

RF Characterization Data

UBX

USRP™ Daughterboard

www.ettus.com

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Introduction

This document provides characterization data for the RF performance of the **UBX Daughterboard**. The UBX Daughterboard has a frequency range from 10 MHz to 6 GHz and bandwidth options of 40 or 160 MHz. Gain range for both RX and TX is 0-31.5 (the maximum RX gain seen in the tests of 37.5dB is due to the additional 6dB provided by the ADC in the USRP motherboard on top of the UBX's maximum gain). Measurements were taken with the UBX Daughterboard installed in an X-series USRP.

Data Presented

Receiver (Freq: 50 MHz to 6 GHz, Gain: 0 to 37.5):

- Gain
- IQ Imbalance
- DC Offset
- IIP3
- IIP2
- Noise Figure

Transmitter (Freq: 50 MHz to 6 GHz, Gain: 0 to 31.5):

- Output Power
- IQ Imbalance
- DC Offset
- OIP3
- OIP2

Chart Formats

For each direction (i.e., RX or TX), the data is presented in two ways:

Fixed Gain, Sweeping Frequency

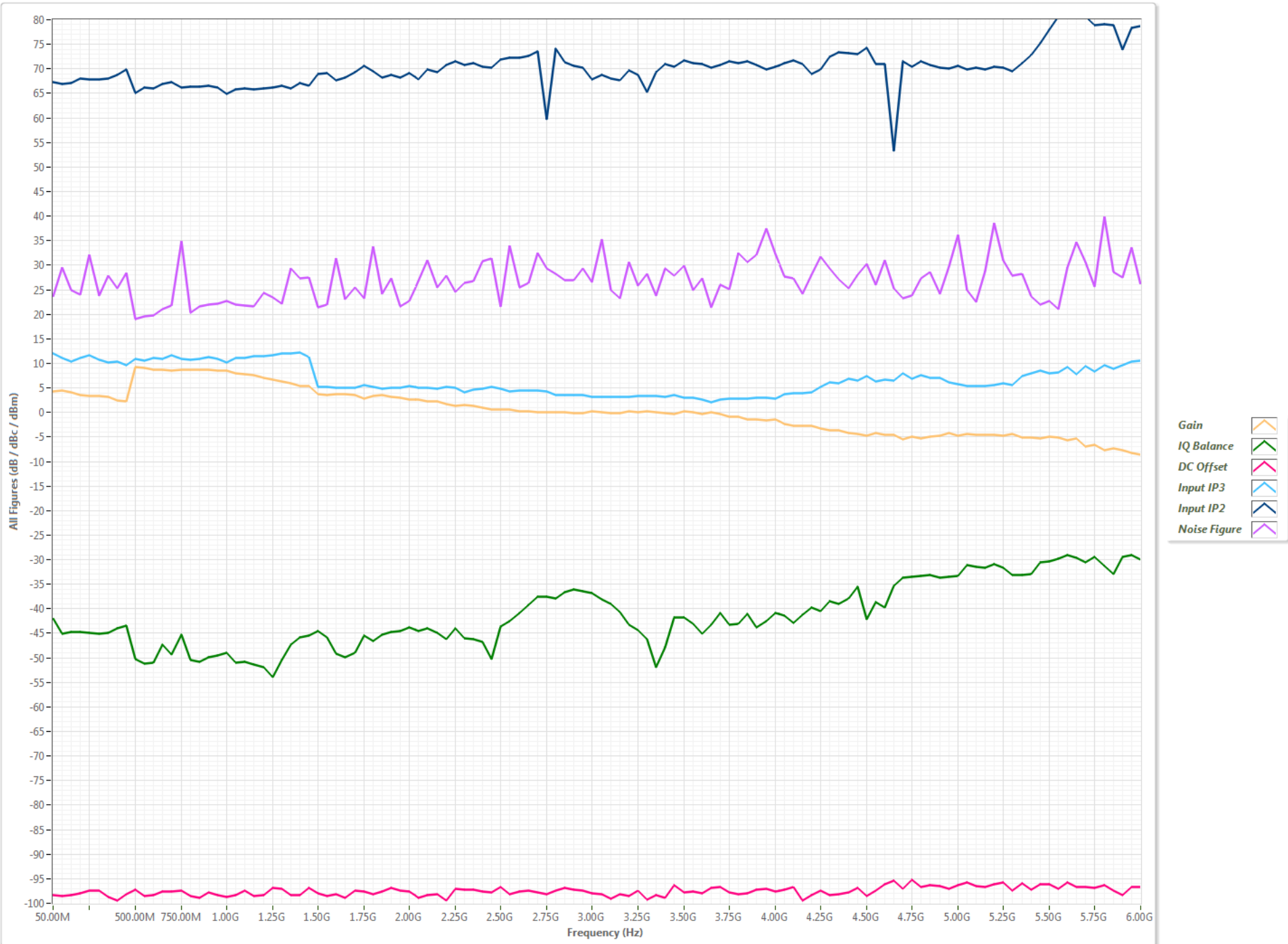
In these charts, the gain is fixed to particular value, and the curves are plotted over the frequency range of the daughterboard.

Fixed Frequency, Sweeping Gain

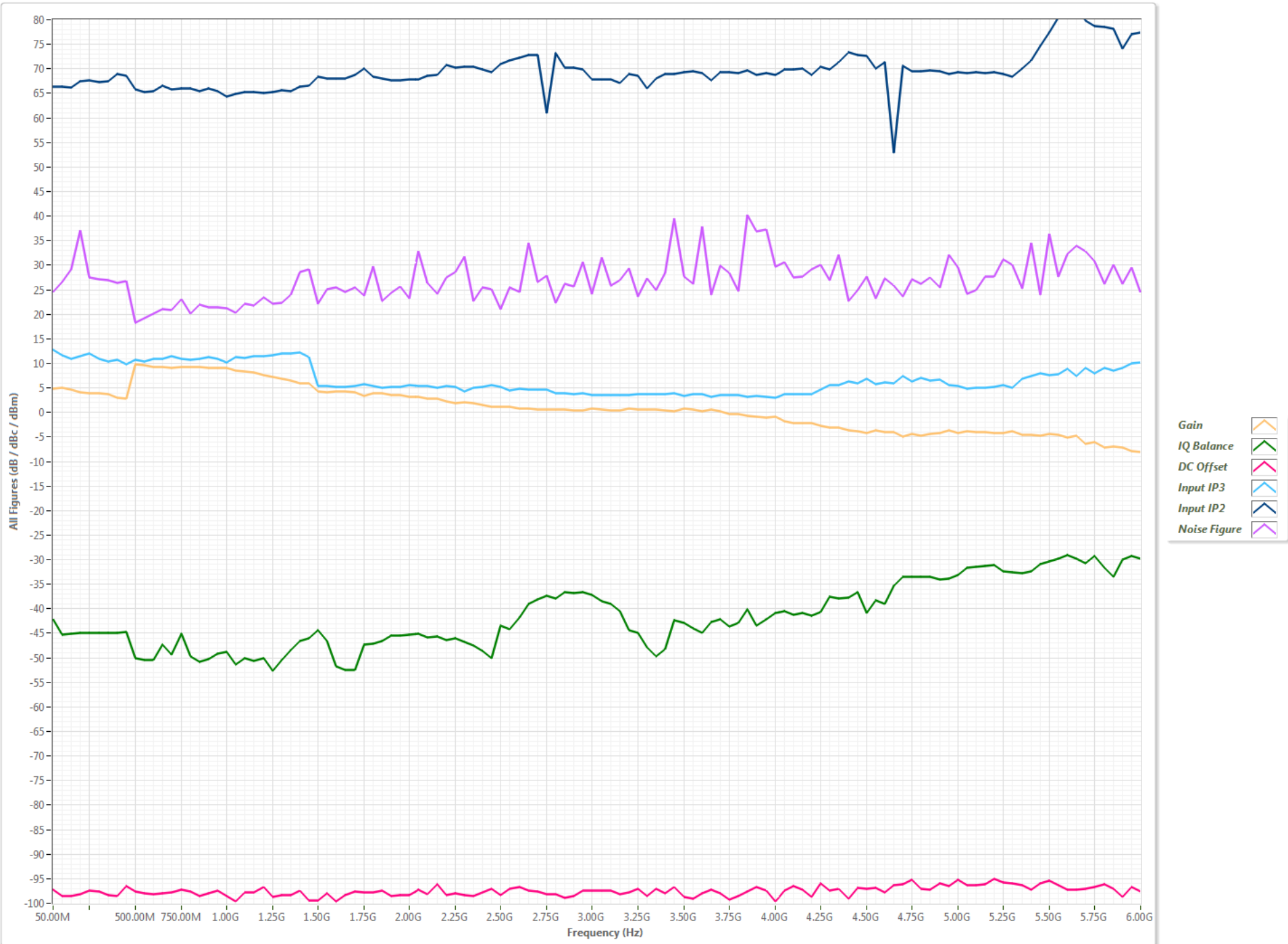
In these charts, the frequency is fixed to a particular value, and the curves are plotted over the gain range of the daughterboard.

You can tell which format the chart is in by reading the title, which will indicate “Figure vs. Frequency” or “Figure vs. Gain”, and then provide the fixed setting for the independent variable.

