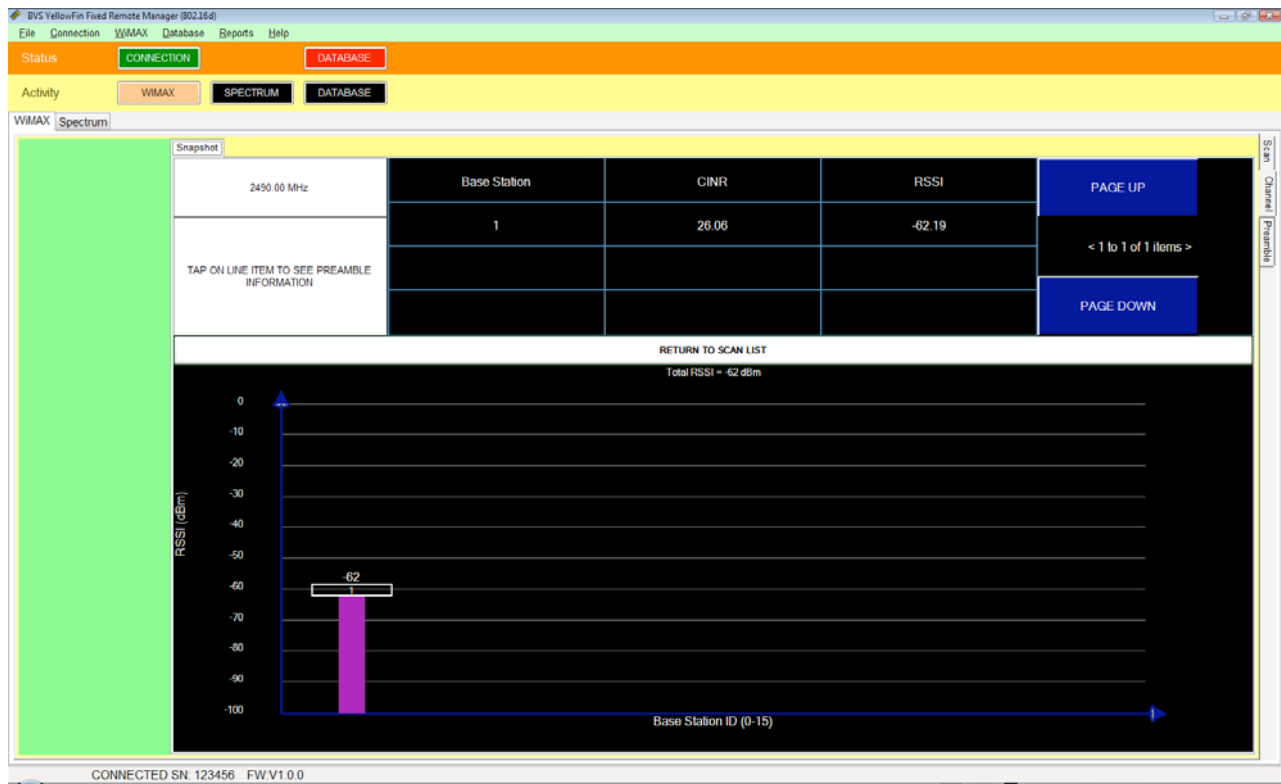


REMOTE MANAGER

(YellowFin 802.16d Fixed WiMAX Analyzer)

Manual version 1.0



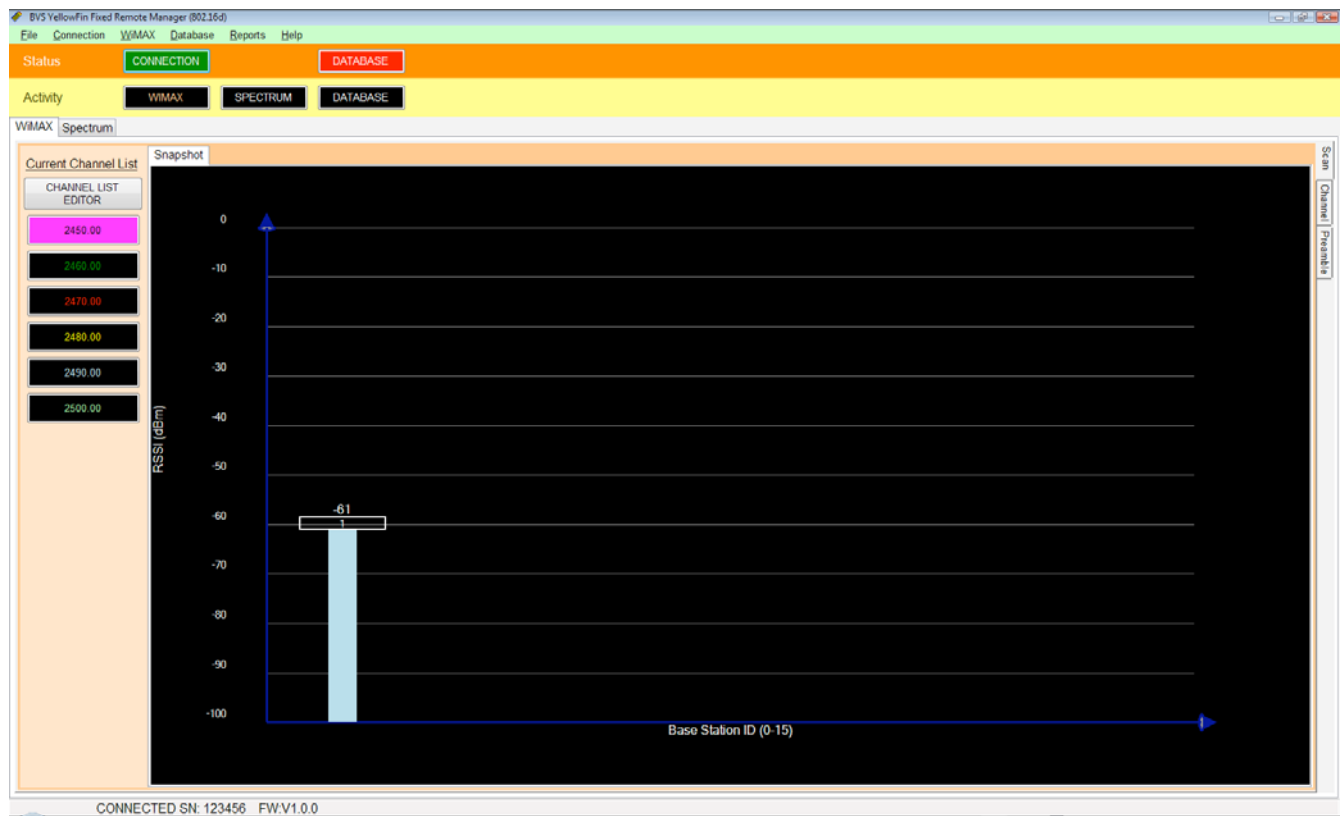
Remote Manager User's Manual

Introduction.....	2
Installation.....	2
System Requirements.....	3
Registration Code.....	3
Quick Start.....	3
Hardware Requirements.....	4
Device Connection.....	4
Database Connection.....	4
Opening A Connection.....	4
Via LAN.....	4
Via Internet.....	4
Connection Status.....	6
WiMAX Mode.....	6
Scan Channel Mode.....	7
Single Channel Mode.....	8
Single Base ID Mode.....	9
Base ID Falloff.....	13
Bandwidth/FFT SIZE.....	13
Spectrum Mode.....	13
Reference Level.....	14
Resolution Bandwidth.....	14
Screen Average.....	15
Video Smoothing.....	15
Triggering.....	15
Traces.....	15
Marker/Delta.....	16
Databases.....	17
Reports.....	18
Output.....	18

BVS YellowFin Remote Manager Software User Manual

INTRODUCTION

The YellowFin Remote Manager (YFRM) runs on a Windows Vista based PC that is connected to a BVS YellowFin system remotely. This connection is made through TCP/IP. Through this connection, a YellowFin can be controlled. The YellowFin can be set to any mode and settings available. Data can be monitored in real-time and stored in a relational database for later viewing and reporting.



