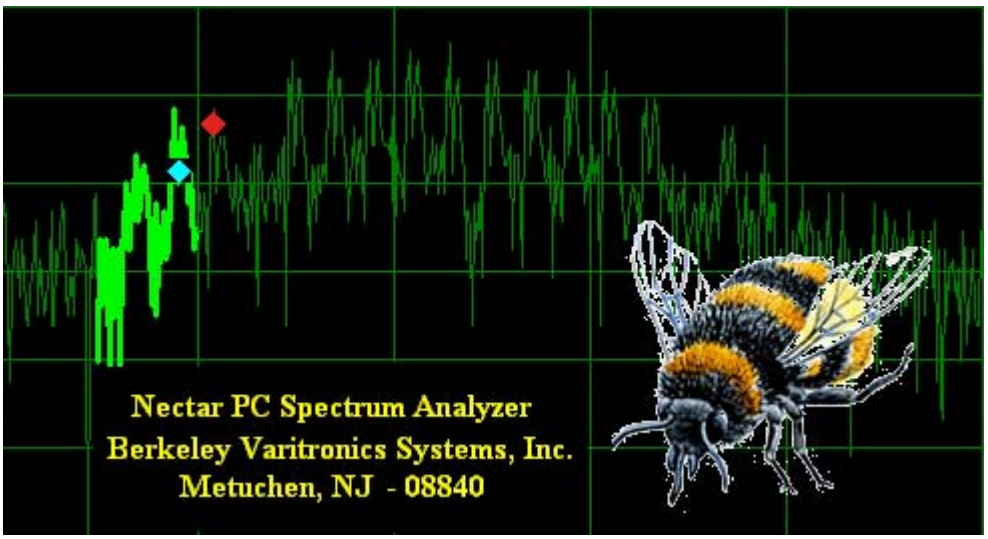
Nectar ™

PC based Software for BumbleBee-EX

User Manual Version 1.0

(for software version 5.3 and greater)



INTRODUCTION

The Nectar PC Spectrum Analyzer runs on a Windows based PC that is connected to a BVS BumbleBee-Ex system remotely. This connection is made through TCP/IP. Through this connection, a BumbleBee-Ex can be controlled via the PC. The BumbleBee-Ex can be set to any mode and settings available. The Spectrum can be monitored in real time on the PC using the Nectar software.

DEVICE INTERFACE

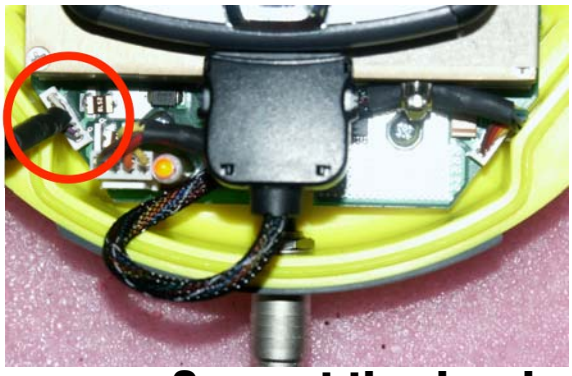
HARDWARE REQUIREMENTS:

In order to connect to a BumbleBee-Ex unit, the hardware must be configured with the optional Ethernet adapter and installed per the instructions on the following page. The BumbleBee-Ex must also be powered by A/C when using this adapter.

HARDWARE INSTALLATION

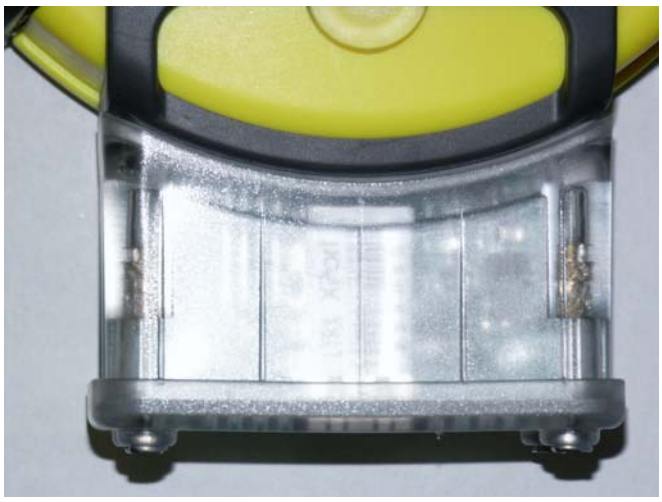
Your BumbleBee-EX will come from the factory with Nectar hardware already installed if you ordered it that way or if you ordered Nectar software with your BumbleBee-EX hardware. Refer to your BumbleBee-EX manual for basic disassembly of your unit. If your BumbleBee-EX is not already configured to take advantage of Nectar's Ethernet communications, follow these simple steps below:

Remove clips holding in port cover from bottom



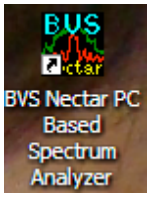
Connect the dongle hardware cable only to this PORT

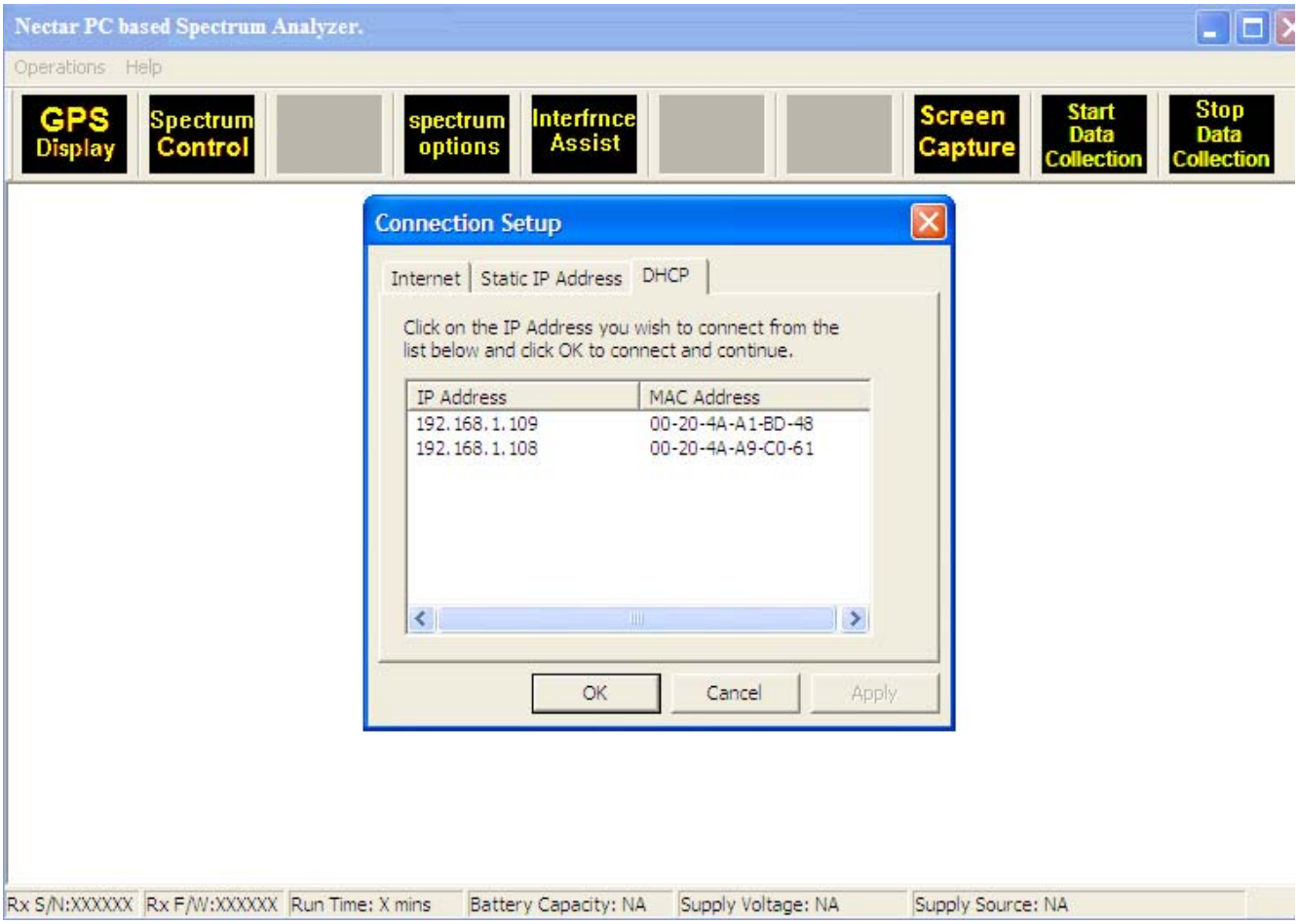
Now install the dongle to the bottom of the unit



