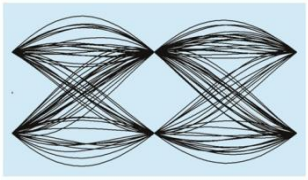

MaxEye Digital Video Signal Analysis Toolkit

DVB-S2

Version 1.0.4.1

Getting Started Guide

MAXEYE TECHNOLOGIES

Contents

MAXEYE TECHNOLOGIES

1. Introduction

The MaxEye DVB-S2 Signal analysis toolkit contains LabVIEW VIs to perform measurements on DVB-S2 signals that confirm ETSI standard EN 302 307 version 1.3.1. Refer to the ETSI EN 302 307 standard for the signal specifications and this document assumes that the user is familiar with the DVB-S2 standard specification. This guide explains how to use the DVB-S2 Signal Analysis toolkit using the programming examples.

2. Installed File Location

The example VIs are installed in, <LabVIEW>\examples\MaxEye\Digital Video Toolkits\DVB-S2 Analysis.

The toolkit help file is installed in, <LabVIEW>\help\MaxEye\Digital Video Toolkits

The other documentation files are installed in, <LabVIEW>vi.lib\addons\MaxEye\Digital Video Toolkits\DVB-S2 Analysis\Documentation.

The toolkit API files are installed in, <LabVIEW>\vi.lib\addons\MaxEye\Digital Video Toolkits\DVB-S2 Analysis\Analysis\API.

You can also find a shortcut to the above location from the windows start menu.

Start->All Programs->MaxEye->Digital Video Toolkits->DVB-S2<Labview>->Analysis

3. Programming Examples

The DVB-S2 Signal Analysis toolkit contains examples for performing the following

i. Modulation Accuracy of the DVB-S2 transmitter can be analyzed based on the signal acquired from the NI RFSA or NI USRP.

ii. Perform the Spectral Measurements of the signal acquired from the NI RFSA or NI USRP.

The programming examples are created using the LabVIEW API VIs. For more information about the API VI used in the example VIs refer to the MaxEye DVB-S2 Signal Analysis Help.chm document, accessible at Start->All Programs->MaxEye->Digital Video Toolkits-> DVB-S2 ->Analysis->Documentation**.**

For more information please contact info@maxeyetech.com

MAXEYE TECHNOLOGIES

3.1. Measure Modulation Accuracy

DVB-S2 Signal Analysis toolkit measures the performance of the RF front end of the DVB-S2 transmitter. The DVB-S2 Signal Analysis toolkit has an example to measure the modulation accuracy of the transmitter by performing the measurements on the signal acquired from the NI RFSA or NI USRP.

3.1.1 MaxEye DVB-S2 RFSA Measure Modulation Accuracy

This Example is used to measure the modulation accuracy of the DVB-S2 transmitter. The measurements are performed on the signal acquired from the hardware. The Figure 1 below shows the front panel of the Example VI.

The user configurations are divided in to four categories

1. Hardware Settings
2. Measurement Settings
3. Measurement Plots
4. Peak EVM Results
5. PL Header Results
6. Measurement Results