WiMAX Channel Scan Mode

INSTALLATION

Two applications are needed to use the complete functionality of the Remote Manager. One is the Remote Manager software and the other is SQL Server Express, a free application from Microsoft.

The Remote Manager software can be installed from the software CD. .NET Framework needs to be installed on the computer in order for RM to function correctly. This framework is already installed on all computers loaded with MS Windows Vista. If the YFRM will not run, install the framework from the CD or from www.microsoft.com.

When using databases to generate reports, SQL Server 2005 must be installed on the

computer. SQL Server Express 2005 is located on the CD and may also be found at www.microsoft.com. SQL Server is the database engine through which the YFRM creates/adds and reports on data from the YellowFin.

SYSTEM REQUIREMENTS

Below is the minimum system requirements needed to run the full Remote Manager system.

Supported Operating Systems:	Windows Vista
Processor Speed:	2 GHz
Memory:	1 GB
Hard Drive Space:	1 GB

REGISTRATION CODE

The first time that Remote Manager is run, a dialog box will show up asking for the registration code. This code is located on the paperwork you received from the factory. Each unit has its own registration code that is unique to the serial number. This registration code is tied to the serial number of the YellowFin hardware. The code will be verified upon connection to the hardware. The Remote Manager must be connected to the YellowFin unit when running the application in order to verify the registration code. The Remote Manager asks the hardware for its serial number. If it is not talking to the hardware, the registration code cannot be verified and the application disabled.

QUICK START

DEVICE CONNECTION

In order to receive data from the YellowFin, you must first make a connection through the network. See "Opening a Connection" below for details on this process.

DATABASE CONNECTION

In order to begin saving data to a database and have the ability to generate reports, you must first create the database and then open it. Please see "Opening a Database" below for instructions on how to do this.

DEVICE INTERFACE

HARDWARE REQUIREMENTS

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

OPENING A CONNECTION

Click 'Open' from the 'Connection' menu to pull up the Connection center.

Connection Center

Is YellowFin on LAN or Internet?

INTERNET STEP 1: If your YellowFin will be accessed at a remote location not on your LAN, connection will be made over the Internet. Enter the IP address of the gateway/router which the YellowFin will access.

INTERNET STEP 2: Enter the port number which will allow you to access the YellowFin through the router. The YellowFin must be configured for this port using the configuration utility. Your network administrator must also enable access through the router on the port specified.

LAN STEP 1: Search for YellowFins or simply enter the IP address and port (usually 10001) of the YellowFin if known.

Search for YellowFins on LAN

Search for YellowFins

192.168.1.105 00-20-4A-A9-29-D9

Select Highlighted Entry

0 . 0 . 0 . 0

Set IP Address of Highlighted Entry

Connect To YellowFin

IP Address: 192 . 168 . 1 . 105

Port: 10001

Connect

Cancel

Connecting to a YellowFin

VIA LAN

If you are connecting to a YellowFin through an internal network (LAN), you simply need to know the IP address that has been assigned to the Ethernet adapter connected to the device. The port is typically 10001 and does not have to be changed. If you are unsure of the IP address but know the MAC address of the adapter (usually visible through the casing of the adapter), a search can be made for devices. Clicking on the search button will list (after 5 seconds or so) any MAC addresses the Remote Manager thinks may possibly be a YellowFin.

Choosing the correct MAC address will place the IP address in the lower box. Make sure that the IP address matches the subnet of your network or you will not be able to make a successful connection. If not, please use the "Set IP Address" option. Click 'CONNECT' after populating the IP address box and the port. After a few seconds you will see the YellowFin LED light up if a connection has been made.

WiMAX scan mode will be entered and the default channels will be scanned. If it is necessary to change the IP address of the YellowFin, (for instance, if the address is not on the right

subnet) select the MAC address in question and choose “Set IP Address”. After doing this, search for MAC addresses again to verify that the address has changed.

VIA INTERNET

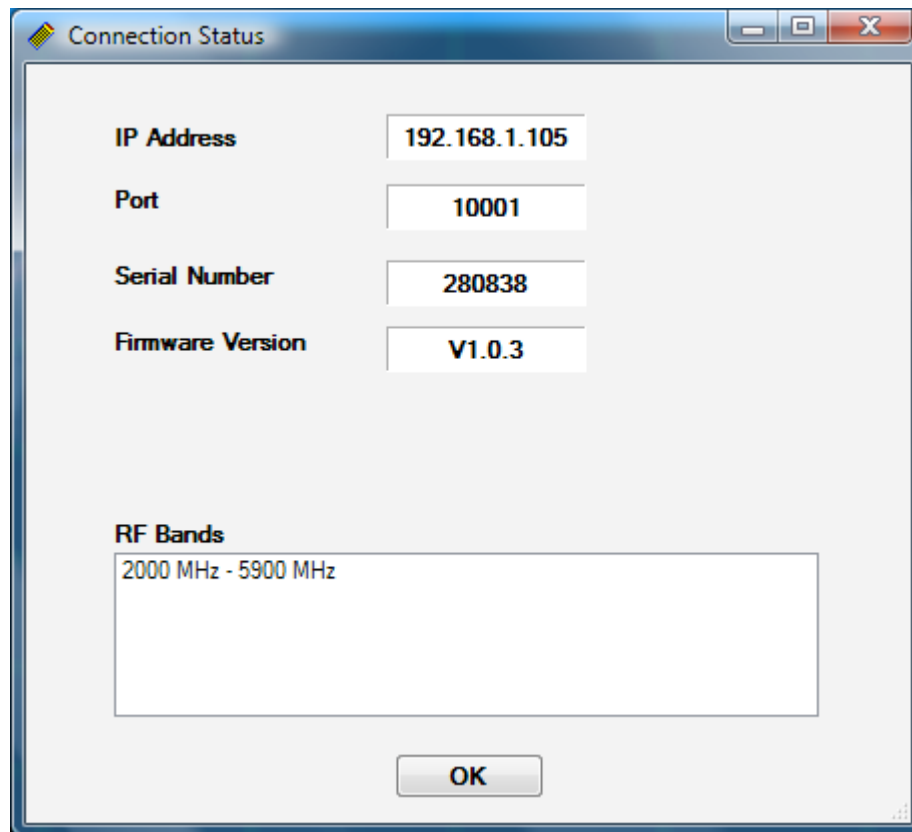
If connecting to a YellowFin which is outside your local network, you need to find out the IP address of the router which provides access to the hardware. Typically the router will have to be configured to forward requests on port 10001 to the IP address of the YellowFin device. Please see the instructions for your router. Entering the IP address of your router (make sure it is a static IP address and not dynamically addressed), use port 10001. If the router is configured correctly, you should be able to connect to the YellowFin through this port.

After clicking 'CONNECT' and waiting a few seconds, you will see the YellowFin LED light up if a connection has been made. WiMAX scan mode will be entered.

If it is necessary to change the IP address of the YellowFin, (for instance, if the address is not on the right subnet) select the MAC address in question and choose “Set IP Address”. After doing this, search for MAC addresses again to verify that the address has changed.

