Injection of Small Signal In the Shielded Room

– Aaronia Spectrum Analyzer@4GHz

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UCDAVIS
DEPARTMENT OF PHYSICS AND ASTRONOMY
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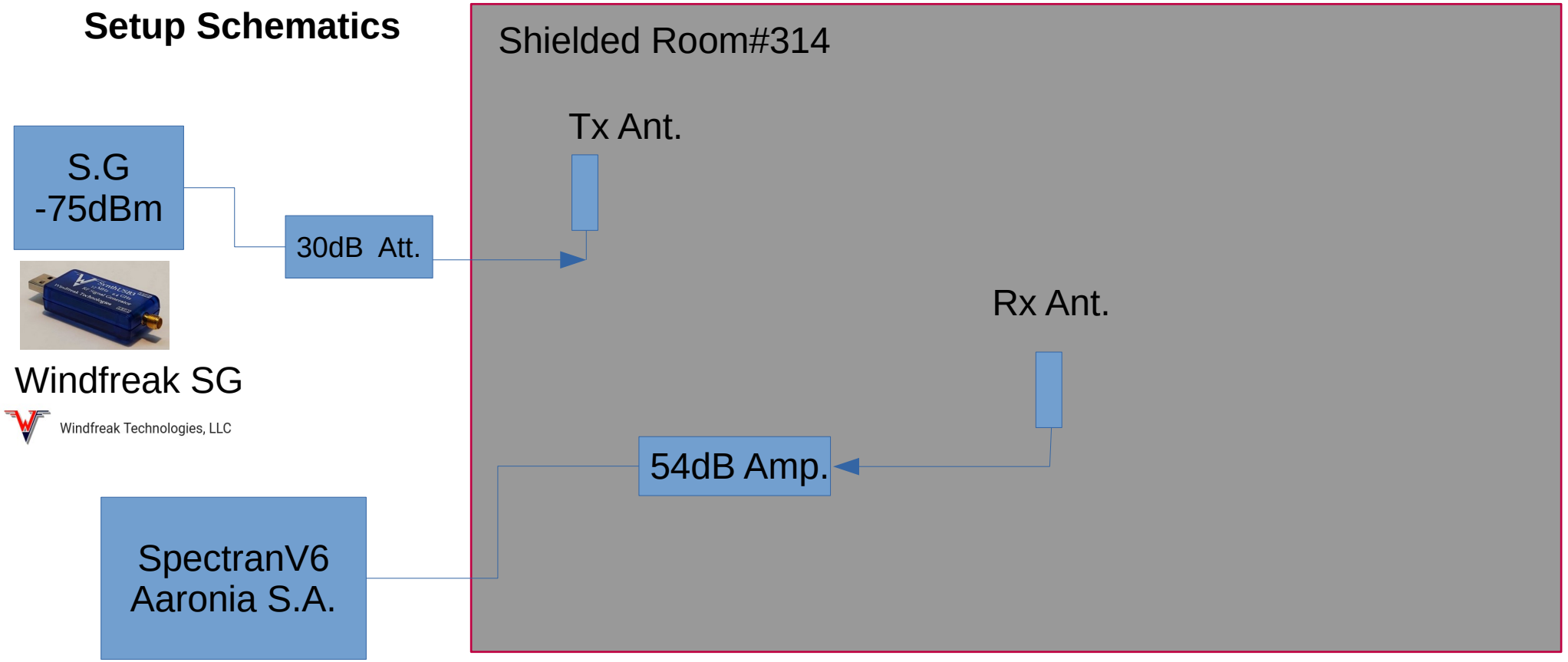
Setup Schematics



Windfreak SG

Windfreak Technologies, LLC

Calibration Tests:

A. Without and With Amplifier
B. Without and With Transmitter
C. Terminated Load at the S.A port/ at the end of cable in the shielded room
D. With the Receiver Antenna

E.

Tx: -105 dBm, Tx and Rx Aaronia antennas are identical, 60 dB Ext. amplifier+SA PreAmp.

