

Decimator 30-Minute Tour (Rev 4)

1. Introduction

SED Systems' Decimator is a L-Band spectrum analyzer that comes in three different form factors: Decimator Card, 4/8 Port Decimator rack-mount unit and Portable Decimator, as shown in Figure 1.

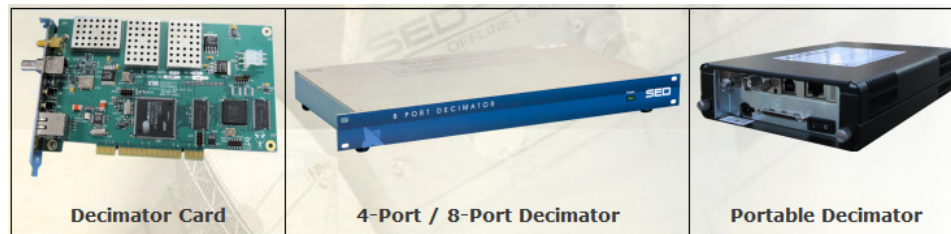


Figure 1 Decimator Form Factors

The intention of this document is to take you through a tour of the main uses and features of the Decimator: Applications, Setup, Getting Started, Markers, Carrier Monitoring, Save and Restore, Reporting, Cross-Pol Isolation Testing and Multi-user Support, all while showing you the ease of use. You will be up and running very quickly, providing instant productivity using a cost effective solution, resulting in great ROI. As we walk you through the tour, we will keep track of the time elapsed to give you an indication of how efficient you can be using Decimator.

2. Applications

Depending on which model you use, the application and setup of the Decimator is slightly different. The Decimator Card can be installed in computer's PCI slot, or it can be integrated into another product or system by mounting it on standoffs and powering it from an on-board 3-pin connector. The Portable Decimator is the Decimator Card in a hand-held enclosure, making it an ideal solution when you need a portable spectrum analyzer, as it easily fits into a laptop case. The 4-Port or 8-Port Decimator is a 1U rack-mount unit that is well-suited to installation in a teleport, earth station or broadcast facility for either local or remote monitoring. Both the Portable and 4/8 Port Decimators are powered from an external AC power source. For all Decimator products, RF signals are connected to either an SMA or F-Type connector and all data communications between Decimator and the controlling computer is via an Ethernet port. Some typical applications of the Decimator Card and the 4/8-Port Decimator are shown in Figure 2.

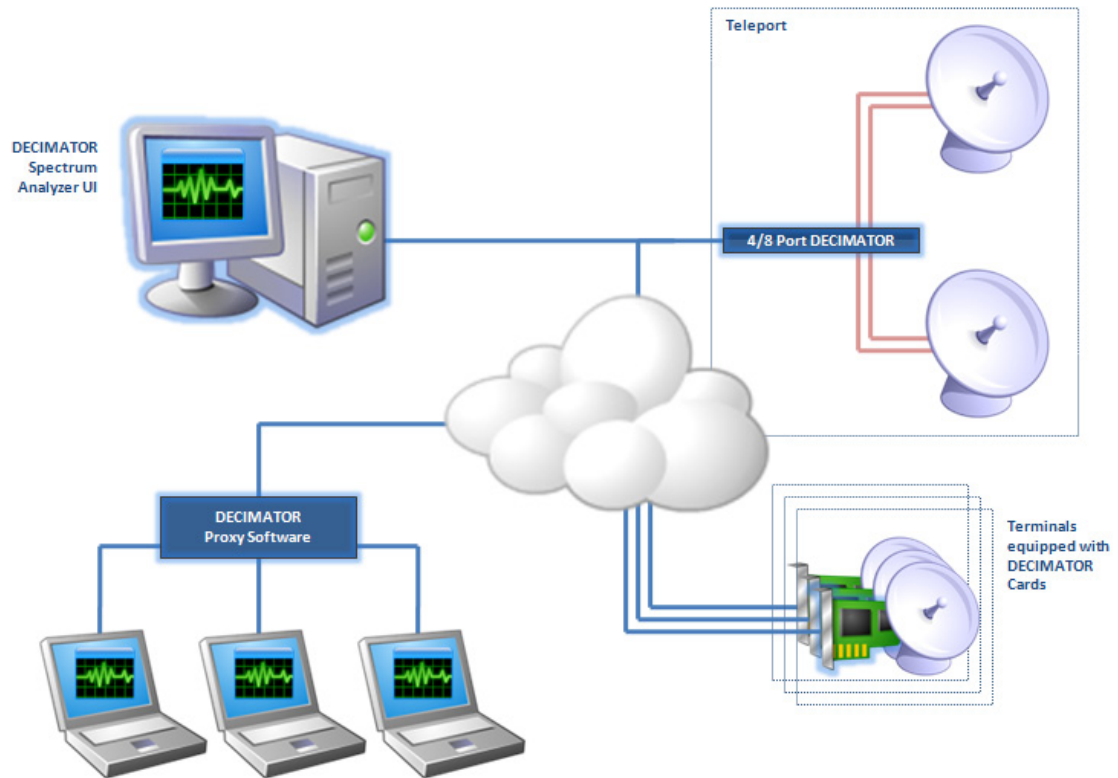


Figure 2 Decimator Applications

3. Setup

We will focus our attention on using a 4-Port Decimator for simplicity, but all Decimator products operate basically the same way. Follow these steps to setup the Decimator:

- Unpack the Decimator.
- Connect your RF feed to port 1 of the 4-Port Decimator.
- Connect a LAN cable between the Decimator and your network.
- Connect the power supply.
- Power up the Decimator and wait for a minute to let the unit boot.
- Open a browser window on a computer on the network and enter the IP Address of the Decimator.
- The main Decimator UI is displayed in the browser as shown in Figure 3 with no need to install any local software!

