# Xirrus Wi-Fi Inspector

Description

The Xirrus Wi-Fi Inspector is a utility for monitoring Wi-Fi networks and managing the Wi-Fi operation of a laptop. Operating on Windows and Mac OS X systems, the Wi-Fi Inspector delivers detailed information about surrounding Wi-Fi networks, enables control of a laptop's Wi-Fi connection, and provides tools to troubleshoot Wi-Fi connectivity issues. It provides a useful tool for anyone deploying and using Wi-Fi. The Xirrus Wi-Fi Inspector 2.0 supports the latest Wi-Fi standards, including 802.11ac Wave 1 and Wave 2 technology.

Applications

The Wi-Fi Inspector can be used for a number of practical applications, including:

- Searching for Wi-Fi networks
- Troubleshooting Wi-Fi connectivity issues
- Verifying Wi-Fi coverage (site survey)
- Controlling a laptop's Wi-Fi connection
- Locating Wi-Fi devices
- Detecting rogue (unauthorized) APs
- Verifying AP settings
- Aiming Wi-Fi antennas
- Wi-Fi education
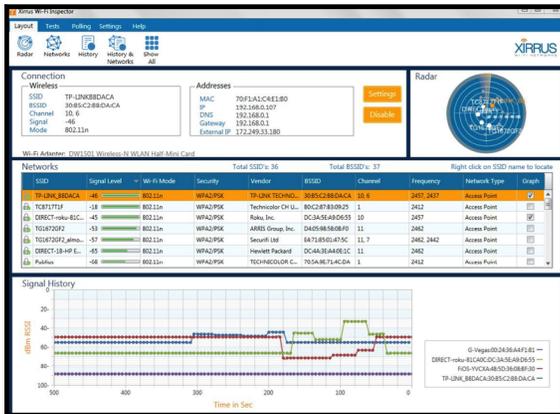
Wi-Fi Inspector Main Display for Windows
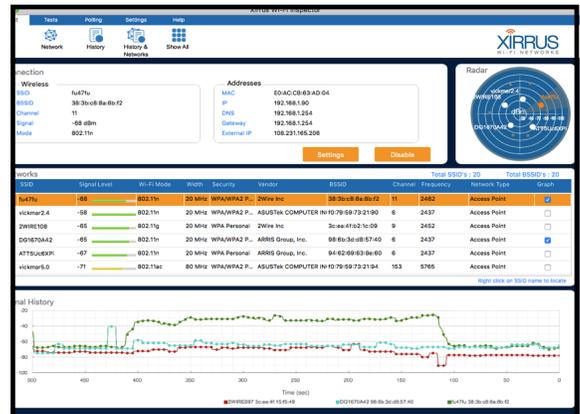
Wi-Fi Inspector Main Display for Mac OS

Features

- Dynamic radar view displaying local Wi-Fi network names and relative distance
- Detailed information table of all local Wi-Fi networks
- Display of laptop's Wi-Fi connection details and most important network addresses
- Connection, Quality, and Speed tests for troubleshooting the Wi-Fi network connection
- Real-time graph of signal strength of one or more Wi-Fi networks with 8 minute history
- Locate mode for tracking Wi-Fi network signal strength, including audible beep
- Export Wi-Fi networks to .csv file
- Open Wi-Fi network settings
- Enable/Disable Wi-Fi adapter
- Integrated glossary of Wi-Fi terms

What's New

The Xirrus Wi-Fi Inspector 2.0 release includes the following:

- Support for Mac OS
- Support for Windows 10
- Dynamically updated vendor address information to identify access point manufacturers in the Networks - Vendor column.
- Support for 802.11ac Wave 1 and Wave 2, the latest Wi-Fi technology standards.

