Chanalyzer + Wi-Spy User Guide

🌐 **support.metageek.com**/hc/en-us/articles/201872824-Chanalyzer-Wi-Spy-User-Guide

Table of Contents

- Installation
- Connect to a Cisco CleanAir Access Point (Requires Cisco CleanAir Accessory)
- Wi-Spy Mode
- Choose a Wireless Network Interface Card (NIC)
- Navigation Pane
- Overview Pane
- Details Pane (Wi-Spy Mode)
- Device Finder
- Details Pane (CleanAir Mode)
- Device Interferers Table
- Report Builder (Requires Report Builder Accessory)
- Automatic Classification (Wi-Spy Mode)
- Lab (Requires Lab Accessory)

Visualize and Troubleshoot WiFi Interference with Chanalyzer 5

Chanalyzer 5 turns RF spectrum data collected from Wi-Spy or a Cisco CleanAir-enabled access point (with accessory purchase) into highly interactive charts and graphs, allowing you to visualize your wireless landscape. Chanalyzer displays wireless access points and other transmitters as they appear in the spectrum, giving quick insight into whether interference is WiFi or non-WiFi related.

Note: The features and abilities of Chanalyzer depend on which data source you are using. When connected to a CleanAir® AP, WiFi data will be unavailable. If using Chanalyzer in Wi-Spy mode from within a virtual machine, an additional USB WiFi adapter is required to gather network data.
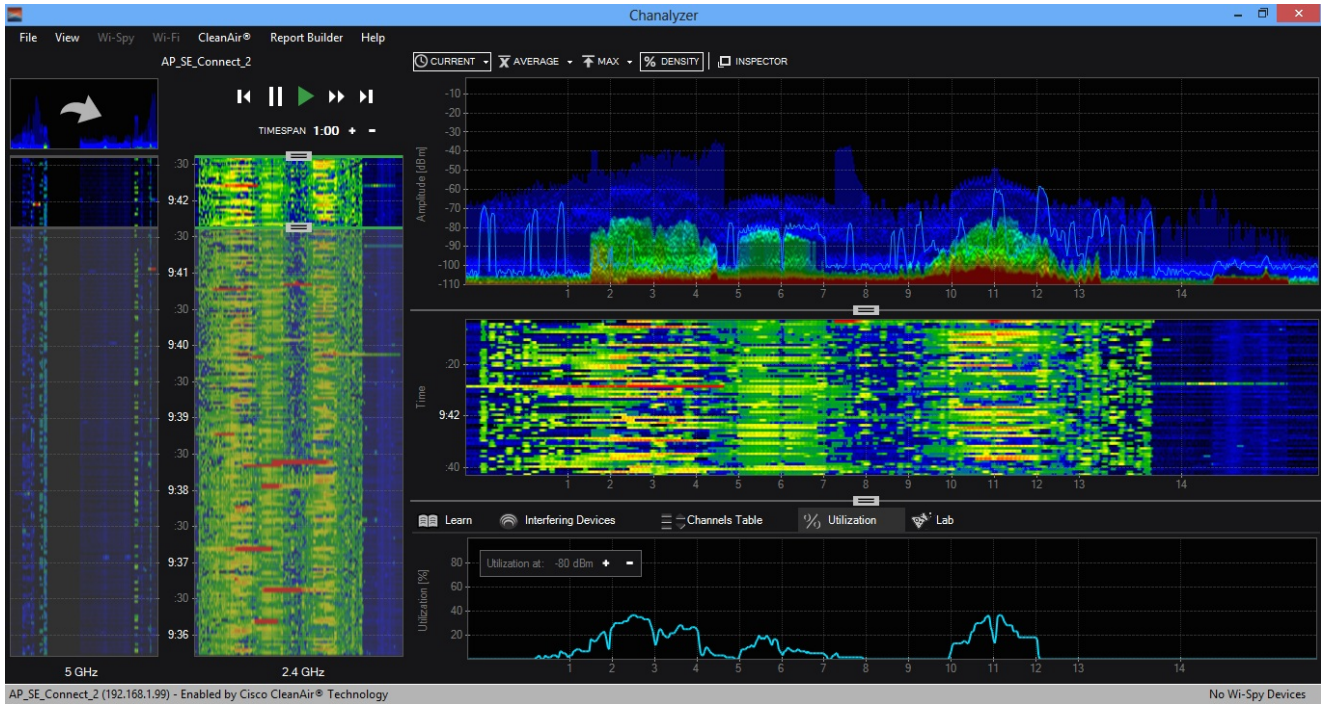
System Requirements

OPERATING SYSTEM: **Microsoft® Windows 10, 8, 7, Vista, XP**

Mac OS X VIRTUALIZATION: **VMware Fusion, Parallels**

Note: Virtual Machines require an external USB WiFi adapter to view WiFi information.

DISPLAY RESOLUTION: **1024x600** (or better)

FRAMEWORK: **.NET Framework 4.0**

USB PORT: **1.1** (or better)

RAM: **4 GB** (recommended)

MetaGeek Wi-Spy Mode

HARDWARE: **Wi-Spy 2.4x or Wi-Spy DBx** and **Built-in WiFi card** (802.11a/b/g/n recommended, b/g/n compatible)

Cisco CleanAir Mode (Requires Cisco CleanAir Accessory)

HARDWARE: **Cisco CleanAir-enabled Access Point** (for remote troubleshooting)

SUPPORTED: Cisco Aironet 1500, 2600, 3500, 3600, and 3700 series

Installation

1 - Download Chanalyzer

http://www.metageek.net/support/downloads/

2 - Run the installer

Locate the installation file and run it. Follow the installer prompts.

3 - Run Chanalyzer

In Windows 7, click the **Start** button, click **All Programs** > **MetaGeek** > **Chanalyzer**.

In Windows 8, press the **Windows** key on the keyboard, type **Chanalyzer**, and press **Enter** or click on the icon.

Cisco CleanAir Mode

Connect to a Cisco Access Point (Requires Cisco CleanAir Accessory)

The three different operating modes of a Cisco CleanAir access point determine which types of data are available to Chanalyzer.

Local - Each Cisco CleanAir-enabled access point radio provides air quality and interference detection reports for the **current operating channel only**. Local mode does not disrupt client connections. When a hybrid-REAP access point is connected to the controller, its Cisco CleanAir functionality is identical to local mode.

Monitor - When Cisco CleanAir is enabled in monitor mode, the access point provides air quality and interference detection reports for **all monitored channels**. Monitor mode allows the AP to share spectrum analysis dwells for collection of WiFi data.

SE-Connect - This mode enables a user to connect Chanalyzer running on an external PC to a Cisco CleanAir-enabled access point in order to display and analyze detailed spectrum data for **all WiFi channels on a radio**. In this mode, an access point is used strictly as a spectrum analysis capture interface and does not provide any WiFi, RF, or spectrum data to the controller.

There are two options for connect to a CleanAir Access Point using Chanalyzer:

CCF File - From the Cisco Prime administration page you can download a .ccf file that contains details about an access point, such as the NSI key. Use Chanalyzer to open the file and start capturing spectrum data.

Chanalyzer Direct Connect - Within Chanalyzer, use the **CleanAir** menu to select **Connect to a CleanAir AP**. You will need to enter the IP address and NSI Key, and you can assign it a friendly name. If the AP has a WSSI monitor module, select the checkbox.


Chanalyzer will keep a list of your recent connections so you can quickly toggle between multiple APs.

Wi-Spy Mode: Choose a Wireless Network Interface Card (NIC)

Select a built-in or connected wireless network card in the main menu to access additional WLAN information about SSIDs, RSSI, MAC address and data rate. Click **WiFi** in the menu bar, and then click the name of your wireless network card to collect WiFi data in conjunction with the spectrum data.