Starting the software and establishing a connection with the BumbleBee-Ex receiver:

Once the software is started by double clicking it's desktop icon as shown ----------> the Nectar PC software window will appear:





Connection Options:

VIA LAN (DHCP/Static IP):

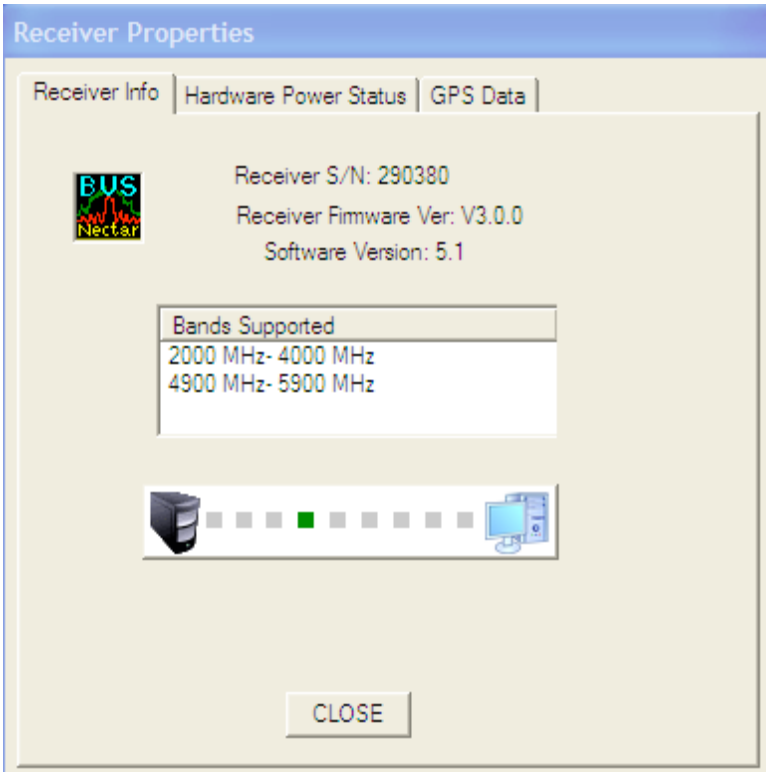
If you are connecting to a BumbleBee-Ex through an internal network (LAN), this can be done in 2 ways: using auto-addressing or DHCP or assigning a Static IP address. In order to use auto-addressing or DHCP, just click the tab which says DHCP. If the LAN DHCP has been enabled, the IP address of the Ethernet adapter and it's corresponding MAC or Ethernet address will show up in the DHCP tab. If it does not, the network router connection settings need to be checked to see if DHCP has been enabled. If DHCP is not enabled. The Ethernet controller needs to be assigned a Static IP address. Make sure that the IP address matches

the subnet of your network and is not an IP address already assigned to another device, or you will not be able to make a successful connection. After entering an appropriate IP address and the Ethernet adapter's MAC address, click OK. The static IP address will be assigned to the Ethernet adapter and a connection with the BumbleBee-Ex will be made.

VIA INTERNET:

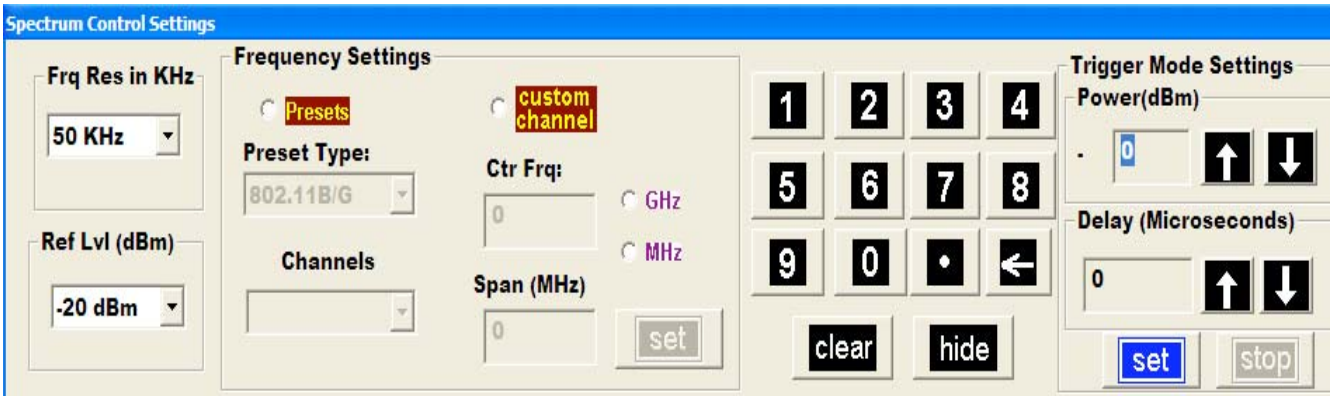
If connecting to a BumbleBee-Ex which is outside your local network or, on the internet, you need to find out the IP address of the router which provides access to the ethernet adapter connected to the BumbleBee-Ex. Typically the router will have to be configured to forward requests on port 10,001 to the IP address of the BumbleBee-Ex device. Please see the instructions for your router to do so. Entering the IP address of your router, if the router is configured correctly, you should be able to connect to the BumbleBee-Ex through this port.