Requirements

Installation and operation of the Xirrus Wi-Fi Inspector requires the following:

1. Windows 8, 9, or 10; Mac OS X 10.10 (Yosemite) or 10.11 (El Capitan)

2. Wi-Fi adapter, either built-in or external

3. Adobe Flash Player for running Speed Test. If you do not have the Flash Player installed, it can be downloaded from: http://get.adobe.com/flashplayer/

4. Microsoft .NET Framework 4.5 or later (only for Windows). To check if it is installed, go to Control Panel – Add/Remove Programs and look for Microsoft .NET Framework.

If it is not present, download and install from: https://www.microsoft.com/net/download.

Installation

1. Download the Xirrus Wi-Fi Inspector executable from the Wi-Fi Tools section of the Xirrus web site at https://www.xirrus.com/inspector.

2. If upgrading from a version earlier than 2.0, uninstall the old version before installing the 2.0 version. To uninstall the old version for Windows, open the Windows Control Panel or Settings, find the Xirrus Wi-Fi Inspector, then uninstall.

To uninstall the old version for Mac, drag the Xirrus Wi-Fi Inspector from the Applications folder to the Trash. Empty Trash to complete.

3. To install in Windows, double click on the Wi-Fi Inspector file to install, then follow the instructions as prompted. The application will install an icon on your desktop.

To install in Mac OS, drag the file into the Applications folder. Drag the file into the Dock if you want a short cut to start the application.

4. Start the Wi-Fi Inspector by clicking / double clicking the application icon.

Operation

The Wi-Fi Inspector is laid out in 4 tiled windows, each displaying different real-time information about the current Wi-Fi environment. A menu ribbon at the top displays a number of options to control the operation of the application. The following sections describe the different functions of the application and their usage.

Layouts

The layout of the 4 windows within the application can be changed via the options in the Layout section of the menu. By default, all 4 windows are displayed. Customized views can be created by selecting the icon in the upper left of each window to collapse/expand it. For example, by selecting Radar, History, or Networks, only that particular window is shown. Selecting History & Networks displays only those two windows.

Radar

The Radar displays a dynamic view of local Wi-Fi networks (SSIDs). Network names and a corresponding dot are visualized in a circular display with their relative distance from the center of the Radar determined by the strength of their Wi-Fi signal. The orientation of networks around the circle does not indicate actual angle of location, but names are spread for readability. As the signal strength changes for a particular network, the name and dot will move towards the center (stronger) or further away (weaker).

By default, the size of the Radar is small and placed in the upper right hand corner of the application face. A total of 5 network names are displayed, with additional non-labeled dots indicating other networks. The Radar display can be expanded to large size by selecting "Radar" from the Layout section of the menu. This will expand the Radar to full size with more network names displayed.
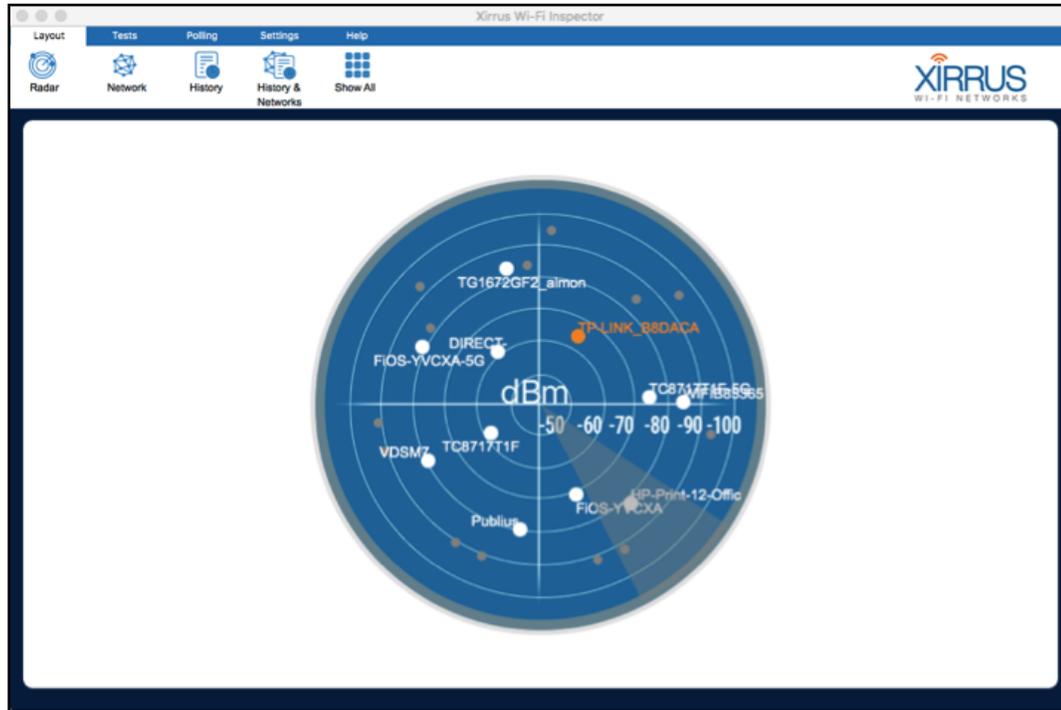
Connection