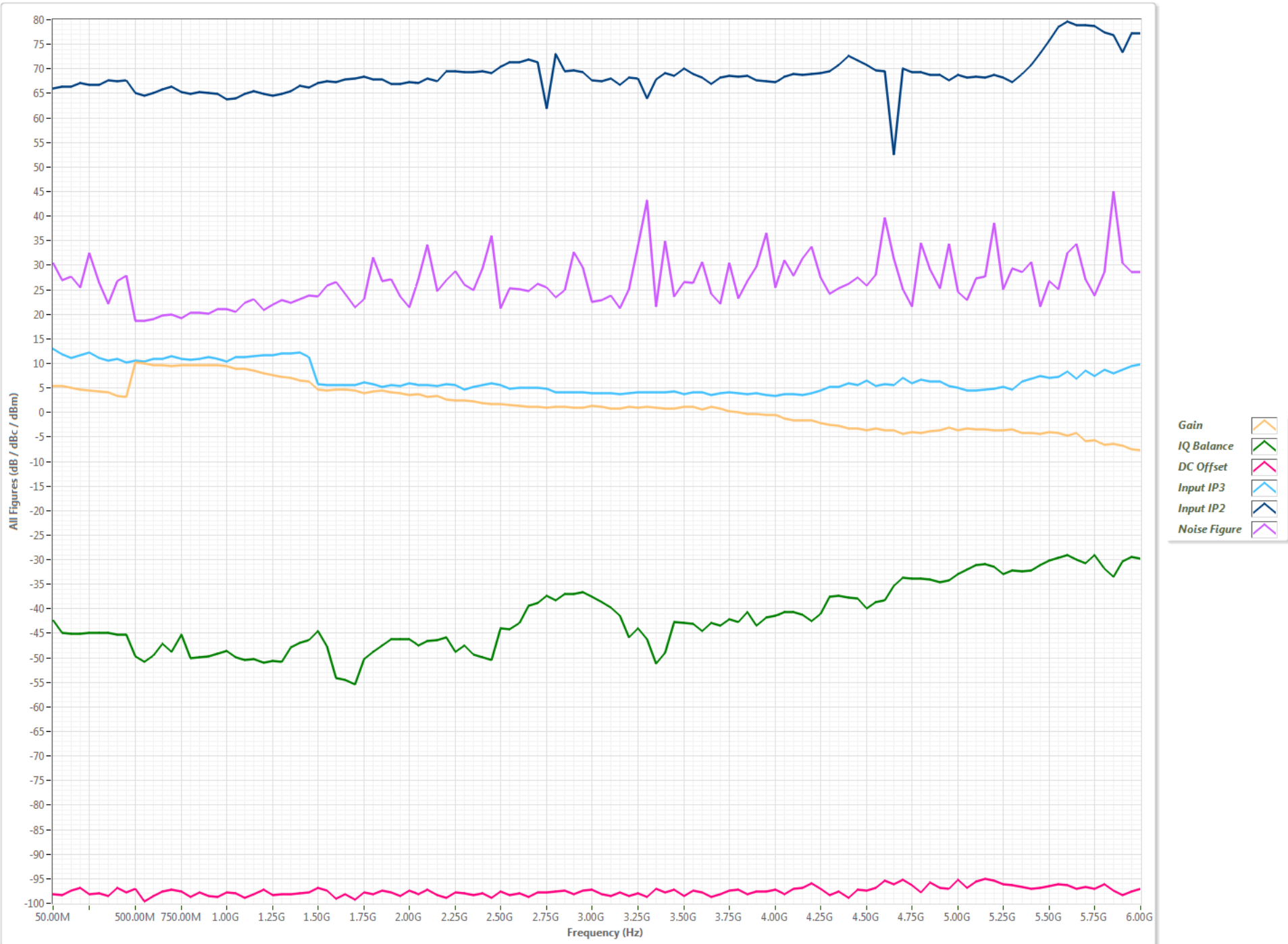
RX Figure vs Frequency w/ Gain=0.00dB



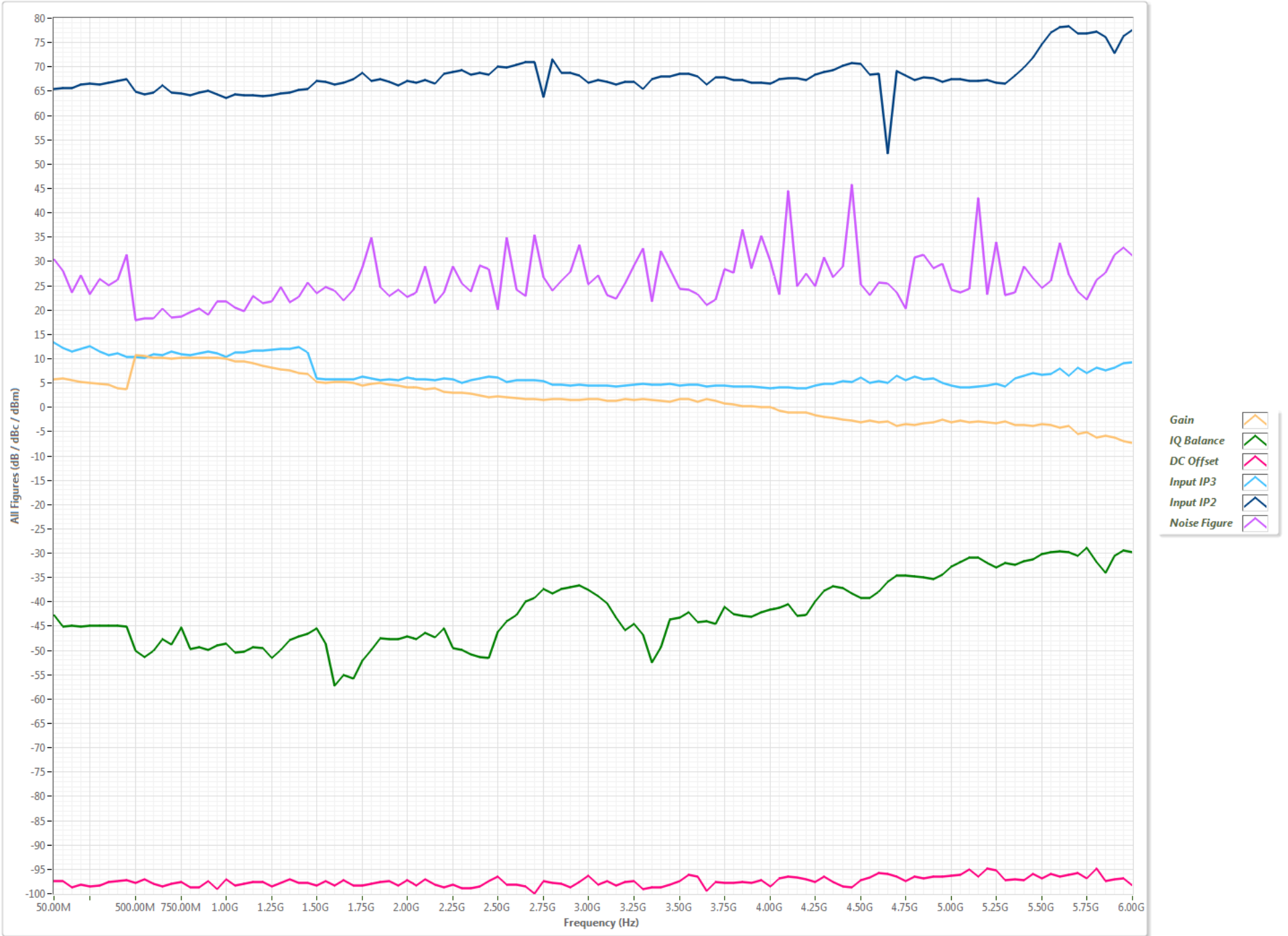
RX Figure vs Frequency w/ Gain=0.50dB



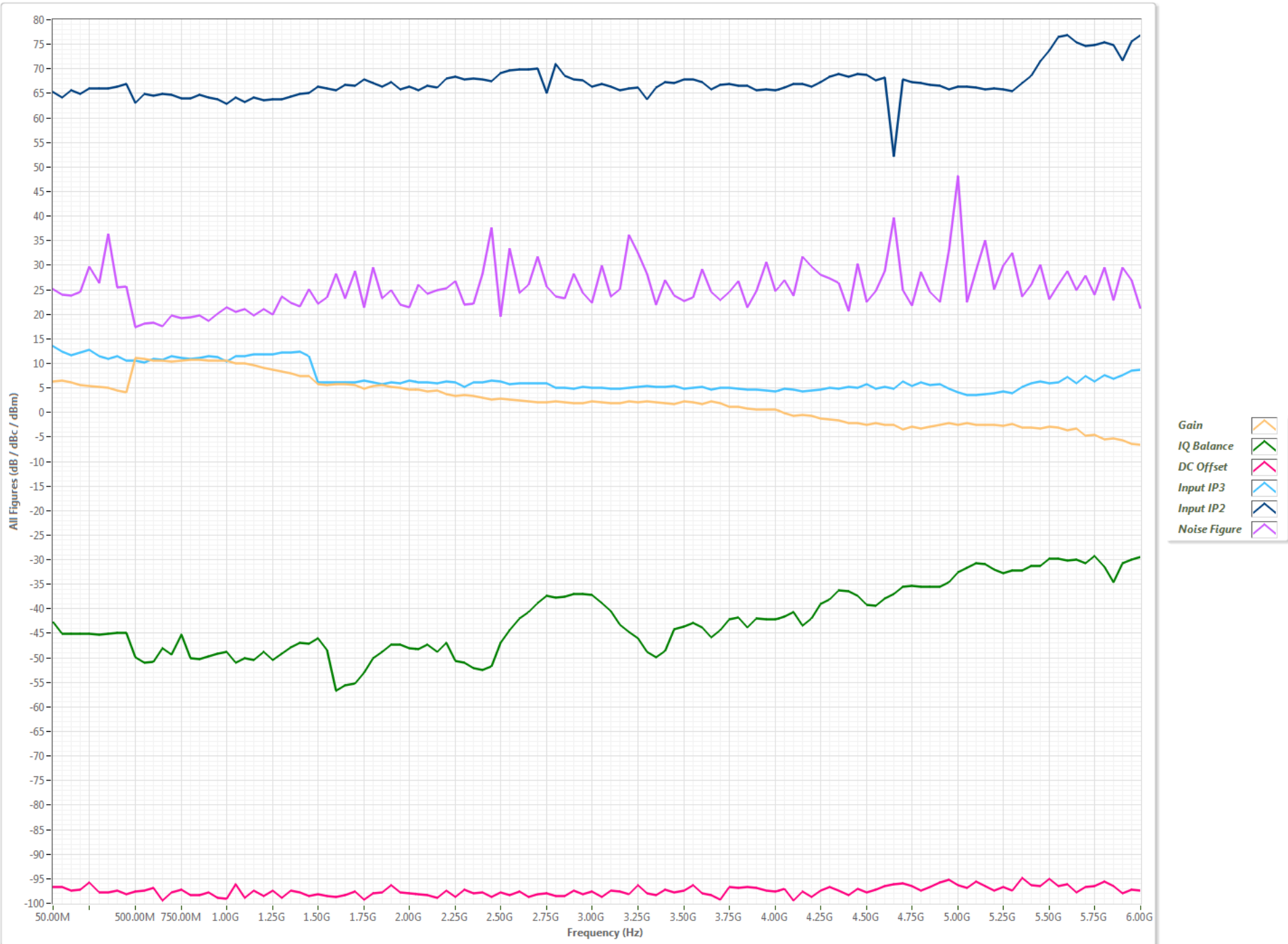
RX Figure vs Frequency w/ Gain=1.00dB



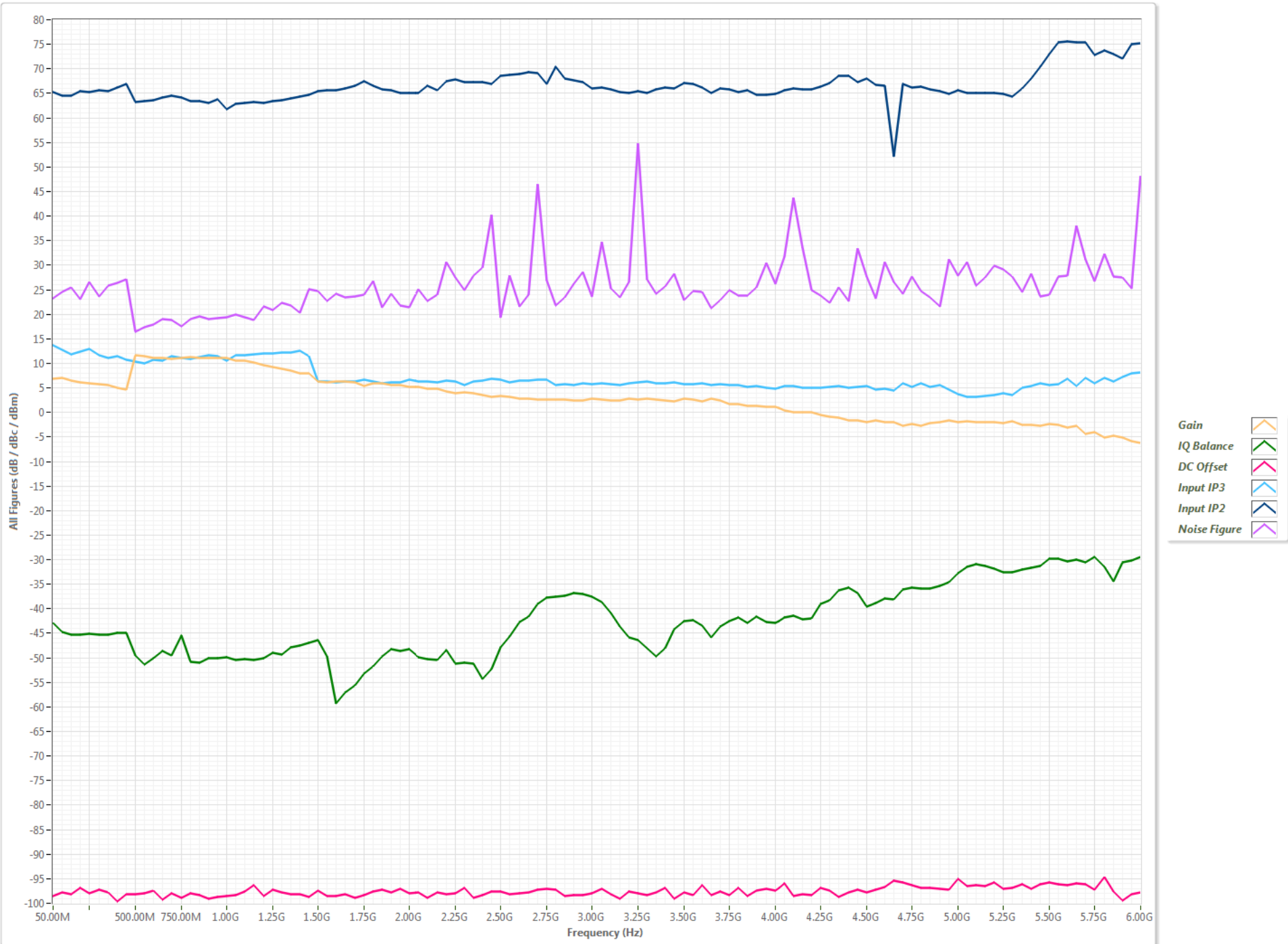
RX Figure vs Frequency w/ Gain=1.50dB



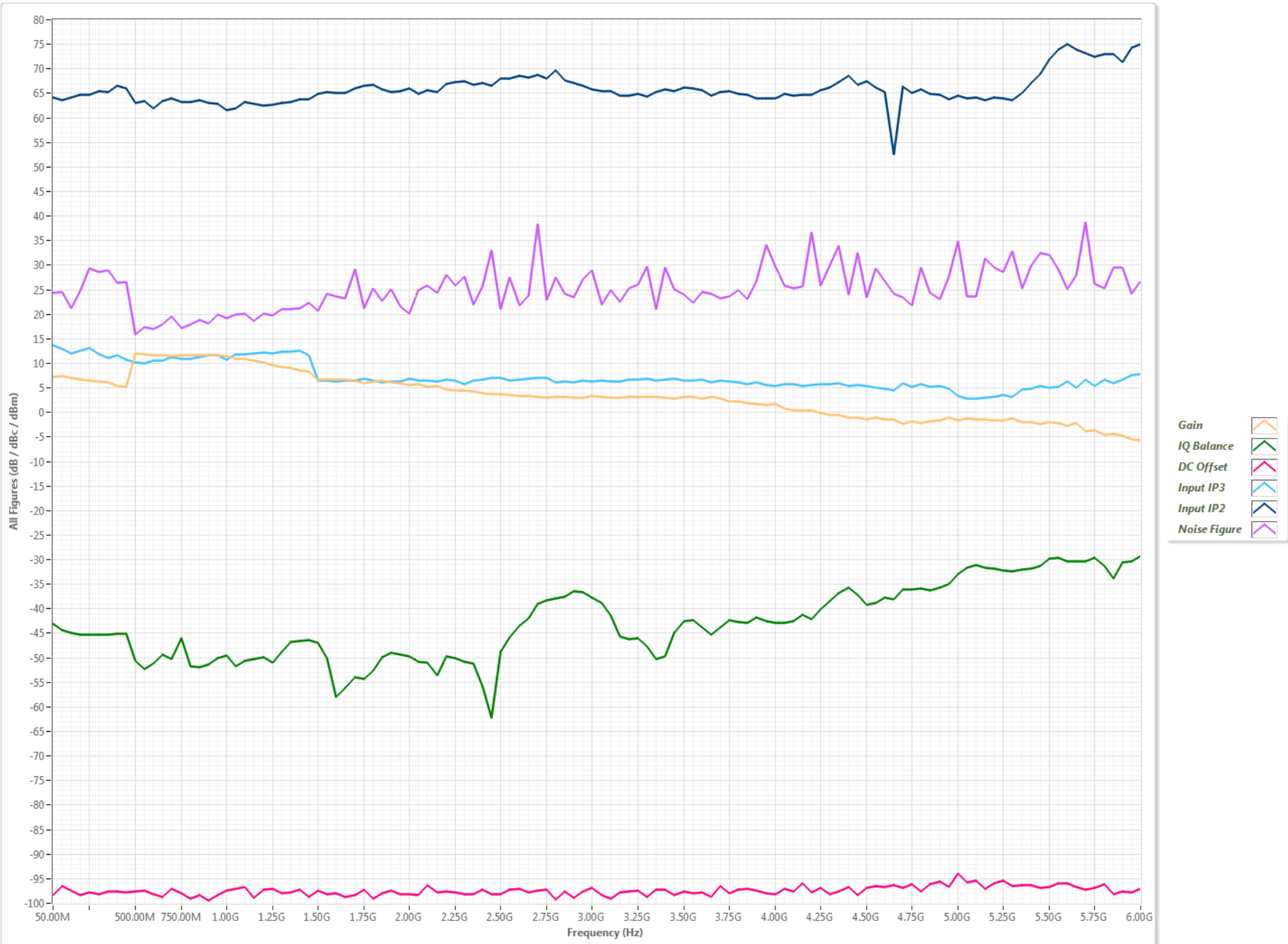
RX Figure vs Frequency w/ Gain=2.00dB



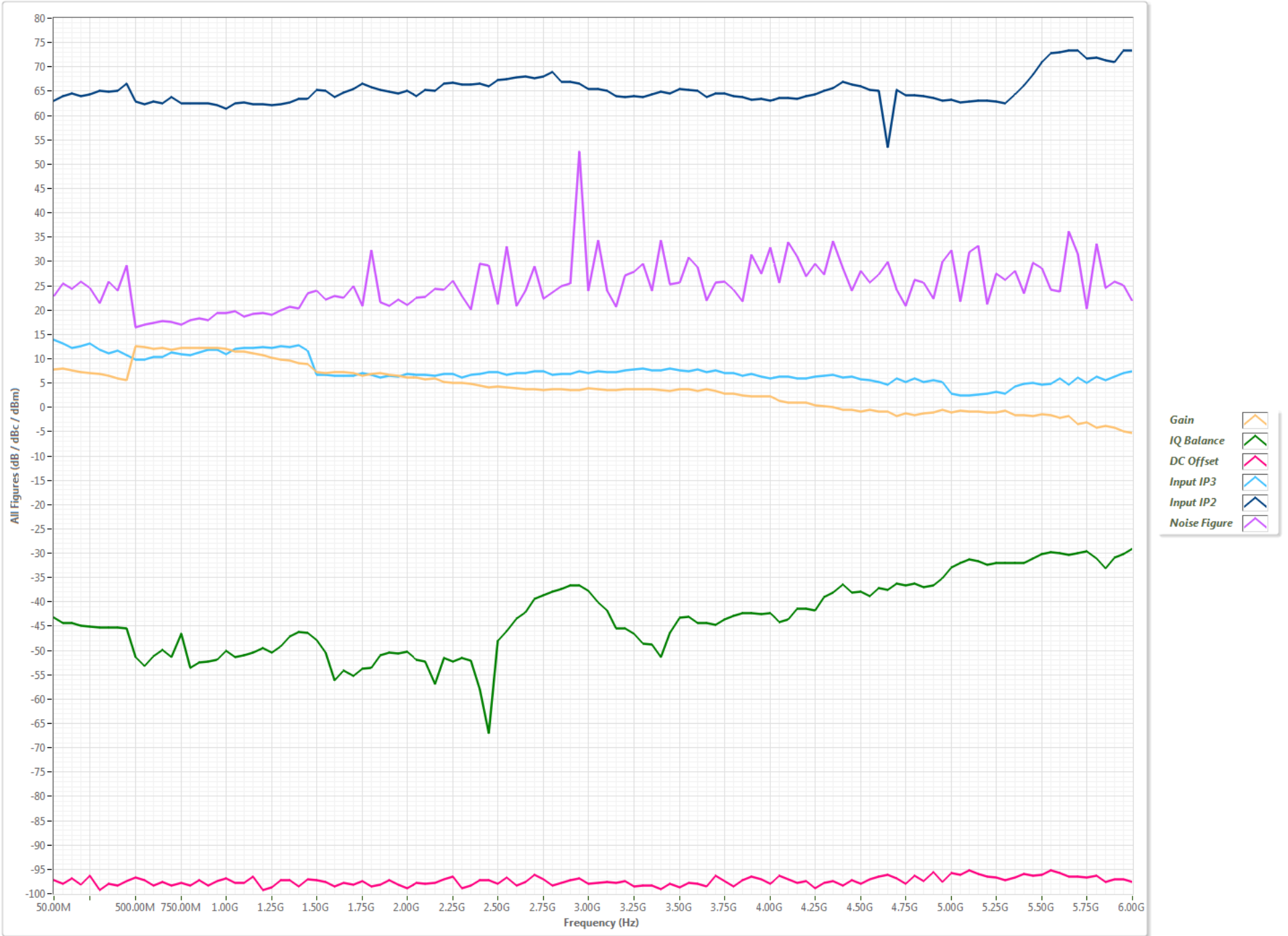
RX Figure vs Frequency w/ Gain=2.50dB



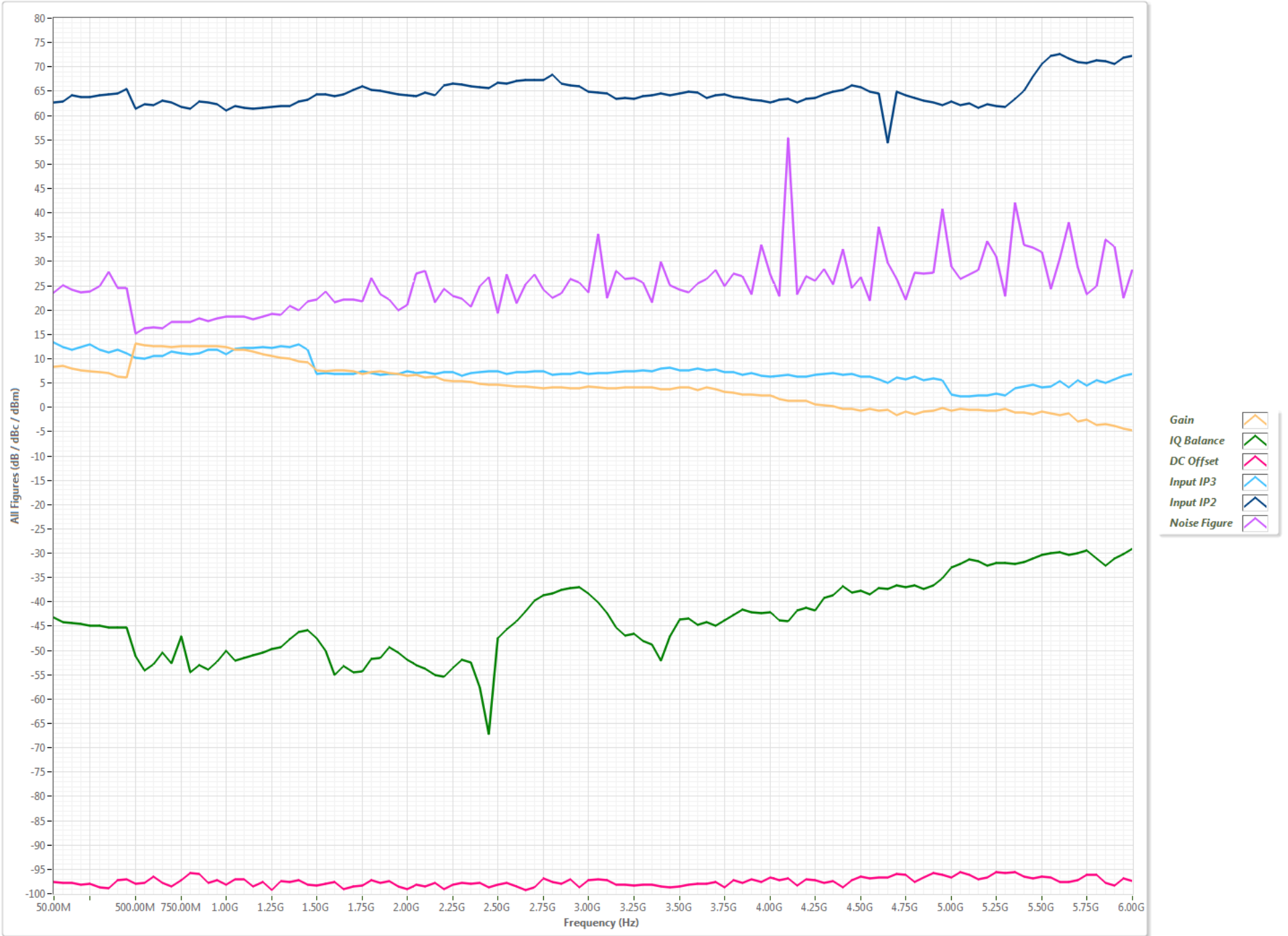
RX Figure vs Frequency w/ Gain=3.00dB



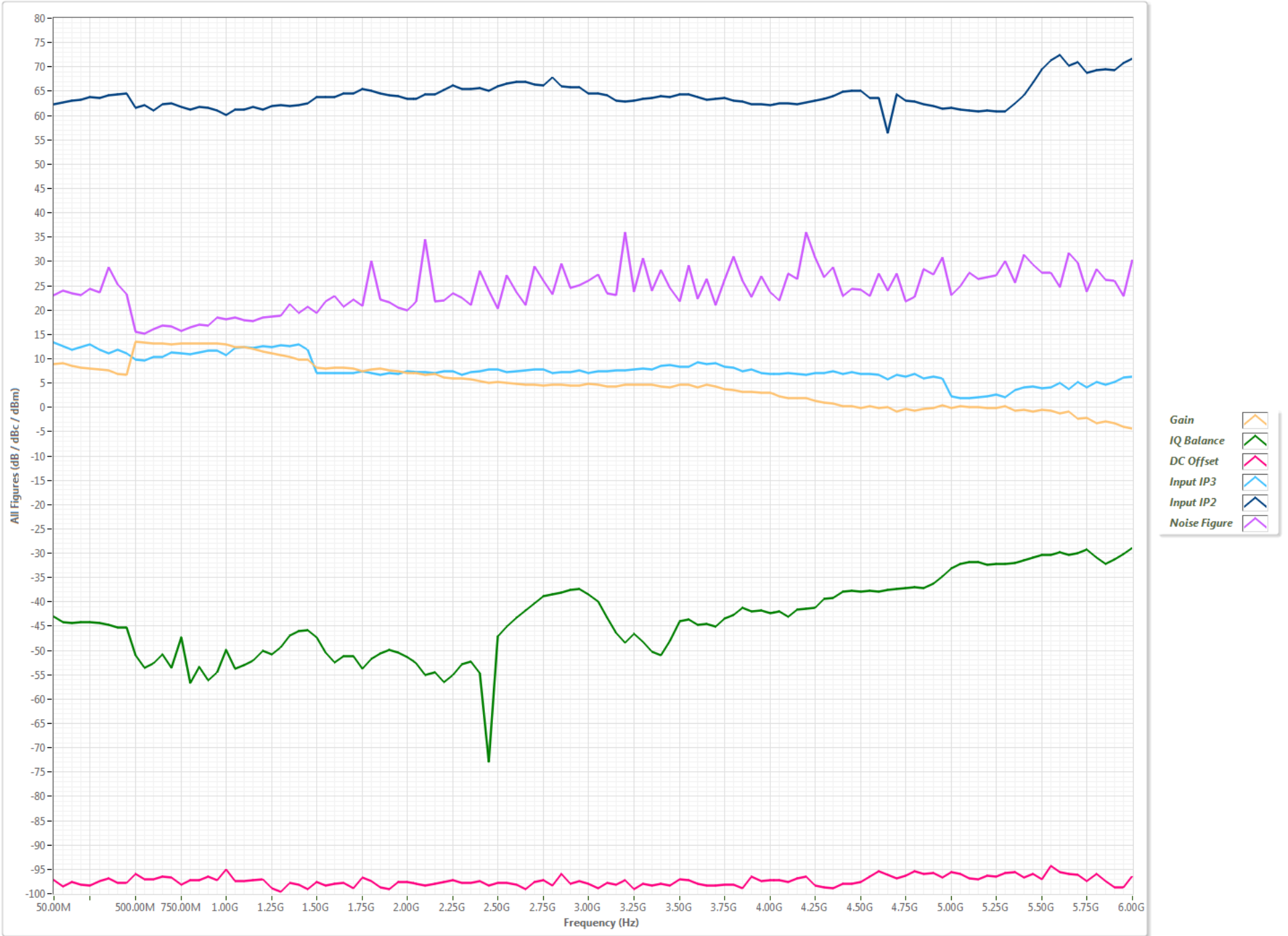
RX Figure vs Frequency w/ Gain=3.50dB



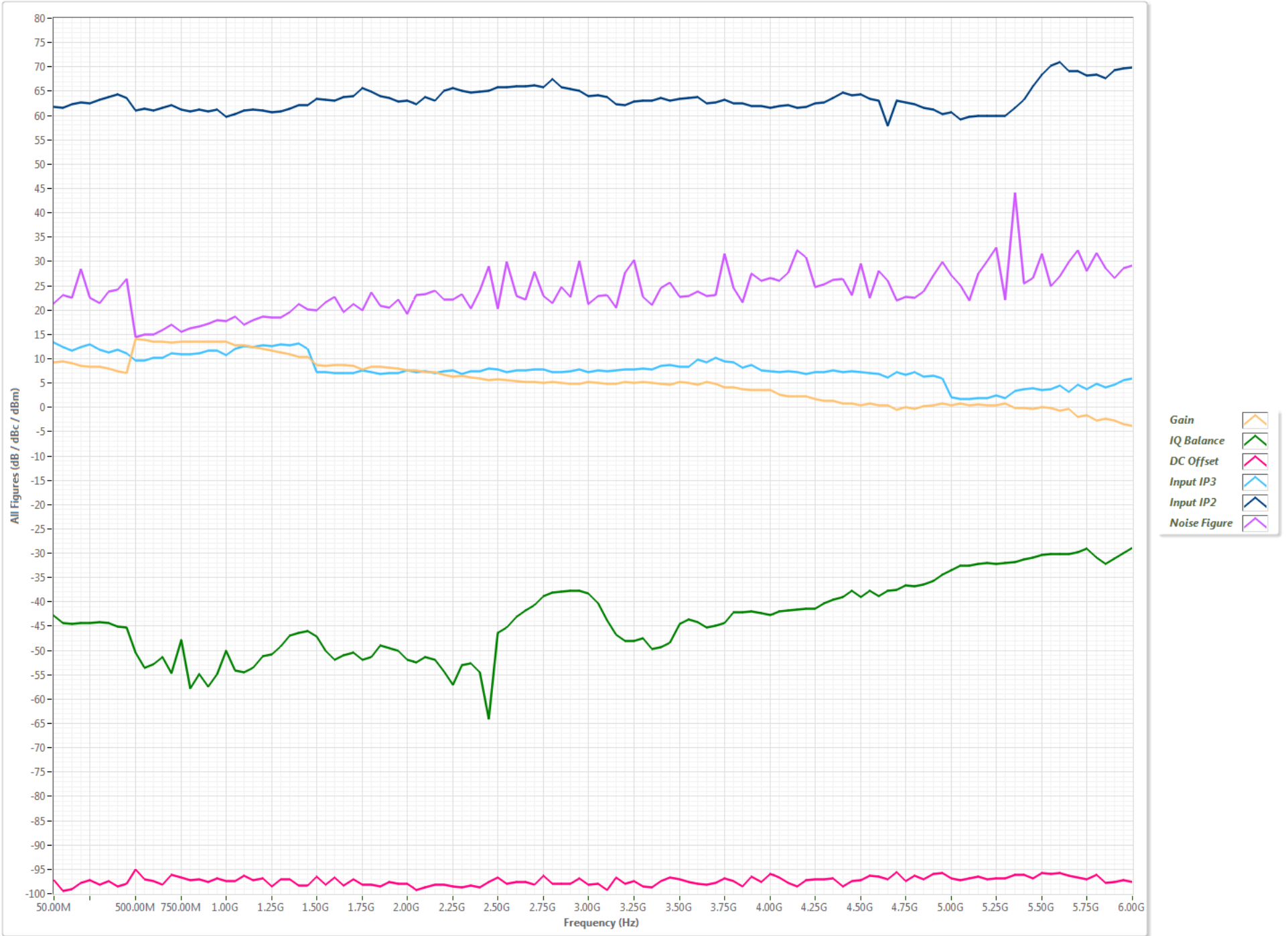
RX Figure vs Frequency w/ Gain=4.00dB



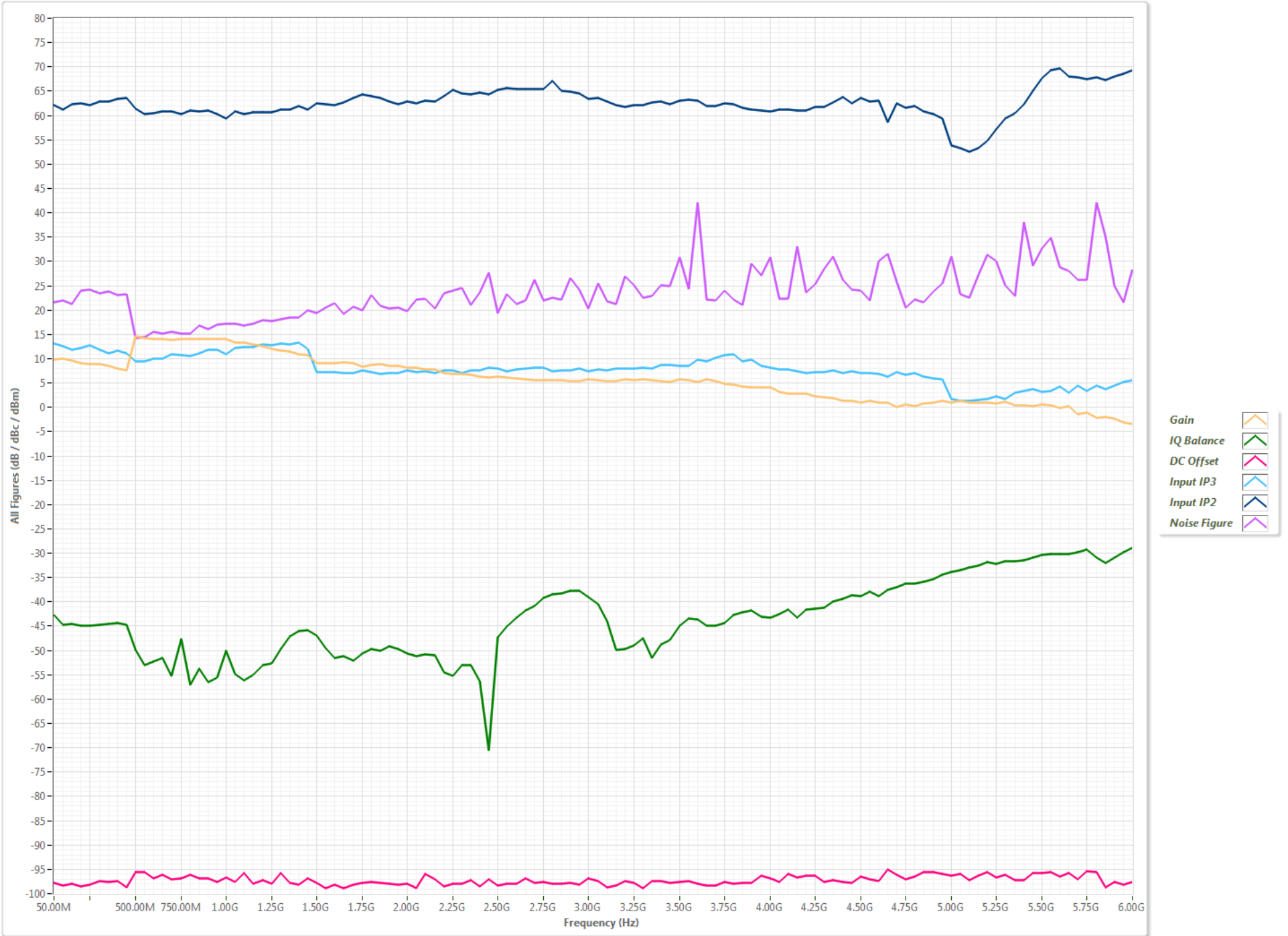
RX Figure vs Frequency w/ Gain=4.50dB



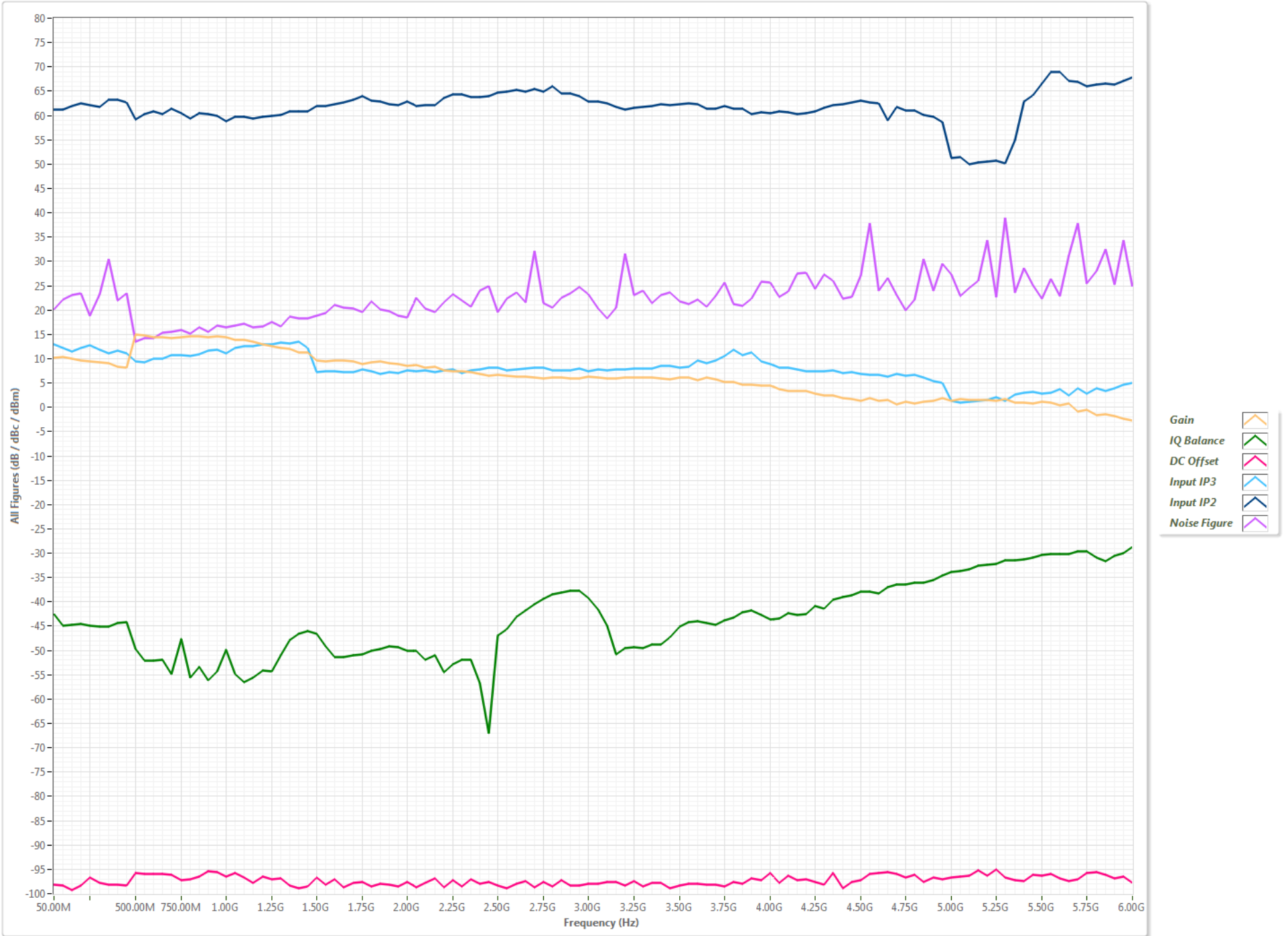
RX Figure vs Frequency w/ Gain=5.00dB



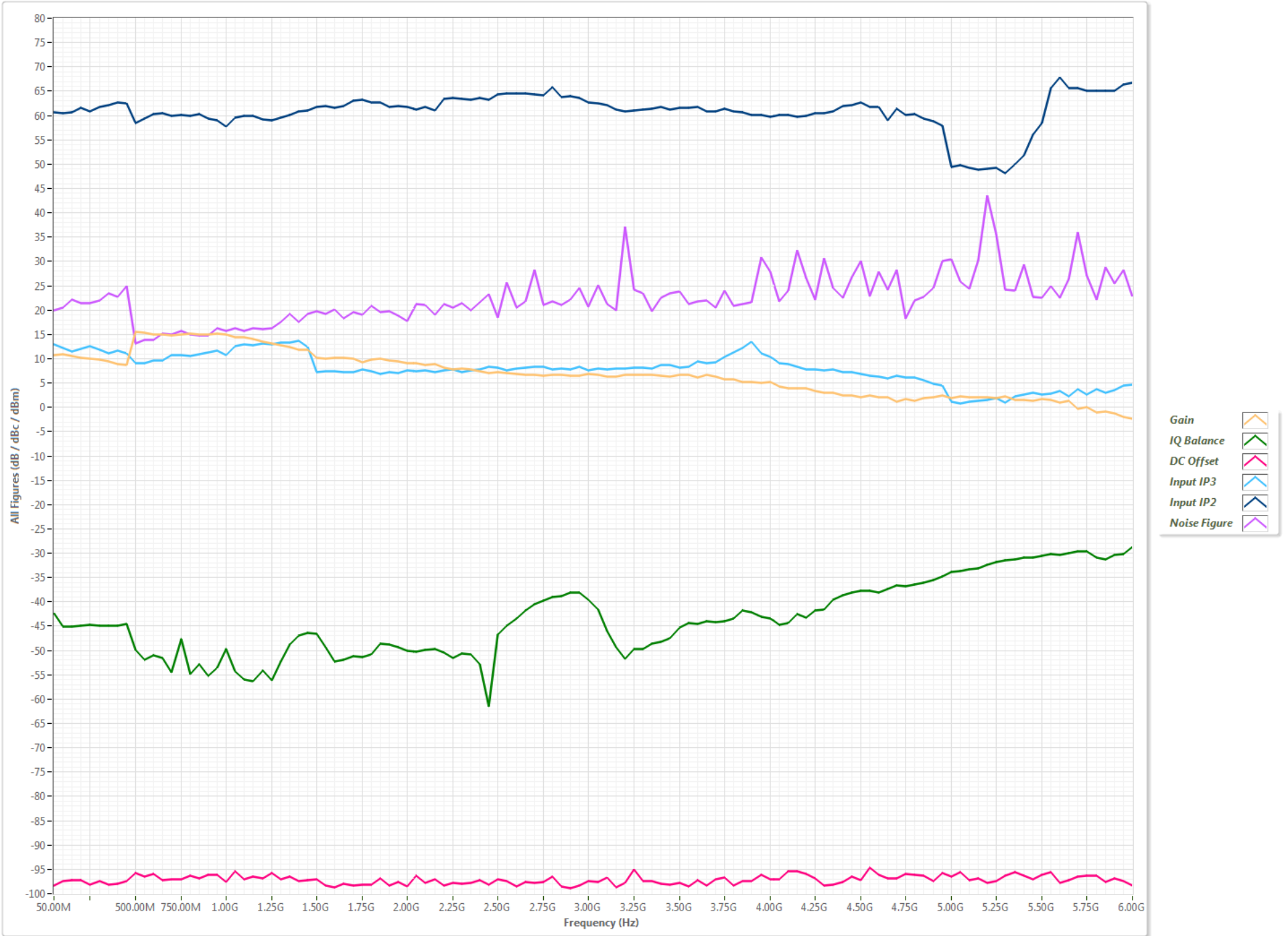
RX Figure vs Frequency w/ Gain=5.50dB



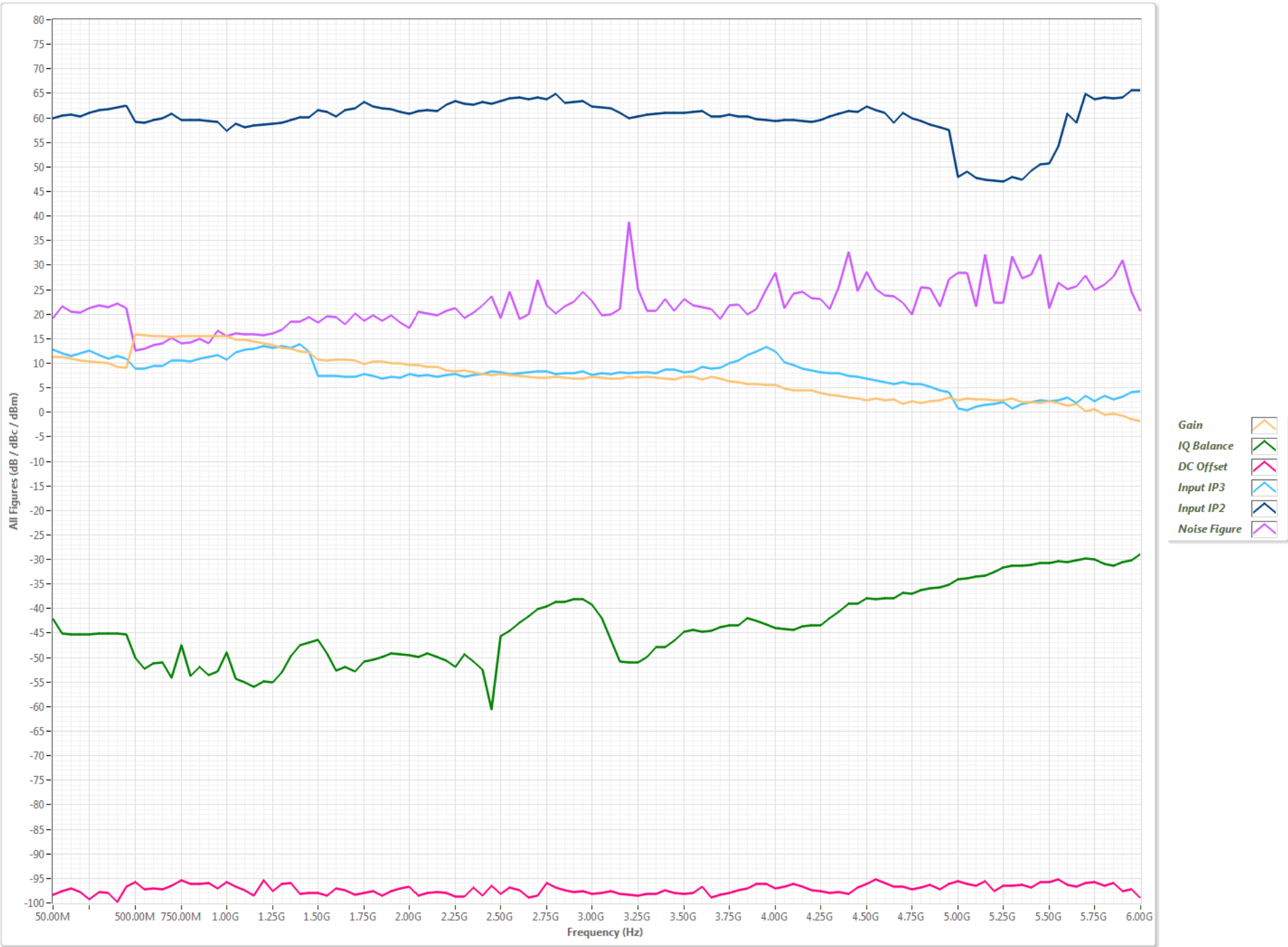
RX Figure vs Frequency w/ Gain=6.00dB



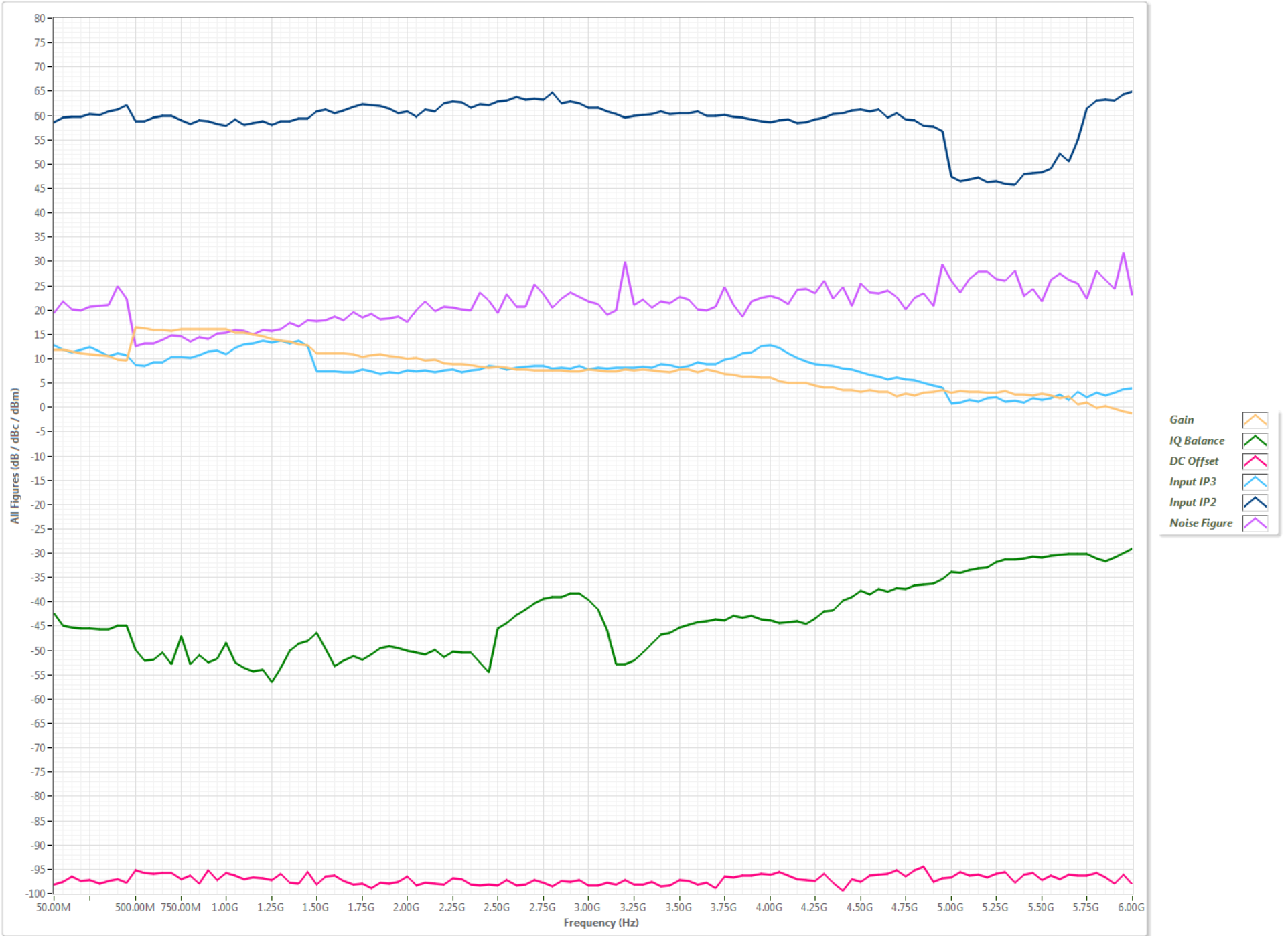
RX Figure vs Frequency w/ Gain=6.50dB



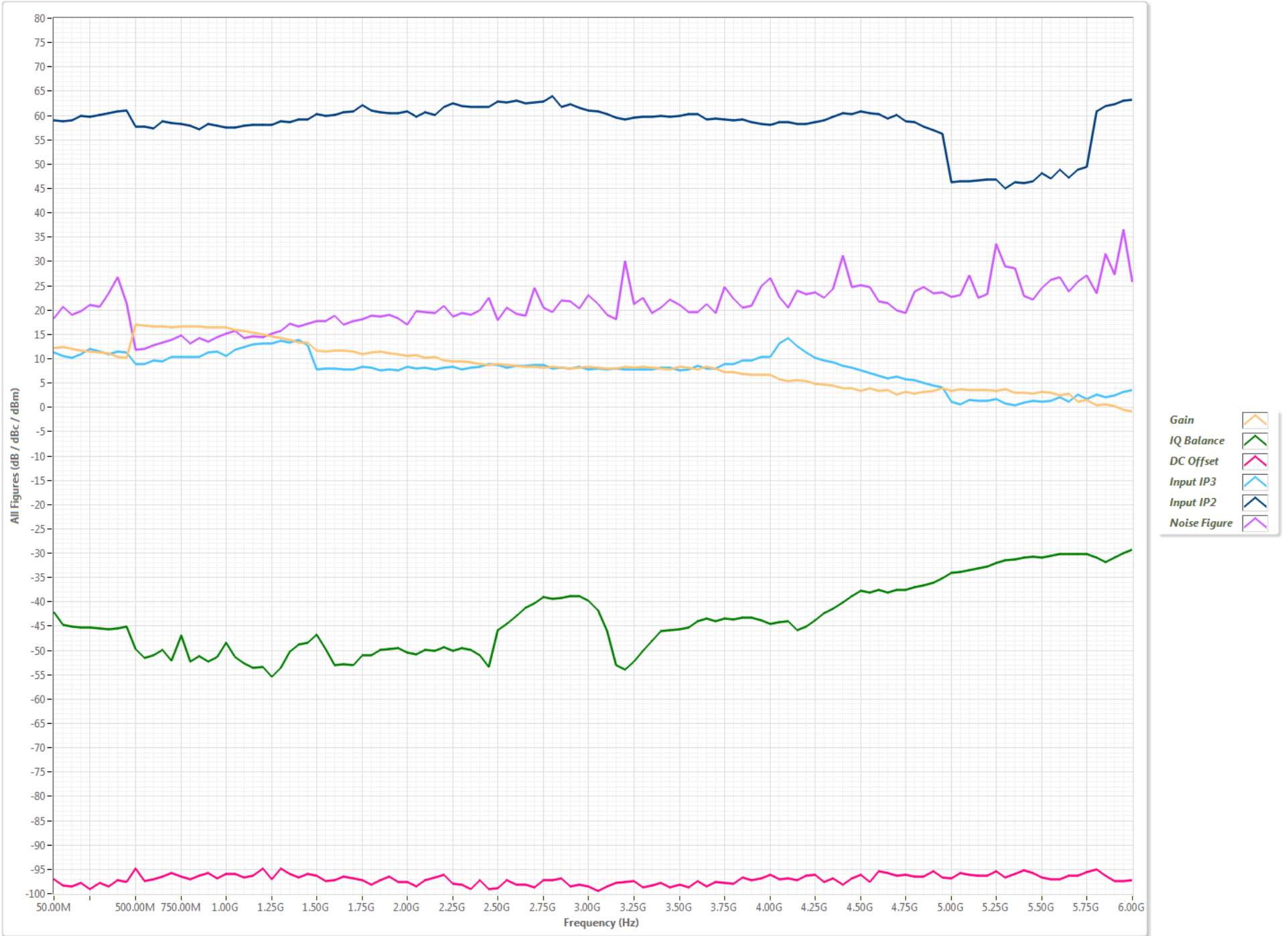
RX Figure vs Frequency w/ Gain=7.00dB



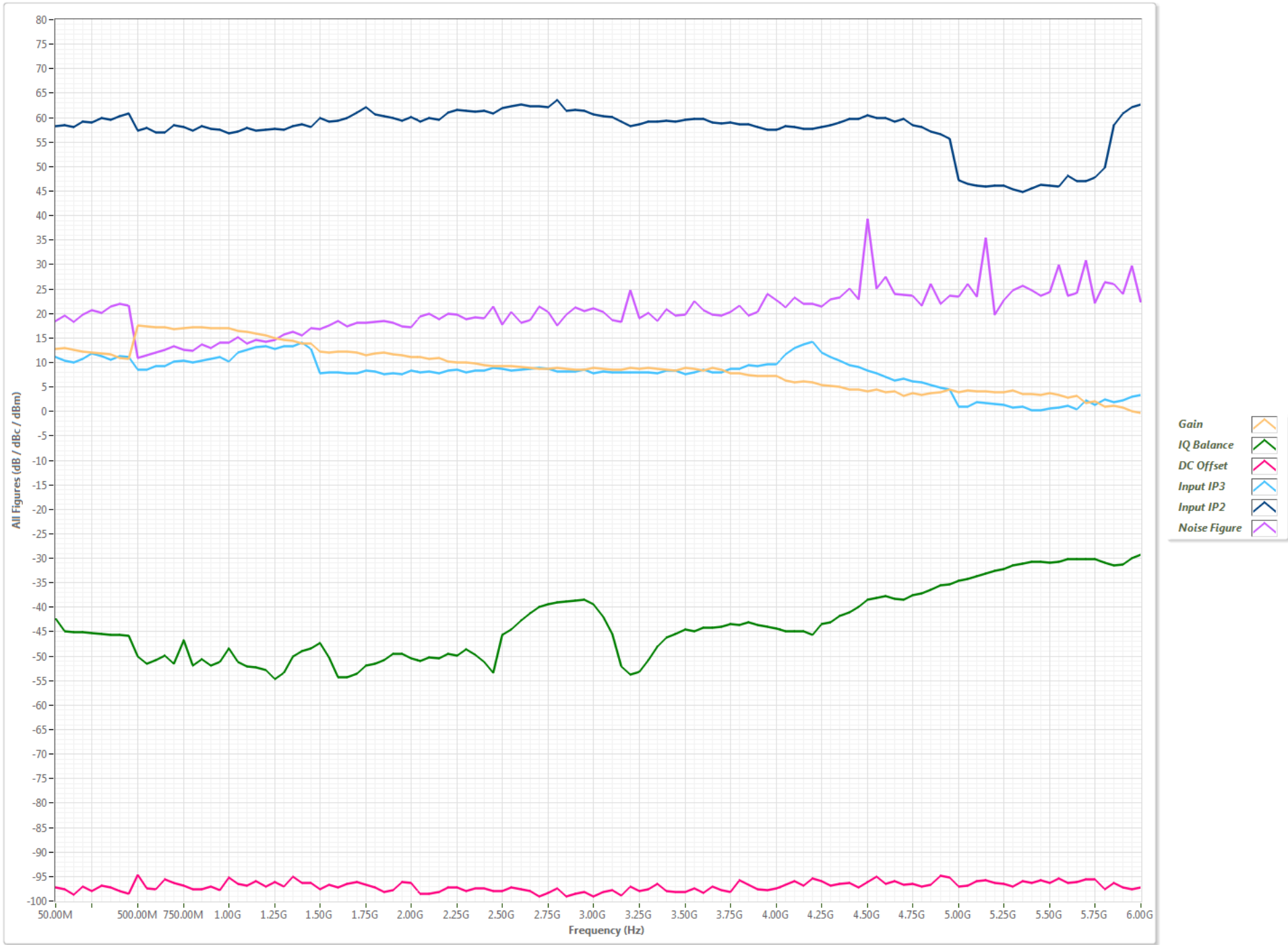
RX Figure vs Frequency w/ Gain=7.50dB



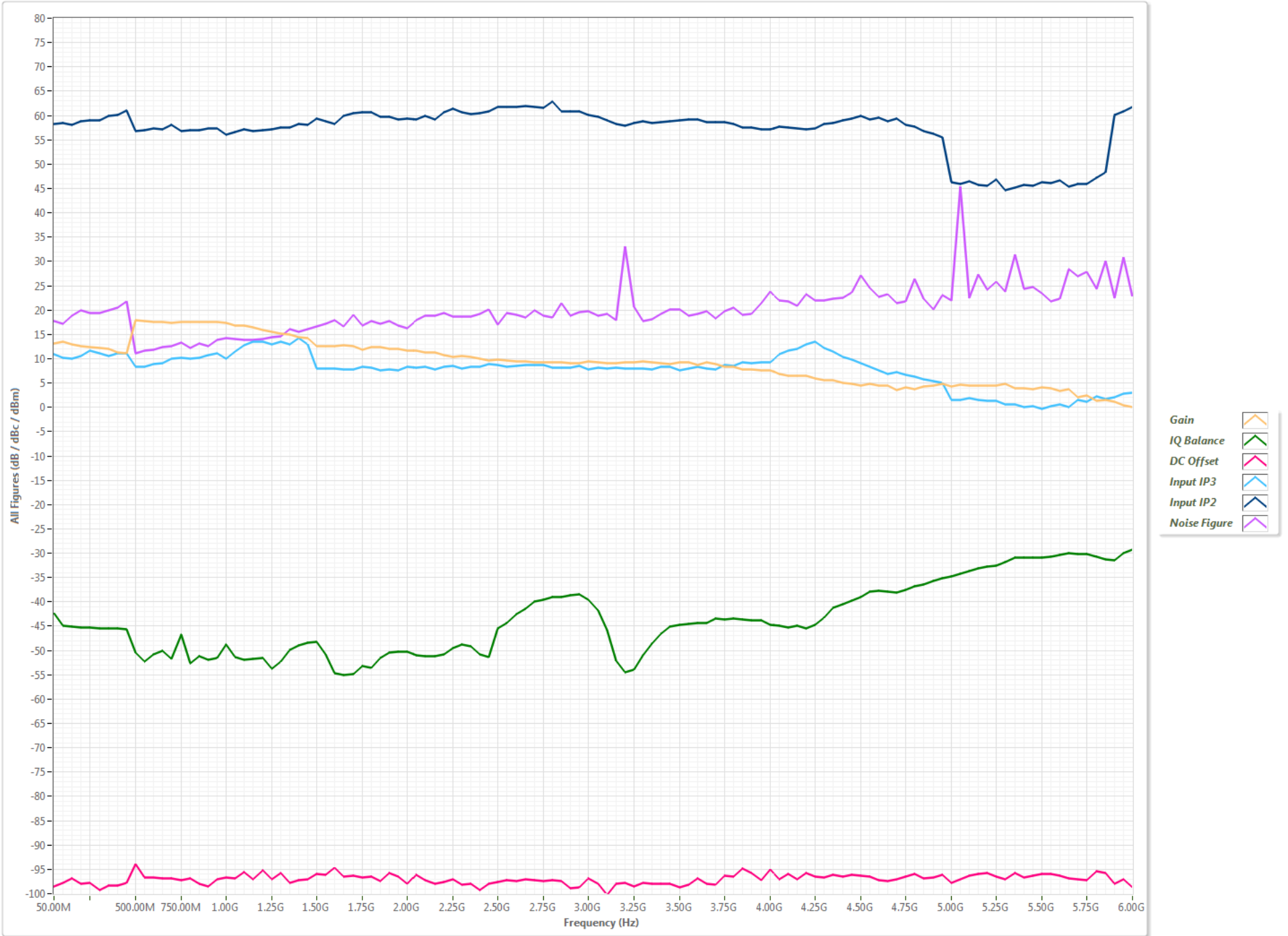
RX Figure vs Frequency w/ Gain=8.00dB



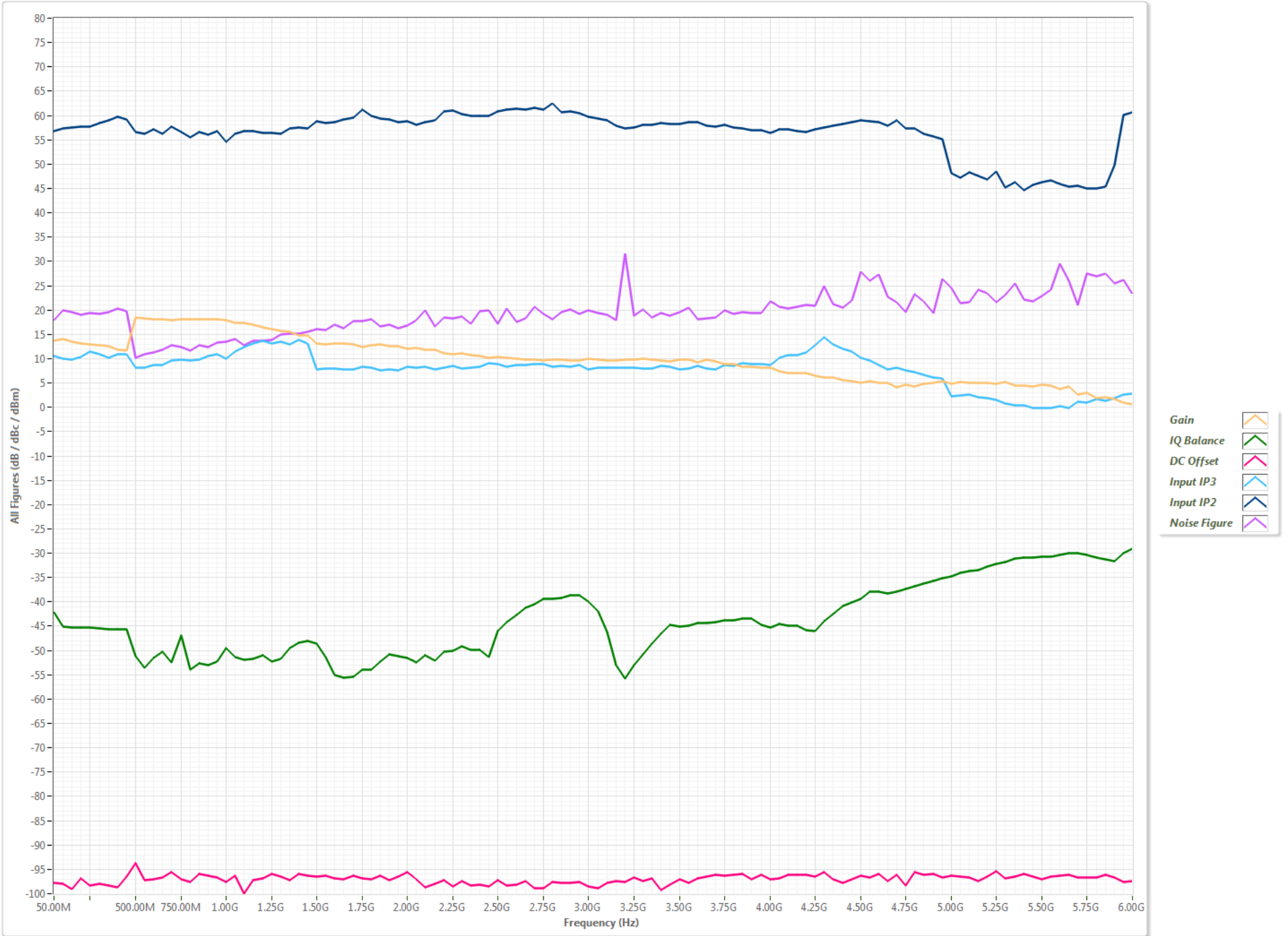
RX Figure vs Frequency w/ Gain=8.50dB



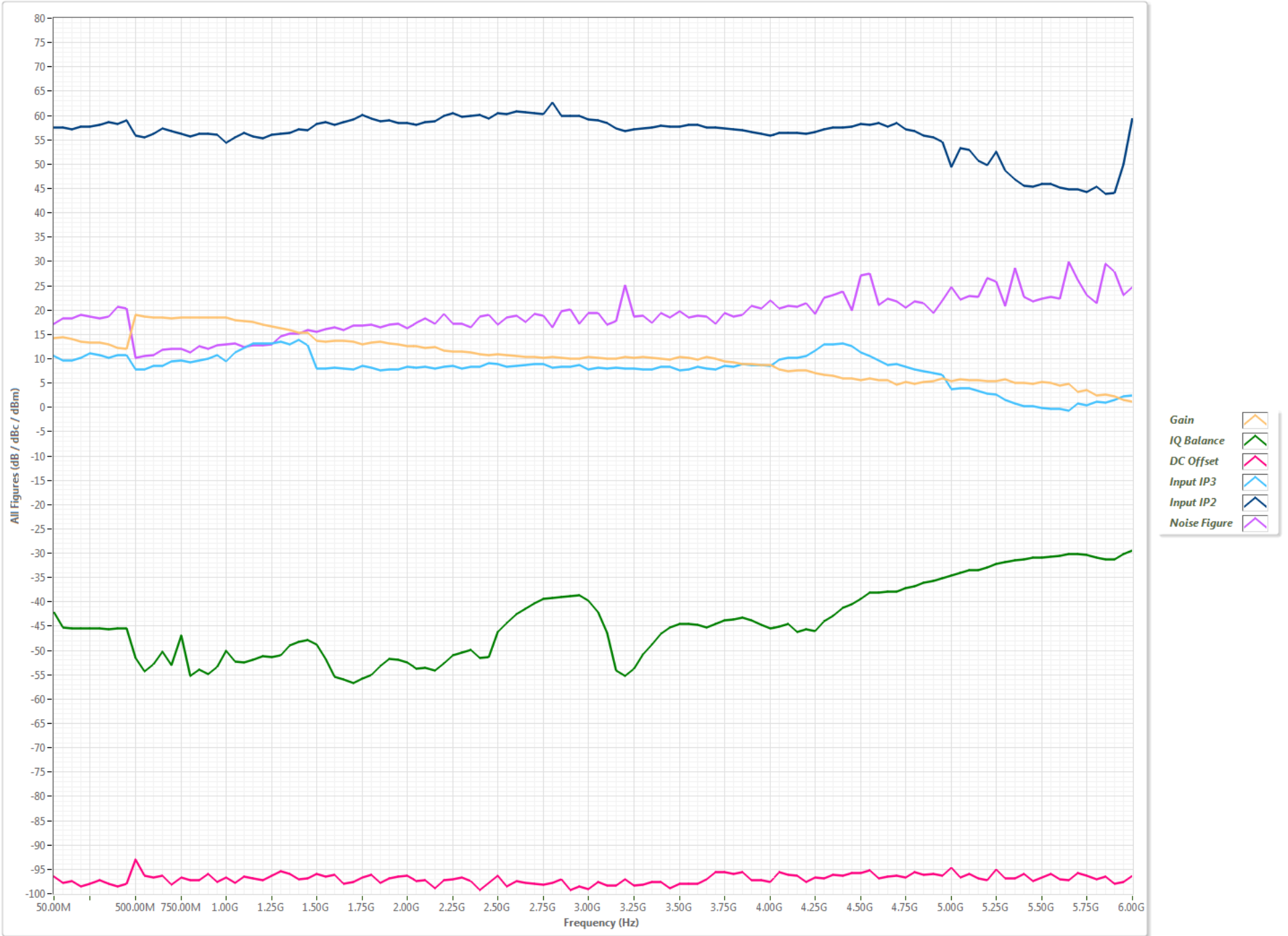
RX Figure vs Frequency w/ Gain=9.00dB



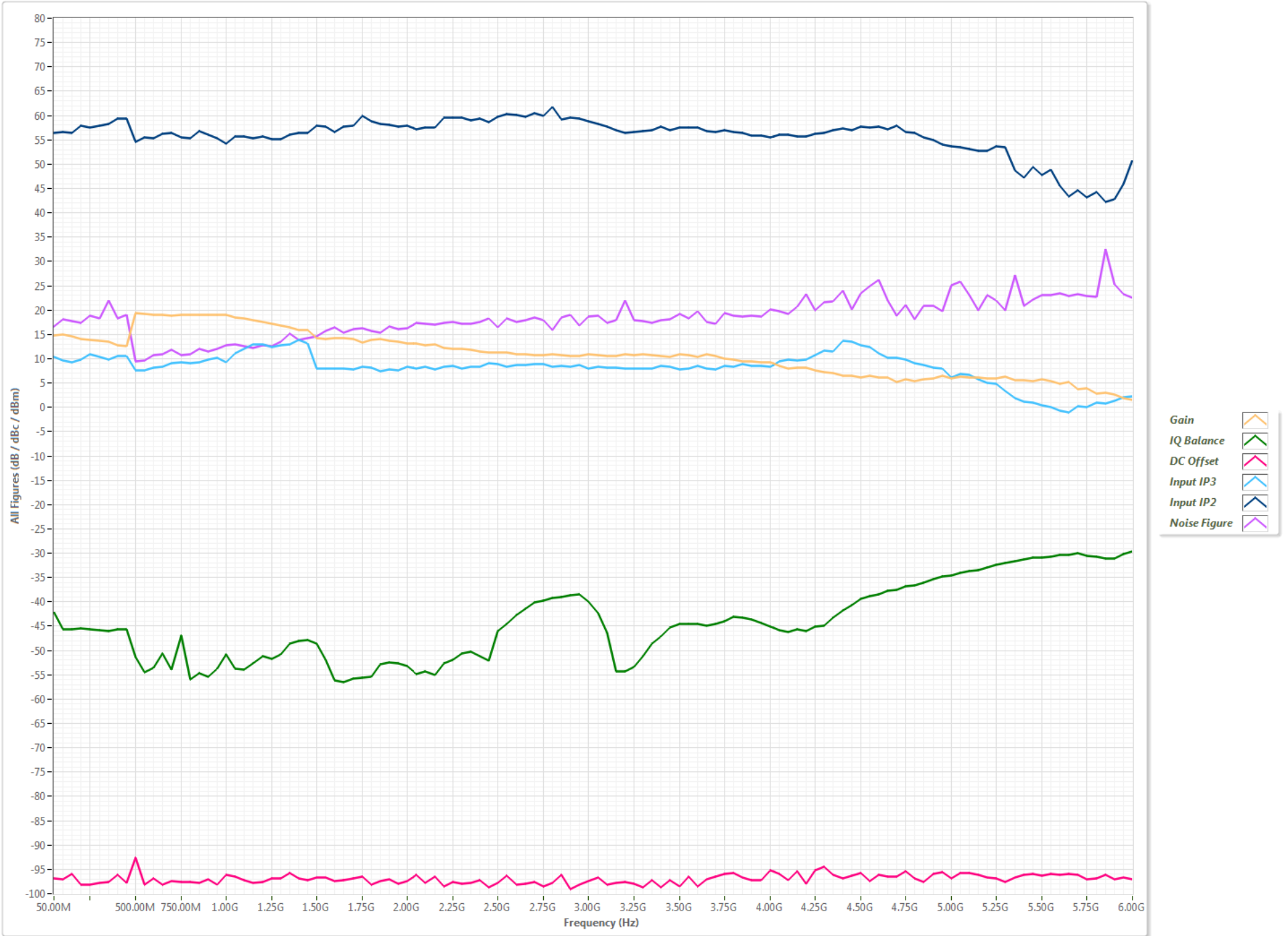
RX Figure vs Frequency w/ Gain=9.50dB



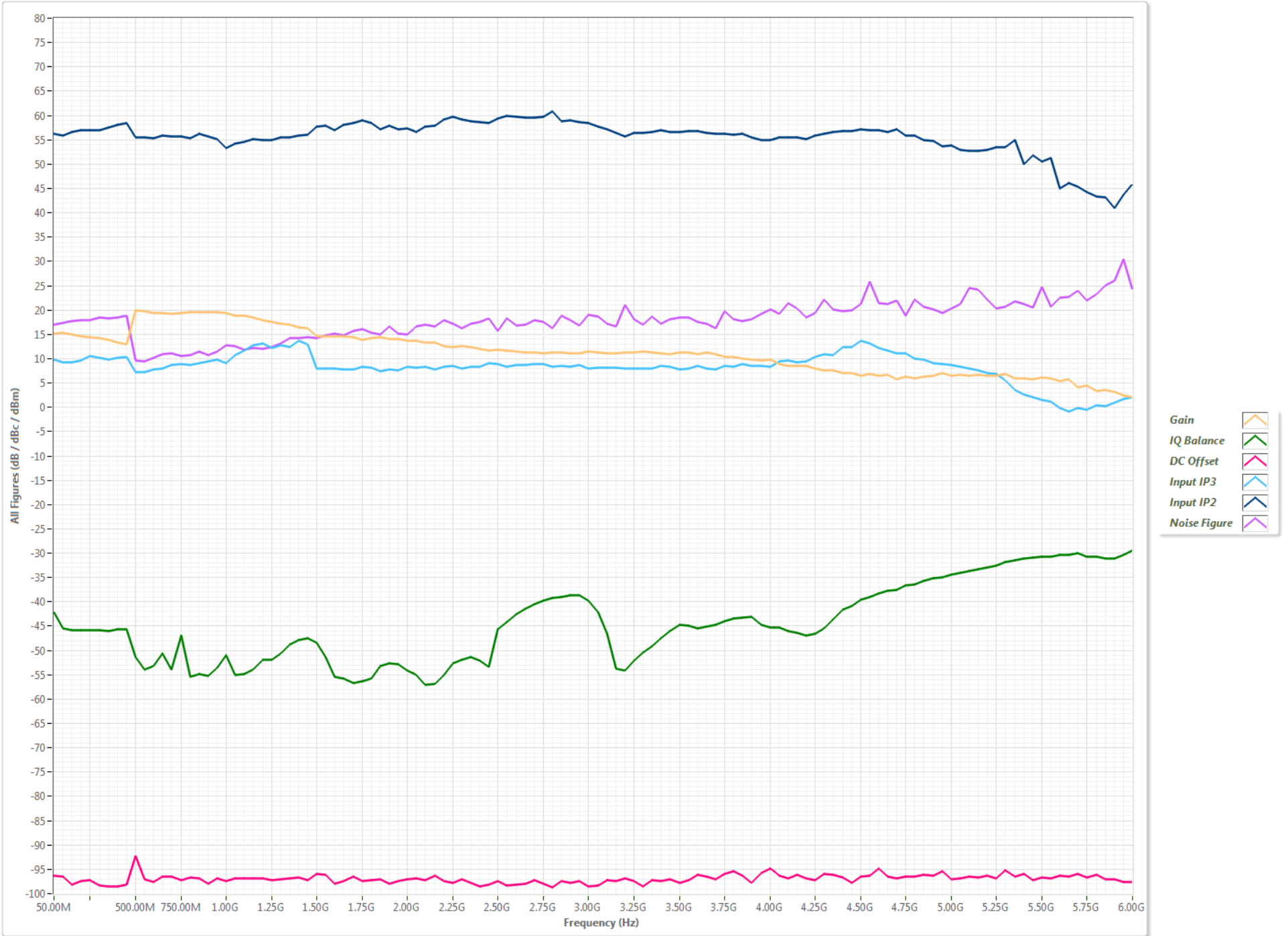
RX Figure vs Frequency w/ Gain=10.00dB



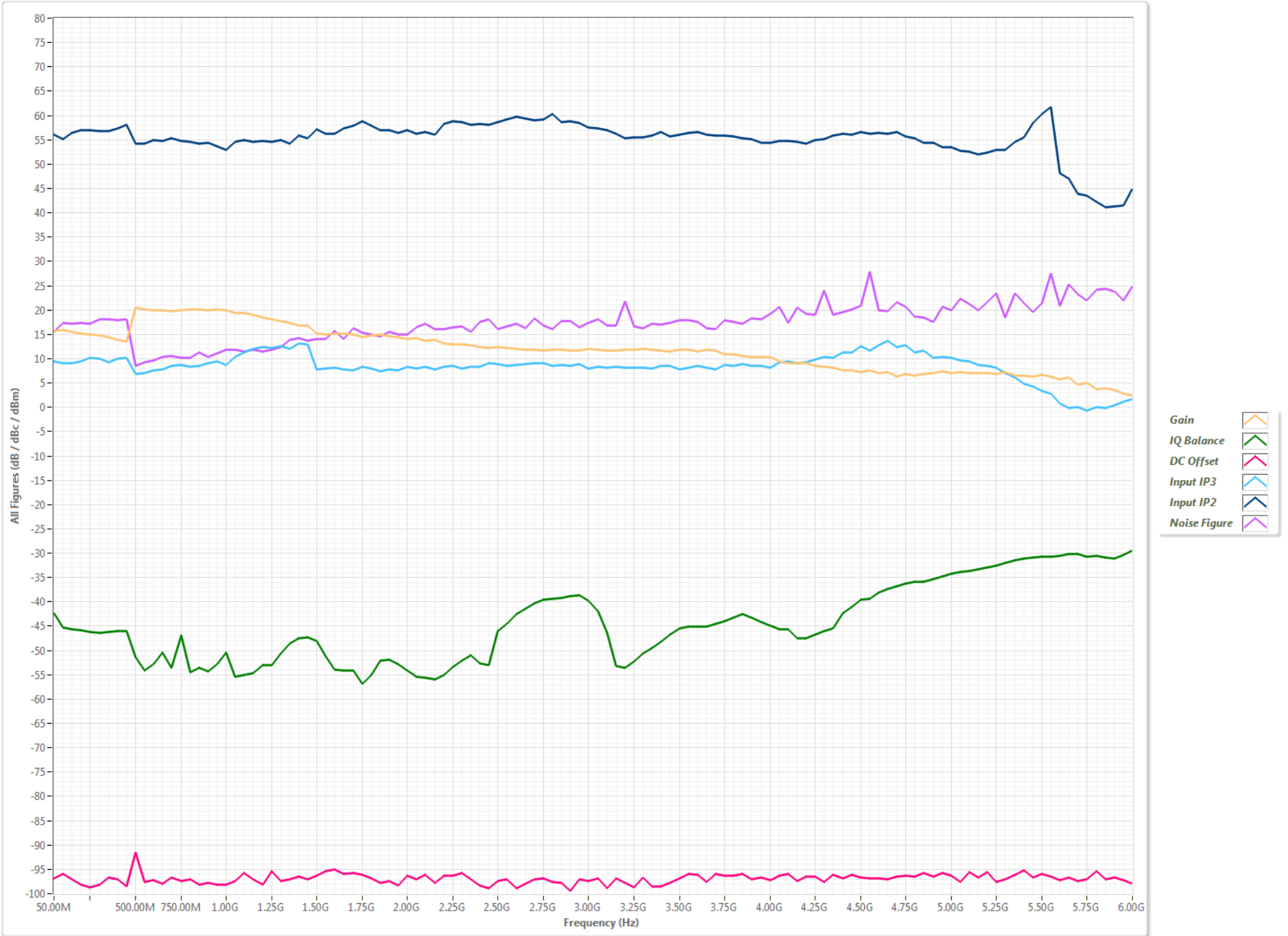
RX Figure vs Frequency w/ Gain=10.50dB



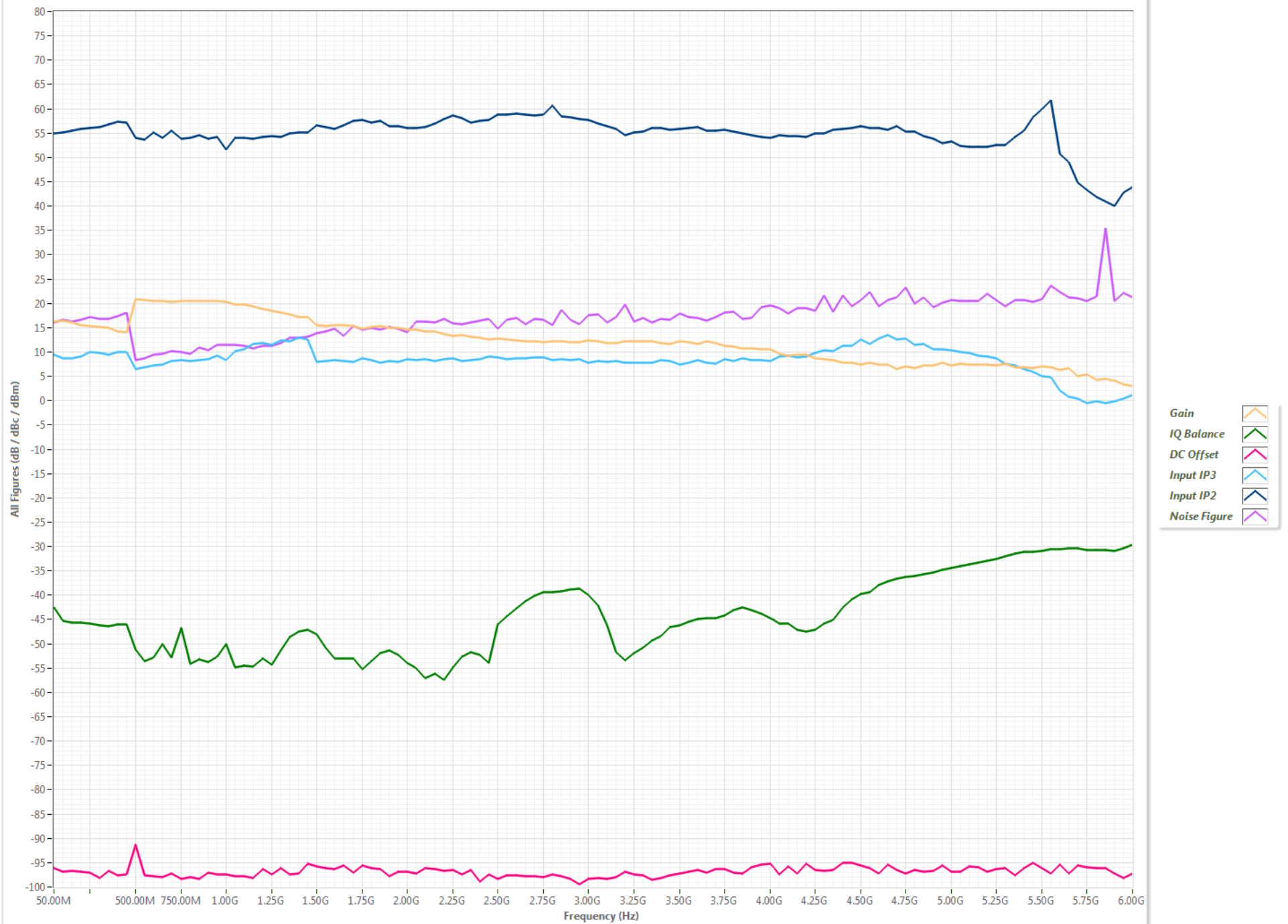
RX Figure vs Frequency w/ Gain=11.00dB



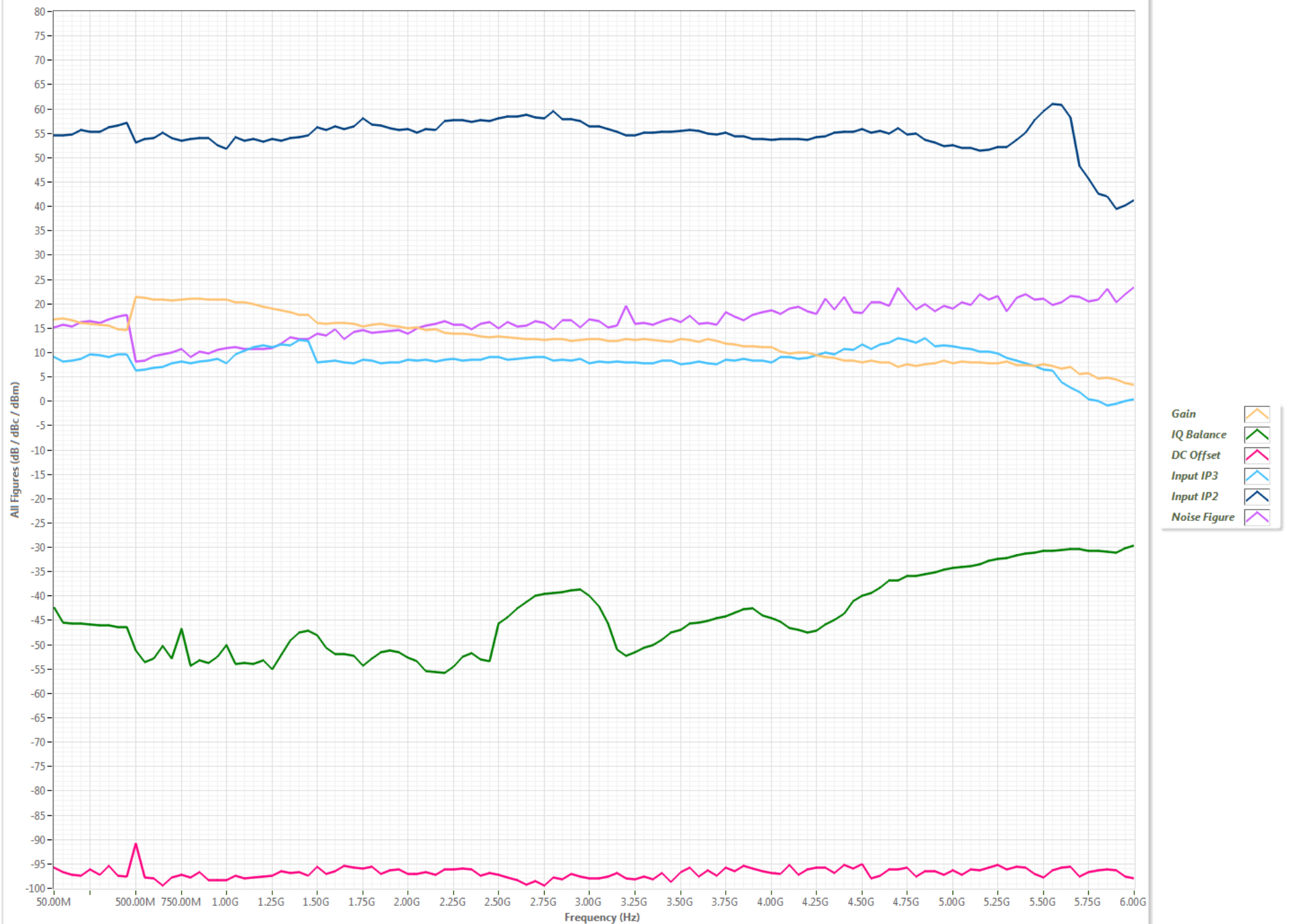
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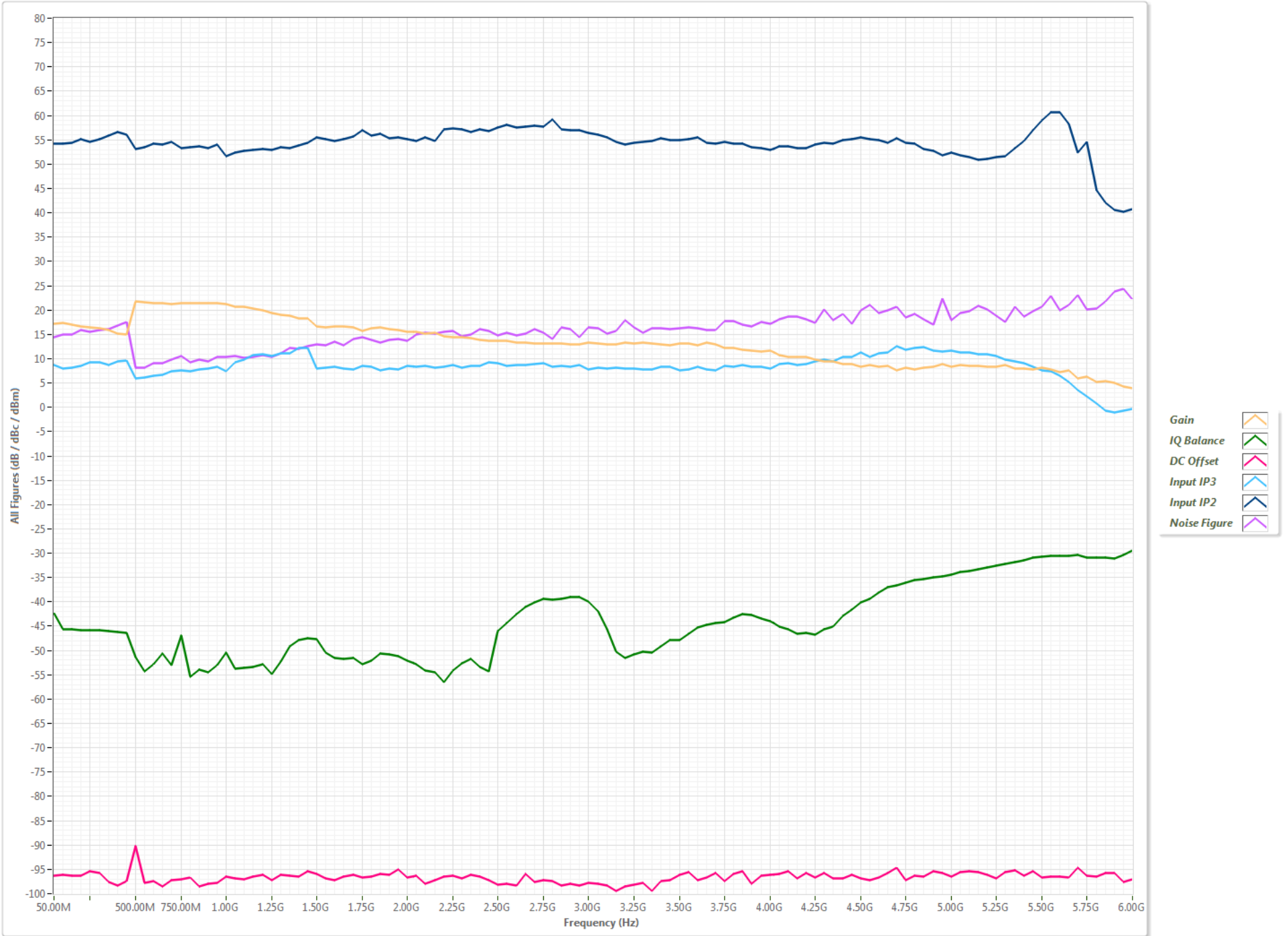
RX Figure vs Frequency w/ Gain=12.00dB



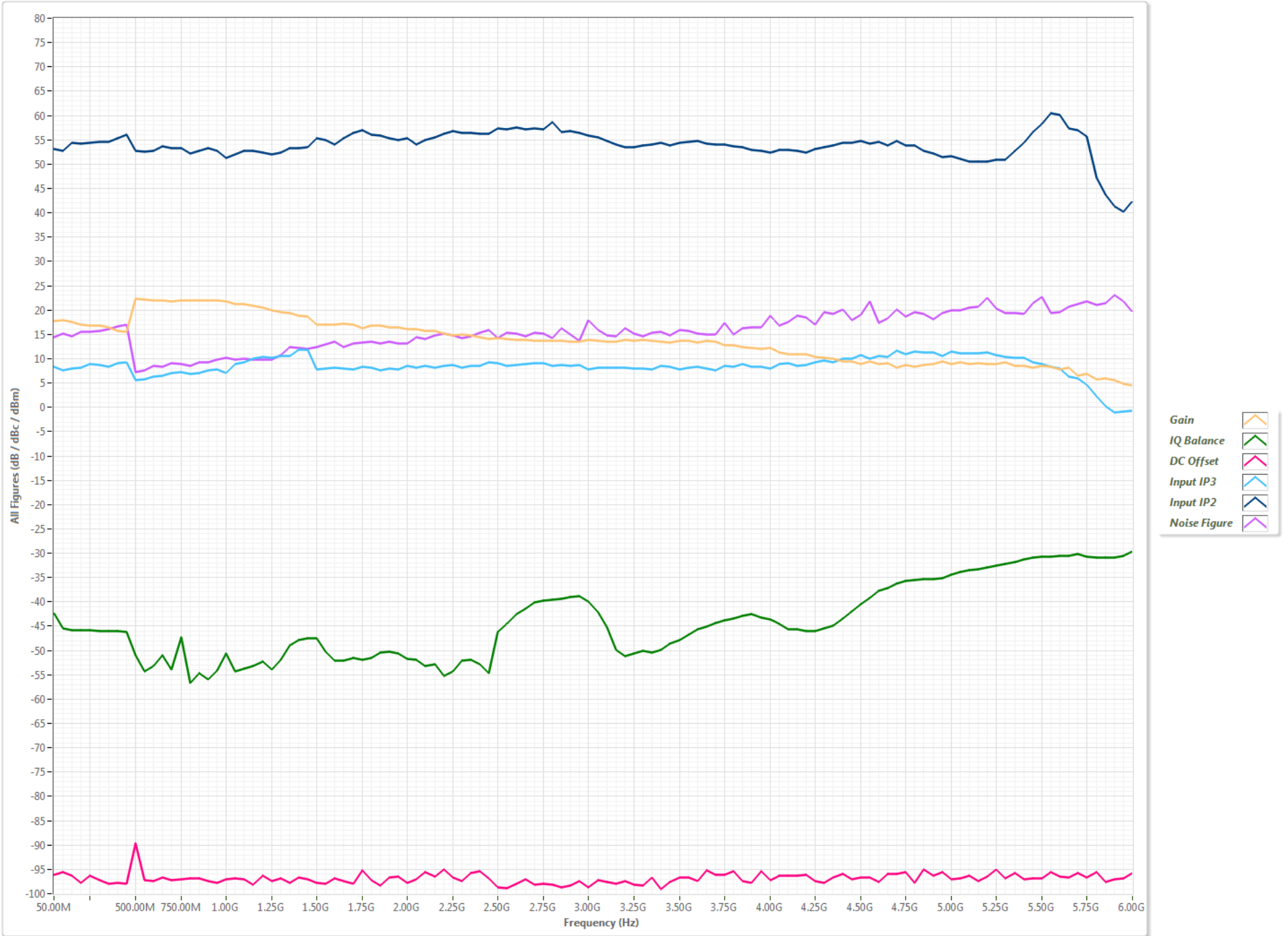
RX Figure vs Frequency w/ Gain=12.50dB



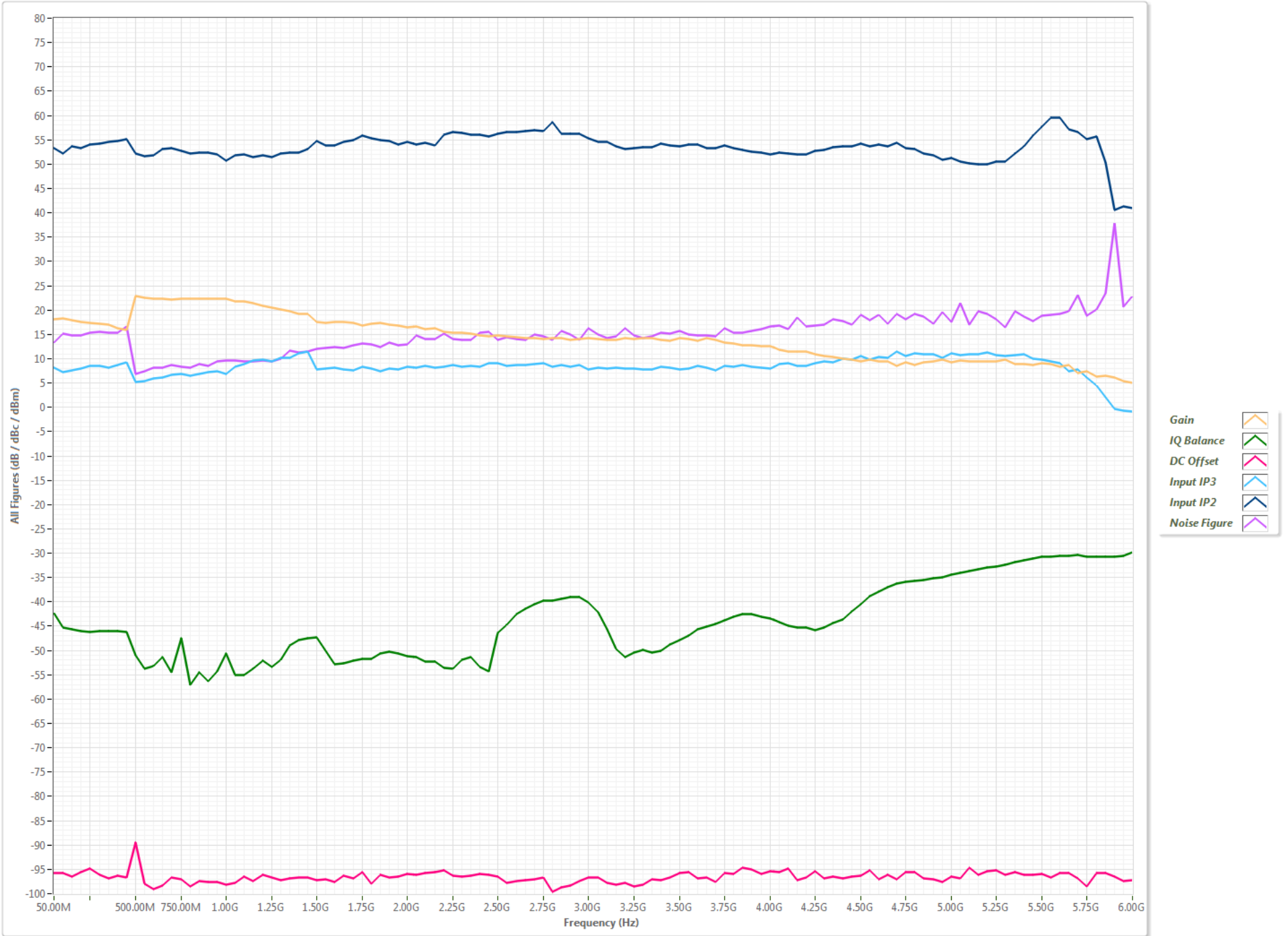
RX Figure vs Frequency w/ Gain=13.00dB



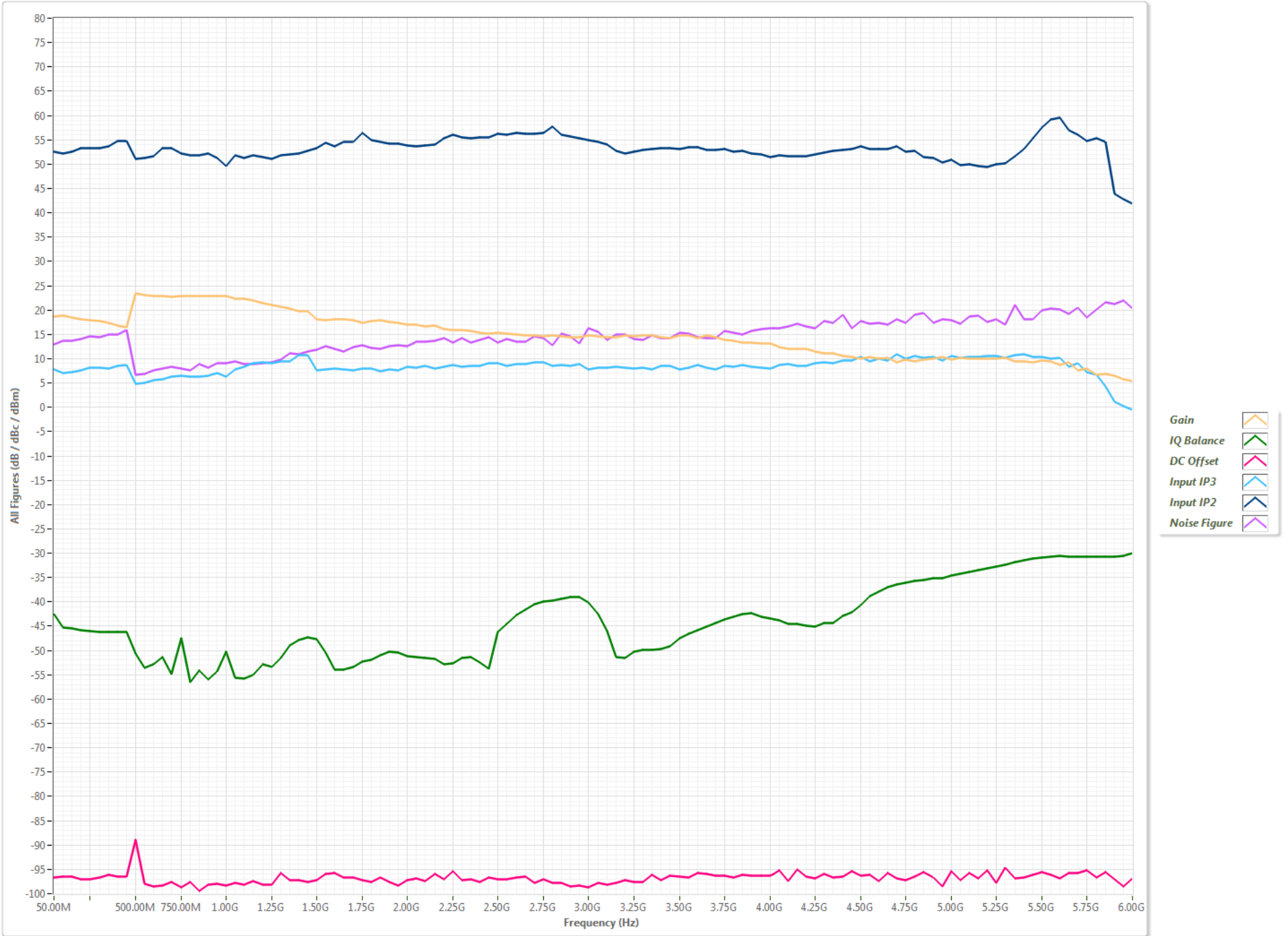
RX Figure vs Frequency w/ Gain=13.50dB



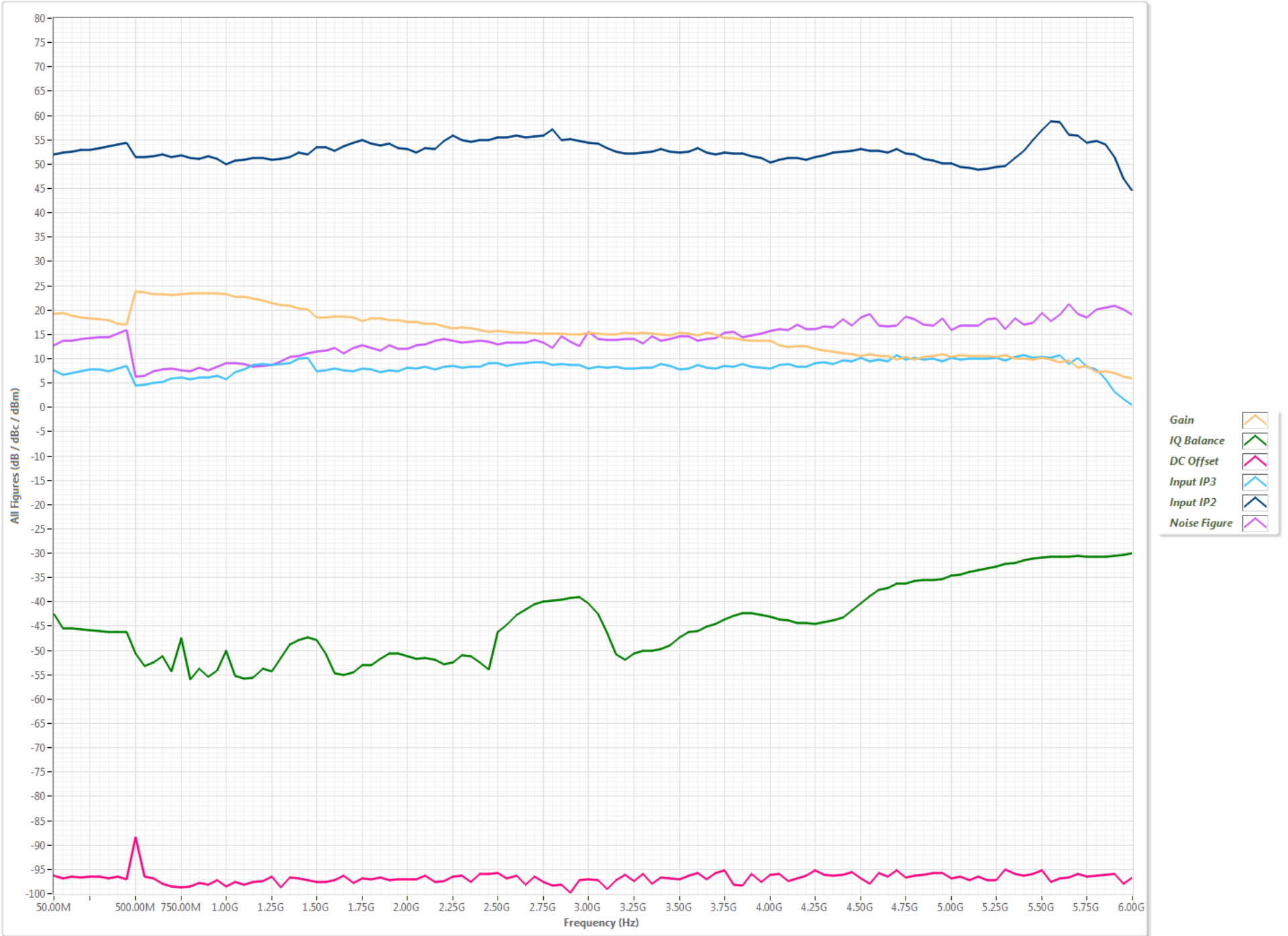
RX Figure vs Frequency w/ Gain=14.00dB



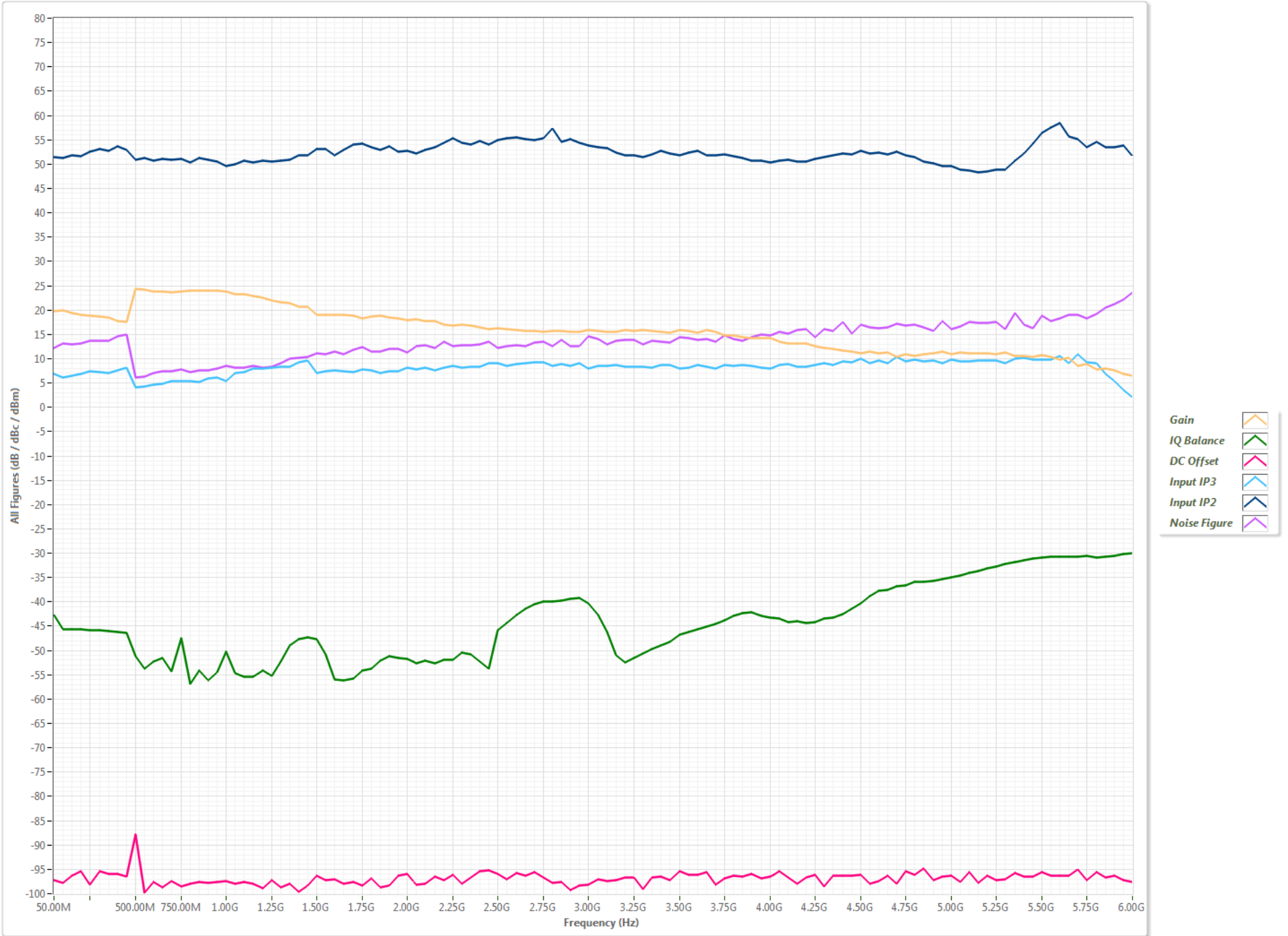
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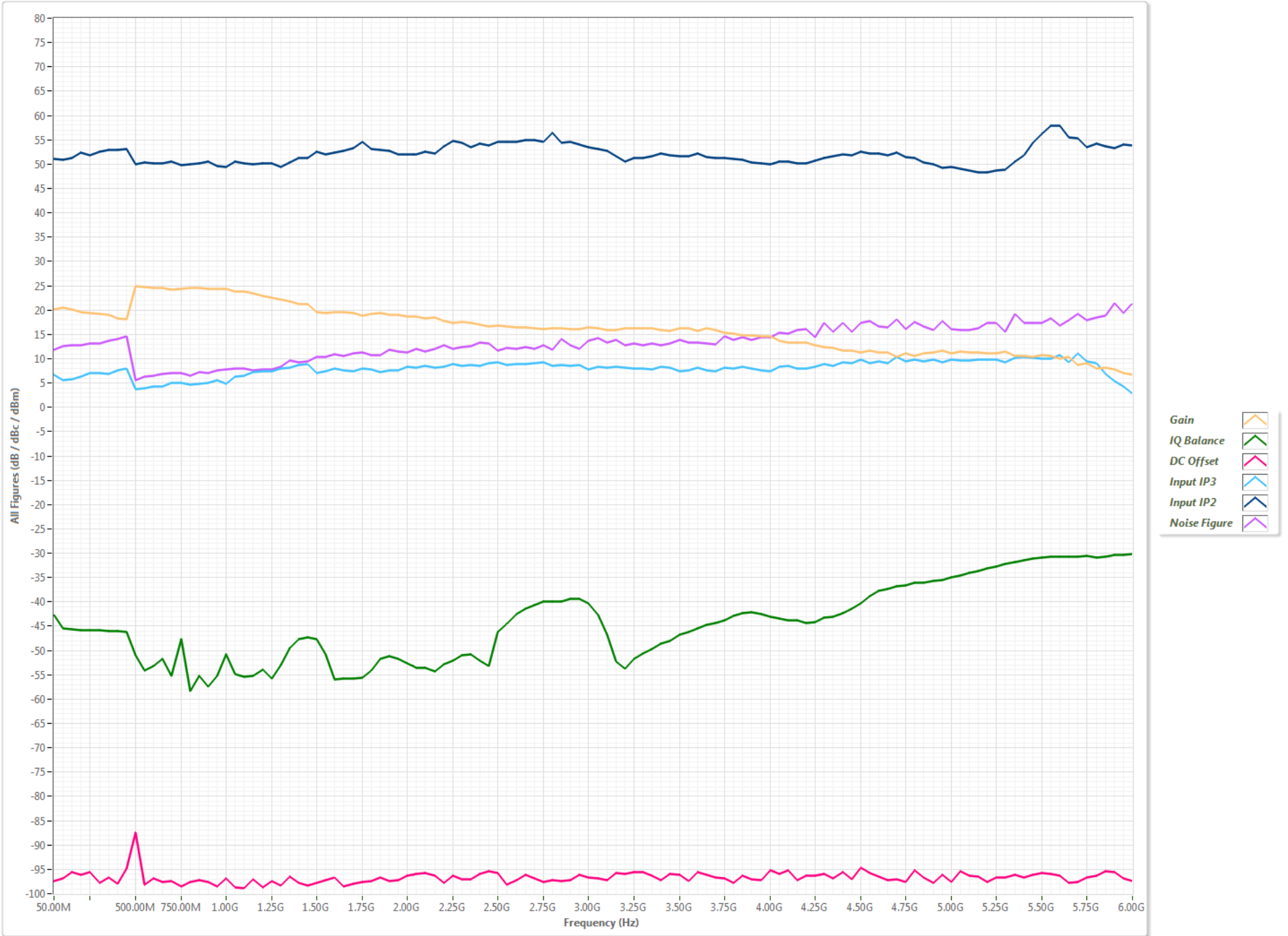
RX Figure vs Frequency w/ Gain=15.00dB