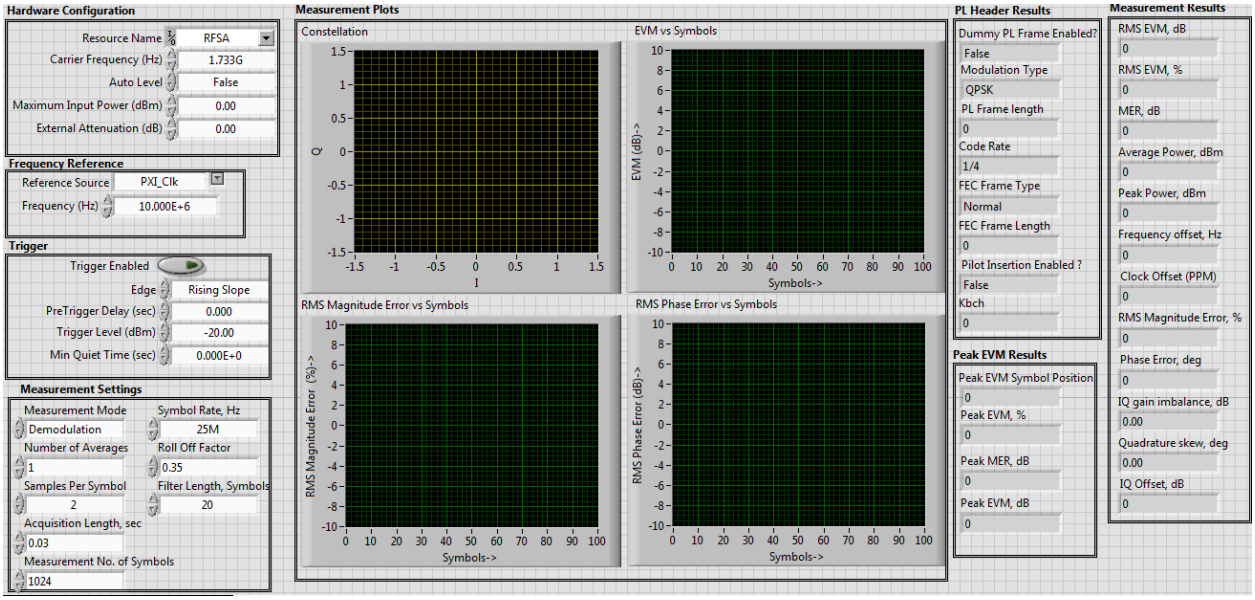

Figure 1

For more information please contact info@maxeyetech.com

3.1.1.1 Hardware Settings

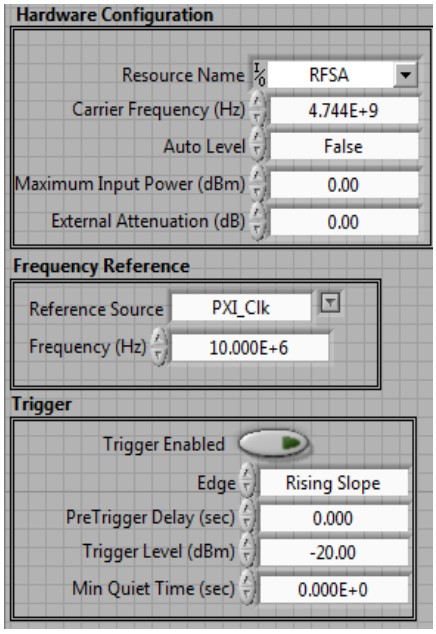

Figure 2

RFSA Resource – Configure the resource name used in NI Measurement and Automation explorer for the RFSA.

Carrier Frequency (Hz) – Center Frequency of the DVB-S2 signal in Hz.

Auto Level (TRUE/FALSE) – Sets the best reference level for the instrument based on the peak power of the measured signal.

Maximum Input Power Level (dBm) – Maximum expected power of an input RF signal.

External Attenuation (dB), Reference Source, Frequency (Hz), Trigger settings – Refer NI RFSA Signal Analyzer help file.

3.1.1.2 Measurement Settings

The Measurement Settings for DVB-S2 Signal Analysis contains Measurement Mode property which specifies the type of measurement performed on the acquired signal. Two measurement modes are supported Demodulation Measurements or Spectral Measurements. The help for each of the properties is available in DVB-S2 Signal Analysis Help.chm file.

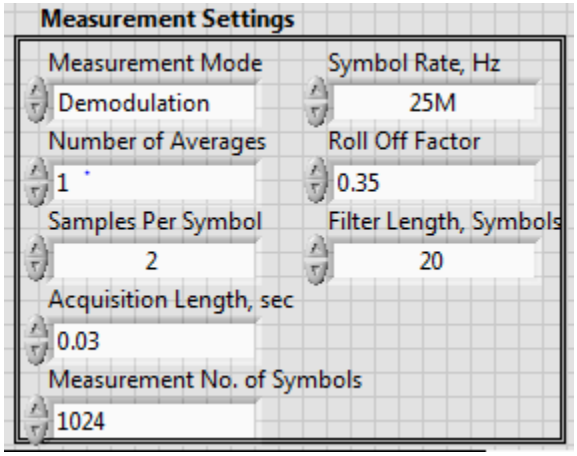

Figure 3

Acquisition Length – configure Acquisition Length in seconds corresponding to 2 DVB-S2 frames. The minimum required value is 1 DVB-S2 frame + PL Header (90 symbols)

Measurement No. of Symbols –The value entered in this property will be used to perform all the measurements.

