# Getting Started EMSA Pilot for InsightCM

## Installation

### Server

InsightCM 2.0 must be already installed on the server before installing the EMSA Pilot.

Run the setup.exe in the \Volume directory of the EMSA Server Pilot and follow the installer prompts. After installation is complete, restart the server.

### Client

The Advanced Sensors Data Explorer provides a new XY plot viewer for the spectrum data collect by the EMSA system. InsightCM Data Explorer 2.0 must already be installed on the client PC before installing the EMSA Pilot client.

Run the setup.exe in the \Volume directory of the EMSA Client Pilot and follow the installer prompts. After installation is complete, restart the PC.

## Hardware

The Electromagnetic Signature Analysis (EMSA) system supports the following hardware:

**Controller:**

NI 9068

**High Frequency CT (HFCT) Input:**

NI 9770

Each NI 9770 support a single HFCT input. Up to 8 NI 9770 can be installed per NI 9068 so the maximum number of channels support per system is 8.

## Firmware Installation

If the system does not already have the EMSA application firmware installed, you can install it the InsightCM server. Once the device is added to the InsightCM server, use the Software tab on the Devices page to Update Application on the device.

## Add Device to InsightCM

EMSA Pilot devices are added to InsightCM Server the same way that they are for regular InsightCM nodes. You can add an EMSA system either offline or online. Refer to the InsightCM documentation for details on adding new devices.

## Configure the System

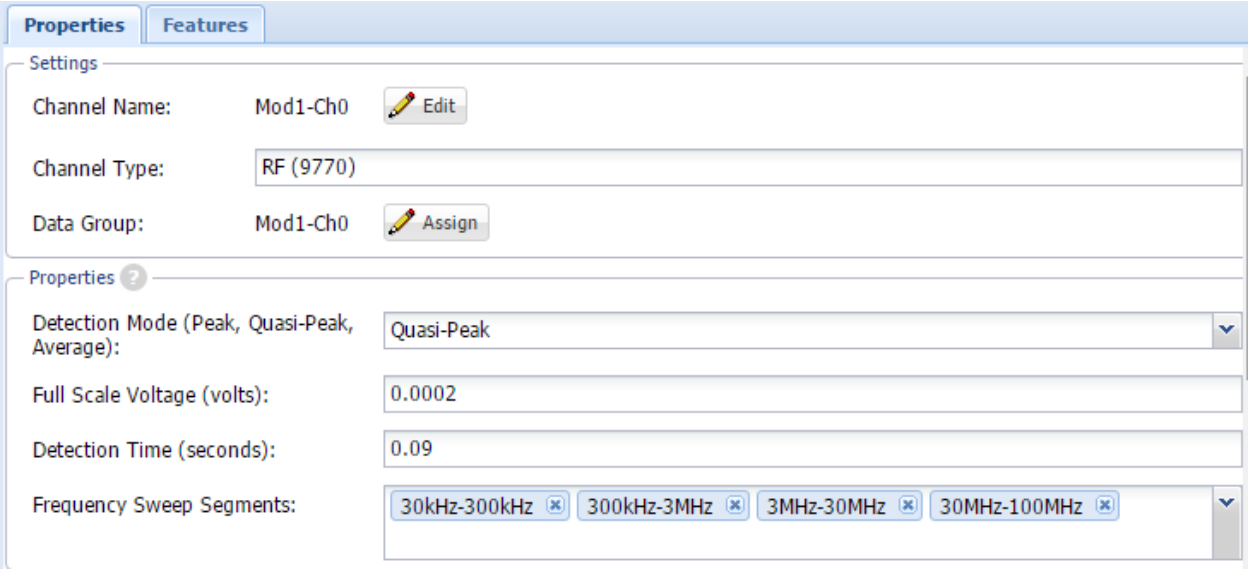
The EMSA system support two types of channels:

- RF (9770) – Defines the properties of the RF input connected to an HFCT.
- Sweep Segment – Defines a portion of the frequency sweep. A channel can have multiple Sweep Segments assigned to it.

**Note:** Make to save your progress before navigating to other main pages like Equipment Hierarchy or Alarms. Any unsaved changes will be lost.

