

# Wi-Spy User Guide

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## Interference Identification Guide

Troubleshooting with Wi-Spy is easiest with a laptop. Our Chanalyzer software requires .Net 2.0 (or higher), which runs on all recent versions of Microsoft Windows (Windows 2000 and newer). Third-party software for Linux and Mac OS X is also available.

### ***Gathering Data***

If you are doing a site survey before installing a new wireless network, or adding an access point to an existing network, it is useful to gather 24 hours of Wi-Spy data. Just plug-in the Wi-Spy, start Chanalyzer and let it run for a day. After the data has been collected by Chanalyzer we suggest saving the recording (select File > Save Recording As...), as it may be useful in the future for comparison. Wi-Spy Recordings (\*.wsr files) require about 5MB per hour of recorded data.

## ***Review the Recording***

Chanalyzer can show up to 1 hour of data at a time allowing you to quickly skim through the 24 hour recording (this is easiest by just clicking on the playback track bar in hour increments). If you have a specific 802.11 channel that you plan to use change the X-axis labels to Wi-Fi and highlight that channel to make it easier to spot interference on that channel.

Chanalyzer also provides an analysis of all Wi-Fi channels. Select "Wi-Fi Report" from the Reports menu to obtain detailed information about each channel, including a composite "grade." The grade is a measurement of how quiet the channel is; the higher the grade, the quieter the channel.

The following screenshot shows Channel 1 highlighted. The red lines demarcate the boundary of the 22 MHz wide 802.11b channel that is being used. The IEEE 802.11b standard defines 14 channels, although some channels are not available in certain countries. Cisco has a comprehensive list of 802.11a/b/g channel definitions as well as a table showing which regions allow each channel. (Note: Chanalyzer support for Channel 14 can be enabled in the File->Preferences dialog)

## **Identifying Interference Signatures**

Chanalyzer provides visualization of your wireless landscape in three dimensions (frequency, amplitude, and time). By utilizing all three views in Chanalyzer most interference signatures can be quickly identified. Identifying device signatures is similar to identifying aircraft by their silhouettes in WWII to immediately determine if an approaching plane was friend or foe. The [Device Signatures](#) Library is a growing collection of recordings of common devices that you are likely to encounter.

With the ever-increasing popularity of Wi-Fi, you are likely to encounter neighboring Wi-Fi networks. There are a number of useful tools available to gather Wi-Fi-specific information, such as our free open-source [Insider](#). This tool generally shows you the network name (SSID), channel, signal strength, and type of security.

### ***Features:***

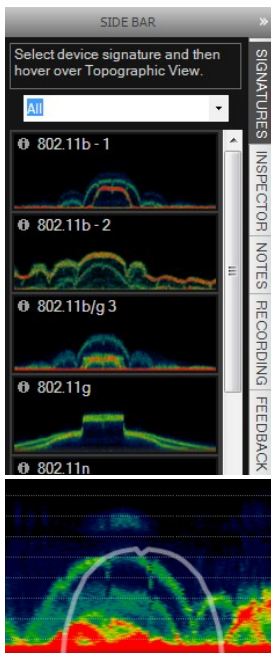
- Typical 2.4GHz and 5GHz device signatures are identifiable using the **Signatures** tool.
- Run Wi-Spy 2.4x, Wi-Spy DBx, Recordings, and Networked Wi-Spy simultaneously
- Wi-Fi network information such as SSID, Channel and dBm. (This does not use the Wi-Spy 2.4x. It uses the WiFi card on the computer)
- 5GHz support with the Wi-Spy DBx
- Networked Wi-Spy. (See [Remote-Wi-Spy](#))
- Better handling of the timeframe.
- More Device Signatures.
- Marker details in Inspector
- Chanalyzer 3 records without any implemented time limit.
- **Inspector** will display frequency, amplitude and popularity of whatever point the mouse hovers over.
- **Notes** allows you to add time-specific annotations to interference instances in a recording.

# Troubleshoot:

## Signatures

Signatures is a great tool Metageek has implemented to help users identify shapes in the spectrum. When Signatures is selected on the right navigation tab, there will be several options listed; 802.11b, 802.11g, 802.11n, Uniden Cordless Phone, and Wireless Mouse/Keyboard.