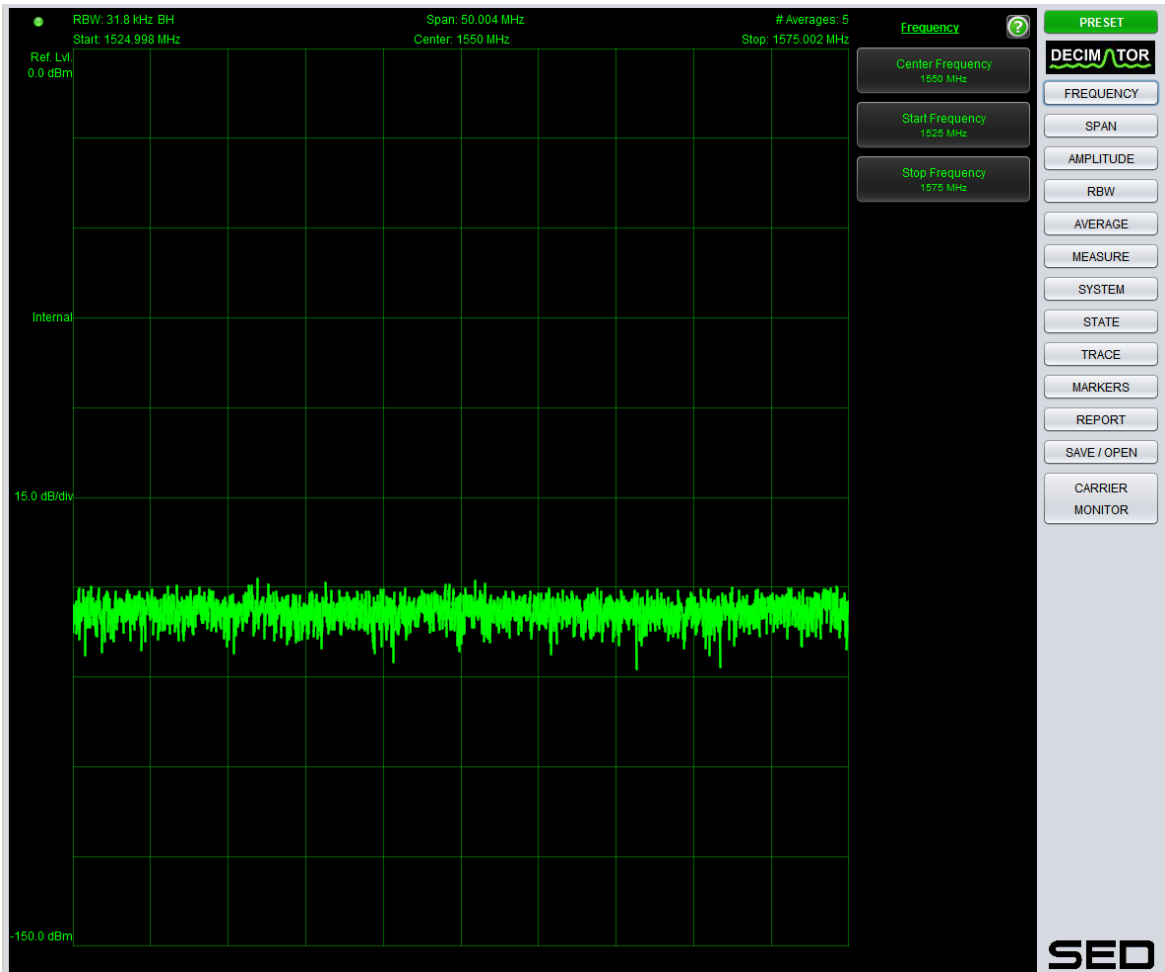


Figure 3 Main Decimator UI Screen

Total Elapsed Time: 5 minutes

4. Getting Started Using the Decimator

The Decimator can be controlled remotely using the provided TCP-IP ASCII based API so that you can integrate it into your NMS to measure a particular carrier(s), or you can use it interactively via the web interface. We will focus our attention on using the web interface to give you a tour of the rich features of the Decimator. The first thing you will notice about the UI as shown in Figure 3 is that it looks like a spectrum analyzer front panel. Just wait, it feels like one too! This intuitive design allows you to use it right out of the box, without reading the manual.

By default, the Decimator is centered at 1550.0 MHz. Let's center the display on a carrier at 1650.0 MHz. Click the Center Frequency menu item and enter 1650 on the dialog. Click OK. You could also use the scroll wheel on your mouse to accomplish the same thing.

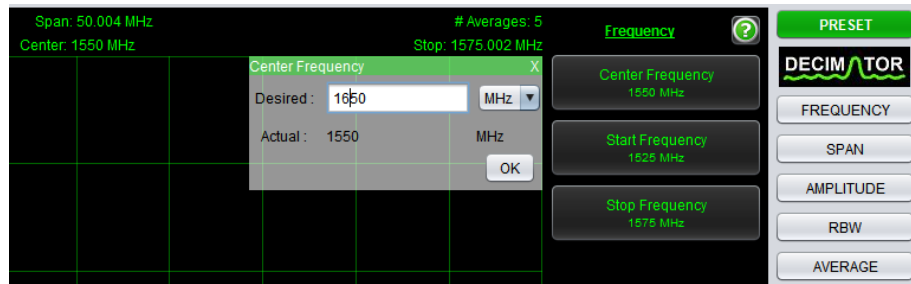


Figure 4 Setting Center Frequency

Let's change the Span to zoom in to a better carrier width by setting the Span to 20 kHz. Click the SPAN button, then the Span menu item, enter 20, change the units to kHz and click OK.

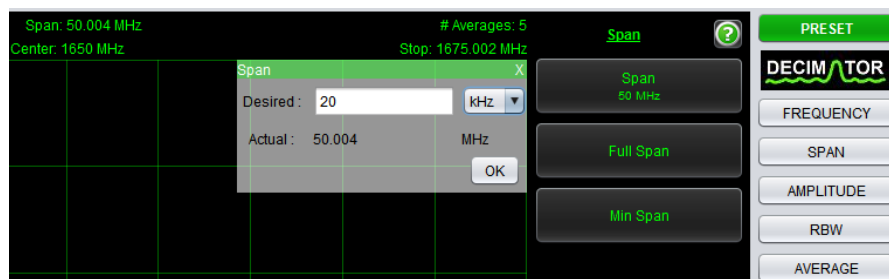


Figure 5 Setting Span

You have now locked the display into the carrier of interest by setting the Center Frequency and Span. There are many other settings that can be tuned, such as Number of Averages, RBW and more. Given a CW carrier, the display looks like that in Figure 6.