TSA600 ANT for HEPCAT
10dBi@4GHz*

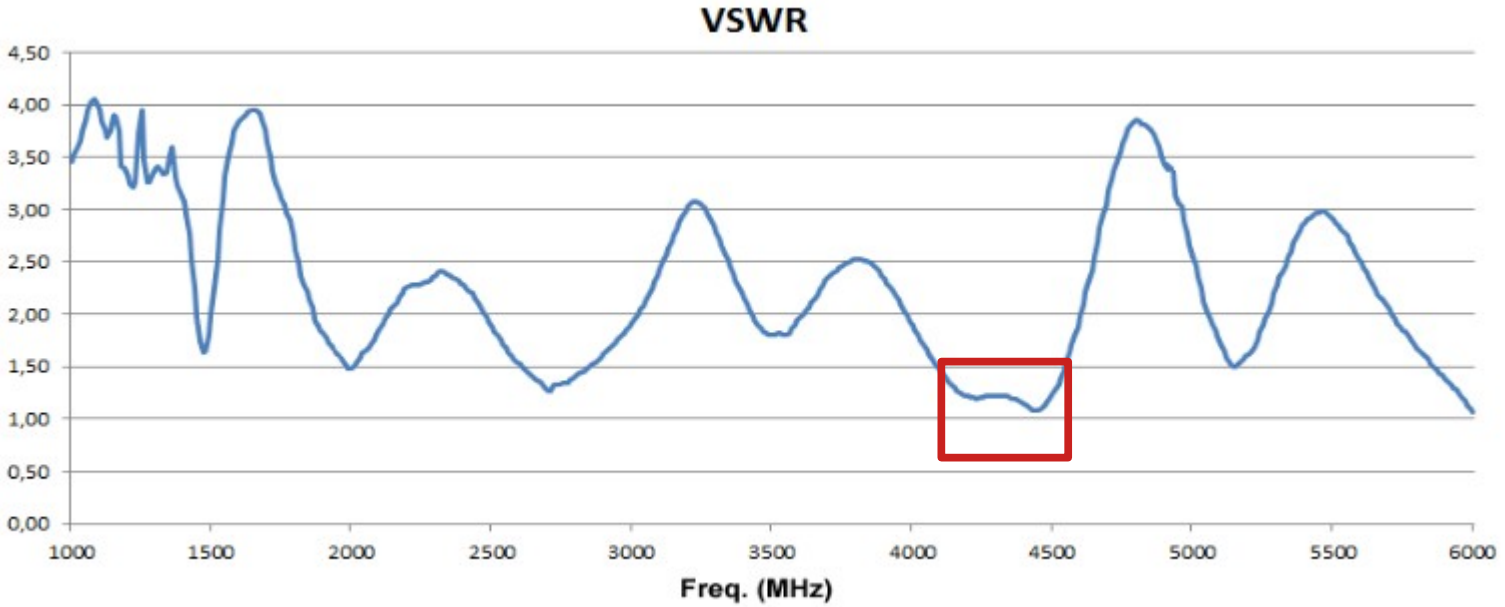
LNA ZX60_63GLN+@4GHz : 2 * 27.2dB N.F. 1, IP3 24.6 dBm

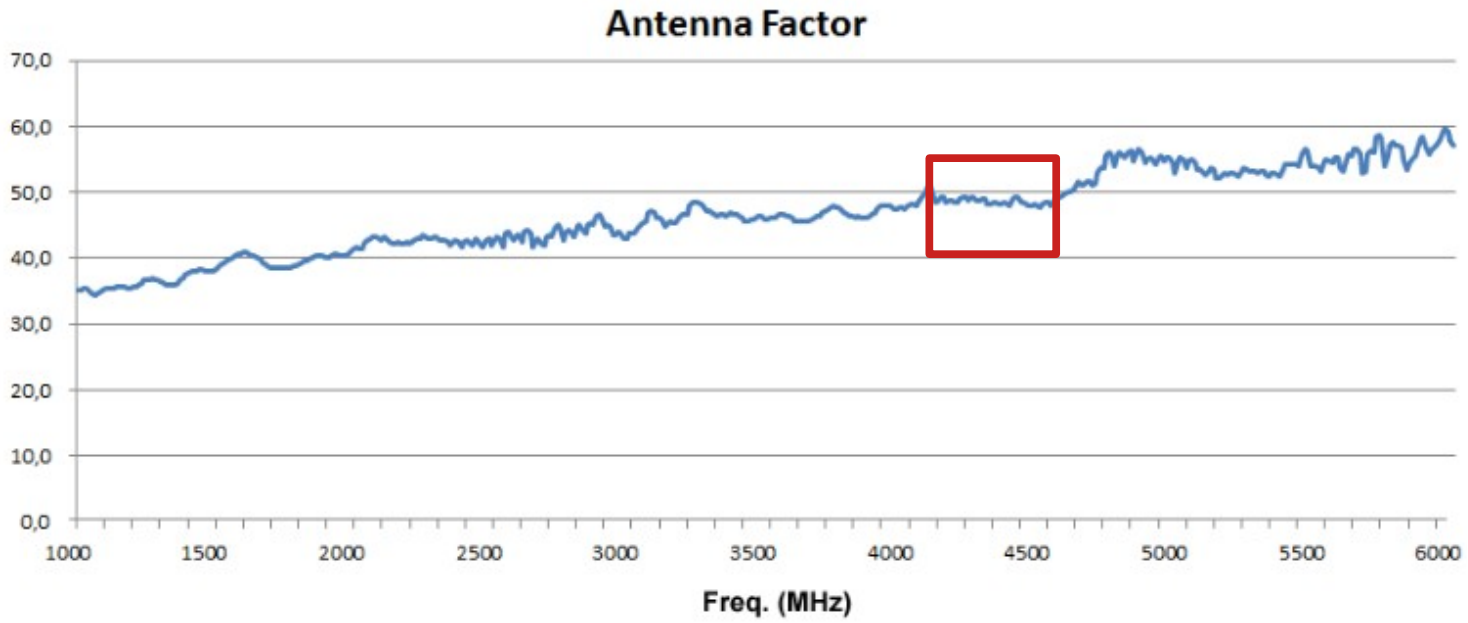
https://www.mouser.com/datasheet/2/1030/ZX60_63GLN_2b-1842821.pdf