Note: Wi-Spy is a spectrum analyzer. It is not capable of reading at the WiFi packet layer. Therefore Wi-Spy will not appear in the WiFi card drop-down list. Due to the way Mac OS X handles WiFi, if you are running Chanalyzer in a VM, you will need an additional USB WiFi adapter to collect network information.
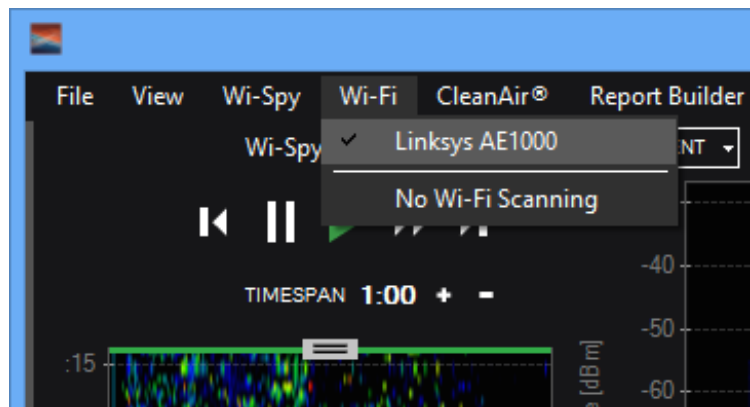

Occasionally a wireless network card will actively perform probe requests on all WiFi channels, creating noise across the entire band with power levels above -40dBm. This background activity can often skew the results of a spectrum analysis site survey. If you

notice this behavior with your wireless network card and don't want the additional noise in your recording, we recommend that you select **No WiFi Scanning**.

See WiFi Channel Labels in the Density View

In the main menu select **View > WiFi Channels**. This will change the x-axis to display the WiFi channels instead of the corresponding spectrum frequencies.

Application Window Details
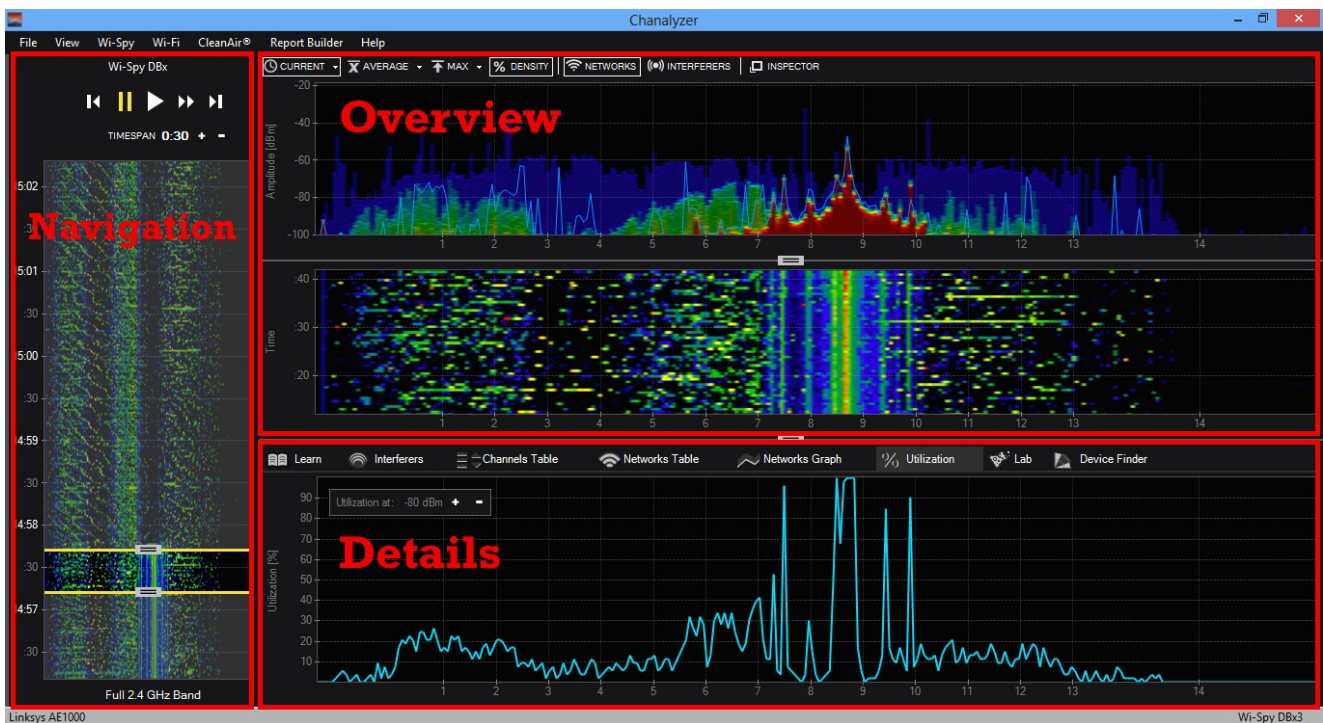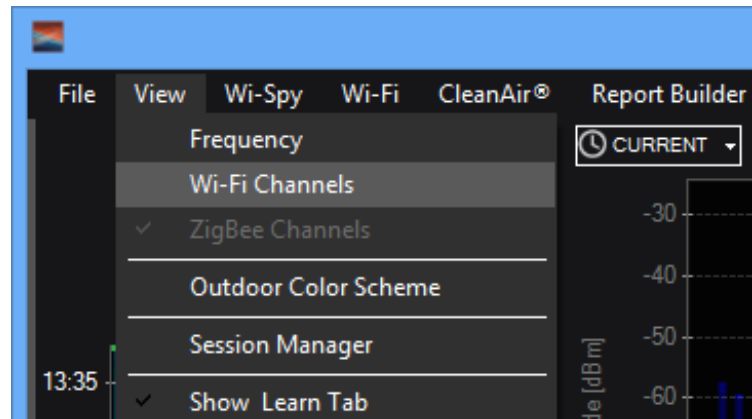
Navigation Pane

The Navigation Pane provides controls for browsing Wi-Spy/WiFi recording sessions. Within the Navigation Pane, you'll find:

Device Selector (Wi-Spy Mode)

Chanalyzer continuously logs data from multiple sources when connected to your computer. To change which band you're currently analyzing and recording, select an option from the **Wi-Spy** menu.

Session Navigator (Wi-Spy Mode)

Each time a user selects a new frequency range in the Wi-Spy menu, the previous data is saved as a session in a Wi-Spy Recording. Active sessions are indicated with a red record icon, meaning there is currently data being added to the session. The session currently being displayed in Chanalyzer, whether it is active or not, will have a green box around it.

Renaming a Session

Sessions can be renamed to represent various points in a recording. This feature is primarily used to identify locations however it can also be used to identify smaller frequency ranges. It's handy to rename sessions to help you navigate through several surveys.
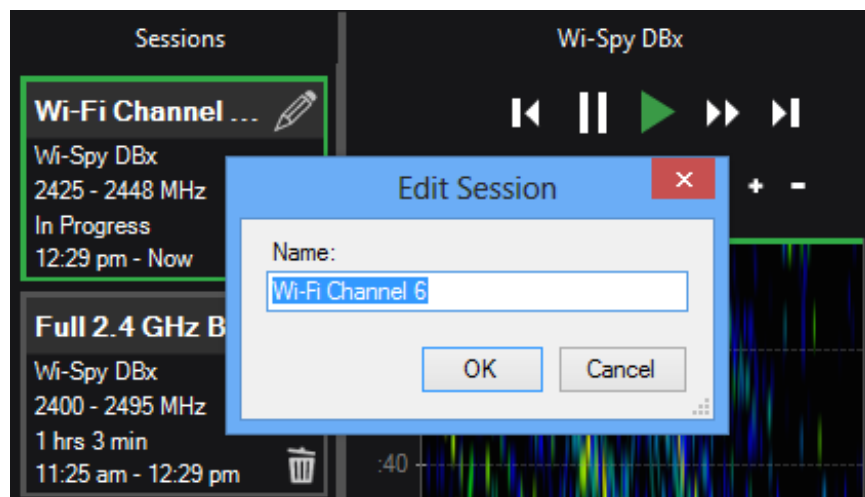

Timespan Controls

The Timespan controls adjust the length of time users see in the Overview and Details panes. Timespan adjustments allow users to narrow in on anomalies and moments in time when WLAN performance suffered. The playback buttons are used to Play, Pause, Rewind, and Fast Forward while viewing a capture. The playback controls can also aid in selecting smaller time spans in the waterfall navigation.

Waterfall Navigation

Waterfall Navigation colorfully displays all data in the current Wi-Spy session to show the section of time detailed in the Overview and Details panes.

To move to a specific position within the session, double-click a point within the waterfall. You can also click and drag the head and tail of the highlight slider region to easily adjust the timespan in the Waterfall Navigation.

