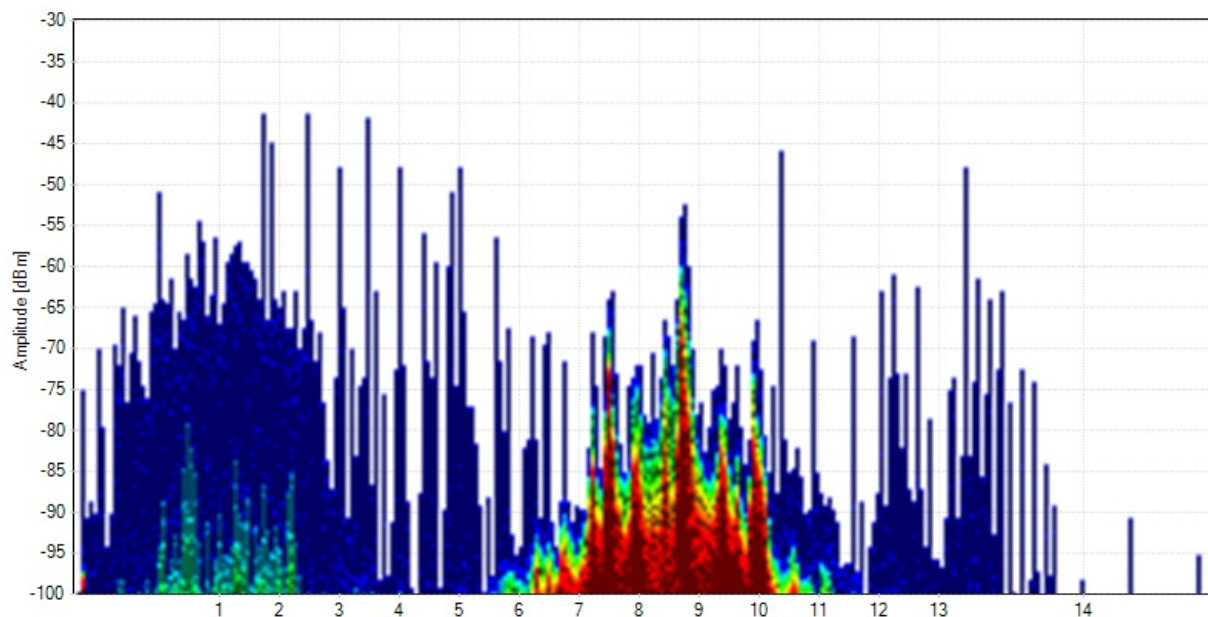# Wi-Spy Report

Date: **Monday, October 14, 2013**

Example: How to Read the Overview Pane

The **Overview Pane** shows you what is currently happening in the spectrum around you.. With **Color by Utilization** enabled, the intensity of the color shows how often a signal occurs. The more intense the color, the more often the spectrum is in use. This is called utilization, duty cycle, or air time usage.

A blue spike is short, like a clap. A red spike is a long, continuous signal, like an air horn.

Blue - Less than 10 percent utilization

Green - 20 percent utilization

Yellow - 40 percent utilization

Red - Over 50 percent utilization

The height of each shape shows how loud it is.

In this example, we can see a non-Wi-Fi device near Wi-Fi channel 9 that is using at least 50 percent of the airtime. While this device (the known signature of a wireless video camera) is powered on, it's using up so much time on the air that Wi-Fi devices most likely won't get a chance to talk.