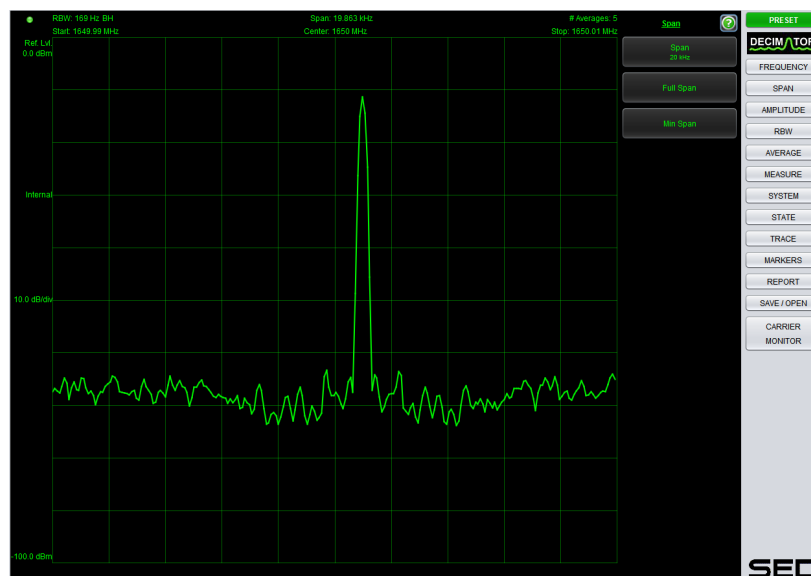


Figure 6 CW Carrier

Total Elapsed Time: 7 minutes

5. Markers

Of course we need to see more information about the carrier. Let's add a marker. Click the MARKERS button and then the Marker 1 menu item. A single marker is added at mid span with the frequency and power shown in the Marker Legend at the bottom. Let's move the marker to the peak. Click the Marker Reference menu item and select Peak Search. The peak power value is shown in Figure 7 in the Marker Legend at -11.10 dBm.

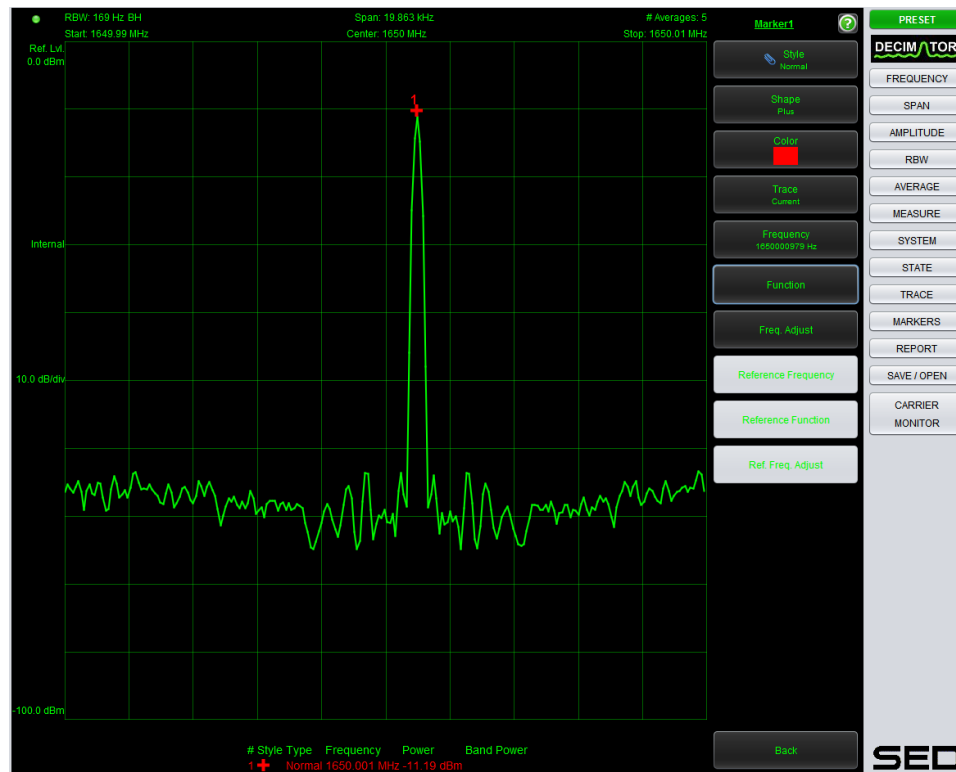


Figure 7 Markers

This example showed use of individual markers, but they can also be used in delta mode, which will allow you to determine the total power in a modulated carrier, by placing one marker on either side of the carrier. This is explained in more detail in the Carrier Monitoring section.

Total Elapsed Time: 9 minutes

6. Carrier Monitoring

Now that you have configured the Decimator UI to view a carrier, you are 90% of the way to performing Carrier Monitoring. Yes, really! In this tour, we will have 2 carriers to measure, with you already having the first one configured. A measurement consists conceptually of a list of settings (or a state) to lock into an area of spectrum to monitor. Each measurement results in a trace that is passed to one or more analyses, producing a pass/fail result. The overall

measurement status result for a particular carrier is a summary of all the analyses included for that carrier.

- Let's capture the existing carrier as a measurement named "CW"
 - Click the CARRIER MONITOR button
 - Click New Measurement
 - Name the measurement "CW"
 - Check the Band Power Analysis and override the default values for Nominal Power and Tolerance Power to -40 dBm and 40 dBm. This provides an operational threshold limit from 0 dBm to -80 dBm. We will use this large window of operation to make sure our first measurement passes. Click OK.