The Connection window displays detailed information about the current Wi-Fi connection. Wireless information – SSID, BSSID, Channel, Signal level, and Network Mode – is displayed on the left. Address information associated with the connection is displayed to the right. The address information includes the MAC address of the Wi-Fi adapter, the laptop's IP address, the DNS server address, Gateway address, and the External IP address that the system is using to access the Internet. The External IP address is normally an IP address from your Internet Service Provider's network.

To the right of the Connection window, two buttons provide functions to manage your laptop's Wi-Fi connection. The Settings button opens the Windows Wireless Network Connection window (or the Mac Systems Preferences Network window), from which a Wi-Fi network can be chosen to connect or disconnect. The Disable/Enable button allows you to turn on or turn off the Wi-Fi adapter on your laptop.
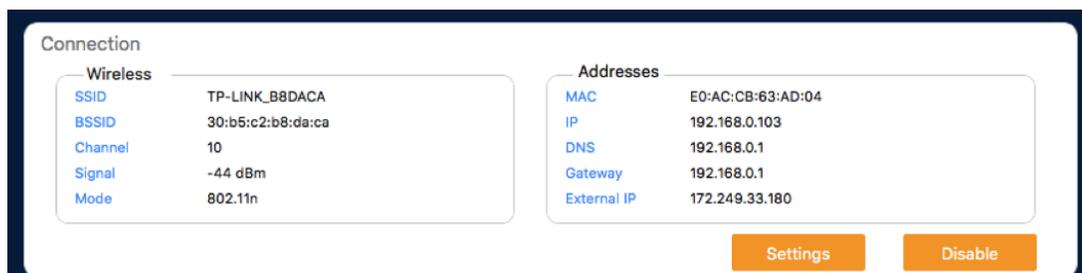
Networks

The Networks window displays a dynamic table of all Wi-Fi networks (SSIDs) that the laptop is detecting in its area. This table updates periodically based on the Polling Interval setting in the Settings window (see below). The row of the currently connected Wi-Fi network (if connected) is highlighted in orange.

The following is a description of the information presented in the Networks table:

- **SSID:** Name of the Wi-Fi network. This is the network name that displays in the Windows Wireless Network Connection window or the Mac Systems Preferences Network window.

- **Signal:** Signal level of the Wi-Fi network in either dBm or %. A colored bar graph visually displays the signal level – green is displayed for signals -70dBm and above, yellow for signals -71dBm to -80dBm, orange for -81dBm to -90dBm, and red for -91dBm and below. A desirable signal level for a robust Wi-Fi connection will be green.

- **Wi-Fi Mode:** Type of Wi-Fi network, either 802.11ac, 802.11b, 802.11a, 802.11g, or 802.11n.

- **Width:** The spectrum width of the Wi-Fi channel, in MHz.