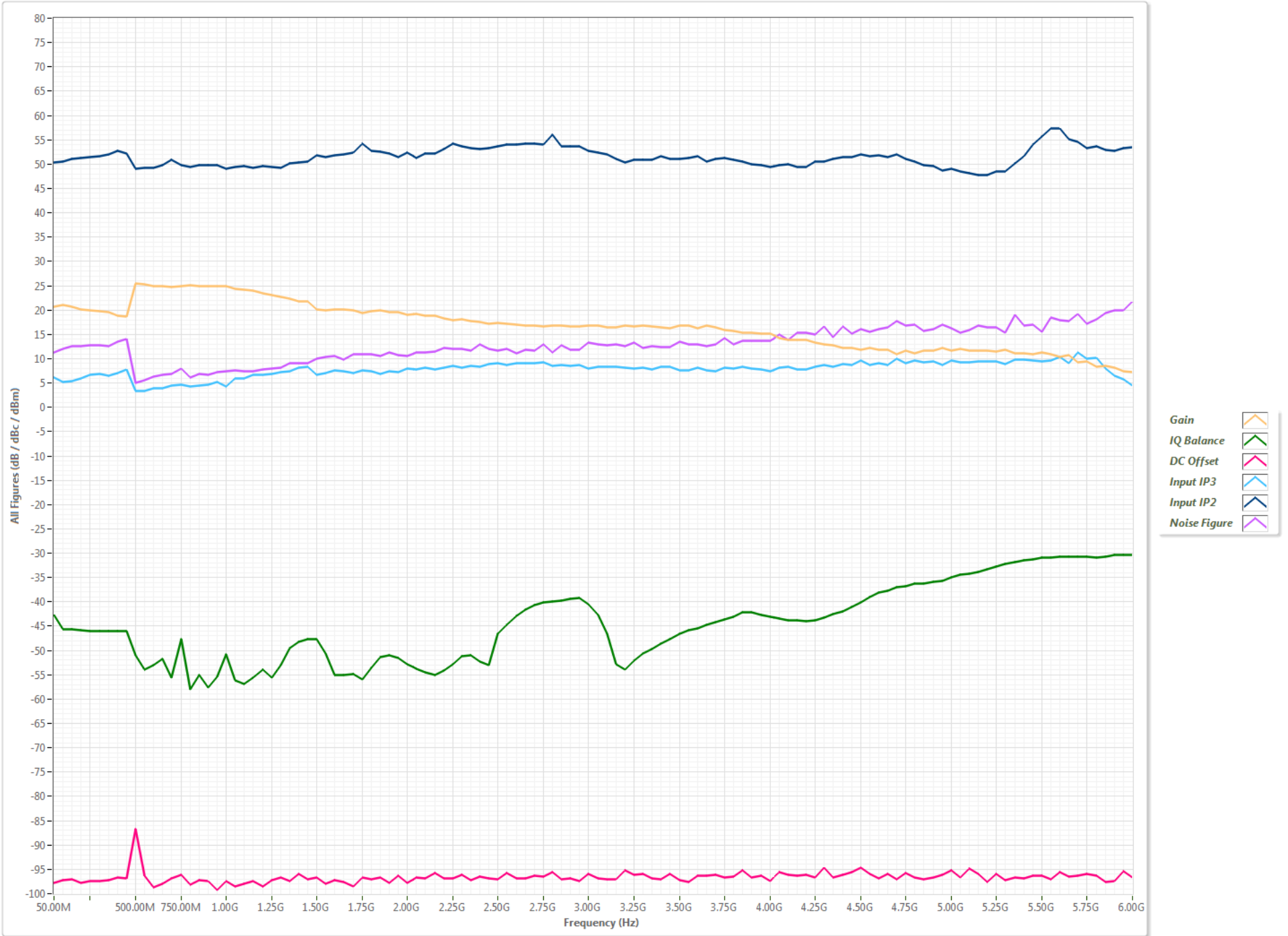
RX Figure vs Frequency w/ Gain=15.50dB



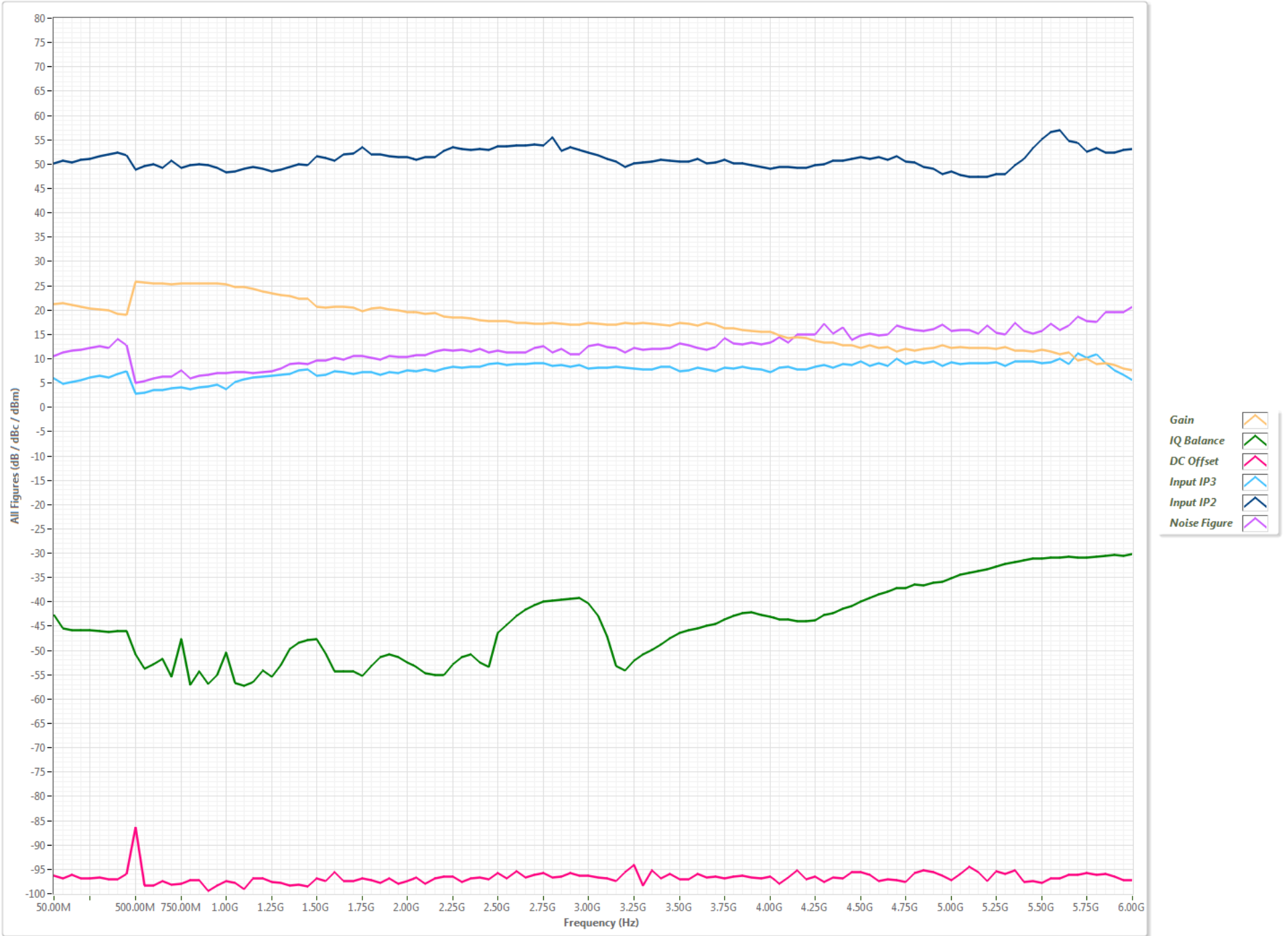
RX Figure vs Frequency w/ Gain=16.00dB



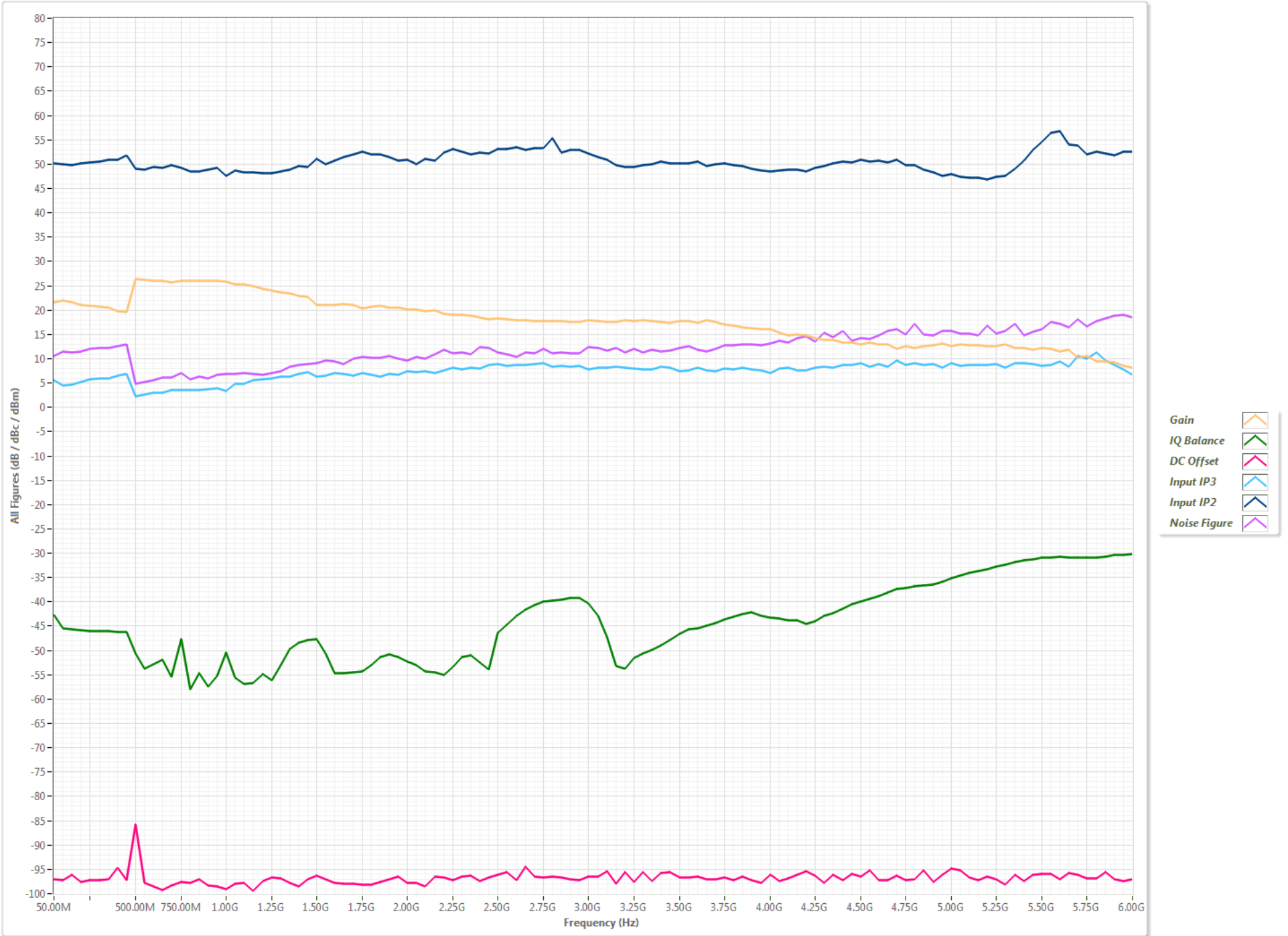
RX Figure vs Frequency w/ Gain=16.50dB



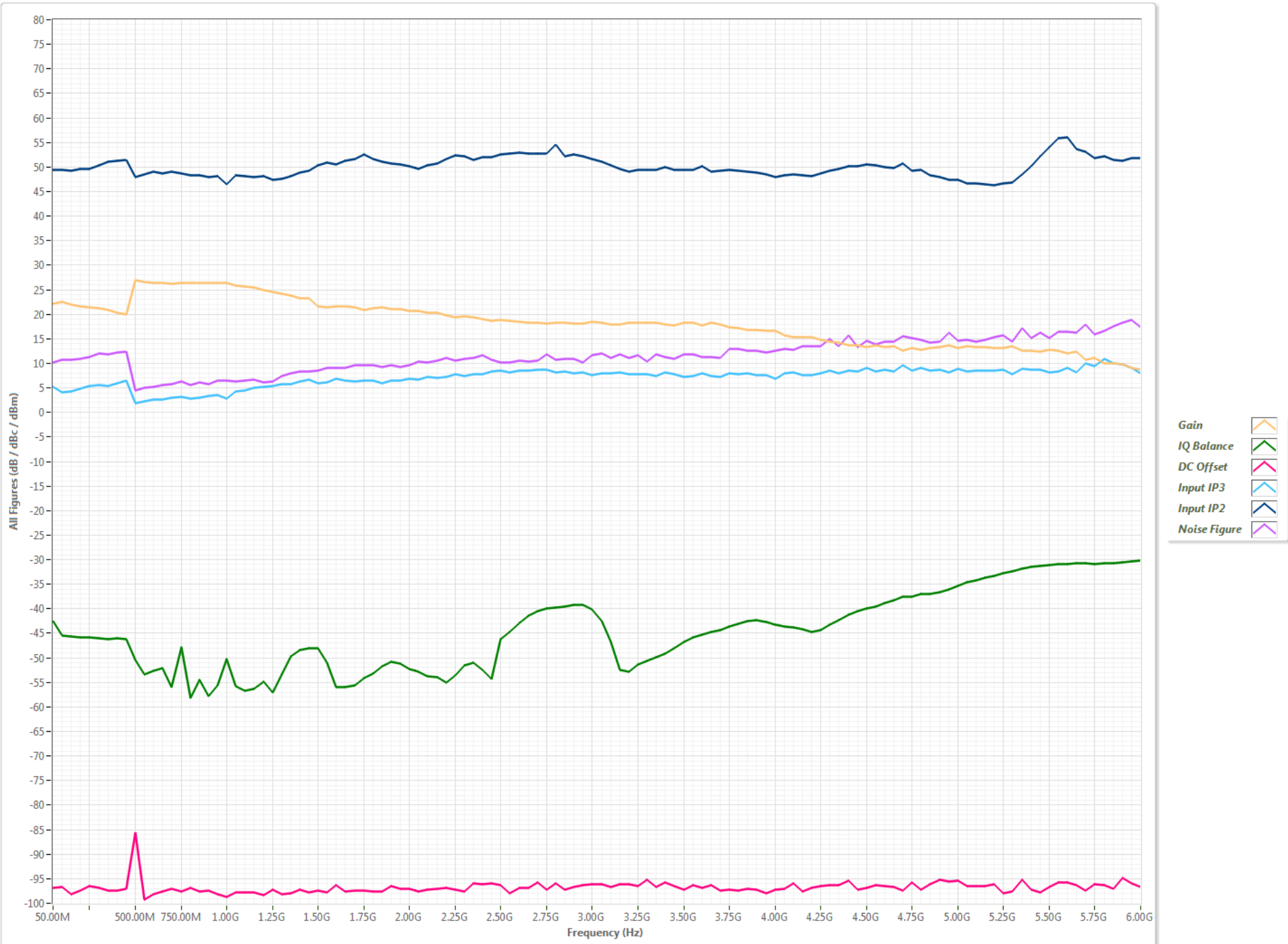
RX Figure vs Frequency w/ Gain=17.00dB



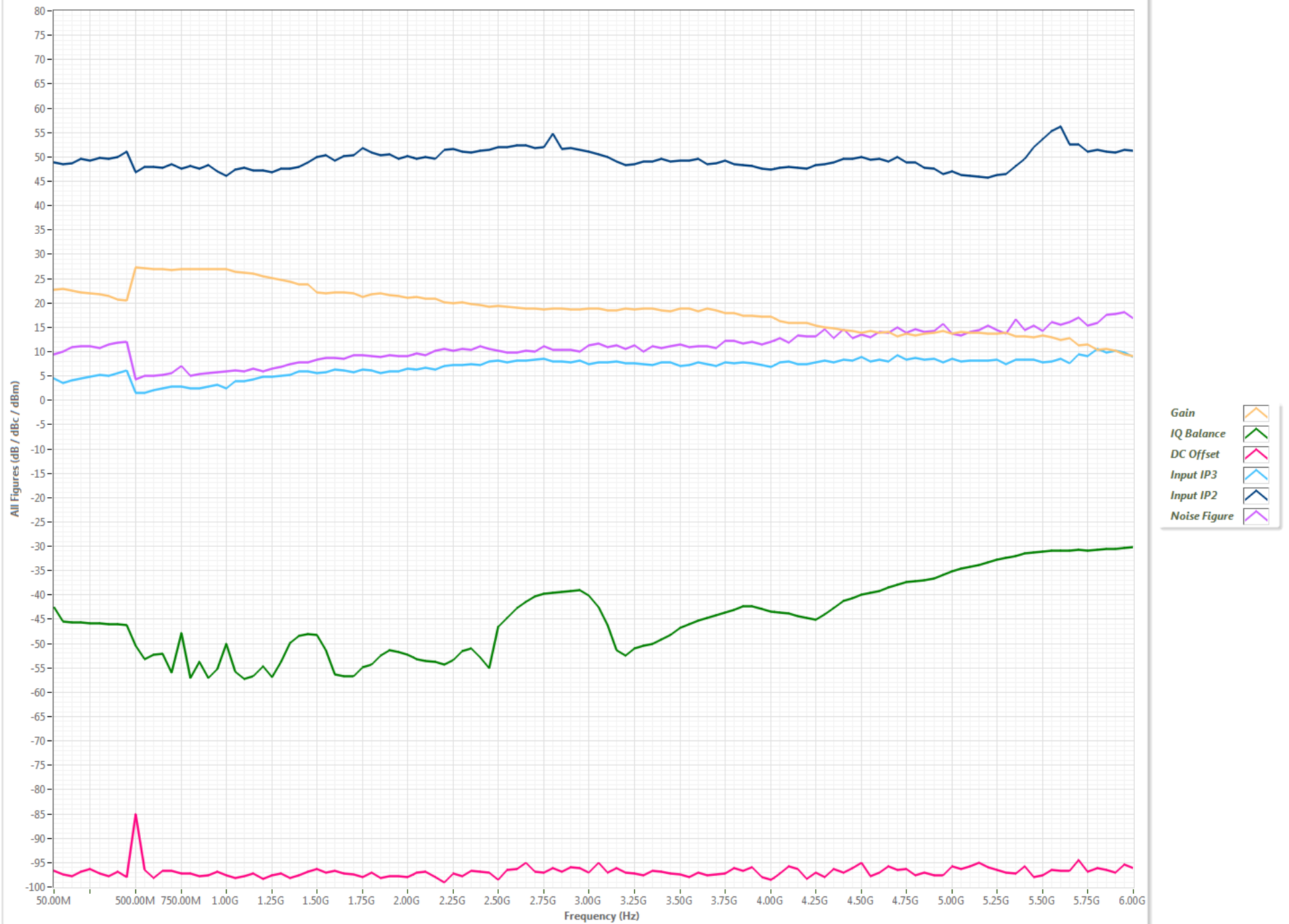
RX Figure vs Frequency w/ Gain=17.50dB



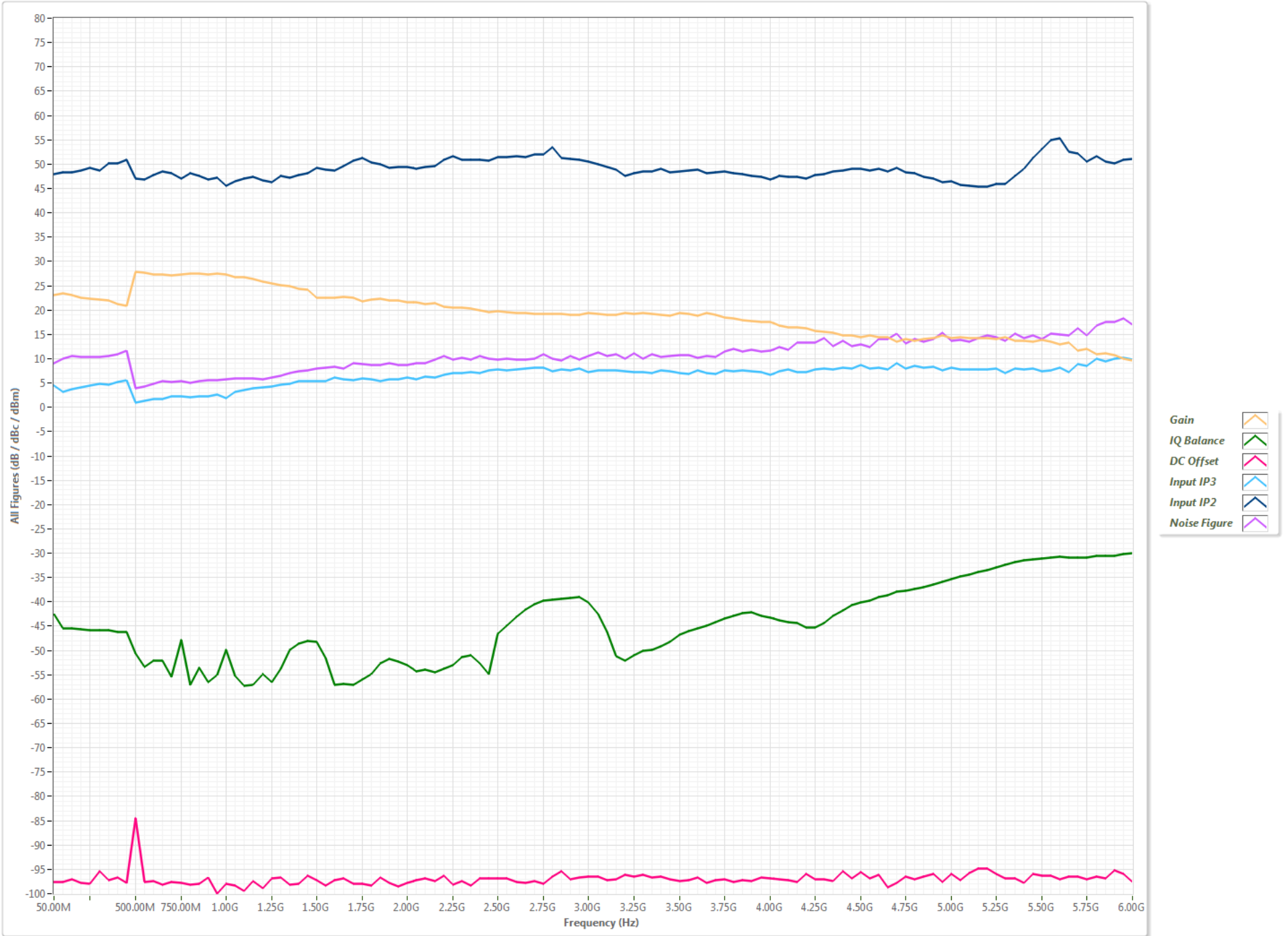
RX Figure vs Frequency w/ Gain=18.00dB



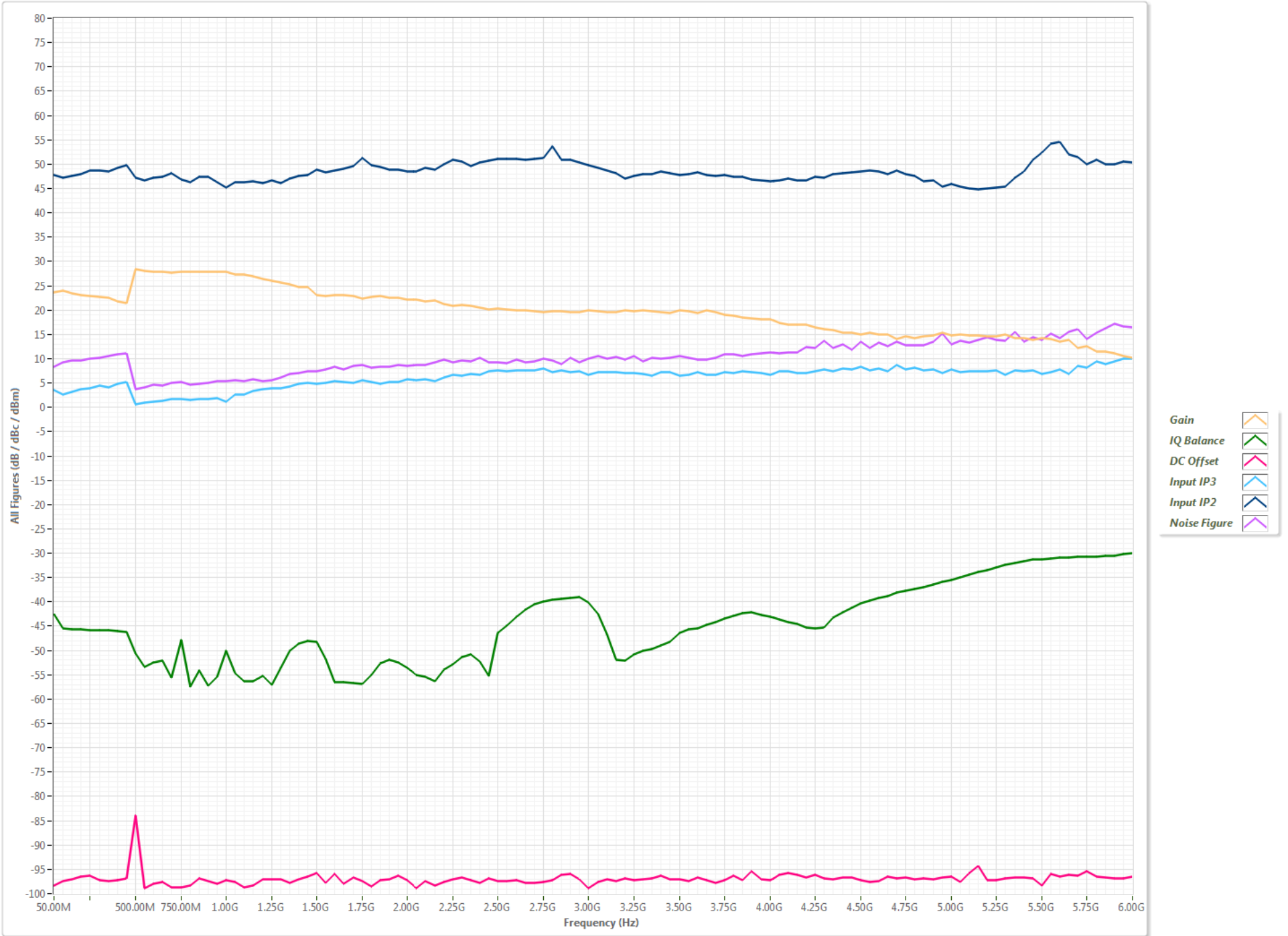
RX Figure vs Frequency w/ Gain=18.50dB



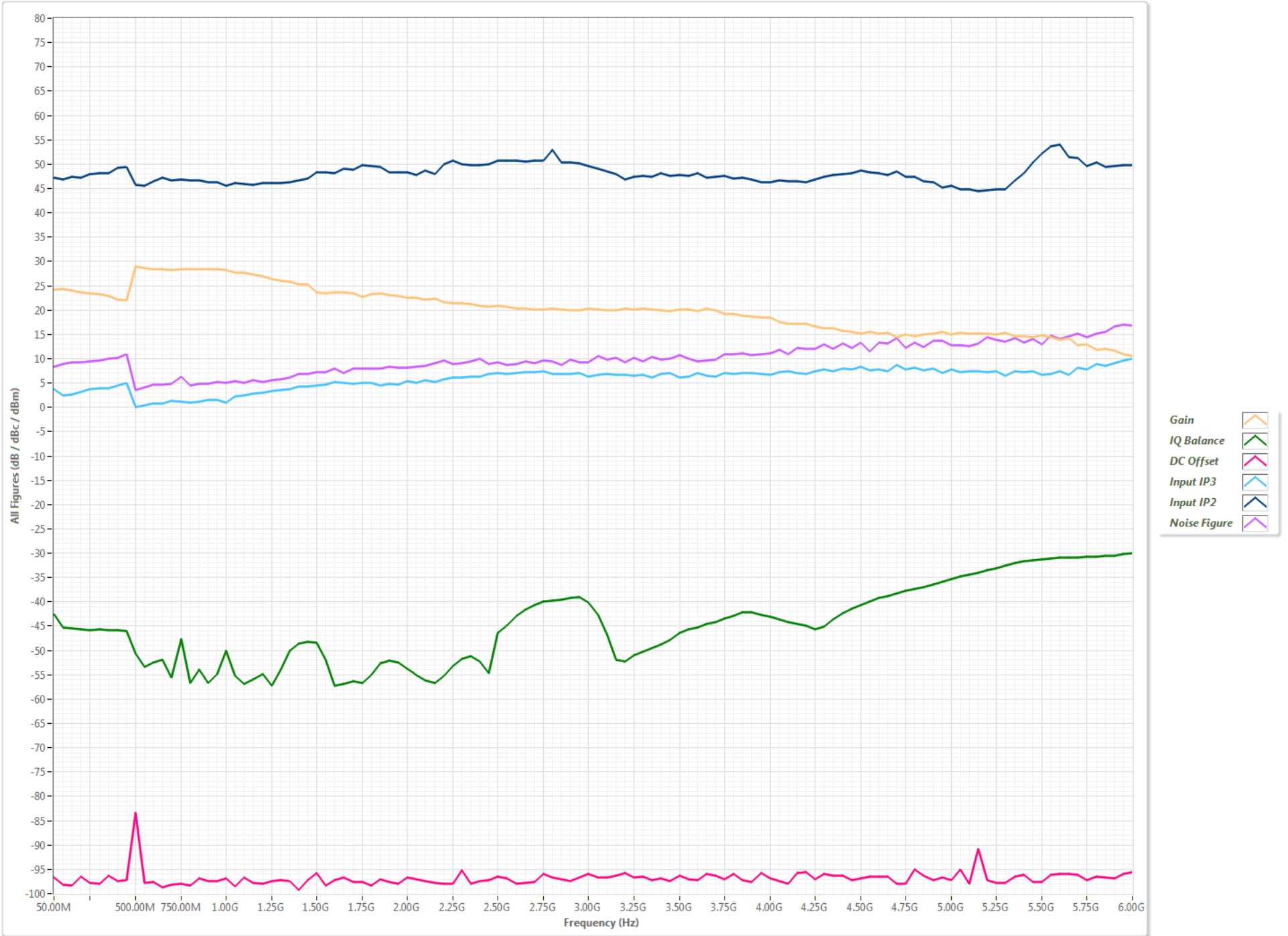
RX Figure vs Frequency w/ Gain=19.00dB



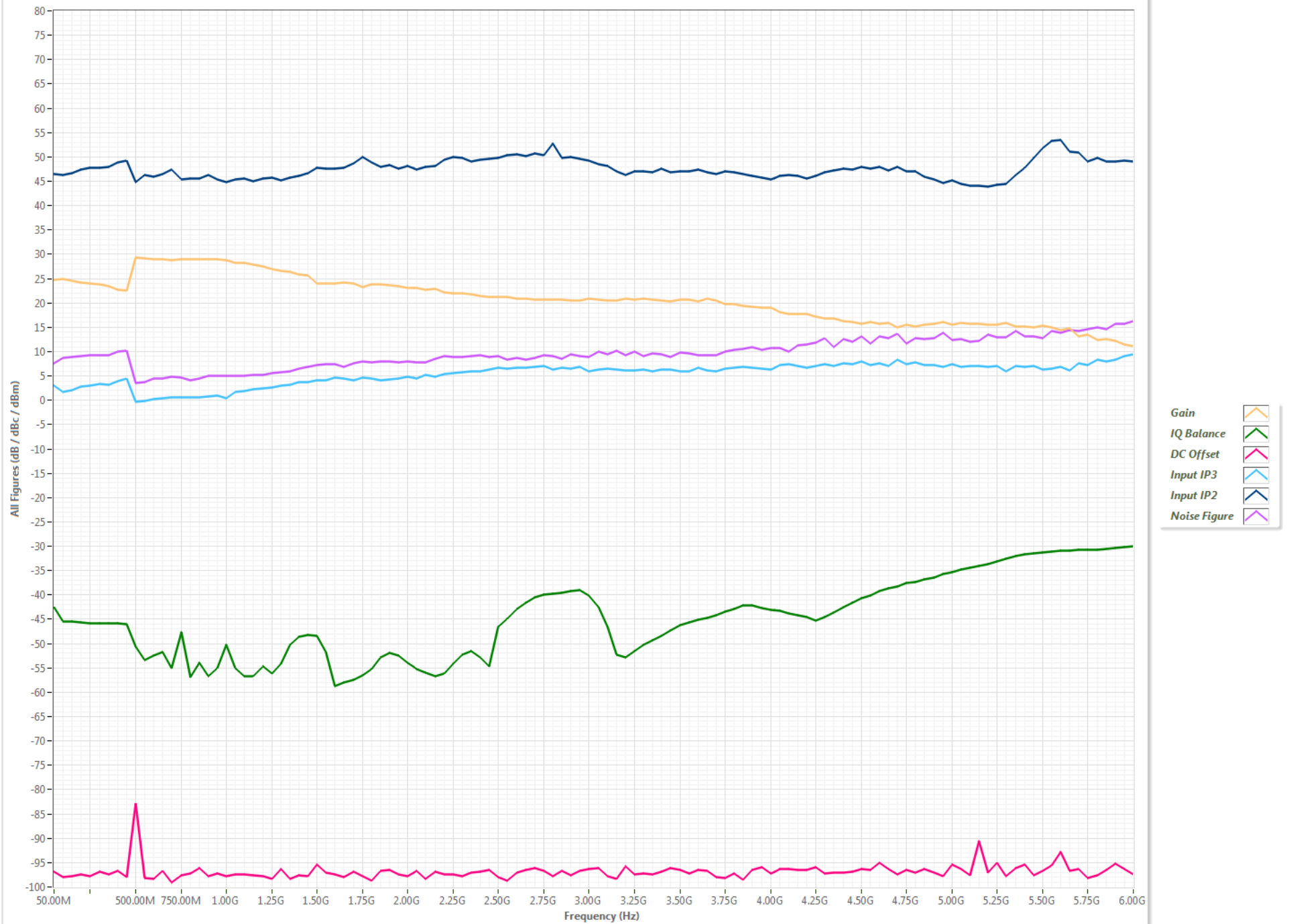
RX Figure vs Frequency w/ Gain=19.50dB



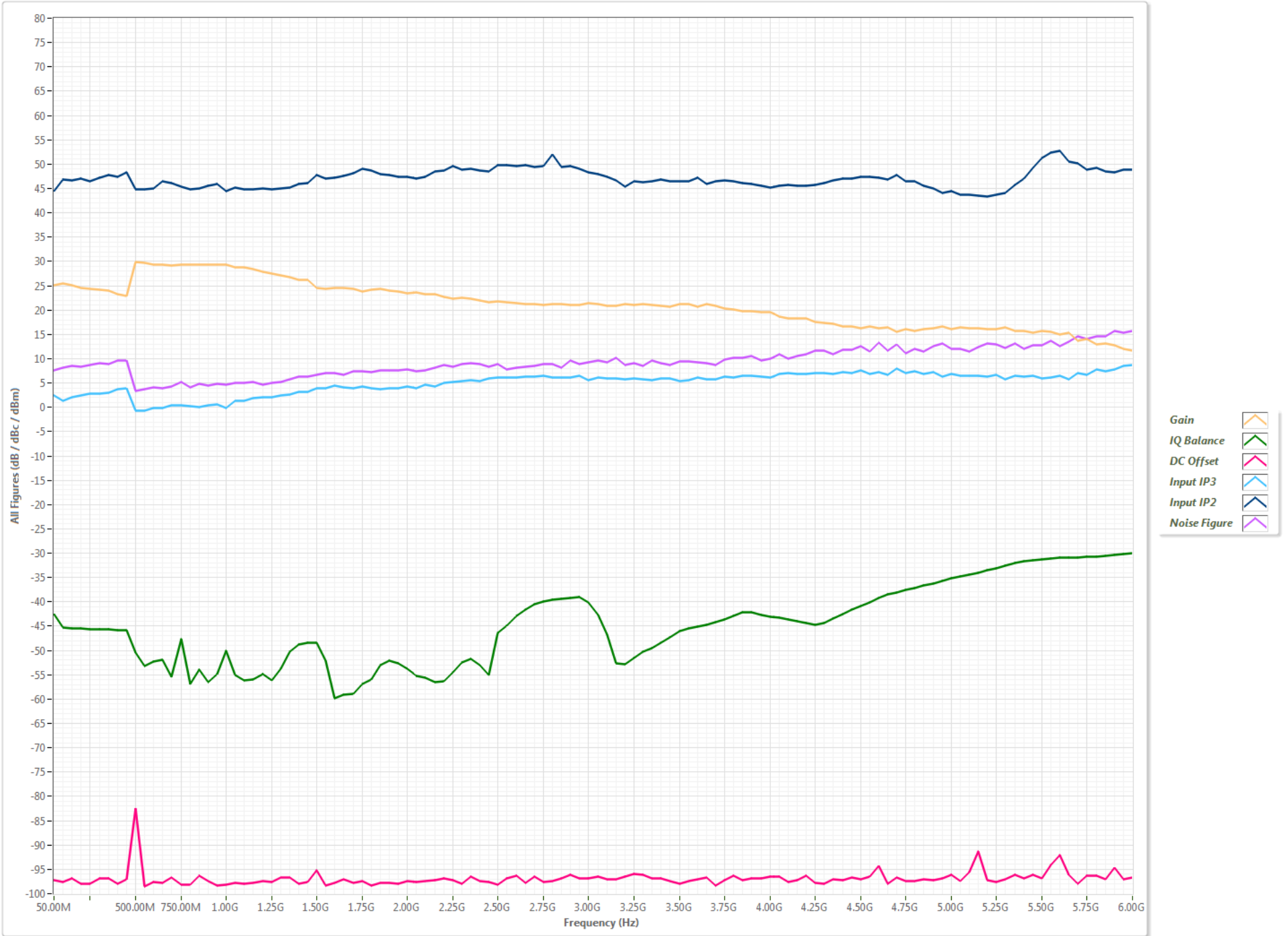
RX Figure vs Frequency w/ Gain=20.00dB



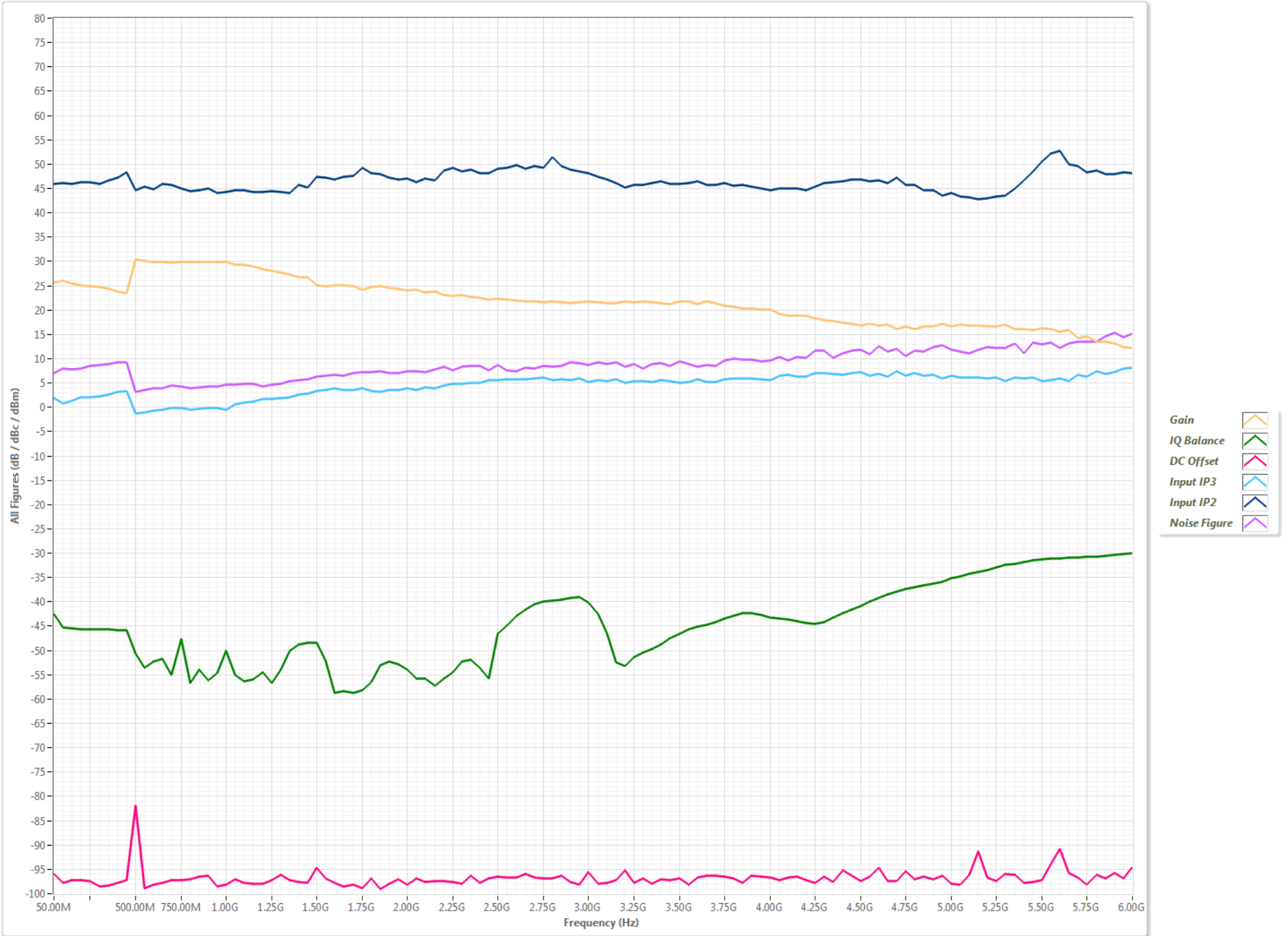
RX Figure vs Frequency w/ Gain=20.50dB



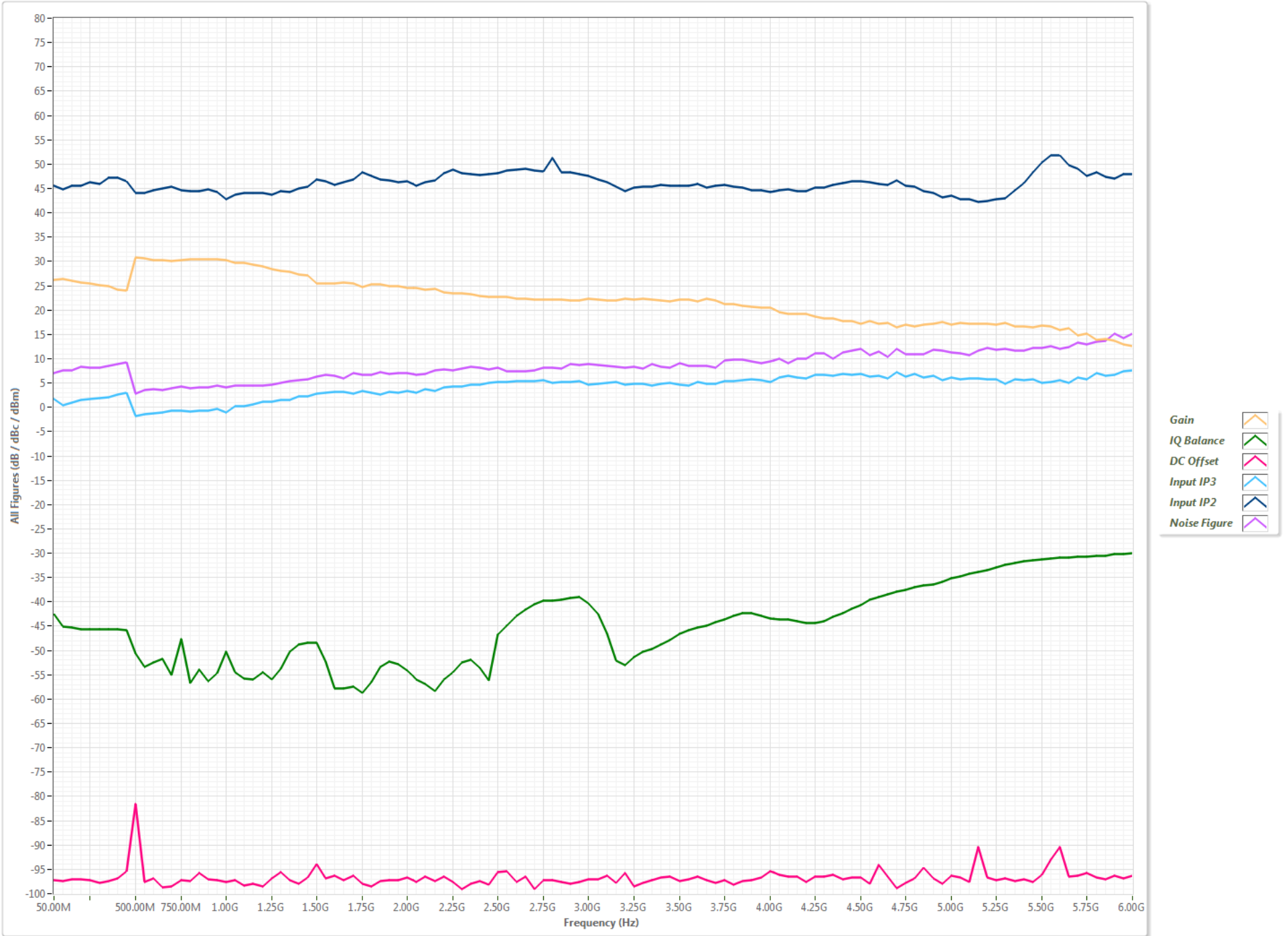
RX Figure vs Frequency w/ Gain=21.00dB



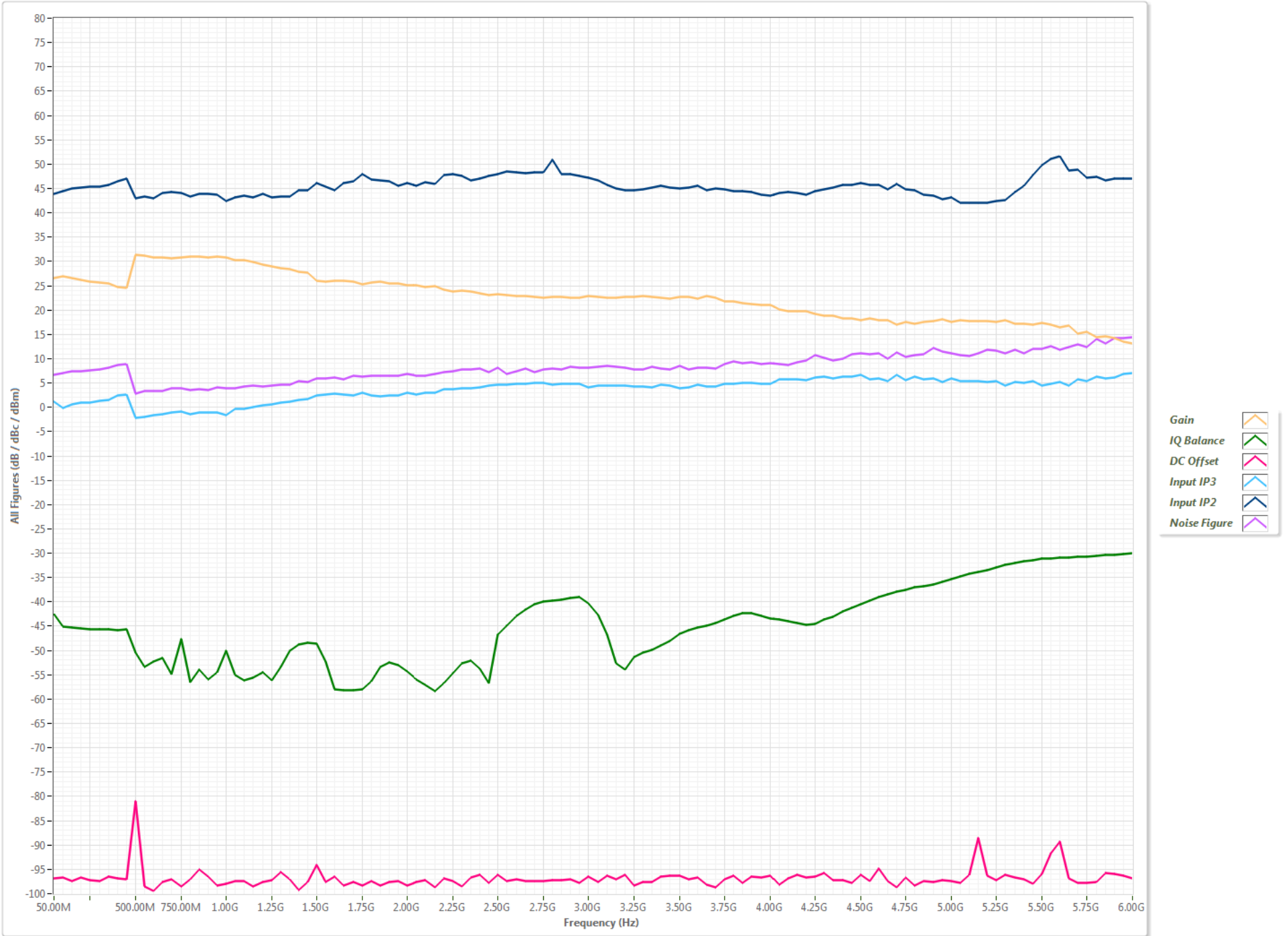
RX Figure vs Frequency w/ Gain=21.50dB



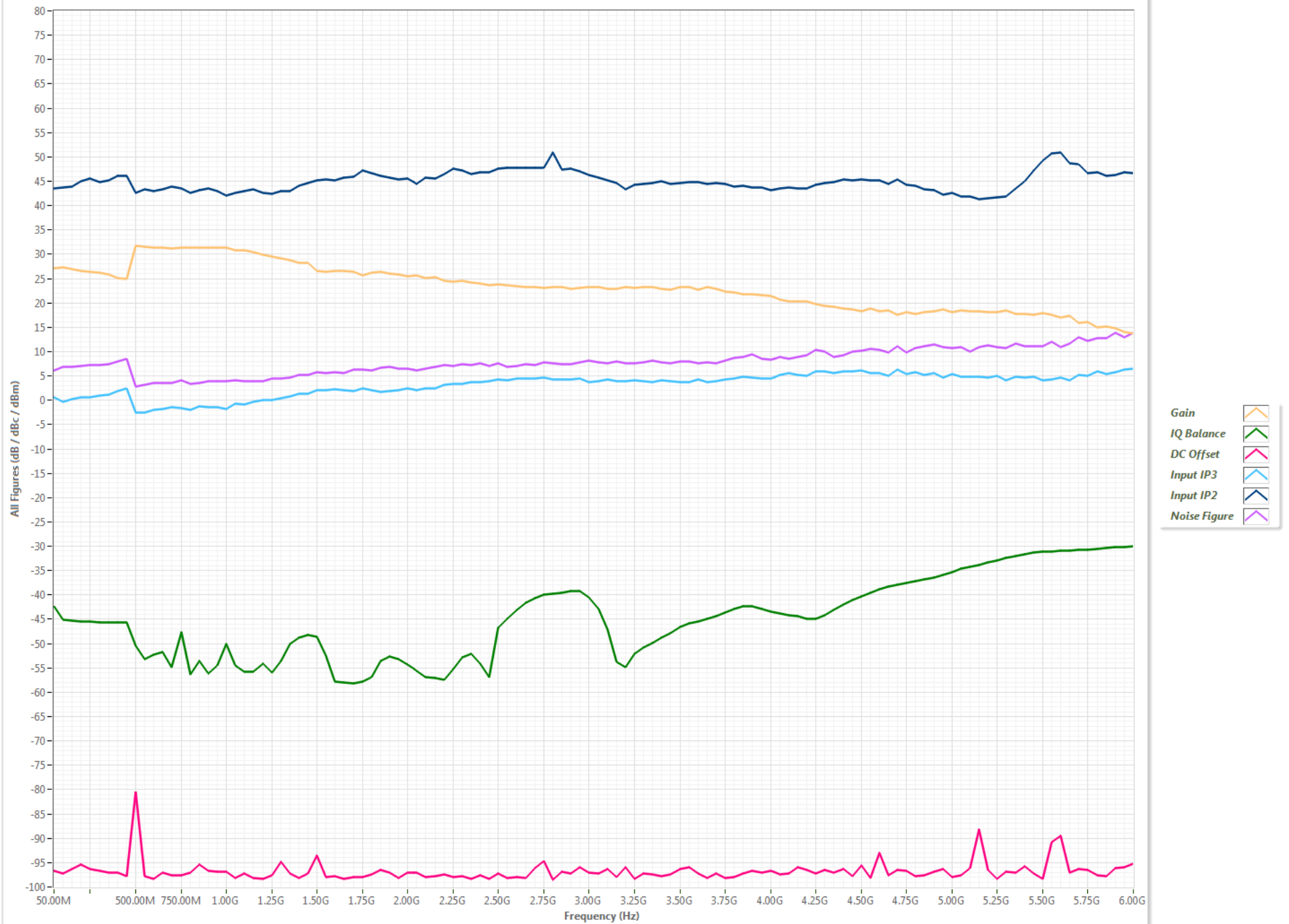
RX Figure vs Frequency w/ Gain=22.00dB



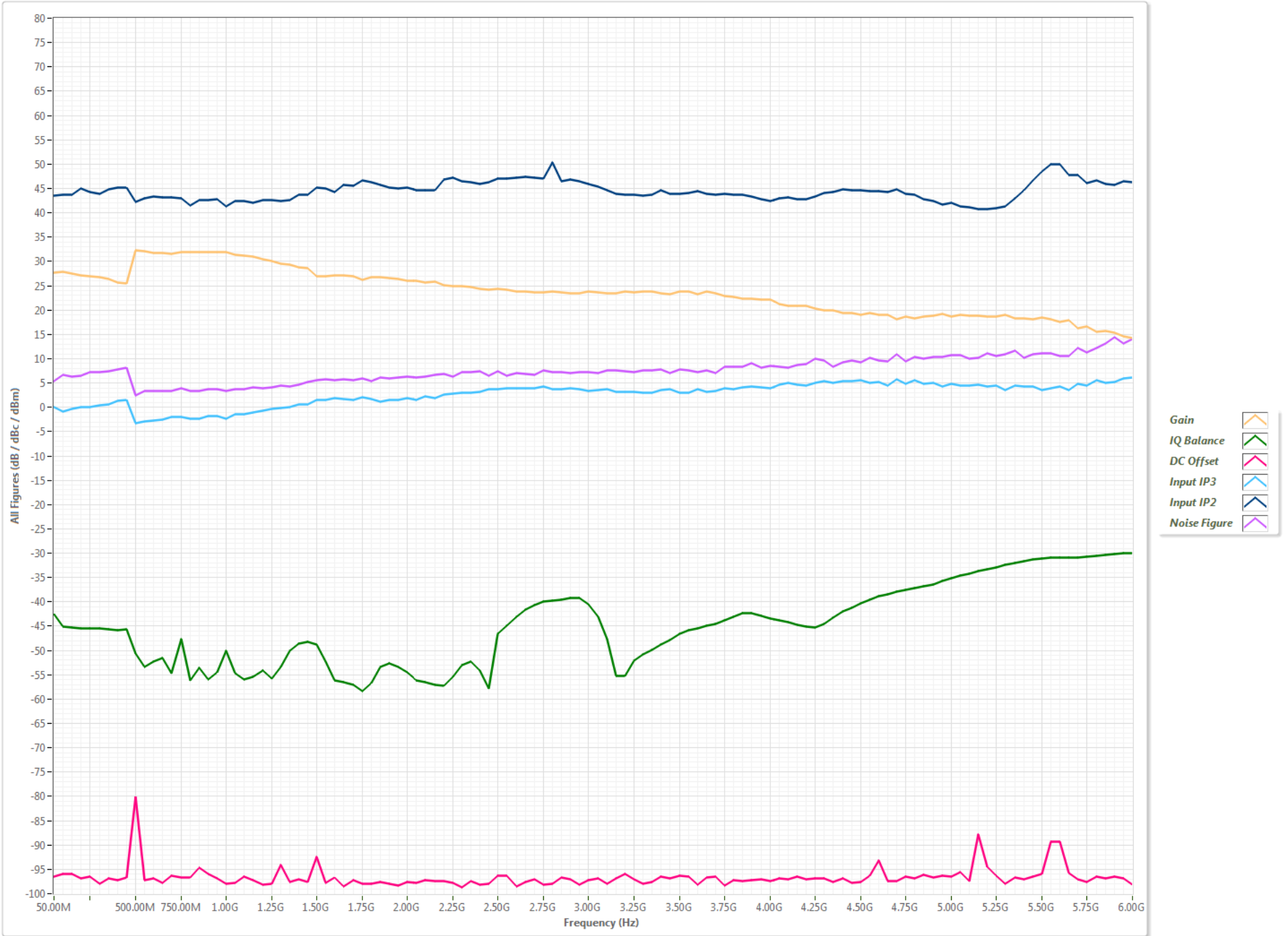
RX Figure vs Frequency w/ Gain=22.50dB



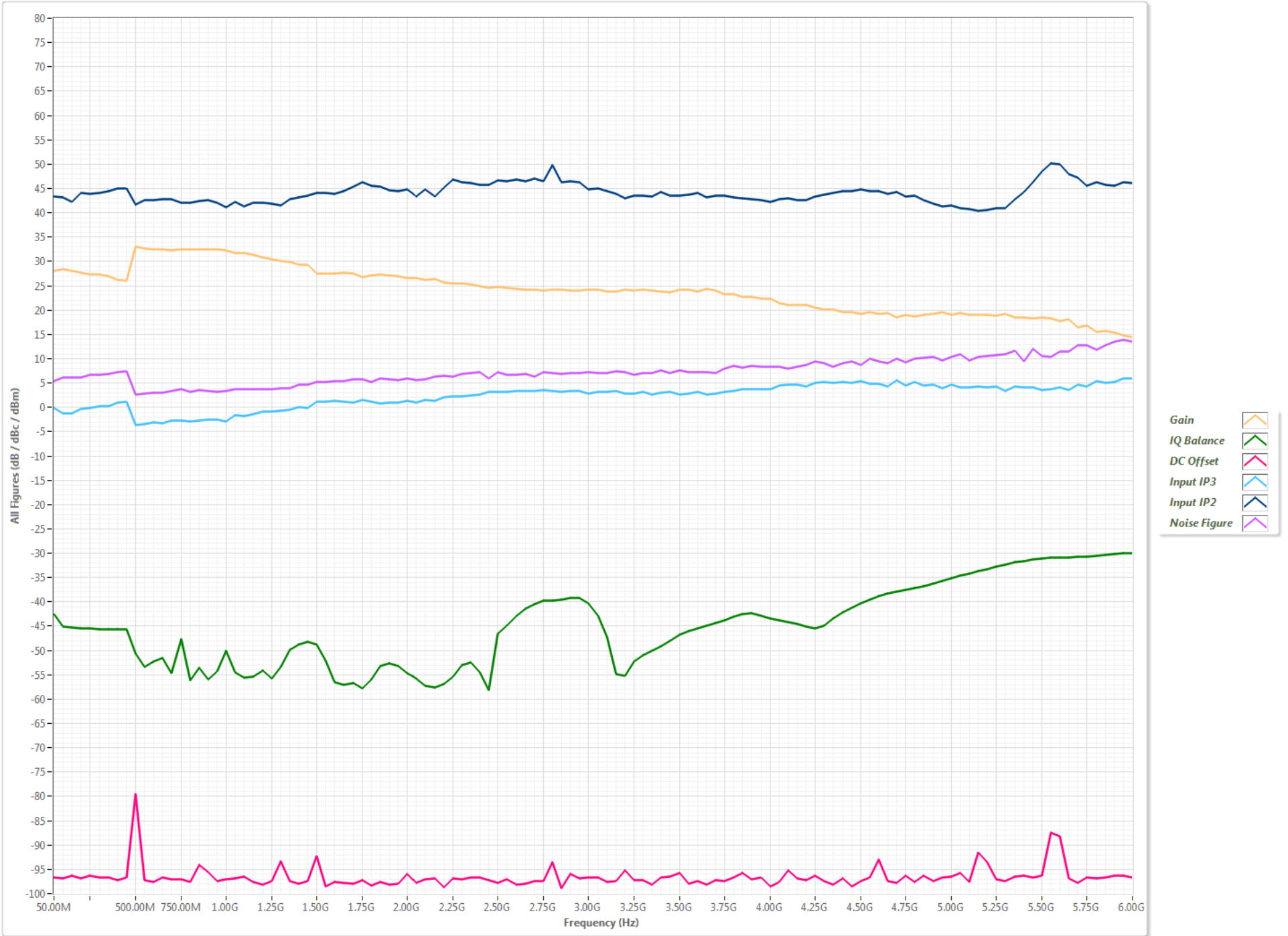
RX Figure vs Frequency w/ Gain=23.00dB



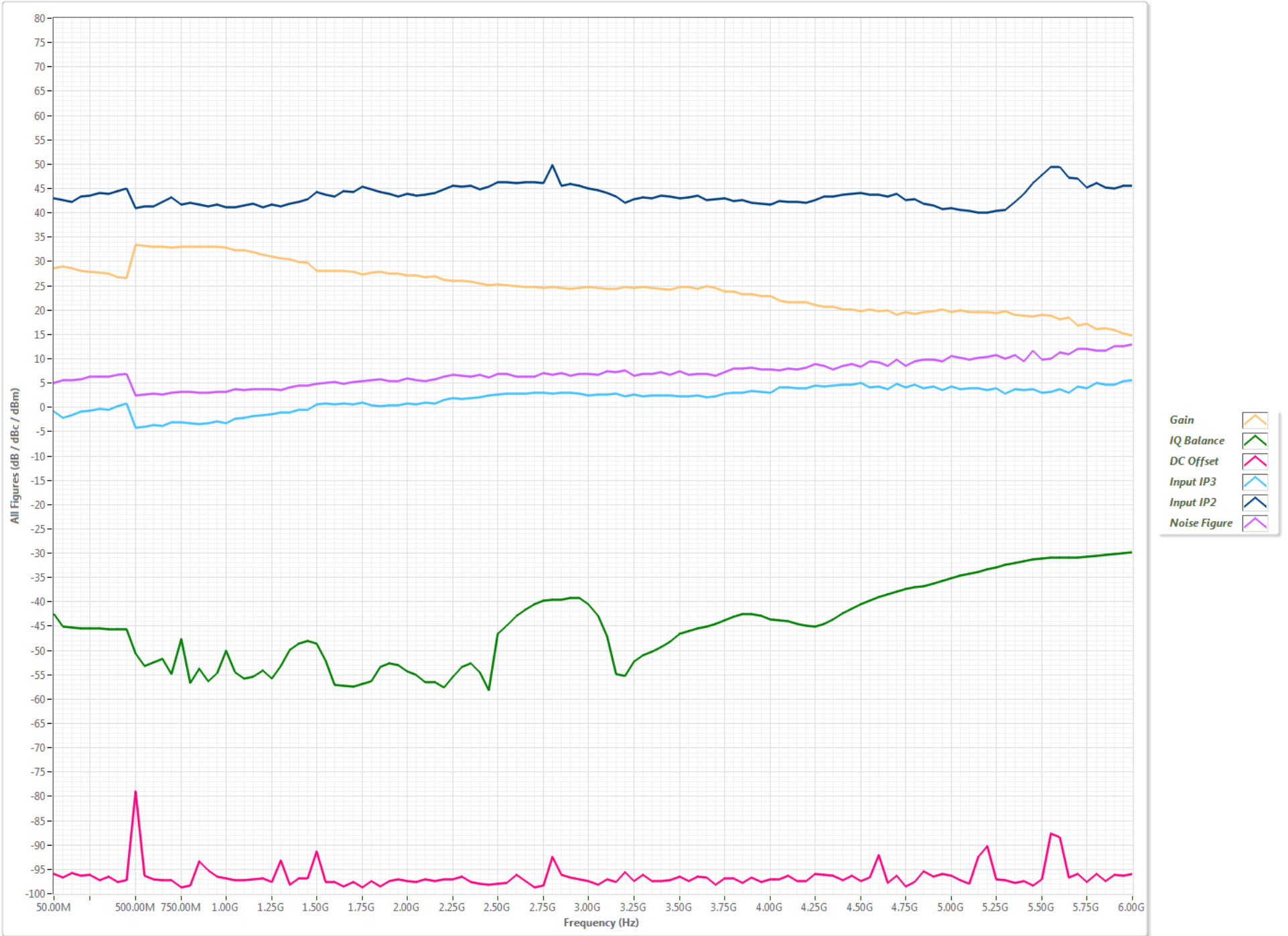
