



limbo-firmware-v1_2-lab-test

Tags

Introduction

Input signal for tests in the lab

Signal Chain

Noise Generator

Signal Generator:

Test Results

ADC RMS

test1—signal connected to 2 pol inputs

test2—signal connected to 1 pol input

Introduction

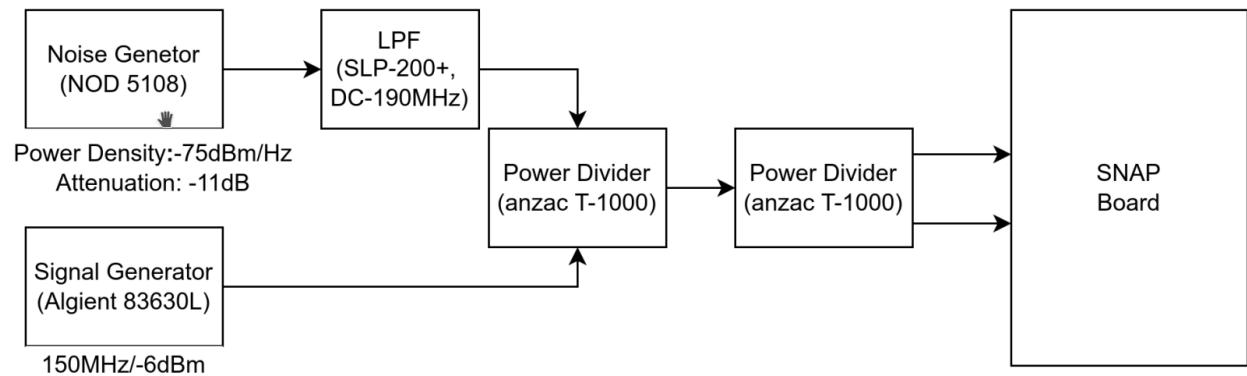
In the last firmware([limbo_500_v1_2_2023-04-11_1634.fpg](#)), we summed all of the 4 inputs of spectra together.

In this firmware, we made the following changes:

- separate the spectra data for two pols
- added some new registers
 - `data_sel2` : select 16bits from the 64bits spectra data from pol2. By default, it should be the same as the value of `data_sel1`.
 - `coeff2` : coefficient for the spectra data from pol2. it should be the same as the value of `coeff1`.
 - `pwr_gain2` and `pwr_gain3` : They should always be set to 1.

Input signal for tests in the lab

Signal Chain



Noise Generator

- PN: NOD 5108

NOD-5108 - Micronetics Noise Generators - BRL Test

NOD-5108 - BRL Test buys sells and leases new used and refurbished Micronetics NOD-5108 Noise Generators. Repair and calibration services for the NOD-5108 are available and warrantied by our world class repair lab.

https://www.brldtest.com/index.php?main_page=product_info&products_id=4095

- Attenuation: -11dB



Signal Generator:

- PN: Agilent 83630L

<https://www.keysight.com/us/en/product/83630L/synthesized-sweptcw-generator-10-mhz-to-265-ghz.html>