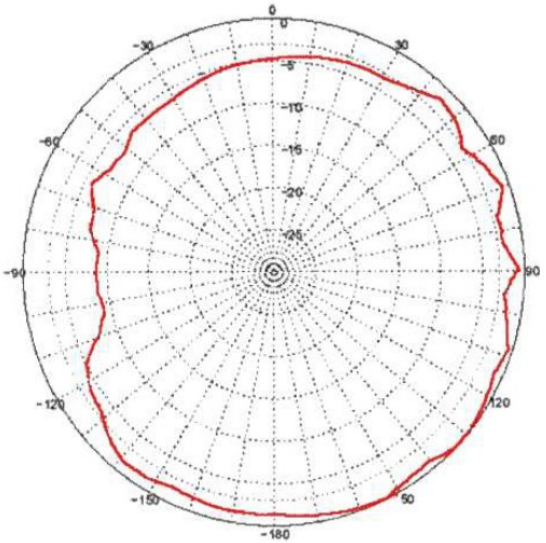
*http://rfspace.com/RFSPACE/Antennas_files/TSA600.pdf

Aaronia Antenna

REMINDER





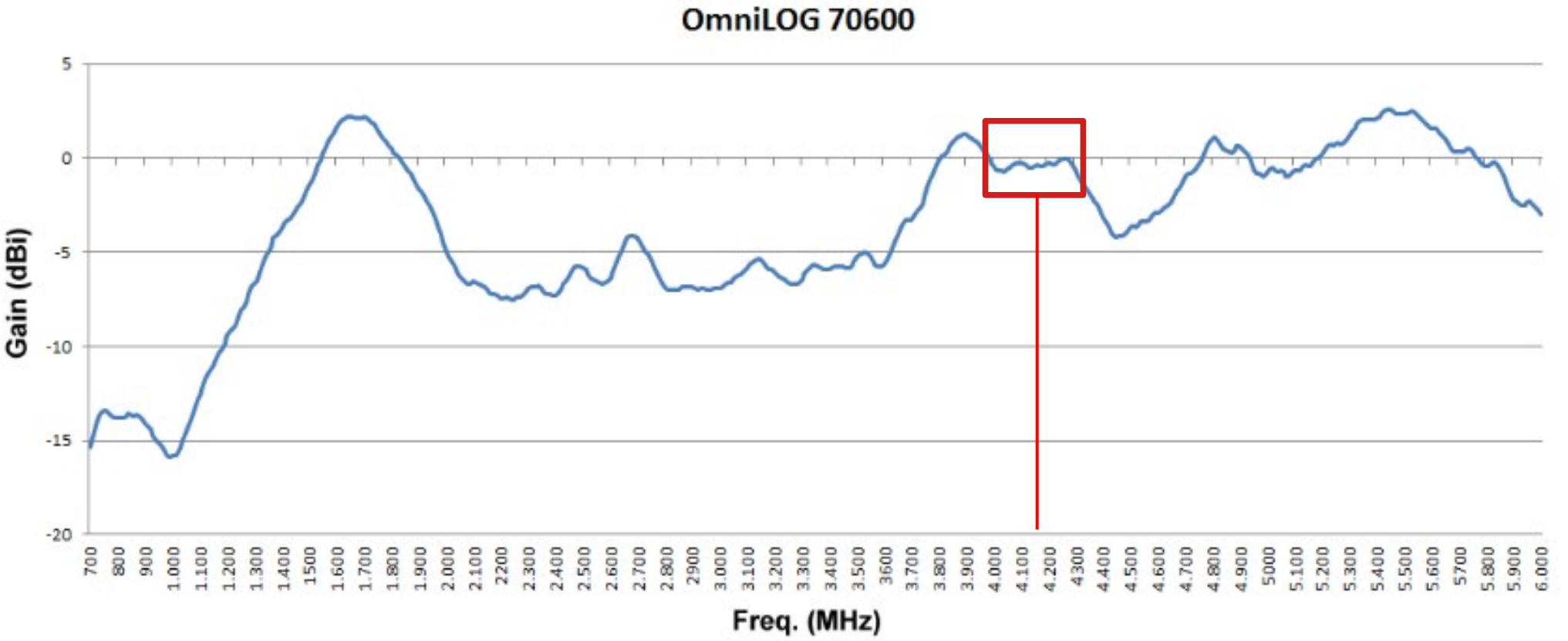


Typ. Horizontal Pattern

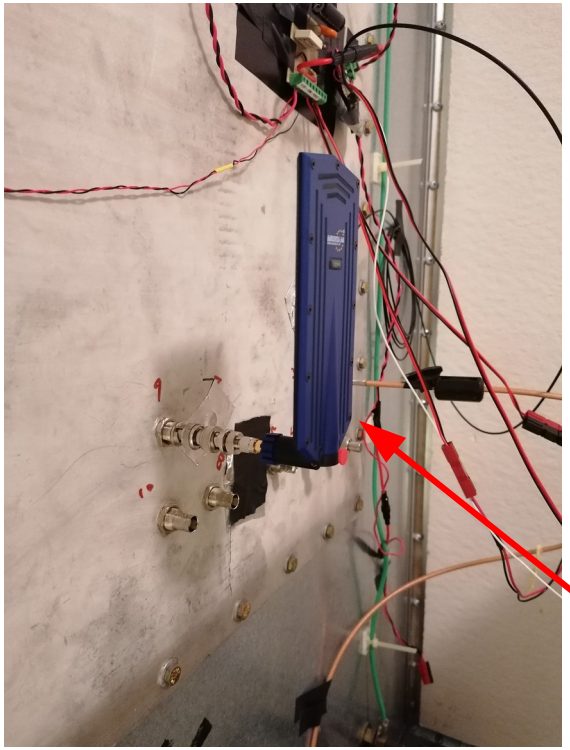
https://www.testequipmentdepot.com/aaronia/pdf/omnilog70600_datasheet.pdf