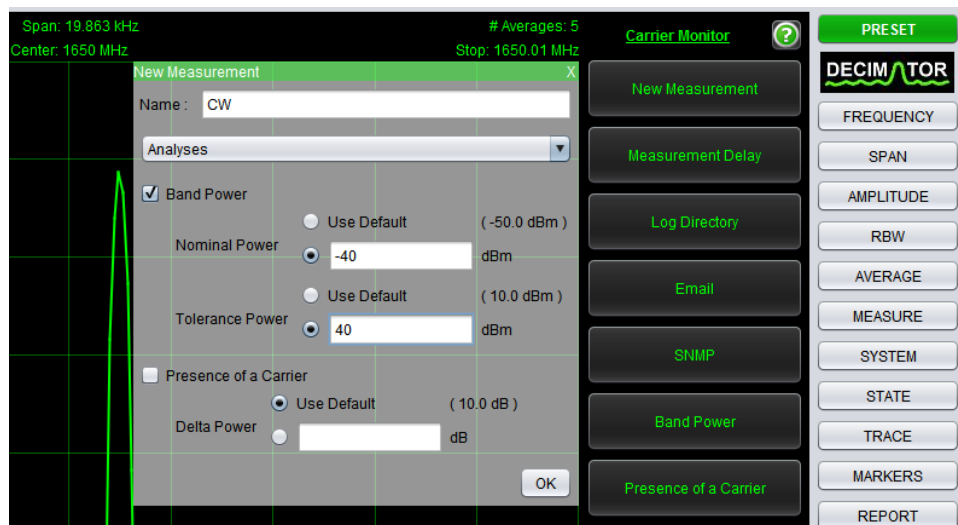


Figure 8 New Measurement

- You will notice a Carrier Monitoring Toolbar added to the left of the display.
- Connect another RF feed to Switch Port 2. We will use a modulated carrier at 1750 MHz with a Span of 50 MHz. Configure these 2 settings using the FREQUENCY and SPAN buttons as before. Click the SYSTEM button and set the Switch Port to 2. We want to compute the Band Power for the modulated carrier, so let's use a Delta marker to help us do this. Click the MARKERS button, then Marker 2, click the Style menu item and select Delta. Drag the markers around with the mouse to separate them, one on each edge of the carrier. The Delta Power shown in the Marker Legend is the total power in the carrier. We can use this for our Nominal Power.

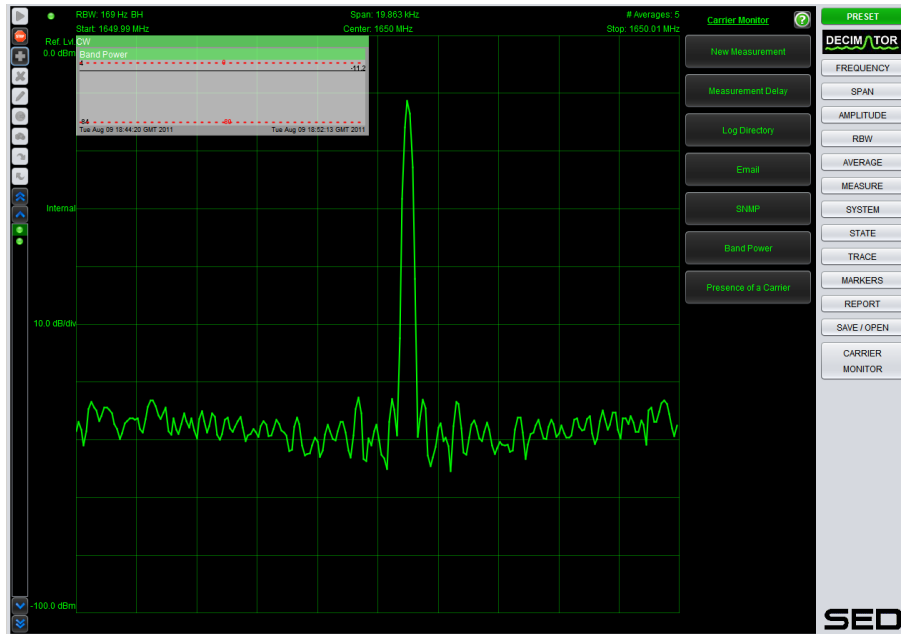


Figure 11 CM Running

- Mouse over the “CW” icon in the left Toolbar. Notice the historical charts for any measurement while the Carrier Monitoring system is running. In this case the “Modulated” carrier is currently being measured with the callout showing the results of the CW measurement.

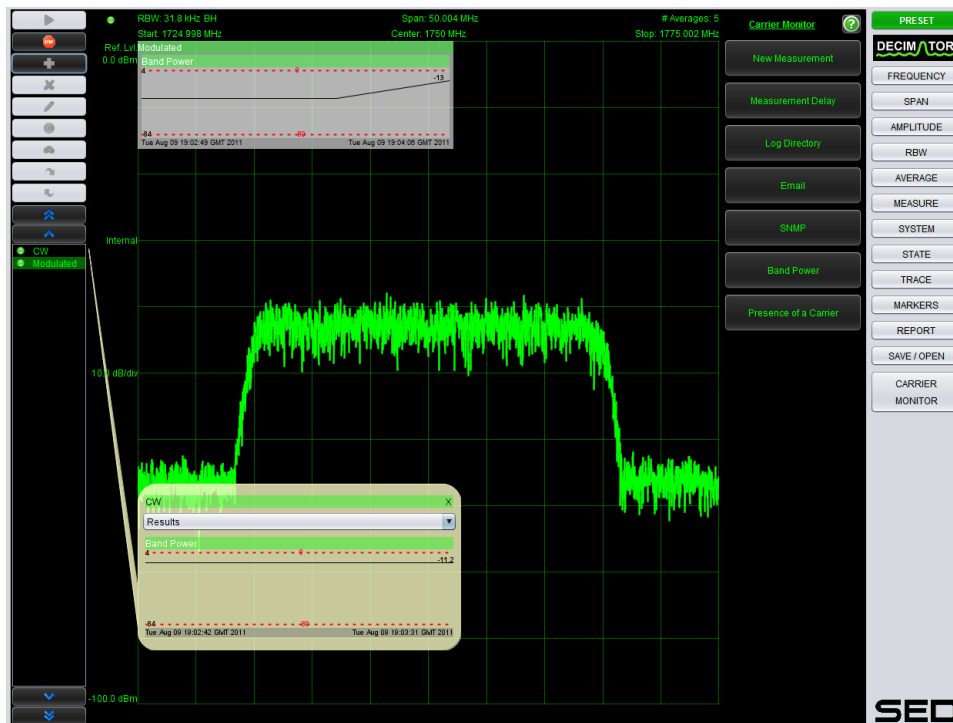


Figure 12 CM Measurement Callouts

- Stop the Carrier Monitoring system.
- Mouse over the “Modulated” icon.
- Select the State item in the combo box. Notice the settings captured in the measurement. Click Recall to push the settings from “Modulated” measurement as the current settings in the Decimator.