Filter Length, Symbols – configures the Filter Length, Symbols corresponding to the Matched filter. Default value is 20. We recommend to set high value to get better EVM results.

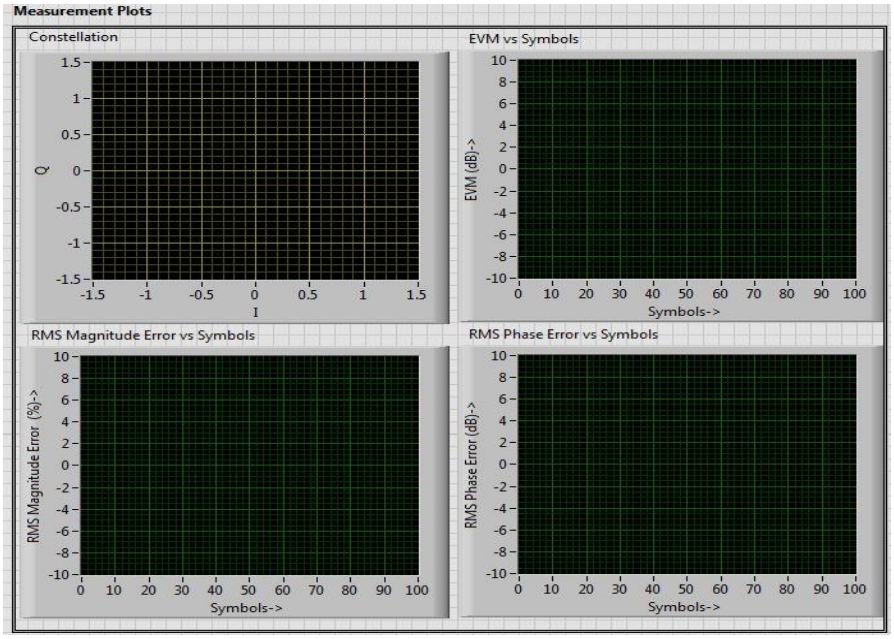

Figure 4

3.1.1.3 Measurement Plots

The DVB-S2 Signal Analysis Toolkit returns several plots to analyze the measurement results. Among them important ones are shown in the Figure 4.

i. Constellation Graph
ii. EVM versus Symbols Graph
iii. RMS Magnitude Error versus Symbols Graph
iv. RMS Phase Error versus Symbols Graph

Refer to the DVB-S2 Signal Analysis Help.chm file for more information about the measurement races.

3.1.1.4 Peak EVM Results

Peak EVM: The Peak EVM results are calculated based on the peak hold averaging if the Number of Averages property value is greater than 1.

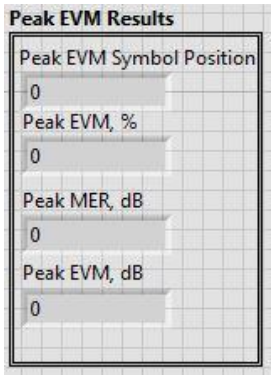

Figure 5

3.1.1.5 PL Header Results

The PL Header measurement results are shown separately as shown in the Figure 6. Refer to the DVB-S2 Signal Analysis Help.chm file for more information about the PL Header Results.

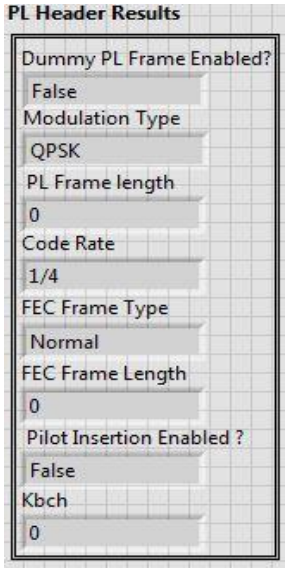

Figure 6

3.1.1.6 Measurement Results

The most important measurement results are shown separately as shown in the Figure 7. The toolkit averages these measurement results over the number of acquisitions specified by the Number of Averages value.