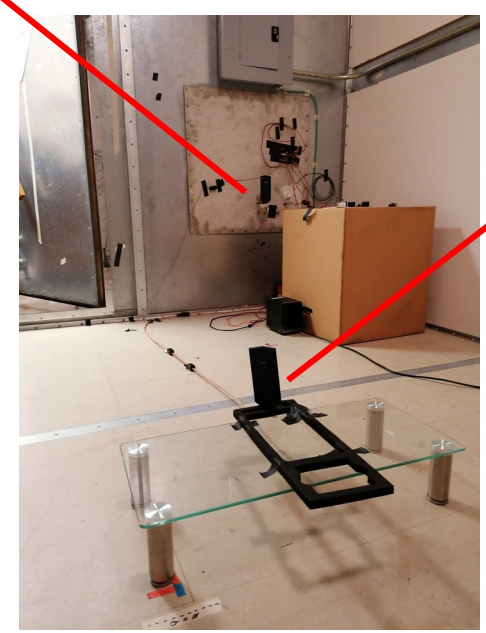
Aaronia Antenna, Gain@4 GHz

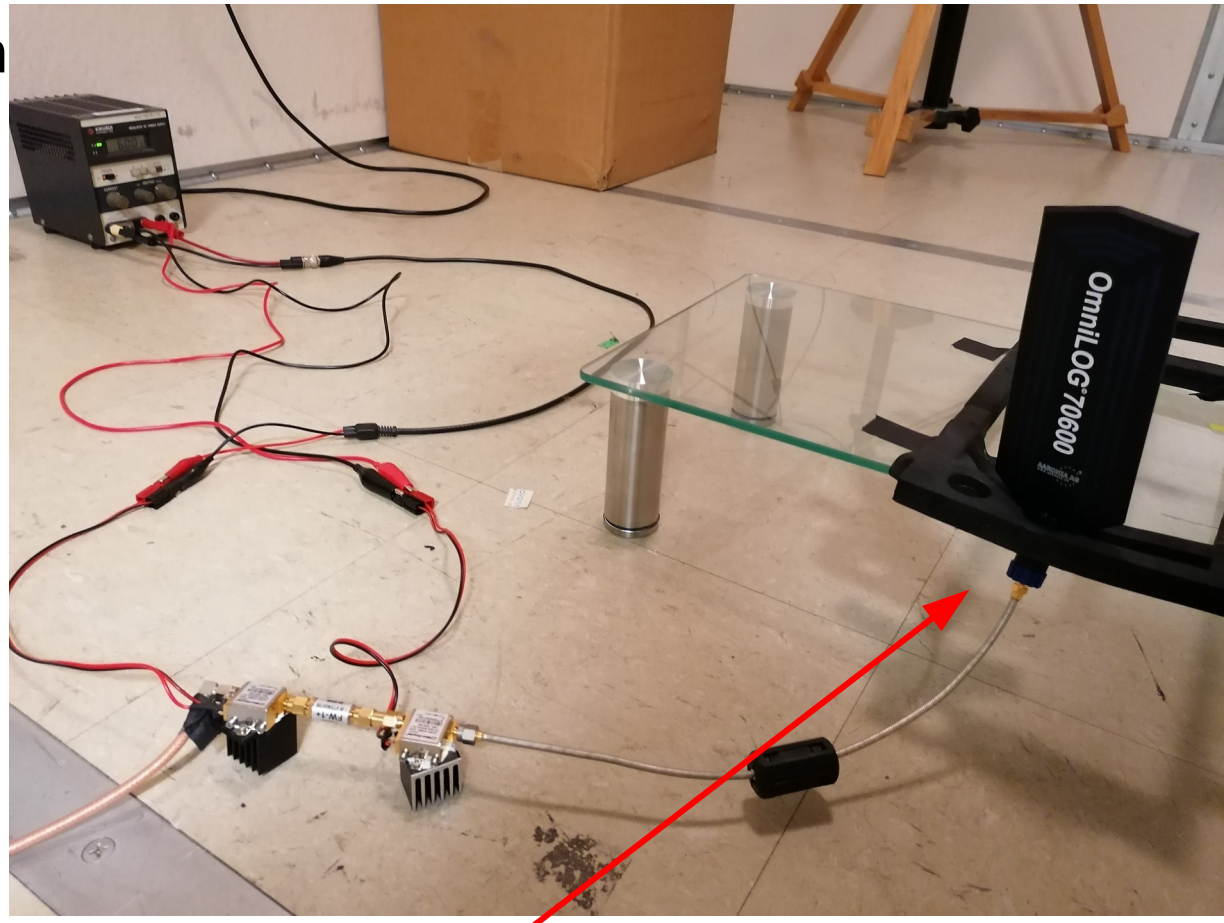
REMINDER



Setup Inside the Shielded Room

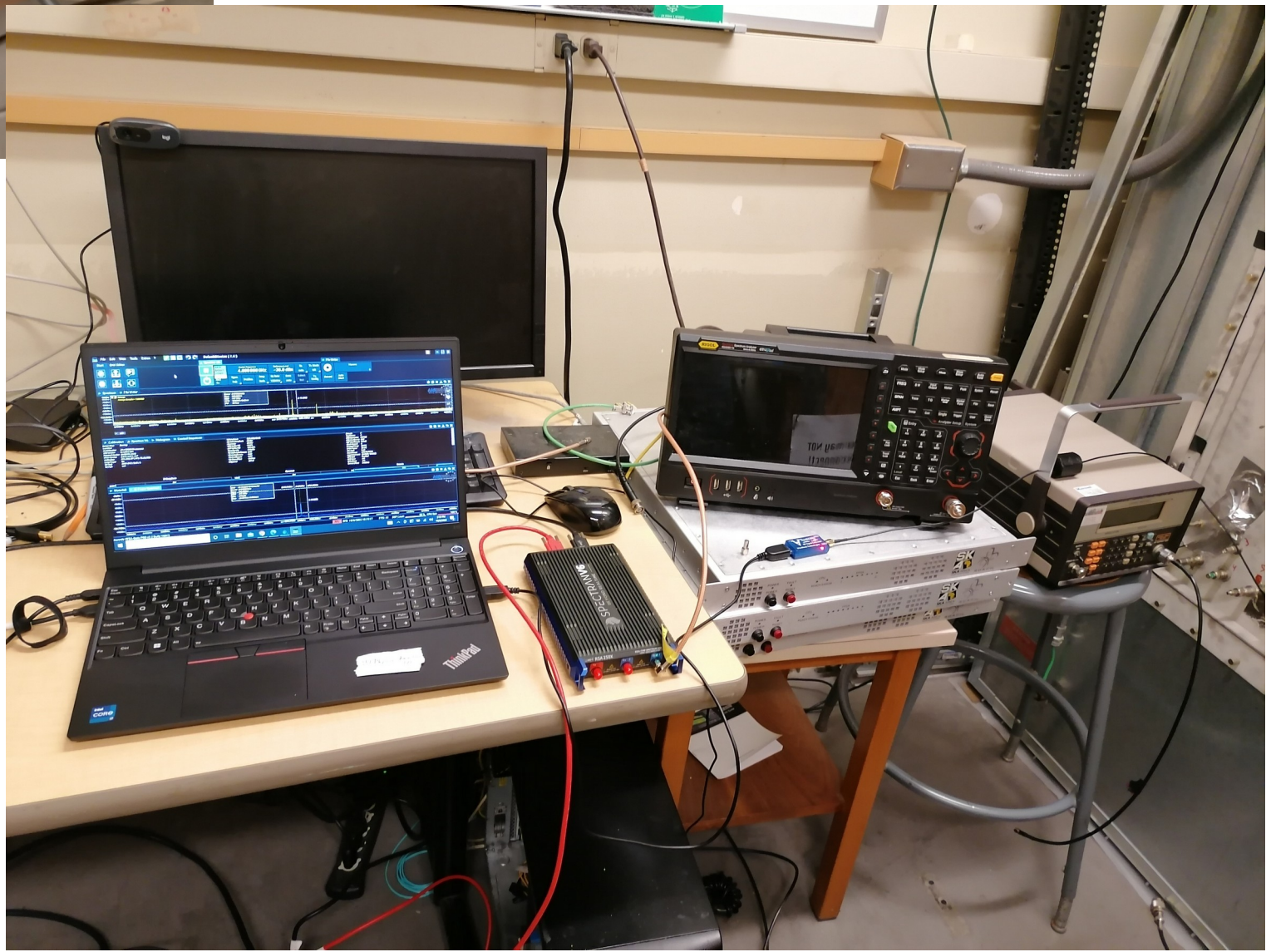




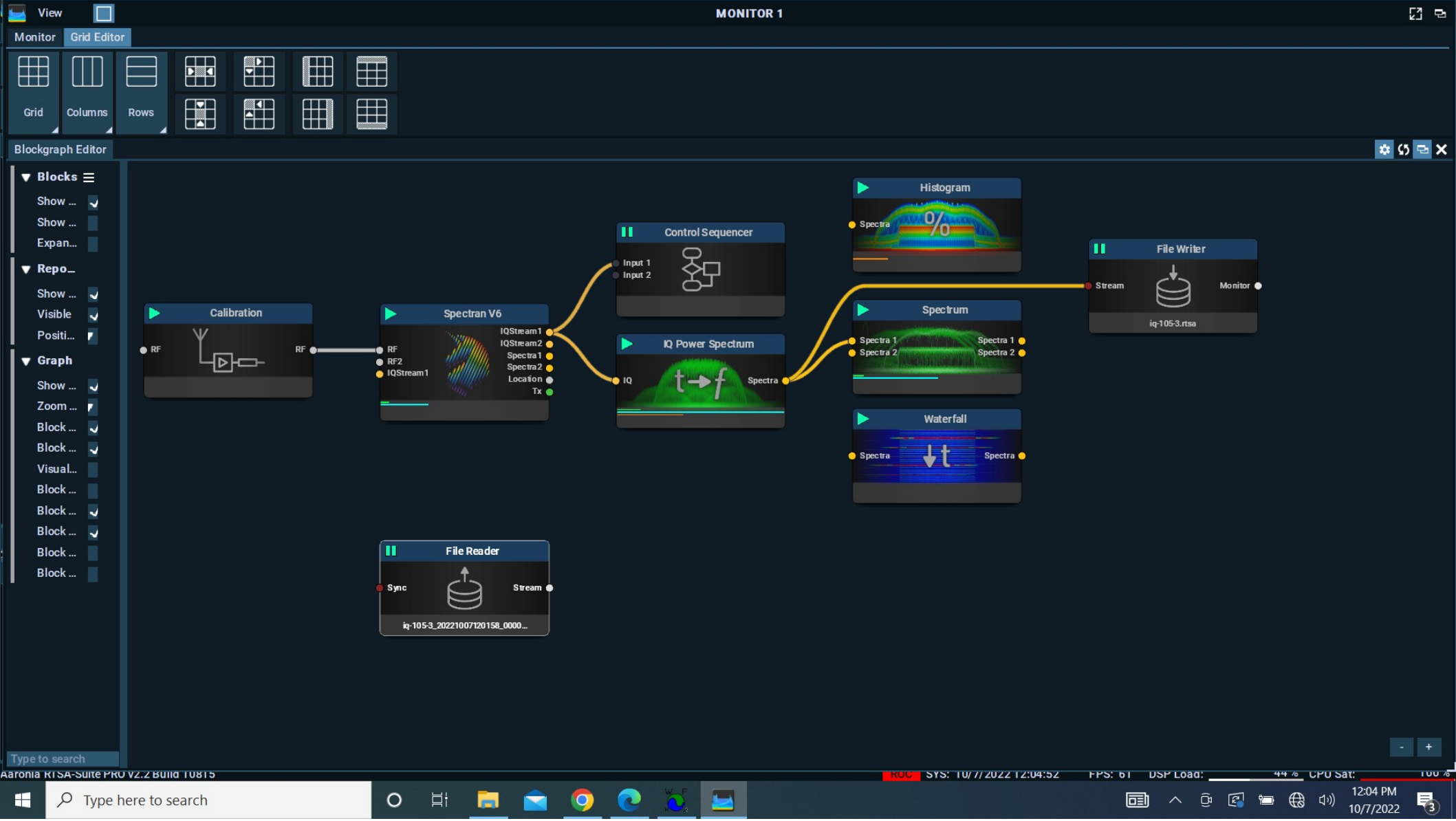


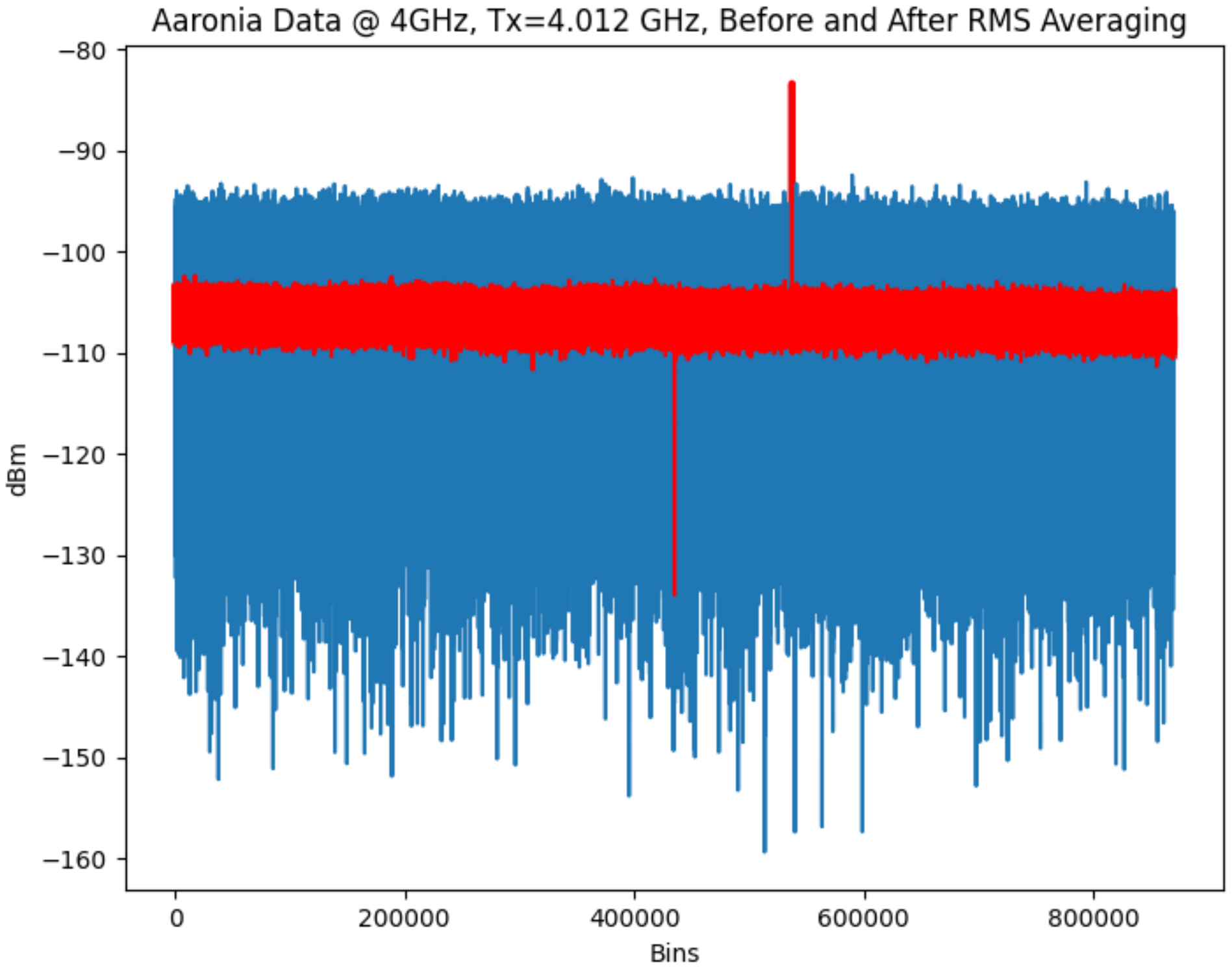
SynthUSB

https://windfreaktech.com/product/synthusb3-6ghz-rf-signal-generator/