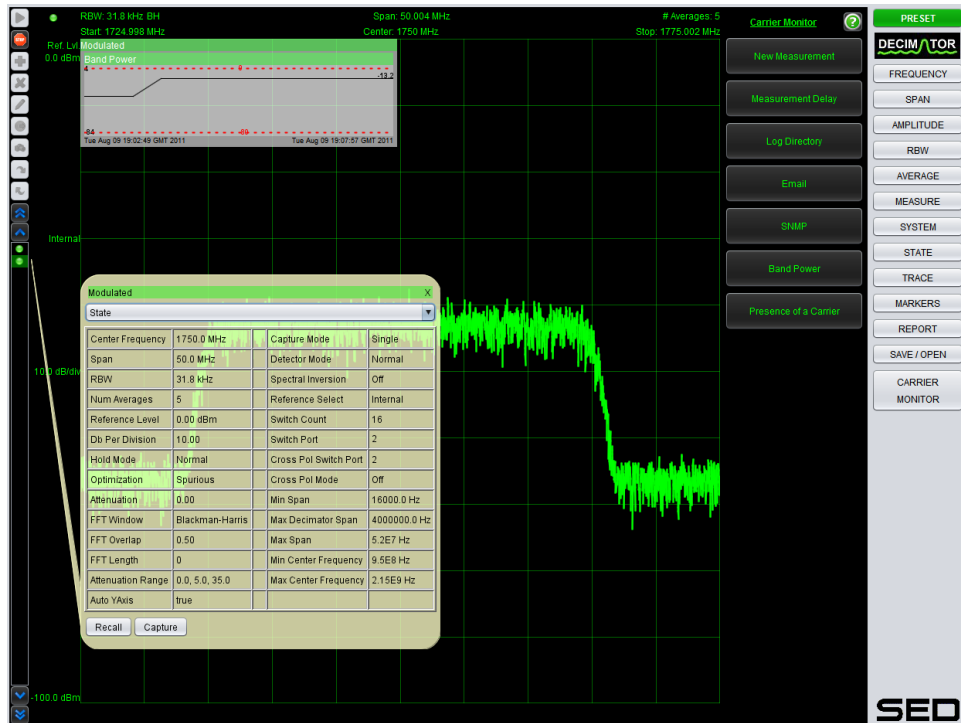


Figure 13 Modify a Measurement

- Change the Span from 50 kHz to 40 kHz. Then click the Capture button on the callout to save the updated span value back to the measurement. You just modified a measurement. That was easy!
- Now let’s configure the Email so that there is a recipient to be notified when a measurement changes result status: either from pass to fail or fail to pass. We will specify a Rich HTML format to include a screen shot of the display in the email. The default, Simple Text is ideal for notifications on smart phones. Click the CARRIER MONTOR button, then the Email menu item. Enable Emailing by checking the Master Switch, and fill it out in a similar manner. You will need unblocked access to a local mail server to send out email notifications.

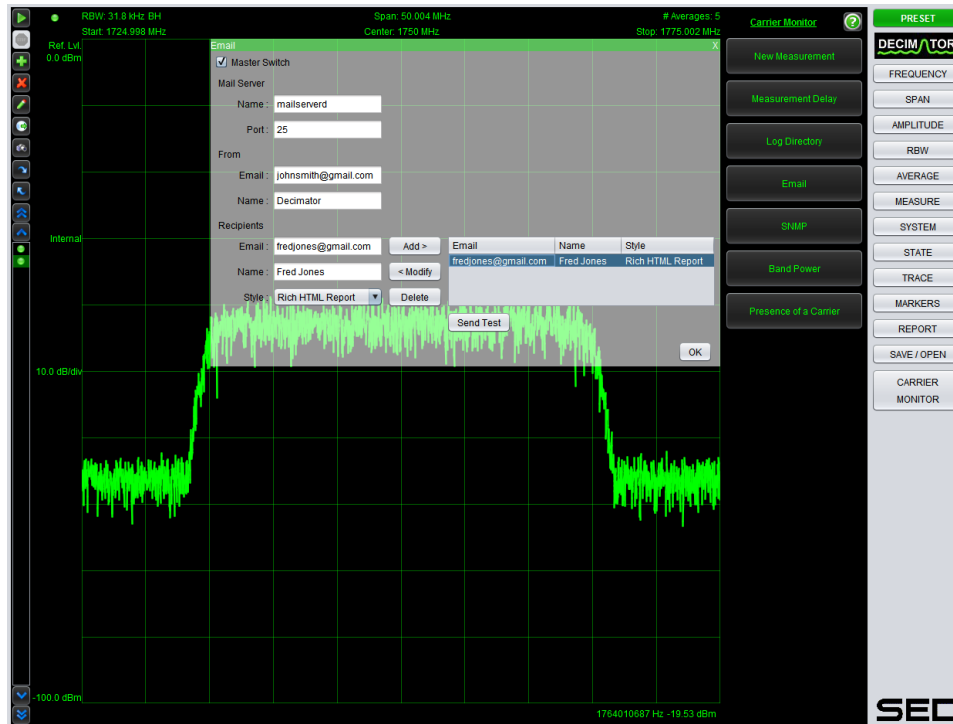


Figure 14 Email Configuration

- Send a test email to verify Email is configured correctly by clicking the Send Test button.
- Verify the test email was received.