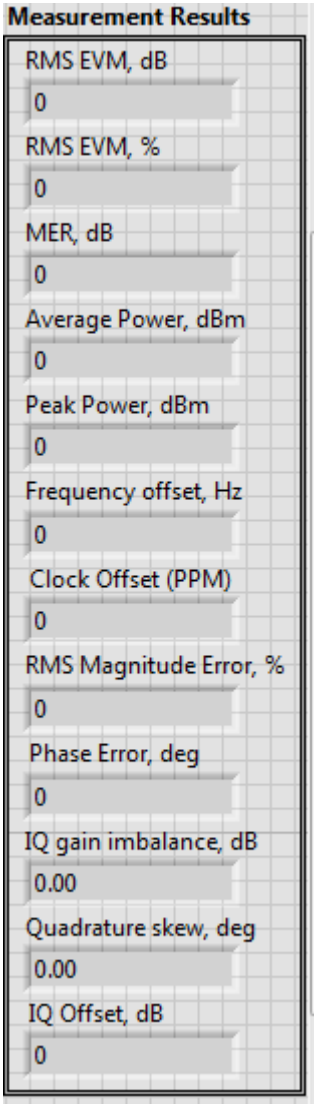

Figure 7

3.1.2 MaxEye DVB-S2 USRP Measure Modulation Accuracy

This Example is used to measure the modulation accuracy of the DVB-S2 transmitter. The measurements are performed on the signal acquired from the USRP. Figure 8 shows the front panel of the Example VI.

The user configurations are divided in to three categories

1. Hardware Settings
2. Measurement Settings
3. Measurement Plots
4. Peak EVM Results
5. PL Header Results

6. Measurement Results

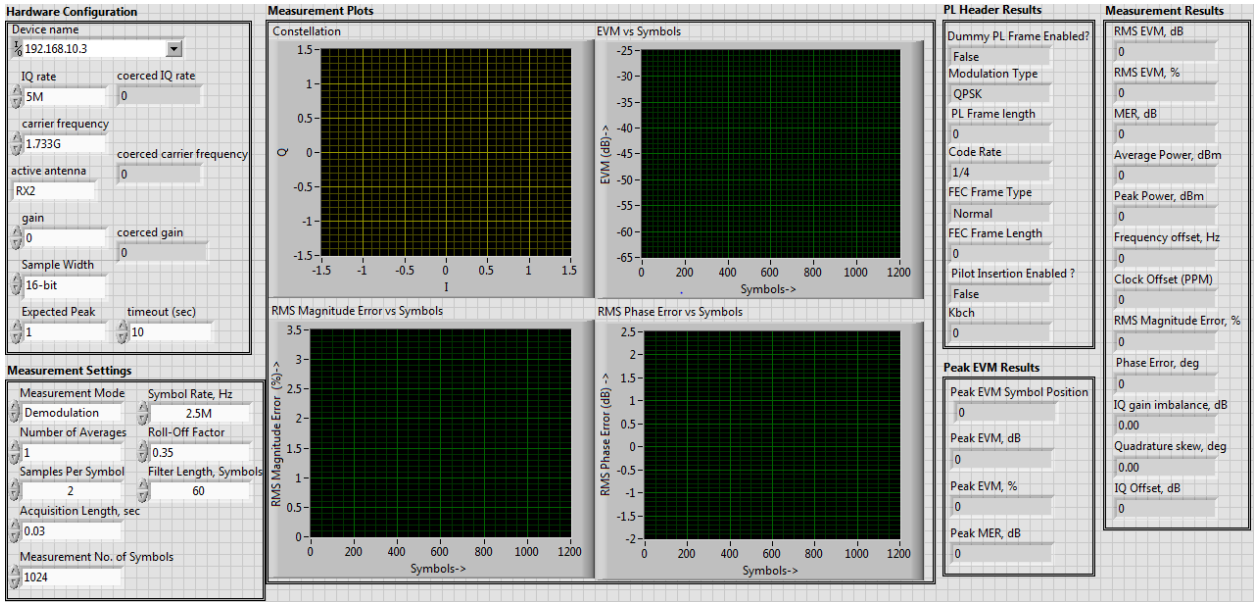

Figure 8

3.1.2.1 Hardware Settings

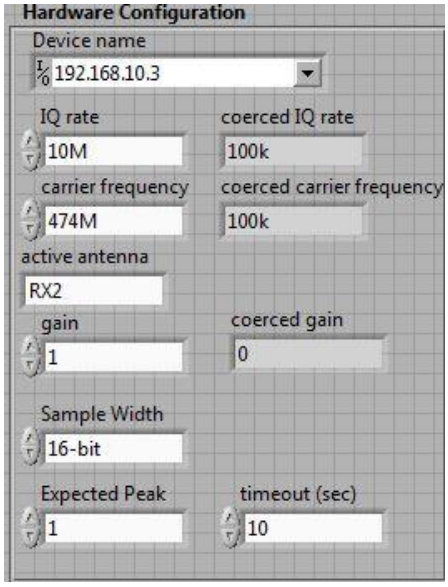

Figure 9

Device Name – specifies the IP address of the NI USRP device**.**

IQ Rate – sampling rate of the signal to be acquired. Configure this value based on the roll-off

factor and the symbol rate of the transmitted DVB-S2 signal.