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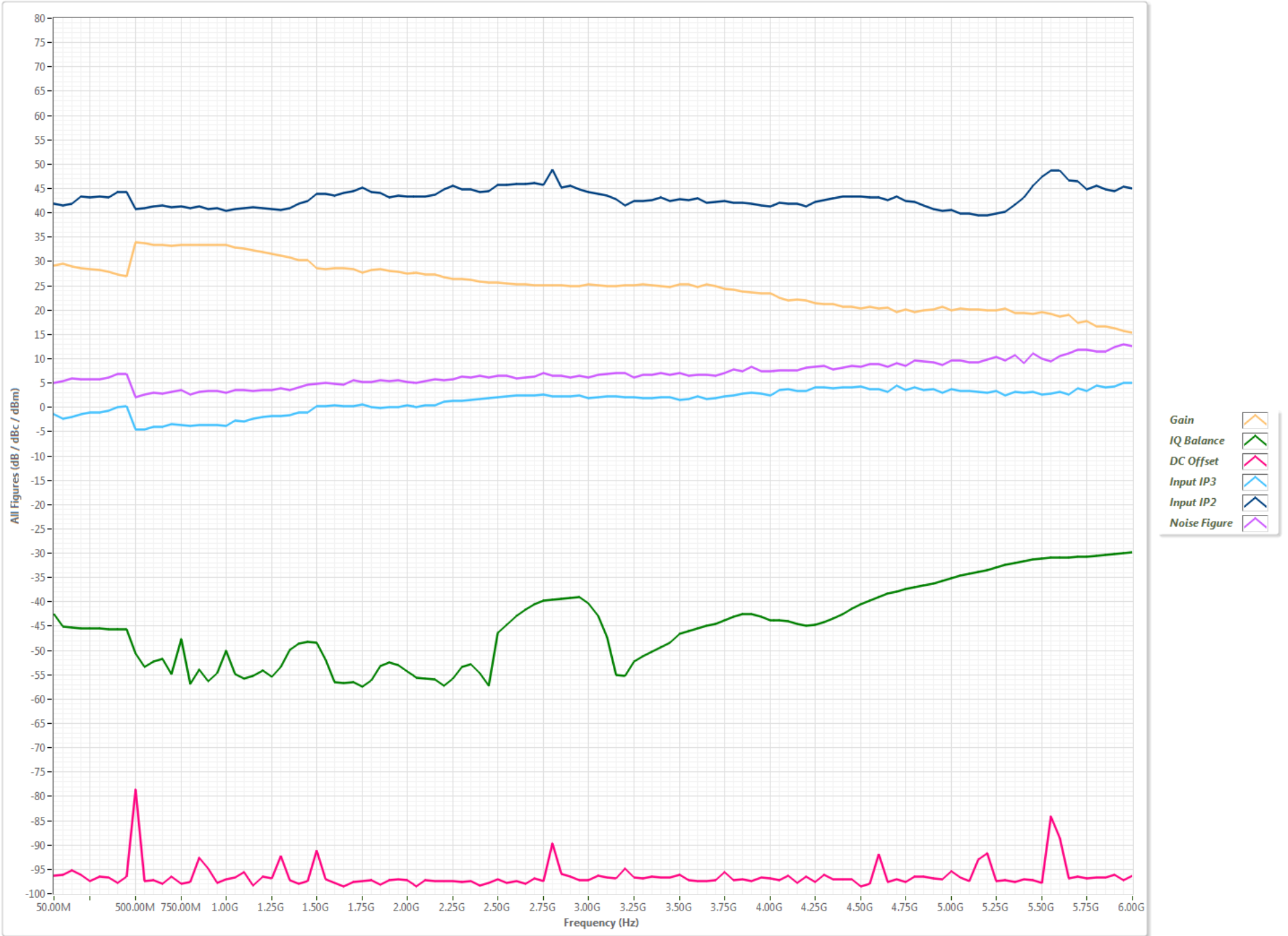
RX Figure vs Frequency w/ Gain=24.00dB



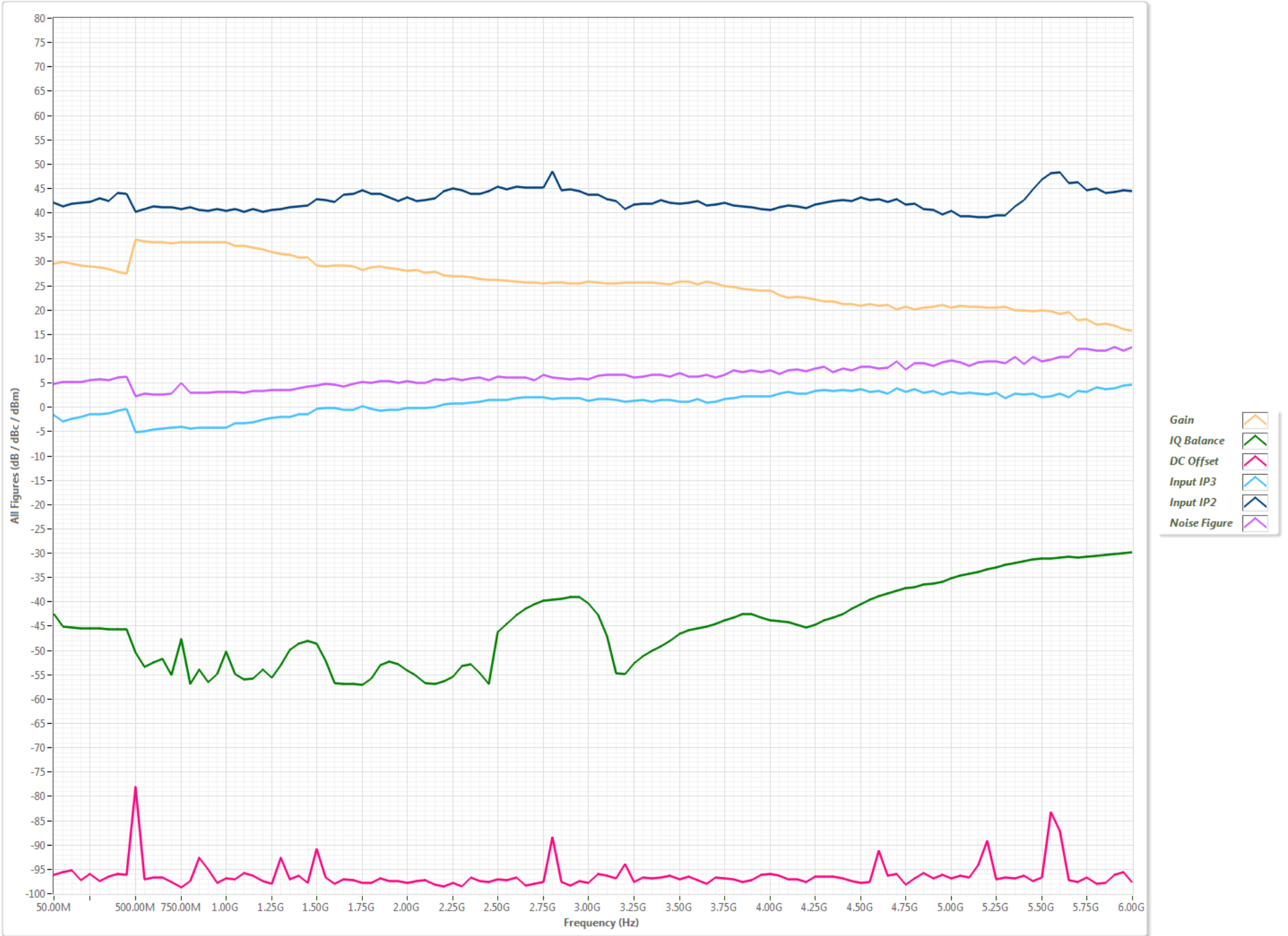
RX Figure vs Frequency w/ Gain=24.50dB



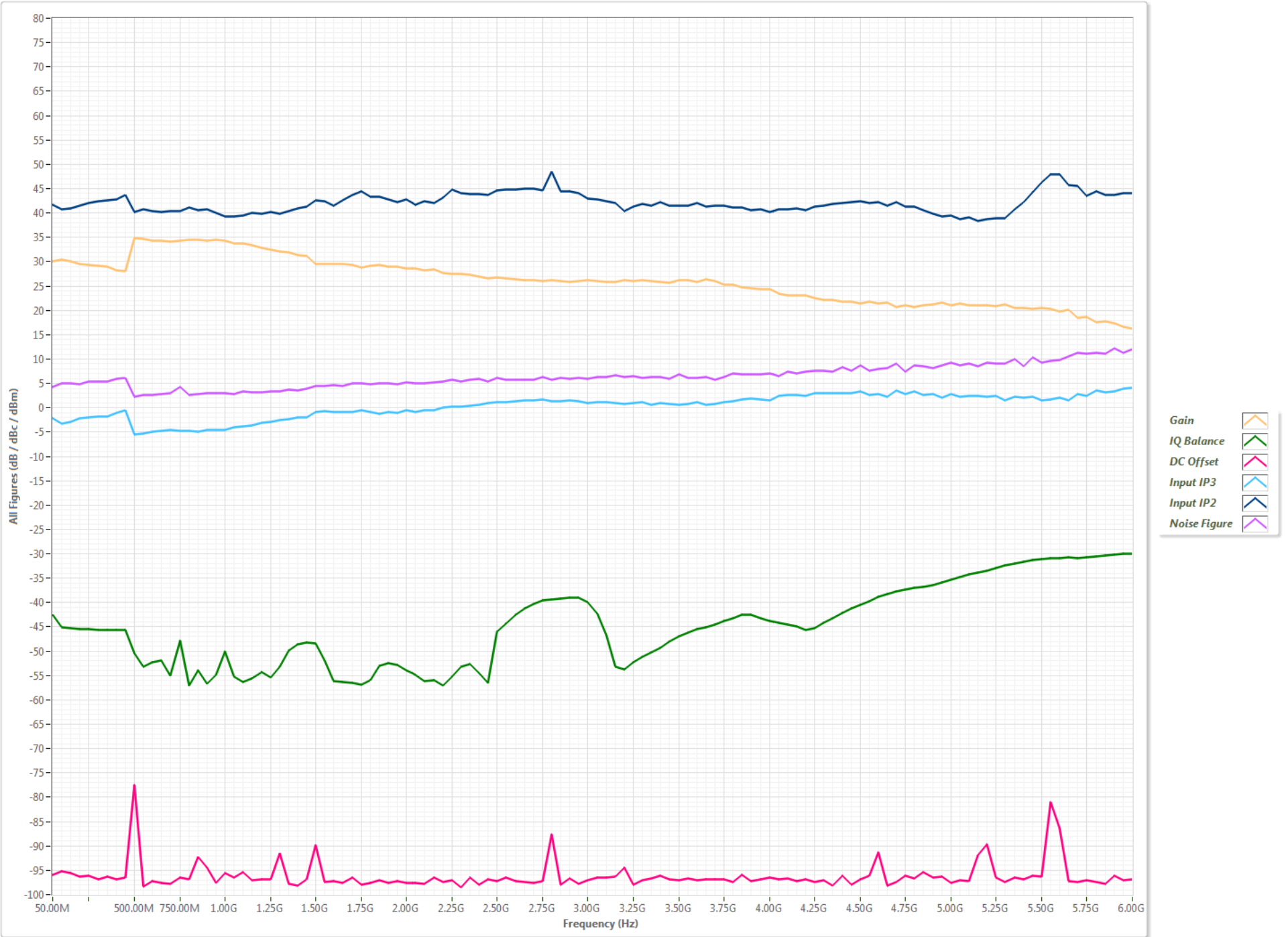
RX Figure vs Frequency w/ Gain=25.00dB



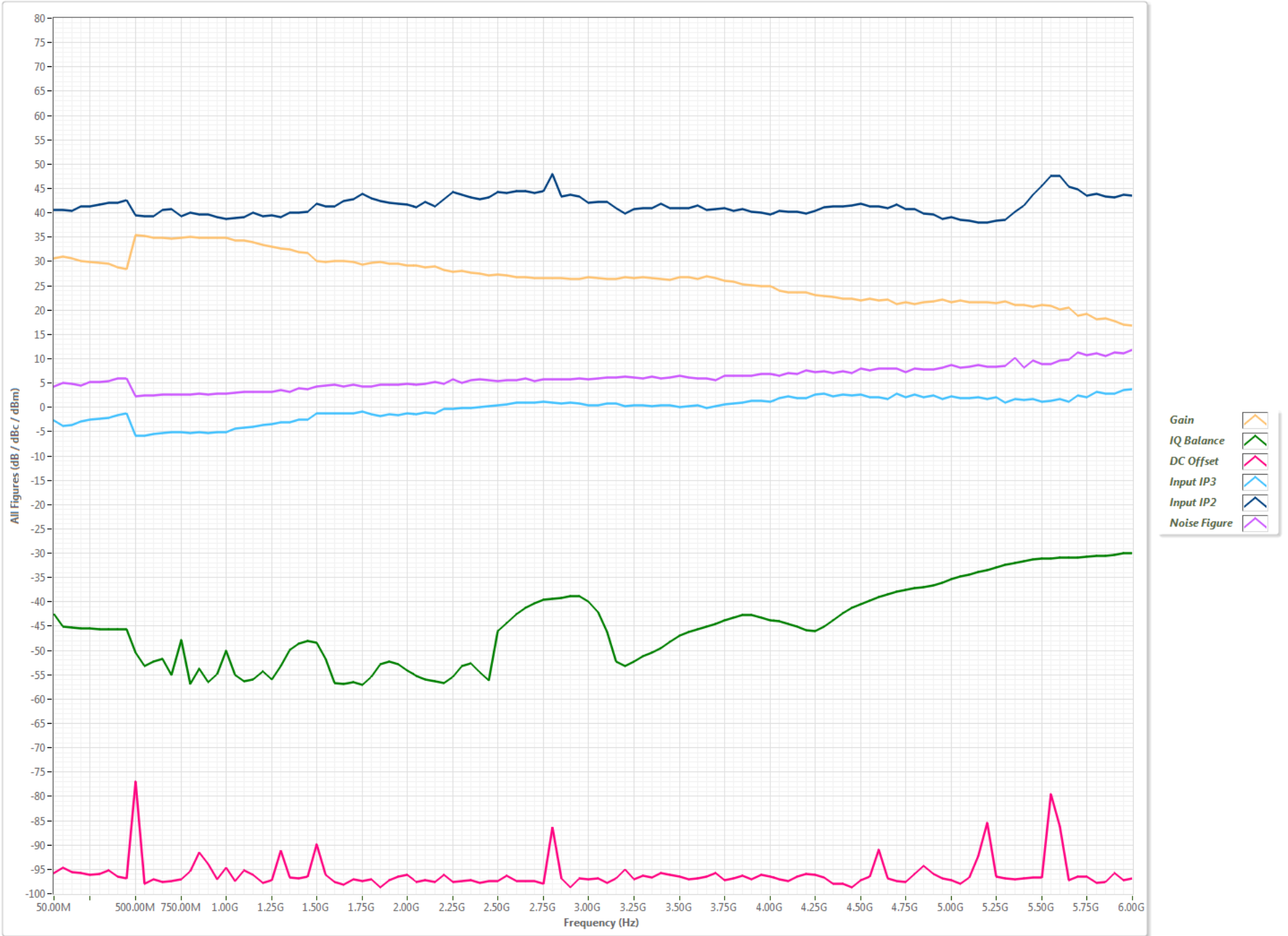
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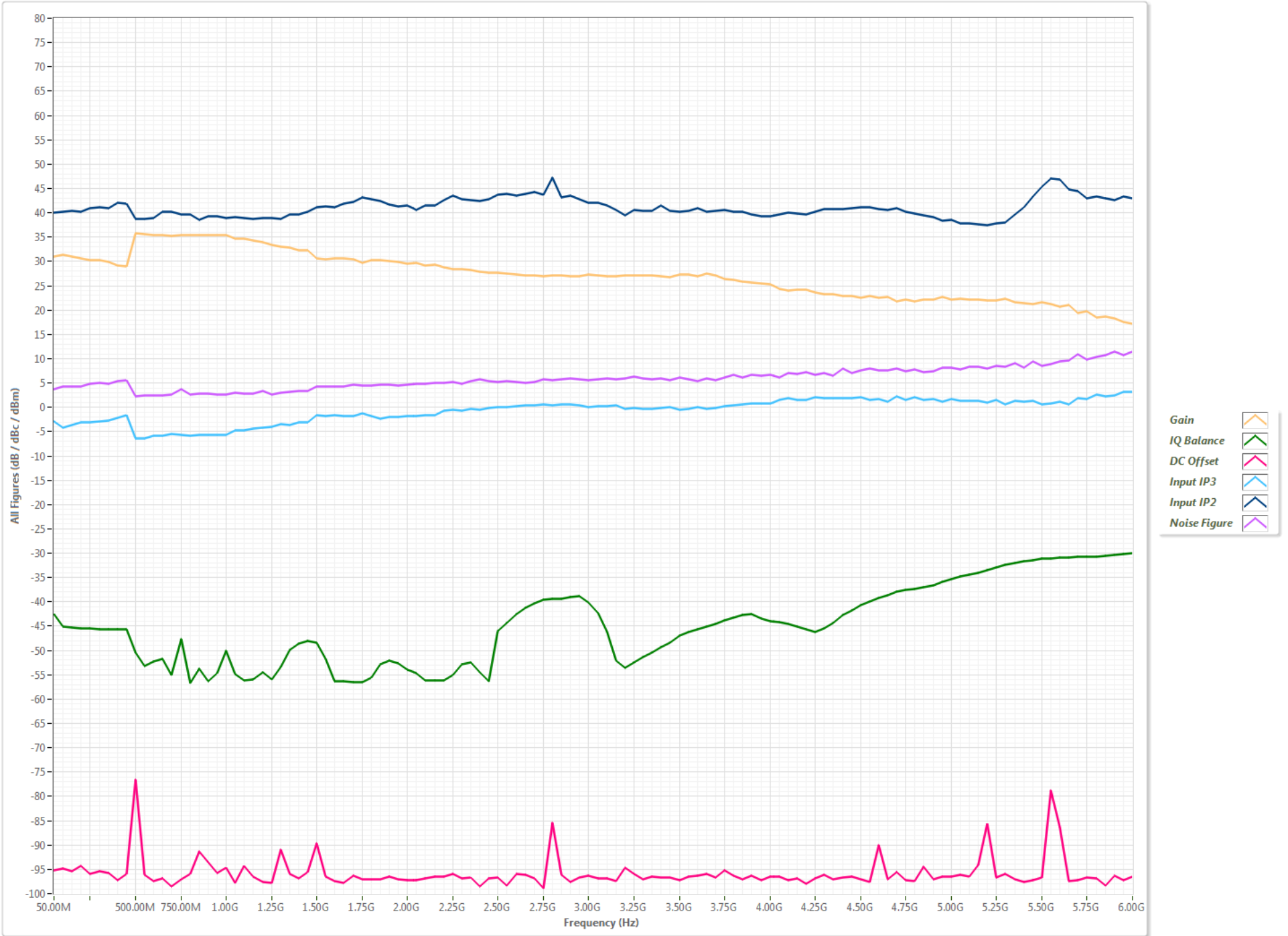
RX Figure vs Frequency w/ Gain=26.00dB



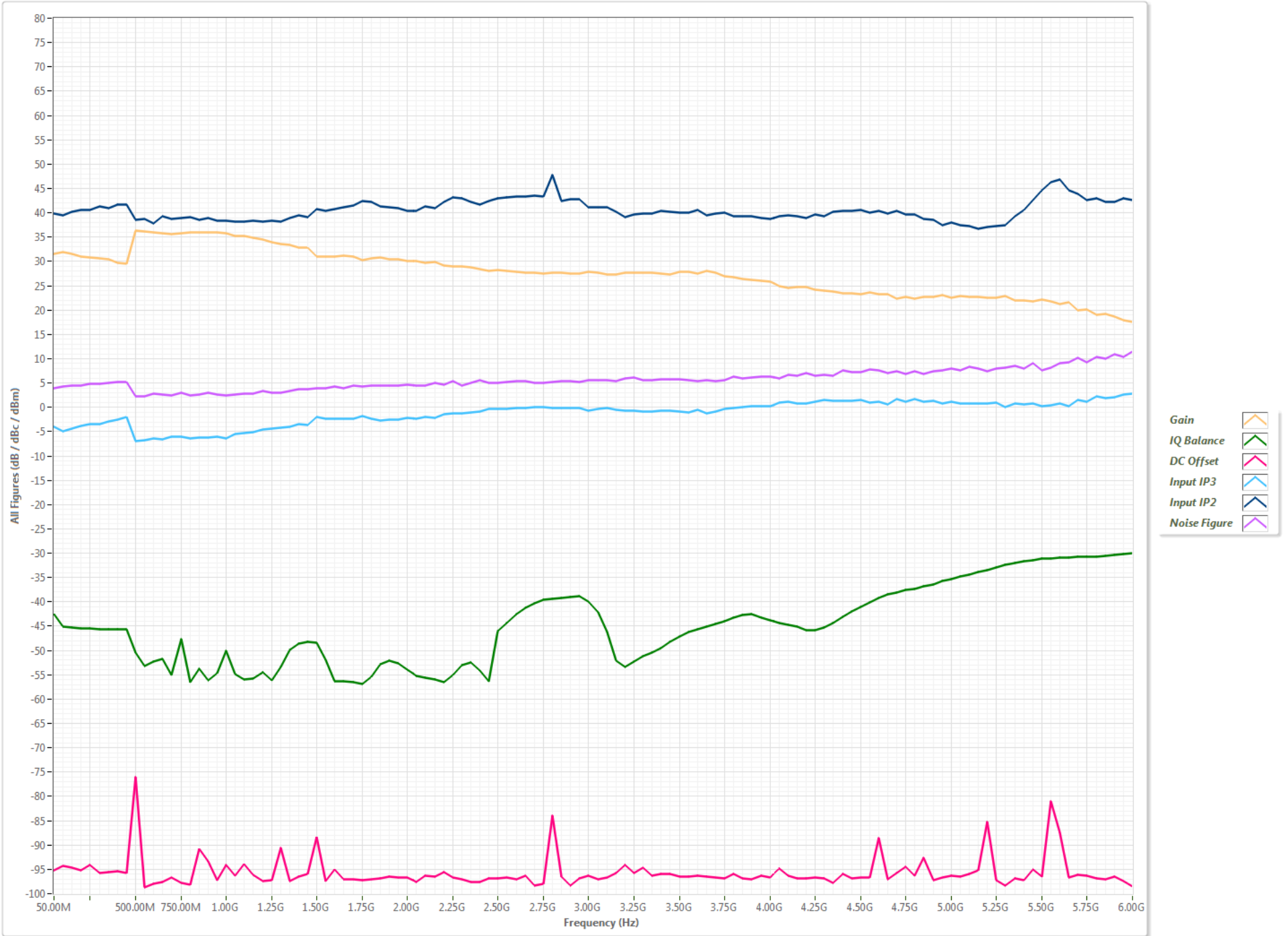
RX Figure vs Frequency w/ Gain=26.50dB



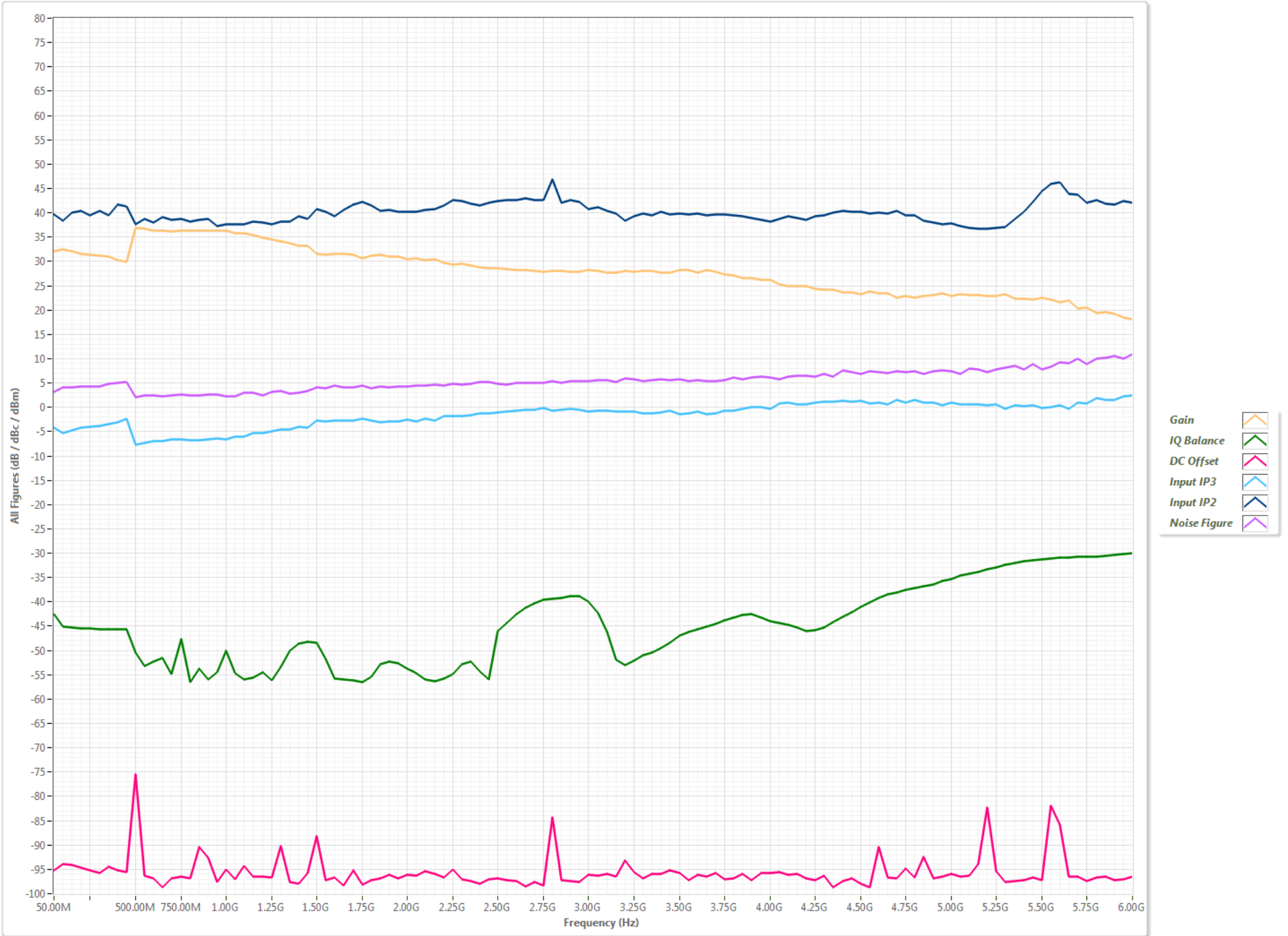
RX Figure vs Frequency w/ Gain=27.00dB



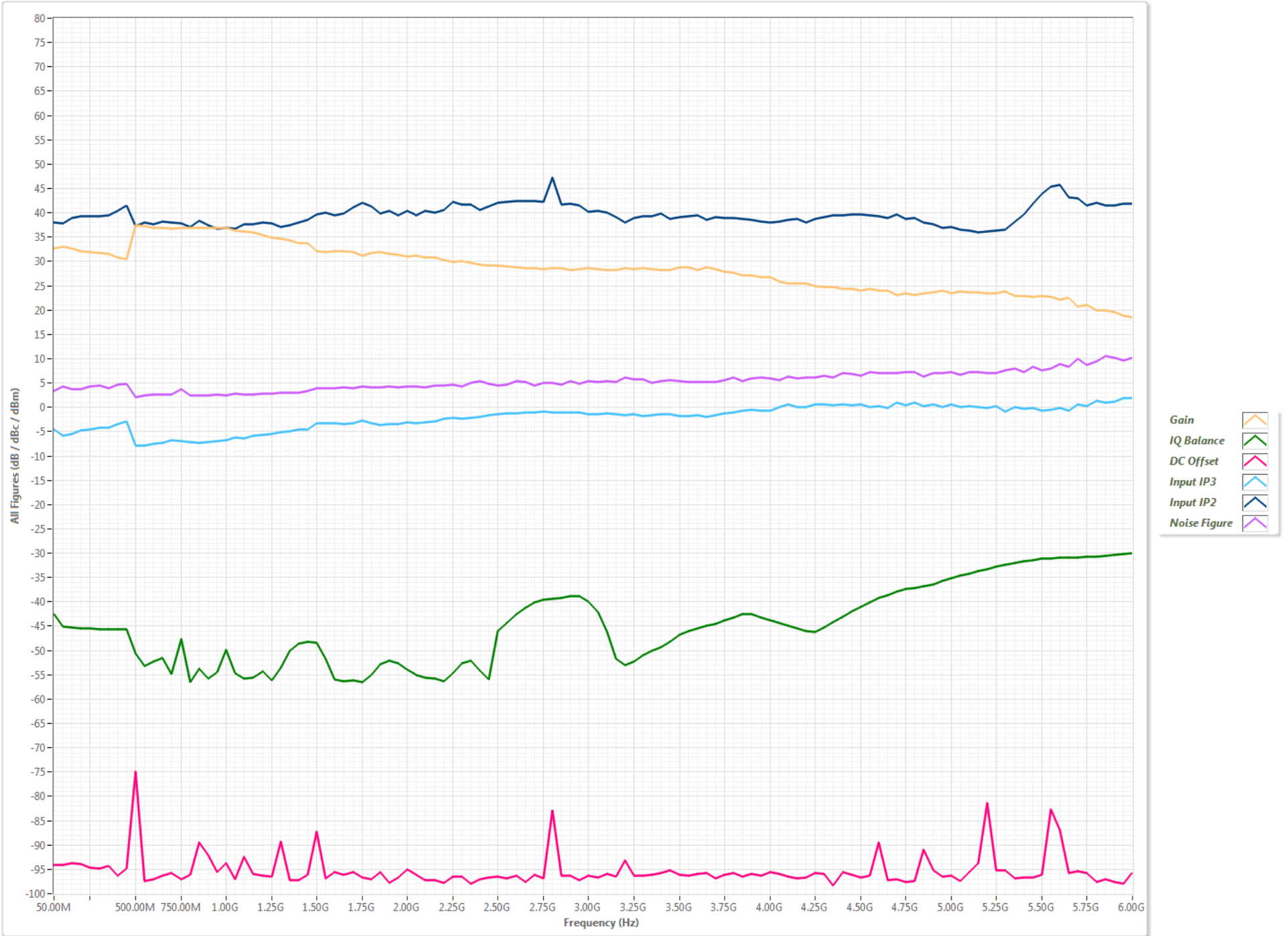
RX Figure vs Frequency w/ Gain=27.50dB



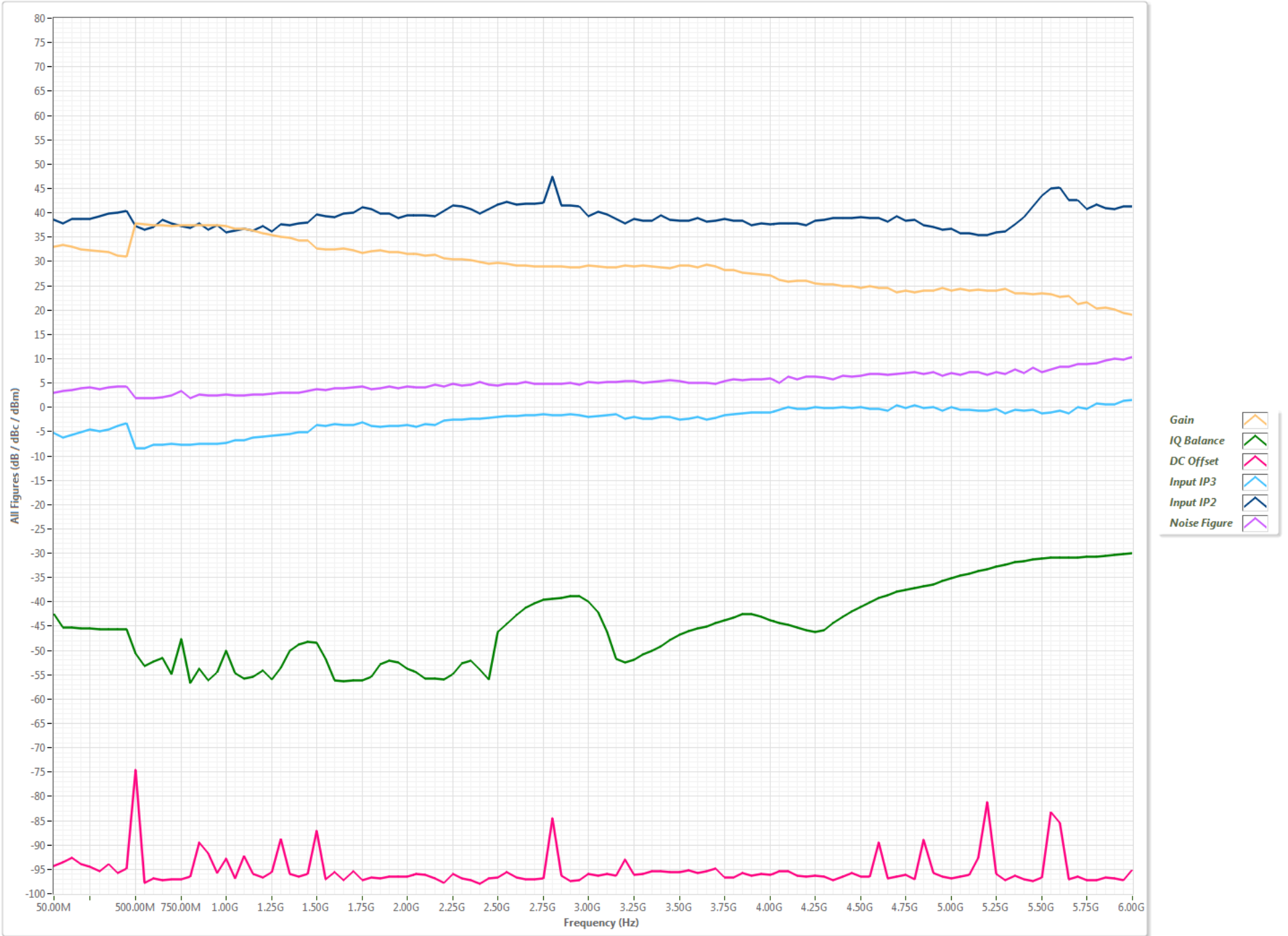
RX Figure vs Frequency w/ Gain=28.00dB



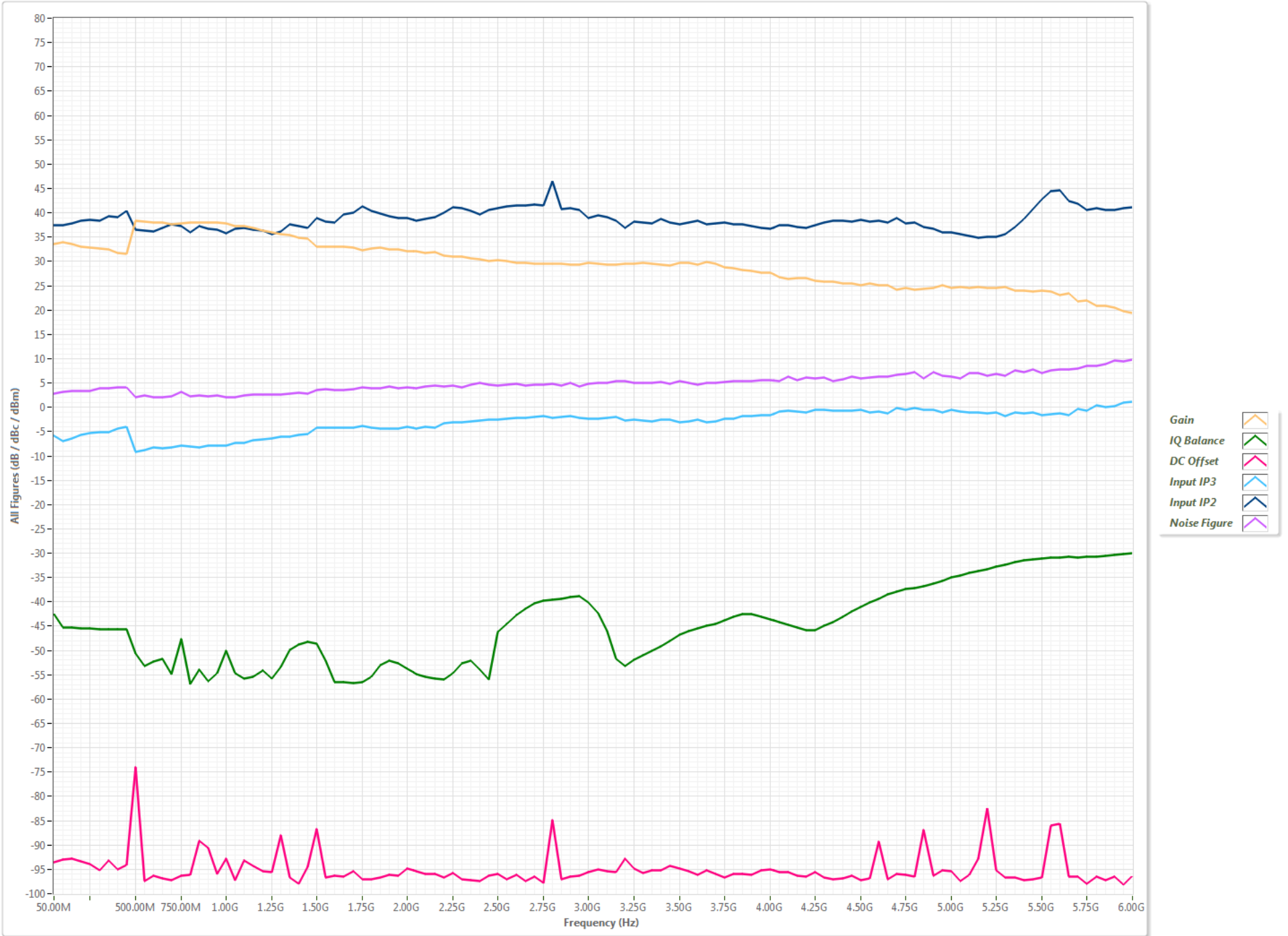
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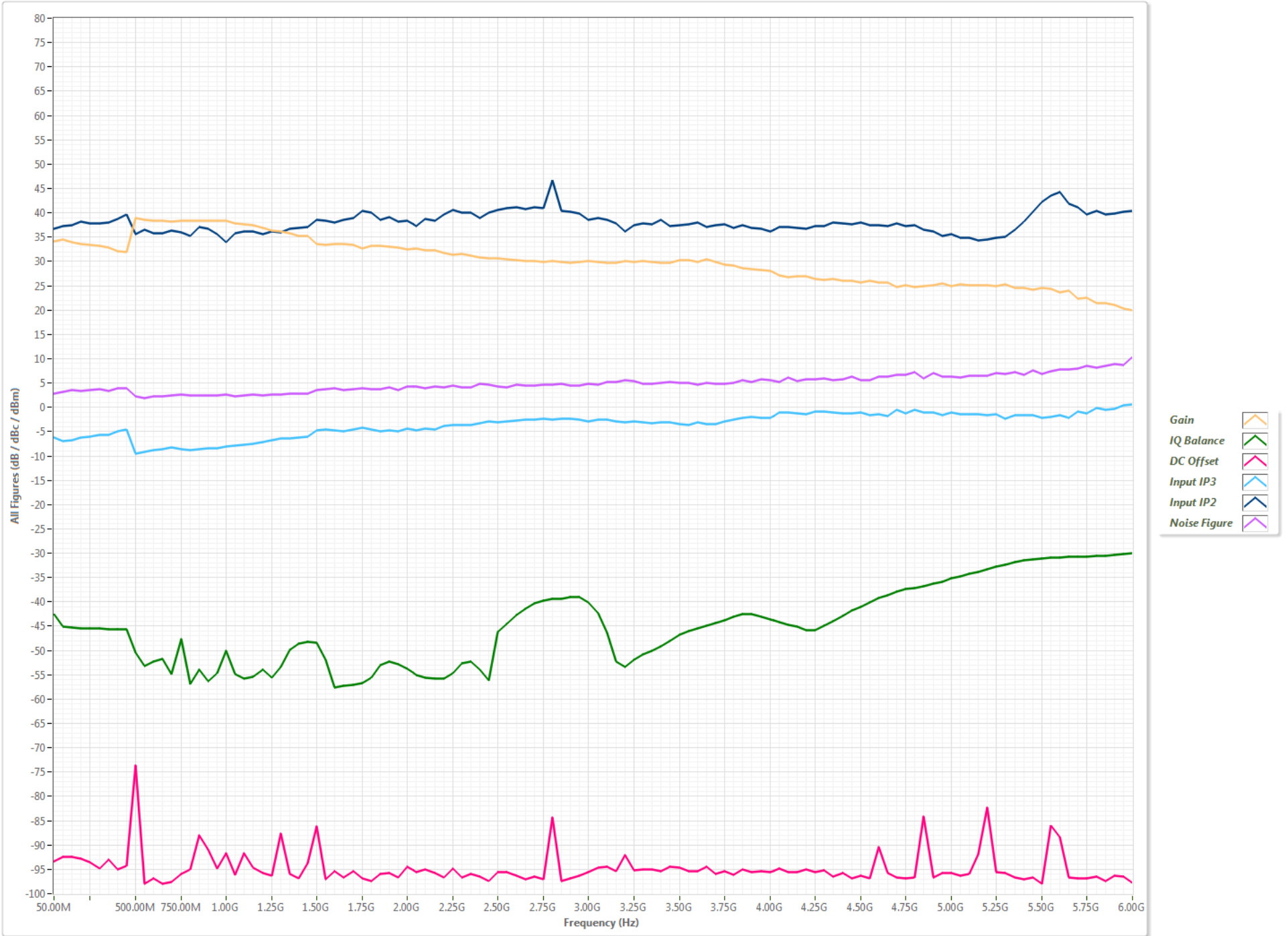
RX Figure vs Frequency w/ Gain=29.00dB



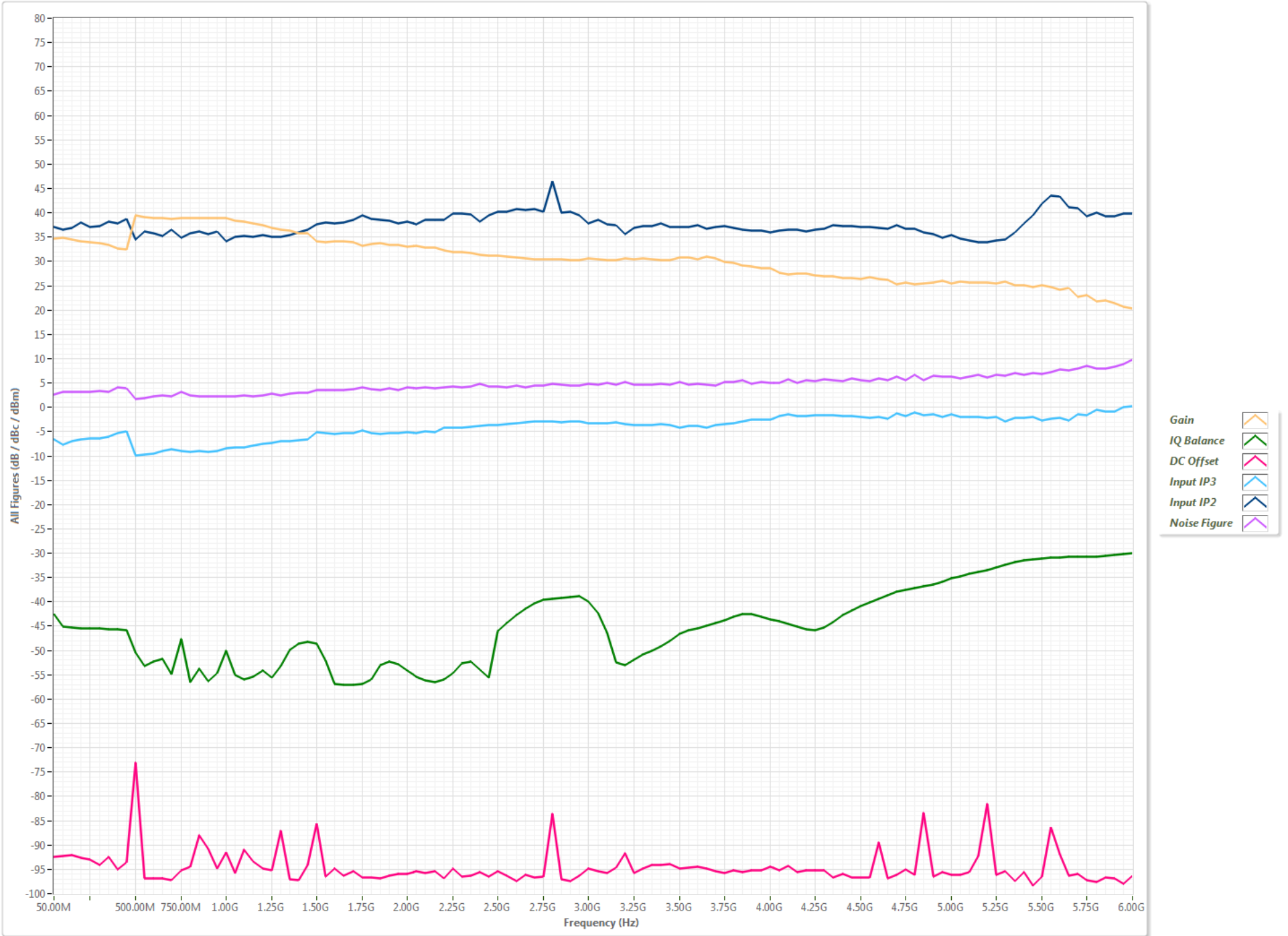
RX Figure vs Frequency w/ Gain=29.50dB



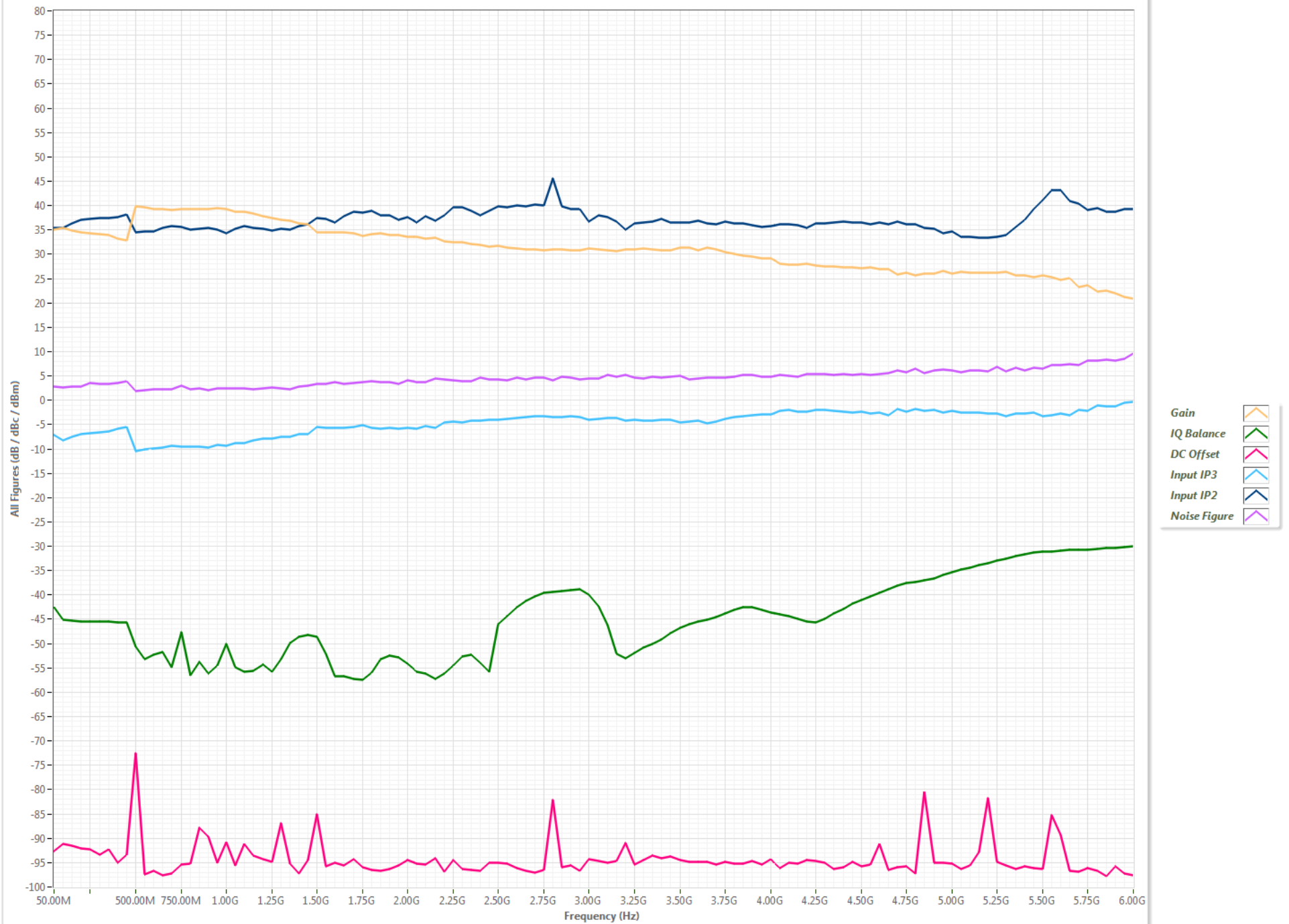
RX Figure vs Frequency w/ Gain=30.00dB



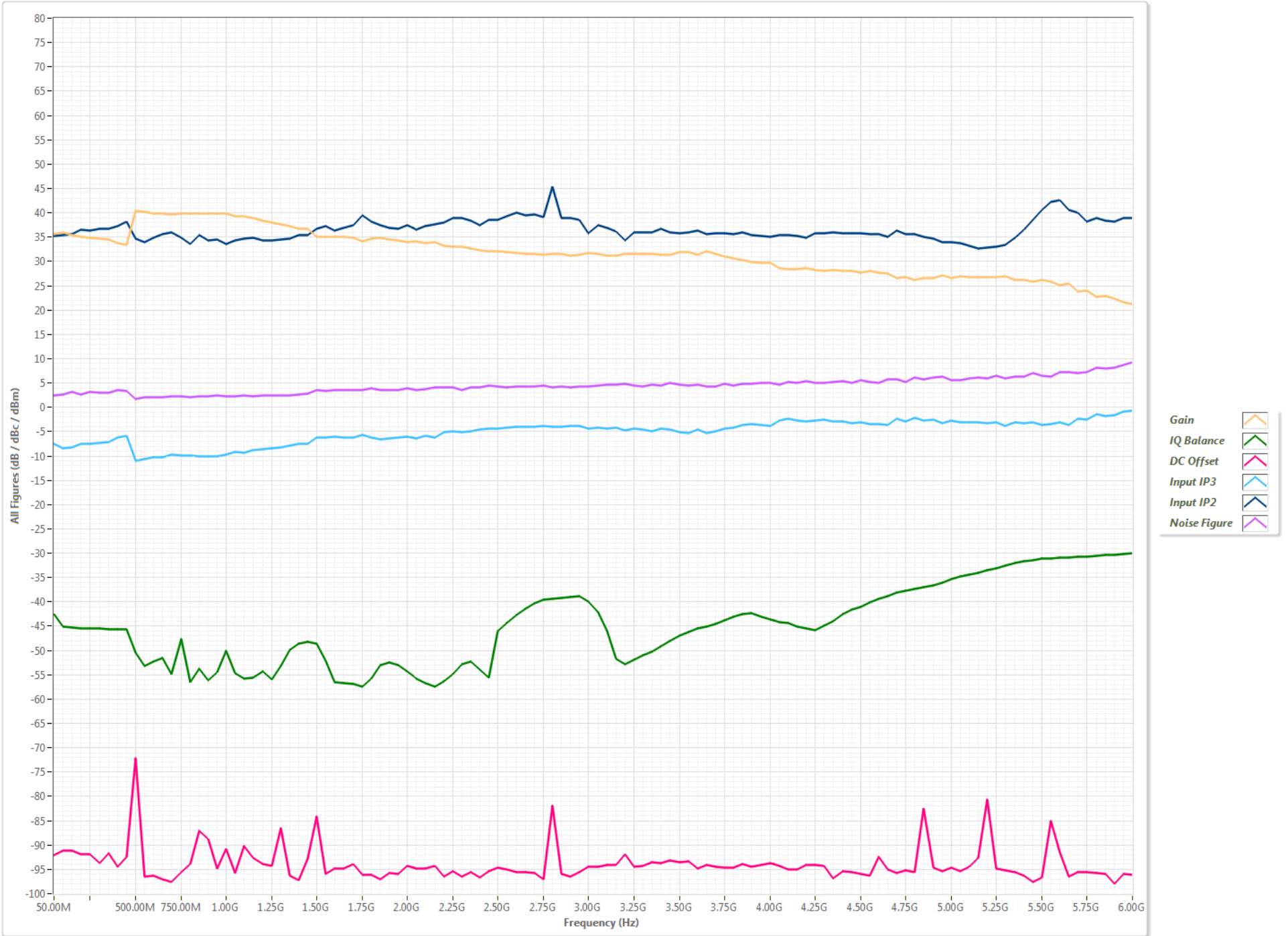
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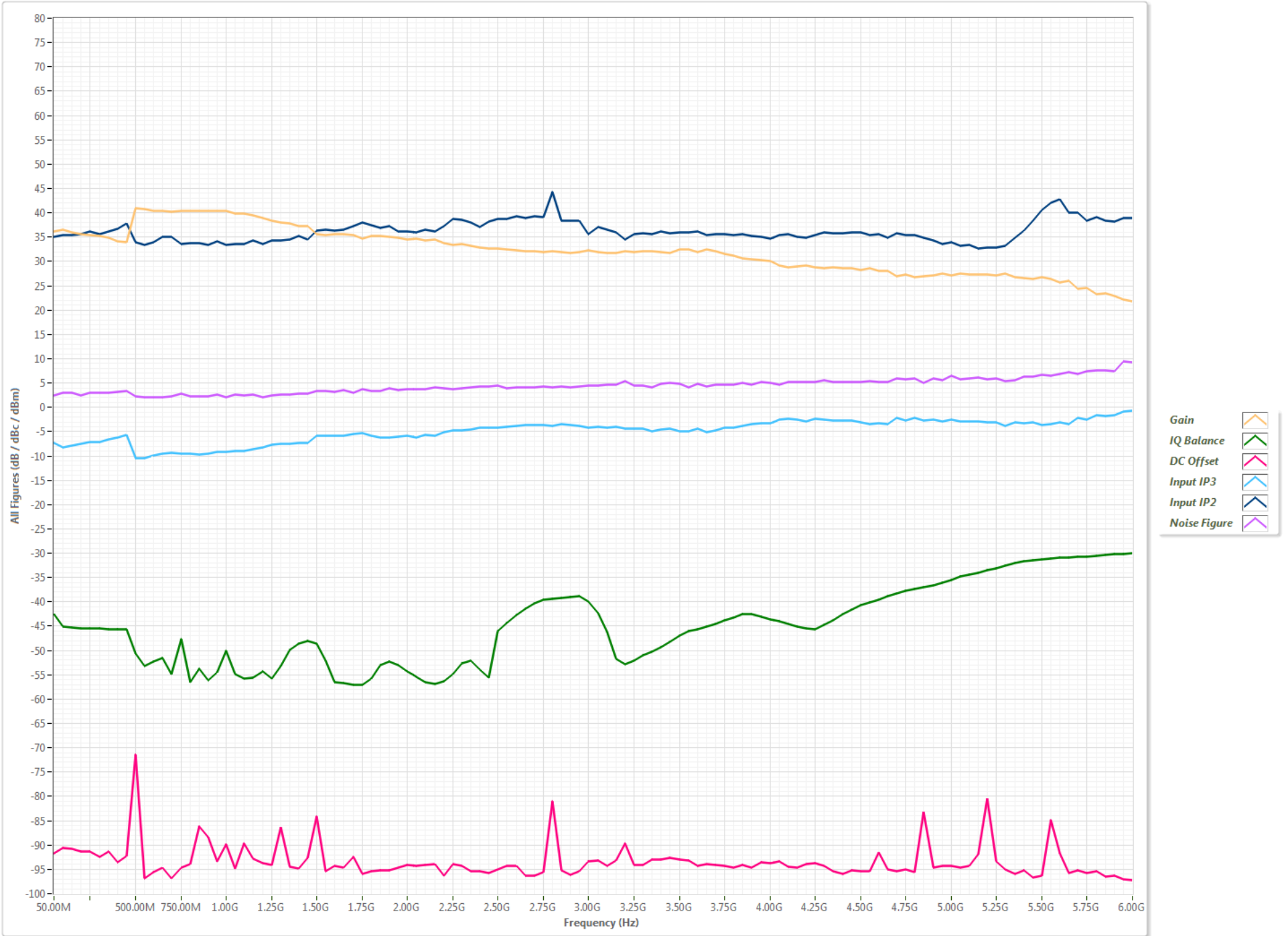
RX Figure vs Frequency w/ Gain=31.00dB



