

Avcom GUI Application Note AN0001
Catching Problematic Intermittent Interference Signals

Problem Scenario:

An intermittent undesired signal causes communication receiver to lose carrier lock (the “event”). The interference is short in duration and occurrence timing is unpredictable. The receiver logs an error when this occurs. The error is time stamped.

Proposed Options:

There are 2 proposed options using the Avcom GUI to identify the interference.

Option 1 – Use the Recording feature to continually record the spectrum data

- Pros:
 - Records more data to facilitate troubleshooting
 - Records spectrum data before, during, and after the event.
 - Simpler set up
 - Data files broken into manageable sizes
 - Date-Time-Stamped files facilitate tracking down the file which includes the event
 - Can be played back on the Avcom GUI
- Cons:
 - Records more data to be managed
 - Requires more disk space
 - If very large file sizes are selected the large files become unwieldy.

Option 2 – Use the Shape Alarm feature and record a time-limited portion of the spectrum data

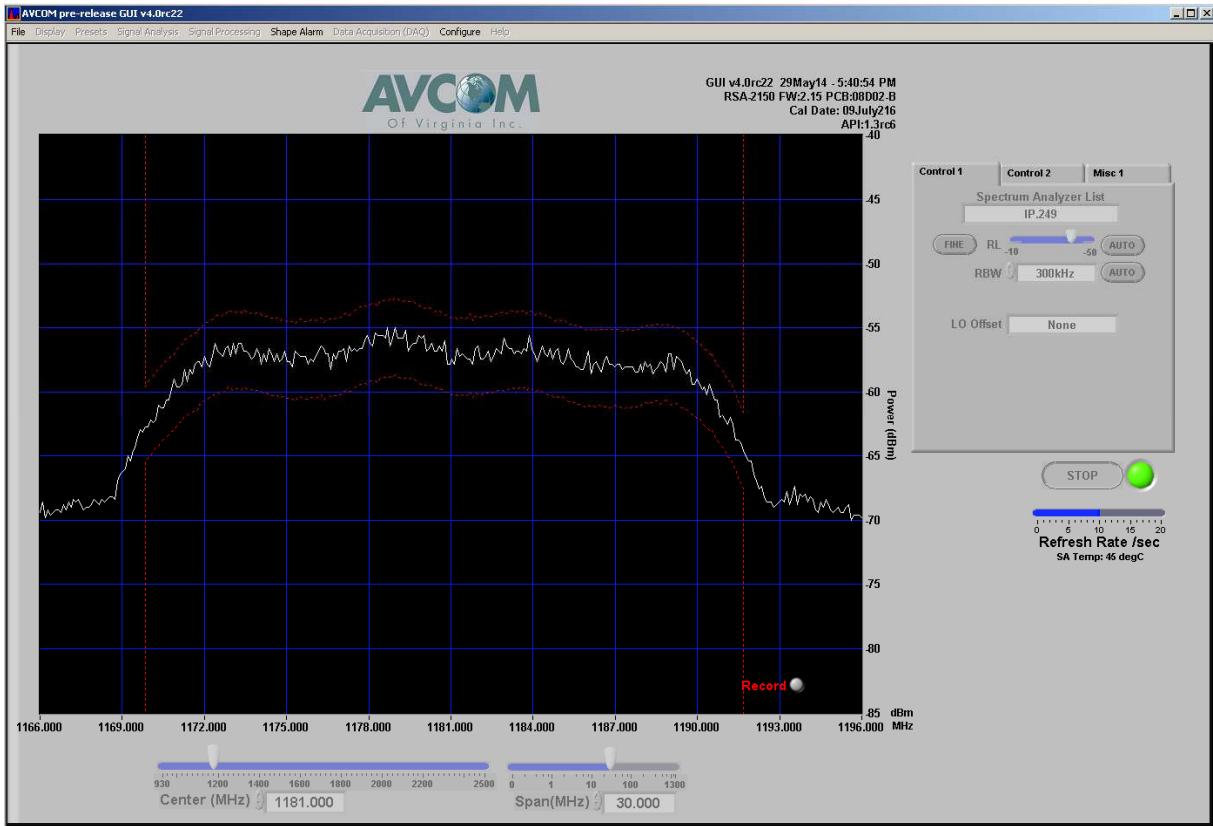
- Pros:
 - Used with a circular buffer can limit the total amount of data collected
 - Easier to determine when the event occurred
 - Data files broken into manageable sizes
 - Date-Time-Stamped files facilitate tracking down the file which includes the event
 - Can be played back on the Avcom GUI
- Cons:
 - With a circular buffer, although the spectrum is recorded up to and including the event, the spectrum data after the event may be overwritten by the next circular buffer created (based on the option selected)