If two Wi-Spy devices are connected, two waterfall views are visible. To swap the active band, click the arrow in the inactive band's thumbnail.
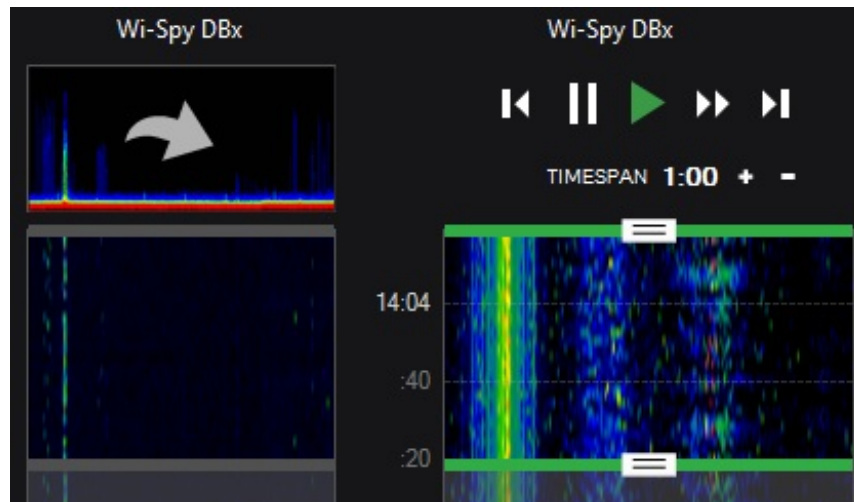
Overview Pane

This pane, located at the top right of the Navigation pane, contains the Waterfall and Density views.

Density View

The Density View displays how often a signal is detected at a specific amplitude. After a short time of gathering data, patterns begin to emerge in the Density View. A density map view enables the user to quickly identify packet-based and analog patterns that may be interfering with your network.
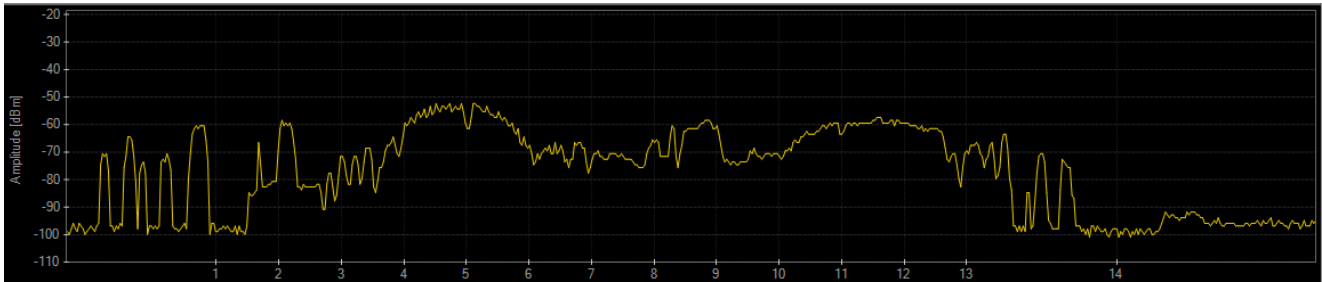
Display Options

The Density View has several view options. All of the display options can be toggled on and off as needed, and the trace colors customized. Users can employ combinations of these options to troubleshoot more efficiently.

Current

The current display option represents the received values at the most recent reading in the time span. By default this will be real-time unless the user has changed the time span settings to previously captured data.
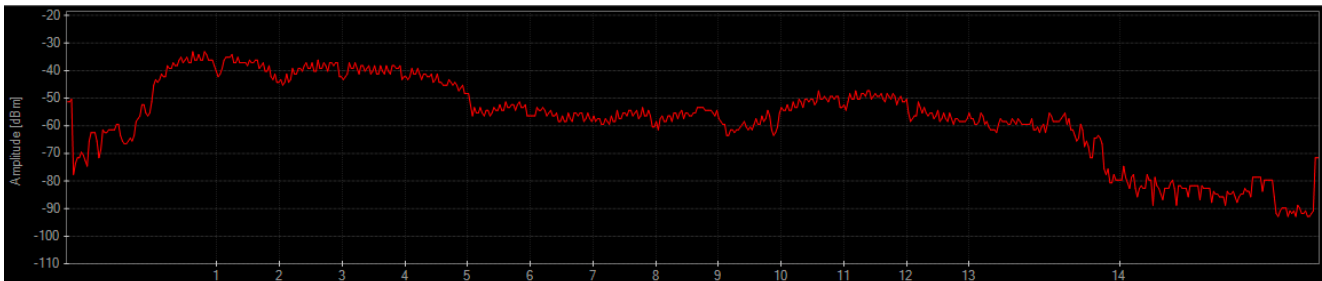

Average

The average display option represents the average of the received spectrum activity in the selected time span. For example, if the time span is 1 minute, the average will be calculated in the rolling 1 minute.
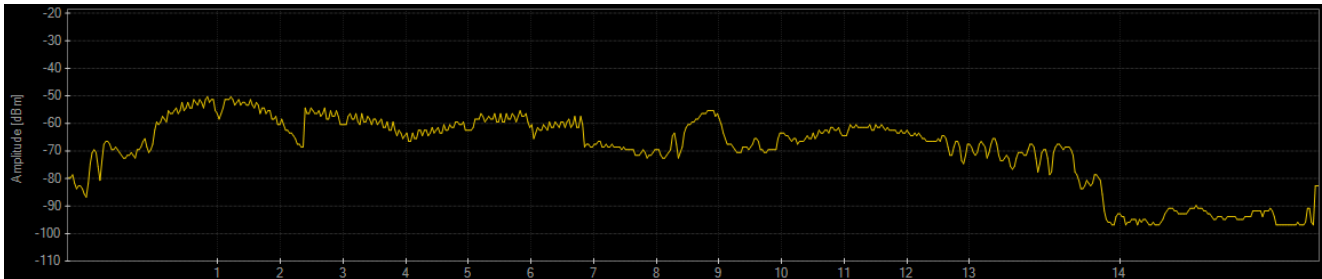

Max

The maximum display option represents the maximum values received from the Wi-Spy across the band in the selected time span.


Density

This view emphasizes how constant noise is across the spectrum. At any given point, Chanalyzer assigns a color based on how much of the energy in a range of time is above that point. If 50% of all the activity is above an amplitude point, Chanalyzer colors it red. This display option is especially useful in understanding just how constant interference is

within a given range of time.
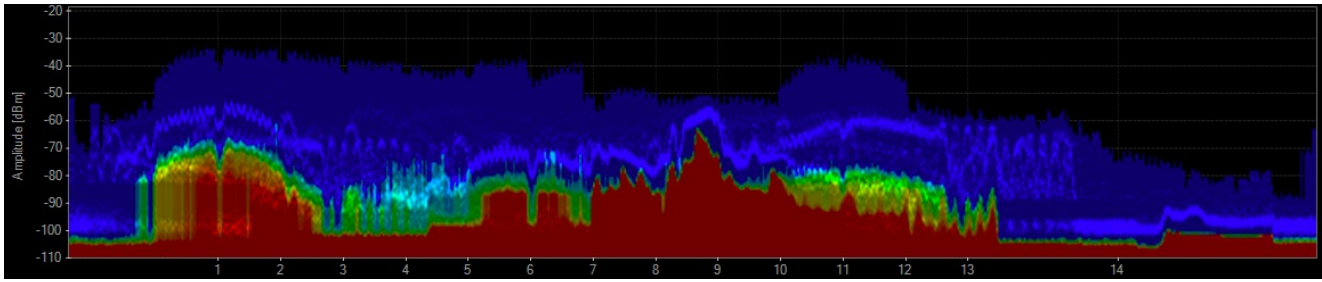
Networks (Wi-Spy Mode)