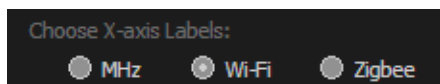
**Note:** Signatures requires [Wi-Spy 2.4x](#) or [Wi-Spy DBx](#).



An overlay will follow the mouse over the topographic display, letting you match the shapes presented

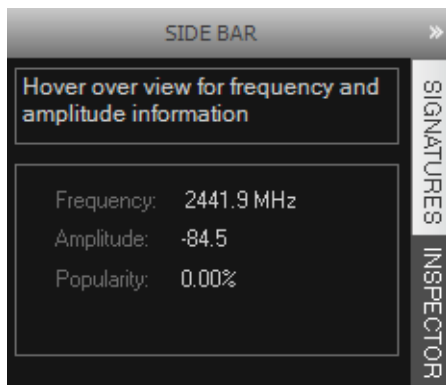
## Visualization Tools

### Axis Labels



### Show Frequencies

Click "Inspector" on the Side Bar. This will allow you to hover over a point in any of the displays to get the frequency, Amplitude, and Popularity. This function will work live, and on pause.



## Channels

Make sure you have WiFi chosen on the axis label, then select one of the channels (1-11), and you will be able to display the general range the WiFi uses. You can use this to troubleshoot and visually see what channels generally overlap and where interfering may possibly be occurring. To remove the overlay, simply click the channel on the axis label again.

## Reports

The Reports menu contains reports for Wi-Fi and Zigbee channels. The reports contain a synopsis of each channel, and a comprehensive grade. The grade is a measurement of how quiet the channel is; the higher the grade, the quieter the channel. The report can be sorted by any column by clicking on the column header. The report data can also be copied and pasted into a spreadsheet by clicking the "Copy to Clipboard" button.

Channel	Grade	Duty Cycle	Average Floor (dBm)	Average Peak (dBm)
1	100 (A)	0.3	-117.1	-72.2
2	100 (A)	0.3	-117.2	-72.7
3	100 (A)	0.2	-117.1	-73.3
4	100 (A)	0.1	-117	-72.3
5	100 (A)	0.1	-116.9	-72.3
6	100 (A)	0.3	-116.7	-71.9
7	99 (A)	0.4	-116.6	-72.2
8	99 (A)	0.4	-116.6	-73.2
9	99 (A)	0.5	-116.4	-72.6
10	99 (A)	0.5	-116.4	-72.4
11	100 (A)	0.3	-116.5	-71.6
12	100 (A)	0.3	-116.6	-69.9
13	100 (A)	0.2	-117	-73.7

## Markers

Chanalyzer 3.2 allows the user to mark points on the spectrum by double clicking on any of the display windows. To remove them, simply double click on the marker you would like to remove. If you would like to move a marker, simply click and drag it. Detailed information regarding each marker can be found under the inspector tab.



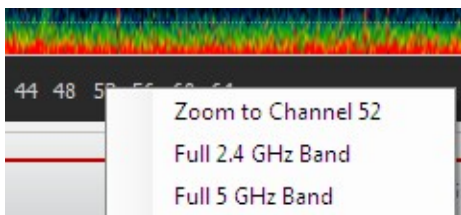
# Hardware Configuration

There are two ways to enter in the frequency you would like to view: Enter the Center frequency and its span, or enter the beginning and end frequencies.

The step and resolution should then be adjusted according to the user's preference. A good recommendation for these settings is to have the resolution be 125 % of the step size.

## Channel Zoom

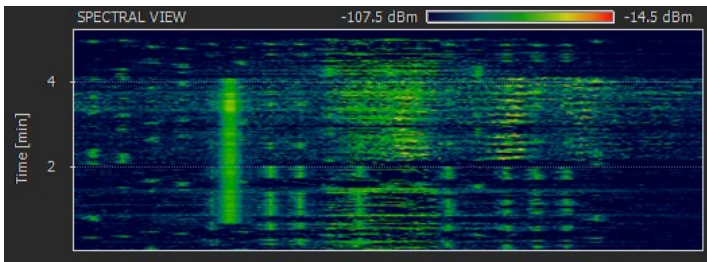
By right clicking on the channel on the x-axis, you can choose to zoom in, or revert back to the full 2.4 range.