Once connection has been established with the BumbleBee-Ex receiver, The receiver information dialog pops up indicating the unit serial number, firmware version and the unit connection status.

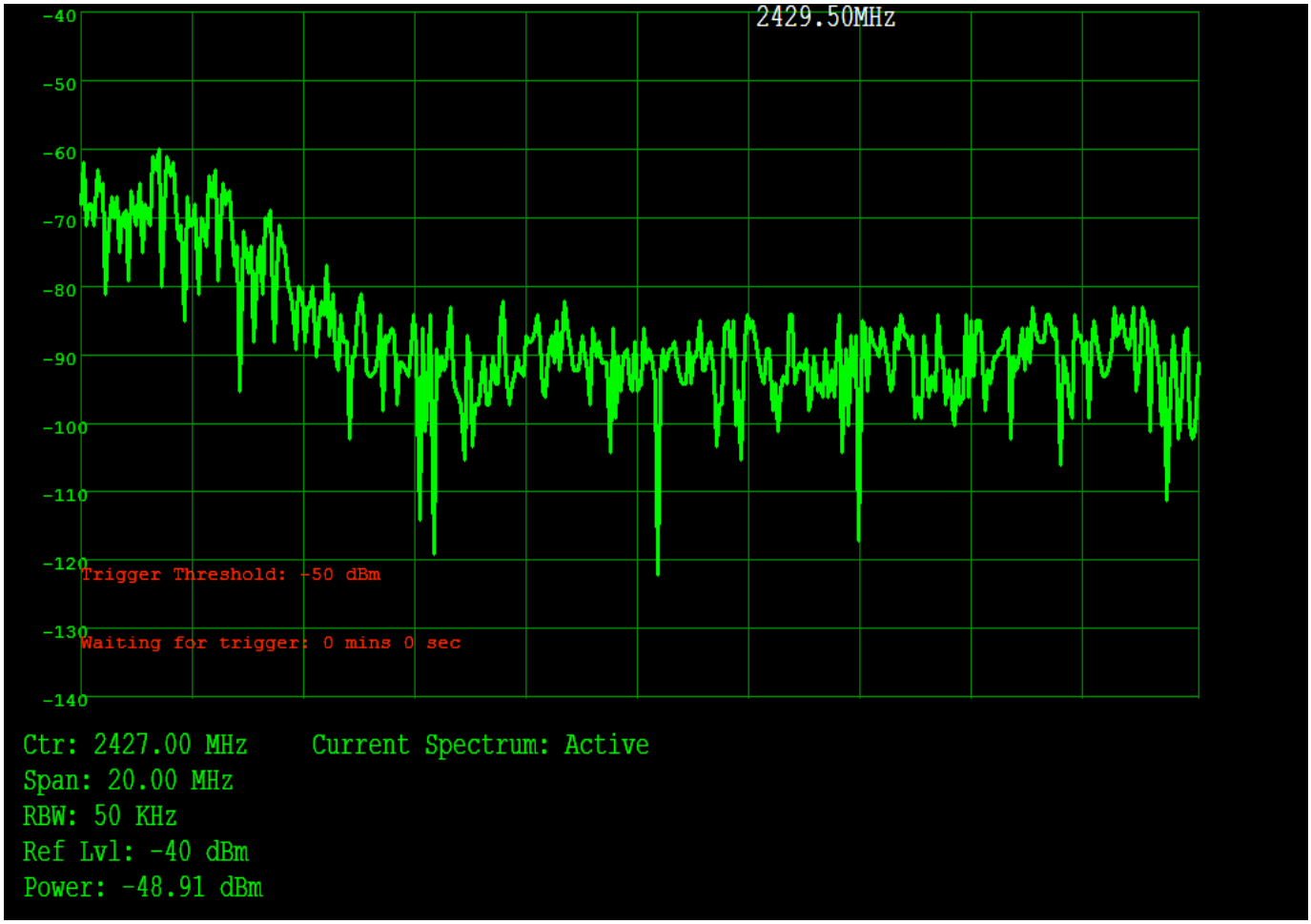


Once connection has been established, the receiver can be set to tune any frequency within

the available bands ie 2 Ghz – 4 Ghz and 4.9 Ghz – 5.9 Ghz. The software provides the user the option of setting a default setting (Center Frequency of 2450 Mhz and a span of 50 Mhz at 50 Khz Resolution Bandwidth, -20 dBm Reference Level) or allowing the user to enter preferred settings through the following pop-up box



Once the appropriate spectrum settings are made, the spectrum waveform shows on the screen.



Using the Spectrum Control Dialog Box shown on the previous page, the following settings can be made:

1. **Resolution Bandwidth:** can be used to set/change the frequency resolution of every point on the spectrum waveform.
2. **Reference Level:** The reference level setting can change the dynamic range of power measurement of the device. The reference level can be set from -20 dBm to -70 dBm. For a 50 Khz resolution bandwidth, the dynamic range is 40 dB below the reference level.
3. **Presets:** The software provides presets for the 14 802.11 b/g and 27 802.11 a channels.
4. **Custom Channel:** The user can set the desired Center Frequency and Span.

Why use a small Resolution Bandwidth ?

A small Resolution Bandwidth is appropriate to measure frequency components and signal characteristics. Smaller Resolution Bandwidths increases the Sweep Time (number of traces displayed per second) for a given frequency span.

Why use a large Resolution Bandwidth ?

A large Resolution Bandwidth is appropriate to measure large spans of frequencies quickly. A resolution bandwidth larger than the signal’s bandwidth can measure channel power. The BumbleBee-Ex may be set to a large Resolution Bandwidth and a large Span to quickly sweep and identify frequencies of interest. The Span and Center Frequency can then be decreased to measure frequency components and the signal's characteristics.