Solution:

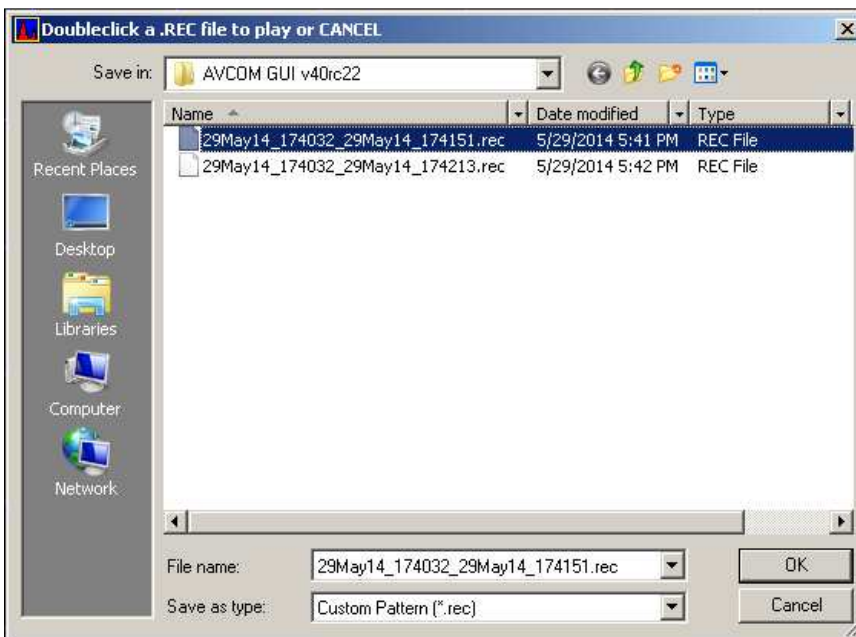
Option 2 is a good choice as it limits the amount of data collected and facilitates easy playback. The following settings were used. This will create a new file each time an alarm event occurs. The timestamps on the files can be compared to the time the error was reported by the communication receiver. Note that accurate time settings on each systems helps correlate the error reports more accurately.

Shape Alarm:	+3 and -3 dB shape envelope
Record Stream:	Yes
Circular Buffer:	Yes
Circular Buffer Size:	100
After Alarm Event:	Keep using Circular Buffer Mode
Send Email:	No
Send SNMP Trap:	No