## RF Input Configuration

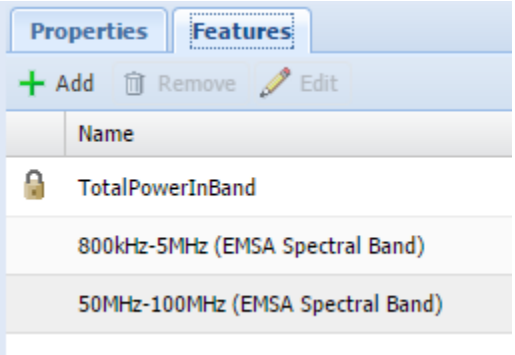
Edit the RF input channel name.




Properties:

| Property | Default | Description |
|---|---|---|
| Detection mode | Quasi-Peak | Detection mode for the frequency sweep amplitude. Available options: Quasi-Peak, Peak, Average |
| Full scale voltage | 200uV | Input level in voltage. Can specify in scientific notation. |
| Detection time | 0.09 | Measurement time at each step in the frequency sweep. Specified in seconds. |
| Frequency sweep segments | | List of sweep segments to use on this channel. Example: Sweep 1, Sweep 2, Sweep 3 |

The features can be defined on Features tab.




To add custom spectral bands for EMSA, go the System Console page and the Features tab. Click *Add* and select EMSA Spectral Band.

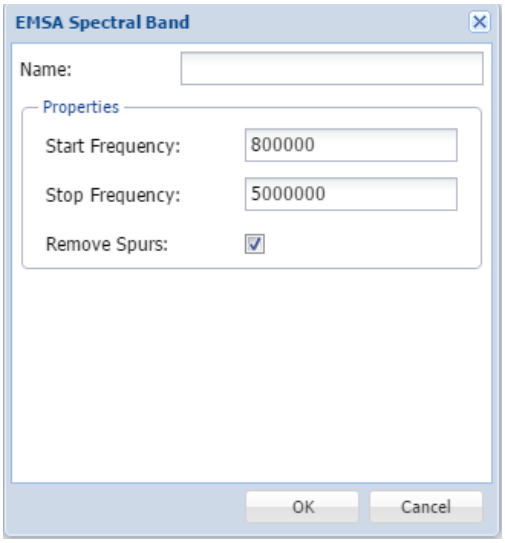
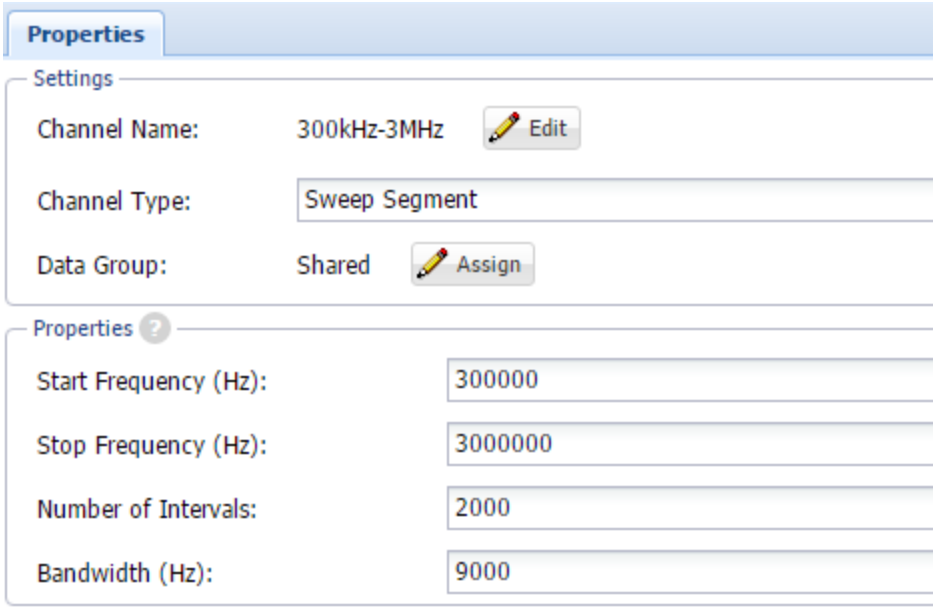



*Figure 1 - EMSA Spectral Band configuration dialog*

Configure the spectral band properties and press *OK*. You can now add the custom spectral band as a feature of RF channels.

## Sweep Segments

Each RF channel must have at least one Sweep Segment channel configured for it.