- Freq: 150MHz
- Amp: -6dBm

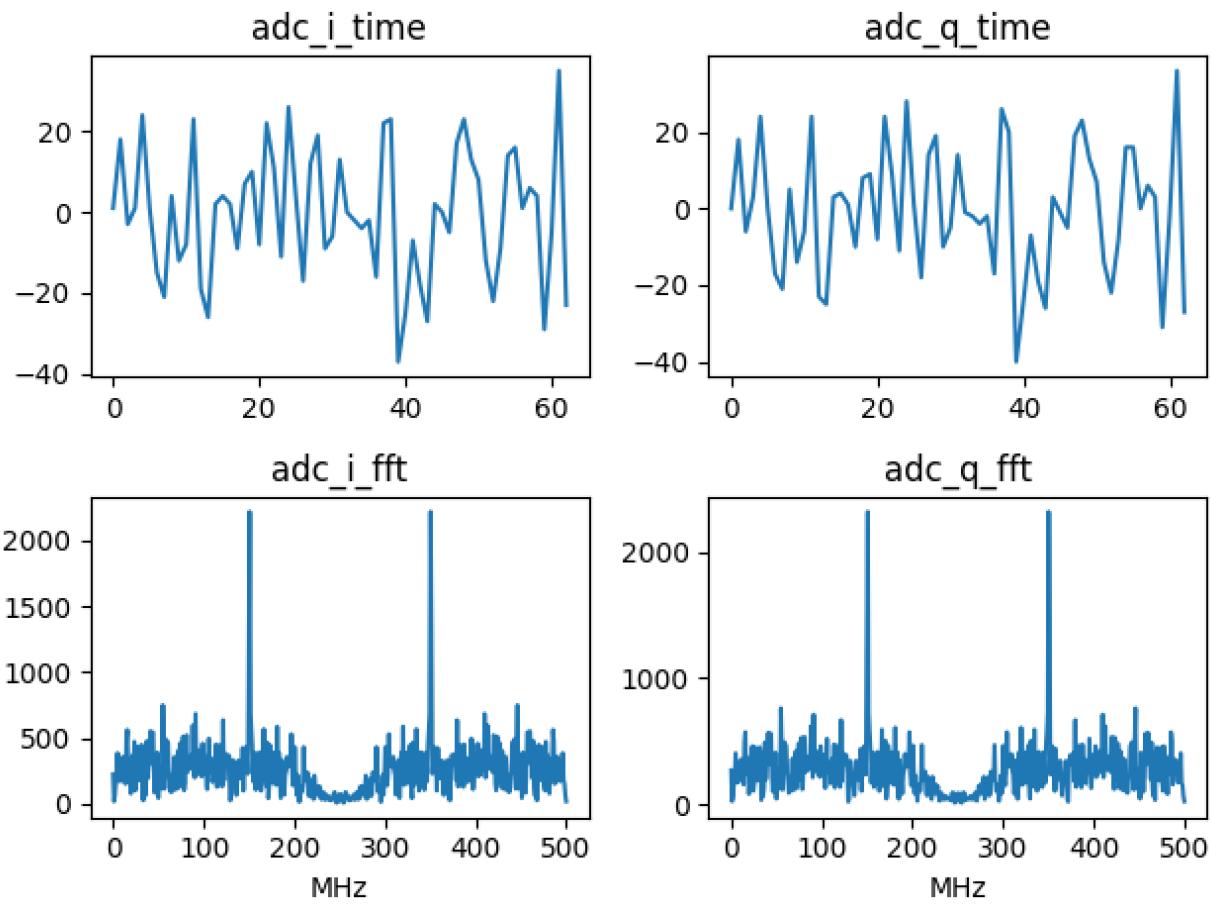


Test Results

ADC RMS

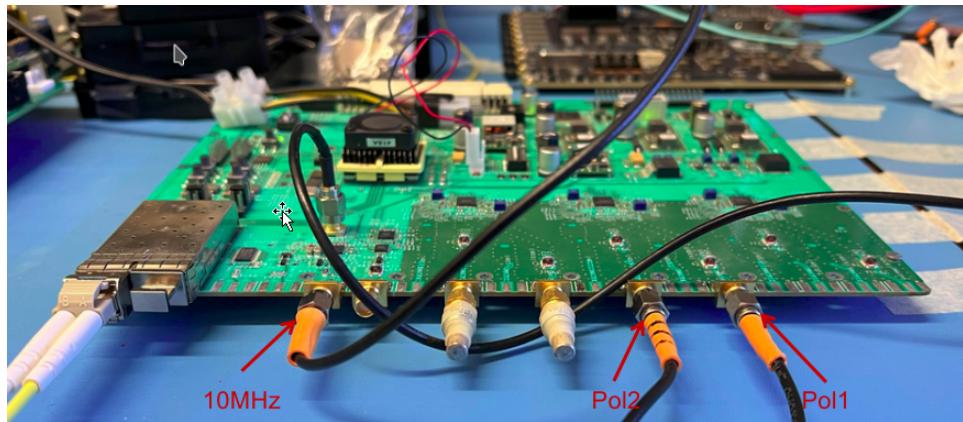
- Before doing the test, we should check the ADC RMS first, and make sure the RMS value is round 20.