CONNECTION STATUS

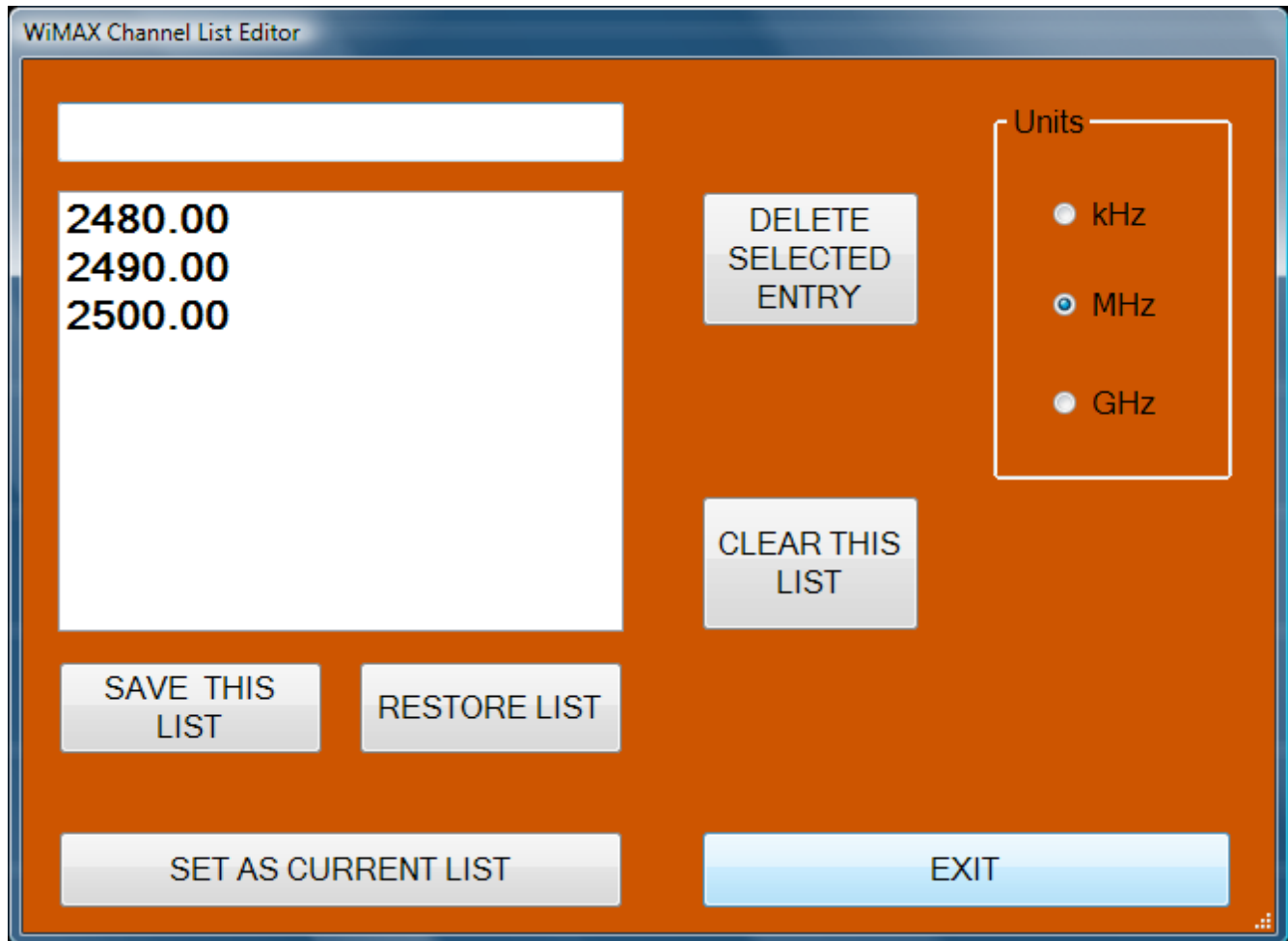
Choosing the 'Status' option from the Connection menu will provide basic information after having connected to the YellowFin unit. Information such as serial number and firmware version of the YellowFin will be provided.



Connection Status

WiMAX MODE

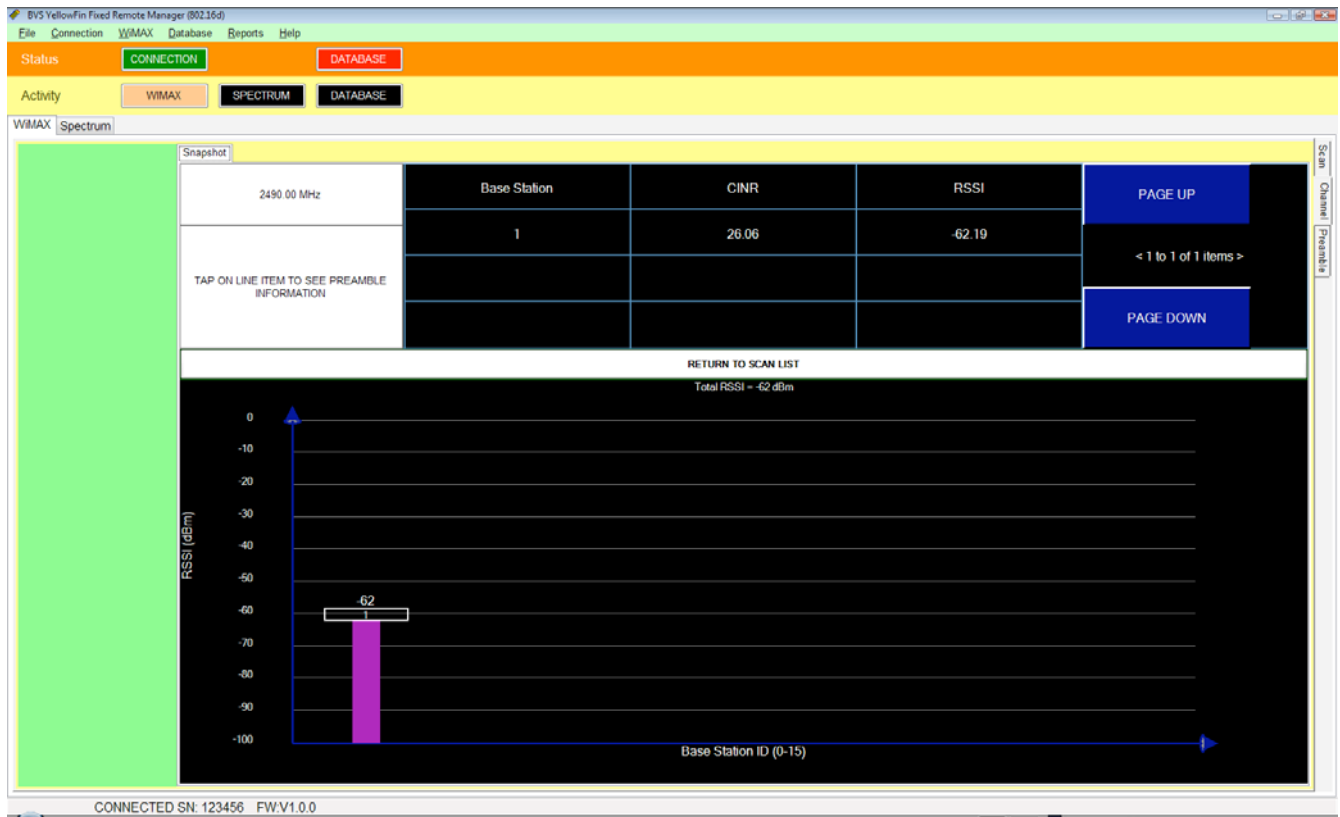
In WiMAX demodulation mode, the YellowFin attempts to demodulate any WiMAX signals found on the specified channels. The channels specified are set using the channel list editor.



The image shows a software window titled "WiMAX Channel List Editor". The window has an orange background. On the left, there is a list box containing three entries: "2480.00", "2490.00", and "2500.00". Above this list is an empty text input field. To the right of the list box is a button labeled "DELETE SELECTED ENTRY". Below the list box is a button labeled "CLEAR THIS LIST". At the bottom left of the window are two buttons: "SAVE THIS LIST" and "RESTORE LIST". At the bottom right are two buttons: "SET AS CURRENT LIST" and "EXIT". On the far right, there is a "Units" section with three radio buttons: "kHz", "MHz" (which is selected), and "GHz".

Channel List Editor

The channel list editor can be accessed by pressing the button in the channel list panel. Up to 16 channels can be placed in the list. The list can be saved to a file or restored from a file. When the list has finished being entered, the user sends it to the YellowFin by pressing the "Set As Current List" button.