By selecting SSIDs in the Networks Table, Chanalyzer will draw overlays in the density view to help the user interpret which ones may be experiencing the most congestion.
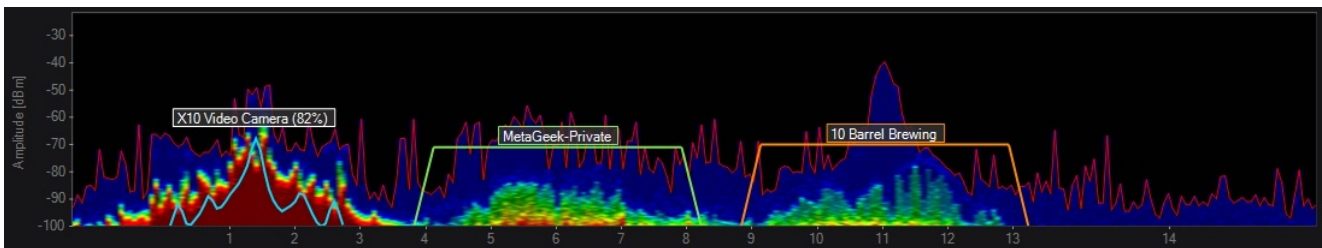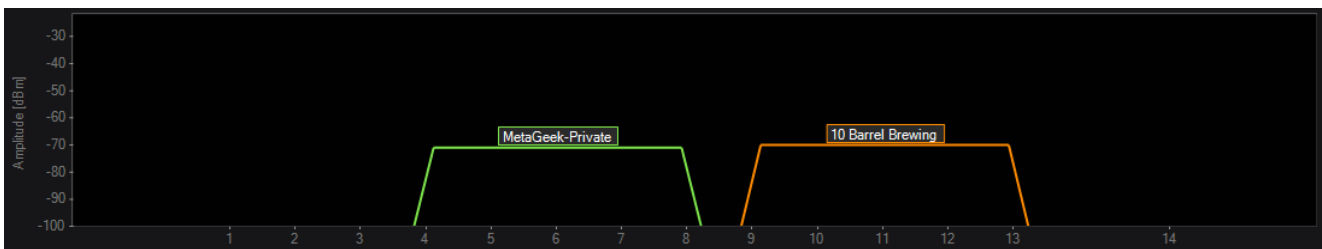
Transmitters

Wi-Spy Mode: Chanalyzer will attempt to automatically identify transmitters from the Signatures tab. This display option will toggle on the drawing of detected transmitters within the threshold settings.
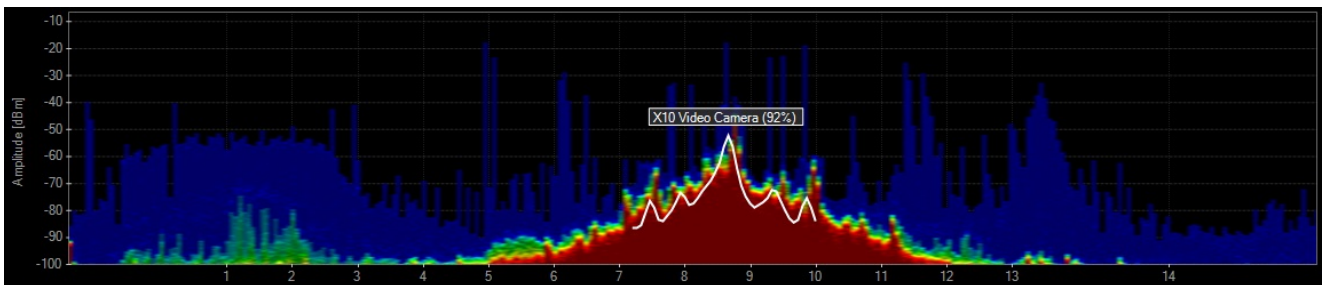
CleanAir Mode: When connected to a CleanAir AP, Chanalyzer will draw overlays around the channels that an interfering device is affecting. Simply check the box in the "Interfering Devices" tab next to the devices you are interested in.
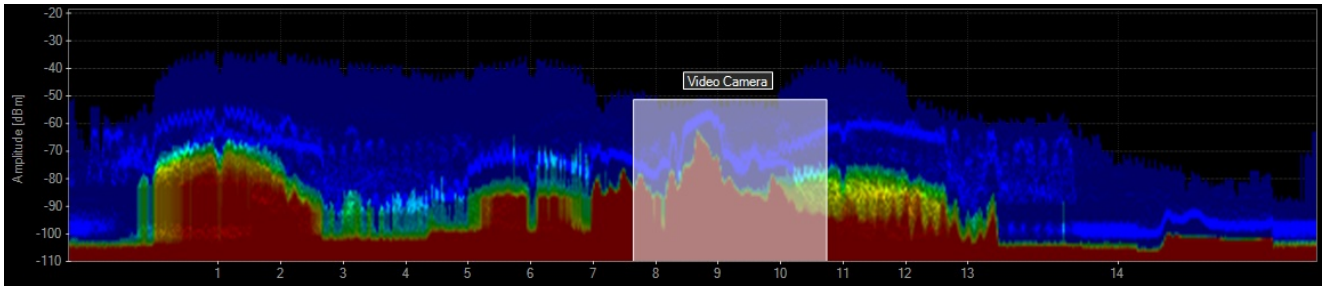
Inspector

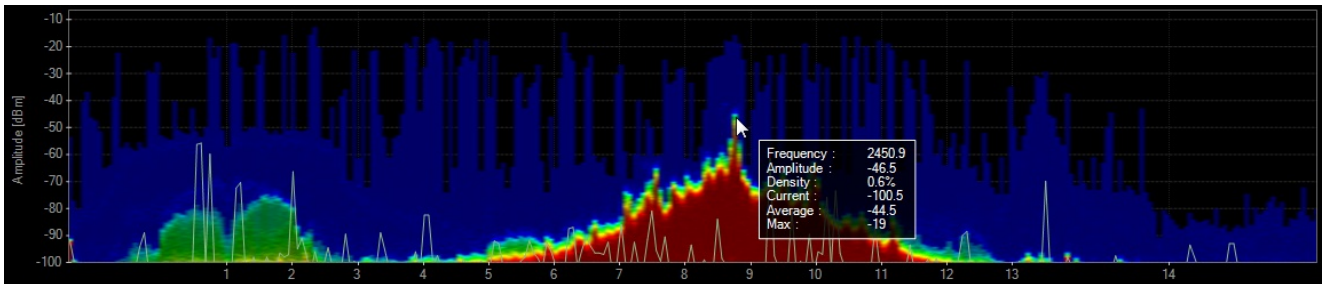This creates a hovering box above the cursor that displays specific numbers regarding a particular frequency amplitude point.

Waterfall View

This view graphs amplitude over time for each frequency in the selected ISM band. The Waterfall View uses a color scale to represent amplitude levels – low levels are dark blue, while high amplitudes are bright red. This emphasizes instances where wireless devices like cordless phones or microwaves may have changed the spectrum. For example, when a microwave is turned on or a cordless phone changes channels, it is very noticeable in the Waterfall View.
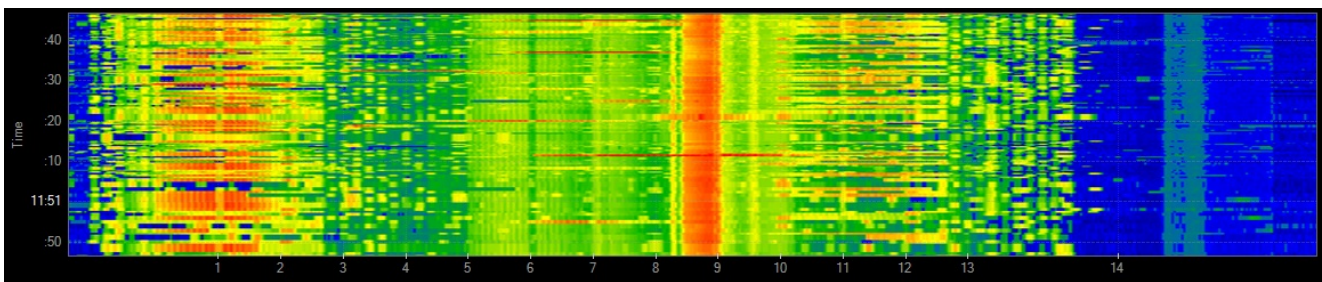
Details Pane (Wi-Spy Mode)

The details pane contains a number of tabs with more in-depth information about WiFi networks and their channels. You can quickly alternate between tabs by pressing **CTRL** + **TAB**.
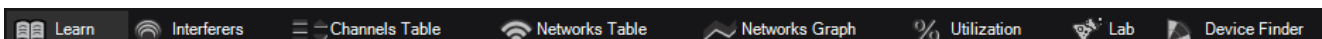
Note: The Lab tab is only available if the Lab Accessory for Chanalyzer has been included or added to your base Chanalyzer license. It can be purchased and added at any time.