# Example: How to Read the Waterfall View
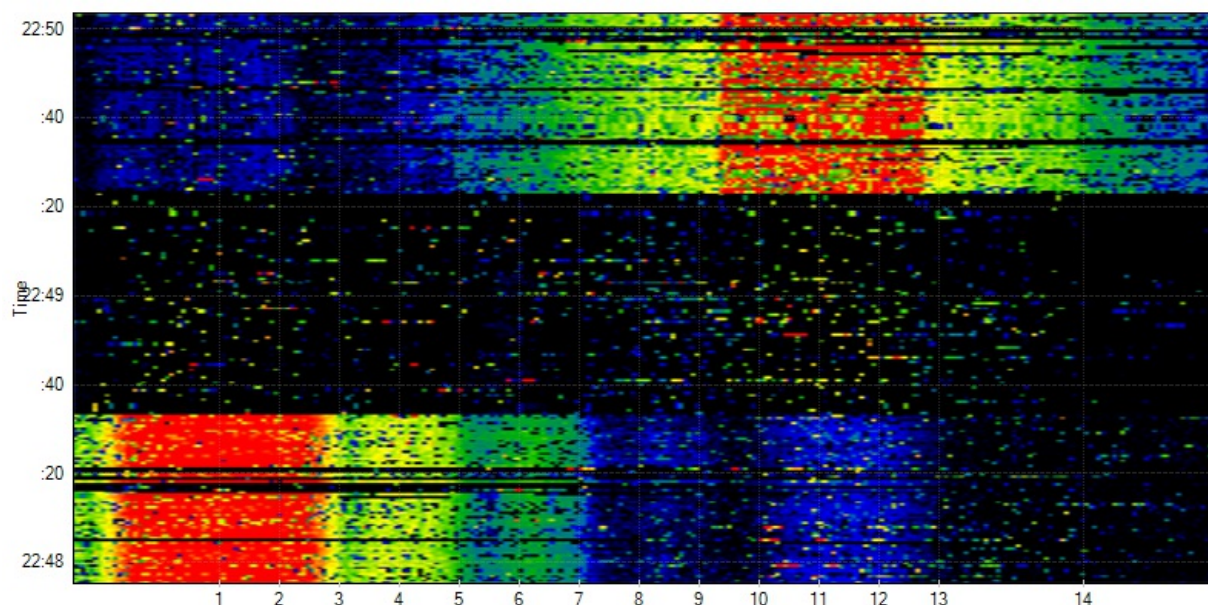
The Waterfall View graphs amplitude over time for each frequency in the band, much like a seismometer graphs earthquakes over time. The colors represent power levels in the spectrum with dark blue as low and bright red as higher amplitude levels - much like a

Doppler radar weather map.

In this example, a device started talking on Wi-Fi channel 1, and then stopped. After a pause, another device started talking on channel 11.

Example: 802.11b Signature
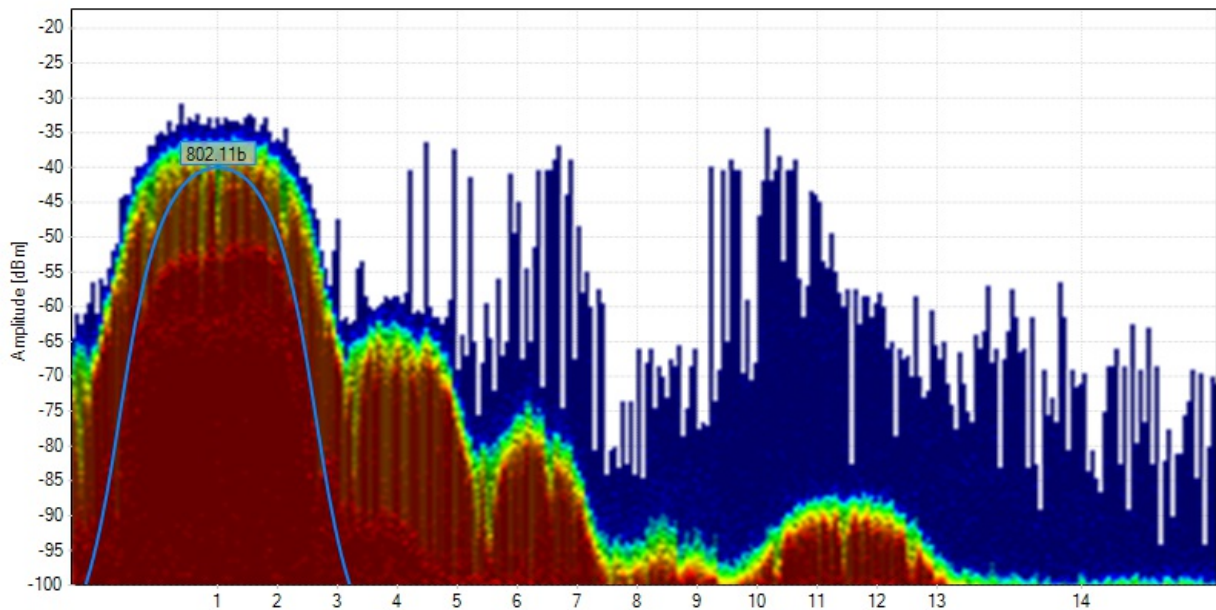
As 802.11b becomes less popular, this signature becomes less common, but it's good to be familiar with it. This **curve shape with lobes down each side** is made by an **802.11b** network, or any 802.11n network running at legacy data rates like 1, 5.5, or 11 mbps. Even an 802.11g or 802.11n network will fall back to this shape from time to time, or when idling. To prevent this, legacy data rates can be disabled, which will improve network performance.