Properties:

| Property | Default | Description |
|---|---|---|
| Start Frequency | 30k | Start frequency of the sweep segment in Hz. |
| Stop Frequency | 300k | Stop frequency of the sweep segment in Hz. |
| Number of Intervals | 2000 | Number of discrete frequencies in this segment. Points are linearly spaced between start and stop. |
| Bandwidth | 9000 | Measurement bandwidth at each frequency. |

There are no features for Sweep Segment channels.

### Equipment Hierarchy

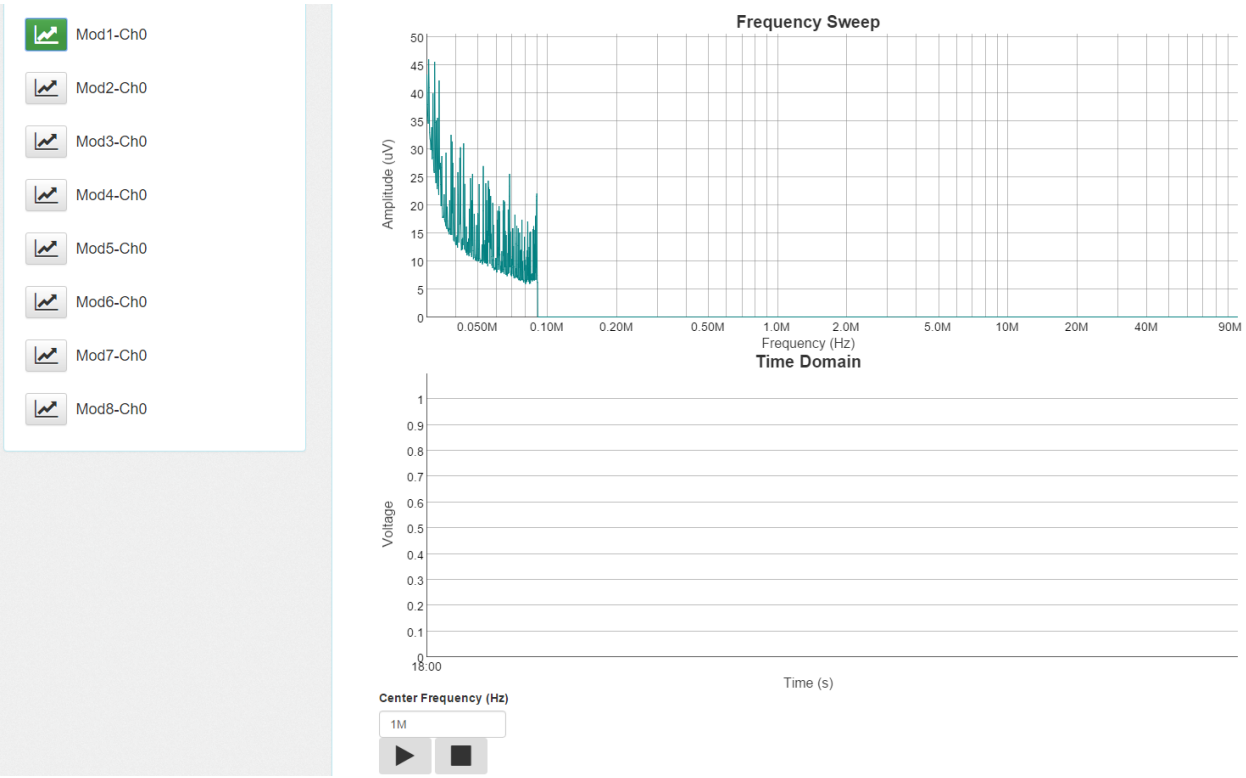
Use the equipment layout tab to assign equipment hierarchy to each of the configured channels.

### Acquisition Properties

EMSA devices support data groups. Typically, each RF input will be in its own data group so that it has independent acquisition settings from the other channels. Refer to InsightCM Help for more details on acquisition settings and data groups.

## Testpanel

To view the testpanel for EMSA devices, select the device in InsightCM dashboard and select View>>Testpanel. This will open another browser window with the EMSA tetpanel.