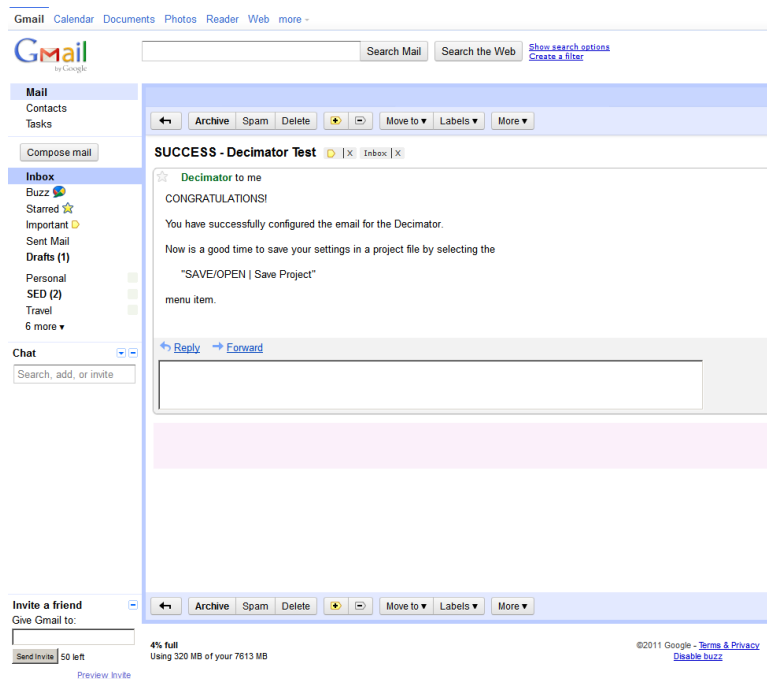


Figure 15 Test Email Received

- Start the carrier monitoring.
- Since both measurements have a passing result status, no email is sent out. Let's trigger a failure by removing the RF cable on Switch Port 2 to eliminate the carrier altogether. Notice the alarm condition on the "Modulated" measurement as it turns red. The Trace shows noise only, so the alarm makes sense visually.