Chanalyzer draws a "curve" network shape (just like it's spectrum signature counterpart) to indicate that your wireless card has detected an 802.11b network, or a network that is using legacy data rates.

Example: 802.11g/n Signature
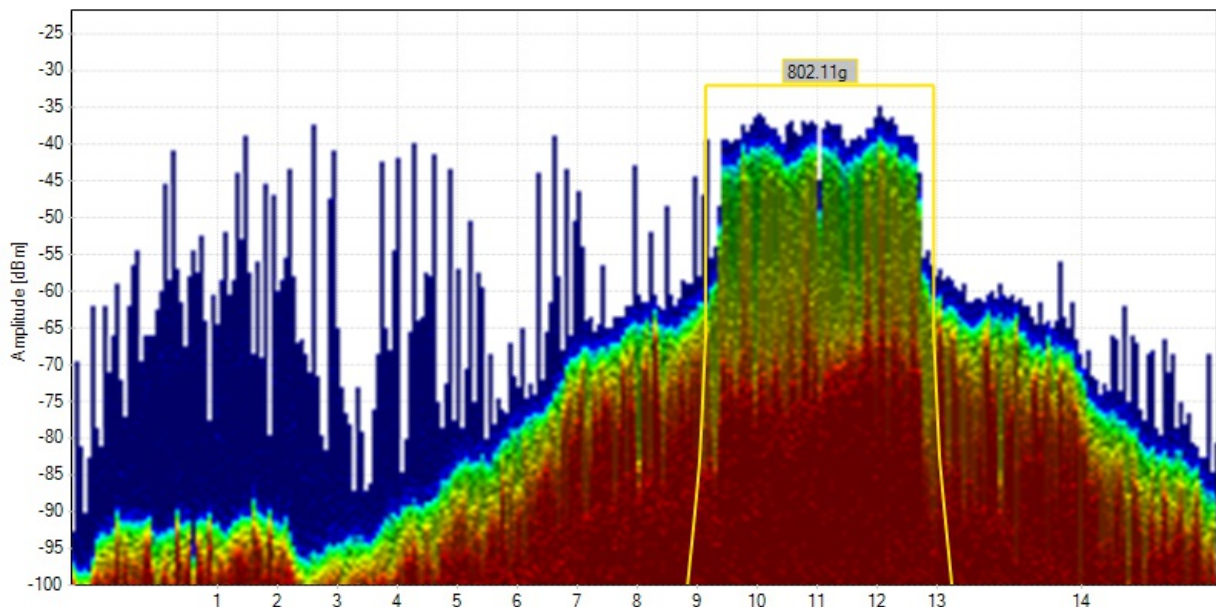
This shape is a **flat table-top shape** with shoulders on either side, which is the signature of an **802.11g** or **802.11n** network. This means that the network is running at faster data rates such as 12, 24, 54 mbps, and beyond.

When Chanalyzer detects an 802.11g or 802.11n network with your wireless card, it will draw a flat table-top shape that matches the signature in the spectrum.