In the main view of the testpanel, you can see the current sweep that is in progress for each channel. In this graph, you can:

- Zoom: right-click + drag
- Pan: shift + right-click + drag
- Zoom out: double-click

. To play data from a specific frequency, use the *Play* and *Stop* buttons under the time domain graph. All sweeps are paused while looking at time domain data from a specific frequency.

On the Audio page, you can configure the device to record a WAV file at a specific center frequency and then listen to or download the recorded WAV file.

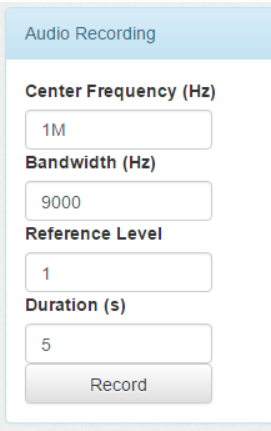



*Figure 2- Audio settings*

When listening to the recorded WAV file, you can right-click on the web player and select *Save As* to save the WAV file locally on your computer.

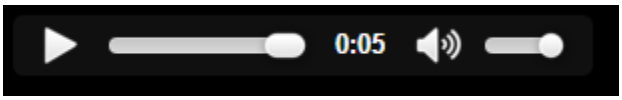



*Figure 3- Web based audio player*

For a free web-based WAV file viewing and editing tool, check out: https://twistedwave.com/online/.

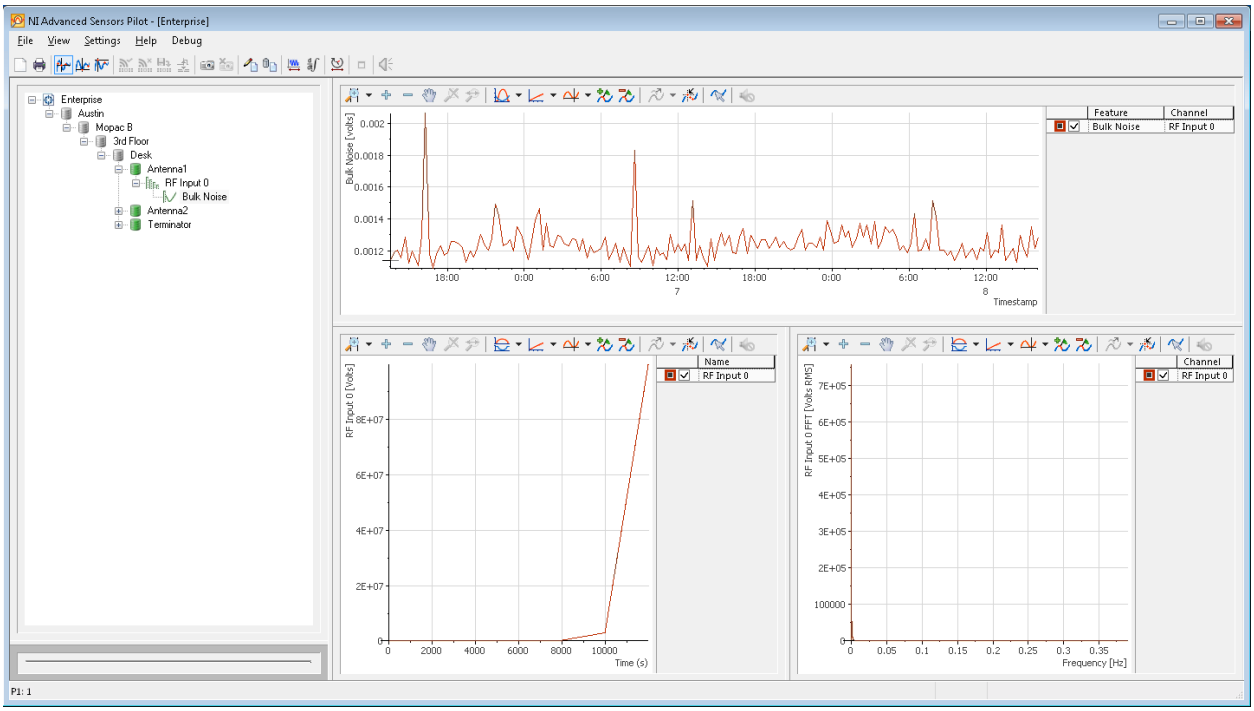
## Viewing Data in Data Explorer

The Advanced Sensors Data Explorer provides a new XY plot viewer for the spectrum data collected with the EMSA devices. The overall functionality of Advanced Sensors Data Explorer is very similar to the released version of Data Explorer. This document focuses specifically on the use of the new XY plot.