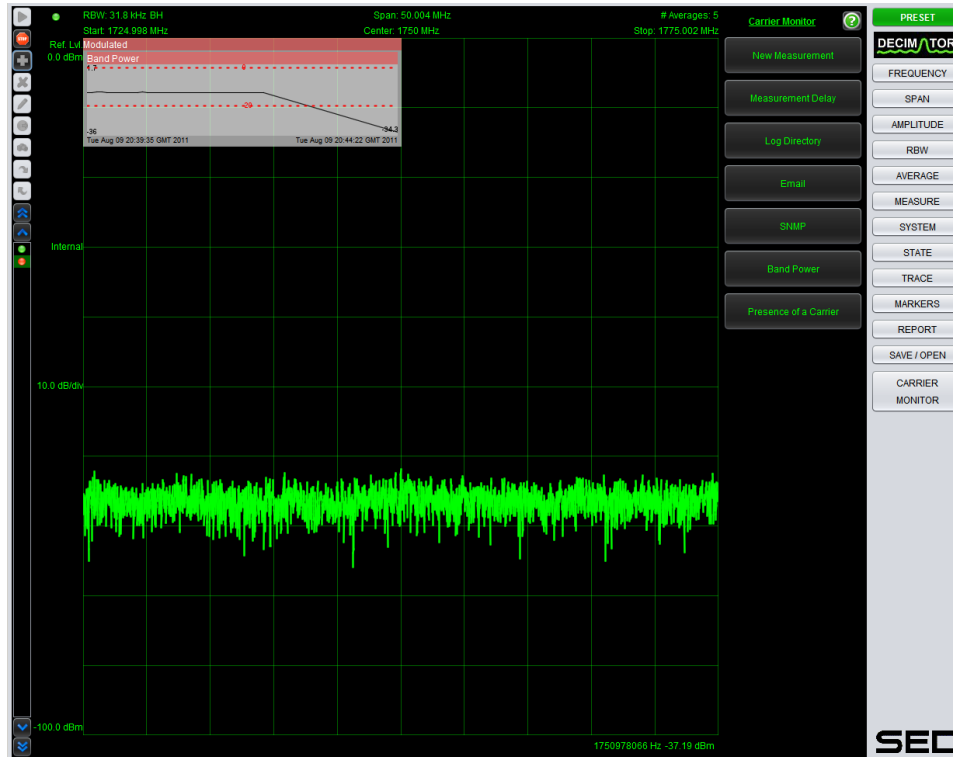


Figure 16 "Modulated" Measurement in Alarm Condition

- Notice the email with the screen shot embedded

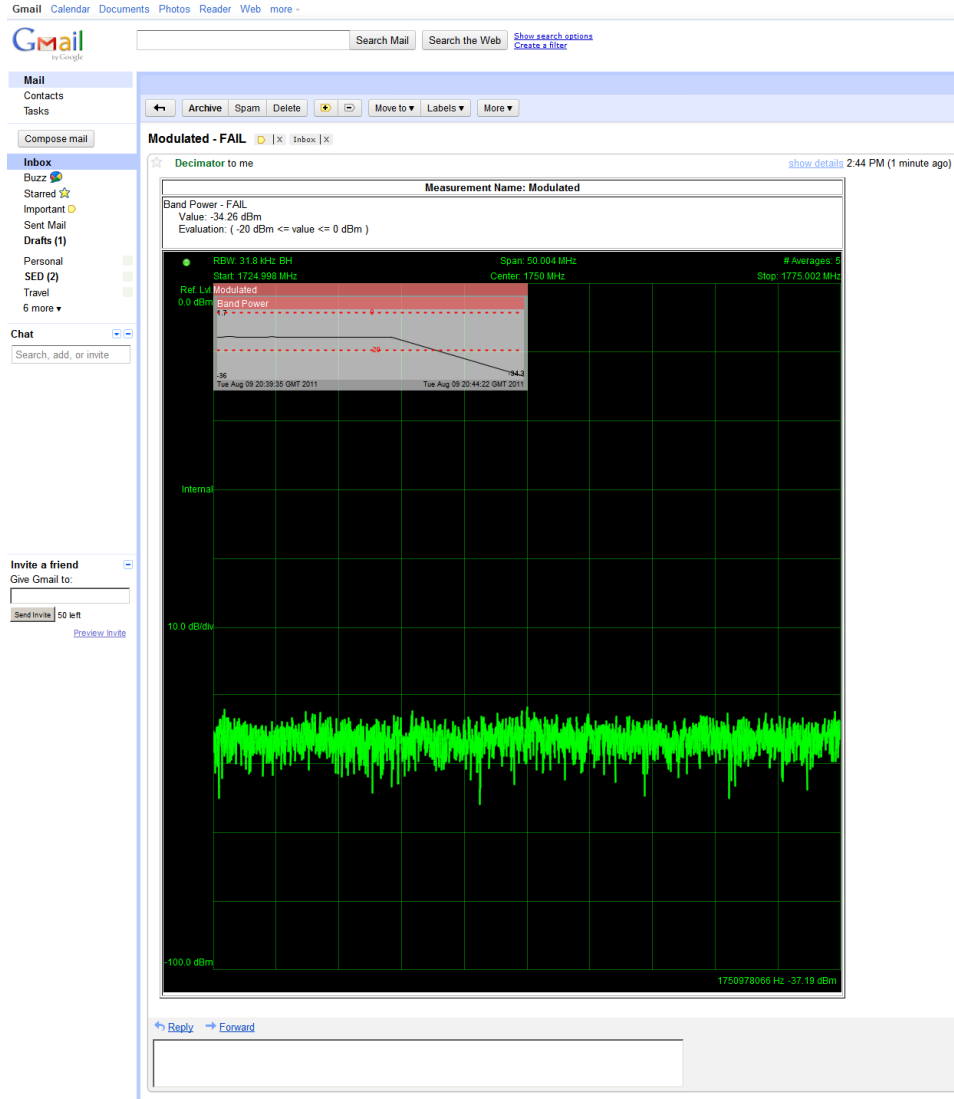


Figure 17 Email Received for “Modulated” Measurement in Alarm Condition

- Reattaching the RF cable on Switch Port 2 moves the “Modulated” measurement back into a success result status triggering another email. On a multi-port Decimator, you can monitor one or more carriers on each of the Switch Ports. The carrier monitoring system automatically switches the ports for you to acquire the Trace.
- You can specify a log directory for the Carrier Monitoring system which logs all the Trace data and the results of any analysis in CSV format. This is great for off line viewing!
- The Decimator Carrier Monitoring system also can be configured to send SNMP V2 traps of the resulting Power and/or Presence of a Carrier Analyses. This is ideal for integration into an existing NMS.

- All you have to do now is locate the rest of your carriers using the Decimator UI interactively and add them in as measurements. Turn it on, forward your email to a smart phone, go home and get notified if there are any problems!

Total Elapsed Time: 19 minutes

7. Save and Restore

Now that you have done all this work, it is a good idea to save the configuration to a project XML file locally on disk. Note that the saving does not save the data on the Decimator card. Use this project file to recall your configuration in the case of a power outage or send it to a colleague with the same set of carriers at a different location. Click the SAVE/OPEN button then the Save Project menu item. Enter a file name and click Save.

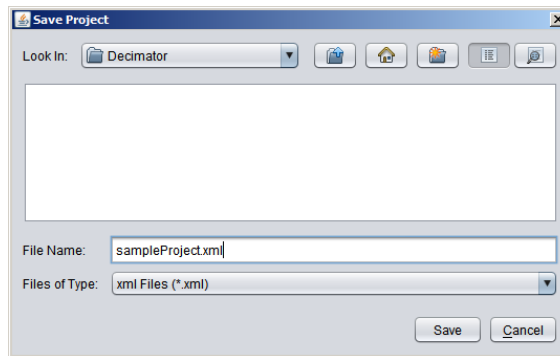


Figure 18 Save a Project

Close the Decimator UI to allow us to start over from scratch. Open a new Decimator UI session by entering the IP Address in the browser. Click the SAVE/OPEN button and click the Open Project menu item. Browse to the file just saved and click Open.

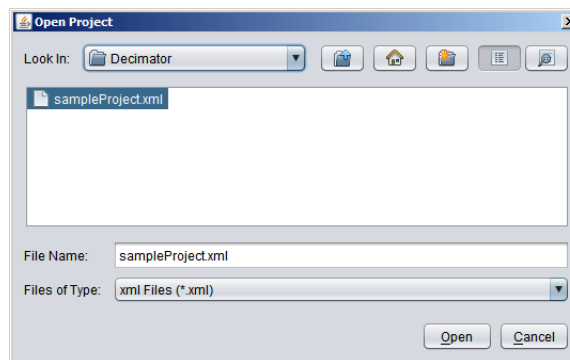


Figure 19 Open a Project

The previous Decimator configuration is restored, including the Carrier Monitoring measurements.

Total Elapsed Time: 20 minutes

8. Reporting

We can create an HTML report for the active Trace and saved Traces or export the Trace data to CSV. Up to 4 additional Traces can be saved. Markers and a screenshot are included.

We will show an example of an HTML report. Close the Decimator UI and restart a new session. Select the REPORT button and click the Export the HTML menu item. Enter a new subdirectory, click Save and when prompted “Do you want to display the report?”, click OK. The contents of the report are shown in a browser window as shown in Figure 20.