REFERENCE LEVEL

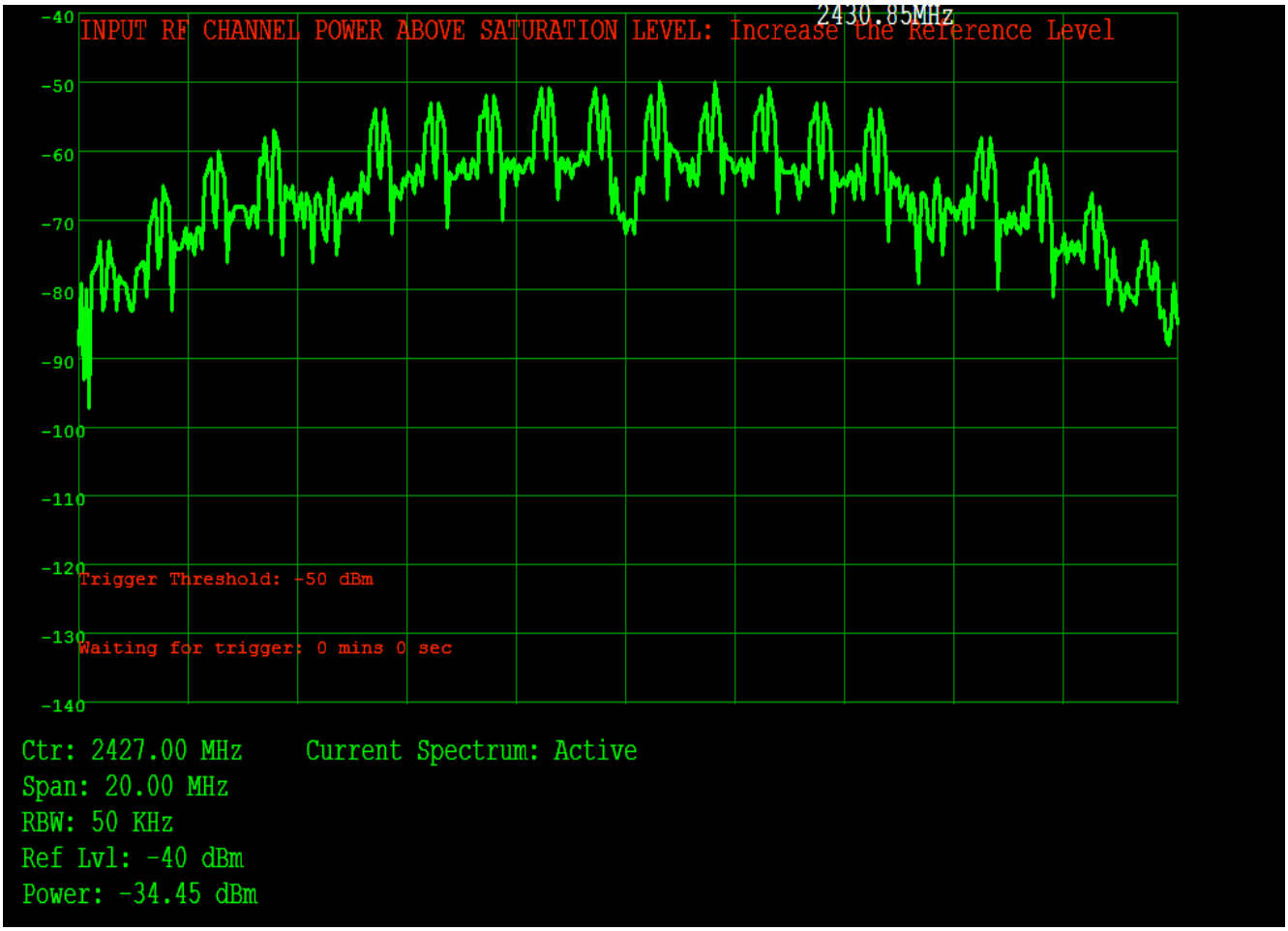
This menu option allows the user to set the current reference level of the receiver. The valid choices are between -20 dBm and -70 dBm, in 10 dBm increments. The Reference Level should be adjusted to obtain the greatest dynamic range. The Reference Level should be set so that the strongest signal on the display is about 10 dB down from the top of the measurement display. If a signal is drawn off the top of the measurement display or the message “clipped” is displayed, lower the Reference Level. The highest Reference Level is –20dBm. The lowest Reference Level is –70dBm.

POWER TRIGGER MODE:

The Power Trigger Mode enables the BumbleBee-Ex to quickly capture the spectrum from sources that are not continuously transmitting. The trigger threshold represents the amount of CHANNEL POWER that when exceeded will trigger the BumbleBee-Ex to measure the spectrum. The trigger delay sets a delay between the trigger threshold being exceeded and the measurement of the spectrum. The trigger threshold is set by the user in dBm, and its range is from the current Reference Level to 20dB below the current Reference Level.

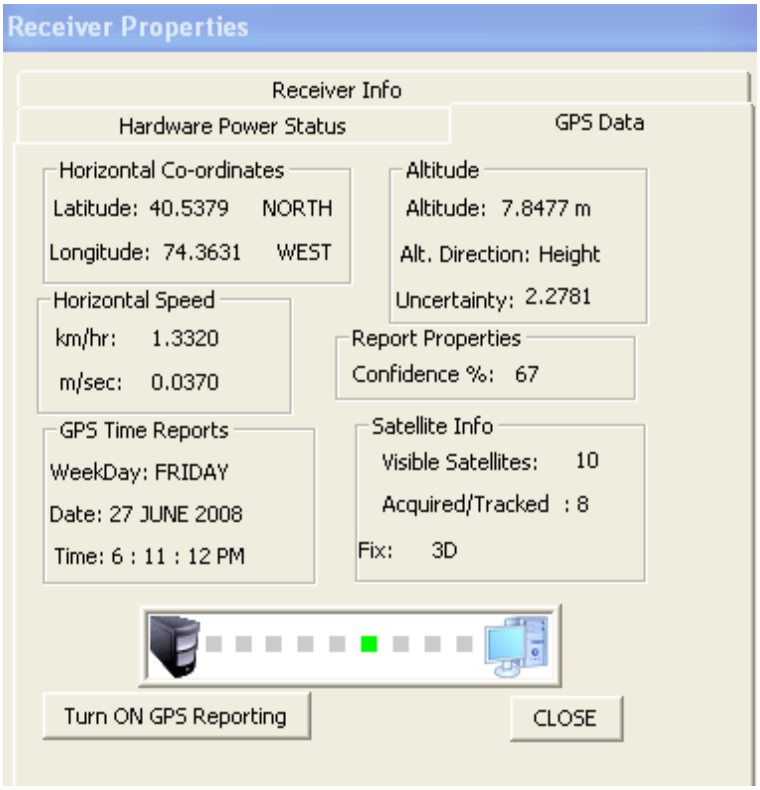
NOTE: Span MUST be set to 20 Mhz.

Trigger Mode is very useful to capture the spectrum from any source that is not continuously transmitting on the same frequency.