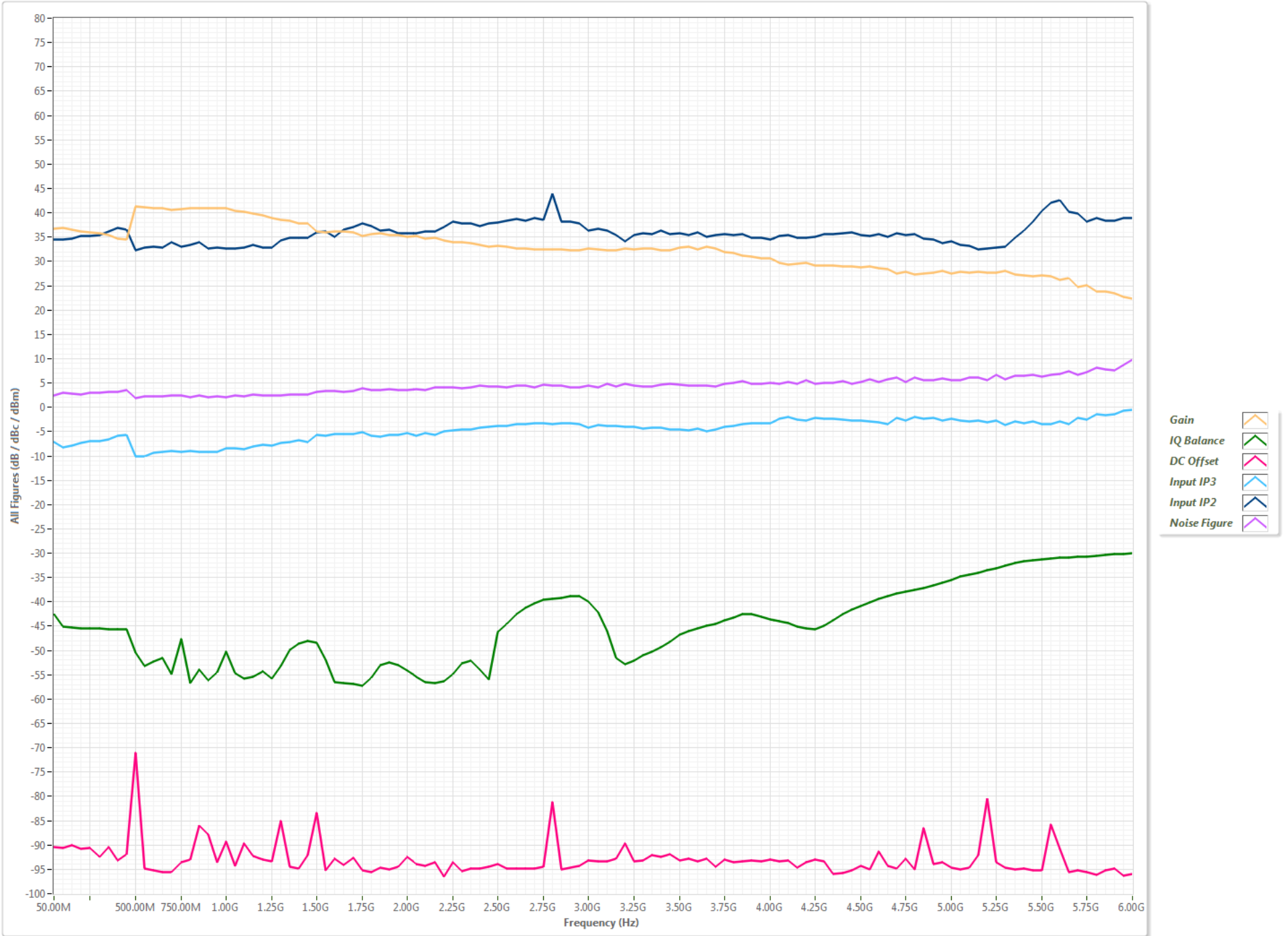
RX Figure vs Frequency w/ Gain=31.50dB



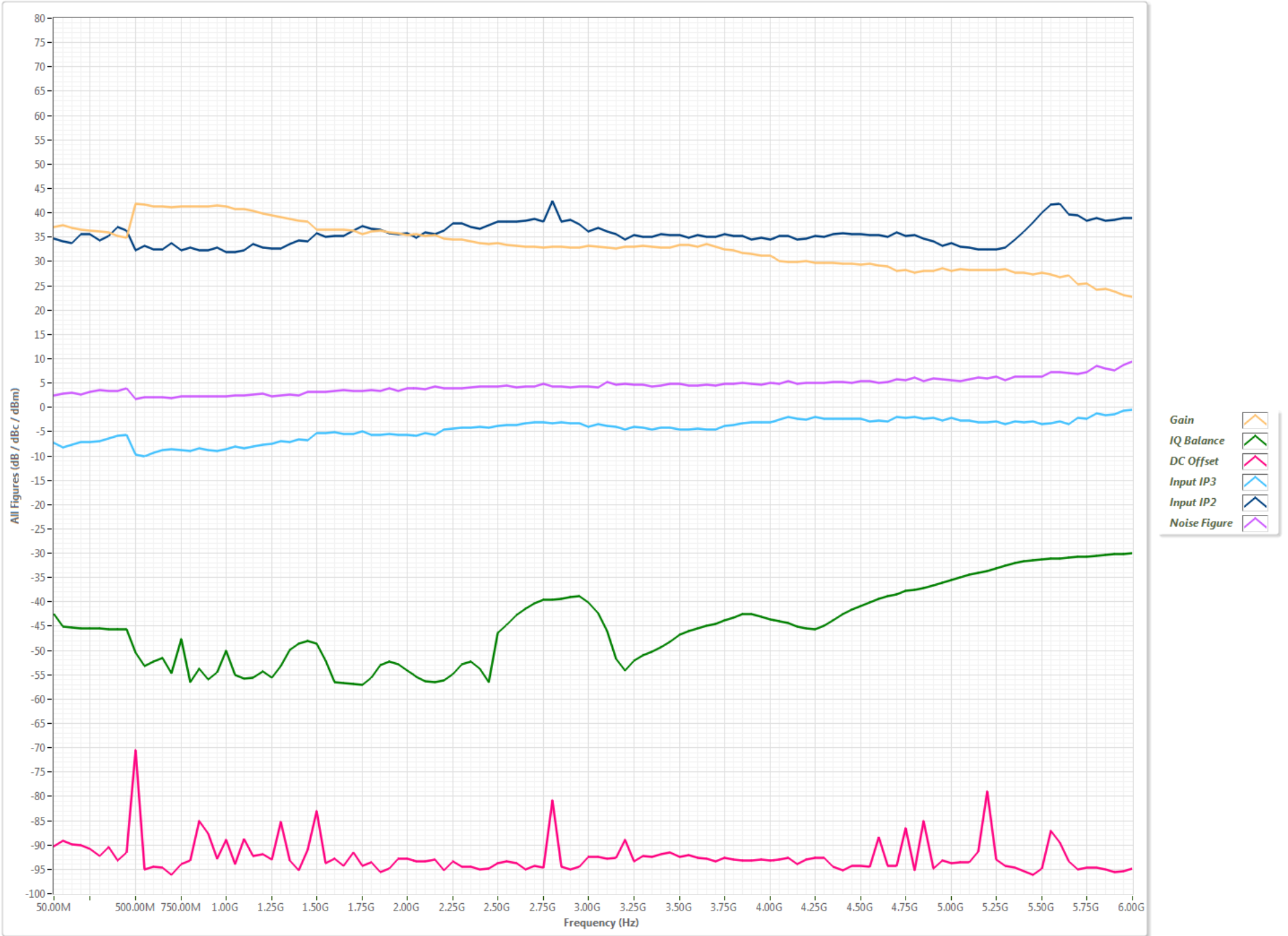
RX Figure vs Frequency w/ Gain=32.00dB



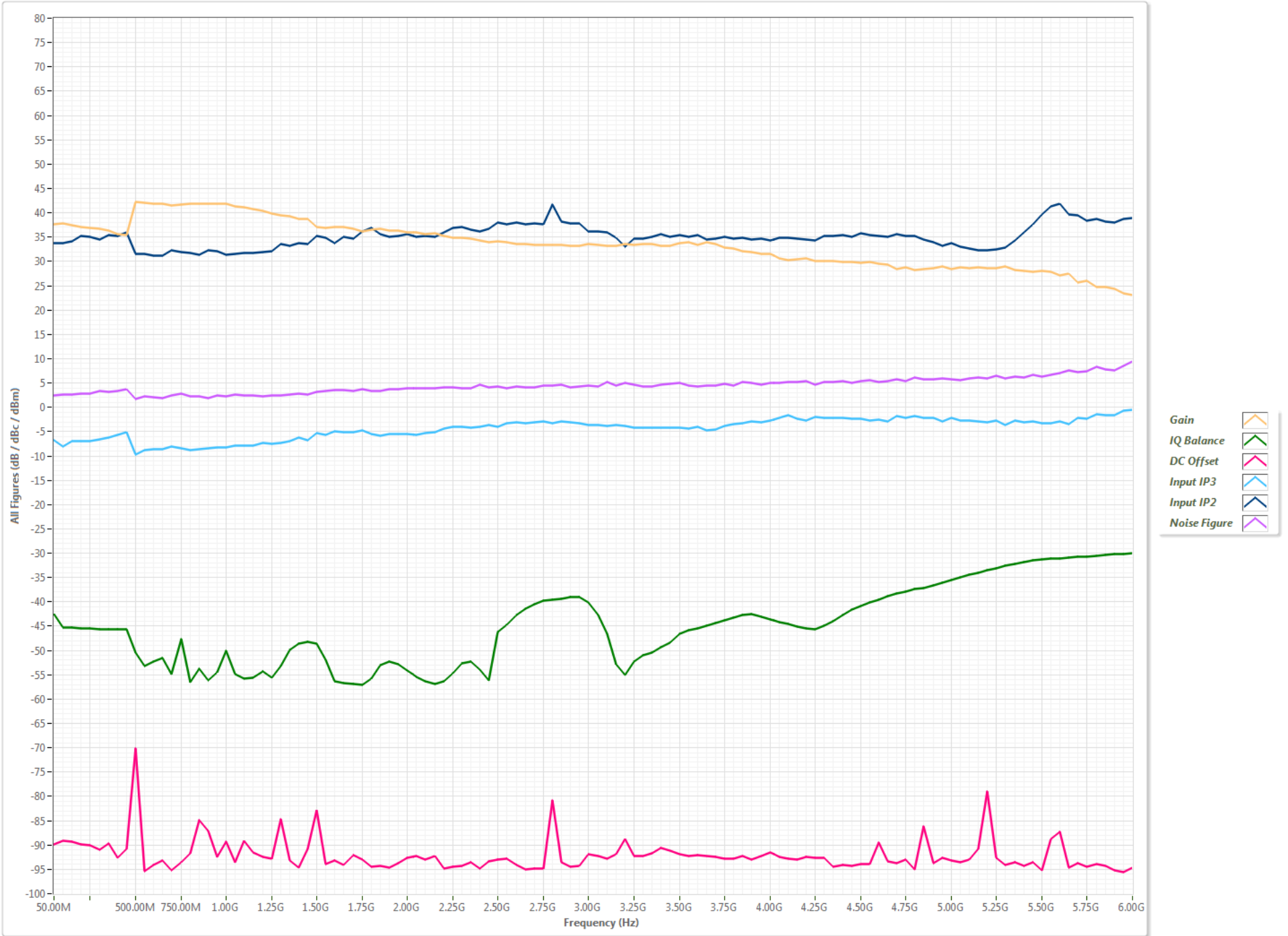
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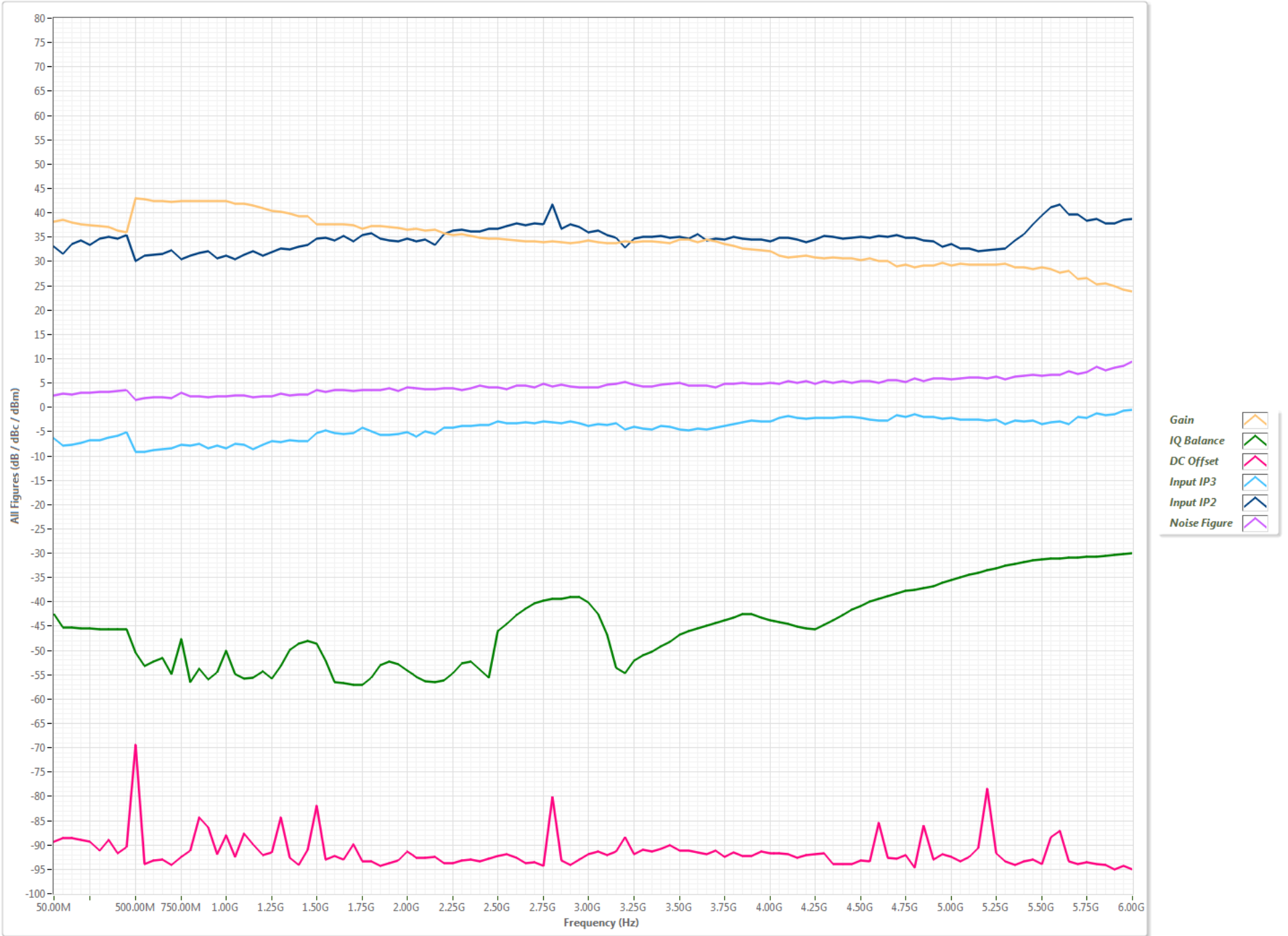
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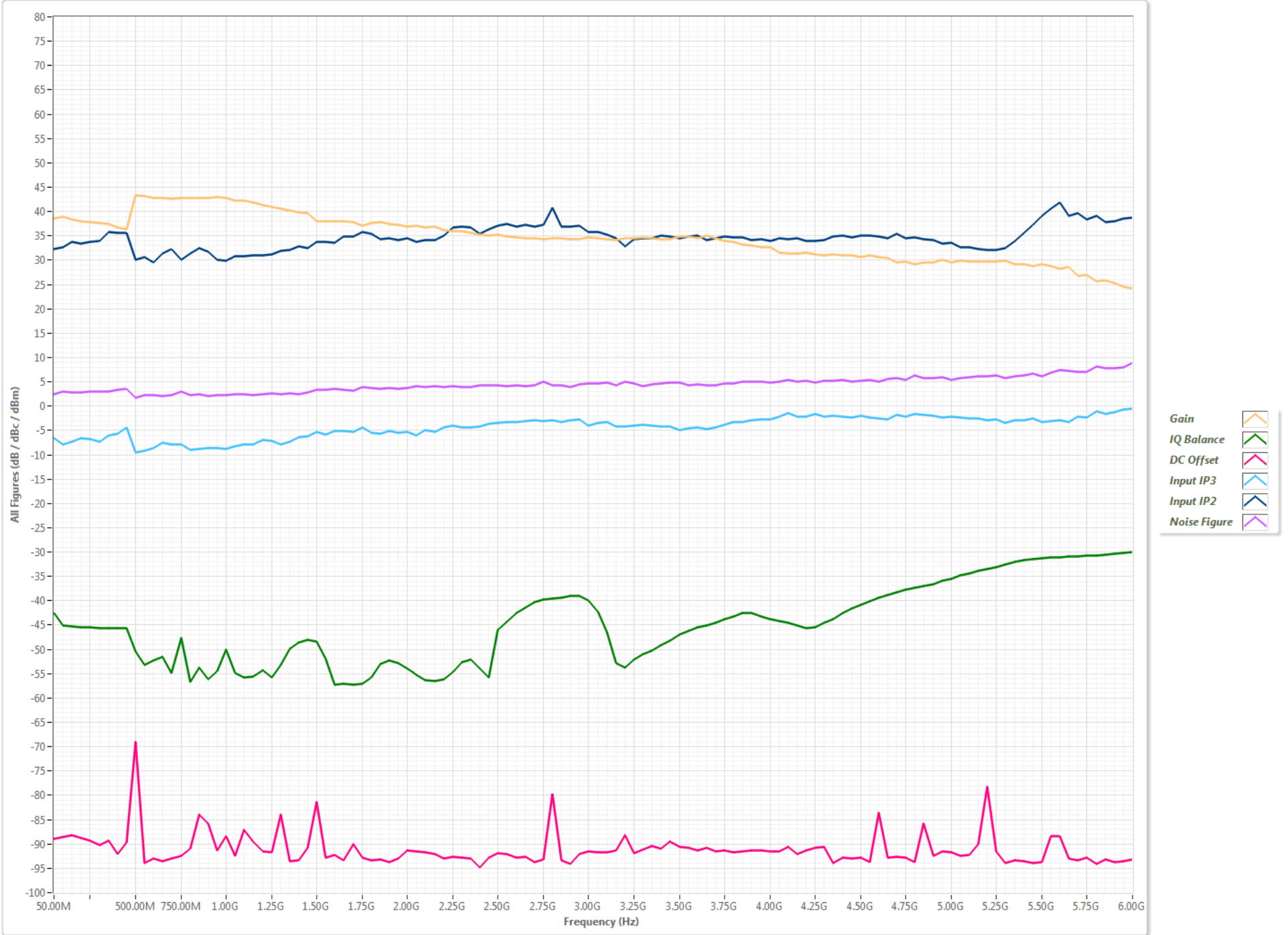
RX Figure vs Frequency w/ Gain=33.50dB



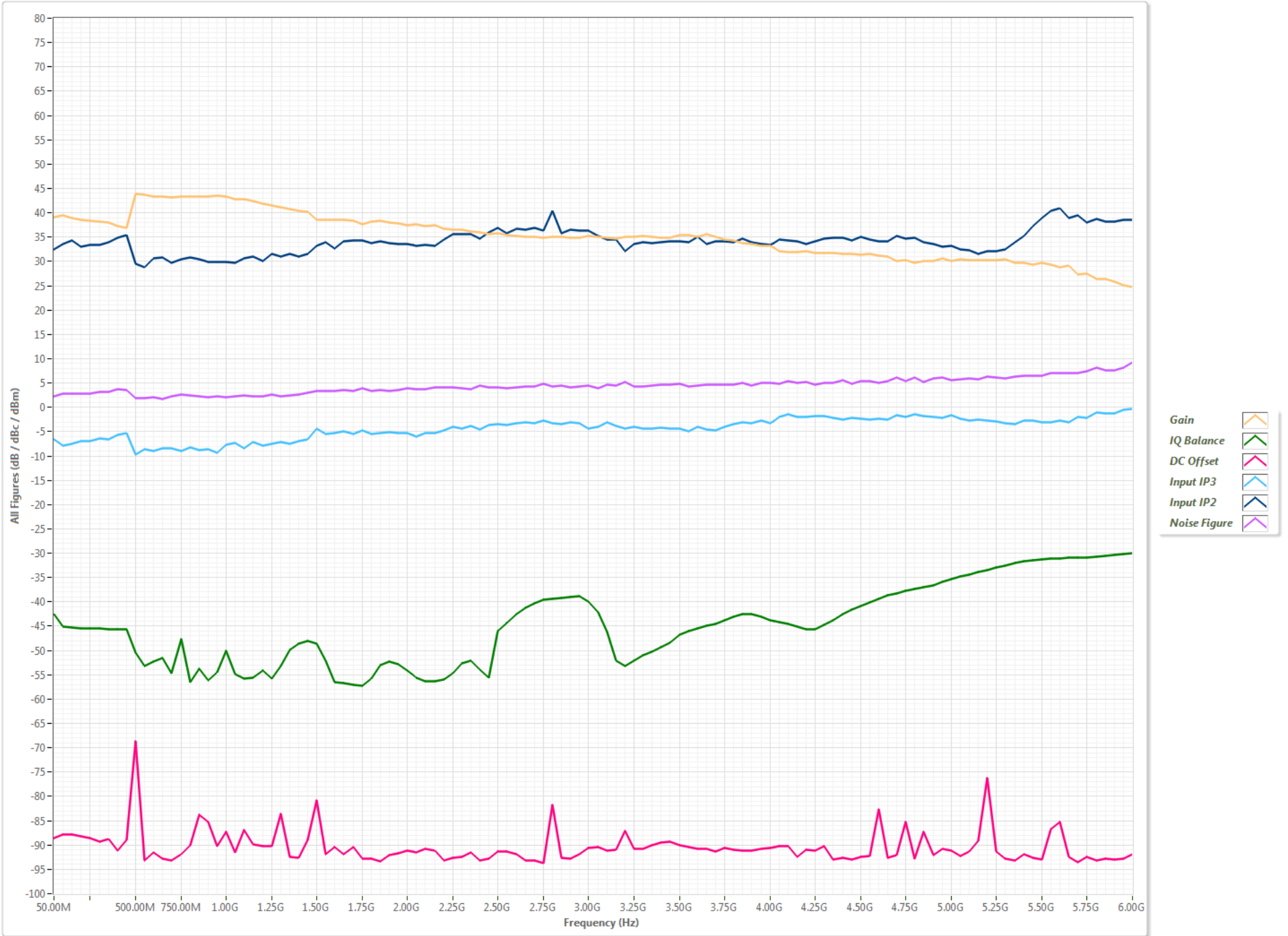
RX Figure vs Frequency w/ Gain=34.00dB



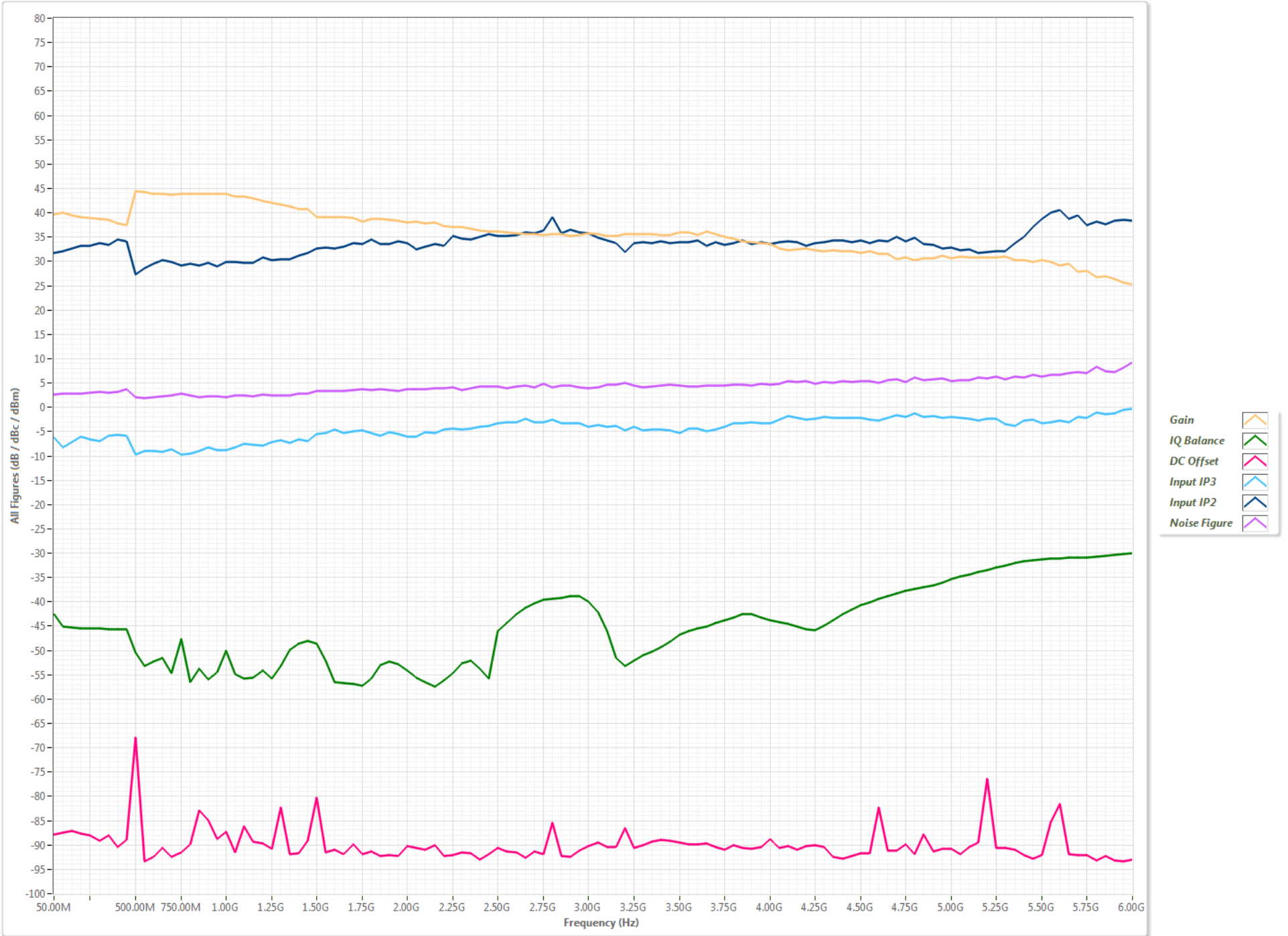
RX Figure vs Frequency w/ Gain=34.50dB



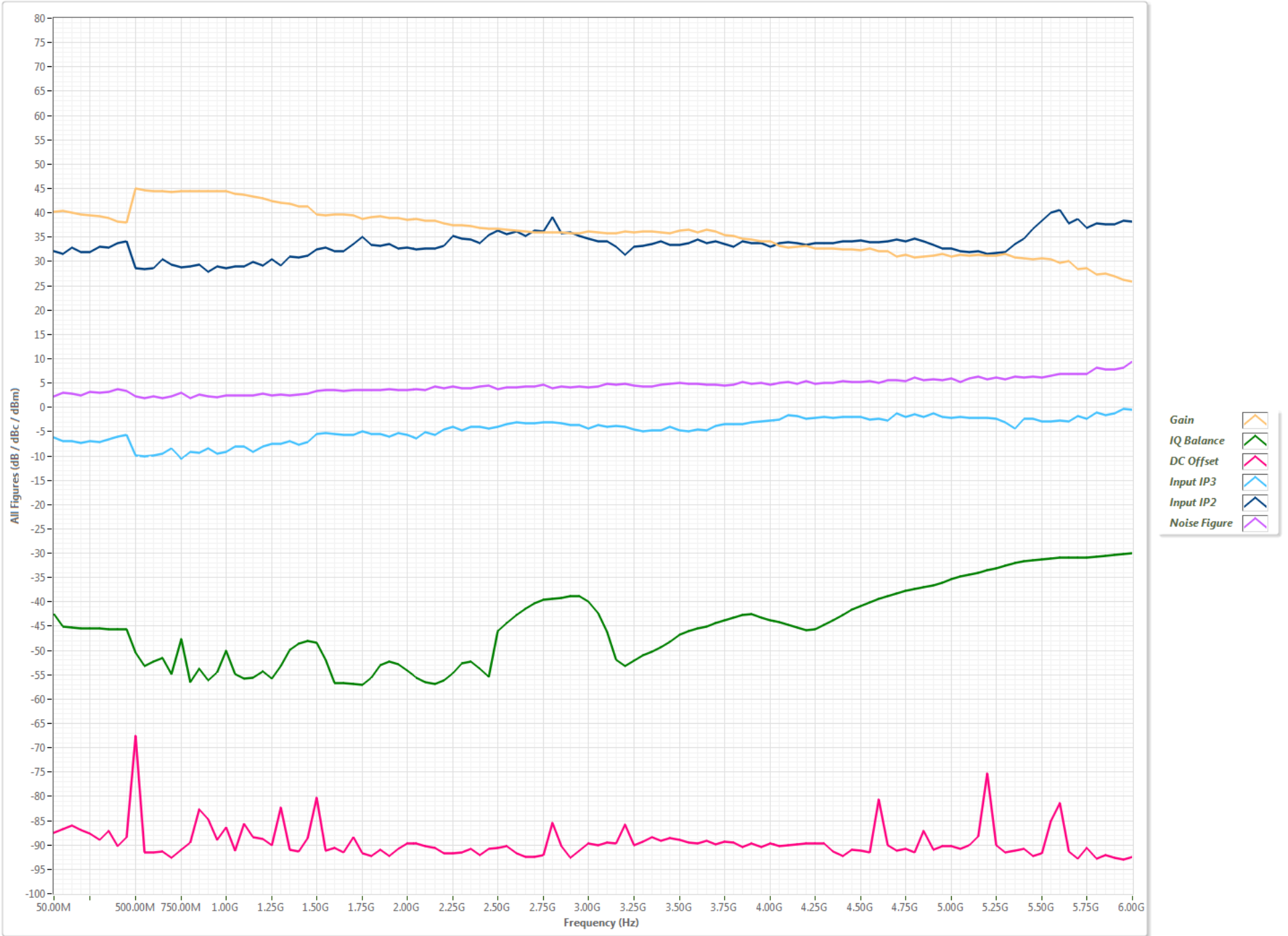
RX Figure vs Frequency w/ Gain=35.00dB



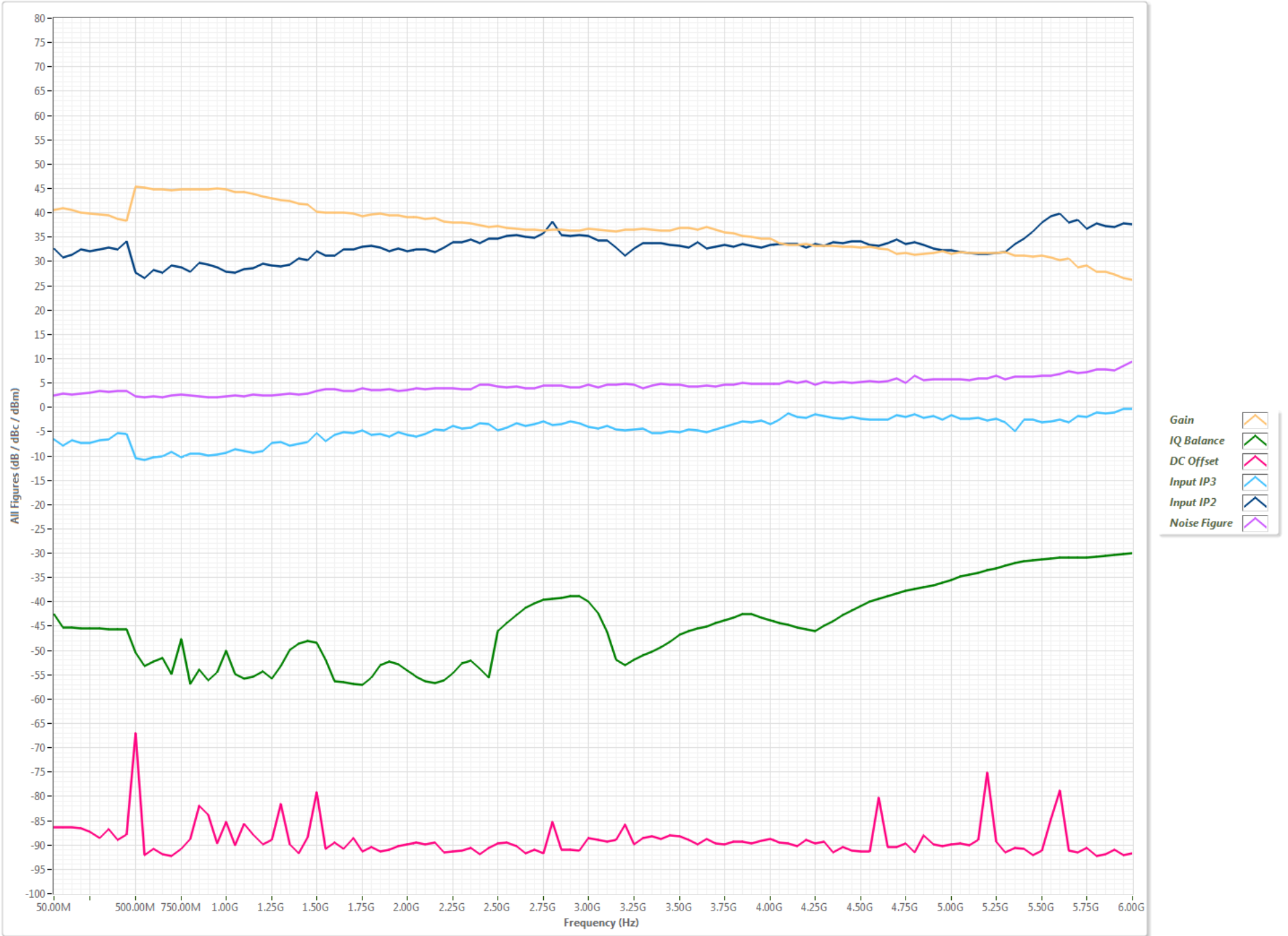
RX Figure vs Frequency w/ Gain=35.50dB



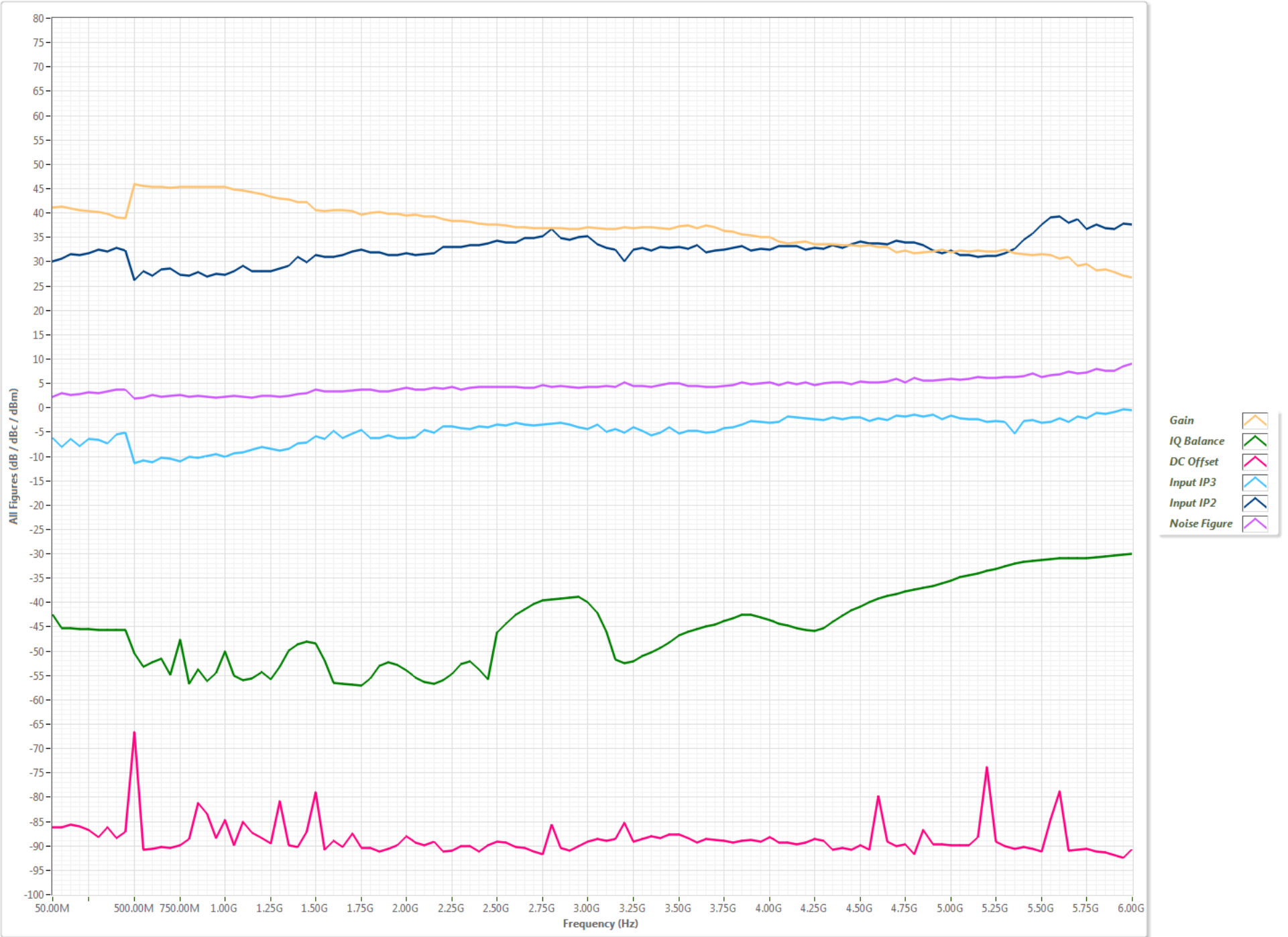
RX Figure vs Frequency w/ Gain=36.00dB



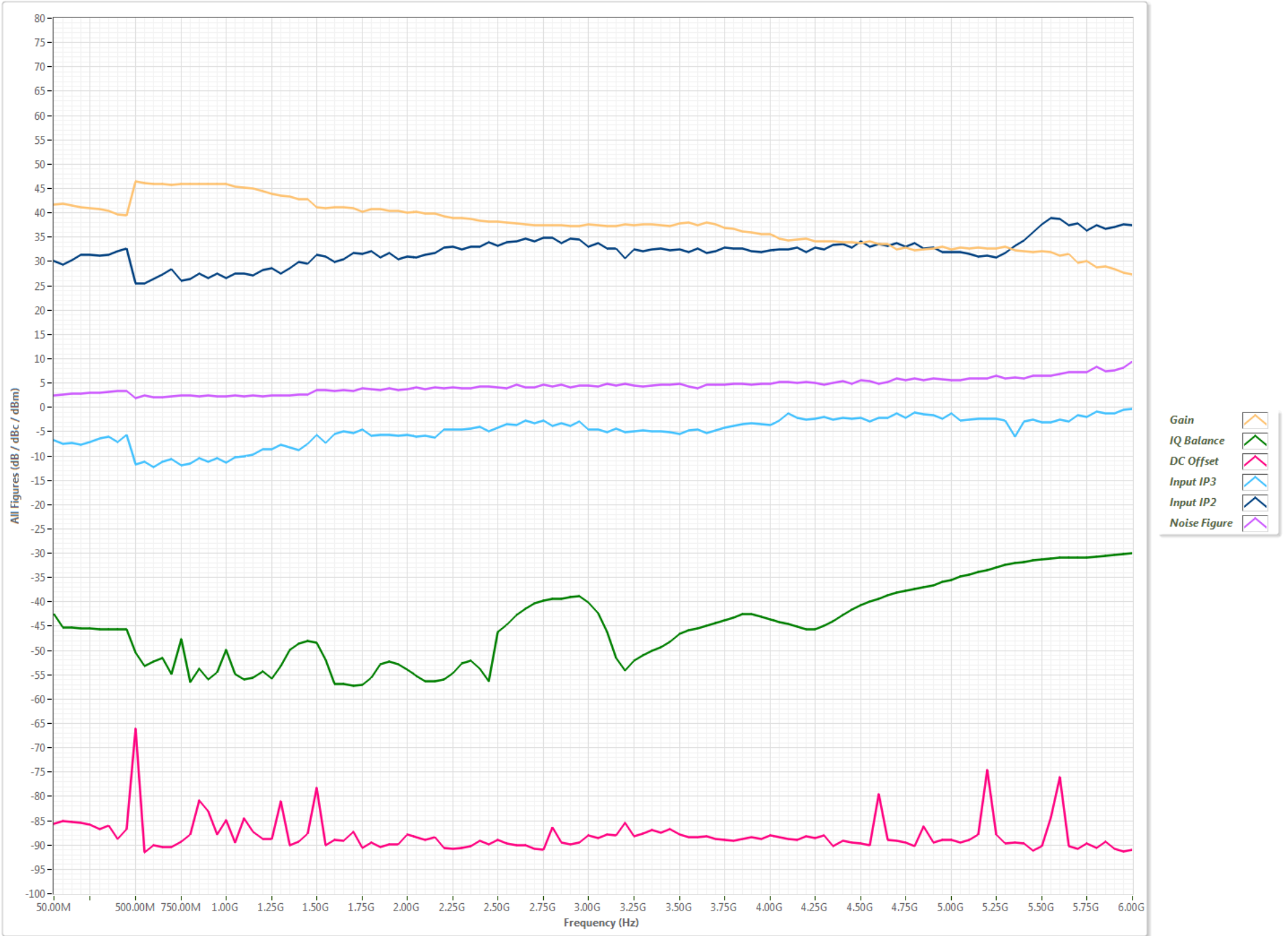
RX Figure vs Frequency w/ Gain=36.50dB



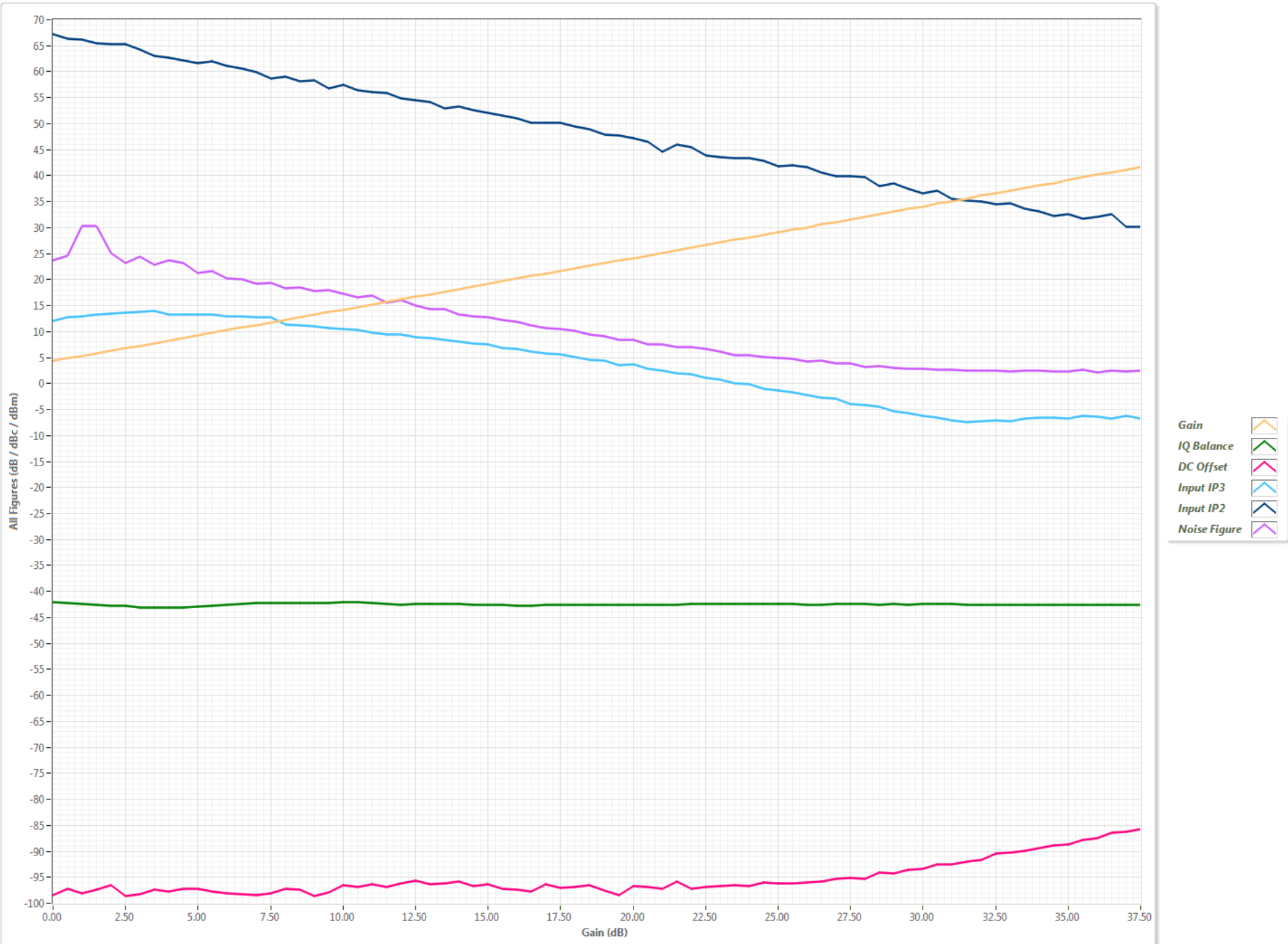
RX Figure vs Frequency w/ Gain=37.00dB



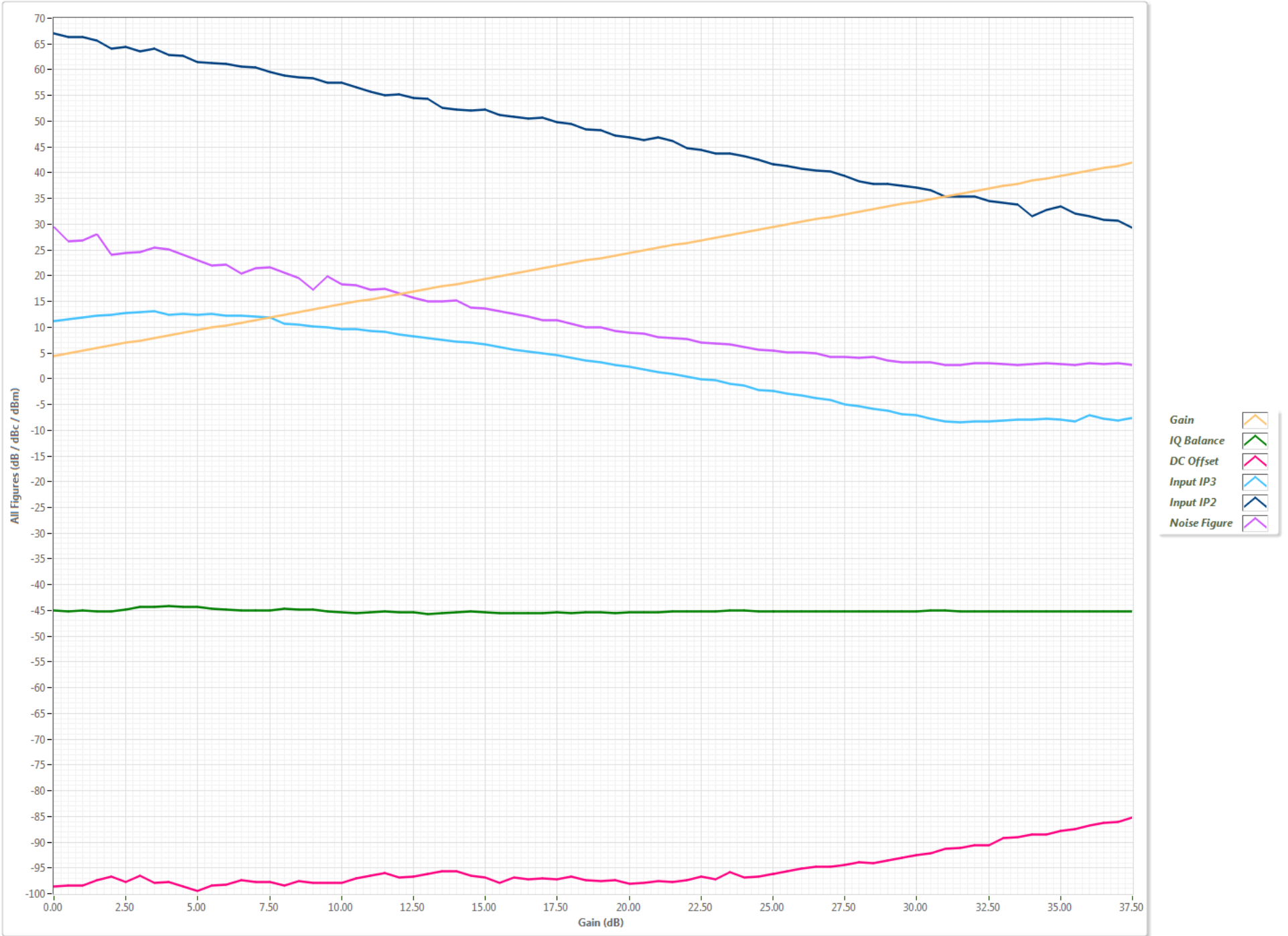
RX Figure vs Frequency w/ Gain=37.50dB



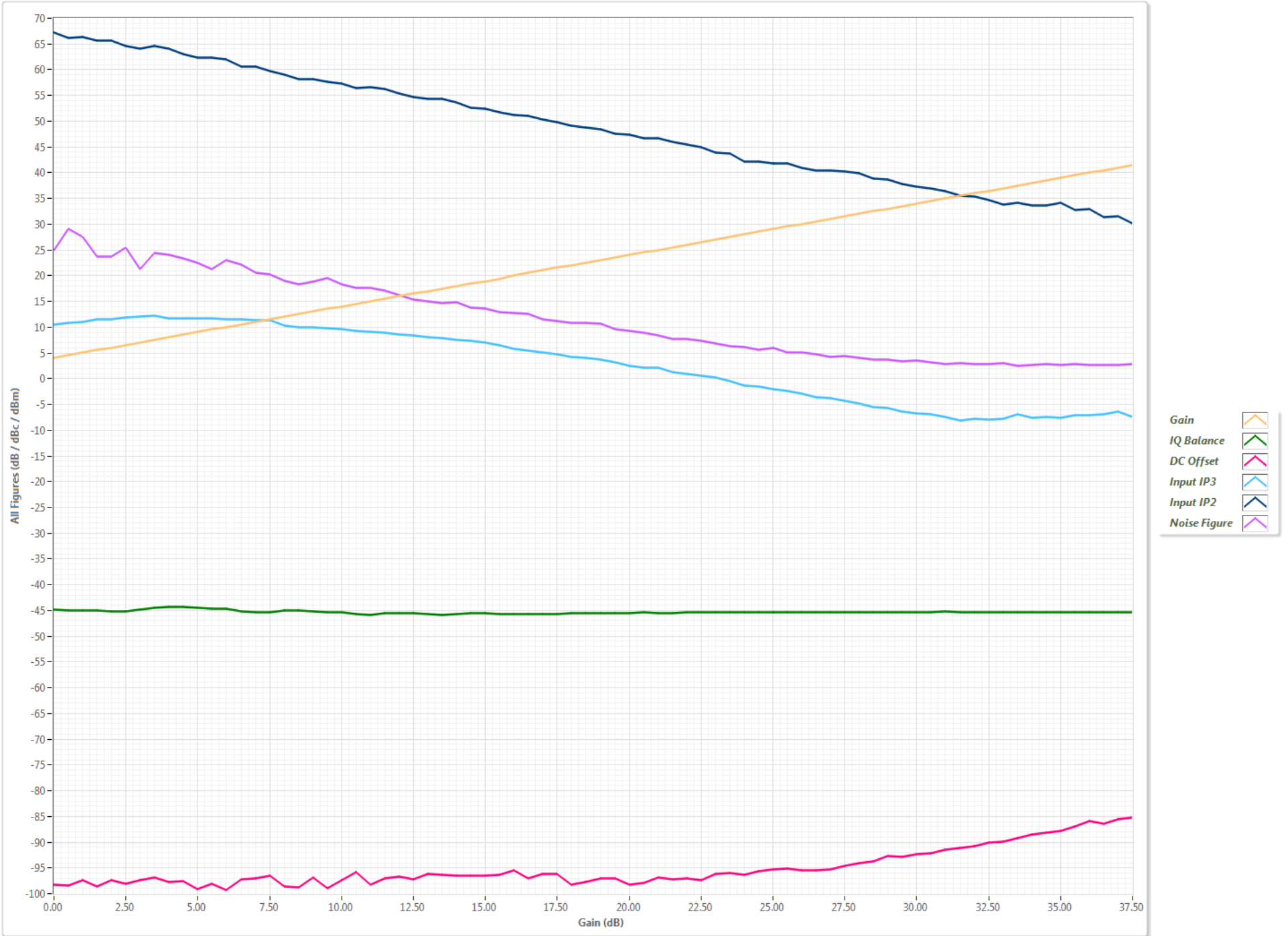
RX Figure vs Gain w/ Frequency=50.00MHz



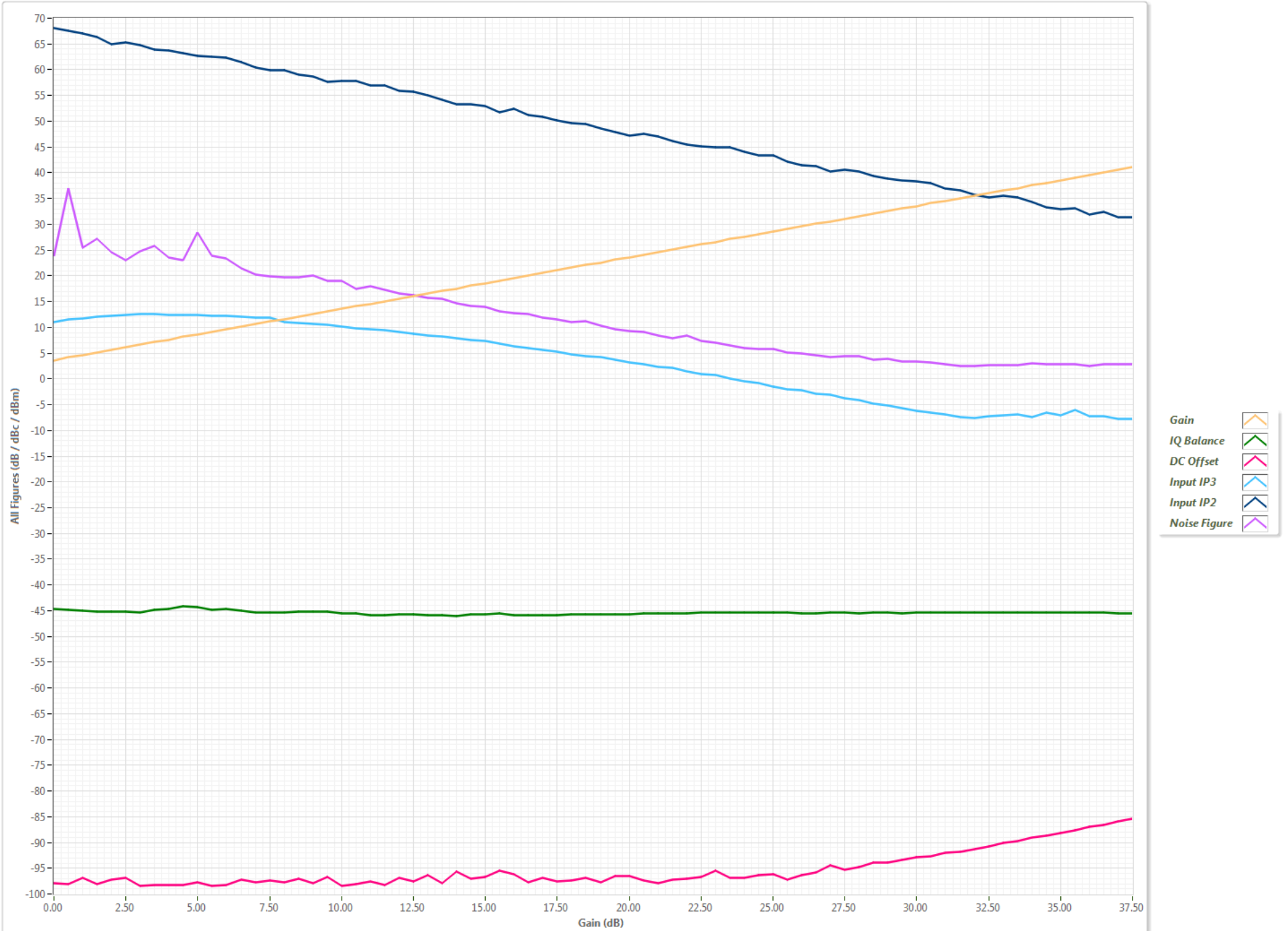
RX Figure vs Gain w/ Frequency=100.00MHz