- **Security:** The security type used on the network, whether Open (no security), WPA2/PSK (Windows) or WPA/WPA2 Personal (Mac) which uses a passphrase, or WPA2/802.1x (Windows) or WPA/WPA2 Enterprise which uses enterprise-grade security.

- **Vendor:** The name of the manufacturer of the AP or Wi-Fi device operating the Wi-Fi network

- **BSSID:** The MAC address of the AP or Wi-Fi device

- **Channel:** The Wi-Fi channel the Wi-Fi network is operating on.

- **Frequency:** The frequency of the Wi-Fi channel, in MHz.

- **Network Type:** The type of operation of the Wi-Fi device operating the Wi-Fi network, either Access Point or Ad Hoc.

- **Graph:** Check box to enable/disable graphing of the signal level of the Wi-Fi network over time

Information from the Networks window provides valuable insights to help you design, deploy and optimize your Wi-Fi. For example, use the channel column to ensure you have good Wi-Fi channel design. Channels in the 2.4GHz frequency should typically be set to either 1, 6 or 11 and not any numbers in between. Networks set to other channels will interfere with those running at 1, 6 and 11 and should be changed.

Signal levels are another crucial indicator, allowing you to verify you have good signal everywhere. You will typically want at least one Wi-Fi network (SSID) in the 5GHz frequency and one in 2.4GHz at levels of -65dBm or higher in all areas where Wi-Fi is supported. If the signal levels are lower, you might need to deploy more APs.

Sorting Networks

The Networks window table also provides sorting for each column. If you are connected to a network, this network will always remain at the top of the table, highlighted in orange. The remaining networks will be sorted by the column selected and direction of the arrow. For example, clicking on the signal column will sort the networks by signal strength - either highest to lowest, or lowest to highest. The example below shows signal strength sorted by strongest (lowest) first after the connected network:

Changing Column Order

You can also change the order of columns, simply by dragging a column to where you want it to appear in the Networks table. For example, changing the column order to show SSID followed by Wi-Fi mode and then channel etc. as shown below:

Filtering Networks

Columns in the Networks table allow for filtering of the networks displayed. Each column flashes a funnel "icon" when you mouse over the column. If you select this funnel, you will be presented with a menu for that column that allows you to choose a specific filter. Selecting custom allows for advanced filtering criteria. For example, if you wanted to only view networks with a specific SSID you would mouse over the SSID column, click on the filter icon and select the desired SSID from the menu. Network filtering is only available on the Windows version of the Wi-Fi Inspector.

Locate

The Locate Mode is used to help determine the location of a specific Wi-Fi device. This mode operates similar to a Geiger counter, using sound and visual information to indicate proximity. Enter Locate Mode by right clicking on the network name in the Networks window, then selecting Locate. When in Locate mode:

- The selected network is highlighted in yellow on the Networks table
- The selected network is displayed on the Radar
- The selected network is graphed in the History window
- An audible beep sounds, the frequency of which reflects signal strength. The more rapid the beep, the closer the network and the slower the beep, the further away.

To exit Locate mode, select "Exit Locate" from the Connection window.

Locate mode can even become a tool for detecting and finding rogue access points, helping you ensure the integrity of your network. Say you notice network (SSID) or vendor names you don't recognize operating at a high signal. These may be unauthorized and require removal. By selecting an unfamiliar network in Locate mode, you can use the audible beep to track down its AP.

Signal History

The Signal History window displays a graph of Wi-Fi network signal levels over time. Choose which networks to graph by selecting the checkbox to the far right in the Networks table. More than one network can be graphed at one time. Up to 500 seconds (about 8 minutes) of signal level history is graphed.
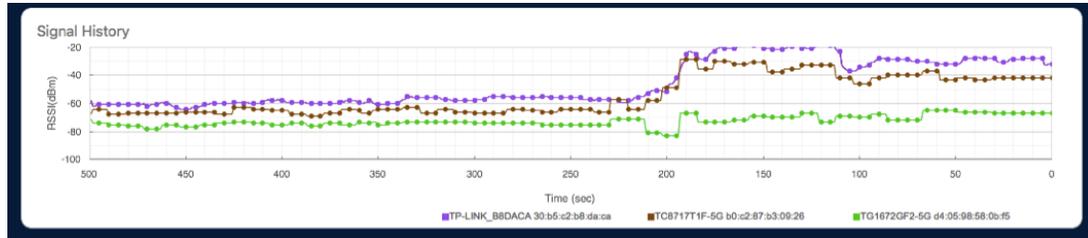
Tests