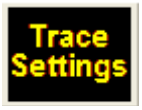


Toolbar Description:

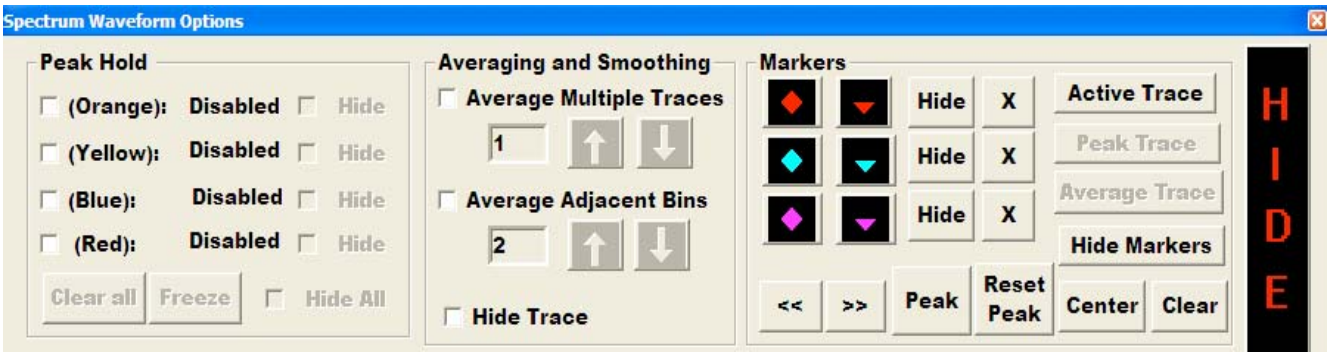
1. **GPS Display:** The GPS display button will cause the GPS Dialog box to pop-up. If a GPS antenna is connected to the receiver, on clicking the button “Turn ON GPS” button, the GPS receiver reports the GPS co-ordinates of the current location. The dialog box then gets populated by the GPS co-ordinates.



2. **Spectrum Control:** The Spectrum Control displays the Spectrum Control Dialog box discussed above. Settings such as the resolution bandwidths, reference level, center frequency and span on the spectrum analyzer can be changed using this dialog box.

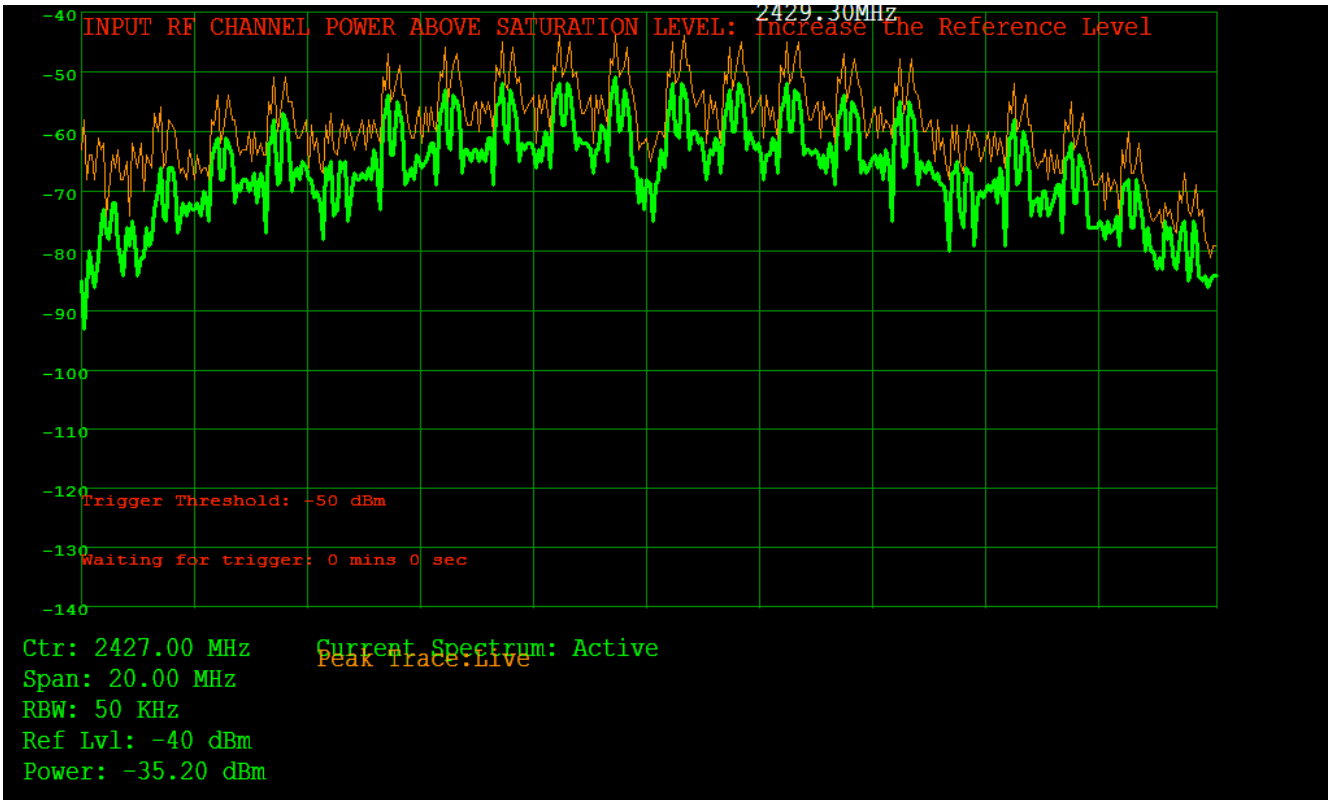


3. **Trace Settings:**



The Trace Settings dialog box allows the user to make settings and changes to the spectrum waveform such as Peak hold, Multiple and Adjacent Bin Averaging, and placing markers on the waveform.

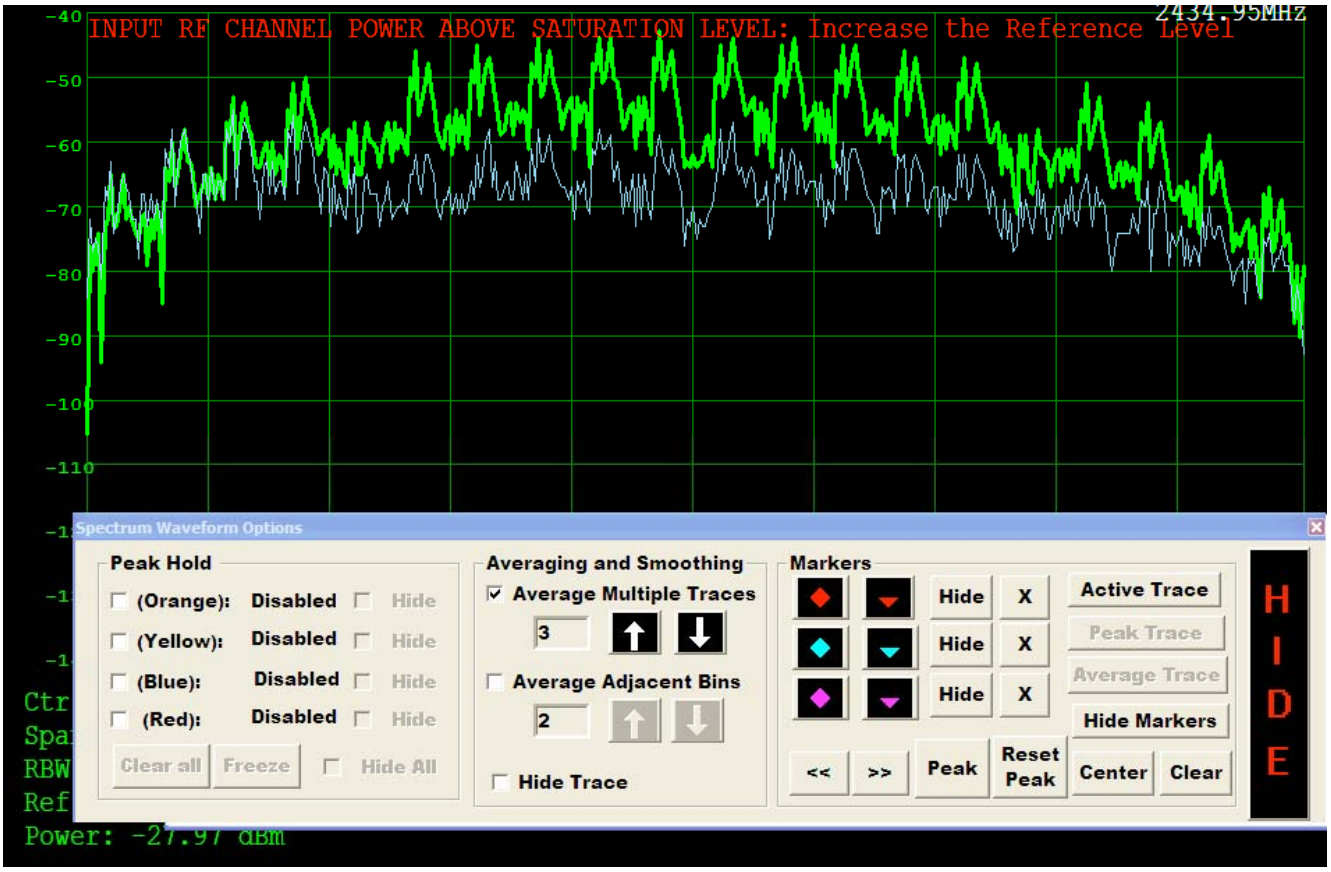
Peak Hold: Peak Hold will hold the instantaneous peaks of the current spectrum trace in a separately colored waveform trace.