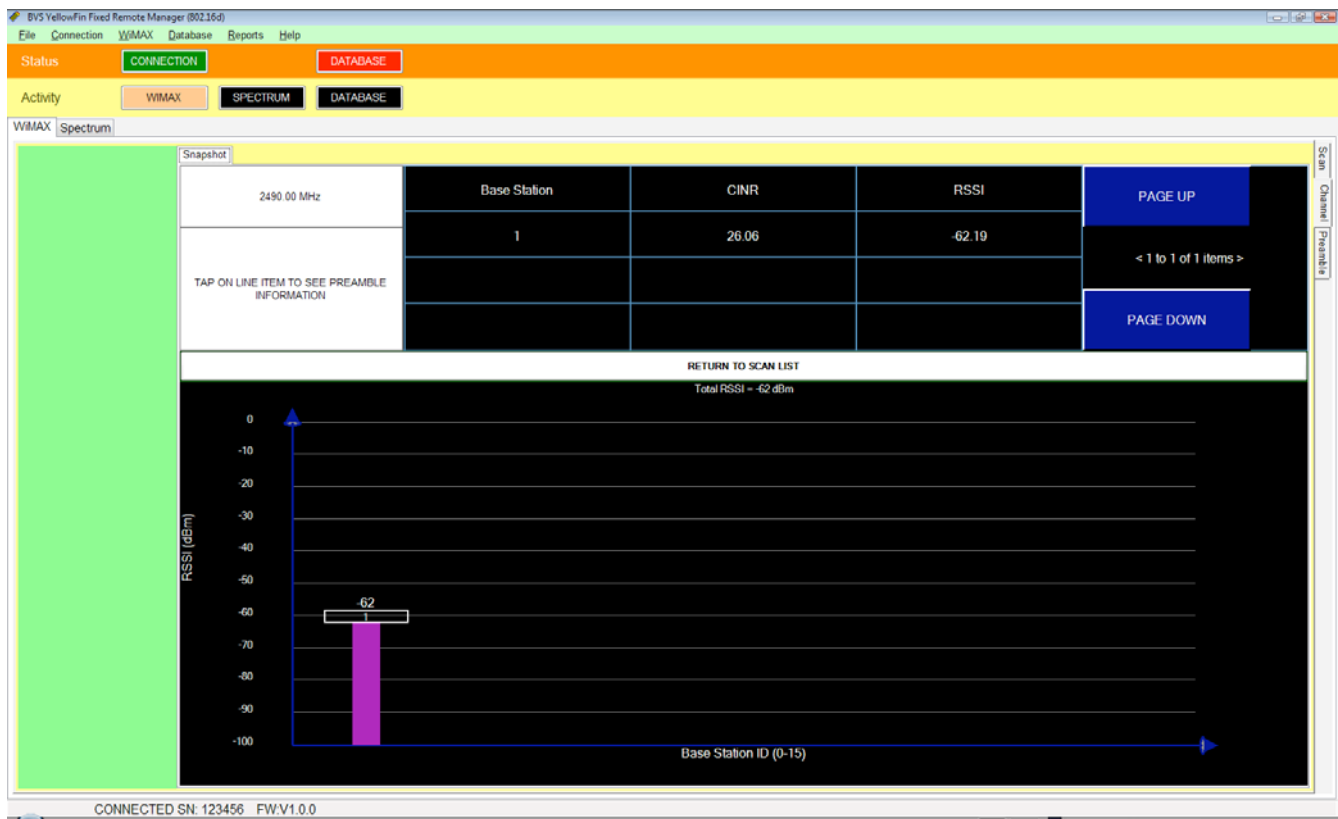


WiMAX Scan Channel Mode

SCAN CHANNEL MODE

These channels will now be scanned in order. Each LED panel on the left will have a different color. If a base id shows up on that frequency, a bar will show up in that color along with the base id number and value in dB.

To view a single channel, click on the appropriate LED panel in the channel list.



WiMAX Single Channel Mode

SINGLE CHANNEL MODE

The list at the top of the screen will display any base ids that were found on the selected frequency. If the base id has not been seen for a time period it will eventually fall off of the list (see base id falloff).

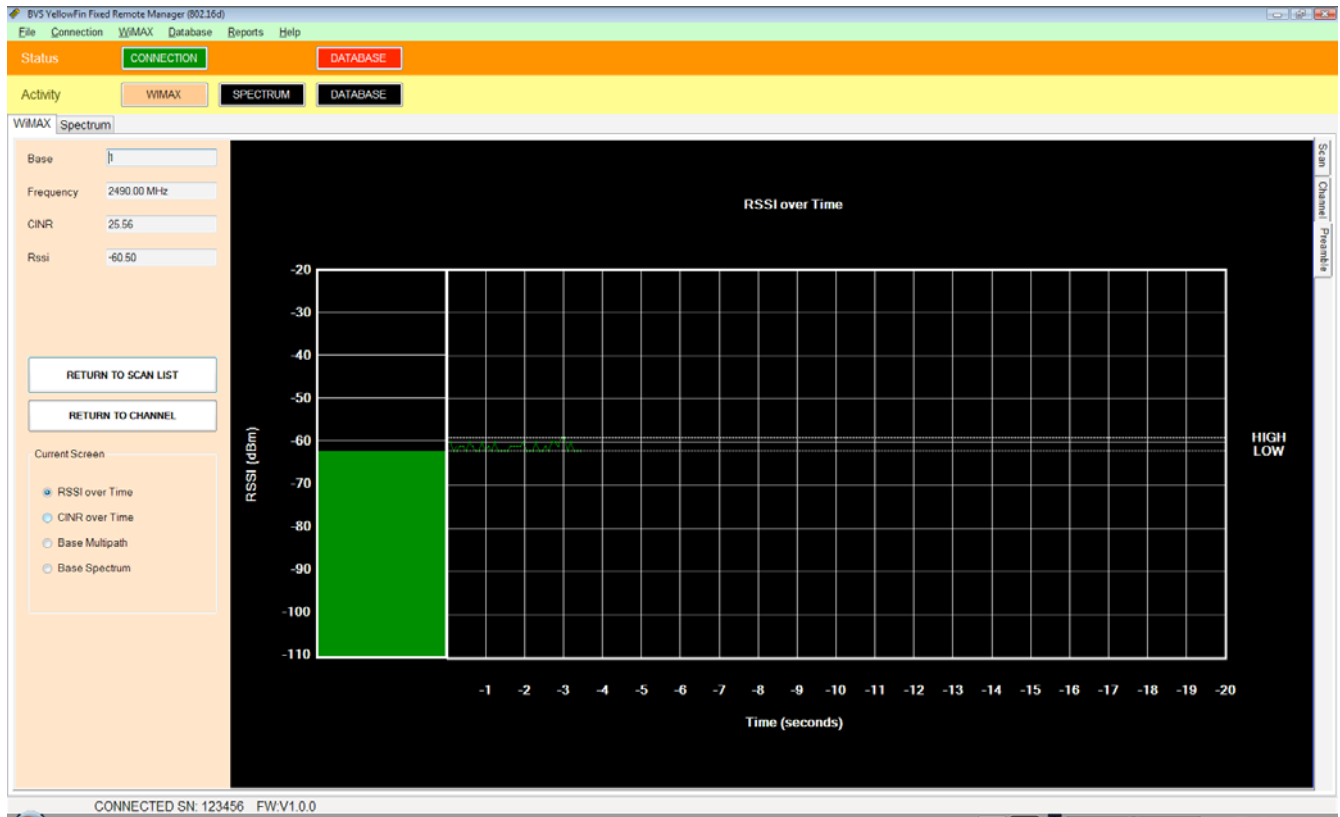
The following fields are shown in the list:

- ITEM – Item number in the list.
- BASE ID # – Base id number from 0-113.
- CINR – Carrier to Interference plus Noise Ratio.
- RSSI – Received signal strength indicator in dBm.