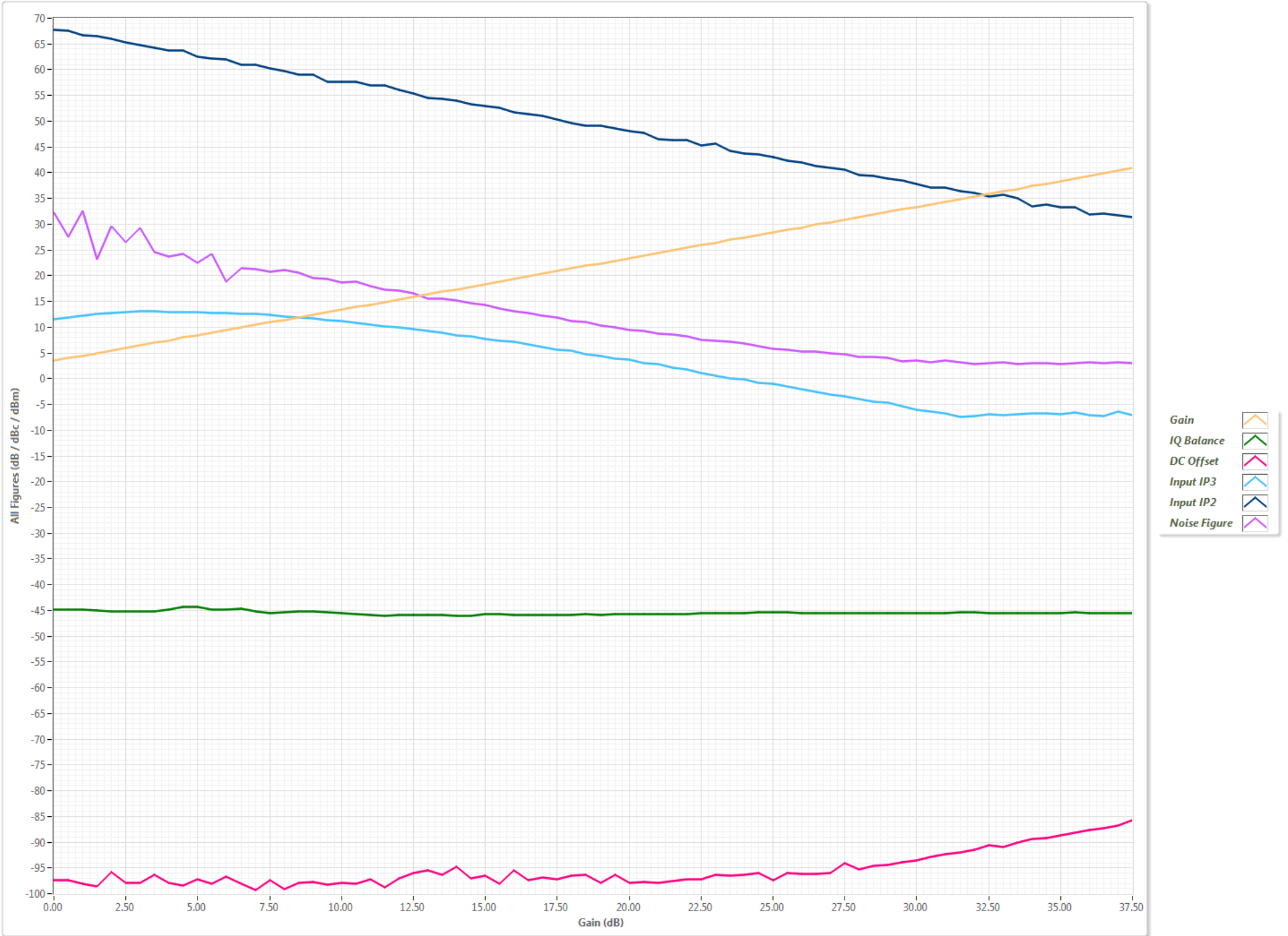
RX Figure vs Gain w/ Frequency=150.00MHz



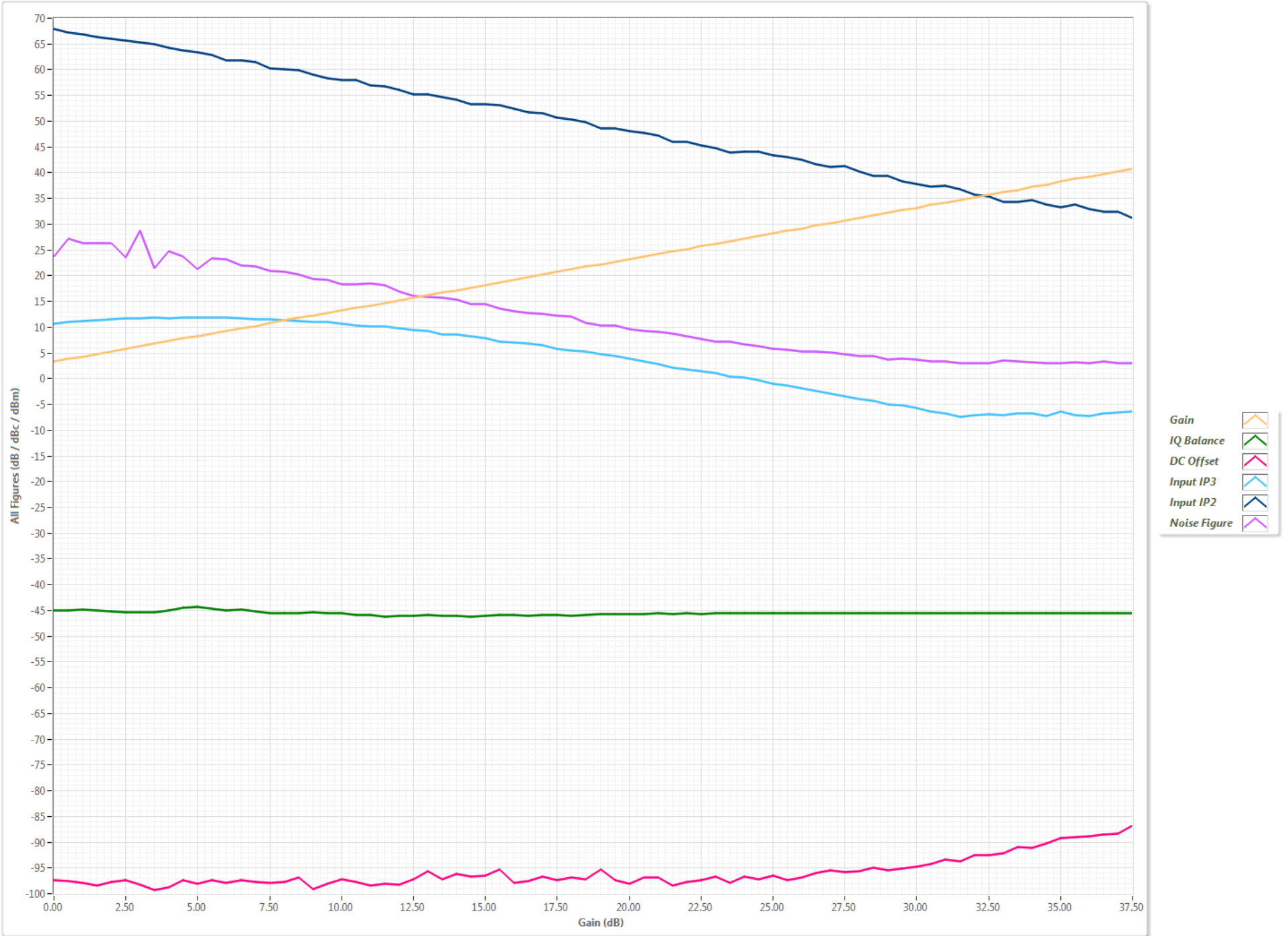
RX Figure vs Gain w/ Frequency=200.00MHz



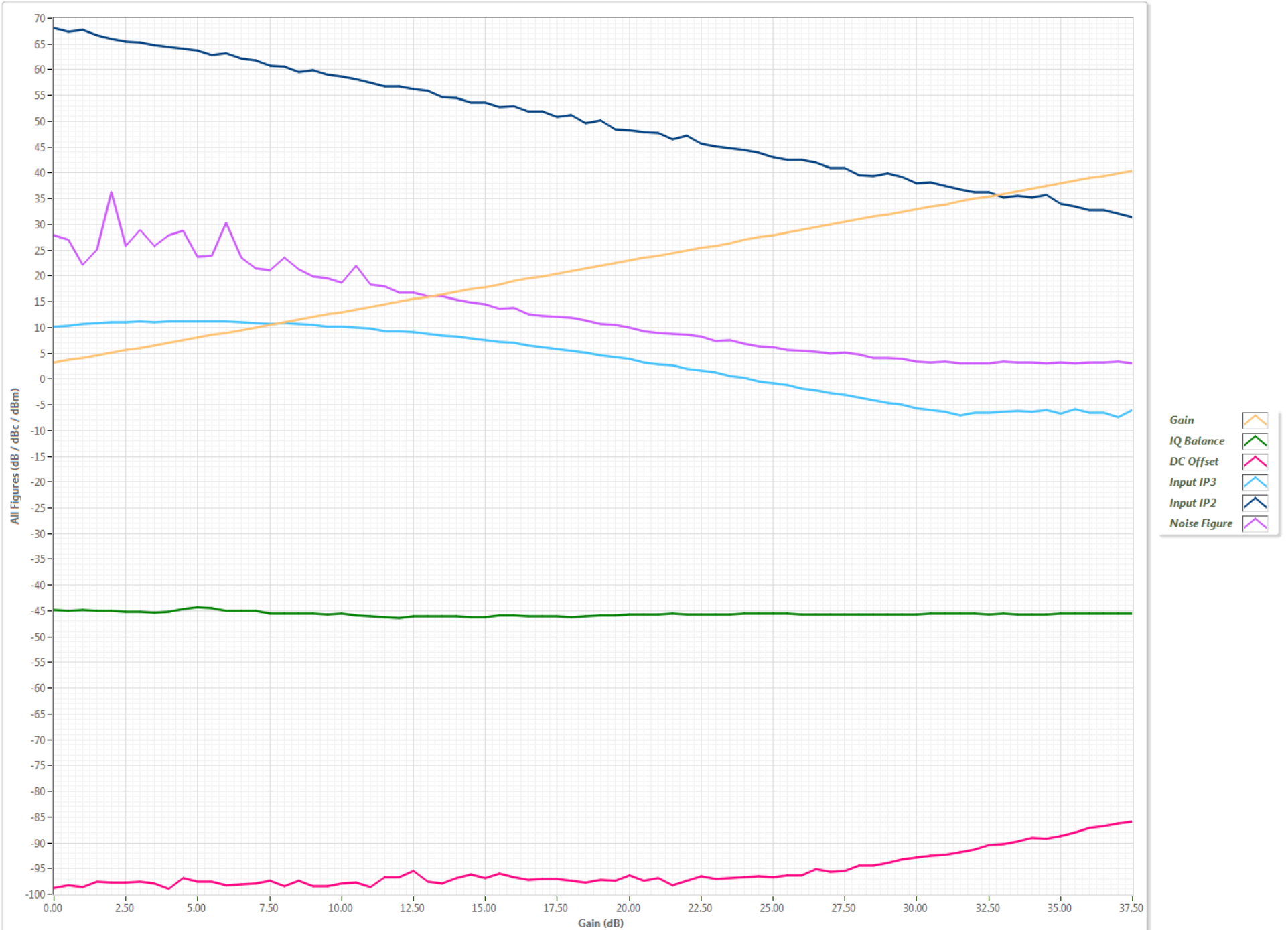
RX Figure vs Gain w/ Frequency=250.00MHz



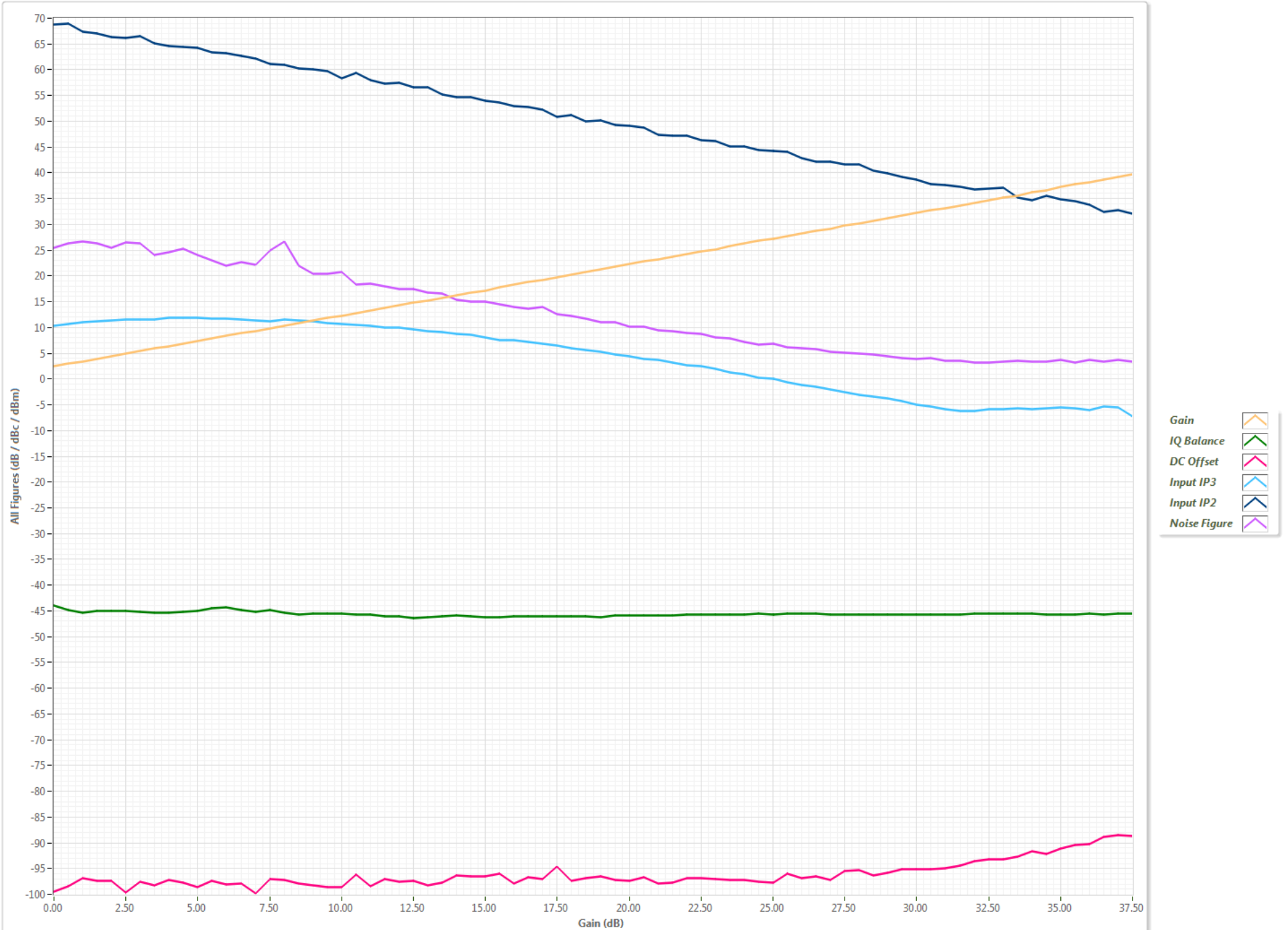
RX Figure vs Gain w/ Frequency=300.00MHz



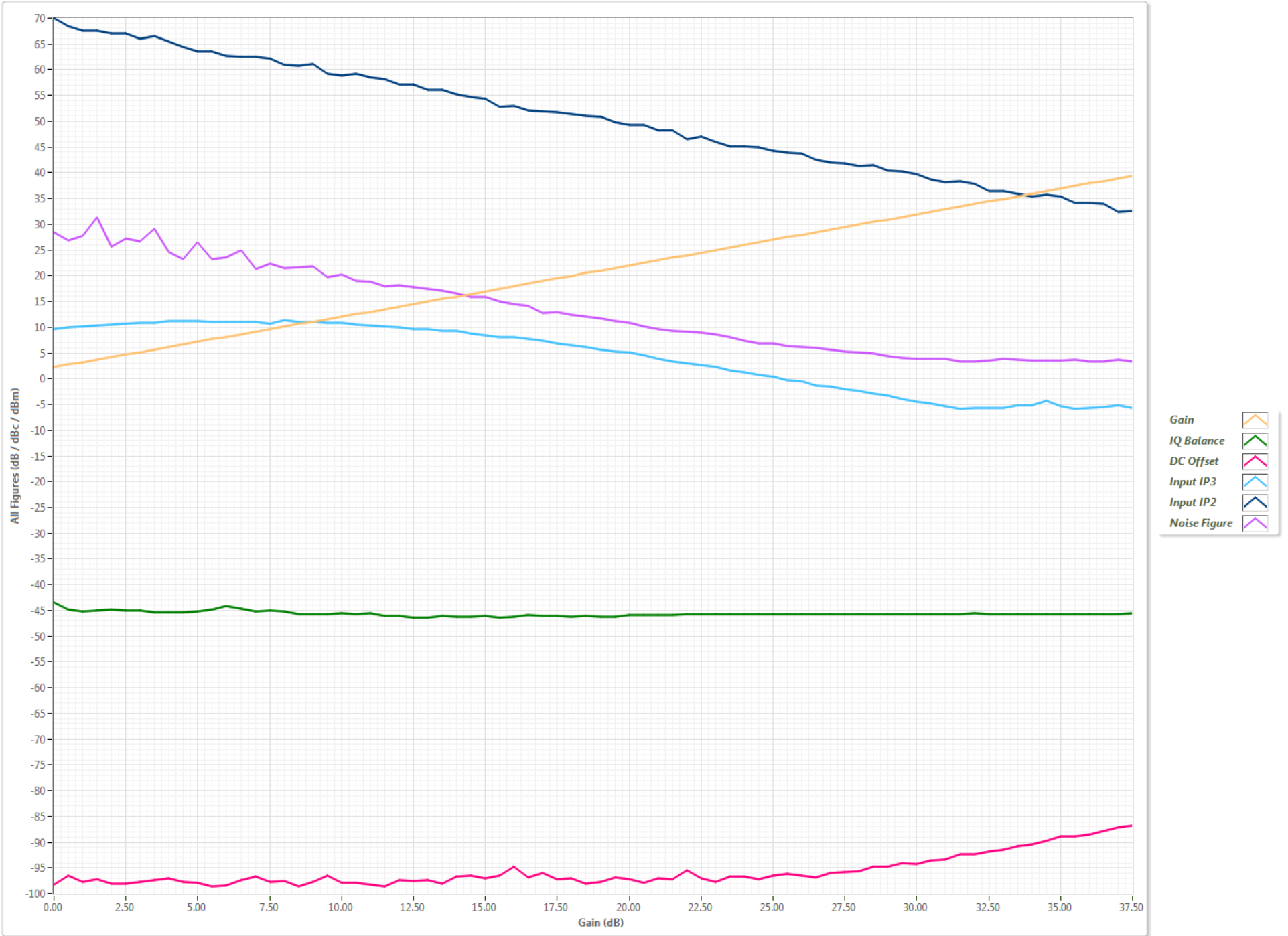
RX Figure vs Gain w/ Frequency=350.00MHz



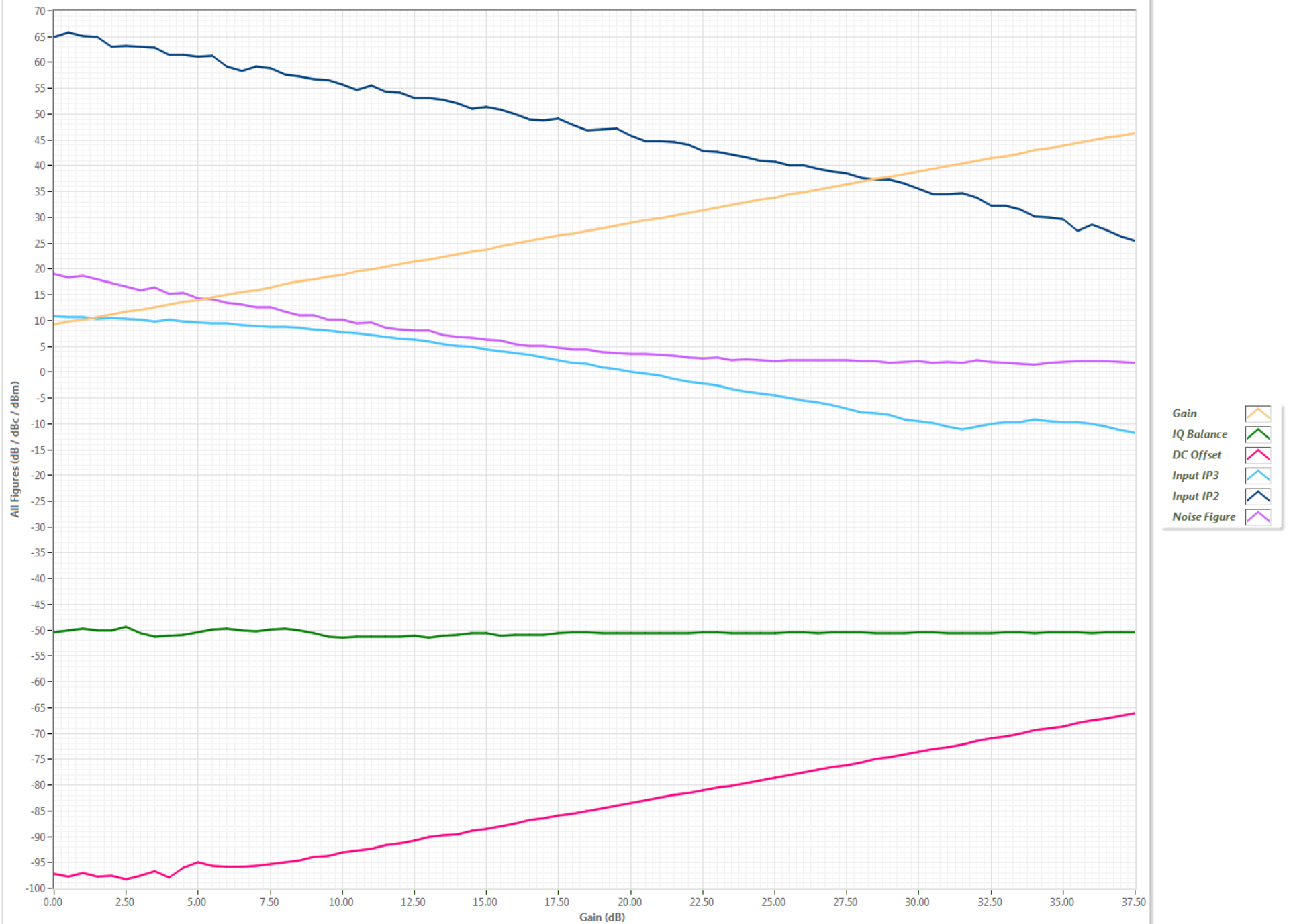
RX Figure vs Gain w/ Frequency=400.00MHz



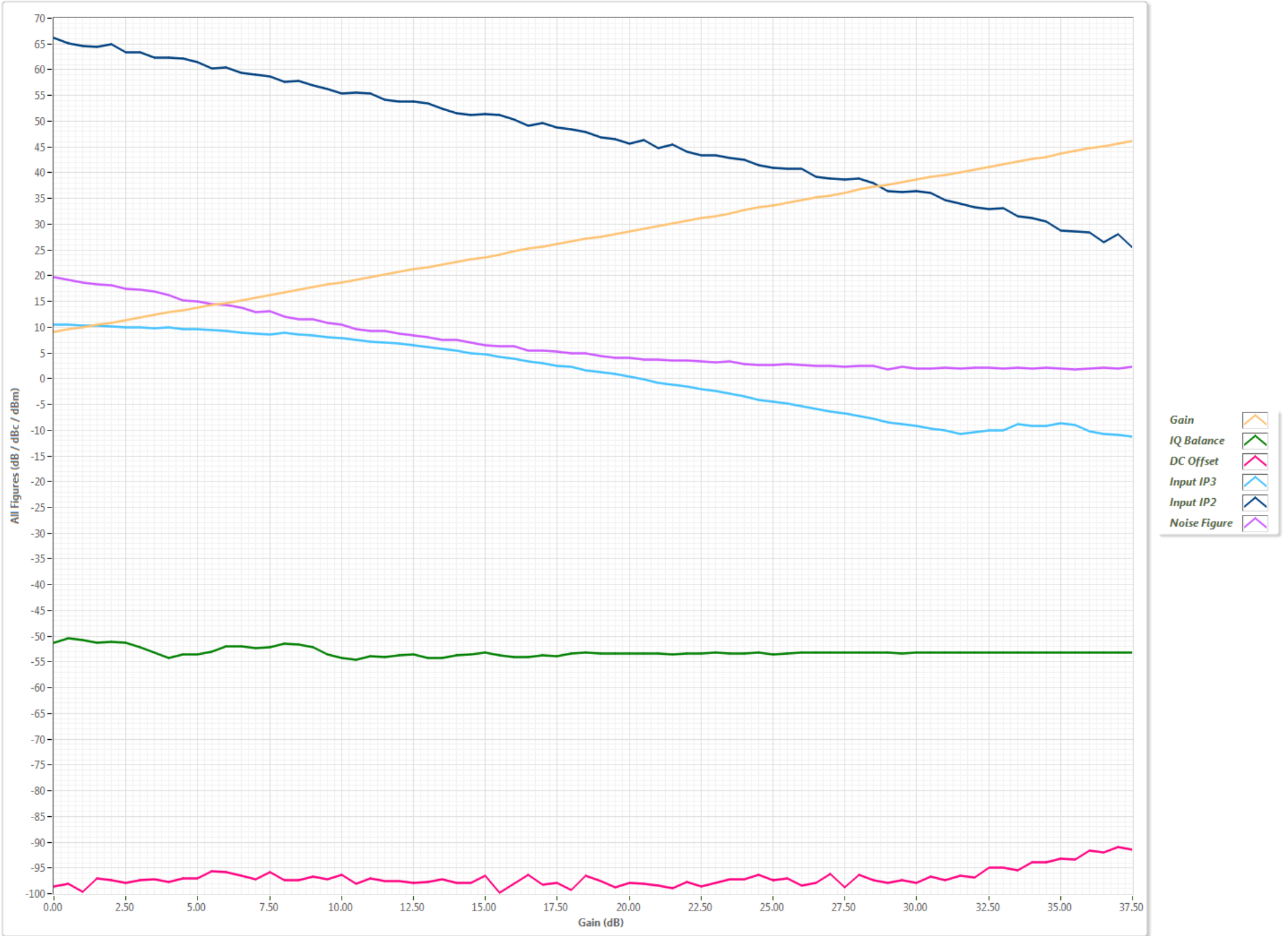
RX Figure vs Gain w/ Frequency=450.00MHz



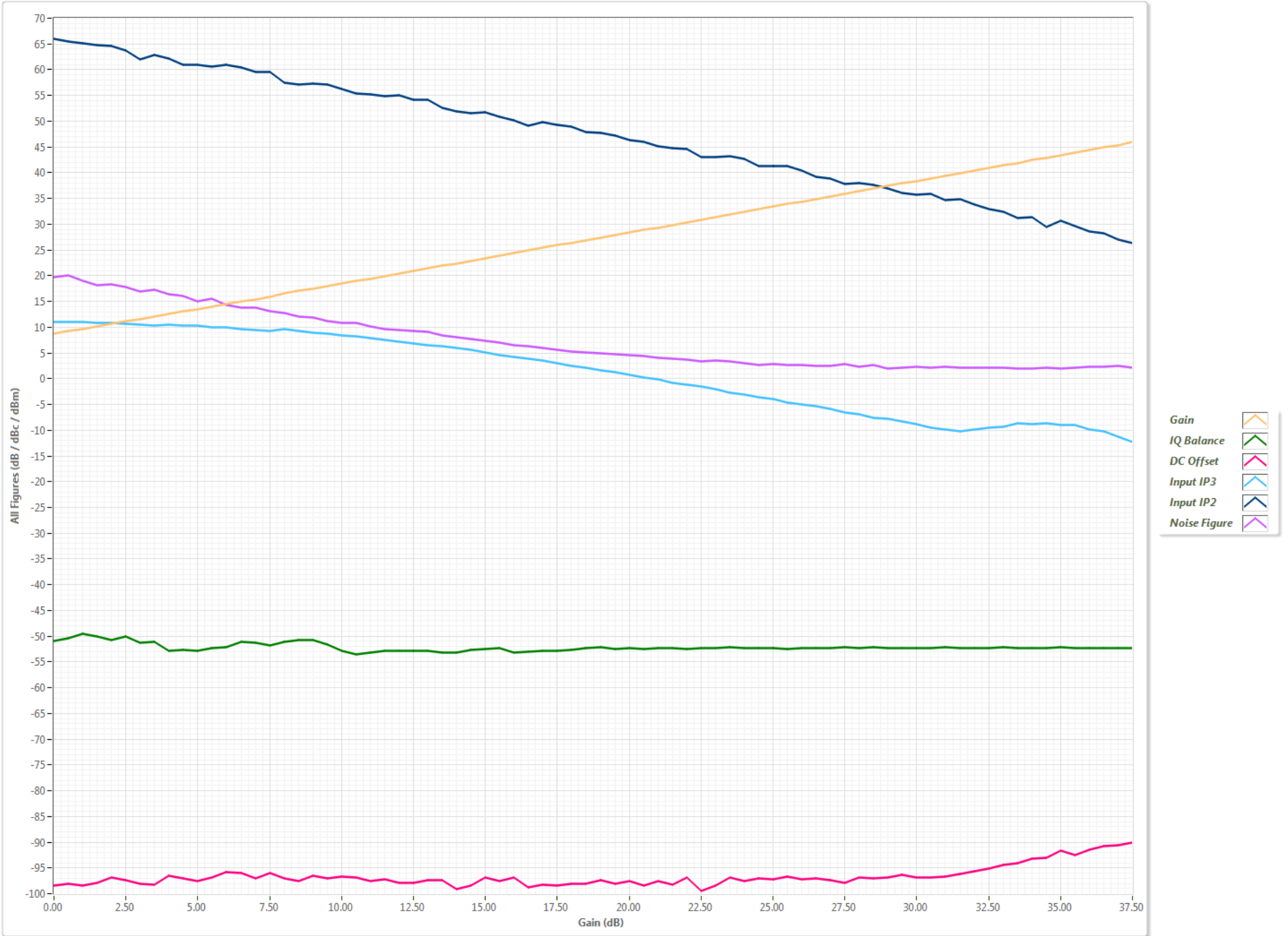
RX Figure vs Gain w/ Frequency=500.00MHz



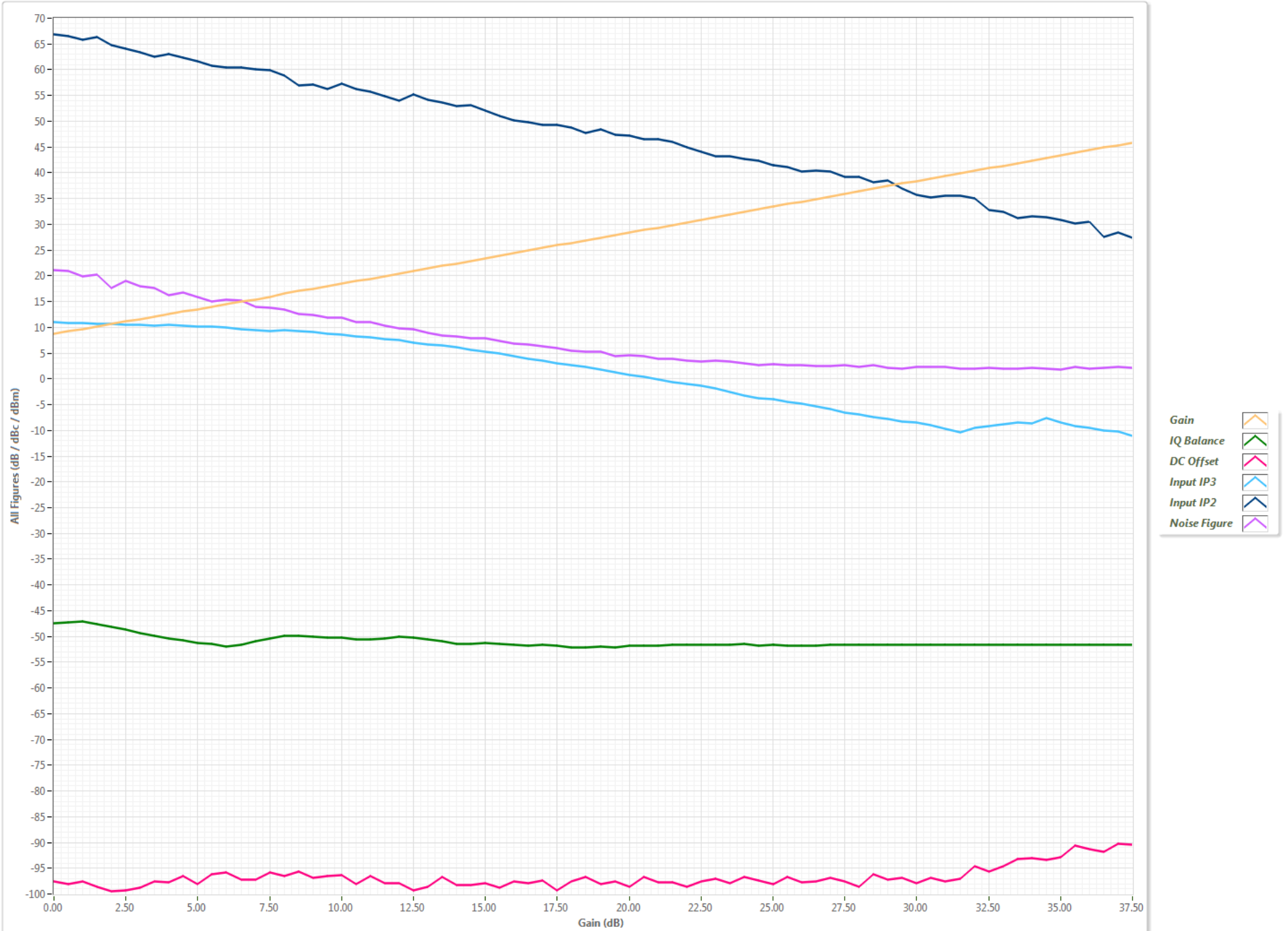
RX Figure vs Gain w/ Frequency=550.00MHz



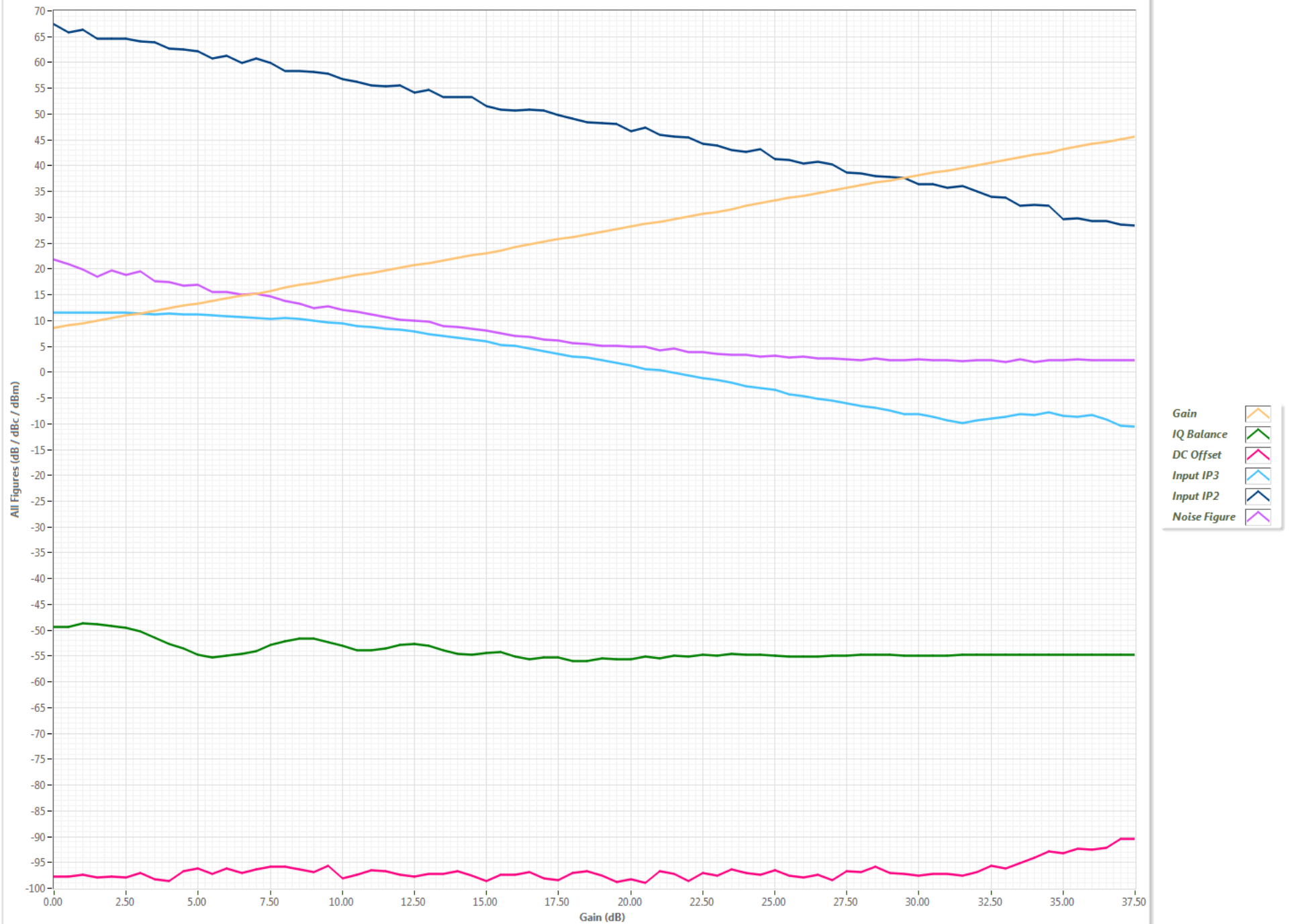
RX Figure vs Gain w/ Frequency=600.00MHz



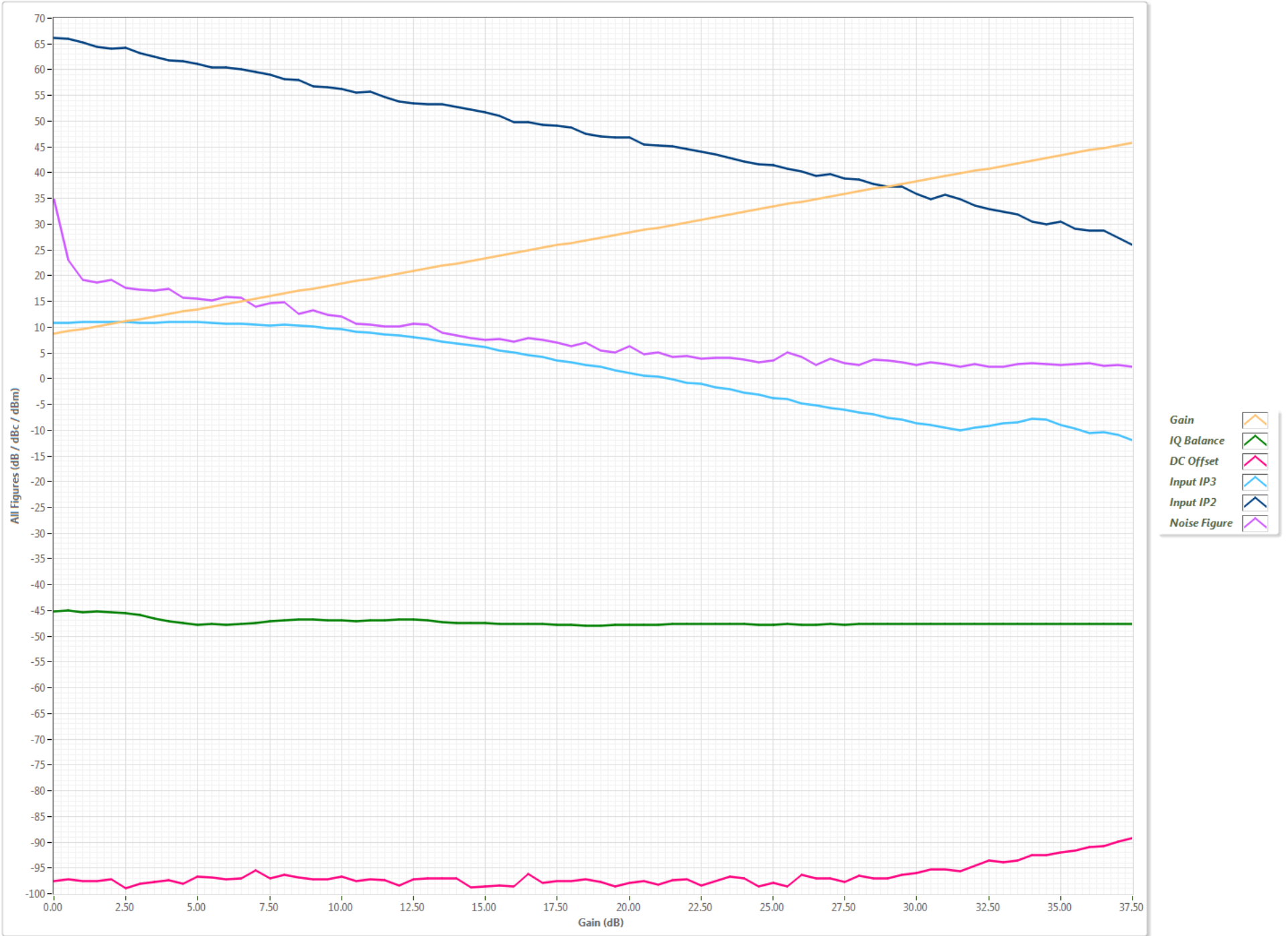
RX Figure vs Gain w/ Frequency=650.00MHz



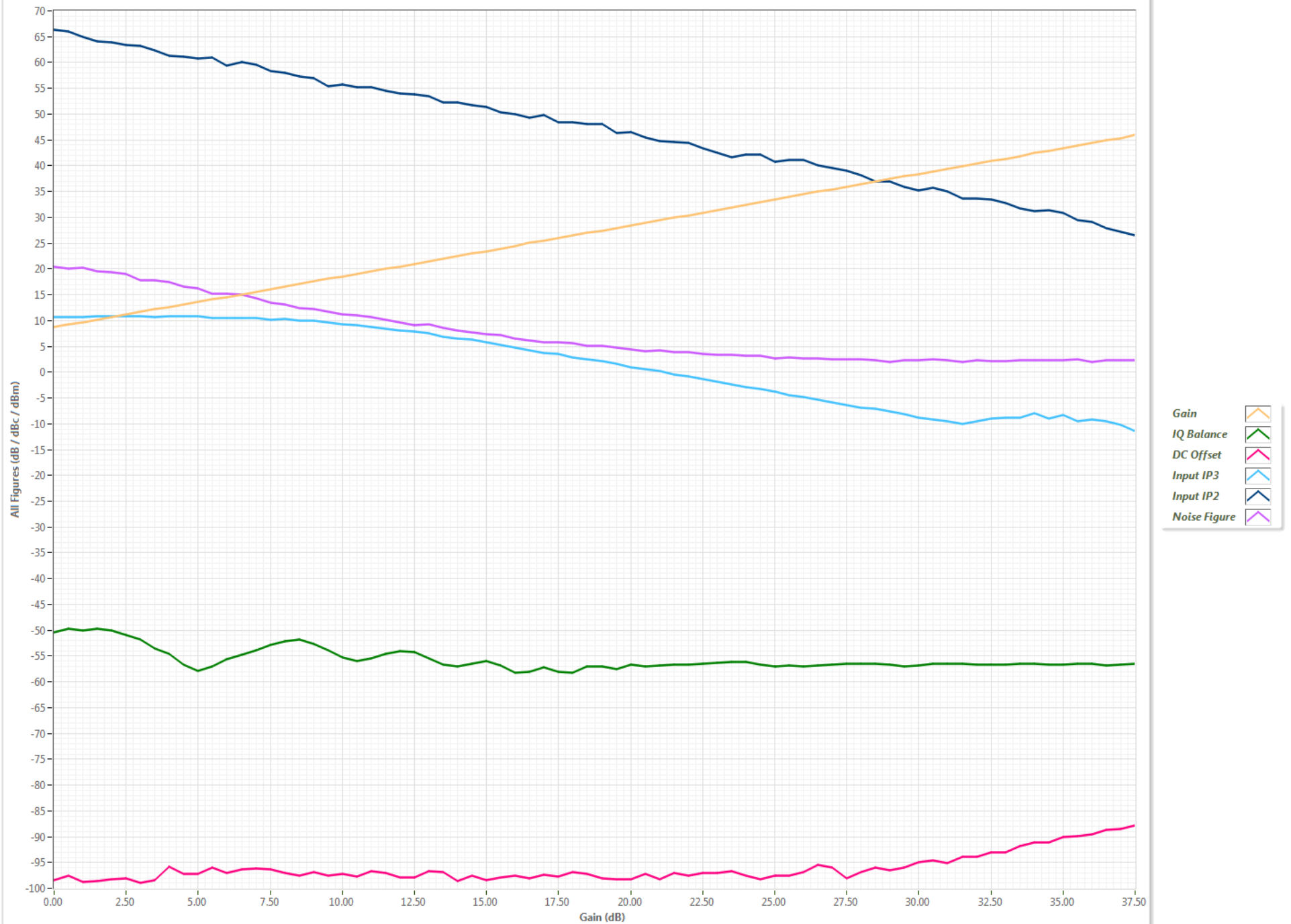
RX Figure vs Gain w/ Frequency=700.00MHz



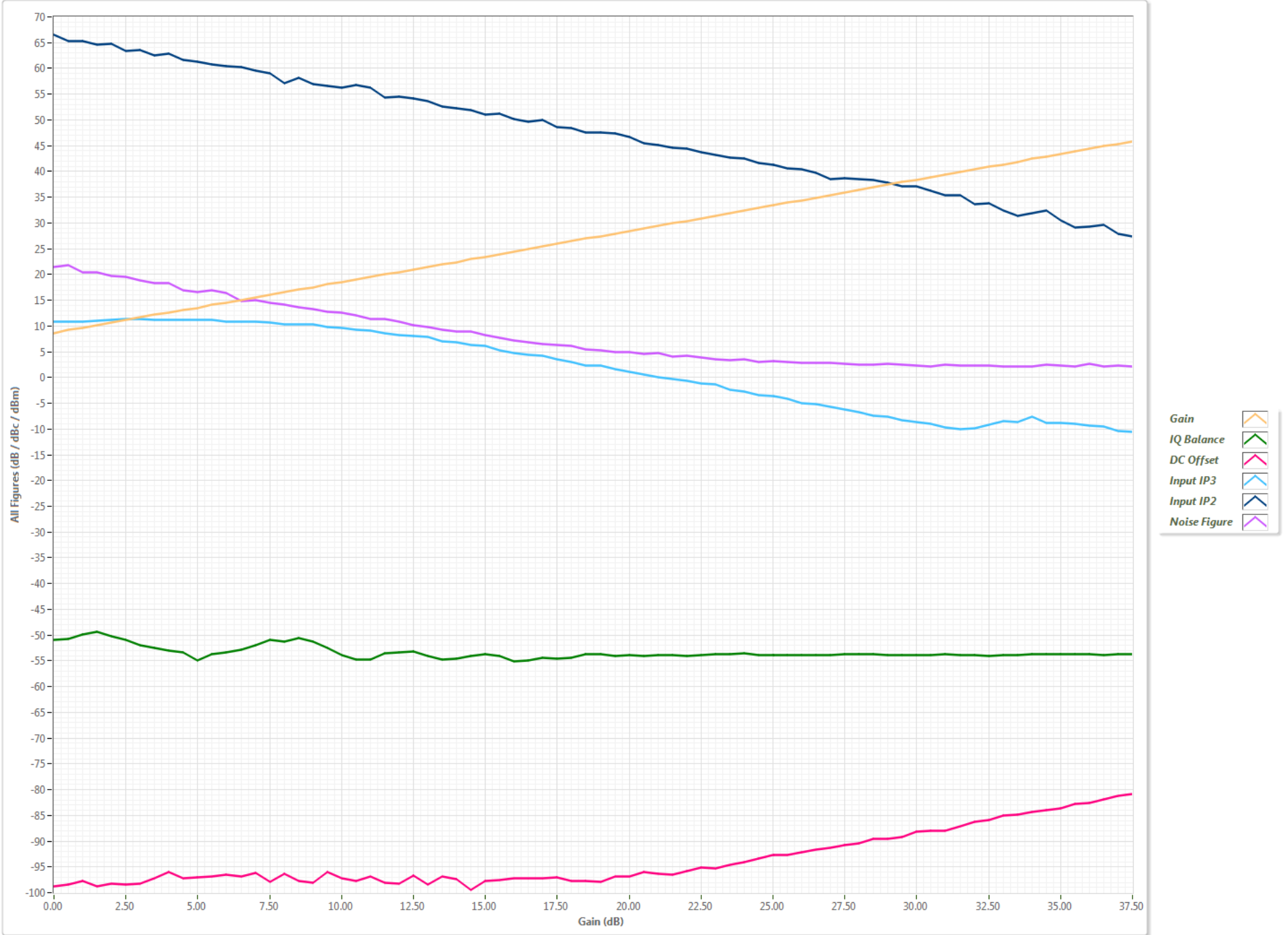
RX Figure vs Gain w/ Frequency=750.00MHz



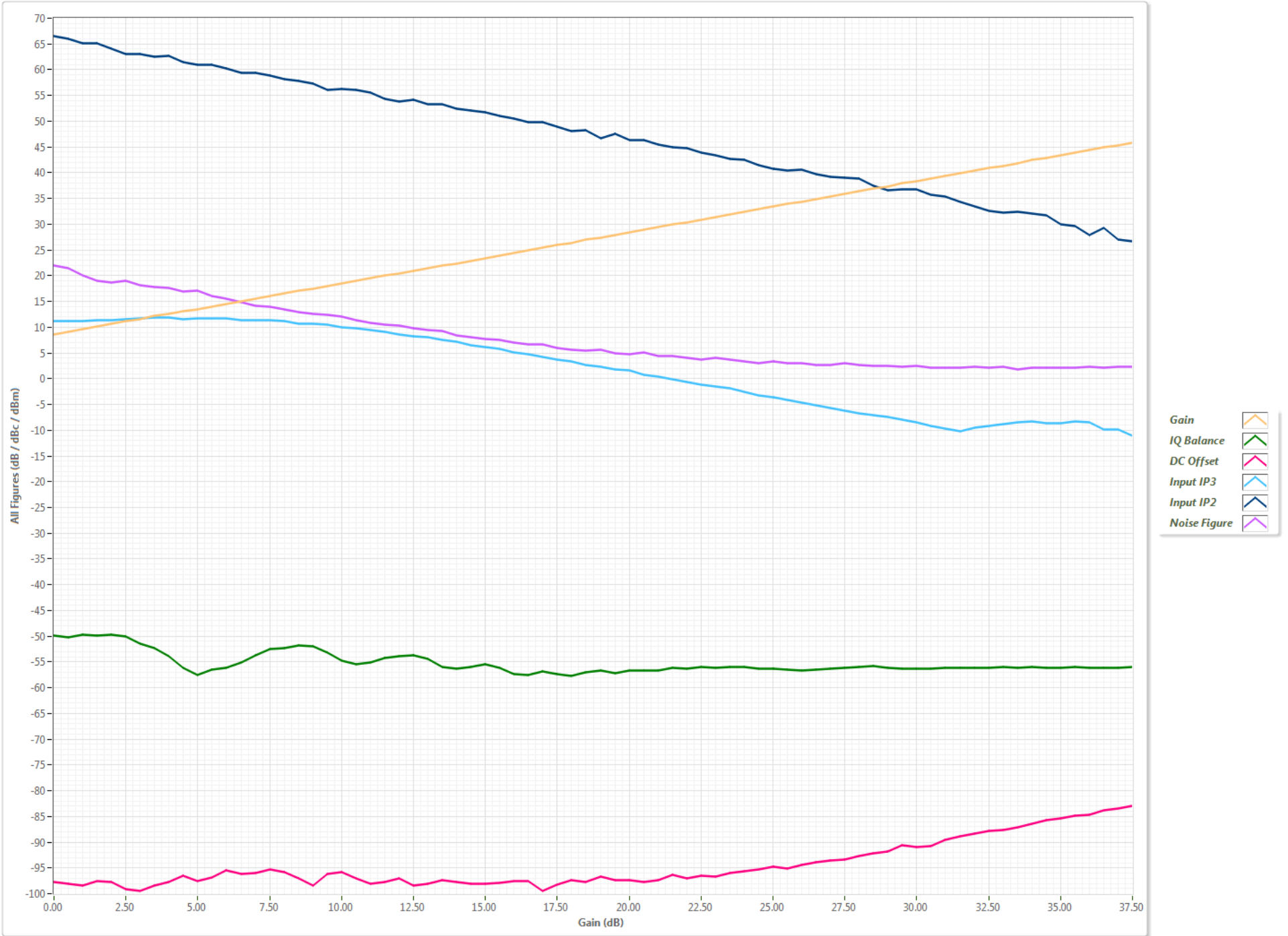
RX Figure vs Gain w/ Frequency=800.00MHz



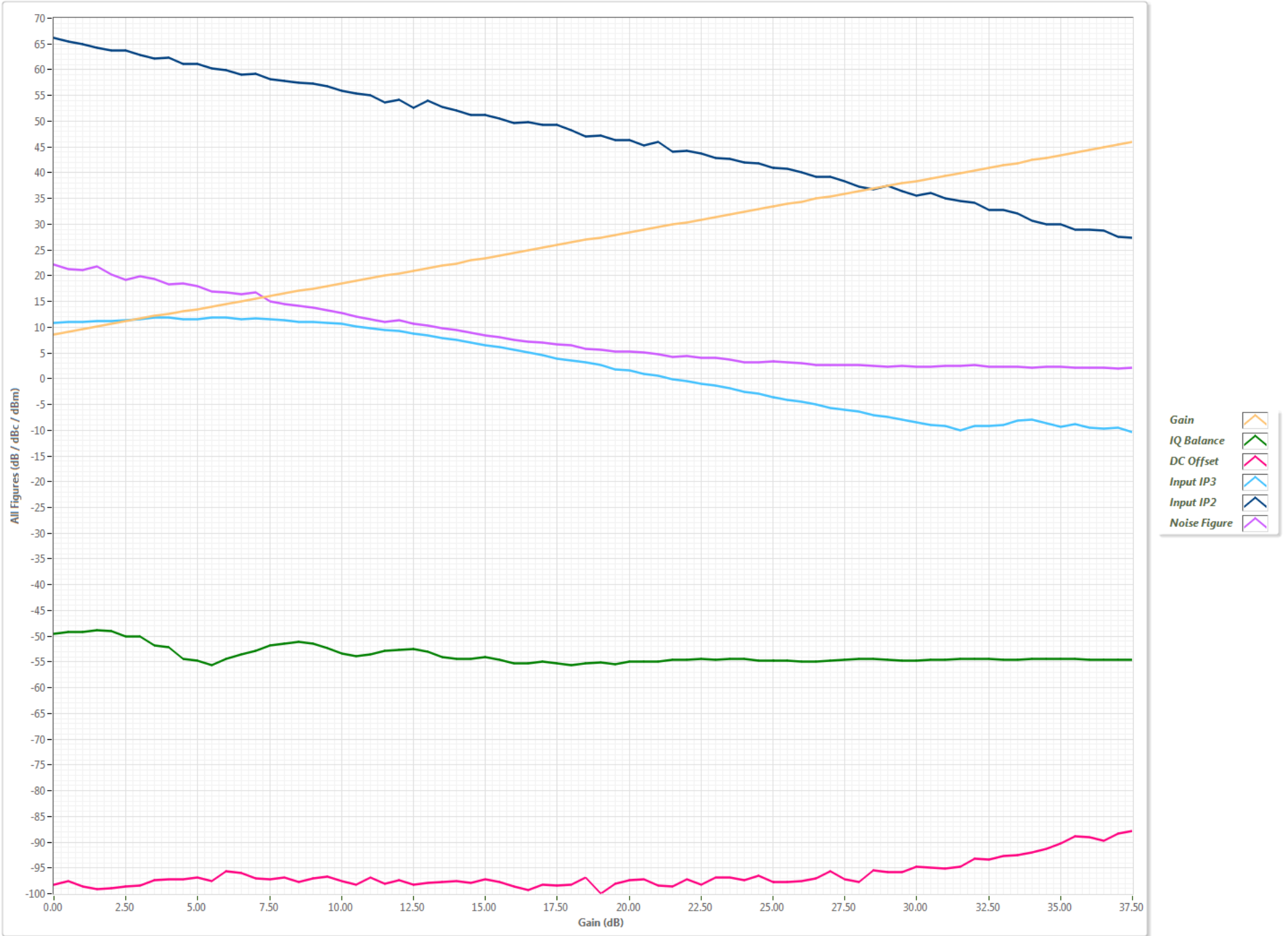
RX Figure vs Gain w/ Frequency=850.00MHz