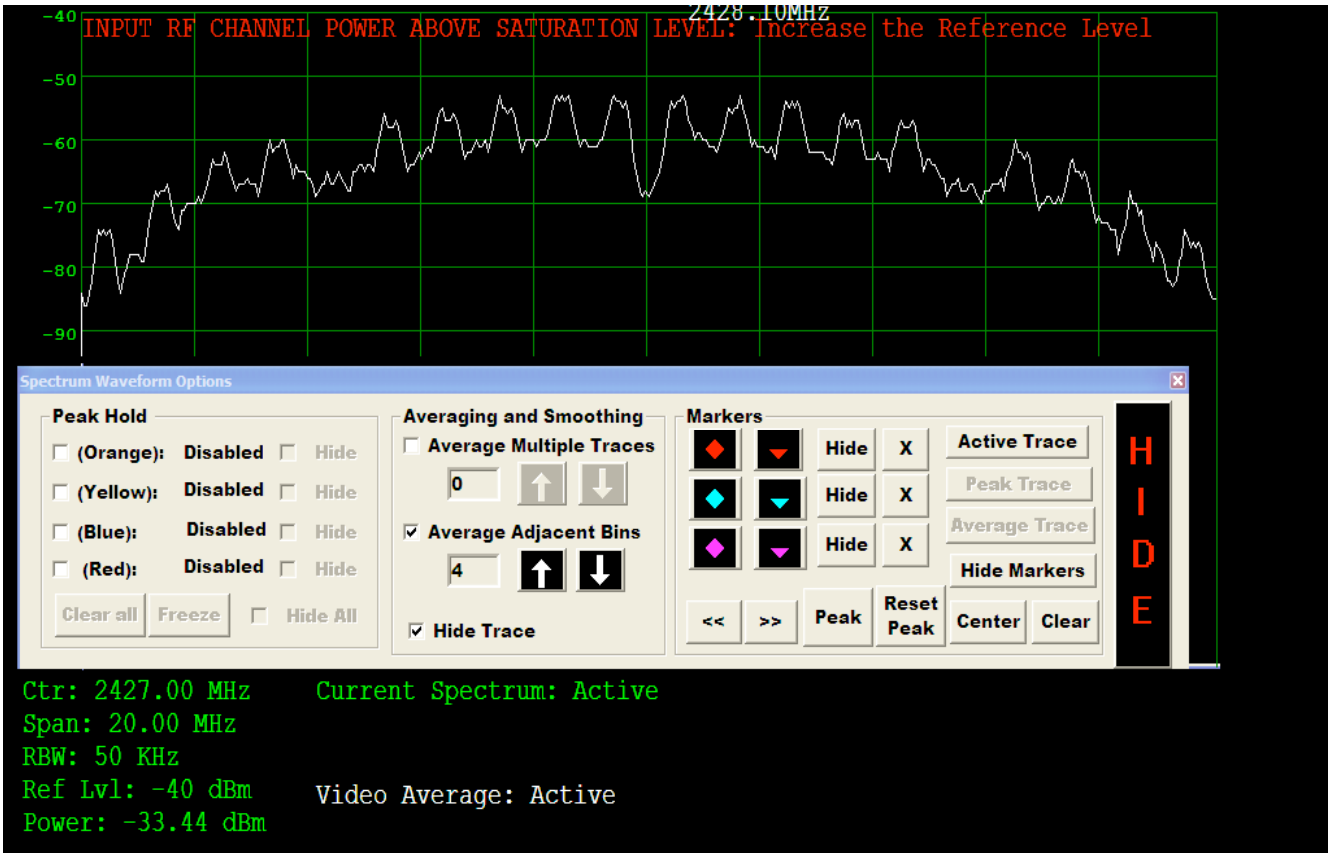


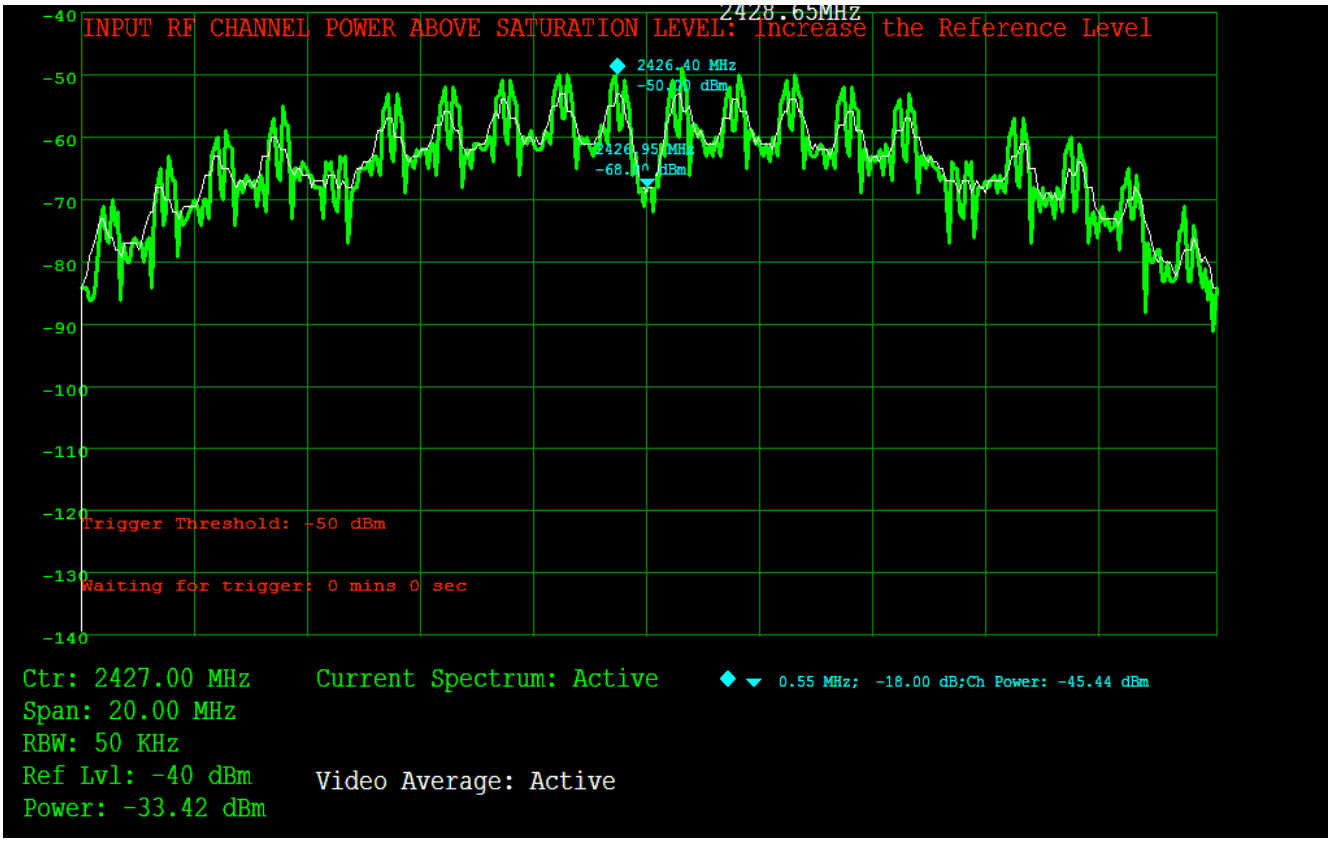
Waveform Averaging:

Multiple Trace Averaging: Turning this option ON will begin averaging multiple past traces of the spectrum waveform. The number of past traces to accumulate and average can be varied between 1 and a 100.

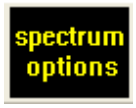
Adjacent Bin Averaging: Turning this option ON will begin accumulation and averaging of multiple adjacent bins. The number of adjacent bins which can be averaged is user settable and can be varied between 1 and a 100.




2428.10MHz
INPUT RF CHANNEL POWER ABOVE SATURATION LEVEL: Increase the Reference Level
-40
-50
-60
-70
-80
-90
Spectrum Waveform Options
Peak Hold
(Orange): Disabled Hide
(Yellow): Disabled Hide
(Blue): Disabled Hide
(Red): Disabled Hide
Clear all
Freeze
Hide All
Averaging and Smoothing
Average Multiple Traces
0
Average Adjacent Bins
4
Hide Trace
Markers
Hide
X
Active Trace