All 114 base ids are shown in this mode. The stronger the signal, the greater the possibility that the base id can be demodulated. Press 'Return to Scan List' to go back to scan mode.

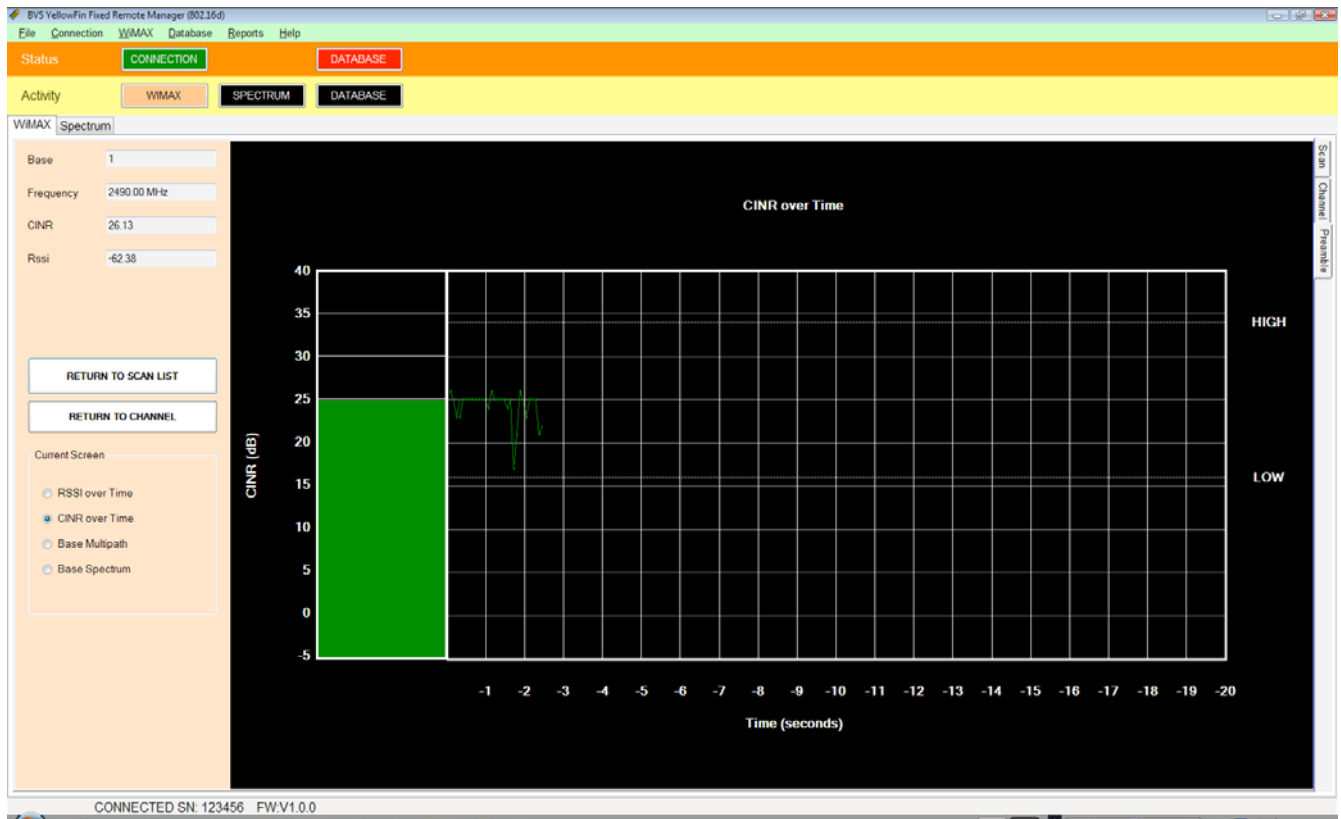
SINGLE BASE ID MODE

A closer look can be made at each of the base ids in the list. Clicking on an item in the list will put the YellowFin into individual base id mode. Only information from the selected base id will be displayed. The RSSI screen shows the RSSI of the base id over the previous 20 seconds. Press the 'Return To Channel' to go back to Single Channel mode. Press 'Return to Scan List' to return to Scan Mode.