# Display

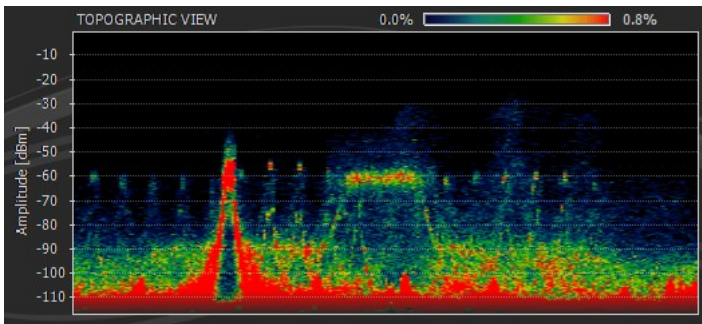
## Spectral View

The Spectral View contains a waterfall graph that shows amplitude over time for each frequency. Based on the [timeframe](#) a row is added to the Spectral View every X seconds or minutes. The color of each frequency/time coordinate represents the amplitude of that frequency, with dark blue representing low amplitudes and bright red representing high amplitudes as shown in the legend.



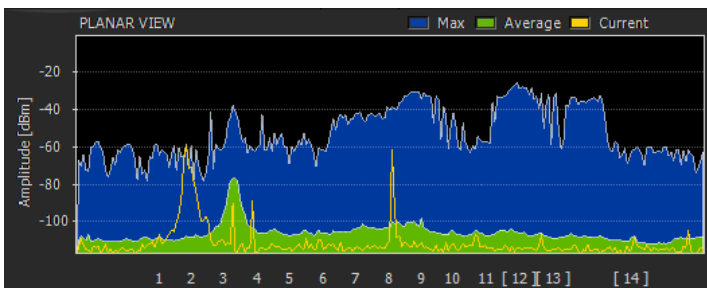
## Topographic View

The Topographic View contains an amplitude over frequency graph similar to the Planar View, but instead of showing the current amplitude of each frequency it shows the popularity of each frequency/amplitude coordinate during the time displayed. The coloration of the Topographic View is similar to the Spectral View with blue being low and red being high, but the coloration now represents the "popularity" instead of the amplitude.

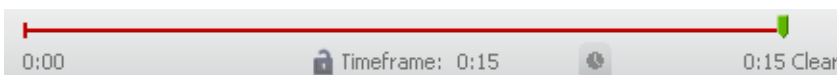


## Planar View

The Planar View shows a typical amplitude over frequency display. The yellow line shows the current amplitude, the green shows the average amplitude, and the blue shows the maximum amplitude. Click the Current, Average, and Max labels in the Planar View controls to toggle the display of the corresponding trace. You can also press CTRL ALT M, A, or C to turn off the Max, Average, or Current display.



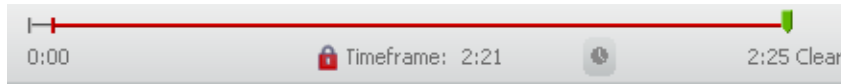
## Timeframe



The timeframe controls how much data is displayed in the views. Each view ([Spectral](#), [Topographic](#), and [Planar](#)) shows a different look at the same data to help you better visualize your wireless landscape. For

fast frequency hopping devices, a short timeframe works well; for wi-fi and other devices that do not change channels, longer timeframes tend to show a better "signature" in the Topographic View.

## Locking the Timeframe



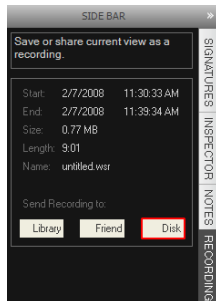
toggling between different lengths of recordings can aid you in your understanding of shapes of wi-fi activity. You can lock the timeframe by clicking the lock. Then if needed, adjust the length by grabbing the tail.

If you lock the timeframe, Chanalyzer will only display the length of time you have selected. This is a great tool to use while watching a fast frequency hopping device. The minimum display time is 30 seconds, and you can drag it to show whatever segment you wish.