Utilization in Your Environment
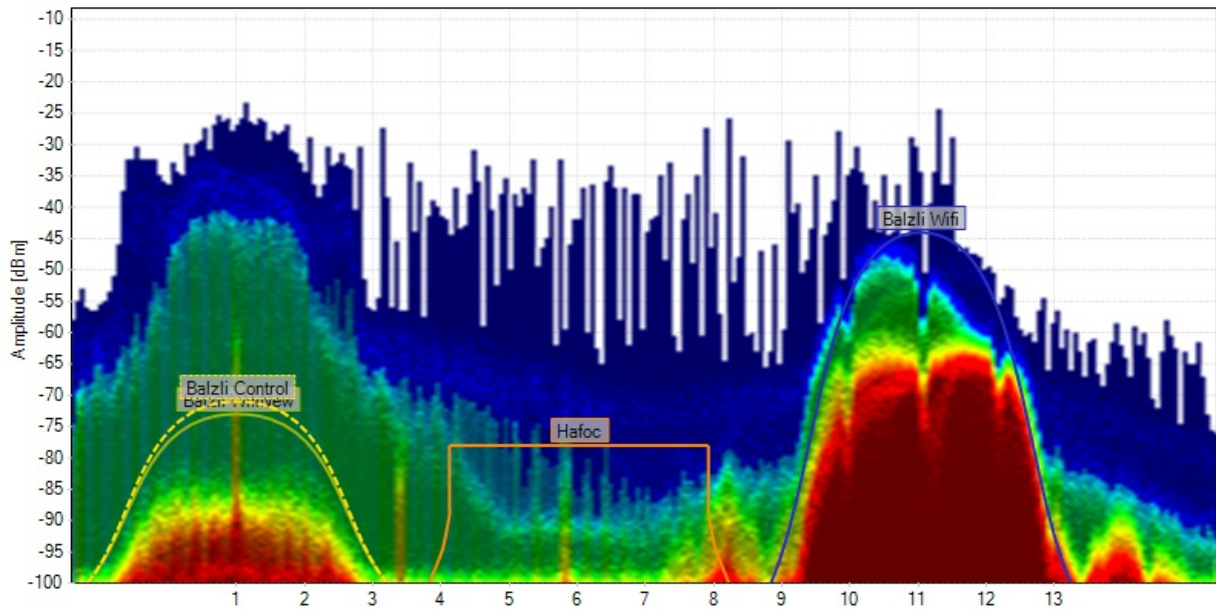
Based on what we know about identifying 802.11b and g networks, and what we know about identifying utilization, we can determine what is happening in the spectrum.

Two 802.11b networks are visible. An 802.11b network is talking to another device on channel 1 (the second device is closer to you, and is creating the tall green curve shape). The network on channel 1 is using more than 50 percent of the available airtime to talk.

The second 802.11b network is on channel 11, and is fairly close to the spectrum analyzer during the recording. It is also using at least 50 percent of the airtime.

Network performance could be drastically improved by either disabling legacy, 802.11b data rates on both access points, or upgrading to 802.11g/n equipment. This will allow devices to say what they need to say faster, so they will tie up the channel for less time.

Wi-Fi Networks
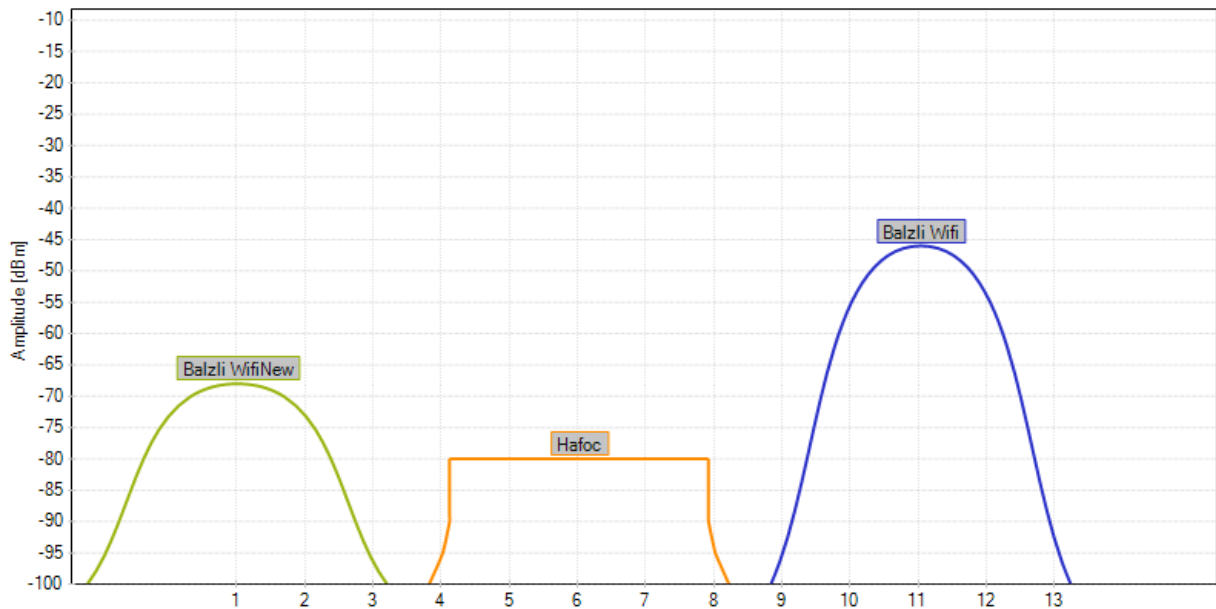
Both of your networks are on Wi-Fi channels 1 and 11. While there are two networks on channel 6, they aren't very close by. You could move your network on channel 11 to channel 6, which would give your ZigBee devices their very own channel to live on.