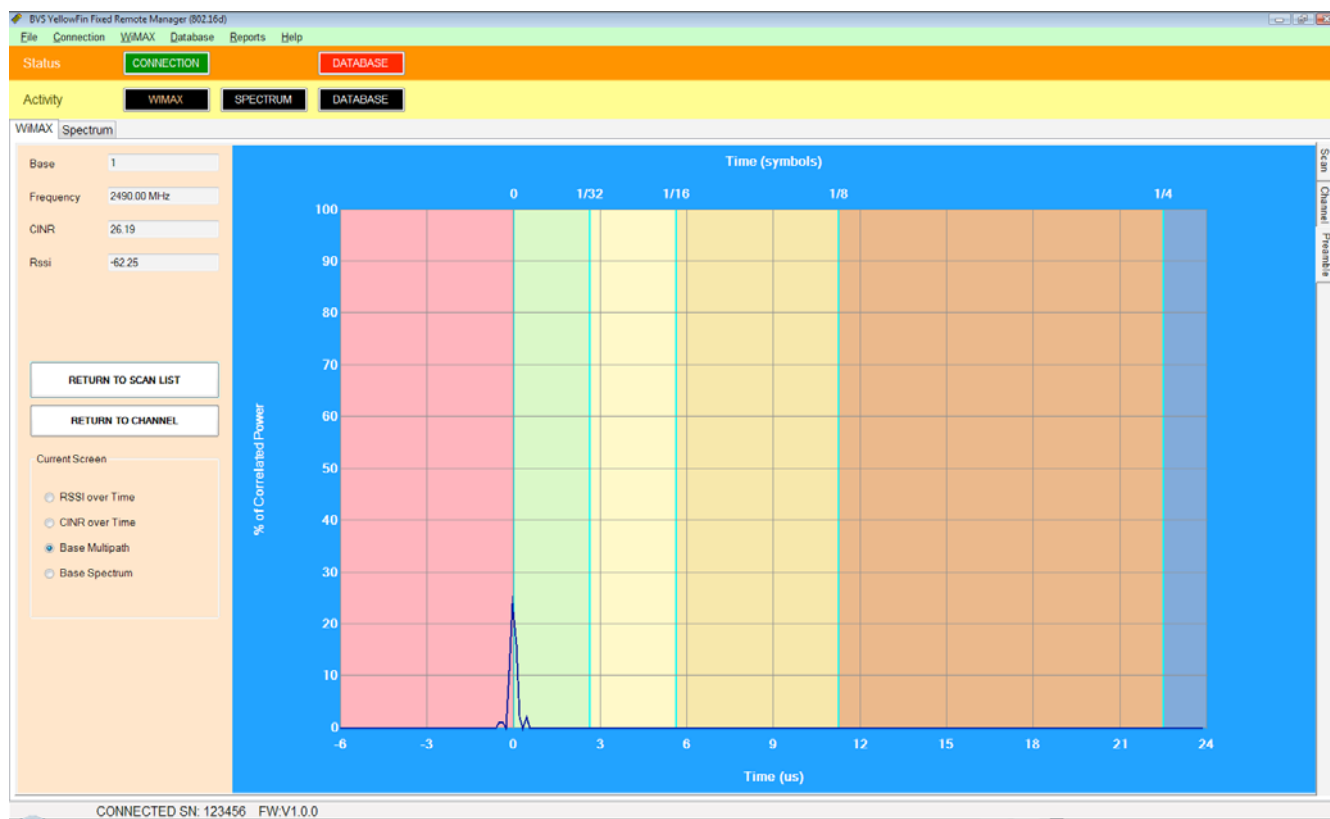


WiMAX Base ID RSSI Mode

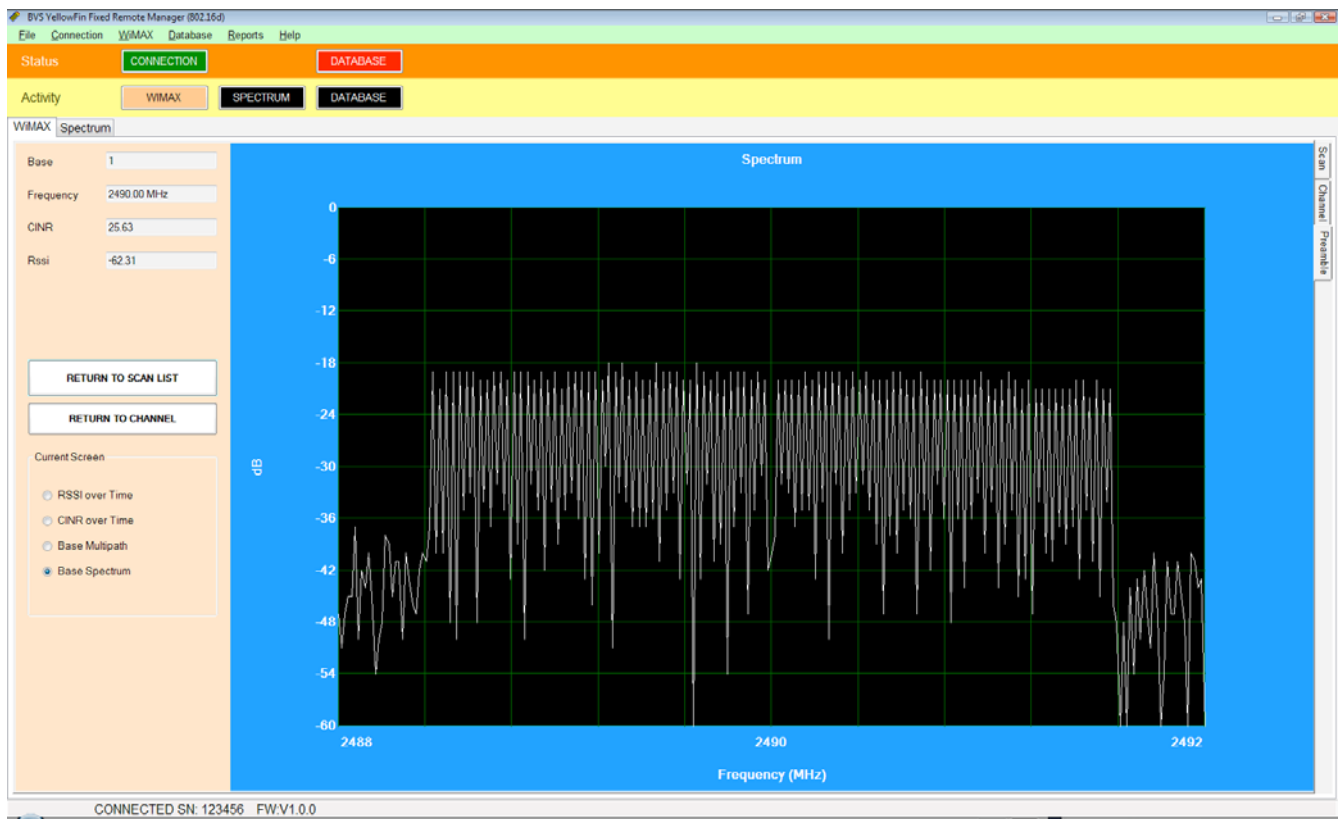
Choose different radio buttons in individual base id mode to view screens for CINR, Multipath, and base id spectrum.



WiMAX Base ID CINR Mode



WIMAX Base ID Multipath Mode



WIMAX Base ID Spectrum Mode

Preamble Fall Off Setting

When enabled, a preamble is dropped off of the list when it has not been seen in the fall off time period.

Fall Off seconds

☒ Enabled

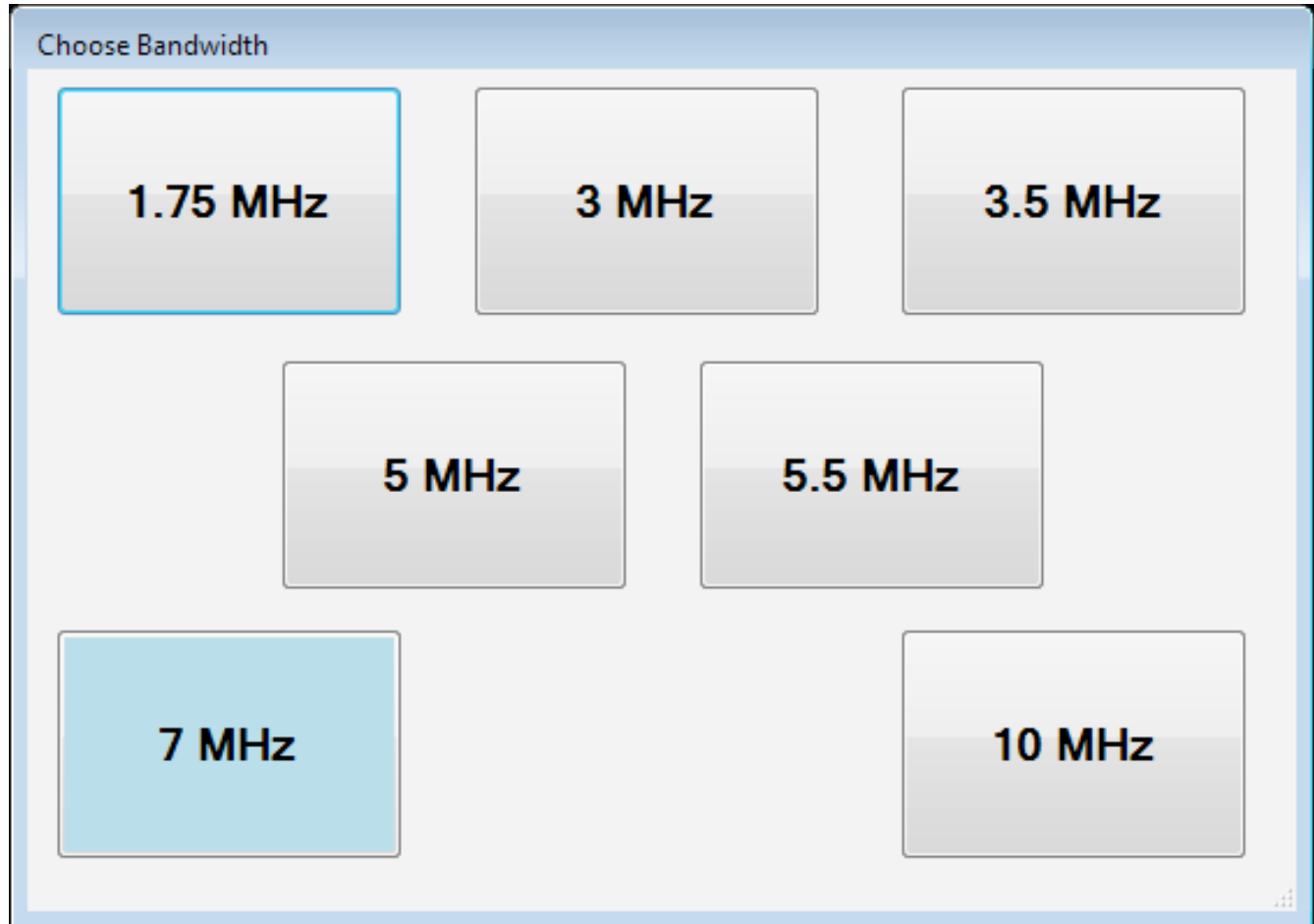
OK

Base ID Falloff Settings

BASE ID FALLOFF

Choose this dialog from the WIMAX menu to adjust or turn off the base id falloff setting. When enabled, the falloff setting will let base ids fall off of the single channel screen when not

seen after the time period set.