The Wi-Fi Inspector provides three tests to assist in troubleshooting and characterization of a Wi-Fi connection – Connection, Quality, and Speed tests.

From the Tests menu, Connection Test runs 5 Pings each directed to the DNS server, Gateway, and an Internet address, plus runs a DNS lookup. A pop up window displays the test results with an indication of Pass, Warning, or Fail. Any lost Pings or an average Ping latency of greater than 100 msec to the Gateway or DNS server, or greater than 250 msec to the Internet, will result in a 'Warning.' Ping or DNS lookup failure will result in a 'Fail.'
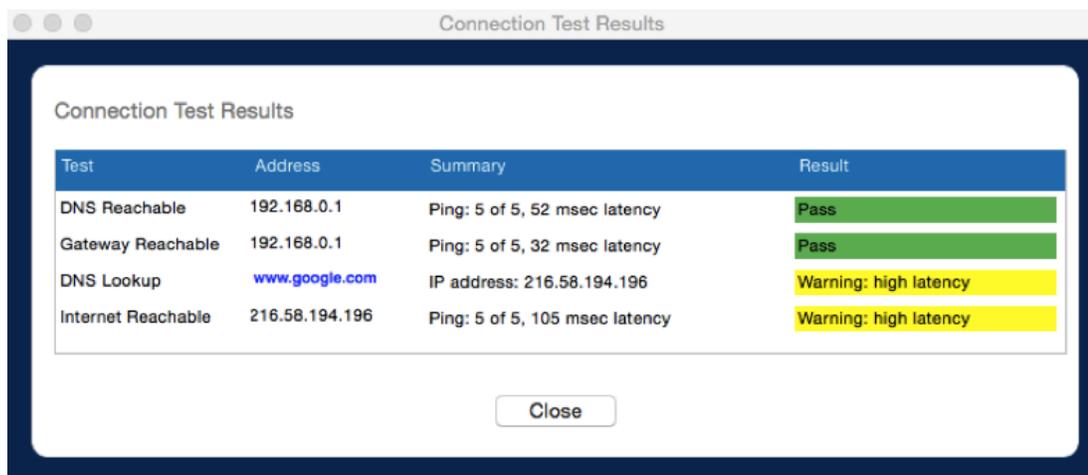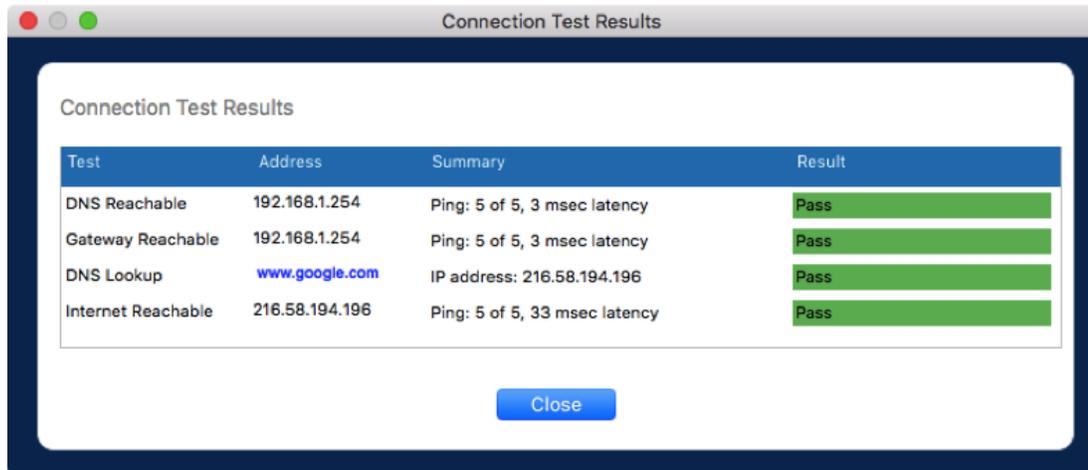
The Quality Test links to the www.pingtest.net web site which allows you to run a test measuring the quality of your laptop Internet connection. From the web site, click on BEGIN TEST to start the test. Results provide the packet loss, latency, and jitter on your connection, plus an overall quality grade. The Speed Test links to the www.speedtest.net web site from which performance tests to the Internet can be executed. From the web site, click on BEGIN TEST to start the test. After the test, the latency and download/upload speeds of your laptop Internet connection are provided