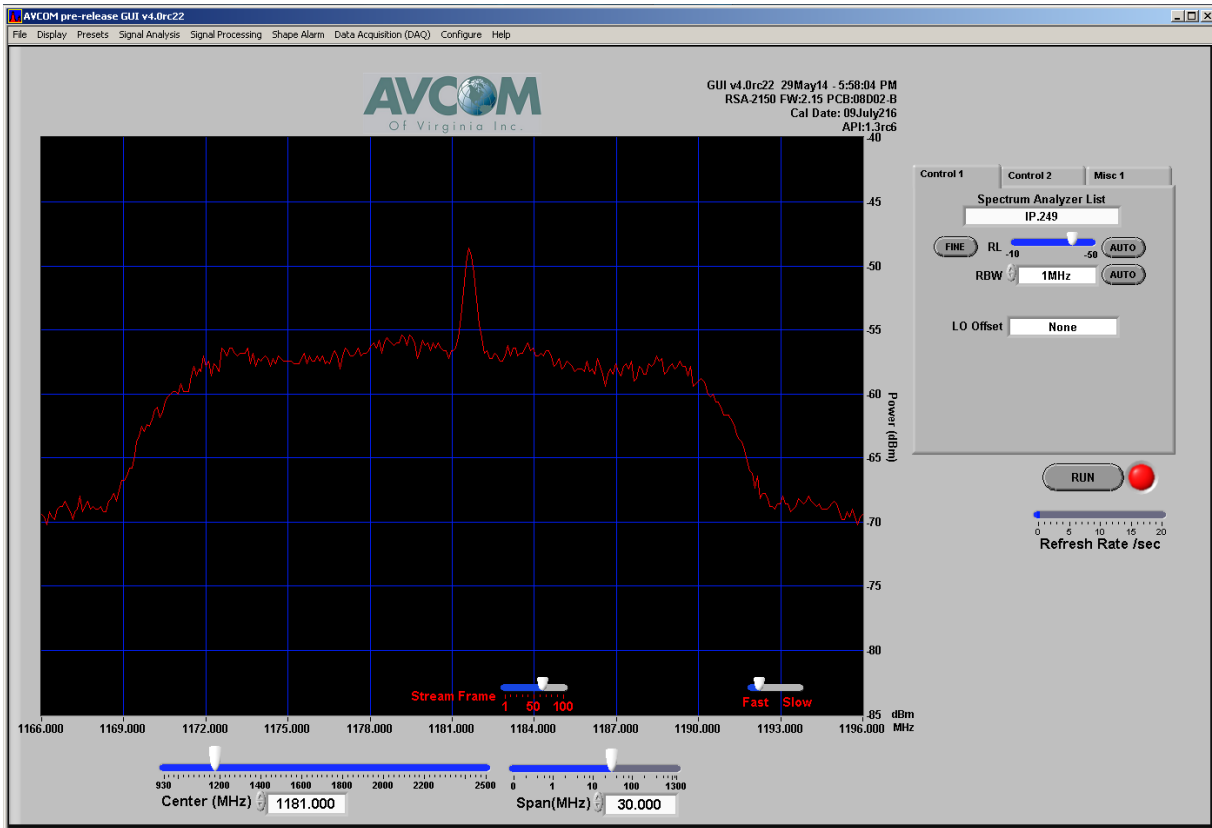
The GUI is started and a Shape Alarm set up to monitor the carrier. The GUI must continue running for the Shape Alarm feature to continue monitoring.



Because of the Circular Buffer options that were selected, two .REC files indicate two alarm events occurred. The timestamp on the first file corresponds to the error reported on the communication receiver. The first file is opened for playback.



The playback shows the interference starting at approximately frame 59. The following picture is one frame of the playback.



Additional Information

Recorded File Notes:

- Each file that is written to disk has the date and time it was written in the file name.
- Recording file sizes larger than 10 MB is not recommended for GUI playback. Larger file sizes can cause slow processing on some PCs.
- A 1Megabyte file holds about 500 spectrum traces.
- If recording at 0.1 second intervals (10 sweeps/second) then a 1Megabyte file will cover 50 seconds.
- The recorded files are simple delimited text files and can be split as long as entire lines are kept intact
- The adventurous could consider importing the data into a database and use of graphing tools to browse the data
- There is no standard third-party player that can play these files. The files are not in a standard format. If you are aware of a standard format that would be a better choice please let us know!

Example of specific recording-interval/file-size scenarios:

Recording Interval (s)	Traces Per Second	Max File Size (MB)	File Time Span (mm:ss)	Megabytes Per Hour	Megabytes Per Day	Files Per Hour	Files Per Day
0.1	10	1	00d 00:00:50	72	1728	72	1728
0.1	10	5	00d 00:04:10	72	1728	14	346
0.2	5	1	00d 00:01:40	36	864	36	864
0.2	5	5	00d 00:08:20	36	864	7	173
0.2	5	10	00d 00:16:40	36	864	4	86
0.5	2	1	00d 00:04:10	14	346	14	346
0.5	2	5	00d 00:20:50	14	346	3	69
30	0.03	10	01d 17:40:00	0.24	6	0.02	1

When a Shape Alarm is activated (locked) the user can opt to have the spectrum data recorded. The following explains how the Shape Alarms work in conjunction with recording:

Recording allows two main options - Circular Buffer and Non-Circular Buffer.

