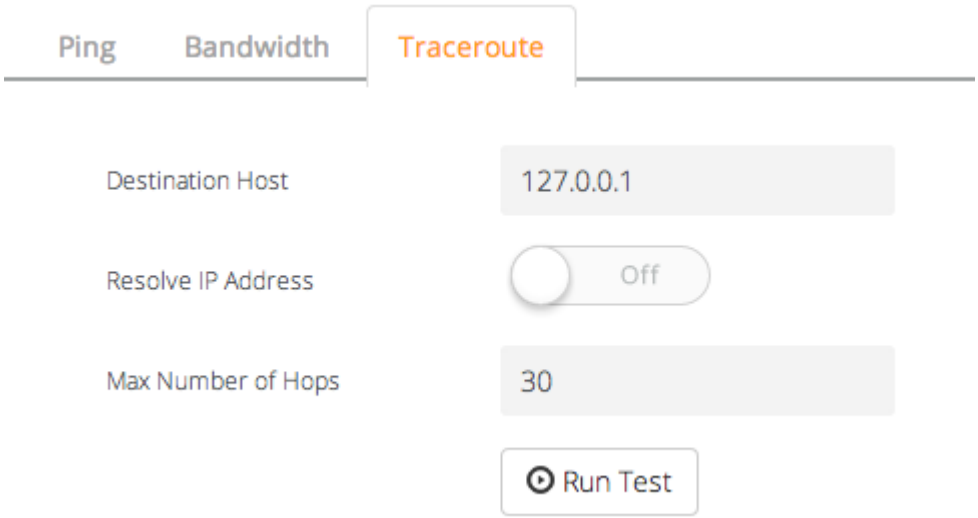
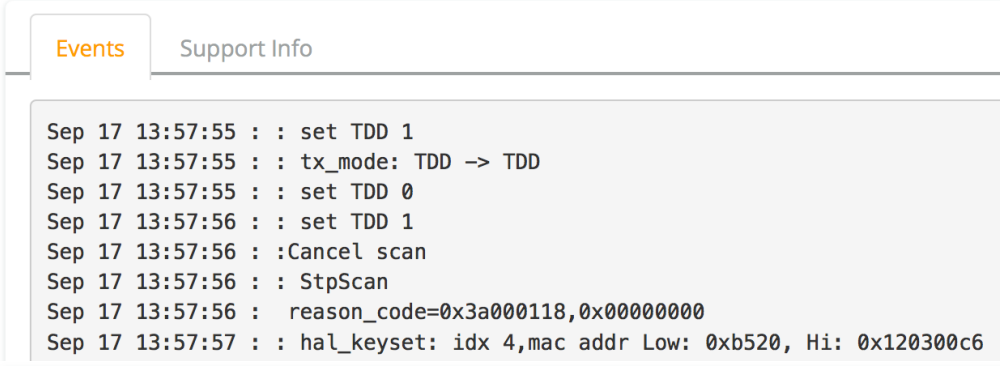


Diagnostic Logs

View Events and download diagnostic information to share with Mimosa Support.

- Event Log - This is a persistent (non-volatile) log of all significant events that occur.
- Support Info - Download a single file containing all information required by Mimosa Support to help with troubleshooting.



B24 External LED Status Indicators

Three LED indicators on the outside of the case communicate operational status: Power, Ethernet, and Wireless.

The tables below describe the meaning of each LED's state: Off, On (solid), On (blinking), and Color.

Power Status LED Table

The Power Status LED indicates the presence of power, and communicates boot and firmware update status.

State	LED	Description
Off		No Power to Device
Blinking Green (Slow)		Device Booting / Rebooting
Blinking Green (Fast)		Firmware Update in Progress
Solid Green		Ready (Operational)
Blinking Yellow		Update Failed (Invalid Firmware Image)[1]
Solid Red		Wiring Error or Boot Error[2]

[1] Please visit the Firmware page to download the latest image.

[2] Please check wiring, cycle power, and then contact Mimosa Support if necessary.

Ethernet Status LED Table

The Ethernet Status LED indicates the negotiated port speed for the wired network connection. The device is designed to perform best with a 1000BASE-T connection. While other port speeds are possible, they are not recommended because they create a data bottleneck that reduces end-to-end throughput.

State	LED	Description
Off		No Ethernet Connection
Solid Green		1000BASE-T
Blinking Green		1000BASE-T with Traffic

Solid Yellow		100BASE-T
Blinking Yellow		100BASE-T with Traffic
Solid Red		10BASE-T
Blinking Red		10BASE-T with Traffic

Wireless Status LED Table

The Wireless Status LED indicates a link between local and remote devices. The blink rate represents received signal strength, which is useful while aiming the local device.

State	LED	Description
Off		Not Associated (No Link)
Blinking Blue		Associated; Blink rate proportional to signal strength*

* Ranges from 1 Hz (one blink per second at -90 dBm or less) to 10 Hz (one blink per 100 ms at -50 dBm or greater).