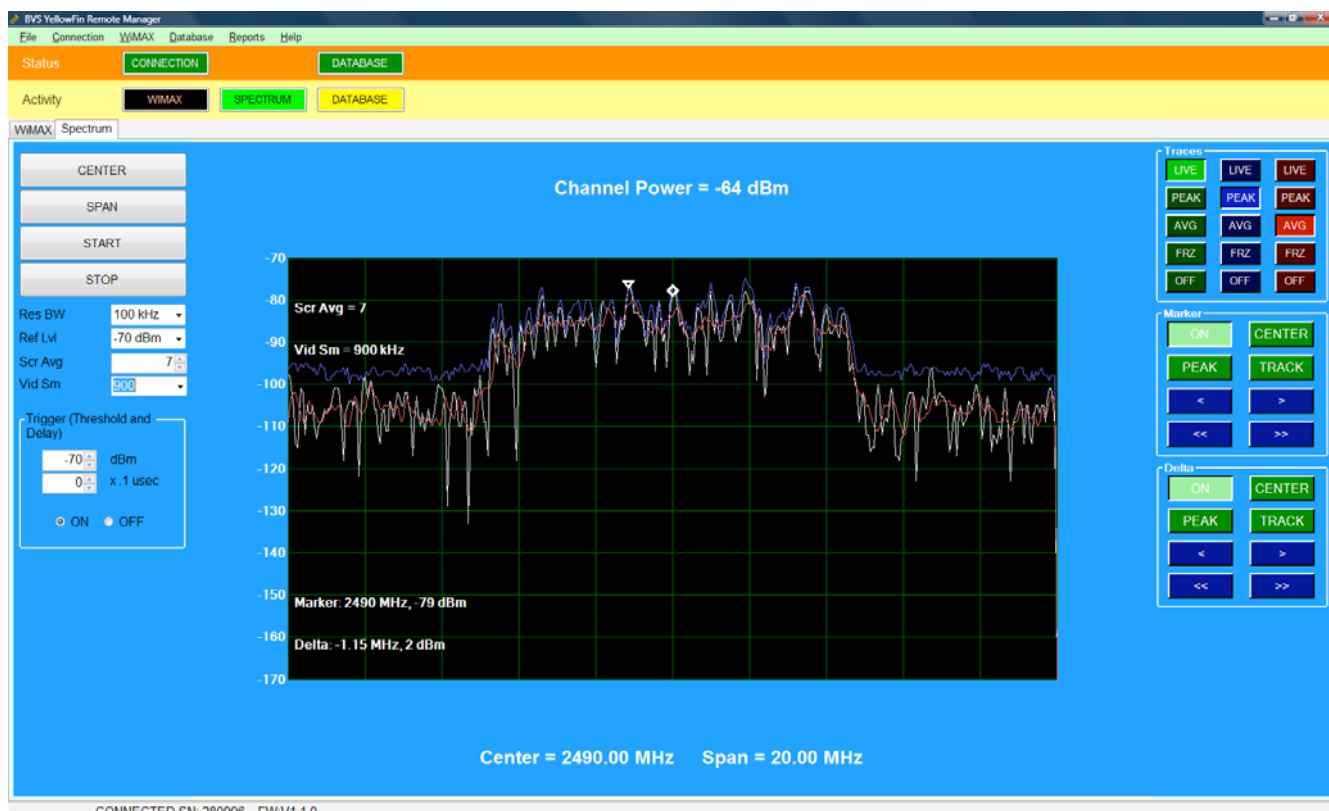
Bandwidth/FFT Size Selection

BANDWIDTH / FFT SIZE

Choose this dialog from the WiMAX menu to set the bandwidth and FFT Size for which packets will be demodulated. The choices are 5MHz/512 and 10MHz/1024.

SPECTRUM MODE

By selecting the Spectrum tab, the YellowFin being controlled will switch from demodulation or packet mode to spectrum analyzer mode.



Spectrum Analyzer Mode

Here the center frequency may be set. The span, start and stop frequencies can also be selected.

REFERENCE LEVEL

This menu option allows the user to set the current reference level of the receiver. The valid choices are between -20 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.

RESOLUTION BANDWIDTH

The YellowFin measures the energy present in different frequency bins, each bin's width equal to the resolution bandwidth. The resolution bandwidth is set by setting the level for the resolution bandwidth desired.

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 YellowFin may be set to a large Resolution Bandwidth and a large Span to quickly sweep and identify frequencies of interest. The Span and Center can then be decreased to measure frequency components and the signal's characteristics.

SCREEN AVERAGE

The average of the last N sweeps will be displayed if the trace is put into AVG mode.

VIDEO SMOOTHING

Video Smoothing uses adjacent bin averaging to reduce the amount of fluctuation in the measured trace due to noise. This is different from Screen Averaging, which averages the same frequency bin from different traces. Use the arrows to increase or decrease the bandwidth which are averaged for the smoothing. When properly set, Video Smoothing can reduce the variation of the trace due to noise without distorting the trace. It is especially useful for smoothing signals that are not continuous or repetitive. The user must use good judgment when applying Video Smoothing. It is possible to smooth the trace too much so that the trace no longer represents the spectrum of the signal.

TRIGGERING

Trigger Mode enables the YellowFin 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 YellowFin 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 continually transmitting on the same frequency.

TRACES

There are three available traces for display. By default, trace 1 is set to the live feed. Each trace can be set to the following:

- ∞ **LIVE – Current real-time data will be displayed.**
- ∞ **PEAK – The highest value recorded at each frequency will be displayed.**
- ∞ **AVG – Video Smoothing and Screen Average results will display.**
- ∞ **FREEZE – The last sweep will be displayed and frozen.**
- ∞ **OFF – Trace will be turned off.**

MARKER/DELTA

The marker menu option allows the user to place a marker at a certain frequency. The frequency and power values are shown at the marker position. It also allows a delta marker. This delta marker shows the difference in frequency and power from the marker. To turn on the marker value and/or the delta marker value, simply tap the 'ON' button for either value. Use the arrows to move the marker or delta value left or right across the screen. Use the double-arrows to move faster. To center the marker on the screen, press the 'CENTER' button. To place the marker on the highest power value, press the 'PEAK' button. To track the peak value, press the 'TRACK' button.

DATABASES

The data being viewed can be stored for later retrieval in a database. This data is then stored into relational tables that can be formatted into reports on the information.

In addition to the simple reports that can be created using the Remote Manager, SQL Express can be used to make even more sophisticated reports on the data stored in the database.

The following options can be found in the 'Database' menu.

CREATION

Choose a filename for your database. Database files can be up to 4GB in size. As the database approaches this size, it will be necessary to create another database.

All appropriate tables will be created here. A popup box will tell you if the database has been successfully created. If you receive an 'Access Denied' error, the current user does not have permission through either Windows or SQL Server to create the database. If this happens, you must check on these permissions.

OPENING

After a database has been created, it can be opened to collect data or to generate reports on existing data. Choose from the list of databases found to be registered with SQL Server.

If the database has been successfully created, the database LED will light.

CLOSING

When switching databases or deciding to stop collecting data, simply choose this option to close the database.

REPORTS

After sufficient data has been collected, a variety of reports can be generated to view the history of the information in WiMAX mode or spectrum mode. The

options for these reports are in the 'Report' menu and can only be accessed after a database has been opened.