1. Circular buffer

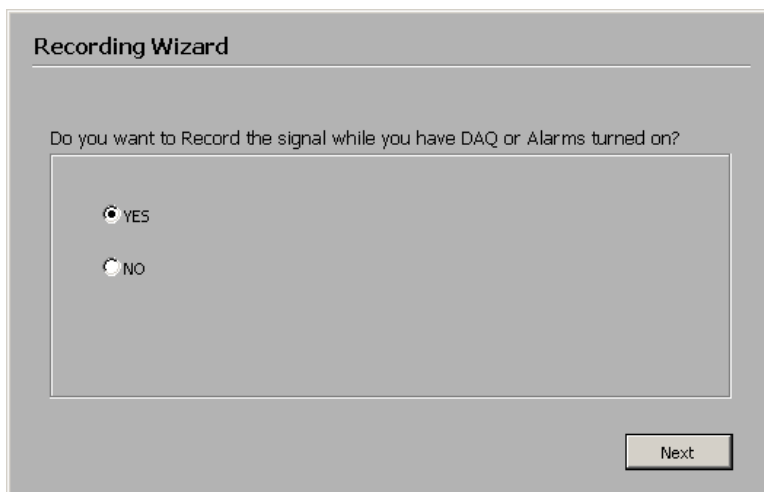
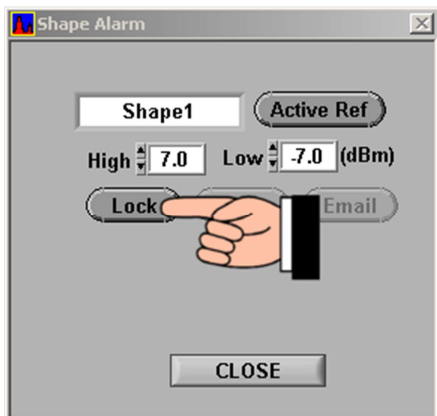
- Fixed size buffer of N number of spectrum traces
- Buffer begins to overwrite itself every N number of spectrum traces
- When an alarm occurs either:
 - Stop using circular buffer
 - Write circular buffer including the alarm “event” to disk.
 - Stop using circular buffer.
 - Begin to record data in files of X size going forward until Shape Alarm is disabled.
 - Continue with circular buffer
 - Write circular buffer including the alarm “event” to disk.
 - Start a new circular buffer
 - On the next alarm event write the buffer file to disk
 - Start a new circular buffer
 - Etc.

2. Non-Circular Buffer

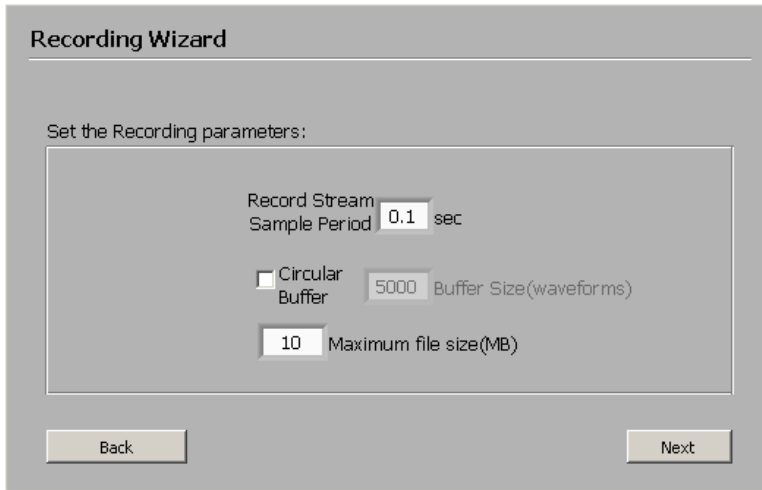
- Simply record every T number of seconds (where $T \geq 0.1$ seconds)

Turning On Recording With Shape Alarms

After clicking on “Lock” to activate a Shape Alarm you will be prompted if you want to record the spectrum trace while the Shape Alarm feature is active. Select “Yes”