Using the Wi-Fi Inspector to Troubleshoot

Using the information presented by the Wi-Fi Inspector and the built-in tests, a simple four-step process can be taken to quickly analyze and troubleshoot issues with a system's wireless and network connection. End users can run the utility and report the provided information back to their Helpdesk as part of diagnosing issues.

1. **Wireless configuration** information is displayed and updated in real-time in the Connection window. The Wireless sub-section indicates if the system is currently connected to the wireless network. If "NA" is listed in these fields, the system is not wirelessly connected to the Internet and troubleshooting should begin with the Wi-Fi connection.

2. **Network configuration** information is displayed and updated in real-time in the Connection window. The Addresses sub-section displays IP address data, including the laptop's IP, Gateway, DNS, and External IP addresses. The External IP is the IP address of the laptop's connection to the Internet – normally from the ISP (Internet Service Provider). If "NA" is listed in one or more of these fields, the system may not be appropriately connected to the network for proper communication to occur. An IP address of the form "169.254.x.x" indicates the laptop is probably not receiving addresses via DHCP. An "NA" for the External IP likely indicates there is no Internet connection.

3. **Network connectivity** is tested by selecting "Connection Test" from the menu. The Connection Test checks the state of the network connection by sending 5 Pings to each of the Gateway, DNS, and External Internet IP addresses. If not all Pings were successful or the average latency is high (greater than 100 msec to the Gateway or DNS server, or greater than 250 msec to the Internet), there may be an issue with the quality of the wireless connection or the configuration of the wired network. No successful Pings to the Internet indicates that the Internet connection is down.

4. **Network performance** is tested by selecting "Quality Test" and "Speed Test" from the menu. These tests run performance tests from external Internet servers to your laptop. The results of the Quality Test, summarized as a letter grade, indicate your ability to run all types of applications over your Internet connection, in particular VoIP and streaming media which are sensitive to delay and packet loss. The Speed Test results provide the upstream and downstream speed of your connection. If the numbers for your Internet connection speed are lower than expected or previously measured, there may be issues with the quality of your wireless connection, congestion on the network, or issues with your ISP.

Polling

The polling interval of the application determines how frequently the Wi-Fi adapter scans the air to update information about local networks. The default setting is every 5 seconds and is set via the Settings window – see below. Polling is on by default but can be turned off by selecting "Stop" from the Polling menu. The "Refresh" option executes an immediate poll.

Settings

■ To change application settings, click on the Settings button from the main menu. Settings for the Windows version of the Wi-Fi Inspector include:

■ Selected Adapter: Choose the Wi-Fi adapter you want to display information about on the main widget face (when more than one adapter is present on your system)

■ Display Units: Select units to display signal strength (RSSI), either % or dBm. A 0% signal corresponds to -100dBm. A 100% signal corresponds to -50dBm or greater.

■ Sweep Type: Select either a radar or sonar style sweep animation for the Radar window. The animation can also be disabled.