Networks Table (Wi-Spy Mode)

The Networks Table is a list of all the WiFi access points that are within range of your computer's WiFi card.

The names (or SSIDs) of access points (APs) are displayed, along with signal strength (RSSI), channel, MAC address and other identifiers. This table provides a snapshot of WiFi networks in the area, and helps correlate RF activity in the spectrum views to known WiFi networks.
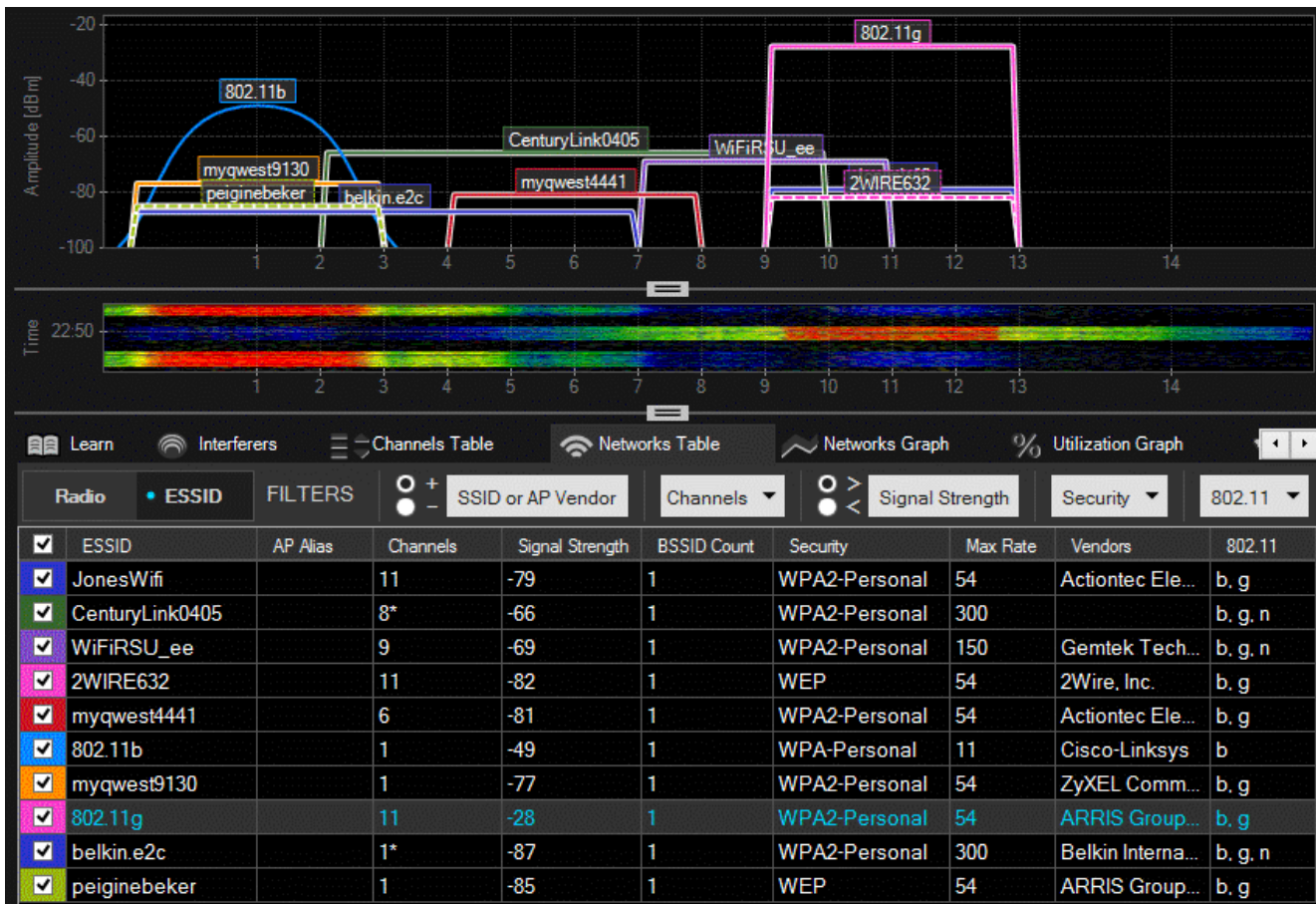
To see a network drawn in the Density View or Networks Graph, click the checkbox next to its name.

	ESSID	AP Alias	Channels	Signal Strength	BSSID Count	Security	Max Rate	Vendors	802.11
☑	JonesWifi		11	-79	1	WPA2-Personal	54	Actiontec Ele...	b, g
☑	CenturyLink0405		8*	-66	1	WPA2-Personal	300		b, g, n
☑	WiFiRSU_ee		9	-69	1	WPA2-Personal	150	Gemtek Tech...	b, g, n
☑	2WIRE632		11	-82	1	WEP	54	2Wire, Inc.	b, g
☑	myqwest4441		6	-81	1	WPA2-Personal	54	Actiontec Ele...	b, g
☑	802.11b		1	-49	1	WPA-Personal	11	Cisco-Linksys	b
☑	myqwest9130		1	-77	1	WPA2-Personal	54	ZyXEL Comm...	b, g
☑	802.11g		11	-28	1	WPA2-Personal	54	ARRIS Group...	b, g
☑	belkin.e2c		1*	-87	1	WPA2-Personal	300	Belkin Interna...	b, g, n
☑	peiginebeker		1	-85	1	WEP	54	ARRIS Group...	b, g

ESSID and Radio Grouping

Select the **Radio** button to group virtual SSID's per radio together, or select the **ESSID** button to group access points with the same SSID together in the Networks Table.

Each group is represented by one line item in the Networks Table.
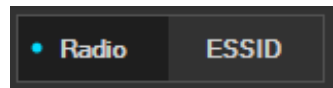
ESSID Grouping
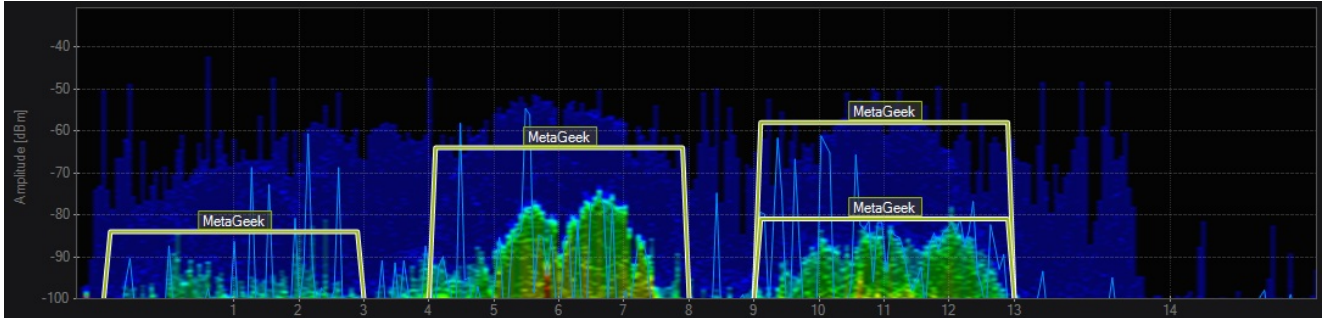

An **ESSID** refers to a group of unique access points with the same SSID, typically spread out across a building or campus.

Each line in the **ESSID** column is a group of access points with the same SSID. The channels table indicates which channels the ESS occupies, and the **BSSID Count** column shows the number of SSID's in the group.

ESSID	Channels	Signal Strength	BSSID Co...	Security	Max Rate	Vendors	802.11
GS Strategies	1	-93	1	WPA2-Personal	144.4	Trendnet	b, g, n
GUEST	11, 161	-77	2	Open	300	CISCO SYSTEMS, INC.	g, n
IBD	11, 161	-78	2	WPA2-Enterpri...	300	CISCO SYSTEMS, INC.	g, n
IBN	11, 161	-76	2	WPA2-Enterpri...	300	CISCO SYSTEMS, INC.	g, n
IBOL	11, 161	-77	2	WPA2-Enterpri...	300	CISCO SYSTEMS, INC.	g, n
Idaho Legislature	161	-78	1	WPA2-Enterpri...	300	CISCO SYSTEMS, INC.	n
IPC-Eagle	11, 161	-76	2	WPA2-Enterpri...	300	CISCO SYSTEMS, INC.	g, n
Key Design Access	1, 44 + 48	-78	2	WPA2-Personal	300	Apple	b, g, n
MetaGeek	1, 6, 11, 52, ...	-53	9	WPA2-Enterpri...	2106	, Cisco	g, n, ac
MetaGeek Airport 5Ghz	155	-48	1	WPA2-Personal	2106	Apple	n, ac
MetaGeek Airport SoS	11	-56	1	WPA2-Personal	216.7	Apple	b, g, n
MetaGeek_QA_Rich	3	-65	1	WPA2-Personal	130	D-Link Corporation	b, g, n
MetaGeek-Lab	6	-56	1	WPA2-Personal	54	Aerohive Networks, Inc.	b, g
OSC	11, 161	-76	2	WPA2-Enterpri...	300	CISCO SYSTEMS, INC.	g, n

Note: One ESS group can contain both 2.4 and 5 GHz SSID's.