ZigBee
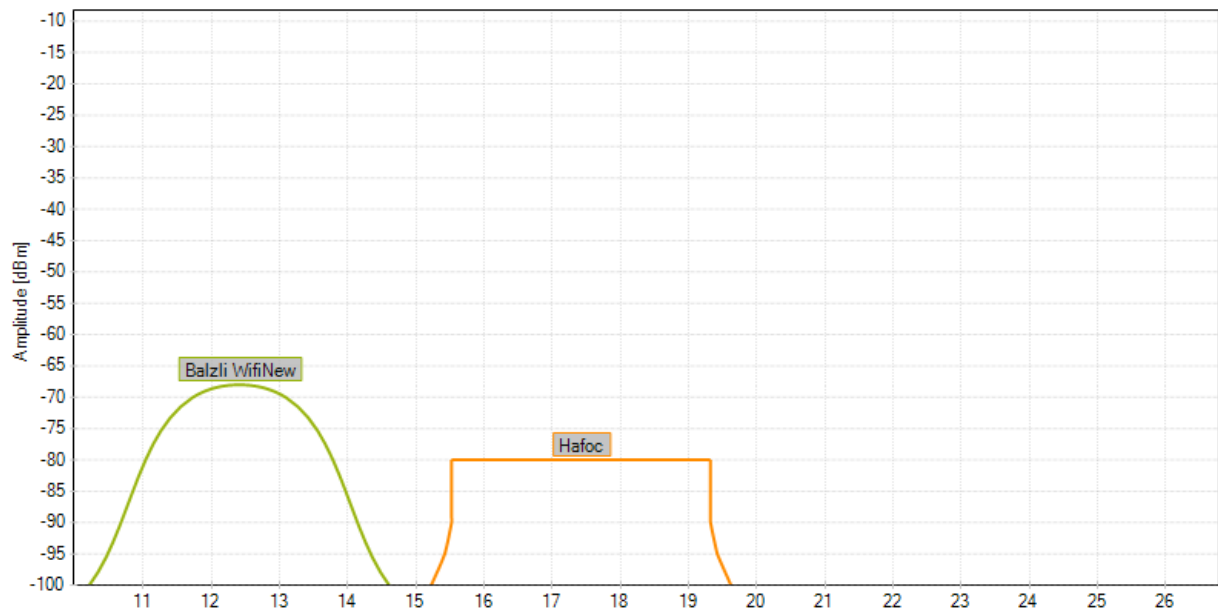
With Balzli Wi-Fi moved to channel 6, ZigBee channels 21-26 would be available for use with no competition from Wi-Fi networks

Recommended Actions

- Disable legacy data rates on 802.11g/n access points to take advantage of faster data rates

- Replace 802.11b devices with 802.11n devices, if 802.11g access points are not present

- Move "Balzli Wifi" on channel 11 to channel 6

- Move ZigBee devices to ZigBee channels 21-26 to avoid Wi-Fi interference