■ Locate Sound: Choose to either enable or disable beeping sound in Locate mode.

■ Polling Interval: Select the interval in seconds that the Wi-Fi Inspector samples new Wi-Fi information. The shorter the interval, the faster the widget will update information.
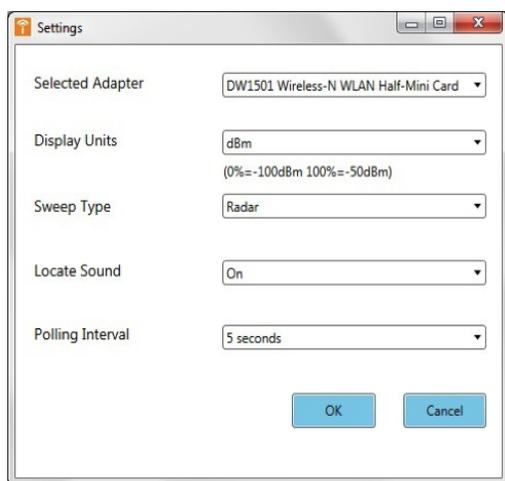
Settings for Mac include all the above except Selected Adapter.
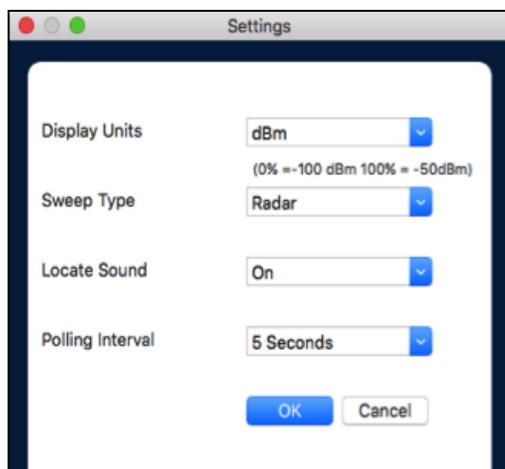
Export Networks

Select "Export Networks" from under Settings in the main menu to save the current Networks list to a .csv file. A snapshot of all current SSID data is saved into the file. This feature enables a snapshot of the current Wi-Fi networks in the area and can be used for future analysis or remote troubleshooting of the Wi-Fi network.

Tips

1. To reduce CPU utilization of the application, increase the Polling Interval (from Settings window) and/or select "None" for the Sweep Type on the Settings window.

2. Click on the column headers on the Networks table to sort by that item. This is especially useful if there are a lot of networks (SSIDs) present.

3. Identify Ad Hoc networks (a potential security threat in Wi-Fi networks) using the Network Type column in the Networks table. This column will display values of either Access Point or Ad Hoc.

Known Issues

Following are known issues with the 2.0 version of the Xirrus Wi-Fi Inspector:

- The Wi-Fi Inspector must be uninstalled before being updated or reinstalled.
- The Enable/Disable network adapter function requires administrator privileges to be operated.
- The Wi-Fi Inspector may not run properly on systems running virtualization software such as VMware or VirtualPC.
- Mac OS users must run version 10.11 or greater for full Layout functionality (including Radar and History & Network full size displays).

Updates

The Xirrus Wi-Fi Inspector may be updated periodically with new features and fixes. The latest versions are posted for free download from the Xirrus website, Wi-Fi Inspector page: www.xirrus.com/inspector.

Support/Feedback

The Wi-Fi Inspector is a free tool and does not come with a guarantee of support. However, inquiries and feedback about the Xirrus Wi-Fi Inspector can be made by sending an email to inspector@xirrus.com.

Also Available

Xirrus also offers a free design tool for Wi-Fi networks called Wi-Fi Designer. This cloud-hosted application allows you to visualize Wi-Fi coverage on a floor plan to determine the number and optimal placement of access points when designing a Wi-Fi network. Wi-Fi Designer is available from the Xirrus website on the Wi-Fi tools page at: www.xirrus.com/free-tools/.

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