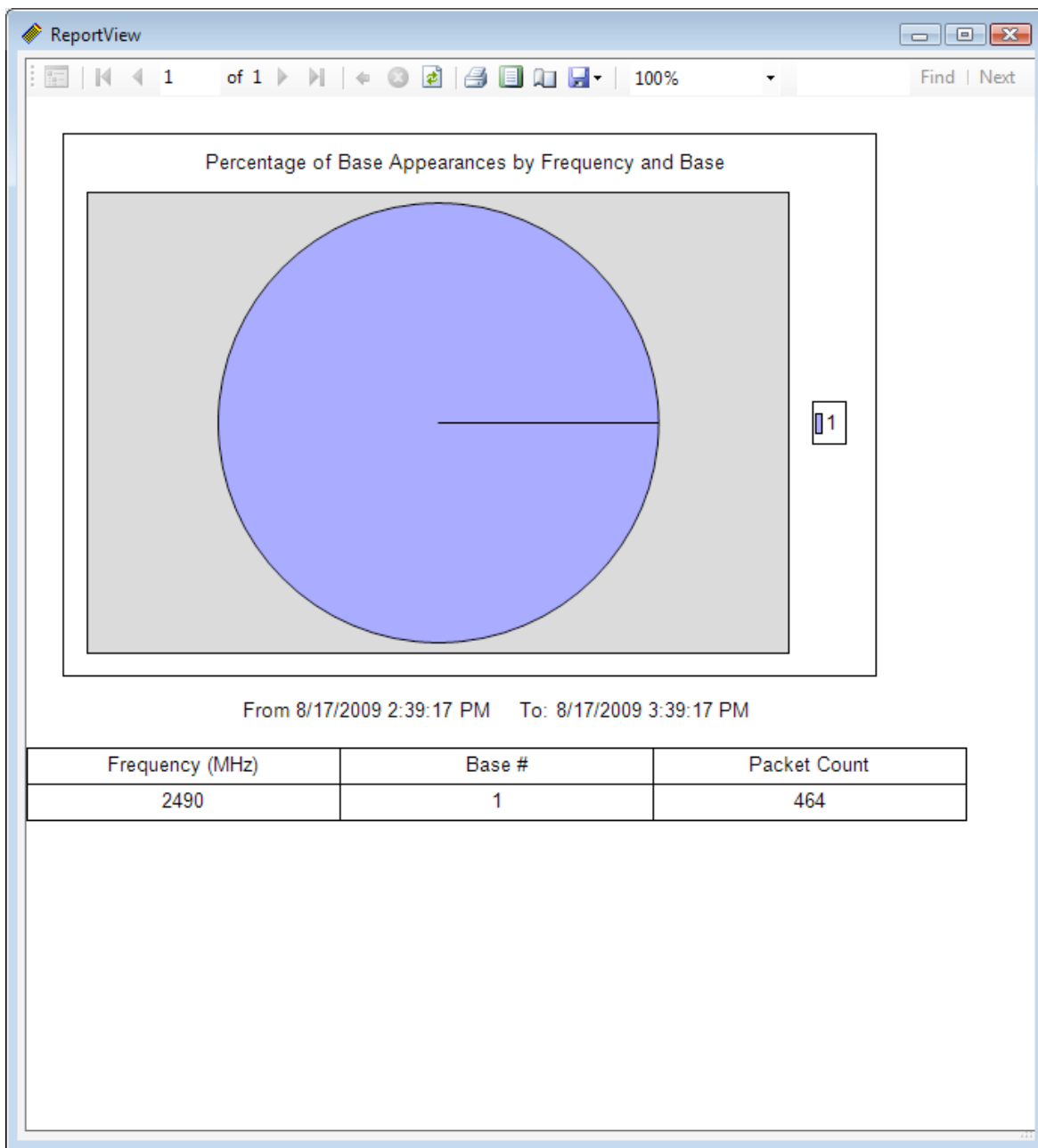
ENTRY FIELDS

FROM/TO DATES

Here the range of data can be selected. Choose times in which you would like to see the data. Make sure to select a data range when data has been collected.

BASE ID PACKET DISTRIBUTION

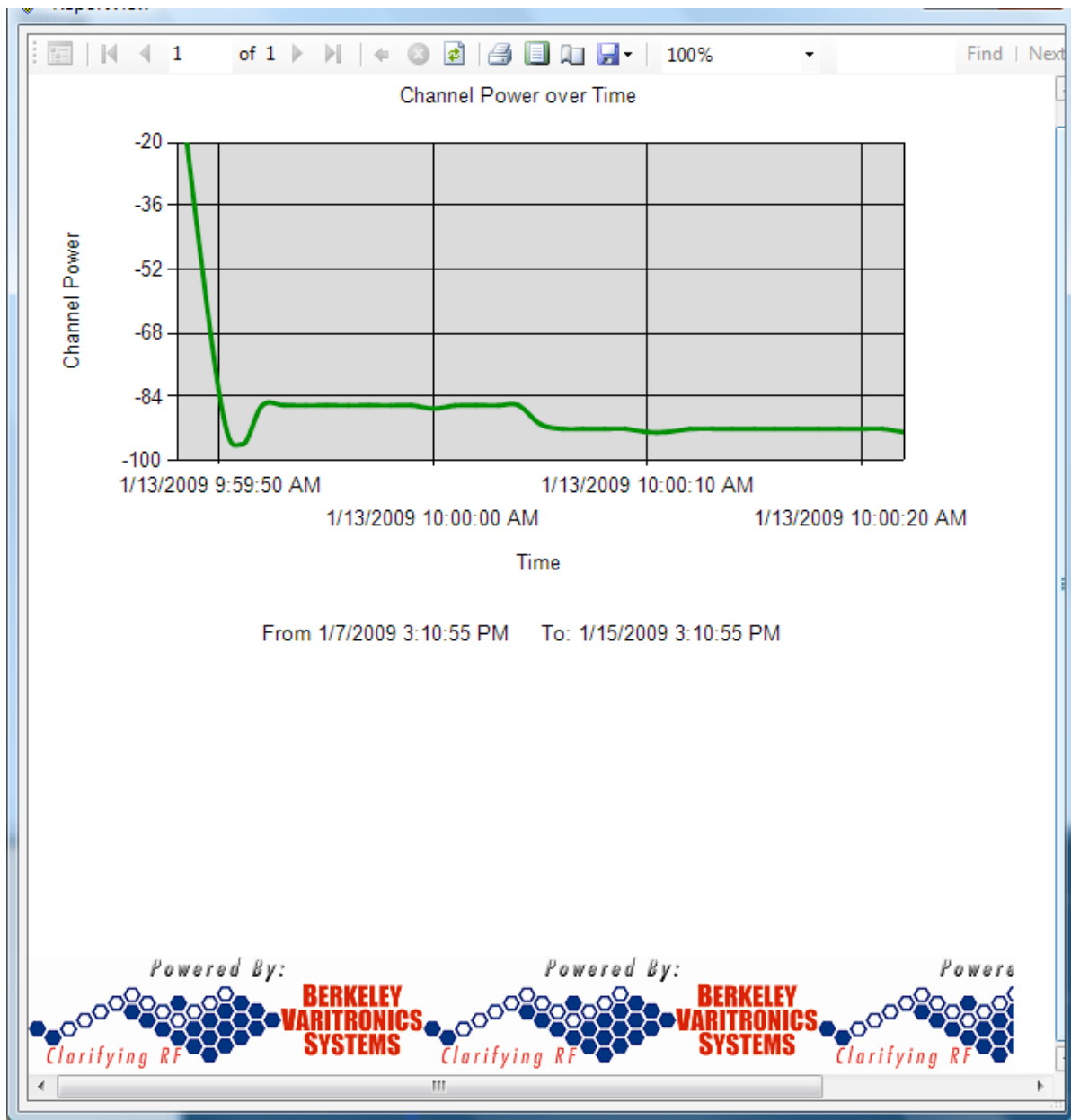
This report will show the distribution of packets received from different base ids over a certain time period.



Sample Base id Distribution Report

SPECTRUM CHANNEL POWER

This report will show spectrum channel power over a certain time period.



Sample Spectrum Channel Power Report

OUTPUT

SAVE TO PDF

Any report can be saved to Adobe Reader format (PDF). Simply click on the disk icon in the report.

SAVE TO EXCEL

Any report can be saved to MS* Excel format (XLS) as well. Click on the disk icon in the report.

PRINT

Each report can be printed. Click on the page preview to make sure that the report properly fits on the page and to determine if the report needs to be switched between landscape and portrait