Radio Grouping

A **Radio** refers to a group of virtual SSID's on the same access point, such as "MetaGeek-Developers" and "MetaGeek-Operations".

Each Line in the **Radio MAC** column represents a group of SSID's on the same access point. Since each virtual SSID requires a unique MAC address, the *x* at the end of the MAC address for the radio indicates the nibble (single character) of the MAC that is incremented, to differentiate them.

Note: 2.4 and 5 GHz radios are selected in pairs. If a 2.4 GHz radio is selected, the matching 5 GHz radio will automatically be selected (and vice versa).

|	Radio MAC	SSIDs	Channel	Signal Strength	BSSID Count	Security Types	Max R...	Vendor	802.11
☐	00:1D:7E:32:E2:26	5THCONFL	6	-76	1	WPA-Personal	54	Cisco-Linksys, LLC	b, g
☑	00:1E:7A:70:E9:x	AHABYOD, AHAGuest,	153	-66	3	WPA2-Person...	54	CISCO SYSTEMS, INC.	a
☑	00:1E:7A:70:E9:x	AHAGuest, , AHABYOD	1	-66	3	WPA2-Enterpr...	54	CISCO SYSTEMS, INC.	g
☐	00:19:E4:7E:3D:61	dmg	3	-89	1	WEP	54	2Wire, Inc	b, g
☑	24:DE:C6:BD:9E:x	Gallatin Guest, GALLATIN	6	-79	2	WPA2-Person...	130	Aruba Networks	b, g, n
☑	24:DE:C6:BD:9E:x	Gallatin Guest, GALLATIN	161 + 157	-79	2	WPA2-Person...	300	Aruba Networks	n
☐	00:14:D1:CF:E9:34	GS Strategies	1	-93	1	WPA2-Person...	144.4	Trendnet	b, g, n
☑	6C:50:4D:7D:DE:x	IBOL, IBN, IPC-Eagle, OSC, , adm...	11	-76	10	Open, WPA2-...	54	CISCO SYSTEMS, INC.	g
☑	6C:50:4D:7D:DE:x	IPC-Eagle, OSC, GUEST, Idaho ...	161	-77	10	Open, WPA2-...	300	CISCO SYSTEMS, INC.	n
☐	F0:D1:A9:15:EF:8E	Key Design Access	1	-71	1	WPA2-Person...	144.4	Apple	b, g, n
☐	F0:D1:A9:15:EF:8F	Key Design Access	44 + 48	-78	1	WPA2-Person...	300	Apple	n
☐	EC:E1:A9:F1:23:60	MetaGeek	6	-64	1	WPA2-Enterpr...	216.7	Cisco	g, n
☐	54:78:1A:32:53:0F	MetaGeek	64	-53	1	WPA2-Enterpr...	216.7	Cisco	n
☐	F8:4F:57:A0:5B:CF	MetaGeek	153	-84	1	WPA2-Enterpr...	216.7	Cisco	n

When **Group by Radio** is selected, the network graphs in the Density view are labeled with MAC addresses.

Networks Table Filters

The Networks Table filters allow you to exclude or include SSIDs that meet your filter criteria. You can filter by SSID, vendor, channels, network type, and security. This can be very useful if you are in an area with dozens of AP's and you only want to view certain networks, for example, networks centered on channel 6. The filters can be stacked to meet a variety of criteria.
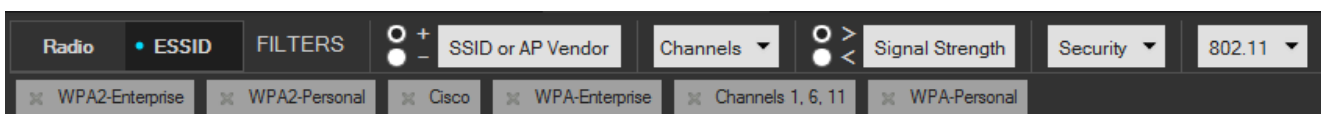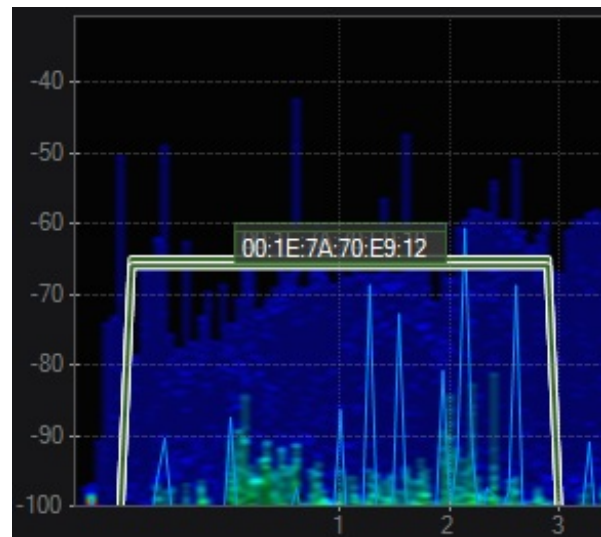
The SSID or Vendor filter begins with a "+" or "-" option. This will determine whether the filter includes or excludes the following text entered. For example, if you do not want to see any wireless networks named "MetaGeek", select the - radio button and enter "MetaGeek" in the SSID or Vendor field. Press enter to apply the filter. Chanalyzer will then show every network that doesn't have "MetaGeek" in the SSID or hardware field.
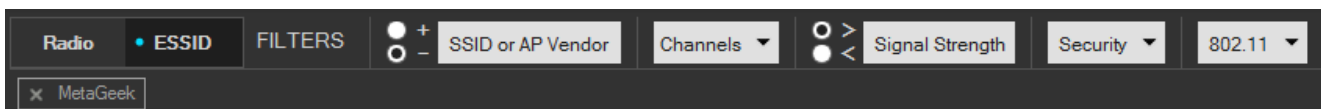

To filter by channels, click the arrow on the drop-down menu which will allow you to choose between 2.4 GHz and 5 GHz channels. 2.4 GHz channels range from 1-14 and 5 GHz channels from 36-165. "-" will filter the channels from a to b. For example, typing (1-6) will

show channels 1 through 6. Using a "," will allow you to enter multiple single channels to view. Typing (1, 4, 6, 9) will show only those channels. You can also use a combination of the two operators as follows: (2-5, 7-10).


The remaining filter options will show either AdHoc or Infrastructure networks, or exclude certain security settings of SSIDs.
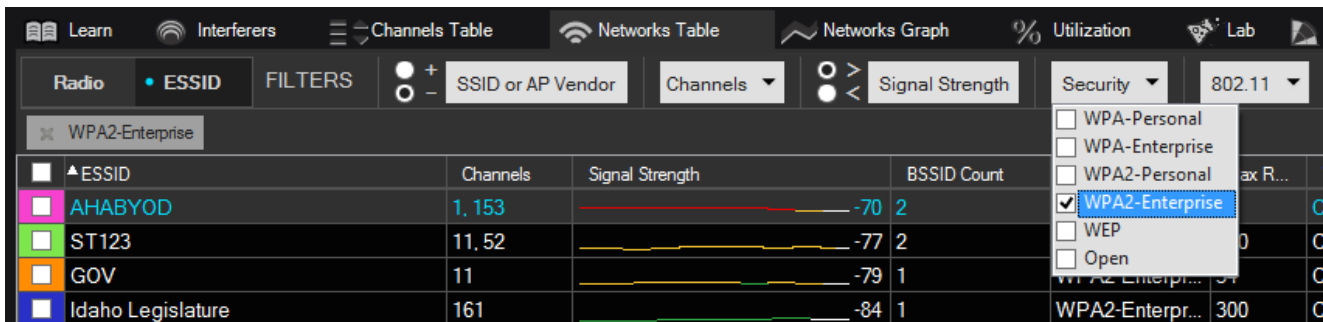
To remove filters, click the **x** next to the applied filter.