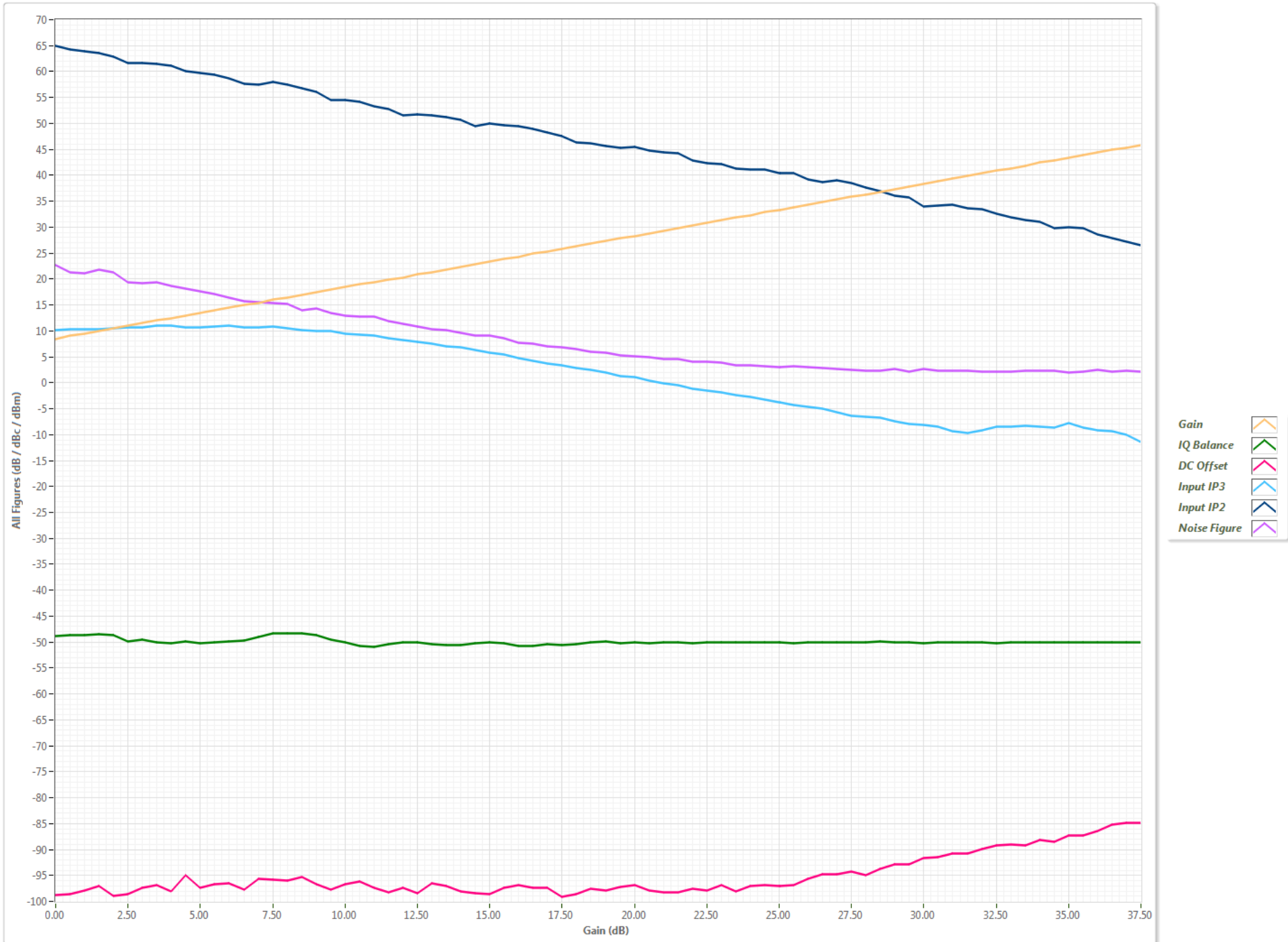
RX Figure vs Gain w/ Frequency=900.00MHz



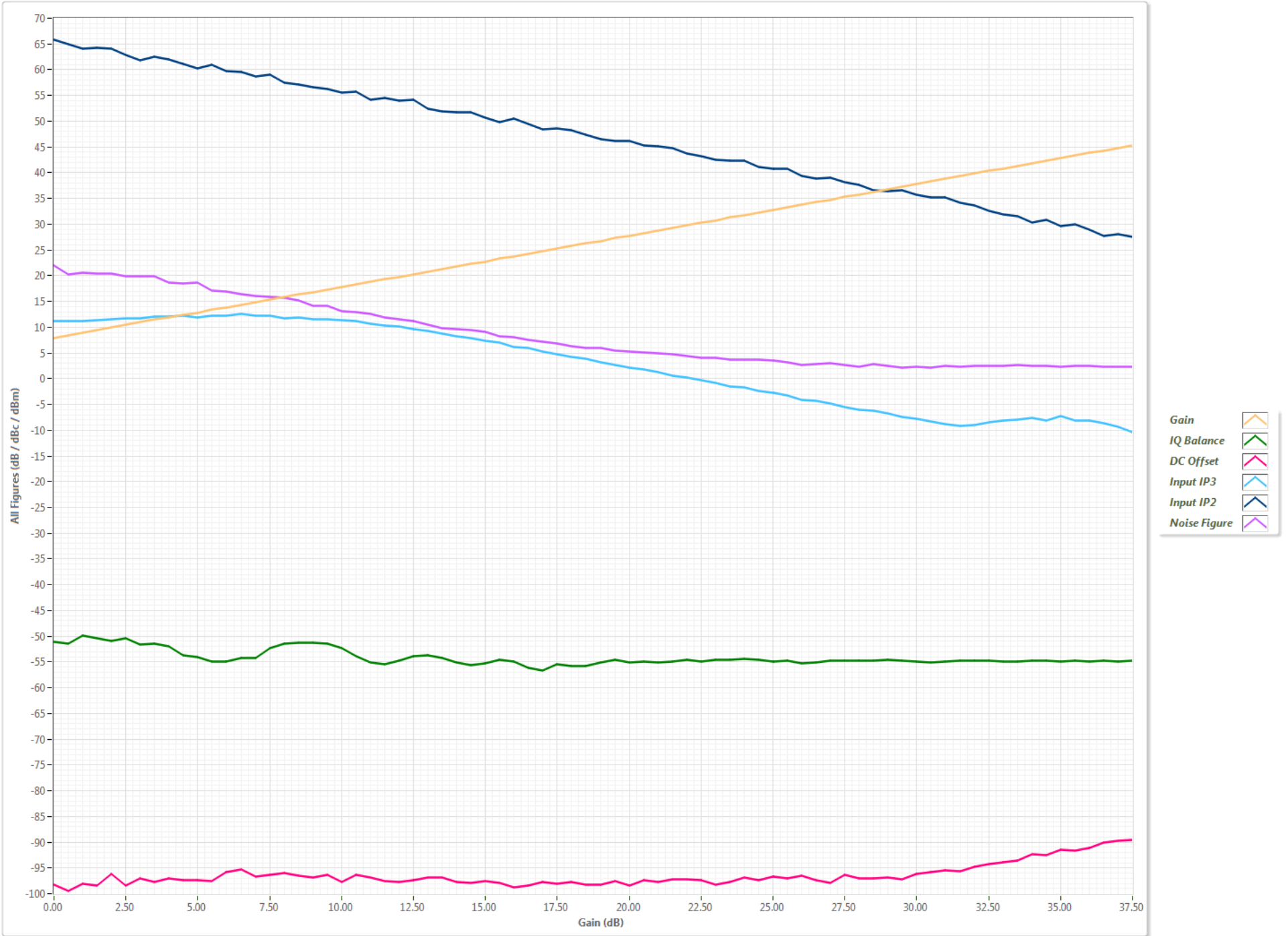
RX Figure vs Gain w/ Frequency=950.00MHz



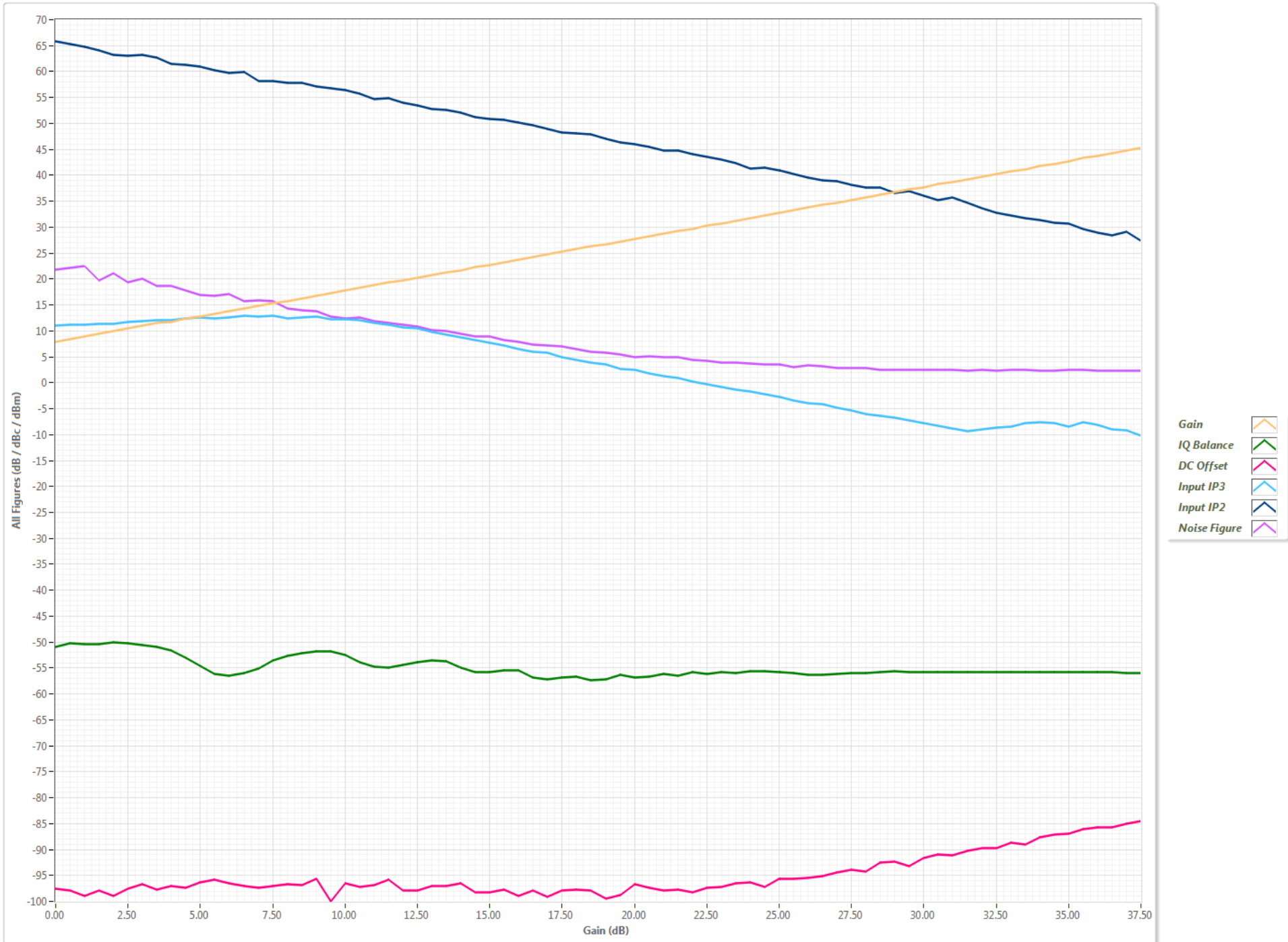
RX Figure vs Gain w/ Frequency=1000.00MHz



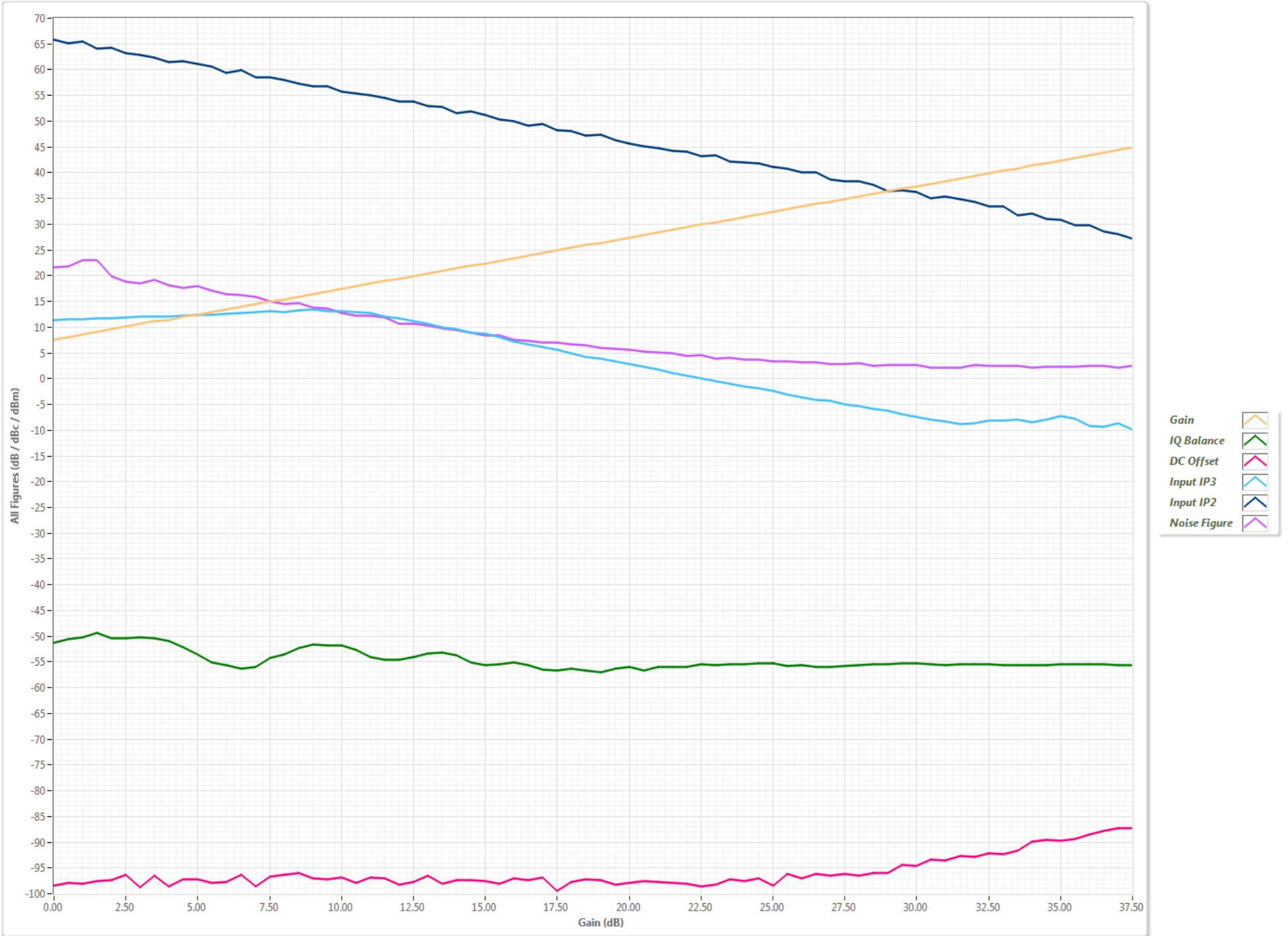
RX Figure vs Gain w/ Frequency=1050.00MHz



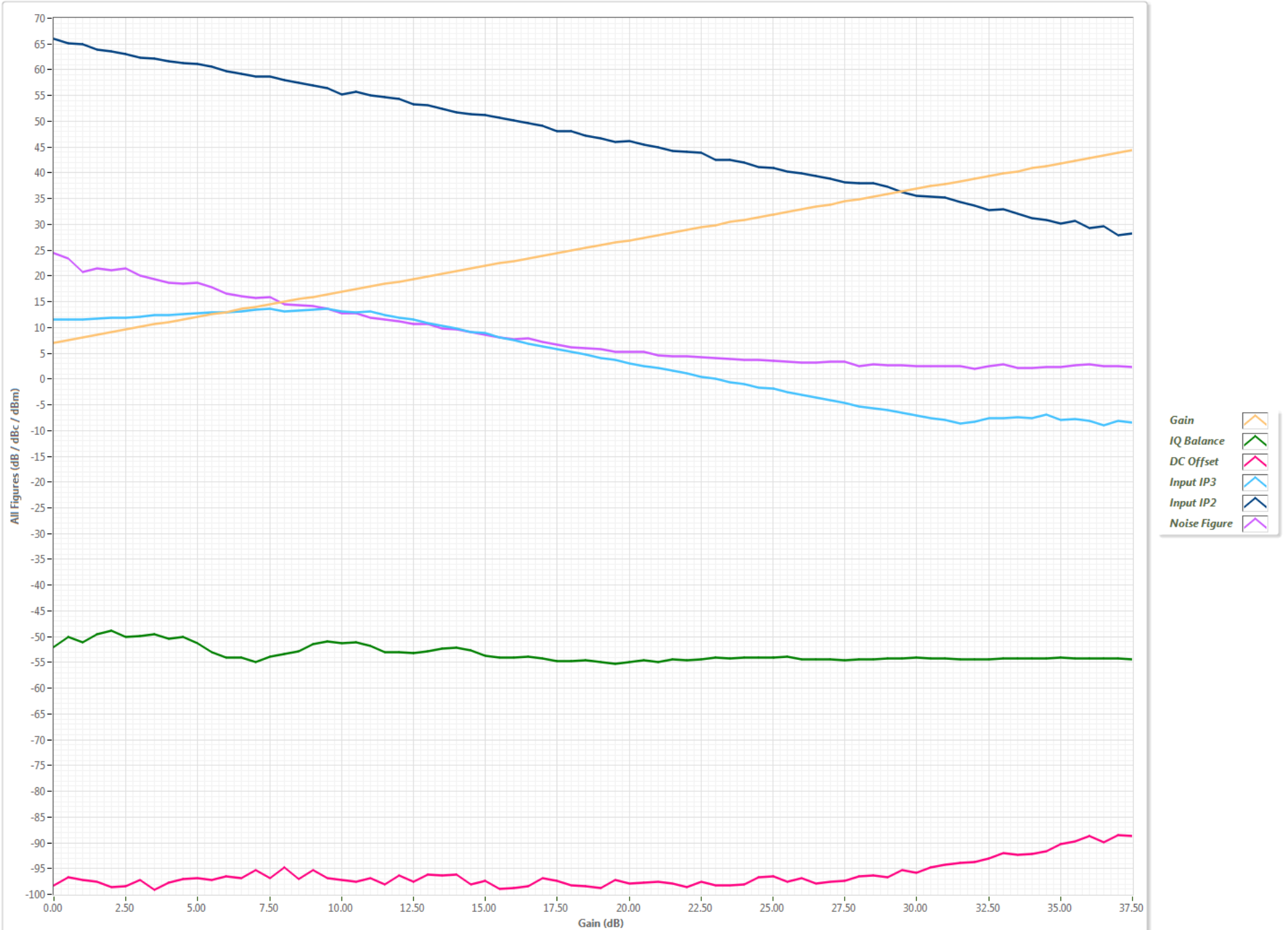
RX Figure vs Gain w/ Frequency=1100.00MHz



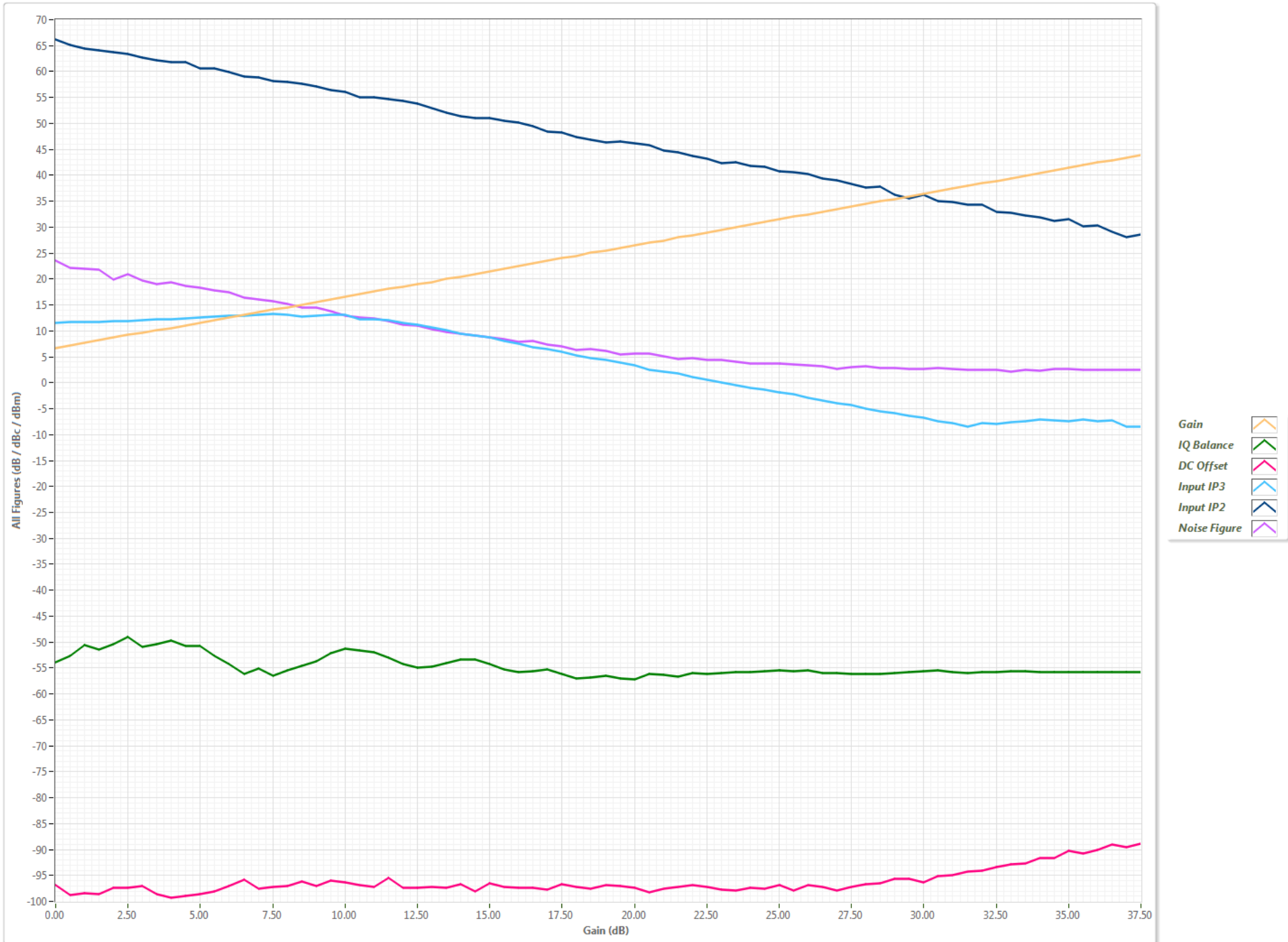
RX Figure vs Gain w/ Frequency=1150.00MHz



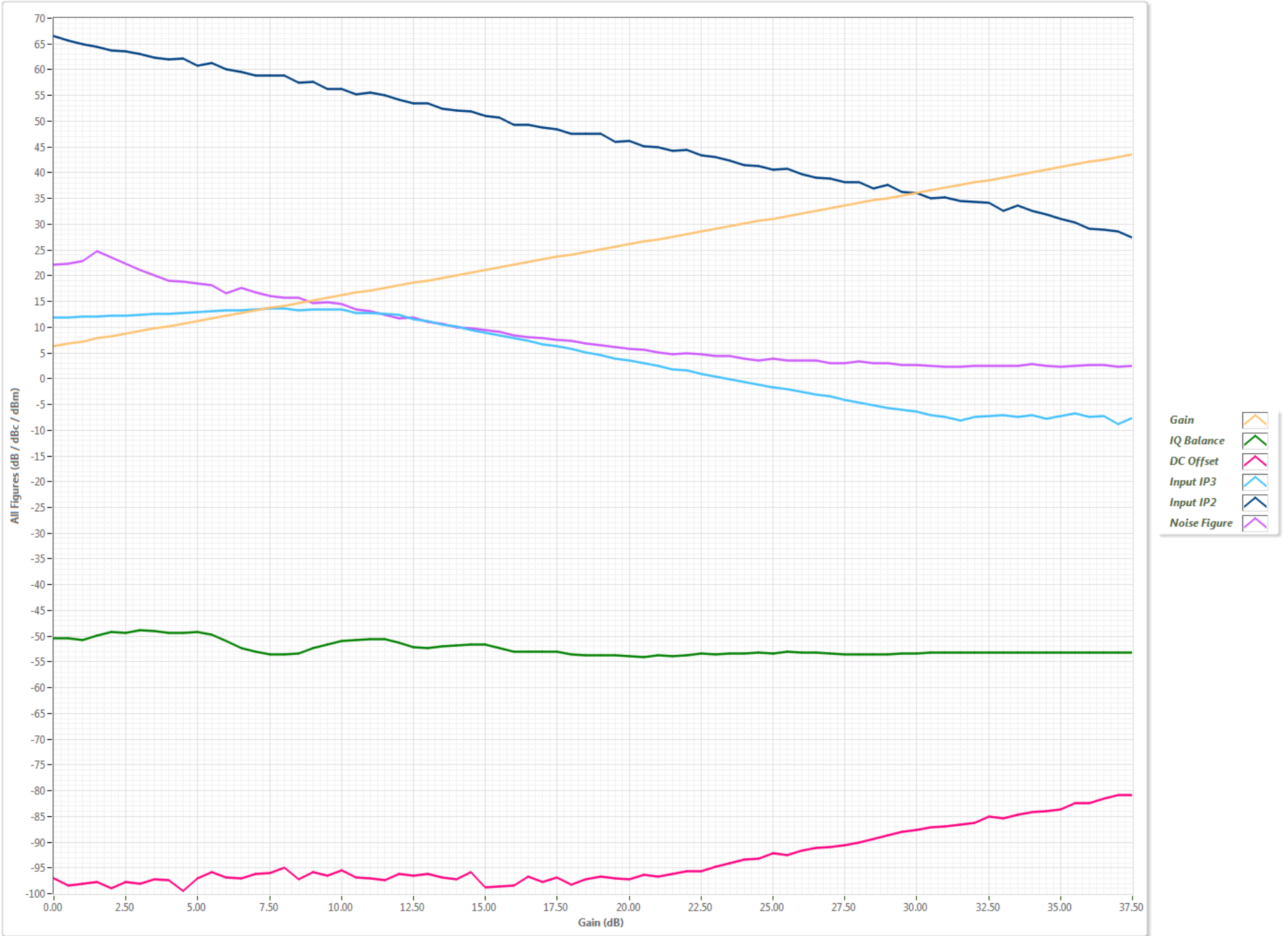
RX Figure vs Gain w/ Frequency=1200.00MHz



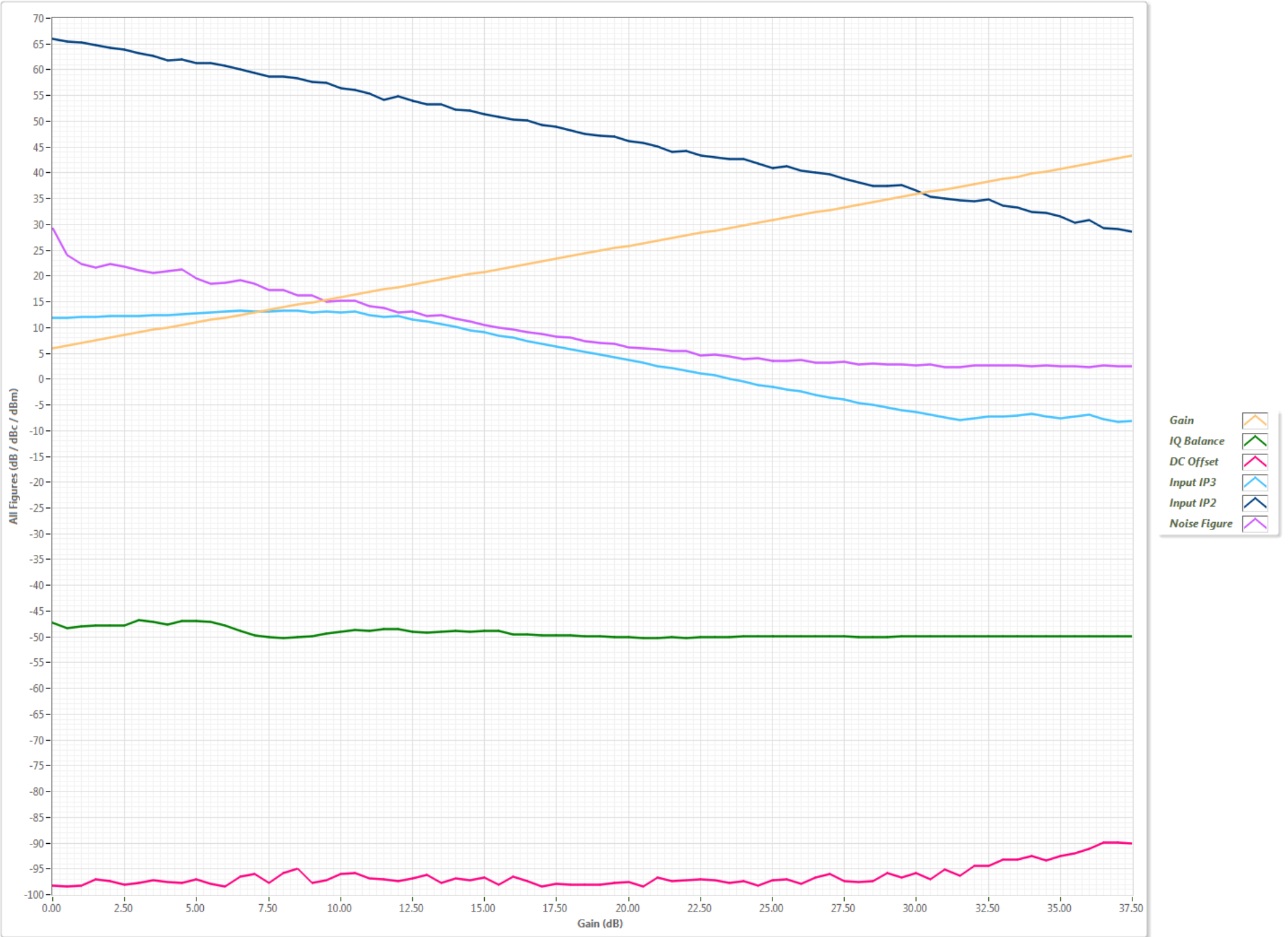
RX Figure vs Gain w/ Frequency=1250.00MHz



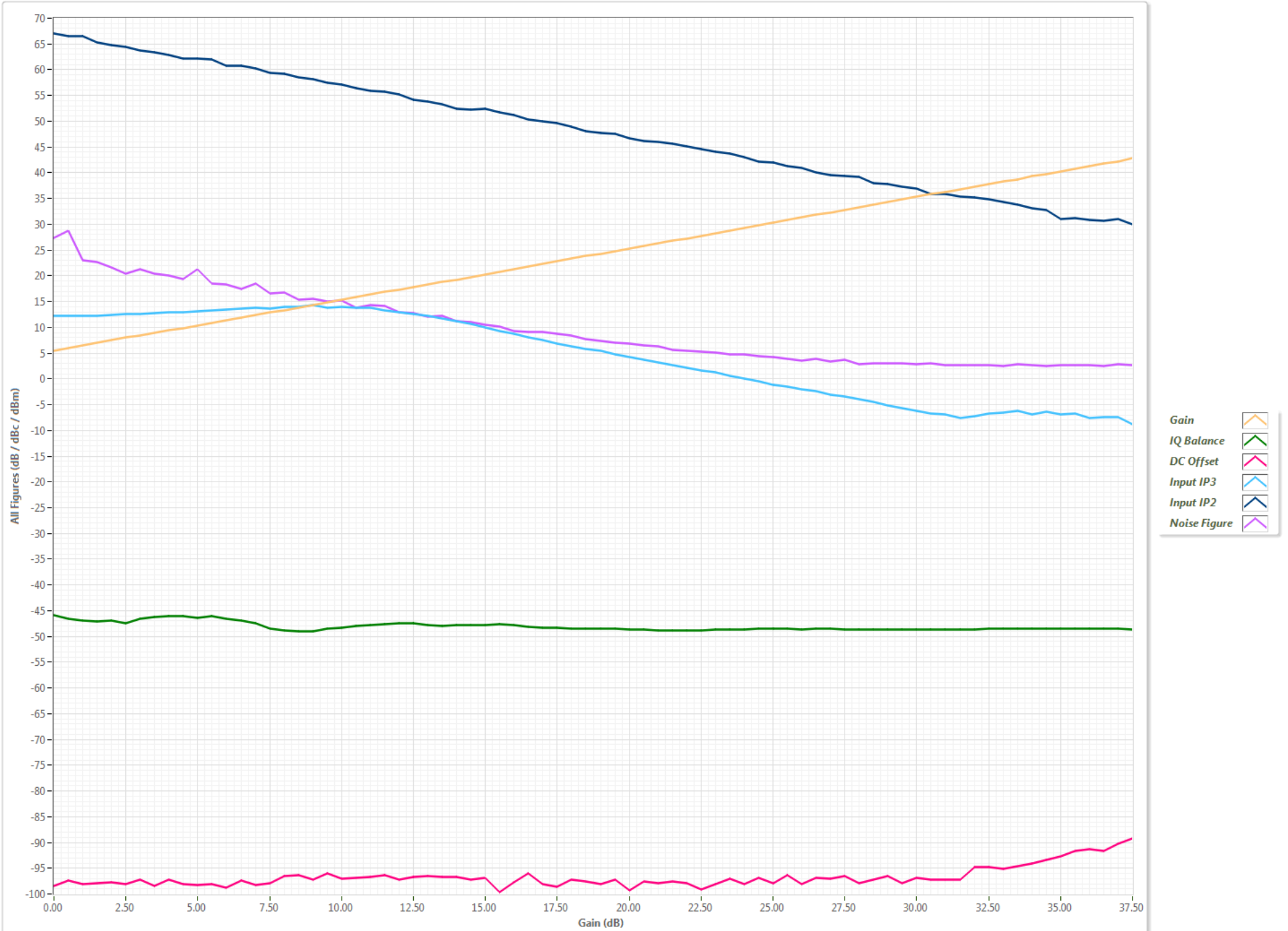
RX Figure vs Gain w/ Frequency=1300.00MHz



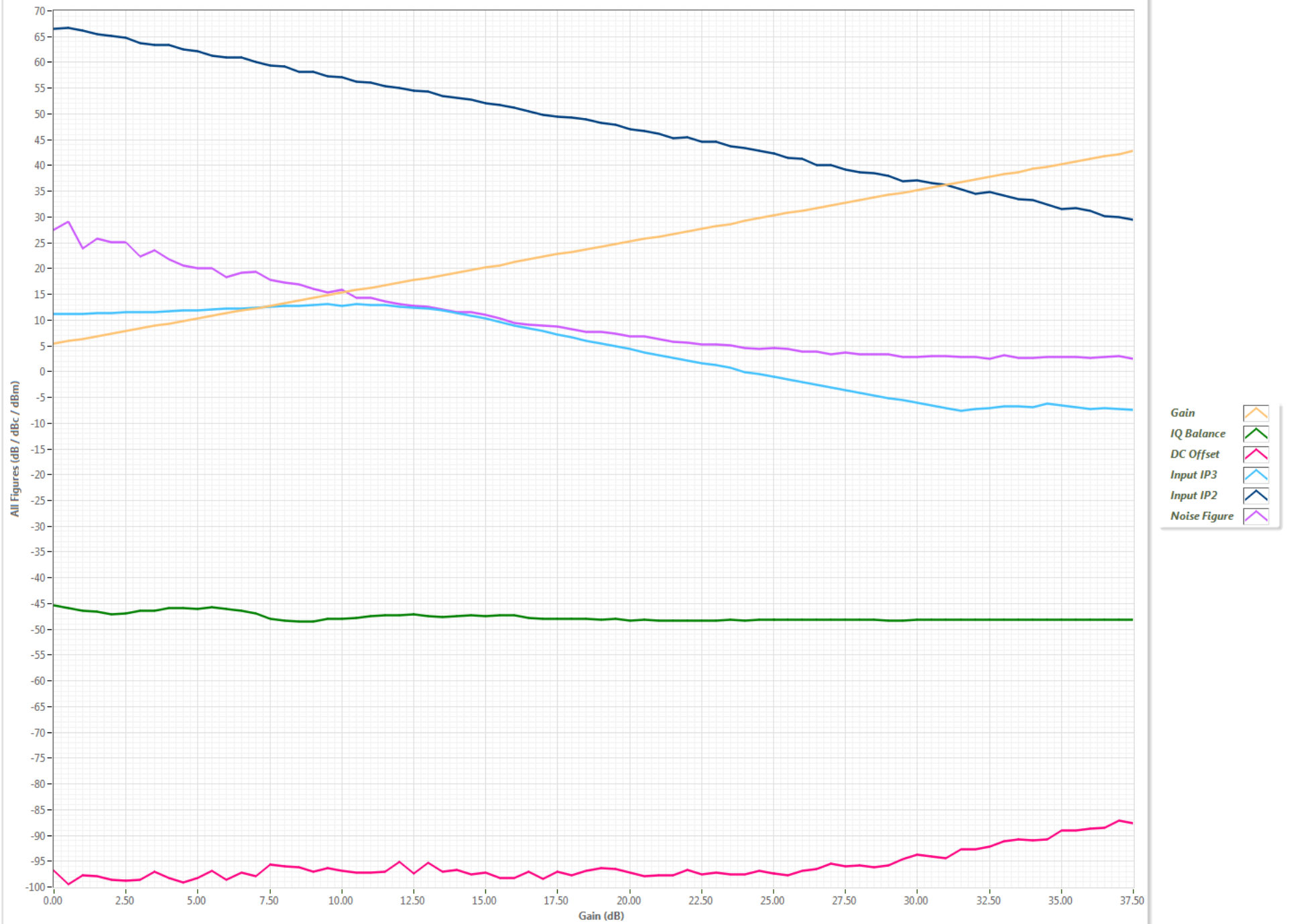
RX Figure vs Gain w/ Frequency=1350.00MHz



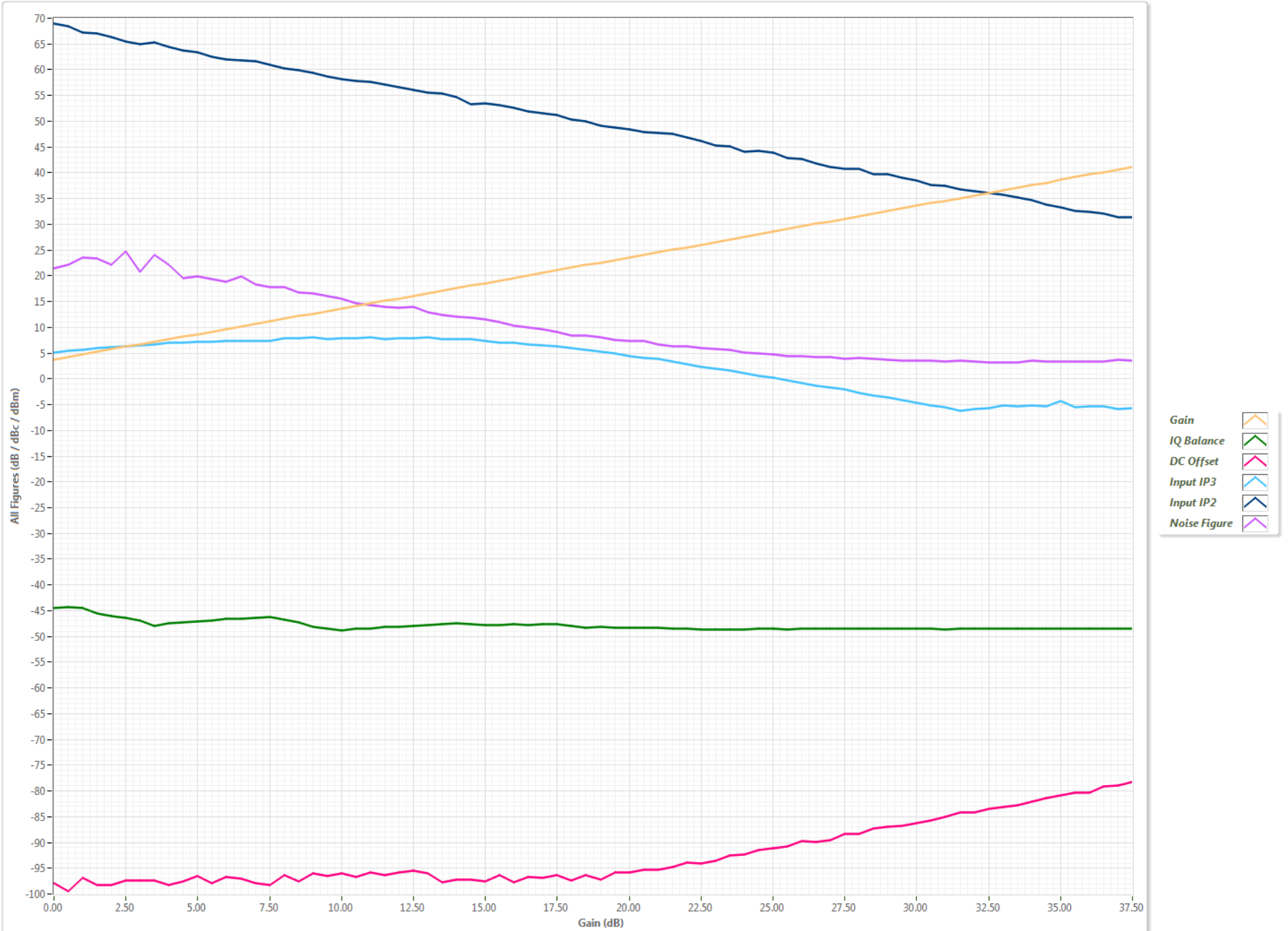
RX Figure vs Gain w/ Frequency=1400.00MHz



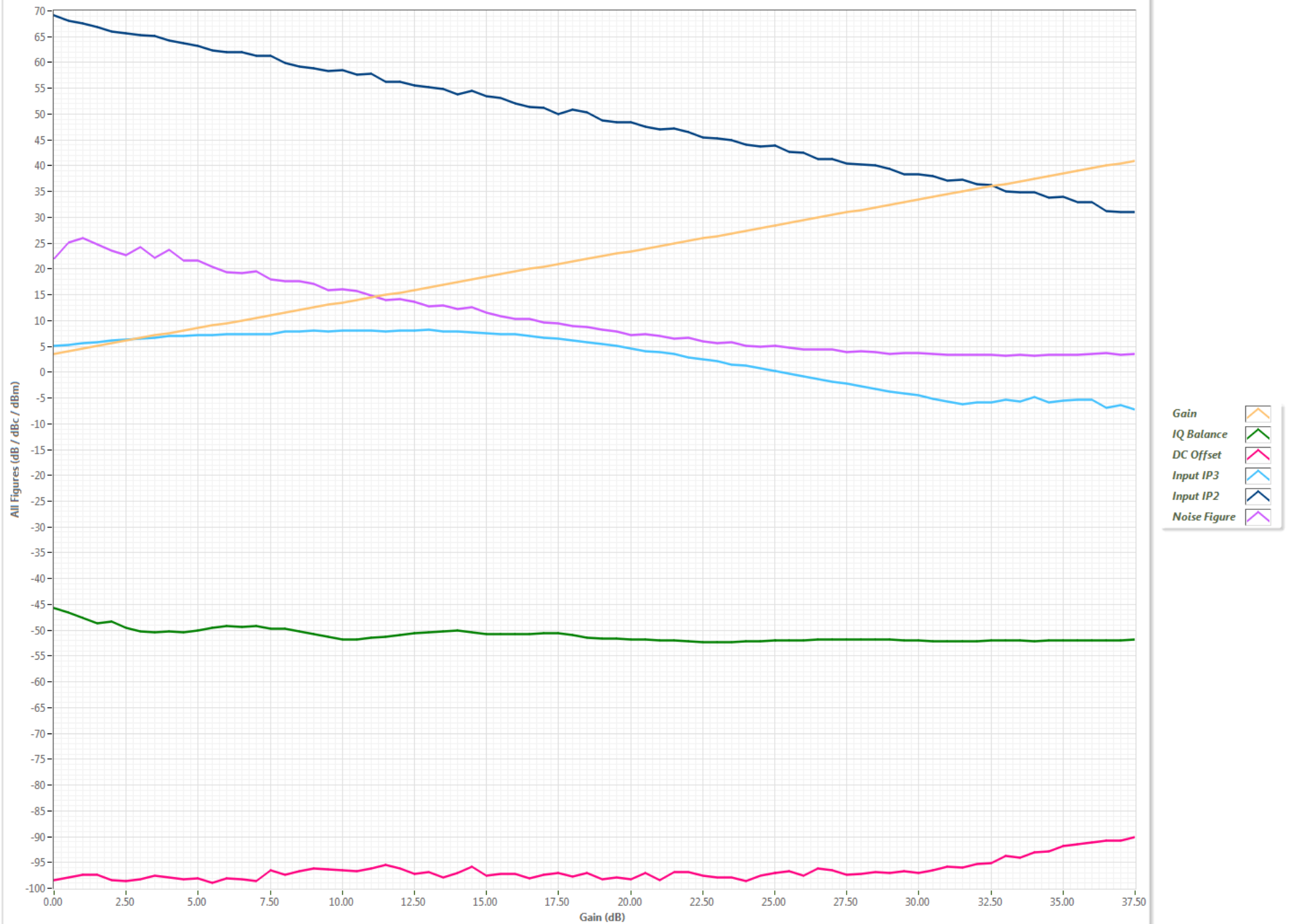
RX Figure vs Gain w/ Frequency=1450.00MHz



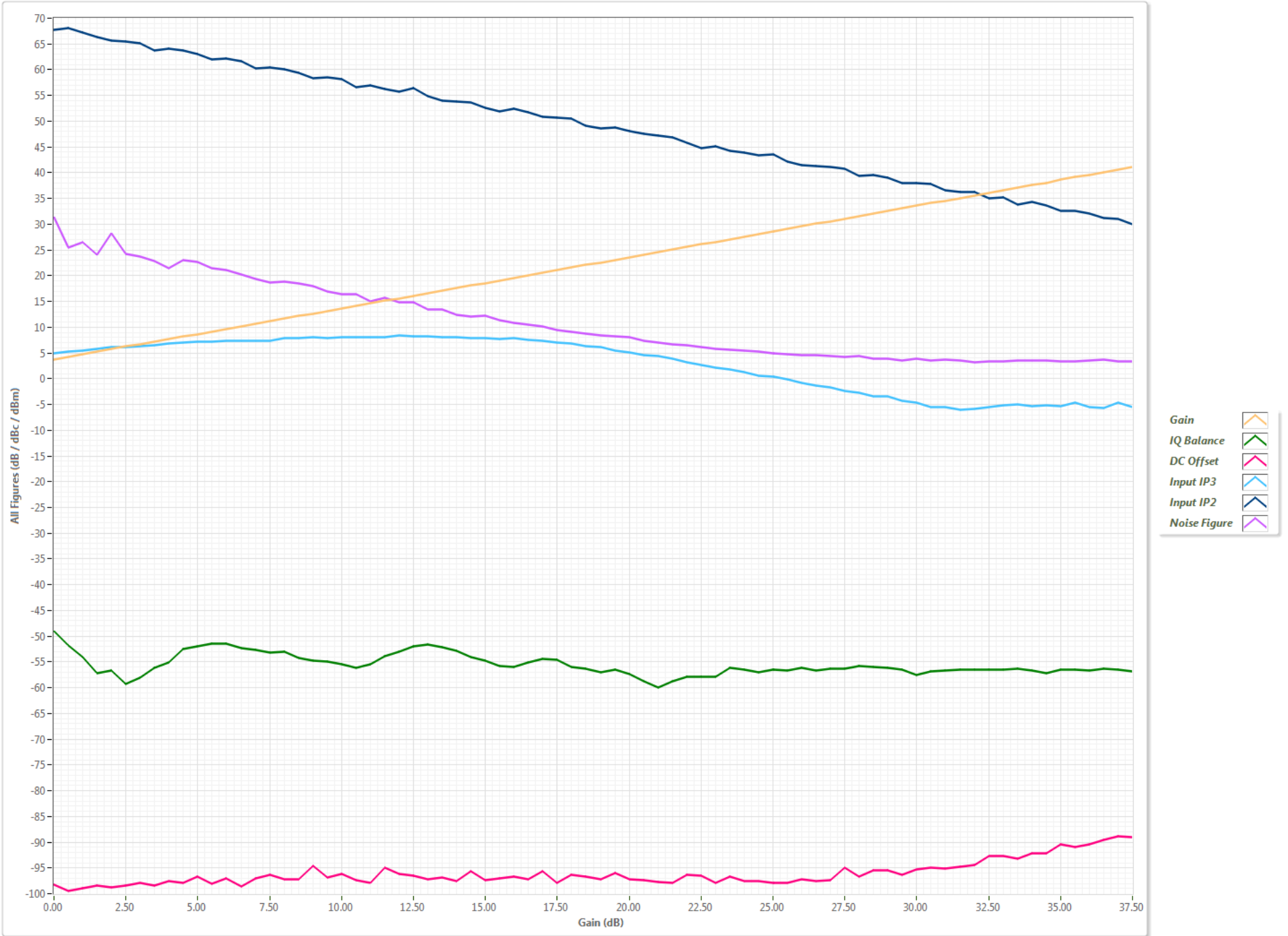
RX Figure vs Gain w/ Frequency=1500.00MHz



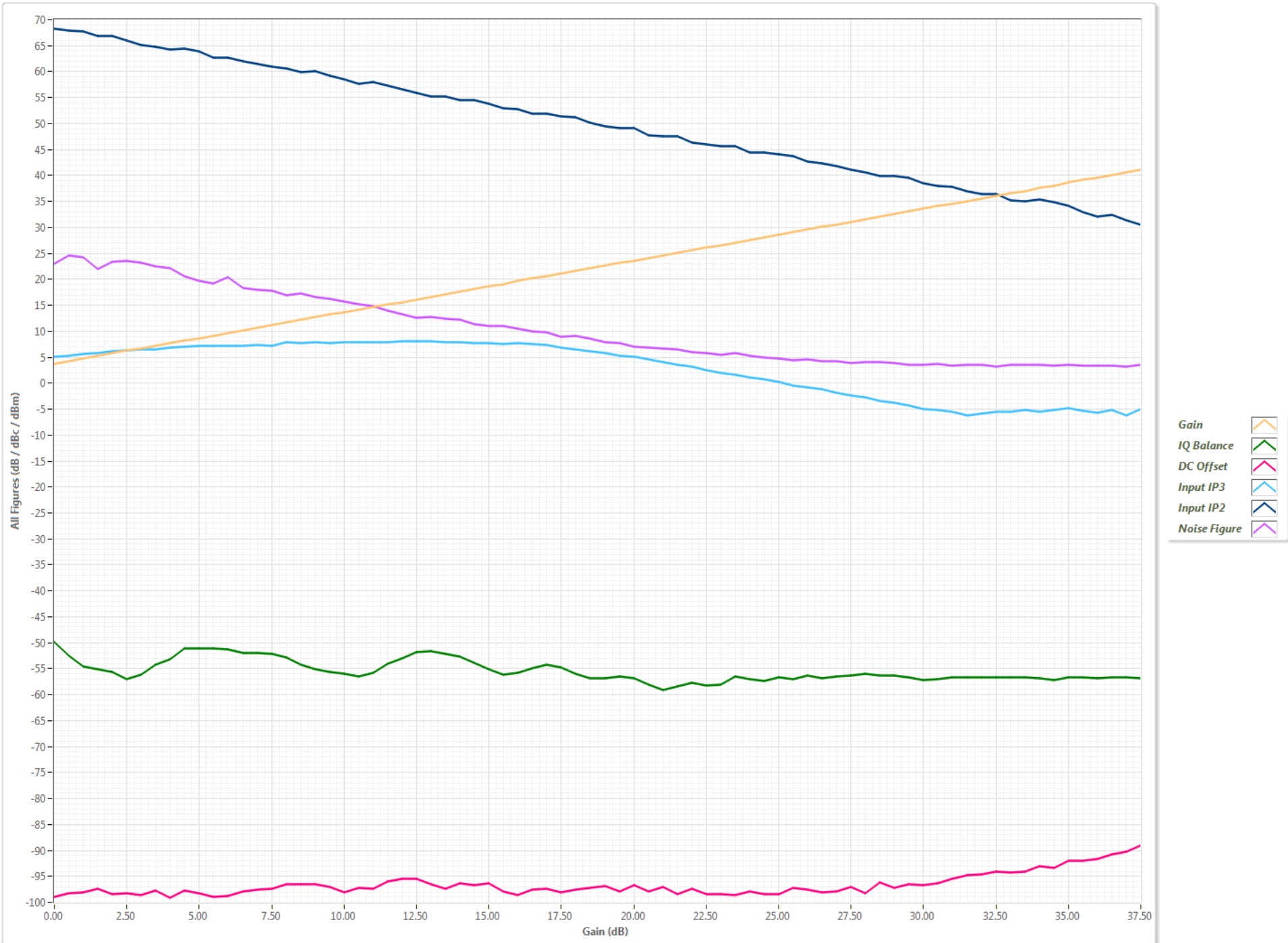
RX Figure vs Gain w/ Frequency=1550.00MHz



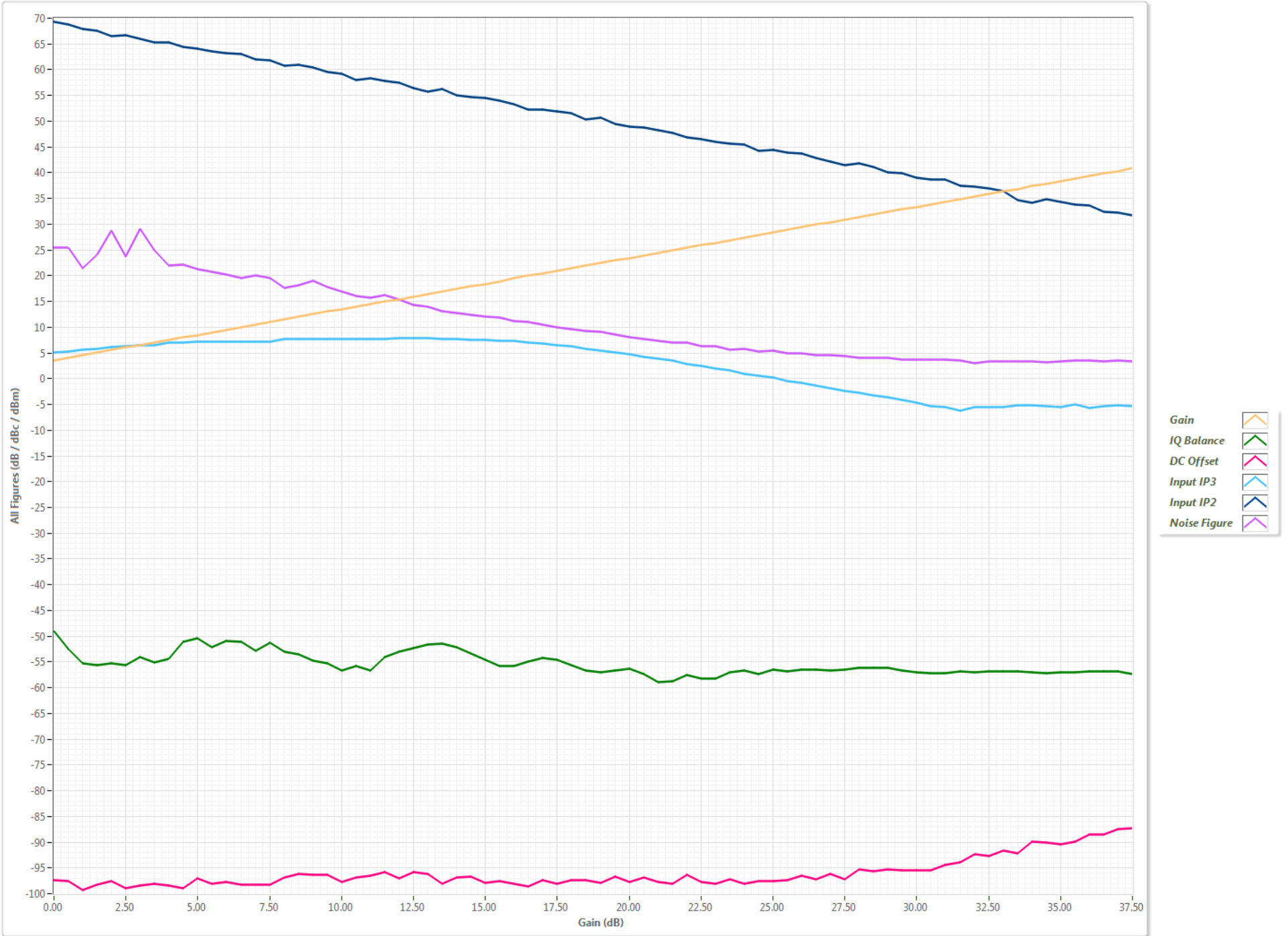
RX Figure vs Gain w/ Frequency=1600.00MHz



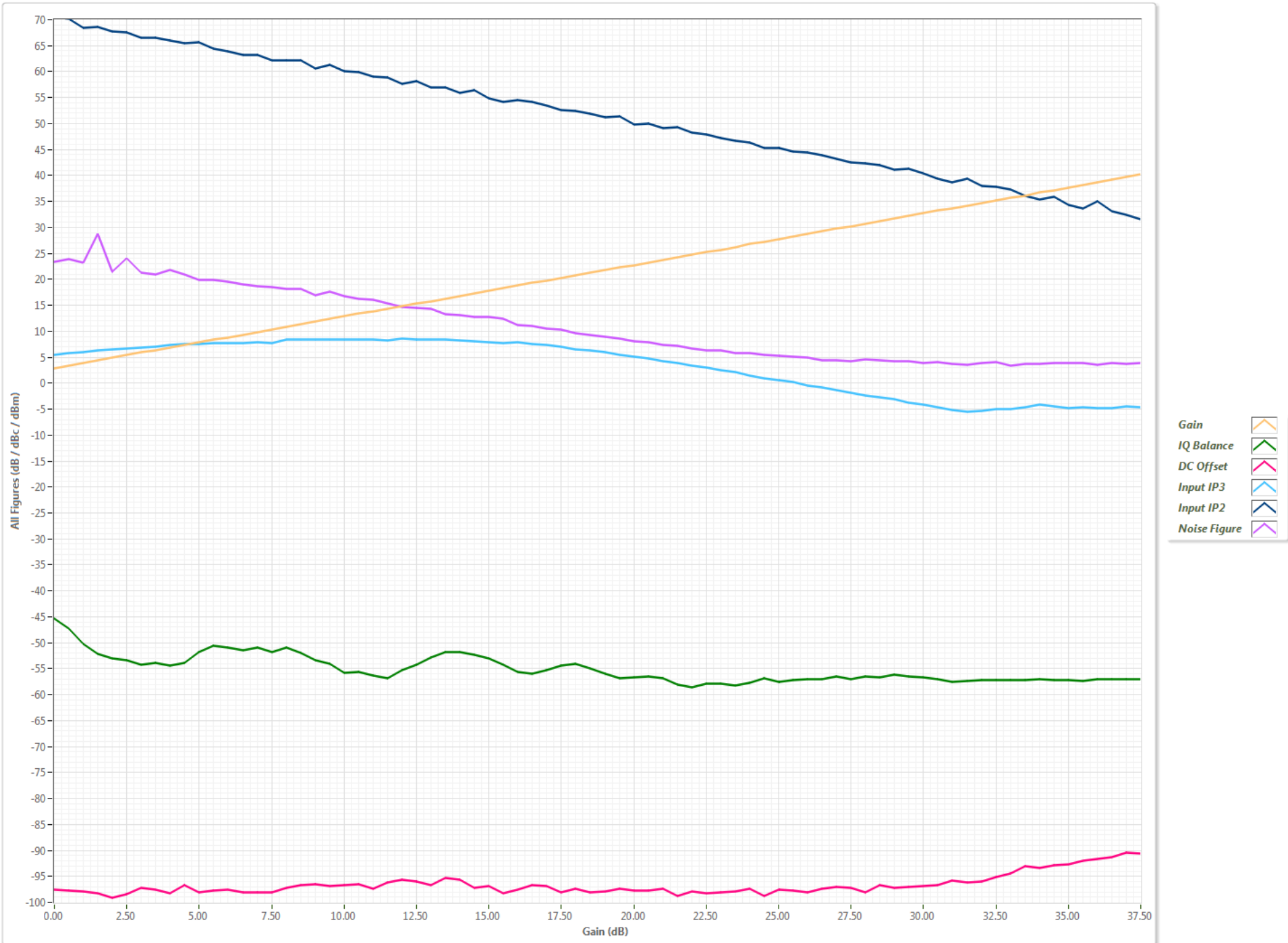
RX Figure vs Gain w/ Frequency=1650.00MHz