Carrier Frequency – Center Frequency of the DVB-S2 signal in Hz.

Sample Width, Active Antenna, Gain, Expected Peak, coerced IQ rare, coerced carrier frequency, and coerced gain – Refer NI USRP help file.

Note: The rest of the front panel controls are similar to the example **MaxEye DVB-S2 RFSA Measure Modulation Accuracy**.

3.2. Spectral Measurements

3.2.1 MaxEye DVB-S2 RFSA Spectral Measurements

This example is used to perform the spectral measurements of the signal received from the RFSA. The front panel of the Example VI is shown in the Figure 10.

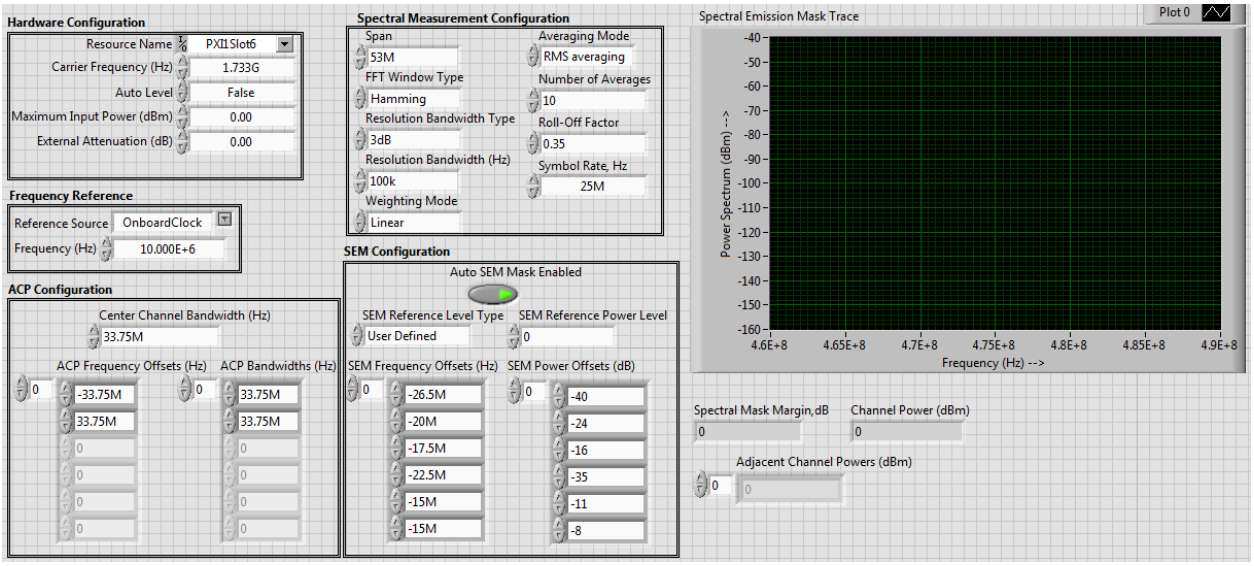

Figure 10

The user configurations are divided in to four categories

1. Hardware Configuration
2. Spectral Measurement Configuration
3. ACP/SEM Configuration
4. Spectral Measurement Results

3.2.1.1 Hardware Settings

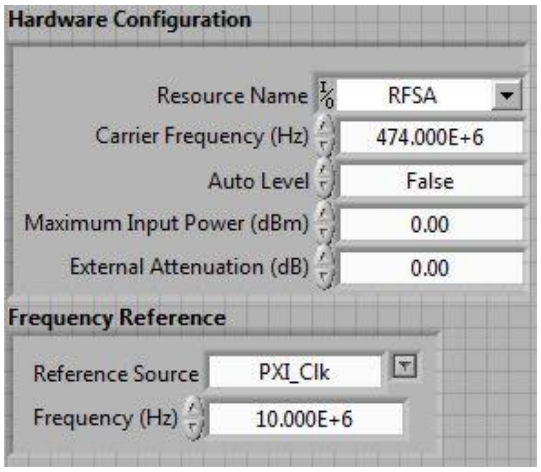

Figure 11

RFSA Resource – Configure the resource name used in NI Measurement and Automation explorer for the RFSA.