Networks Graph

Click the Networks Graph to show signal strength over time, drawing the rows selected in the Networks Table. Drops in signal strength indicate poor signal coverage and can be referenced against the Waterfall and Density views to determine if interference is to blame.
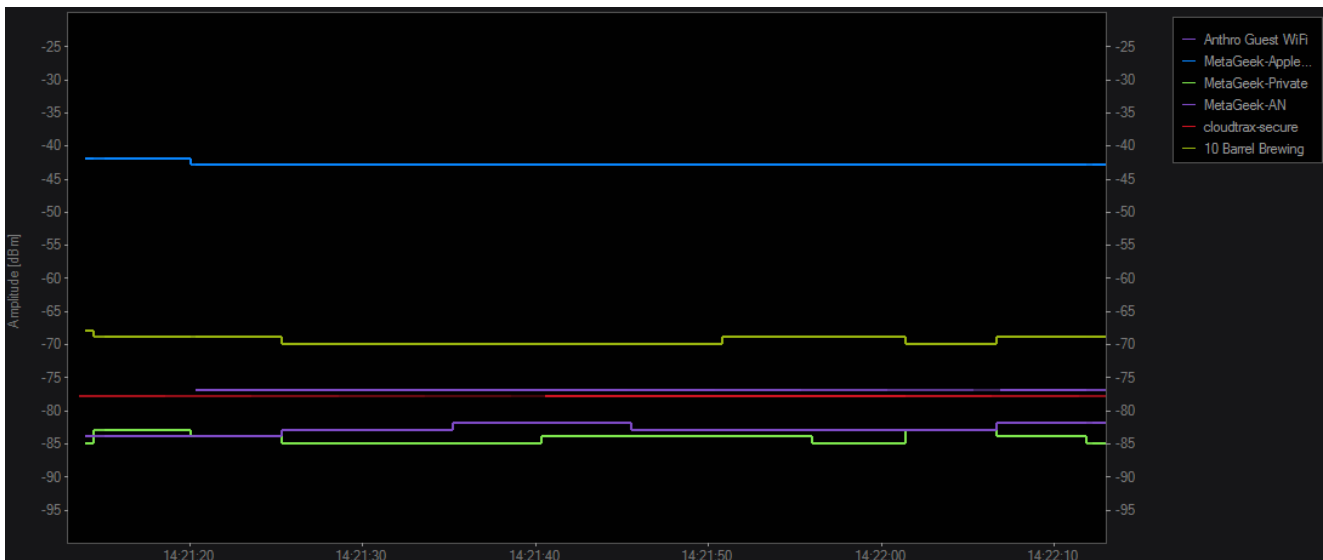
Note: this data comes from the wireless network card and not the Wi-Spy.

Channels Table

Channel - Defines the channel number.

Grade – This calculation uses the entire 20 Mhz width of a WiFi channel. Higher power levels near the center of the channel will affect the grade more negatively. A high grade of 90 or above can be interpreted as an "A" while 80 or above is a "B." Anything below 70 is not recommended for WiFi deployment.

Utilization – Utilization measures the percentage of time that act a signal was active at or above the Utilization Threshold (configurable in the Utilization Graph tab). The measurement is an average utilization over the entire 20 MHz 802.11 channel, also averaged over the timespan that is selected in the Waterfall Navigation view.

Average - For each channel range (for example, WiFi Channel 1, 2401 - 2423 MHz), Chanalyzer calculates the average power within that channel frequency range.

Current – The current represents an average of the most recent amplitude readings within the channel range.

Max - This is an average of the highest amplitude points within the WiFi channel frequency range.

Noise Floor - Shows the noise floor for the 20 MHz channel.

Access Points – Amount of detected Access Points on the channel, as detected by a WiFi adapter that is connected to Chanalyzer.

| Channel	Grade	Utilization	Average (dBm)	Current (dBm)	Max (dBm)	Noise Floor (dBm)	Access Points
1	78.4	9.9%	-70.5	-79.0	-59.5	-95.5	3
2	76.7	10.4%	-70.5	-79.0	-59.5	-95.0	1
3	72.6	12.8%	-69.0	-79.0	-58.0	-94.0	0
4	61.1	18.8%	-65.5	-61.0	-54.0	-92.0	0
5	53.7	20.6%	-66.0	-61.0	-54.5	-91.5	0
6	47.9	23.5%	-66.0	-61.0	-54.5	-91.0	11
7	52.2	21.9%	-65.5	-61.0	-54.0	-91.5	0
8	63.3	16.9%	-64.0	-81.0	-53.5	-93.0	0
9	66.1	16.4%	-60.5	-80.0	-49.0	-93.5	1
10	63.6	17.2%	-60.0	-74.0	-49.0	-93.0	1
11	61.6	17.4%	-60.0	-72.5	-49.0	-93.0	10

Device Finder

This view shows a signal strength over time graph similar to the Networks Graph, but also shows the signal strength of a selected frequency range. Device Finder will enable you to actively seek out transmitters so you can know exactly what is happening in your networks.

How to use Device Finder →

Utilization Tab

The Utilization Tab shows you the exact utilization (how often the frequency is being used or utilized) at the defined threshold on a frequency-by-frequency basis, as represented in the graph. You can change the measurement threshold in this view with the **+** and **-** buttons in the upper-left. The height of the graph shows the percentage of utilization for that specific frequency.
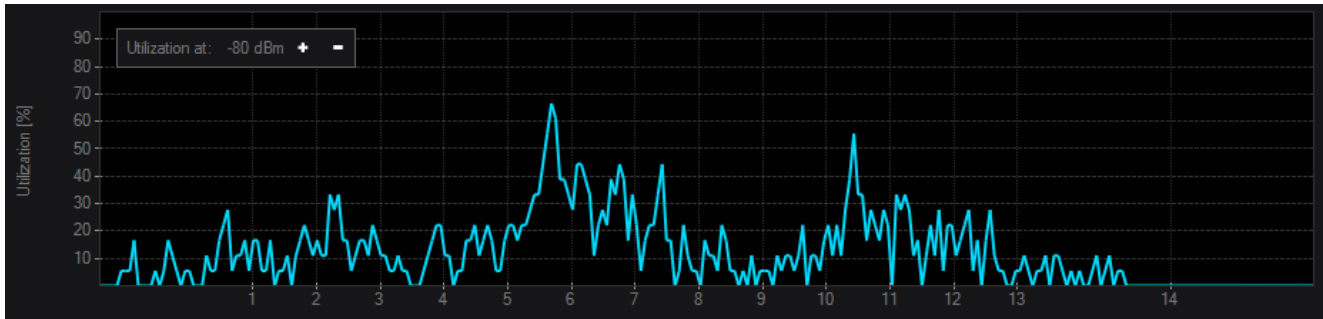
Details Pane (CleanAir AP Mode)

Device Interferers Table

When connected to a CleanAir AP, Chanalyzer will begin populating the Interfering Devices table with any non-WiFi transmitters that are detected. The table is fully filterable by Device Type, Severity, Duty Cycle, and Signal Strength.

Clicking the checkbox next to an interferer will display a visual indicator in the density view that spans the channels where the device is active. The spanning area will be filled in depending on the severity of the interference-- The higher the severity, the more opaque the overlay will be (and the more impact your users are likely to experience).

| Device Type	Signal Strength (dBm)	Is Active	Channels Affected	Discovered Time	Duty Cycle	Last Seen	Severity
Bluetooth	-69	True	1-6	10:56 AM	0.0%	10:58 AM	2
Bluetooth	-81	True	11-13	10:56 AM	0.0%	10:58 AM	2
Bluetooth	-81	True	2-5	10:57 AM	0.0%	10:59 AM	2
Bluetooth	-81	True		10:57 AM	0.0%	10:58 AM	0
Bluetooth	-84	True		10:57 AM	0.0%	10:58 AM	0
Bluetooth	-83	True		10:57 AM	0.0%	10:59 AM	0
802.11	-73	True	1-7	10:57 AM	0.0%	10:59 AM	3
802.11	-68	True	8-13	10:57 AM	2.0%	10:59 AM	5
802.11	-71	True	1-5	10:57 AM	0.0%	10:59 AM	3
Bluetooth	-70	True	1-9, 12-14	10:57 AM	0.0%	10:59 AM	2
Bluetooth	-76	True		10:57 AM	0.0%	10:58 AM	0
DECT-Like ...	-71	True	4-14	10:57 AM	0.0%	10:58 AM	2
Bluetooth	-75	True	2-4, 11-13	10:57 AM	0.0%	10:58 AM	2
802.11	-66	True	3-10	10:57 AM	3.0%	10:58 AM	11
Bluetooth	-79	True	11-14	10:57 AM	0.0%	10:58 AM	2
Bluetooth	-67	True	1, 3-14	10:57 AM	0.0%	10:58 AM	2

Report Builder Accessory for Chanalyzer

With the Report Builder accessory for Chanalyzer, users can highlight and visually explain how bad interference was when it occurred in an easy, professional manner.