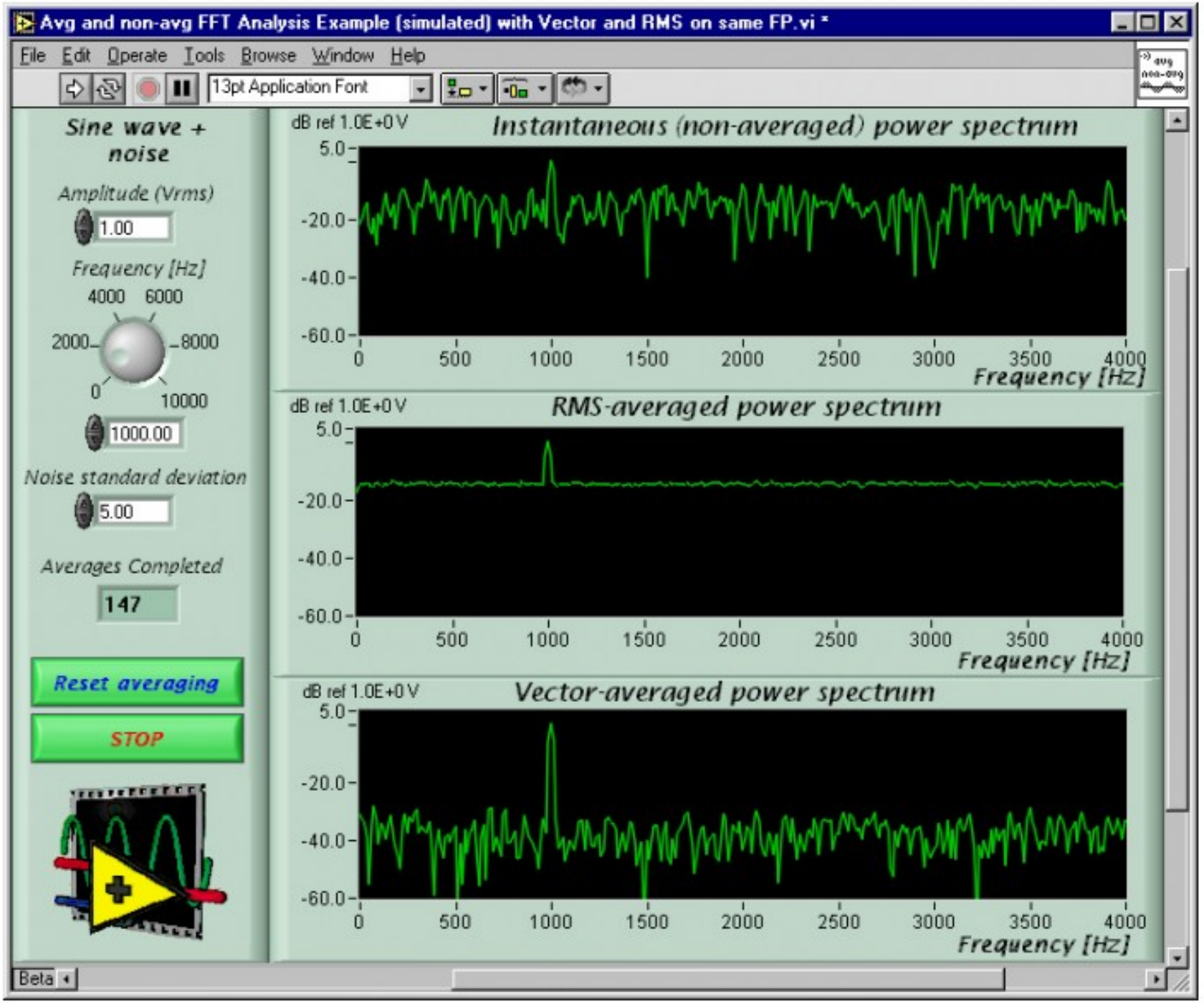


FFT 1M
Bin 870404
Span 102 MHz
RBW 117 Hz
Fc= 4 GHz
Ftx=4.012 GHz


View
MONITOR 1
Monitor
Grid Editor
Grid
Columns
Rows
Blockgraph Editor
Blocks
Show ...
Show ...
Expan...
Repo...
Show ...
Visible
Positi...
Graph
Show ...
Zoom ...
Block ...
Block ...
Visual...
Block ...
Block ...
Block ...
Block ...
Block ...