Carrier Frequency (Hz) – Center Frequency of the DVB-S2 signal in Hz.

Auto Level (TRUE/FALSE) – Sets the best reference level for the instrument based on the peak power of the measured signal.

Maximum Input Power Level (dBm) – Maximum expected power of an input RF signal.

External Attenuation (dB), Reference Source, Frequency (Hz), – Refer NI RFSA Signal Analyzer help file.

3.2.1.2 ACP/SEM Configuration

The ACP/SEM configurations for DVB-S2 Signal Analysis are shown in the Figure 12. The help for each of the properties is available in DVB-S2 Signal Analysis Help.chm file.

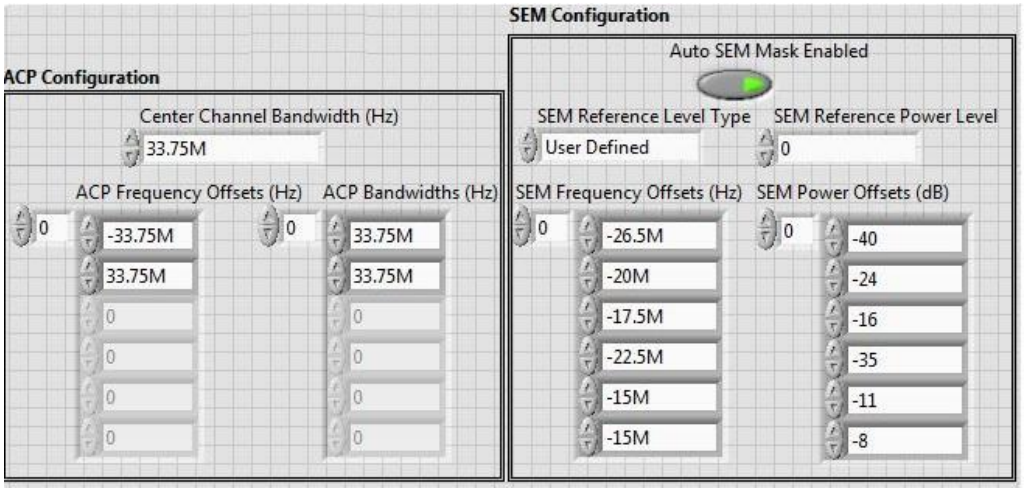

Figure 12

3.2.1.3 Spectral Measurement Results

DVB-S2 Signal Analysis tool kit returns the following results

1. Spectral Mask Trace
2. Spectral Mask Margin
3. Channel Power (dBm)
4. Adjacent Channel Powers (dBm)

The help for each of the spectral measurement results is available in DVB-S2 Signal Analysis Help.chm file.