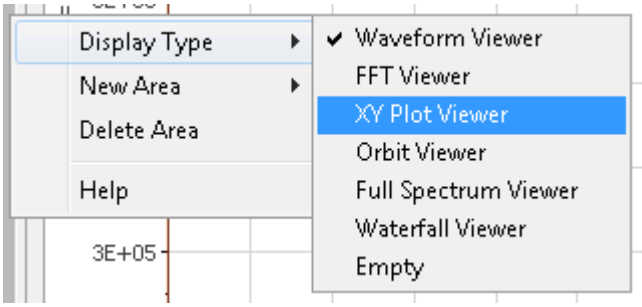
To launch Advanced Sensors Data Explorer, go to Start Menu>>All Programs>>National Instruments>>InsightCM Advanced Sensors>>DataExplorer AdvSensors.

Connecting to a server and viewing the equipment tree is the same as in the released version of Data Explorer.

Browse in the equipment tree to the EMSA data that you want to view and drag the Bulk Noise feature to the trend. You will see something like this:

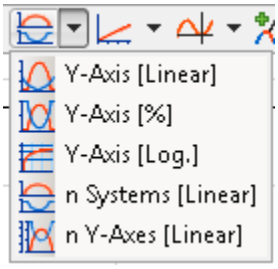



The bottom two displays do not apply to the EMSA data. Change one of the displays to an XY plot by right-clicking in the border area of the display and use the menu (shown below) to select XY Plot Viewer.

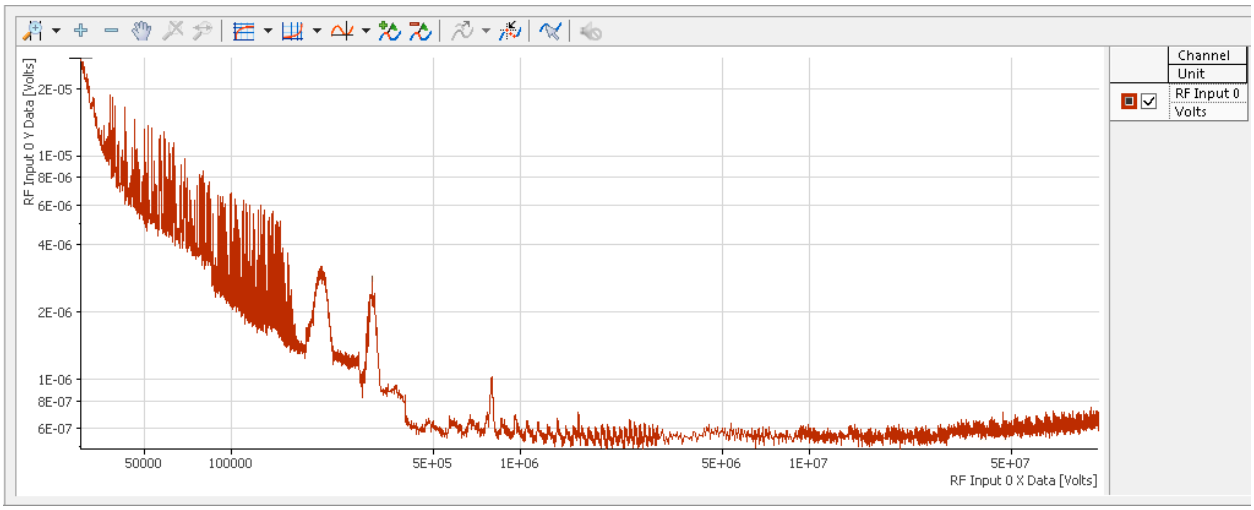



To remove the unused display, right-click again in the border area and this time select Delete Area.

In the XY plot, you can change the X and Y axis scaling by using the buttons available in the menu bar.




After changing both axes to be log scale, the XY plot looks as follows:




# Changelog

## EMSA Device Image

| | |
|---|---|
| 0.1.0 | Original release for InsightCM 1.0 |
| 0.1.12 | Original release for InsightCM 2.0 |
| 0.1.13 | Fixed issue with scaling of demodulated data |