How to use Report Builder →

Recognizing Interferers (Wi-Spy Mode)

You can recognize interferers using the patterns they make in the Density View. To assist with with recognizing interferers, there is a library of interferer identifier patterns which can be found under the **Interferers** tab.
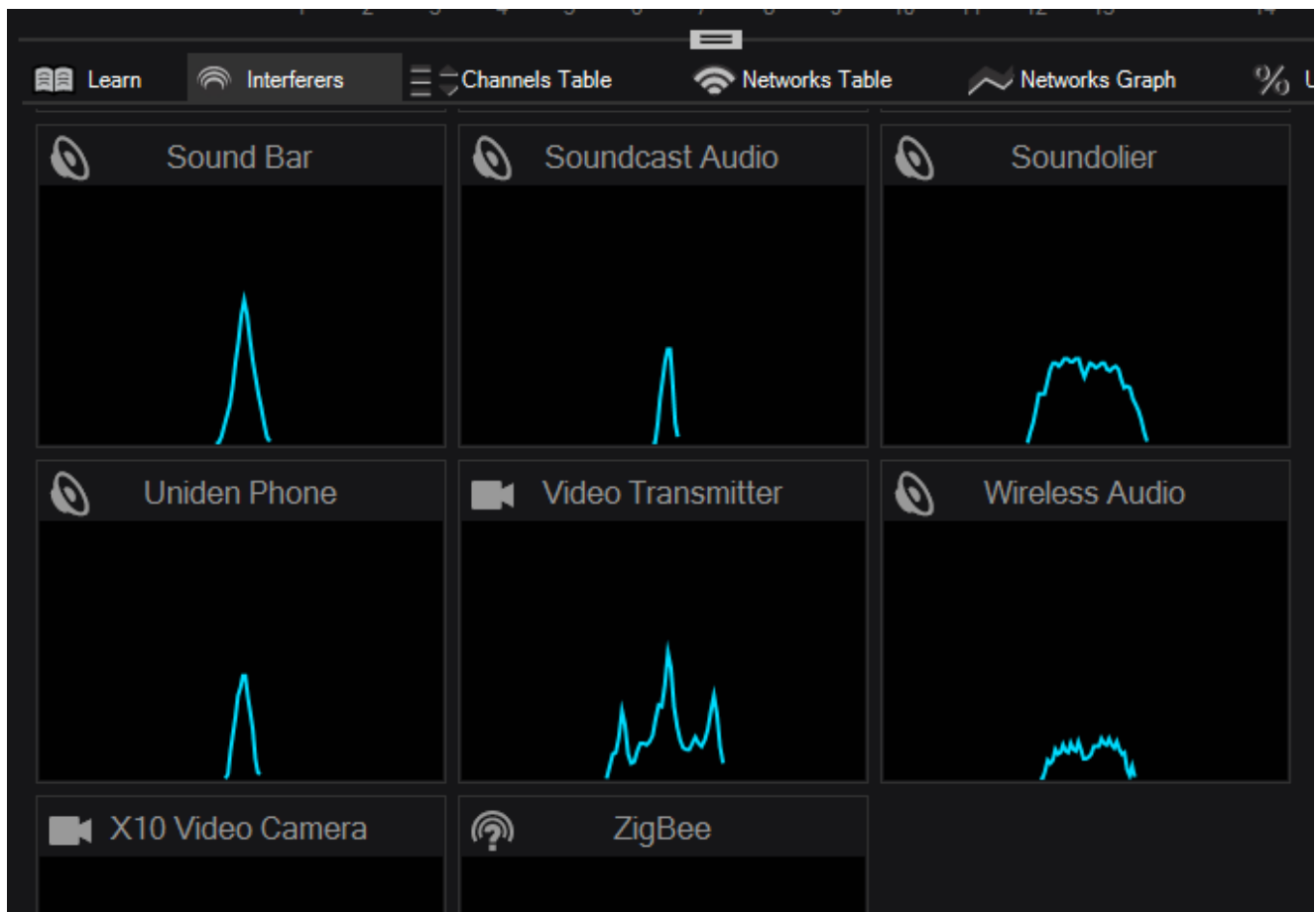

Using the Identifier Pattern for Finding & Identifying Interferers

Click on the classifier in the **Interferers** tab and then hover the mouse over the Density View. Turn off the silhouette by clicking the box again in the **Interferers** tab.

Line up an interferer signature with the shape in the Density View, then click to jump to Device Finder mode.

Create a New Interferer Identifier

1. Highlight the frequency range of the interference for which you want to create an identifier pattern.
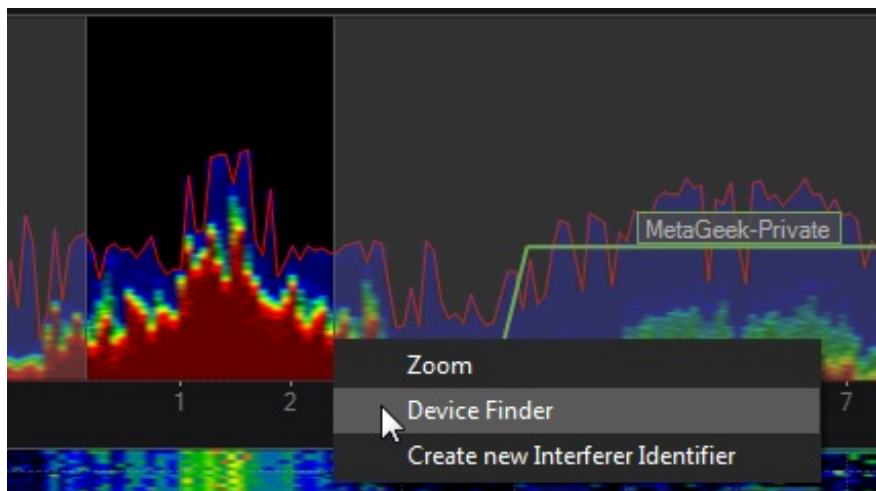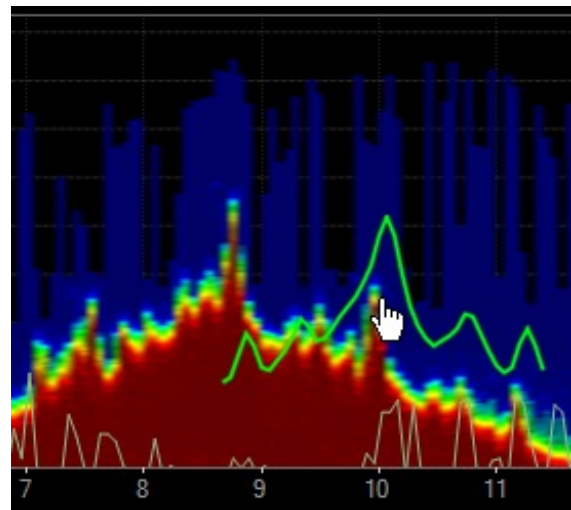
2. Adjust the time frame to find shape that represents the device the most.

3. Click **Create new Interferer Identifier** in the contextual menu.

4. Assign a Category to the identifier and give it a name.

Deleting an Identifier

To permanently remove a identifier from the Interferers tab, click the **garbage can** icon in the top right of the identifier.

Lab Accessory for Chanalyzer

The Lab Accessory for Chanalyzer gives you fine-grained control over Wi-Spy, so you can tune it to your specific needs.

How to use Lab →