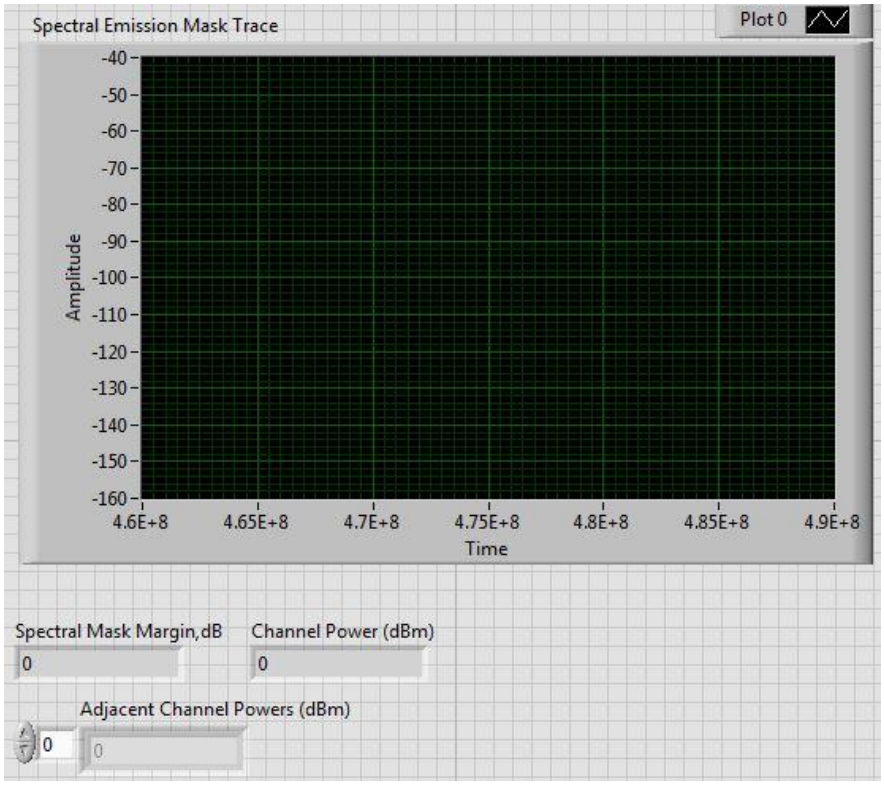

Figure 13

3.2.2 MaxEye DVB-S2 USRP Spectral Measurements

This example is used to perform the spectral measurements of the signal received from the USRP. The front panel of the Example VI is shown in the Figure 14

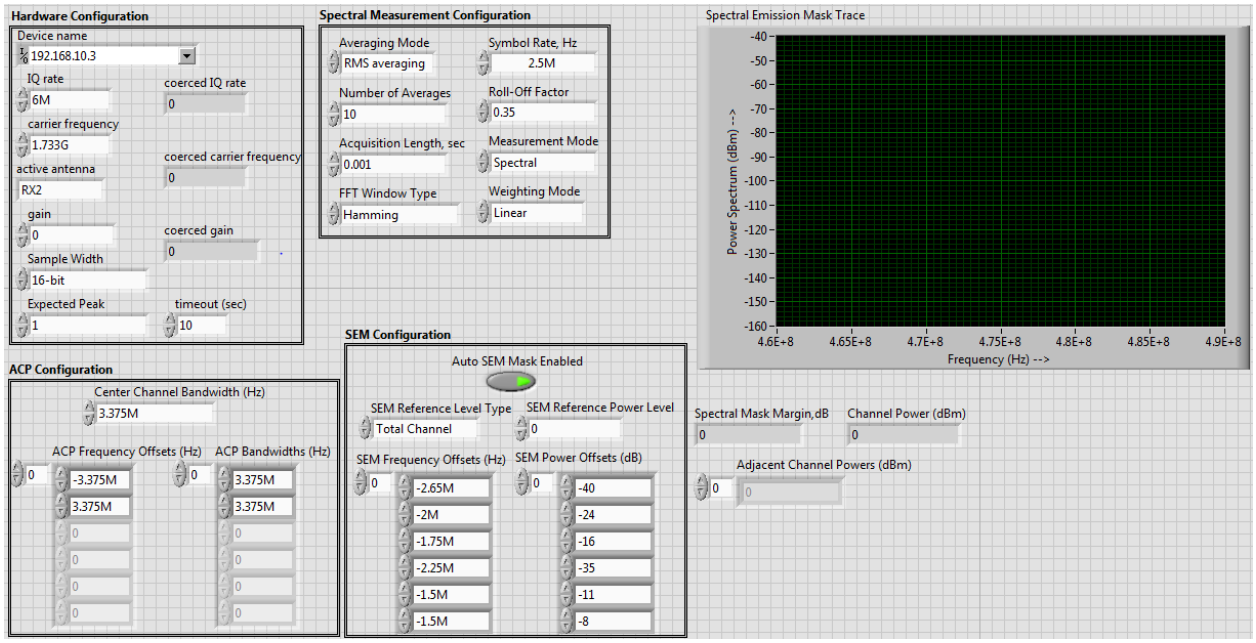

Figure 14

3.2.2.1 Hardware Settings

The hardware settings of the USRP is similar to the example **MaxEye DVB-S2 USRP Measure Modulation Accuracy** explained in the Section 3.1.2.1

Note: Apart from the hardware setting the front panel of the Example VI is similar to the example MaxEye DVB-S2 RFSA Spectral Measurements. For each of the properties please refer the DVB-S2 Signal Analysis help file.