## Share Recordings

### *Saving Data As a Recording*

Chanalyzer automatically saves all data in your default user temp directory. To save all (or part) of the saved data to a recording click the Sidebar > Recording > Disk ... A file dialog box open asking you for a file name. Click "untitled.wsr" to give it a new name. This will save the entire recording, or just the time selected. All signal strength data is recorded to a file along with the timestamp of each spectrum sweep.



### *Play a Recording*

To Play a recording either double click on a recording file (\*.wsr) or select File > Open Recording and select a recording file. You may also select a recently opened recording from the File > Recent Recordings submenu. A new tab will be created and the playback controls shown below will appear in the top right corner of the tab



The elapsed time and current timestamp are both displayed on the left side. The right side contains the playback trackbar which can be clicked or dragged to easily navigate to anywhere in the file (When the mouse hovers over the playback trackbar a tooltip will display the elapsed time of that position). The playback trackbar also indicates the section of the recording currently displayed in the views (notice the red line that trails the play position indicator). To adjust the amount of data displayed in the views adjust the Timeframe. Below the slider bar are the following buttons:

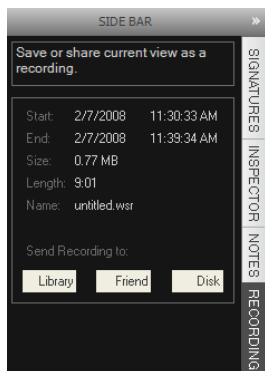
- Rewind
- Pause
- Play (1x)
- Fast Forward (2x)
- Fast Forward (4x)s

## ***Upload to Library***

MetaGeek.net has a small, but growing library of downloadable recordings. There are recordings of everything from cordless phones interfering with wi-fi downloads to experiments with microwave ovens. We encourage you to share any interesting or unique recordings with the community by uploading them to the library.

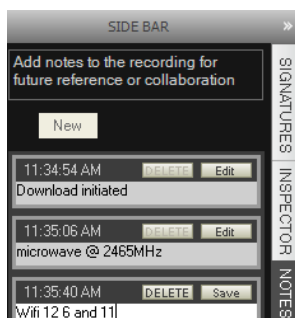
## ***Send to Friend***

Click "Send to Friend" to send a recording via email.



## ***Notes***

Chanalyzer is capable of storing notes associated with certain time points on the timeline. The user can either pause the recording, or while live display is going, press "new" and describe the event.



Notes are a powerful tool to bookmark interference in your chanalyzer recording. When using Insider, you can identify which WiFi networks are on what channels and note them accordingly. Embed these to the recording using the notes feature for future reference.

Notes are especially useful to MetaGeek, it helps us identify certain devices in your recordings.

For examples of how notes can be utilized, please check out the sample recordings on the [webpage](#). Download, open the \*.wsr in Chanalyzer, and then click on the notes tab!

# Connect to a Remote Host

## Requirements

- Remote Computer with a Wi-Spy 2.4x and Wi-Spy for Recon
- Windows 2k or higher
- .Net Framework 2.0

If the remote Wi-Spy is within your local area network, the device will appear in the devices window. Click on Open Device. You can also set Chanalyzer to automatically open network devices in preferences.

For those of you looking for a linux version of Recon for Wi-Spy, it already exists! It is part of the [Spectools Package](#). Chanalyzer 3 will connect to Spectools\_net as well as Wi-Spy for Recon.

Chanalyzer 3 allows the user to connect to a remote host with a Wi-Spy 2.4x running Wi-Spy Recon. The IP address of the computer with the Wi-Spy will be needed later.

Recon for Wi-Spy is a lightweight software program, that turns a computer into a Wi-Spy 2.4x data server.

## Using Recon

Give the Wi-Spy a simple easy to remember name.

*"Downtown Office"*

Write down the IP address of the computer. You will need this when accessing the Wi-Spy 2.4x from a different location. If you do not know what it is go here: [Whatismyip.com](#)

From another computer, open Chanalyzer 3.2.