Type to search
Calibration
RF
RF
Spectran V6
RF
RF2
IQStream1
IQStream1
IQStream2
Spectra1
Spectra2
Location
Tx
Control Sequencer
Input 1
Input 2
IQ Power Spectrum
IQ
Spectra
Histogram
Spectra
Spectrum
Spectra 1
Spectra 2
Spectra 1
Spectra 2
Waterfall
Spectra
Spectra
File Writer
Stream
Monitor
iq-105-3.rtsa
File Reader
Sync
Stream
iq-105-3_20221007120158_0000...
Aaronia RTSA-Suite PRO V2.2 Build 10815
SYS: 10/7/2022 12:04:52
FPS: 61
DSP Load:
44 %
CPU Sat:
Type here to search
12:04 PM
10/7/2022


Aaronia Data @ 4GHz, Tx=4.012 GHz, Before and After RMS Averaging
−80
−90
−100
−110
−120
−130
−140
−150
−160
dBm
0
200000
400000
600000
800000
Bins

RMS Averaging vs. Vector Averaging



https://www.dsprelated.com/showarticle/1159.php

RMS/Absolute Averaging Vector Averaging (Including Phase)

Oscilloscope Block in Aaronia for Vector Averaging To be Investigated

NEXT:

1- **Spurs between 50MHz-350MHz (vs. ROACH)**

2-Spurs around 4GHz (Detection and Removal)

3-Vector Averaging

4-DP Constraints @ 4.1 GHz
(~HEPCAT REDO)
Gain and AF

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