Peak Trace
Average Trace
Hide Markers
<<
>>
Peak
Reset Peak
Center
Clear
HIDE
Ctr: 2427.00 MHz
Span: 20.00 MHz
RBW: 50 KHz
Ref Lvl: -40 dBm
Power: -33.44 dBm
Current Spectrum: Active
Video Average: Active


2428.65MHz
INPUT RF CHANNEL POWER ABOVE SATURATION LEVEL: Increase the Reference Level
2426.40 MHz
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
Trigger Threshold: -50 dBm
Waiting for trigger: 0 mins 0 sec
Ctr: 2427.00 MHz
Span: 20.00 MHz
RBW: 50 KHz
Ref Lvl: -40 dBm
Power: -33.42 dBm
Current Spectrum: Active
0.55 MHz; -18.00 dB;Ch Power: -45.44 dBm
Video Average: Active

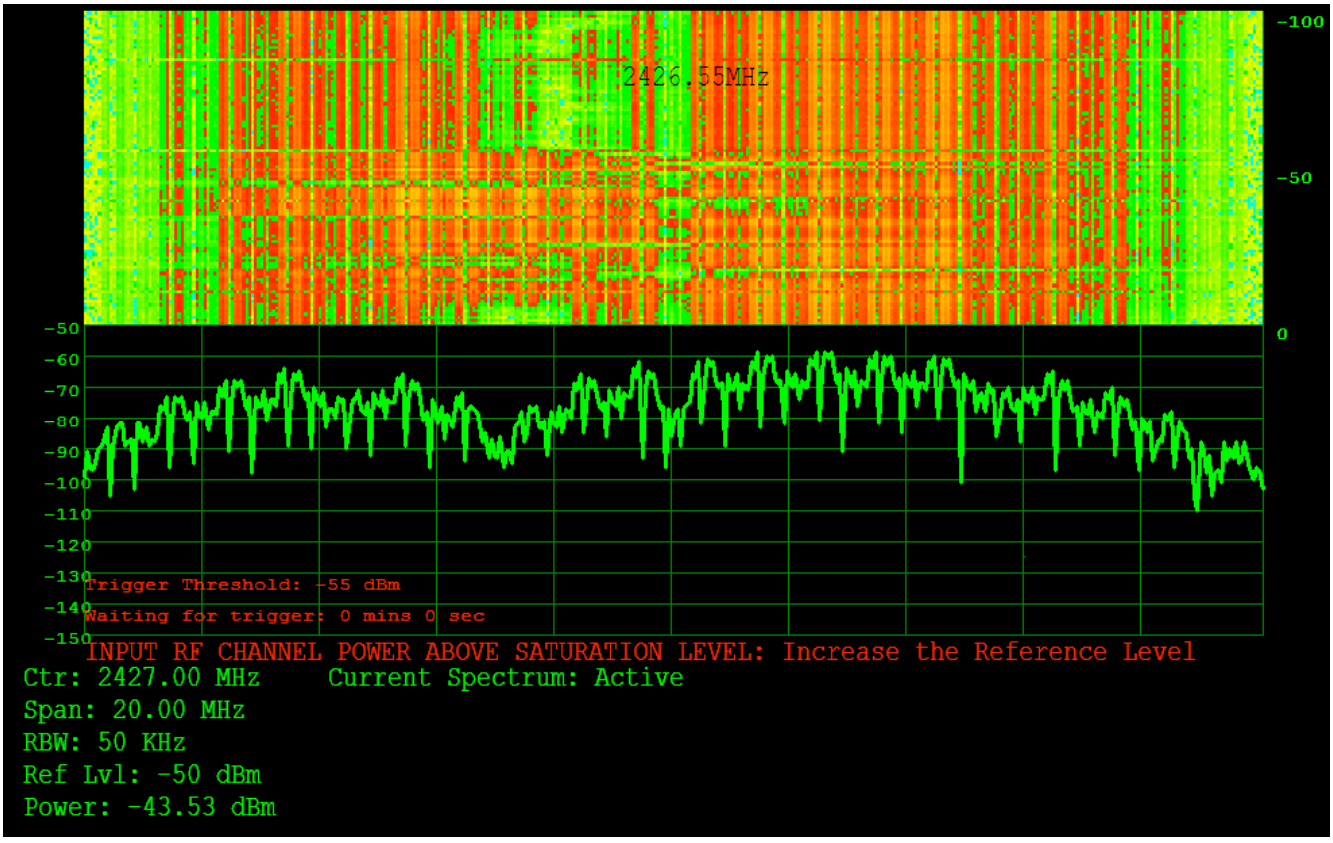
Markers: The Marker/Delta Marker pair can be set on the waveform to measure the total power between two points on the waveform or the difference in power between the two points. Three such pairs of markers are available. The markers can be set to the Peak Hold trace, the average trace or the active waveform trace.