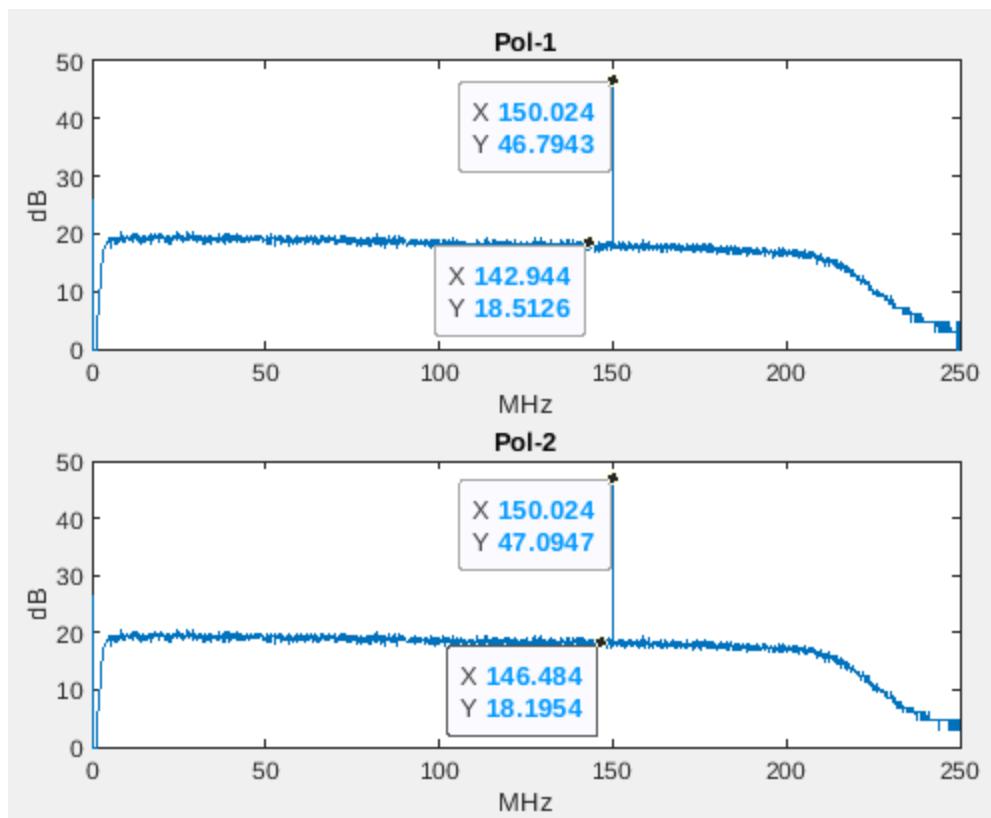
```
(py38) wei@panoseti:/data/Wei/FRB/limbo_scripts/scripts$ ./check_status.bak.py --all --plot
*****
--SNAP Board IP: 192.168.2.100
*****
Fabric Clock Freq : 250.342826 MHz
RMS of ADC_I : 14.644352
RMS of ADC_Q : 15.234880
```