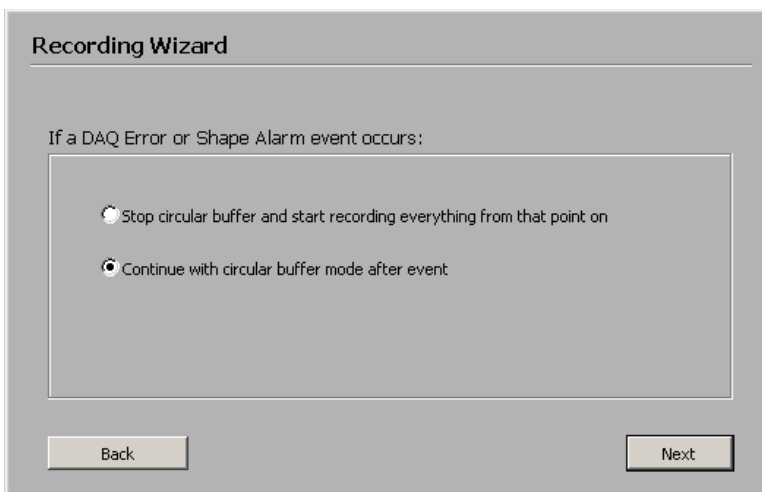
When setting the recording parameters always set the Maximum file size. Uncheck the “Circular Buffer” checkbox temporarily if needed.



Check (or re-check) the “Circular Buffer” checkbox if you will use a Circular Buffer.



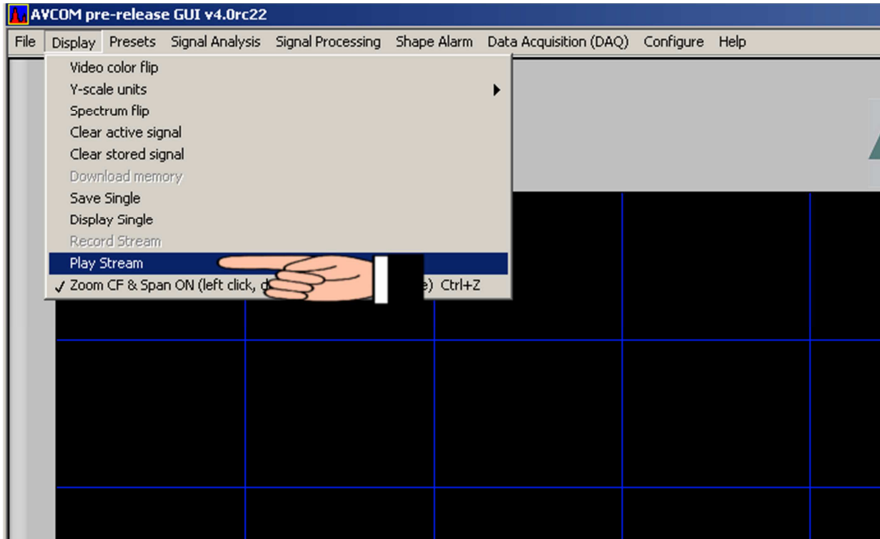
The default option to “continue with circular buffer mode after event” is the most efficient in terms of number of files and disk space and the best choice in most circumstances.