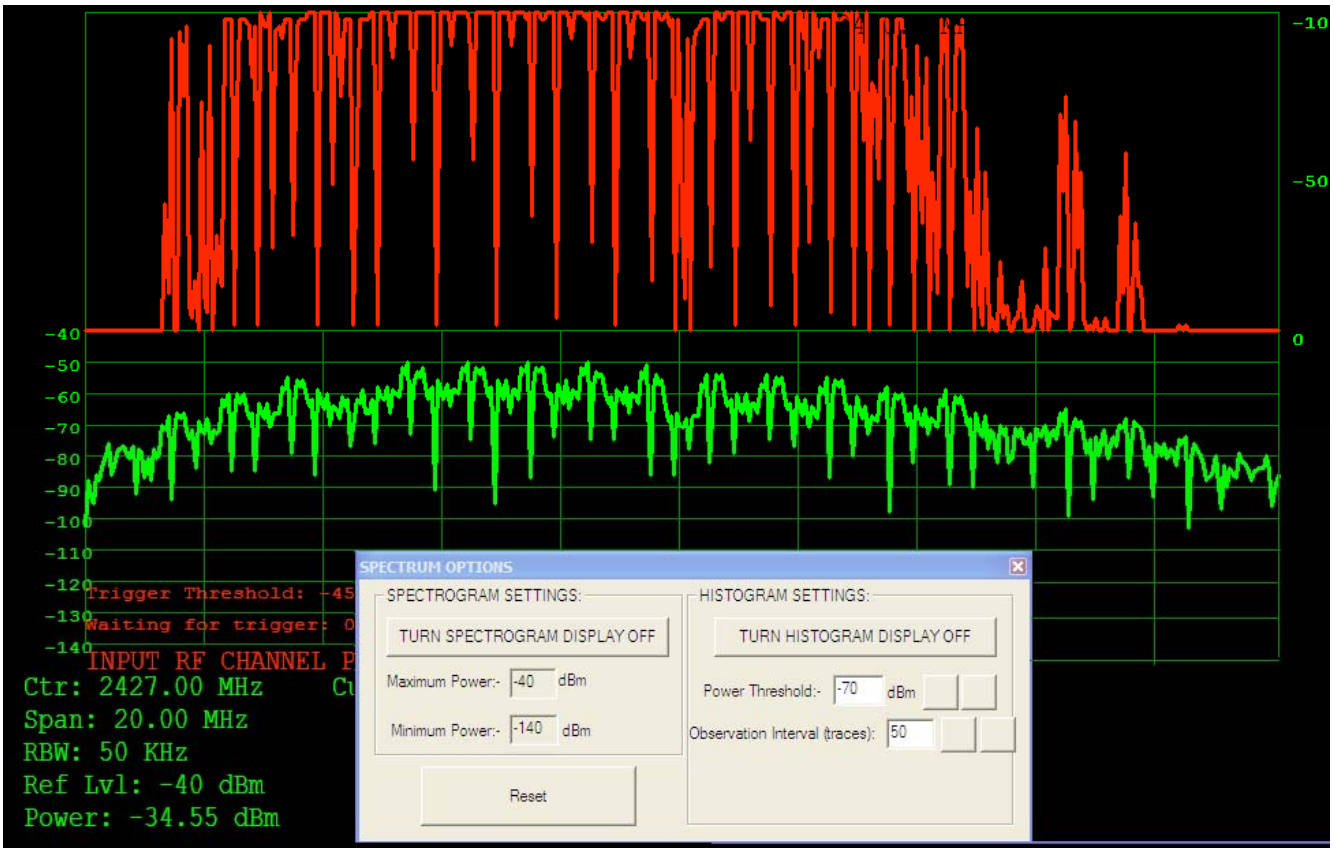


Spectrum Options: The spectrum options allows for the display of the Histogram and Spectrogram.

Spectrogram: The Spectrogram display shows the past 100 spectrum waveforms with the RSSI values color-coded. See Fig X on the next page.

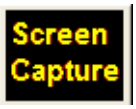
Histogram: The Histogram displays the percentage of the past traces for which the RSSI is above a certain threshold. The number of past traces and the RSSI Threshold can be user settable. See Fig X on the next page.




-10
-50
0
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
Trigger Threshold: -45
Waiting for trigger: 0
INPUT RF CHANNEL P
Ctr: 2427.00 MHz
Span: 20.00 MHz
RBW: 50 KHz
Ref Lvl: -40 dBm
Power: -34.55 dBm
SPECTRUM OPTIONS
SPECTROGRAM SETTINGS:
TURN SPECTROGRAM DISPLAY OFF
Maximum Power:- -40 dBm
Minimum Power:- -140 dBm
Reset
HISTOGRAM SETTINGS:
TURN HISTOGRAM DISPLAY OFF
Power Threshold:- -70 dBm
Observation Interval (traces): 50

Interference Assist: The interference assist screen is a helpful tool for the user to identify difference sources of interference from the spectrum signatures. It acts as a guide for the users to identify Direct Sequence Spread Spectrum, Frequency Hopping Spread Spectrum, Continuous Wave (CW) and Bluetooth waveforms and the devices which create these waveforms.

Save Current Settings/Recall Saved Settings: The current waveform settings can be saved to a file which can later be recalled. Current settings such as Center Frequency, Span, Resolution Bandwidth and Reference Level and Power Threshold, if in Trigger Mode, are saved to a file. This file can then be recalled later to set the spectrum analyzer to the saved settings.



Screen Capture: The Screen Capture button allows the user to capture the current screen into a bitmap/jpeg which can be saved to a file.

Start/Stop Data Collection: Data collection can be started to collect and save all the real-time spectrum data to a file. This saved data can then be reviewed using the PC Viewer (optional, can be purchased separately) software or converted to ASCII text file using the Chameleon file converter, which comes along with the unit.