test1—signal connected to 2 pol inputs

- freq: 150MHz
- data_sel: 1
- coeff: 1





	signal amp	noise amp	SNR(dB)
Pol1	46.79	18.51	28.28
Pol2	47.09	18.19	28.9

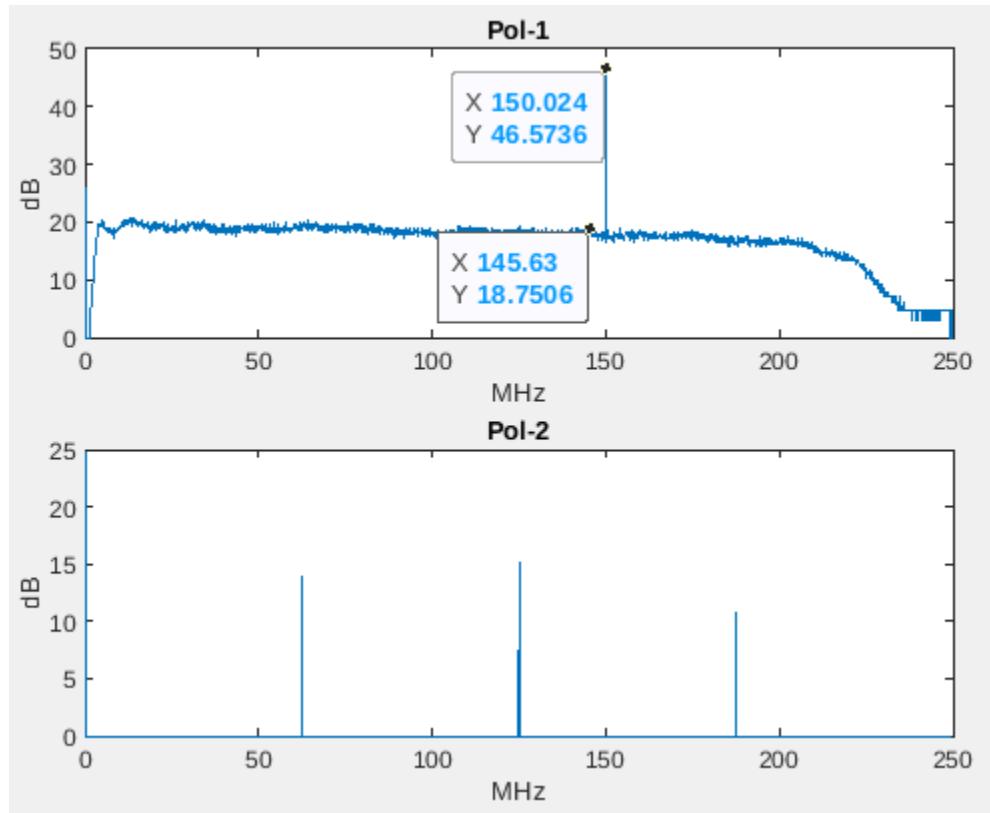
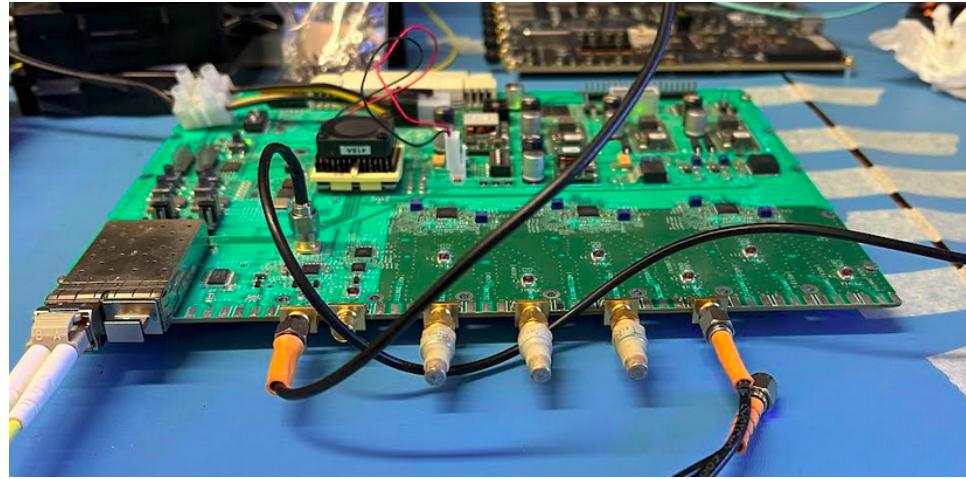
In theory, the power of noise is:

$$-75 + 10\log(244.1 * 10^3) - 11 = -32.1 \text{ dBm}$$

The signal amp is -6dBm, so the SNR should be **26.1dB**, which is almost the same as the result we got in the lab.

test2—signal connected to 1 pol input

- signal is only connected to **pol0** input(**SMATP5**)



- signal is only connected to **pol1** input(**SMATP7**)