- File > Connect to a remote host
- Click the Radio button, "Enter IP address of Remote Wi-Spy"

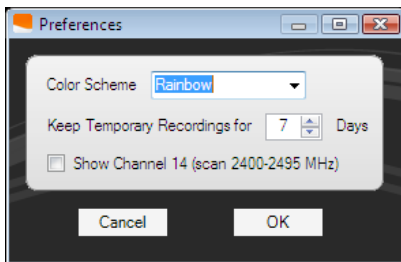
## Keyboard Shortcuts:

File Menu	
Ctrl + O	Open Recording...

Ctrl + W	Close Tab
Ctrl + S	Save Recording As...
Ctrl + Home	Preferences...
Alt + F4	Exit
<b>View Menu</b>	
Alt + S	Toggle Spectral View Display
Alt + T	Toggle Topographic View Display
Alt + P	Toggle Planar View Display
Ctrl + Shift + F	Show Frequency Labels
Ctrl + Shift + W	Show Wi-Fi Channel Labels
Ctrl + Shift + Z	Show Zigbee Channel Labels
Ctrl + C	Copy Image
Ctrl + Shift + S	Save Image As...
<b>Help Menu</b>	
F1	Open Help Contents
<b>Planar View Controls</b>	
Ctrl + Alt + C	Toggle Planar Current Trace Display
Ctrl + Alt + A	Toggle Planar Average Trace Display
Ctrl + Alt + M	Toggle Planar Max Trace Display

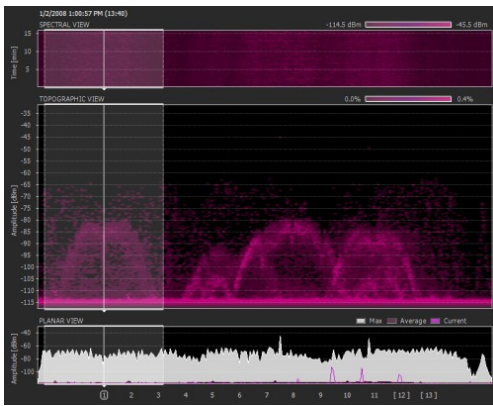
## Preferences

By going to File > Preferences you can change the color options, and change Chanalyzer's temporary storage options. You can also press Ctrl + Home to access preferences as well.



### Color Blind Option

MetaGeek implemented a color option in the preferences section to help our color blind customers. To use this feature, go to **file > Preferences** and then choose **"Purple"** color scheme in the drop down box.



# Connect to a Remote Host

Remote Wi-Spy troubleshooting

## Requirements

- Windows 2k or higher
- .Net Framework 2.0

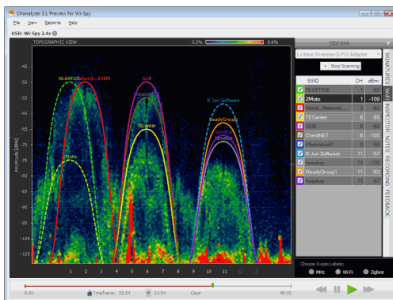
For those of you looking for a linux version of Recon for Wi-Spy, it already exists! It is part of the [Spectools package](#). Chanalyzer 3 will connect to Spectools\_net as well.

Chanalyzer 3 allows the user to connect to a remote host with a Wi-Spy 2.4x running Wi-Spy Recon. The IP address of the computer with the Wi-Spy will be needed later.

Recon for Wi-Spy is a lightweight software program, that turns a computer into a Wi-Spy 2.4x data server.

## Wi-Fi

Chanalyzer 3 now integrates information from your wireless card though it is not guaranteed to work with every device. The Wi-Spy 2.4x is incapable of reading SSID information, and can not be selected as a network device.



Access points can be displayed by ticking the box next to the name.

	SSID	CH	dBm
<input type="checkbox"/>	RI-OFFICE	1	-50
<input type="checkbox"/>	2Moto	1	-100
<input checked="" type="checkbox"/>	Worst...Network.....	2	-50
<input type="checkbox"/>	TECenter	6	-67
<input type="checkbox"/>	GOB	6	-50
<input type="checkbox"/>	ClientNET	6	-53

An overlay will then appear in the topographic view.

Users maintaining multiple access points can set them to avoid interfering with each other. It also allows them to understand what is not Wi-Fi data, and that could possibly cause interference.

Currently the Wi-Fi data is not stored with a Wi-Spy recording. The Wi-Fi functionality will only work in real time.