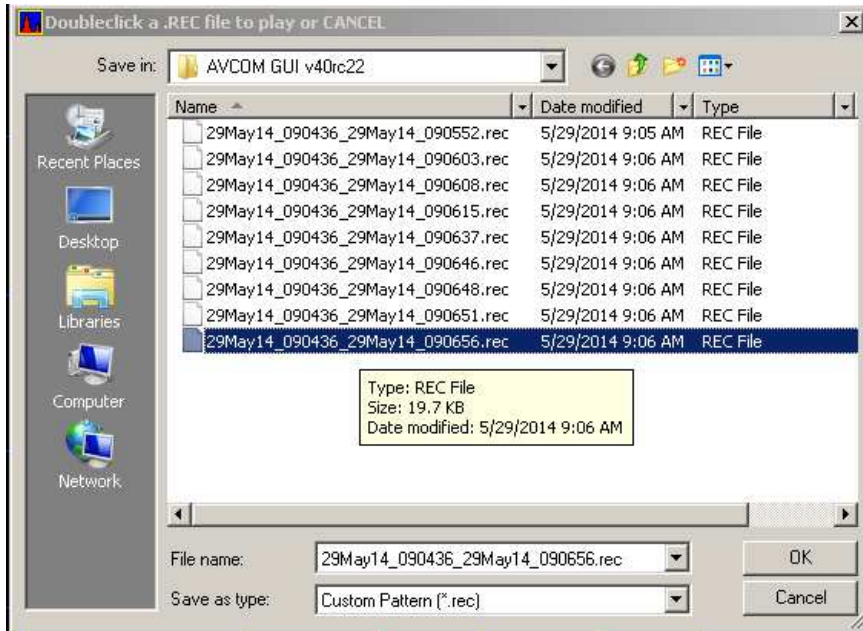
Playing Back Files Via the Avcom GUI

The recorded files can only be played back on the Avcom GUI. The file format is open so that you could create your own playback tool.

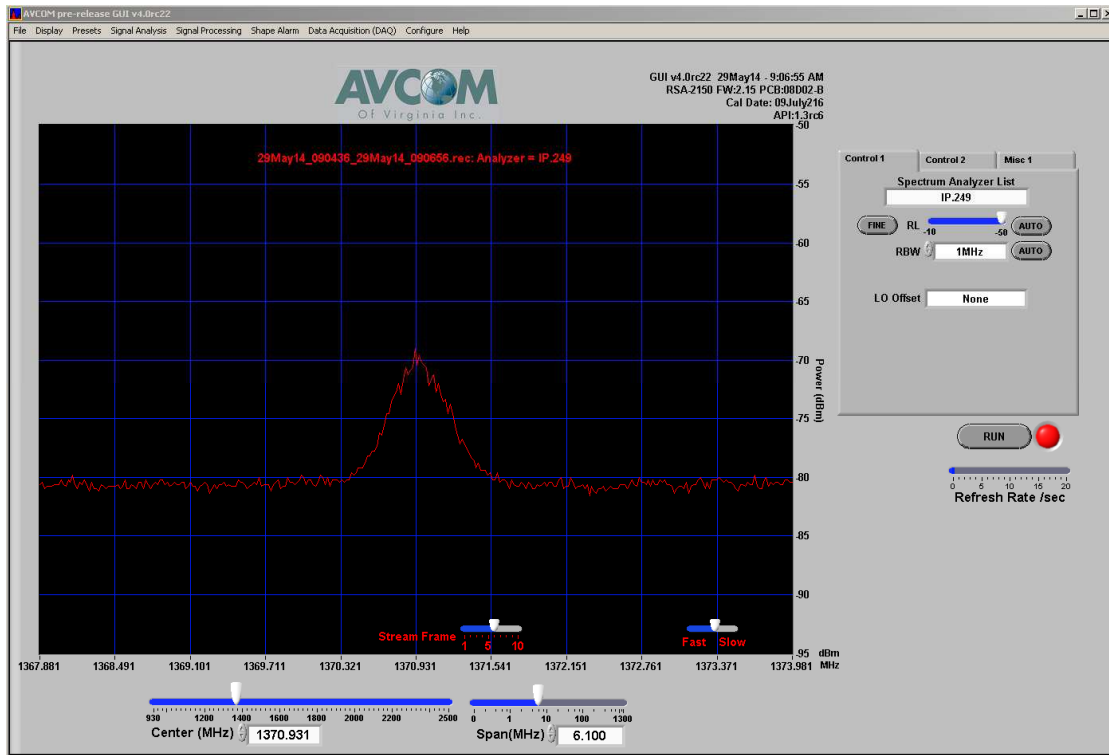
- 1) Stop the GUI
- 2) Select "Play Stream" from the Display menu item



- 3) Select a ".rec" file to play back. Note that if you know the time an Alarm event occurred you should look at the file that was recorded at that time or just after that time. Be sure to check the time settings on all of your systems to assure the time matches.



- The stream will load and begin to play back. You can control the speed of playback as well as fast-forward or backward to the frame you are interested in.



Where To Get More Information:

For additional details please see the Avcom GUI user manual. You can access the GUI user manual under the "Help" menu in the GUI.