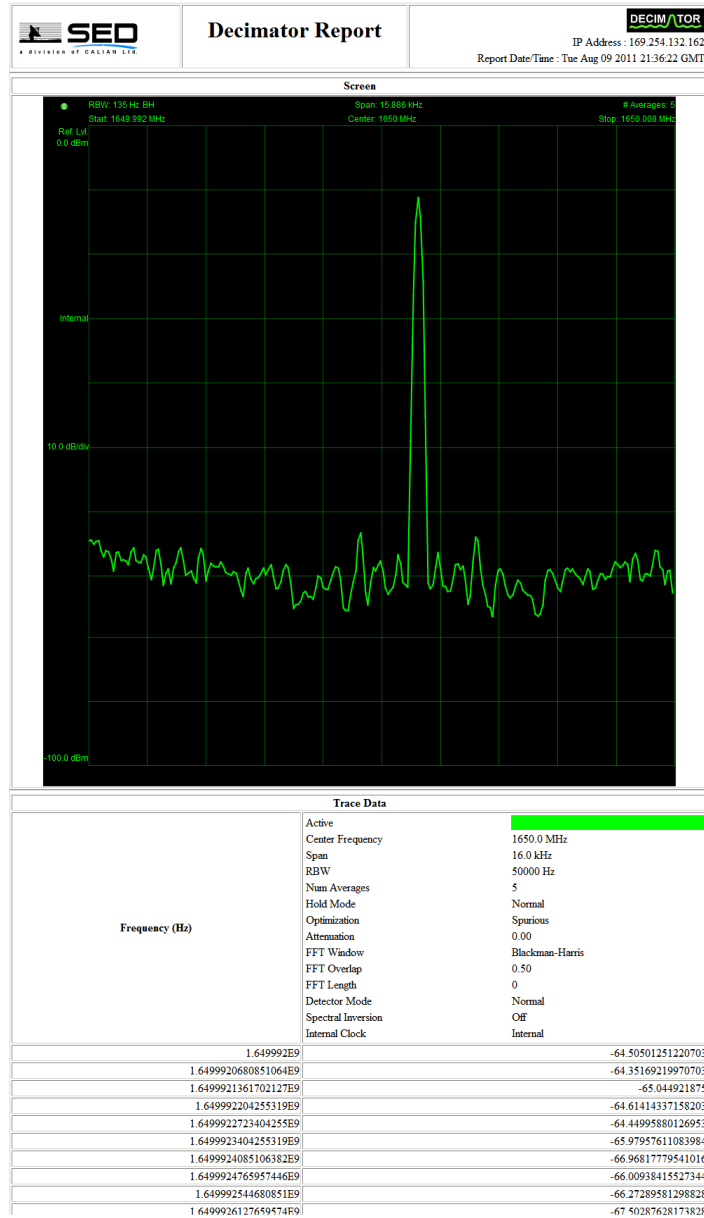


Figure 20 HTML Report

Total Elapsed Time: 22 minutes

9. Cross-Pol Isolation Performance Testing

The 4 and 8 Port Decimators are capable of Cross-Pol Isolation Performance testing. To conduct this test, perform the following:

- Connect one polarization RF feed (the Co-Pol) to switch port 1.
- Connect the opposite polarization RF feed (the Cross-Pol) to switch port 2.
- Run the Decimator UI in the browser.
- Click the SYSTEM button.
- Verify Switch Port is set to 1, if not adjust it to make it so.
- Verify Cross Pol Switch Port is set to 2, if not adjust it to make it so.
- Set the Cross Pol Mode to On

The Decimator UI captures a trace from each port, toggling back and forth. Cross-Pol markers are added to the display, which are locked as a frequency pair. The Marker Legend displays the Delta Power value to be maximized, which is the Cross-Pol isolation. All you have to do is adjust the orientation of the antenna and observe the changes to the Delta Power value. Figure 21 shows the result of a recently configured Cross-Pol testing on an 8 Port Decimator with Switch Port 8 and Cross Pol Switch Port 3 being used.

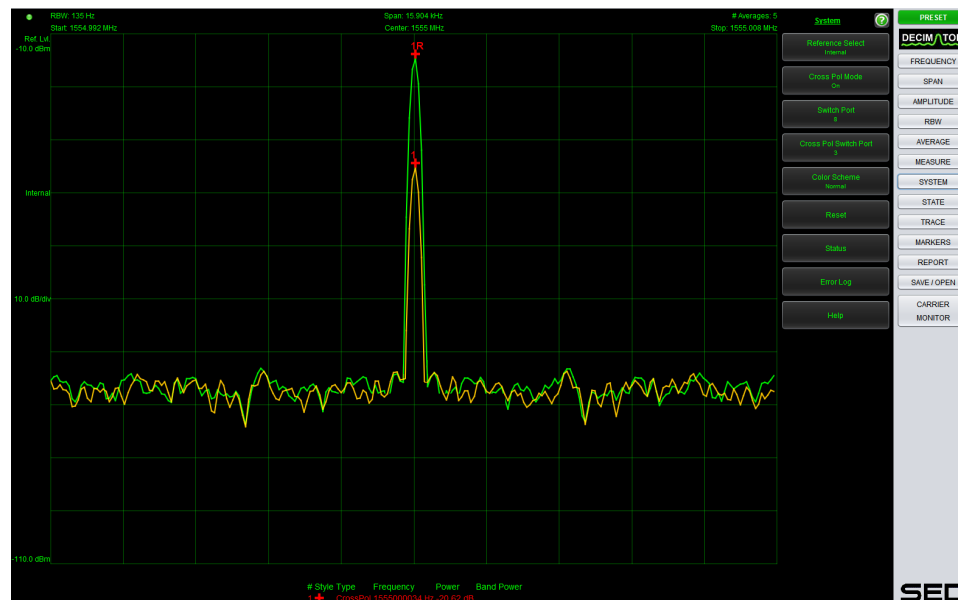


Figure 21 Cross-Pol Mode

Total Elapsed Time: 26 minutes

10. Multiuser Support


Version 2 of the Decimator (D2) supports multi-user access to the Decimator via a Proxy, which is an external piece of software that is installed on the client PC, acting as a middle man between multiple clients and the Decimator. We are pleased to announce that multiuser access to the Decimator is directly built into the hardware in version 3! This allows you to connect the UI to the Decimator to perform ad-hoc measurements while having a separate independent connection from your NMS that is performing background measurements with no extra running software. Up to 5 concurrent users can be serviced in a round robin fashion. Really nice!

Total Elapsed Time: 28 minutes

11. Conclusion and Contact

The Decimator is an extremely powerful, cost effective and intuitive product for viewing your spectrum, performing simple Carrier Monitoring and testing Cross-Pol Isolation. There are other features of the Decimator not discussed here, such as saving Traces and setting and recalling States. We continue to add features that you want. Upon request, we can provide User's Manuals and the API Specification for any of the Decimator products.

Total Elapsed Time: 29 minutes, giving you another minute to get your hands on one today, or ask further questions by contacting:

	Contact Information
Name	Tim Braun (SED Sales Representative)
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Email	braunt@sedsystems.ca
Website	http://www.sedsystems.ca/decimator_spectrum_analyzer
Interactive Online Demo	http://www.sedsystems.ca/management_and_interfaces ... and select "Click Here to Try the Decimator..."