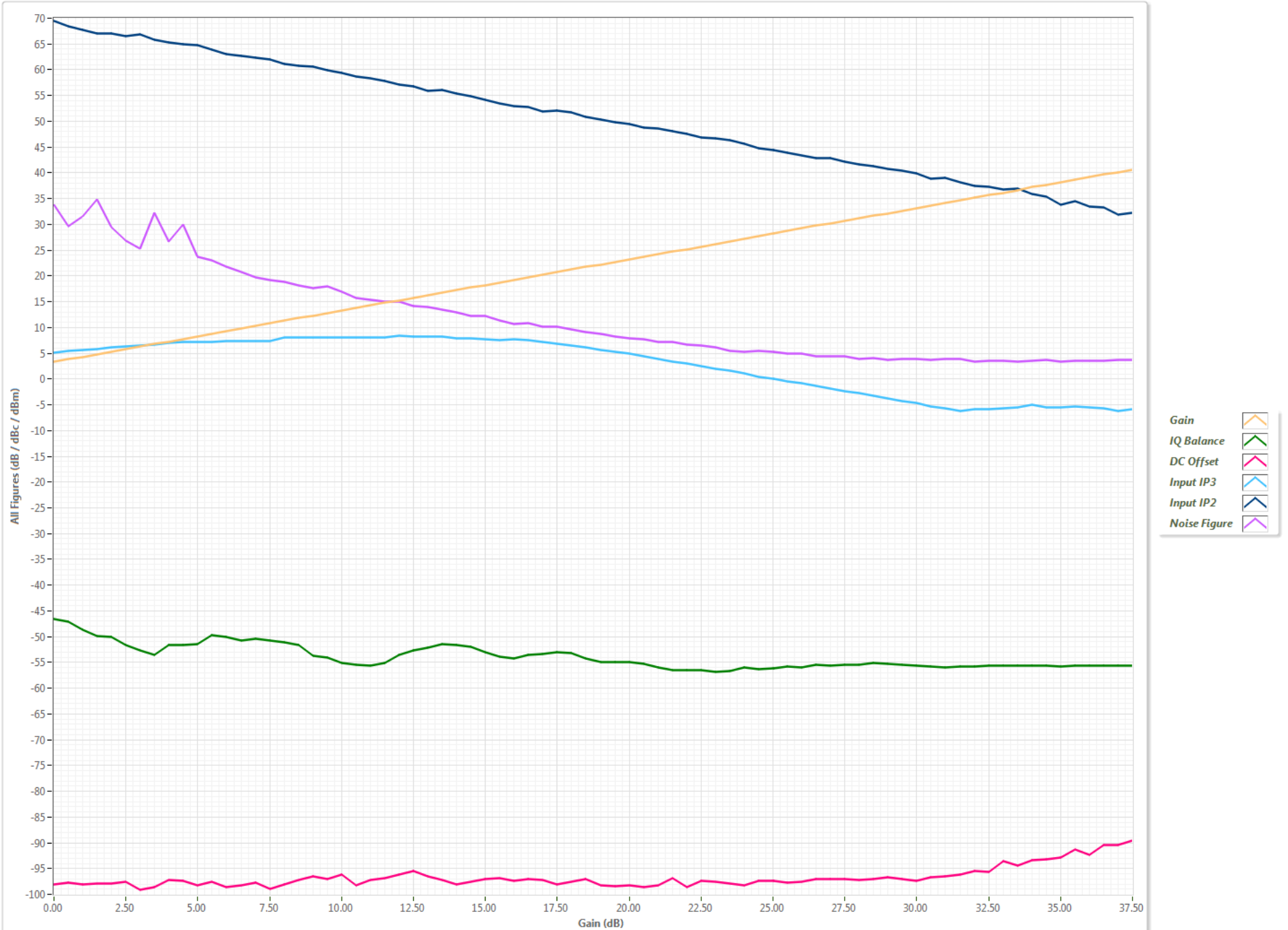
RX Figure vs Gain w/ Frequency=1700.00MHz



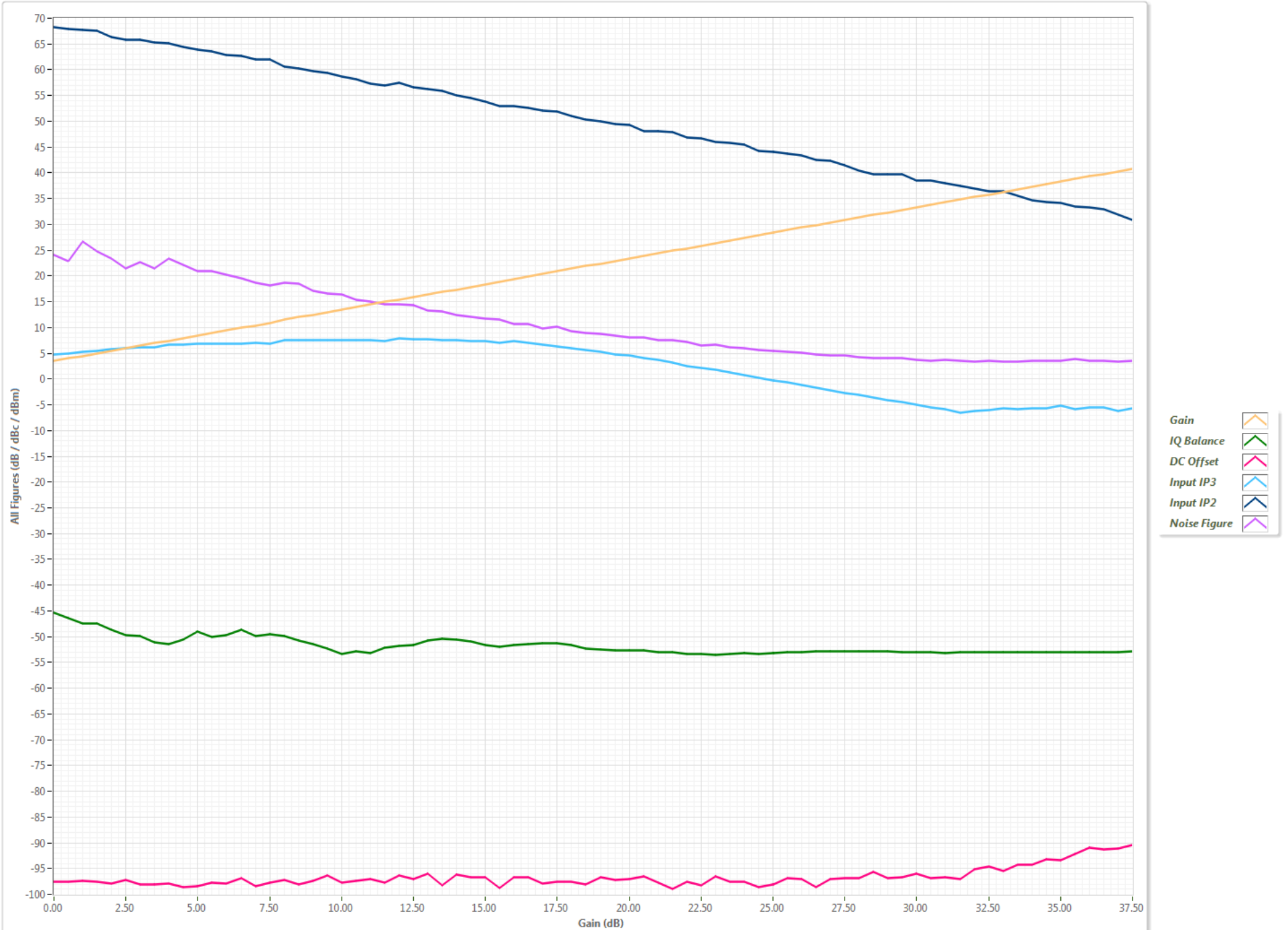
RX Figure vs Gain w/ Frequency=1750.00MHz



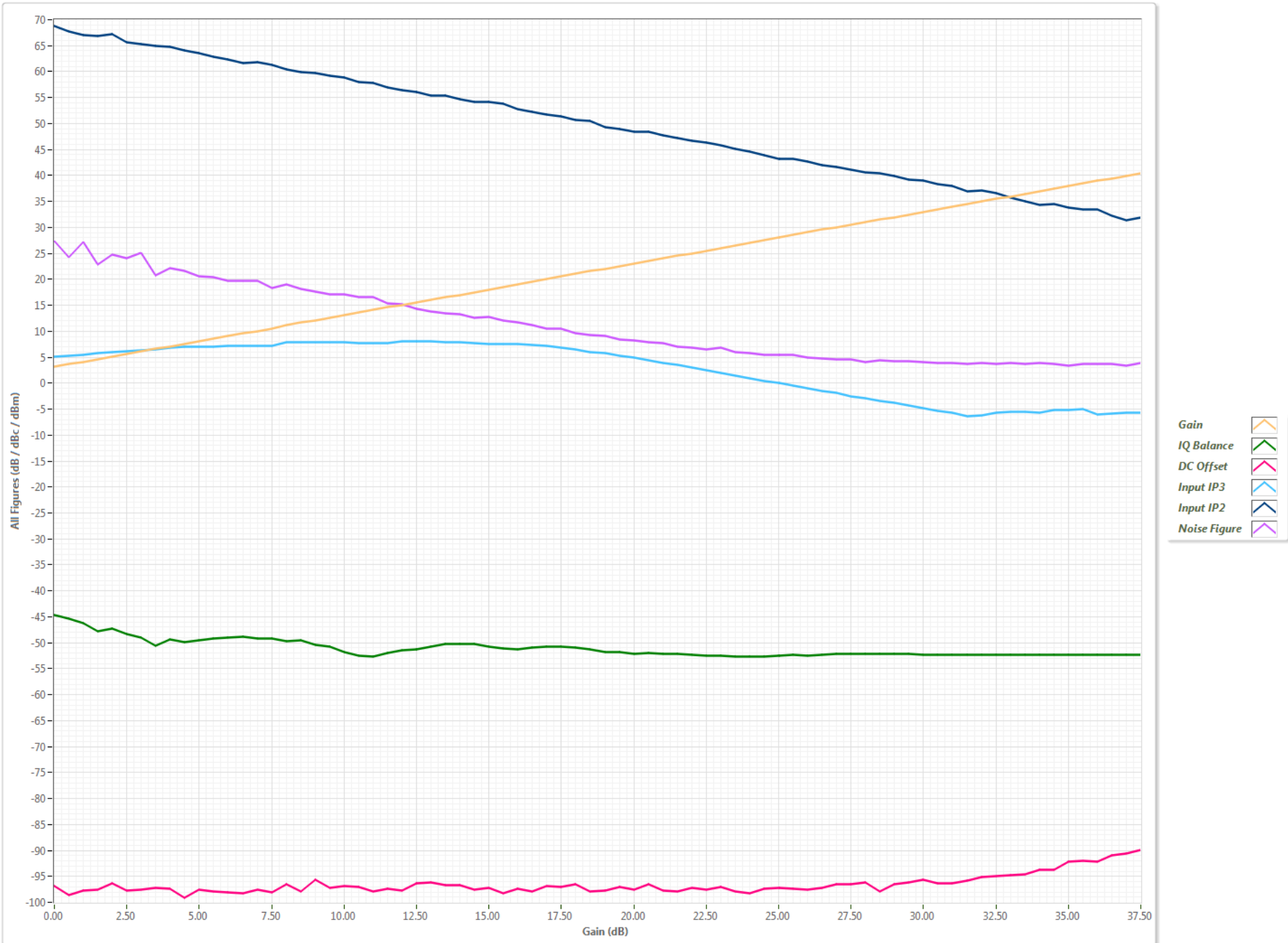
RX Figure vs Gain w/ Frequency=1800.00MHz



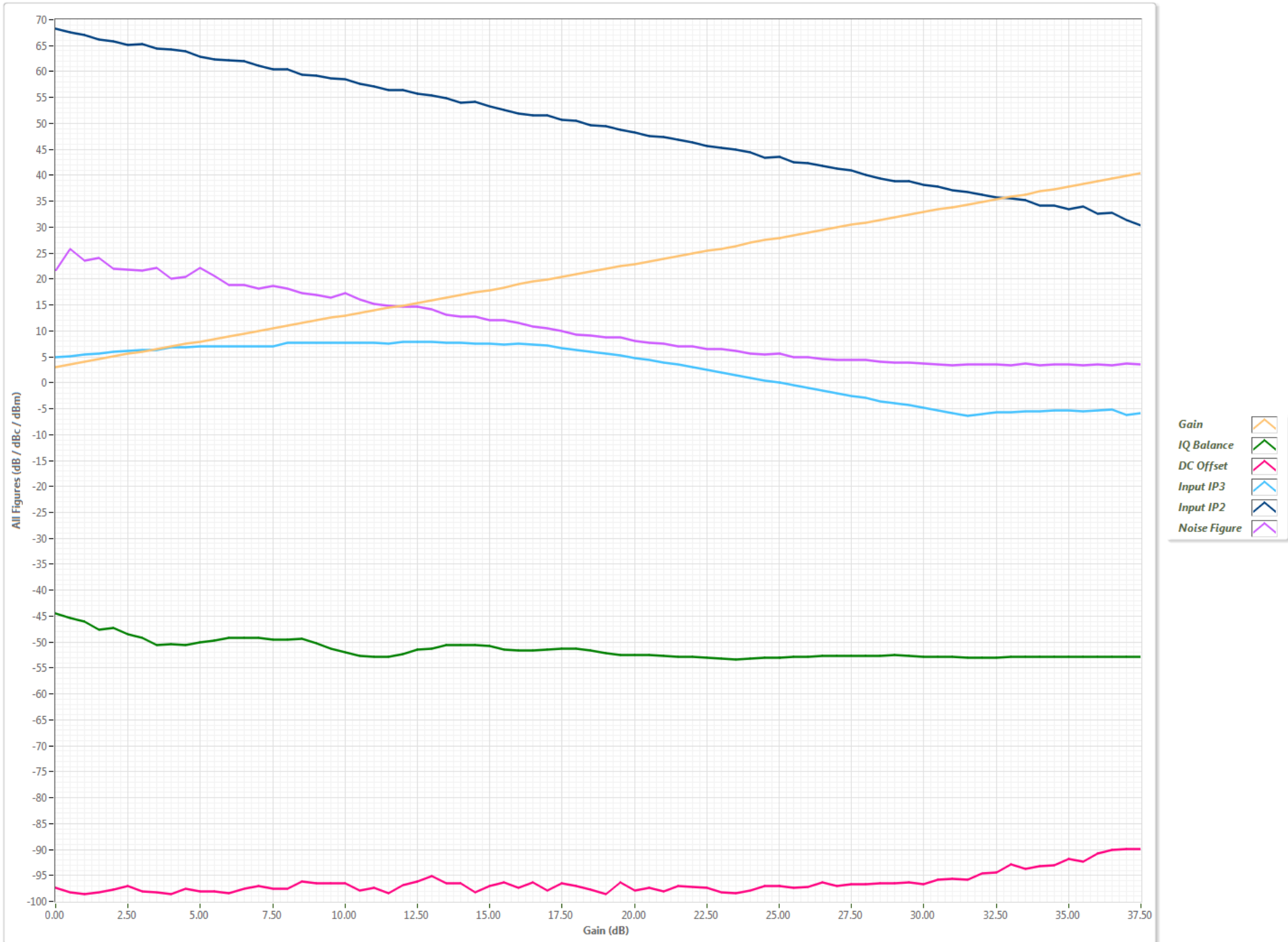
RX Figure vs Gain w/ Frequency=1850.00MHz



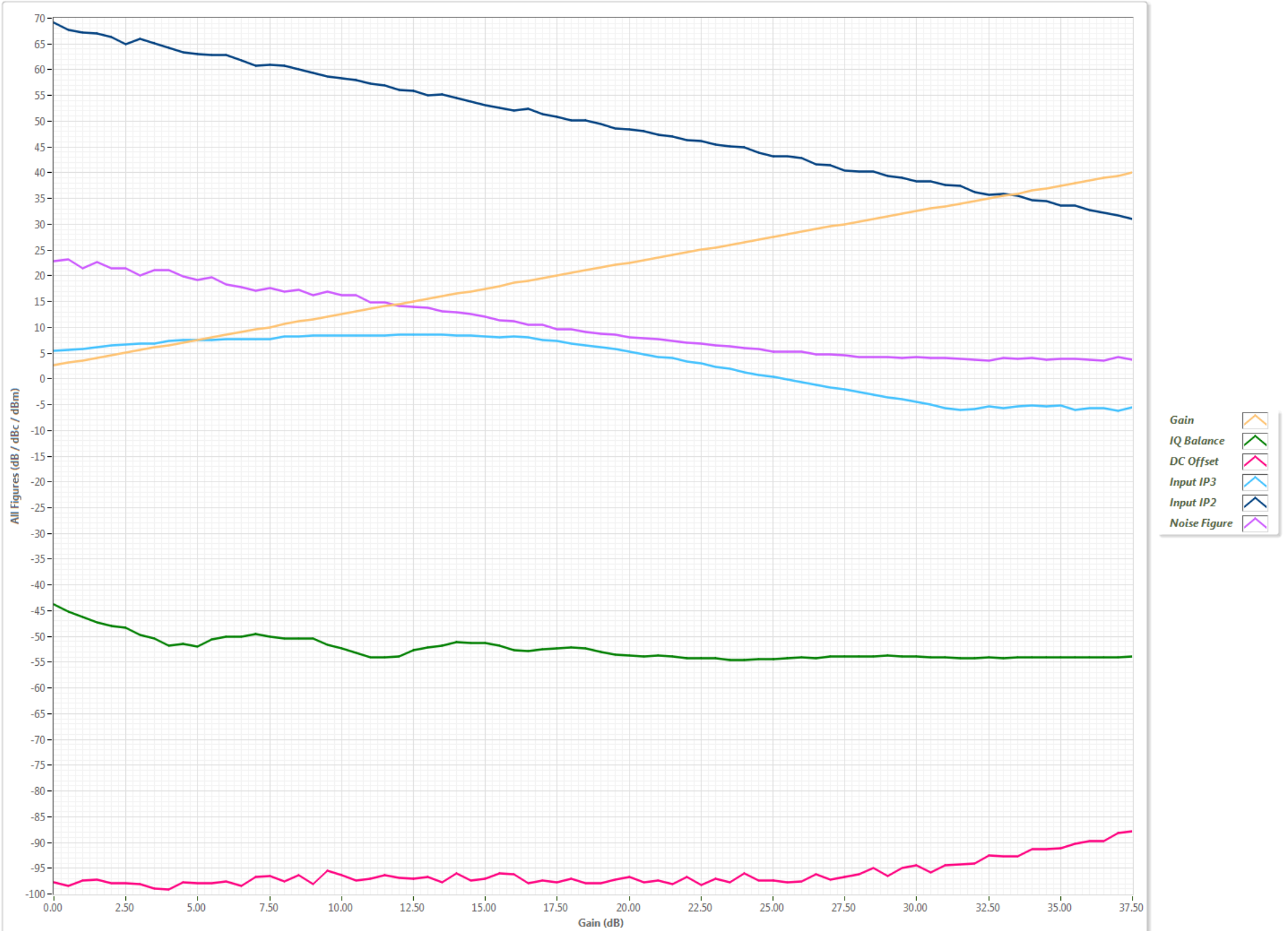
RX Figure vs Gain w/ Frequency=1900.00MHz



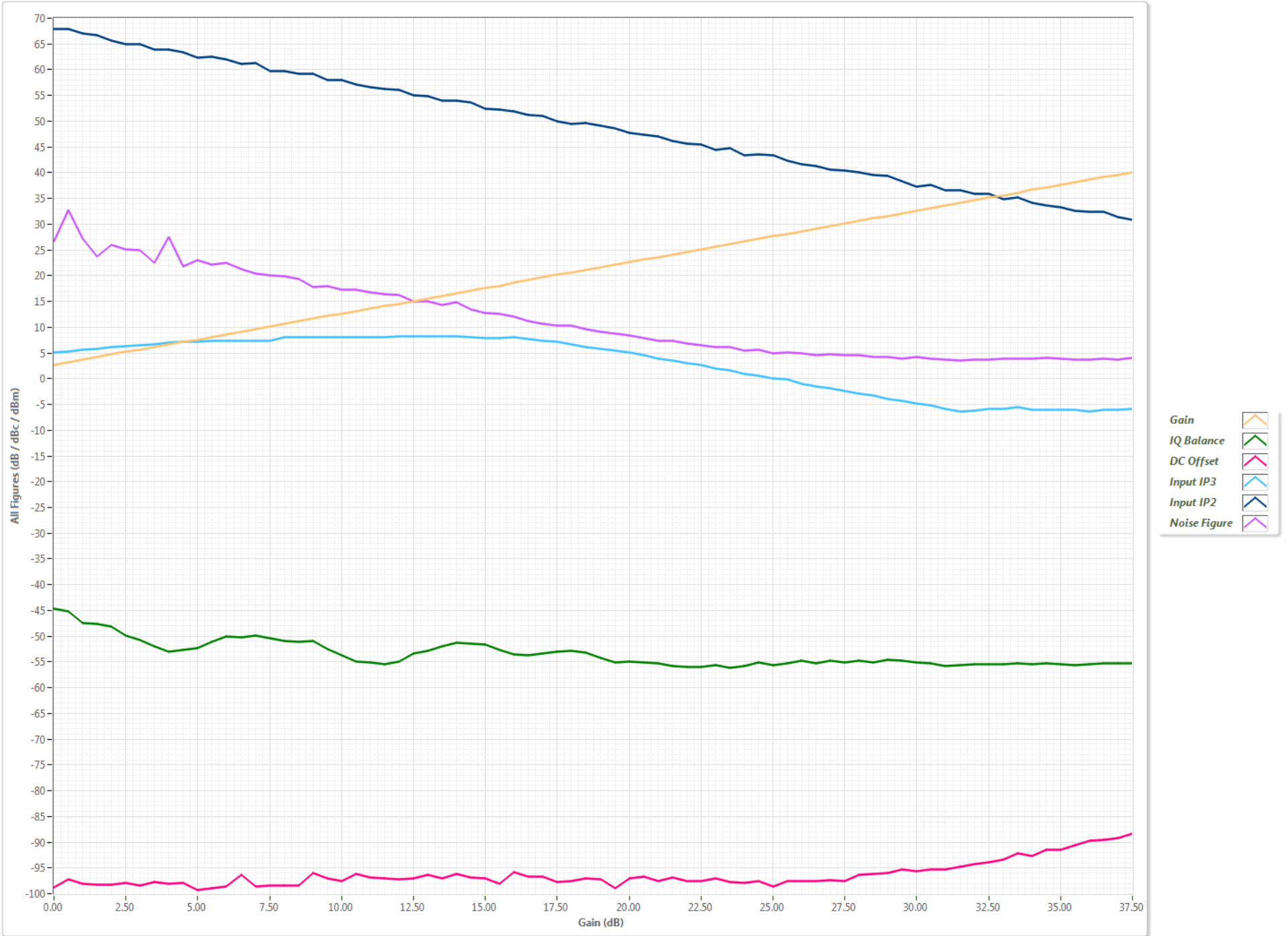
RX Figure vs Gain w/ Frequency=1950.00MHz



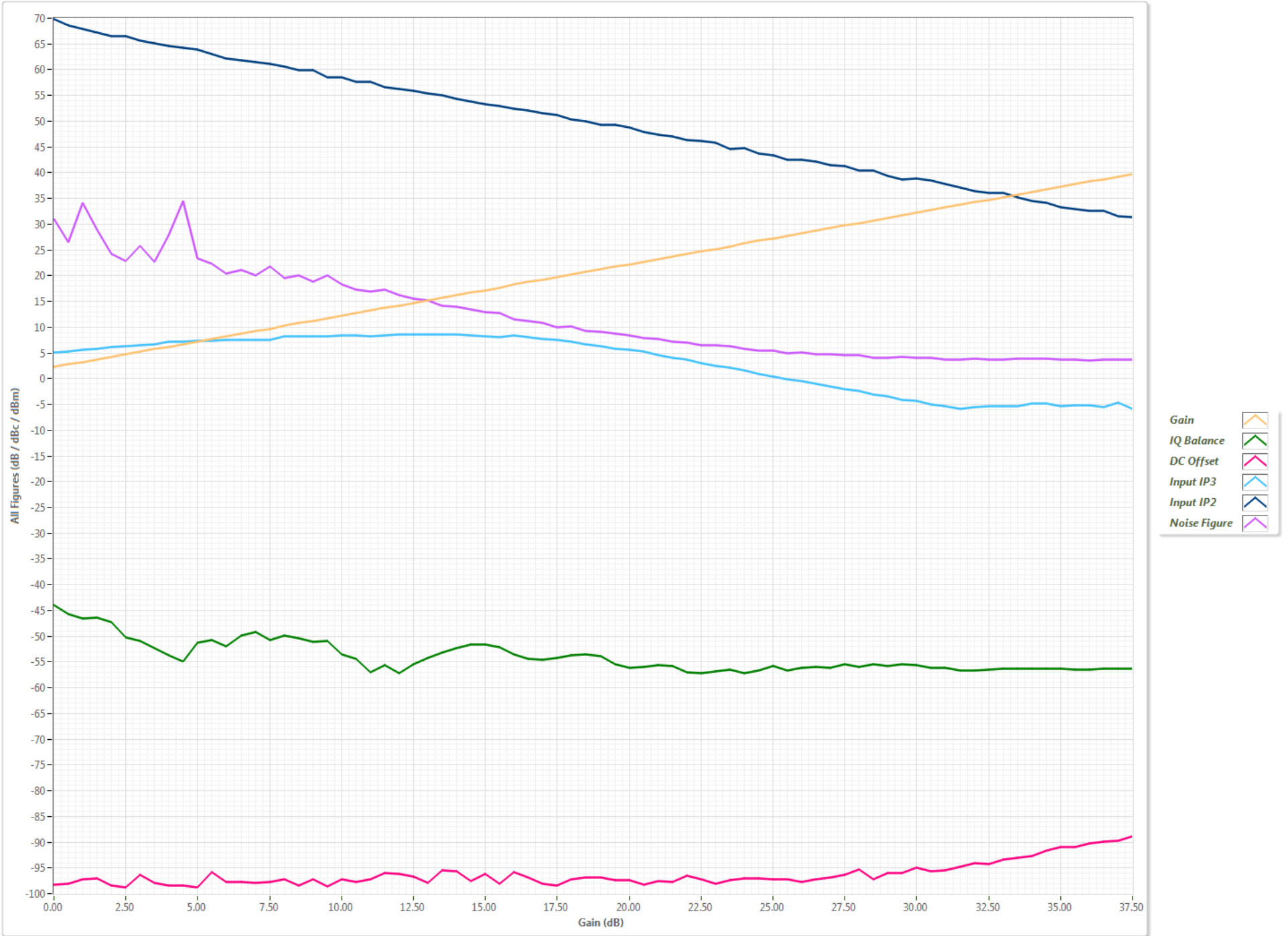
RX Figure vs Gain w/ Frequency=2000.00MHz



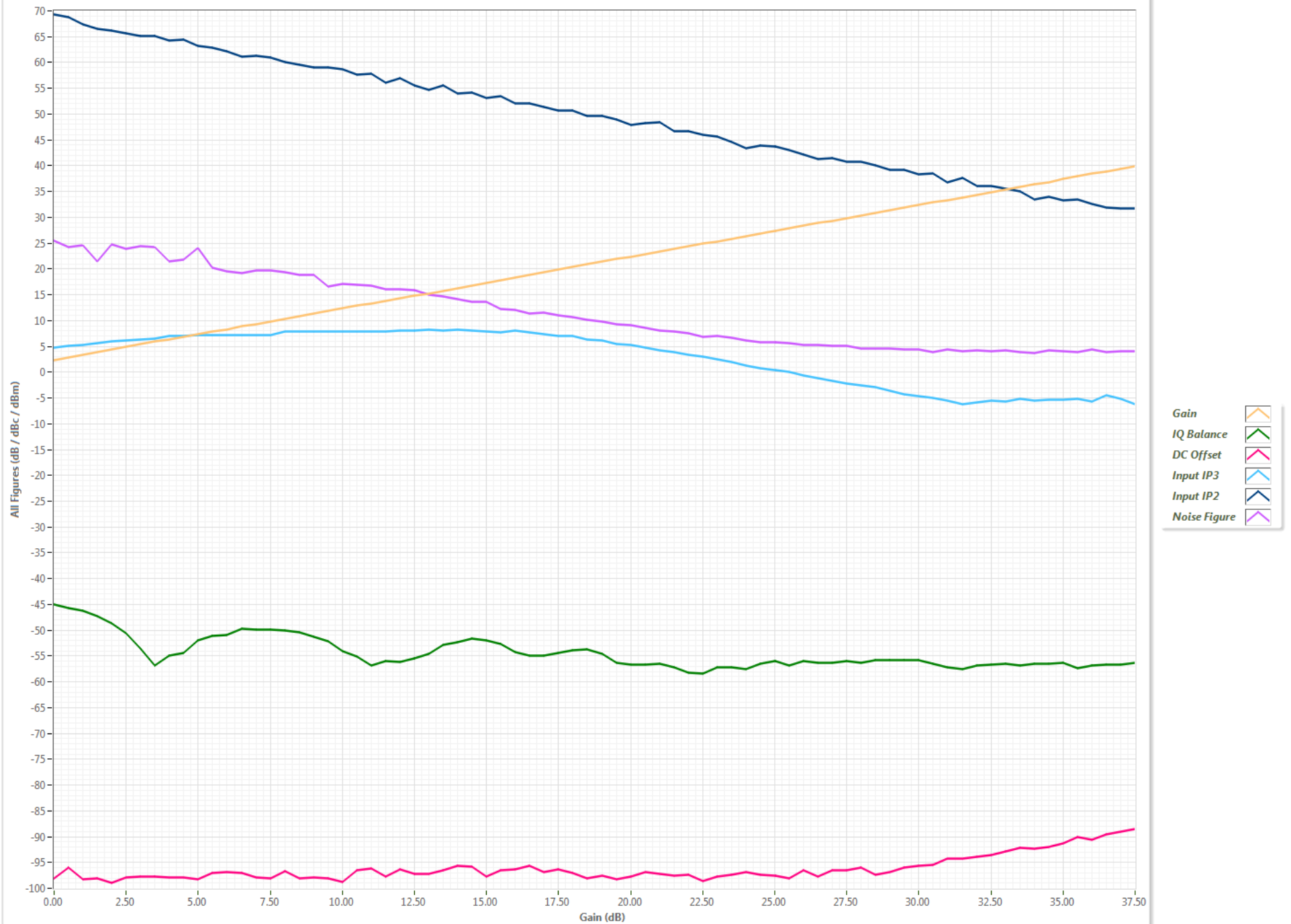
RX Figure vs Gain w/ Frequency=2050.00MHz



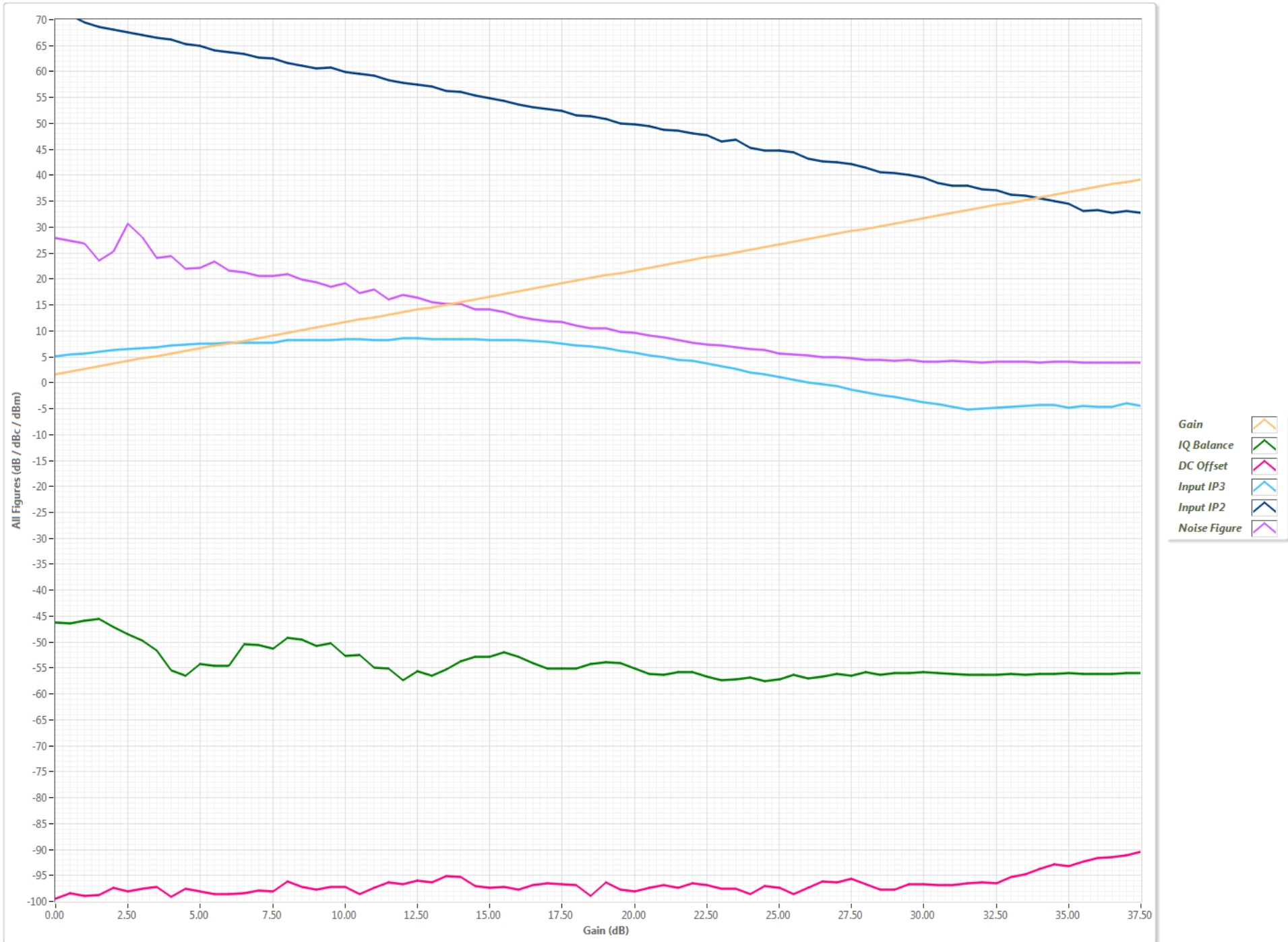
RX Figure vs Gain w/ Frequency=2100.00MHz



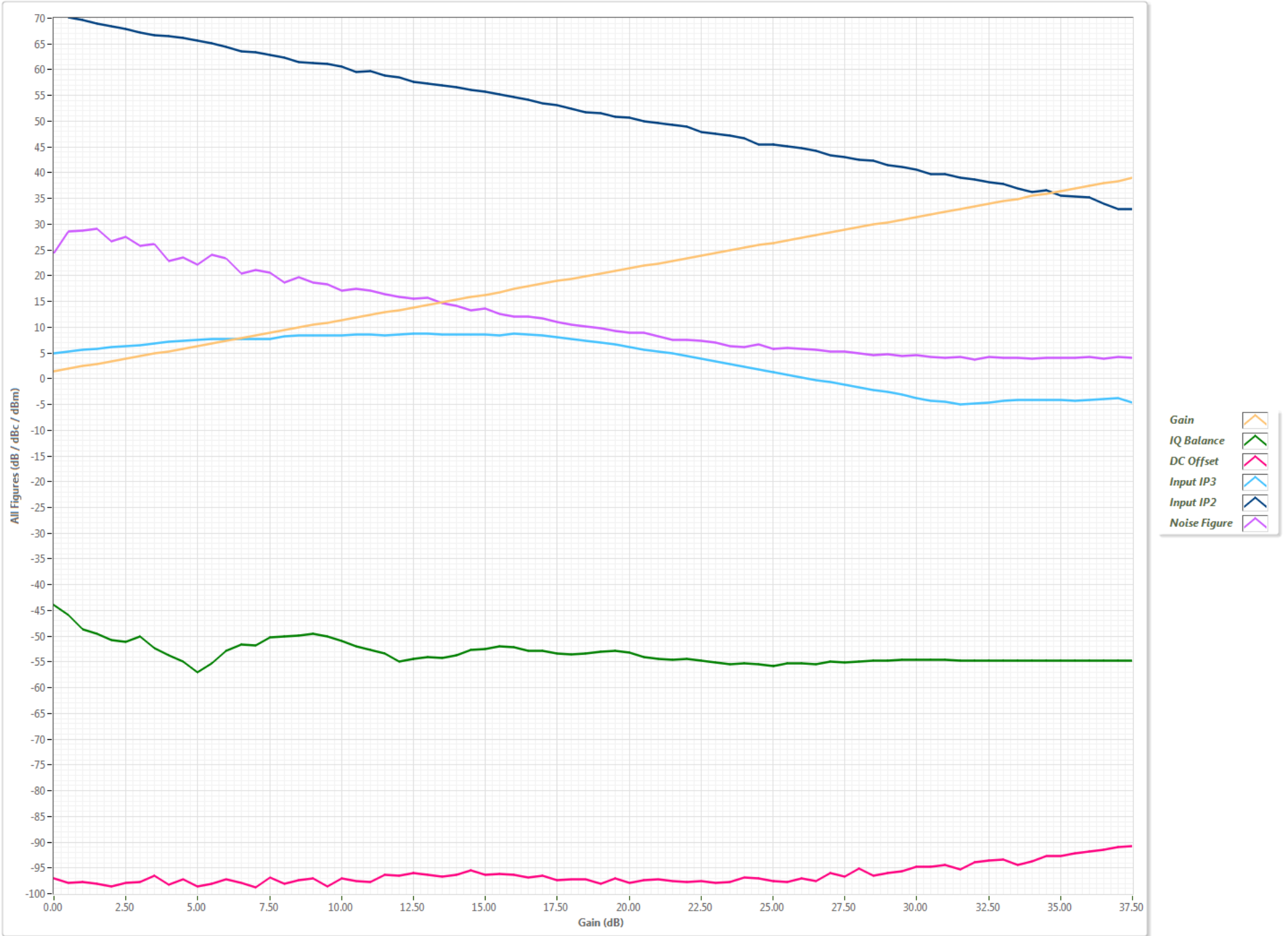
RX Figure vs Gain w/ Frequency=2150.00MHz



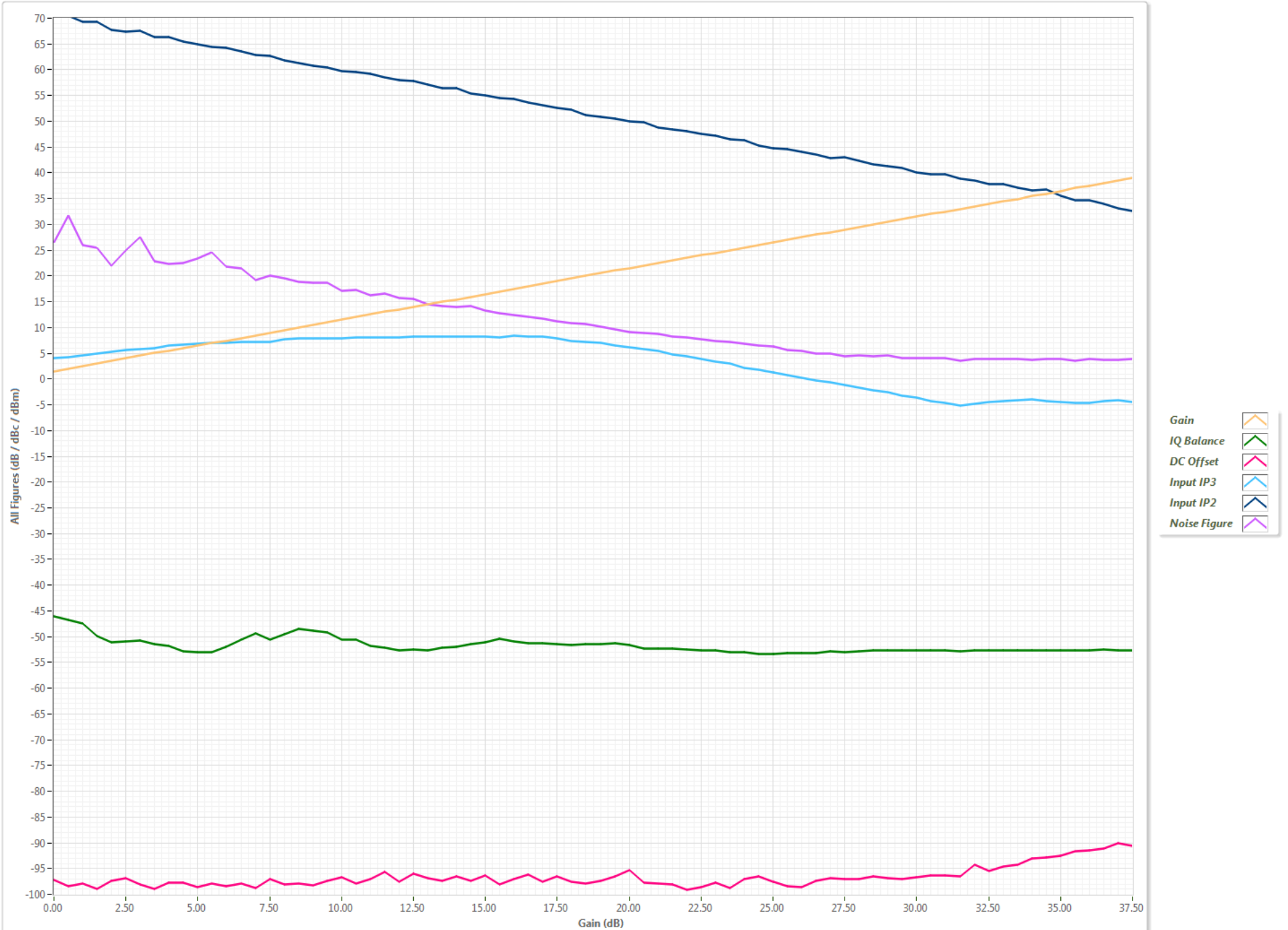
RX Figure vs Gain w/ Frequency=2200.00MHz



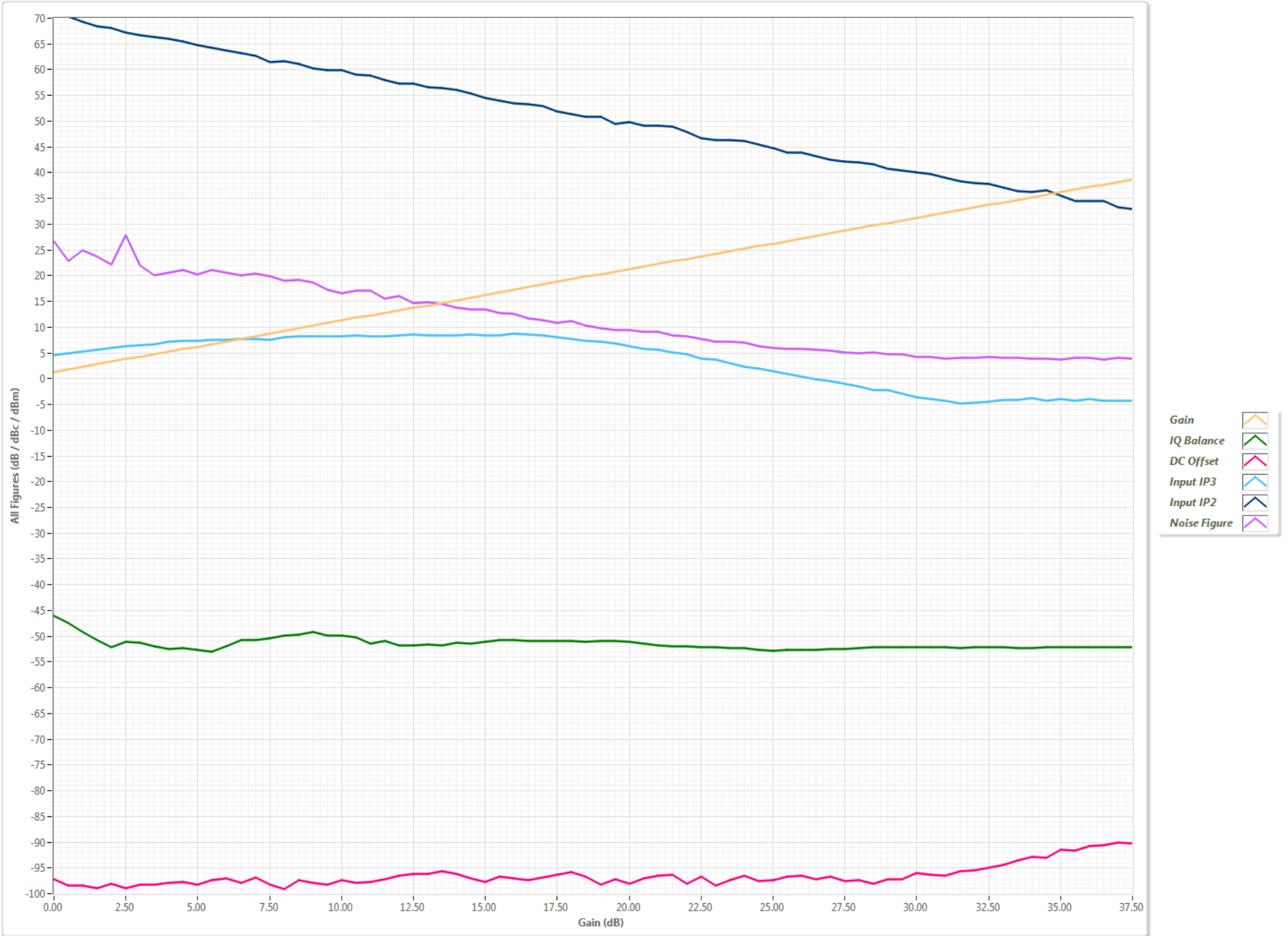
RX Figure vs Gain w/ Frequency=2250.00MHz



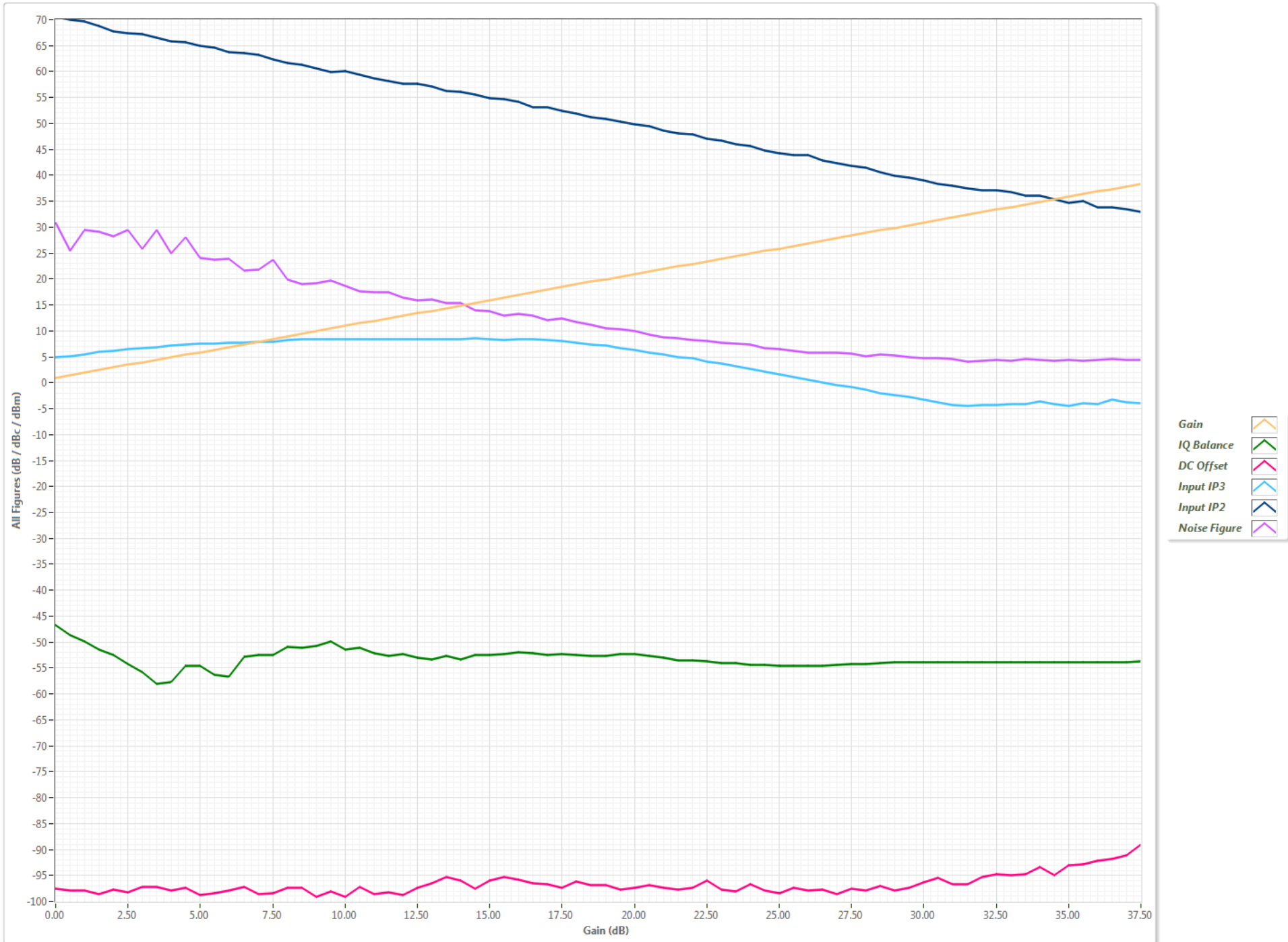
RX Figure vs Gain w/ Frequency=2300.00MHz



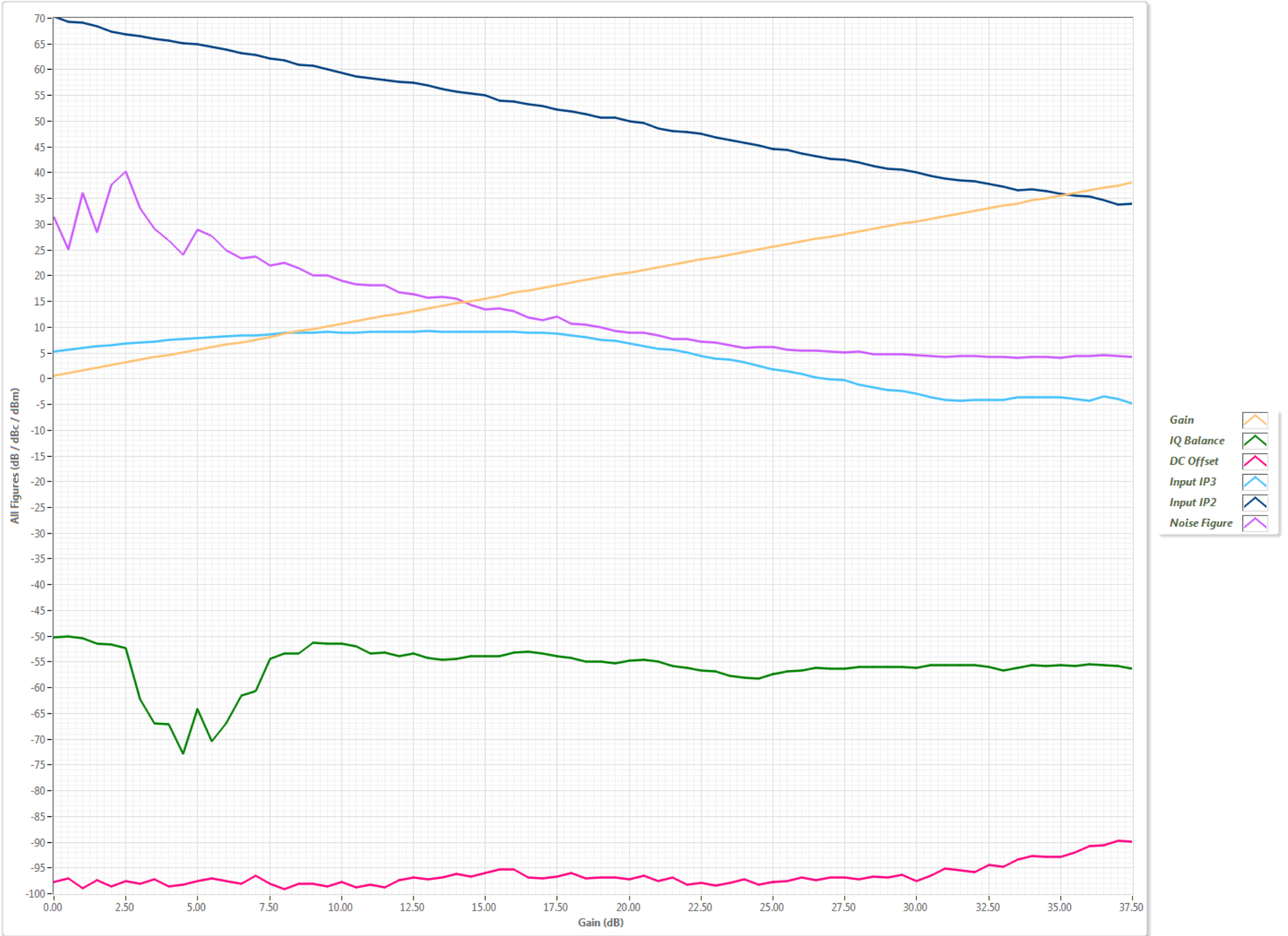
RX Figure vs Gain w/ Frequency=2350.00MHz



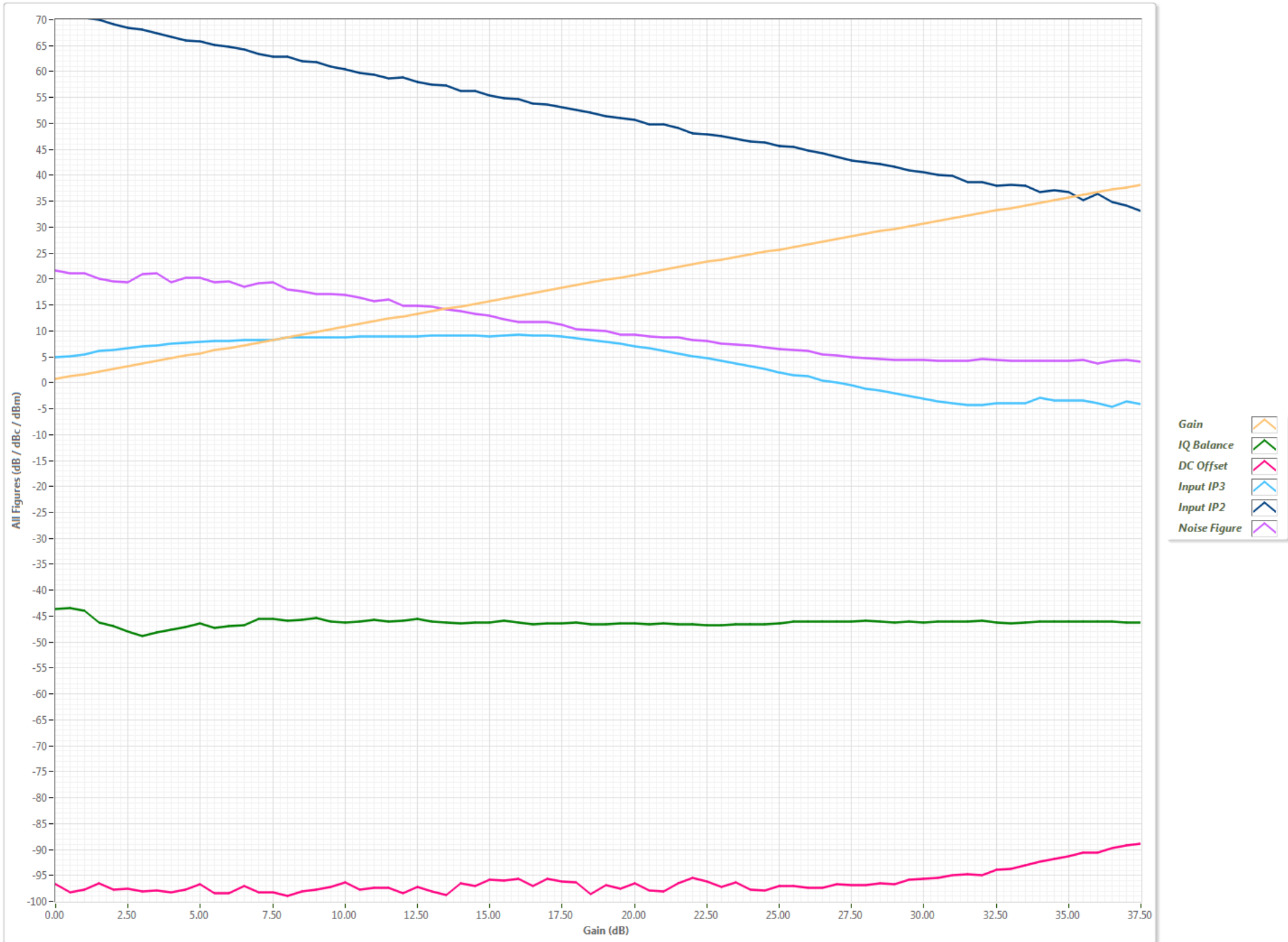
RX Figure vs Gain w/ Frequency=2400.00MHz



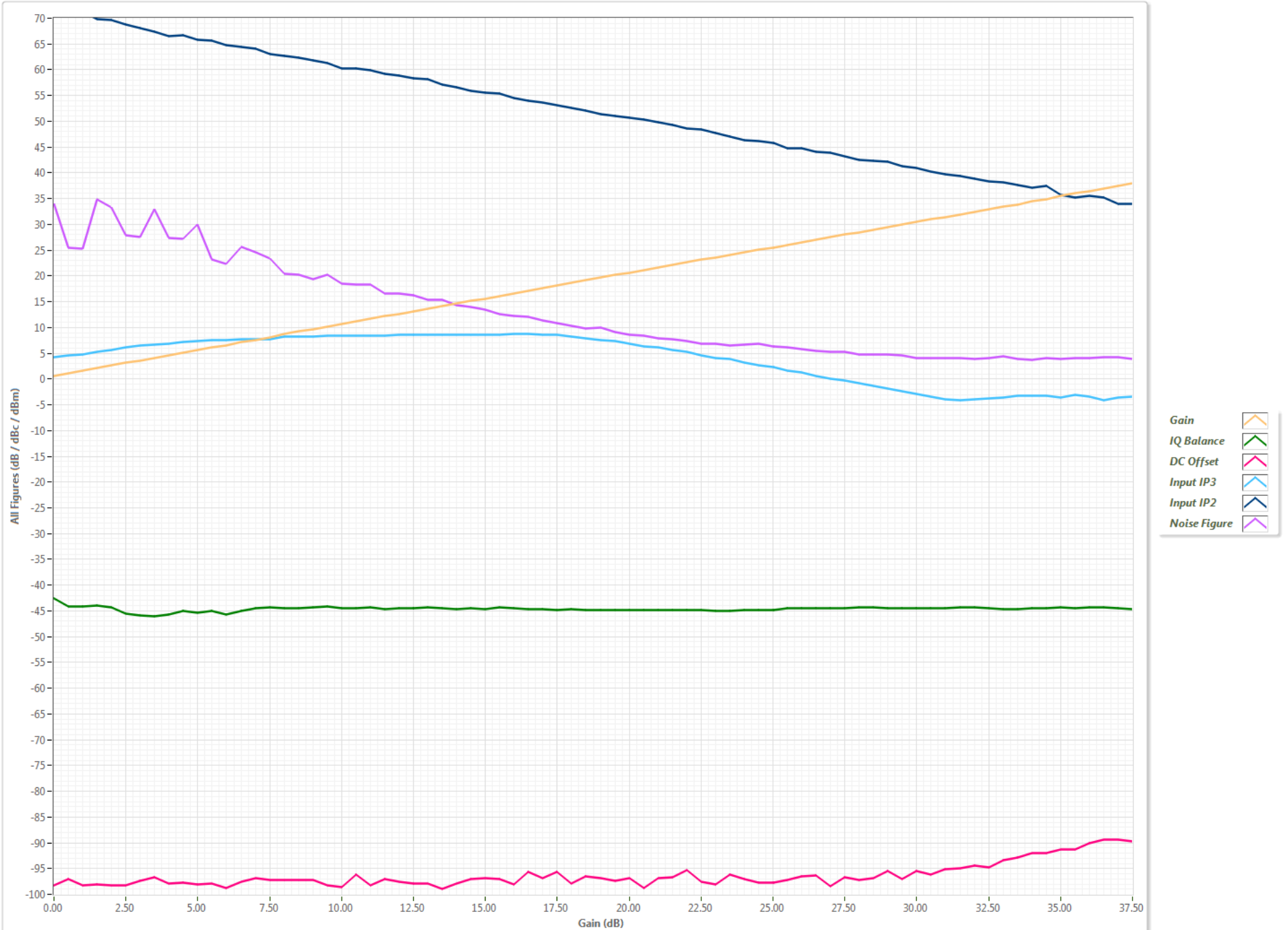
RX Figure vs Gain w/ Frequency=2450.00MHz



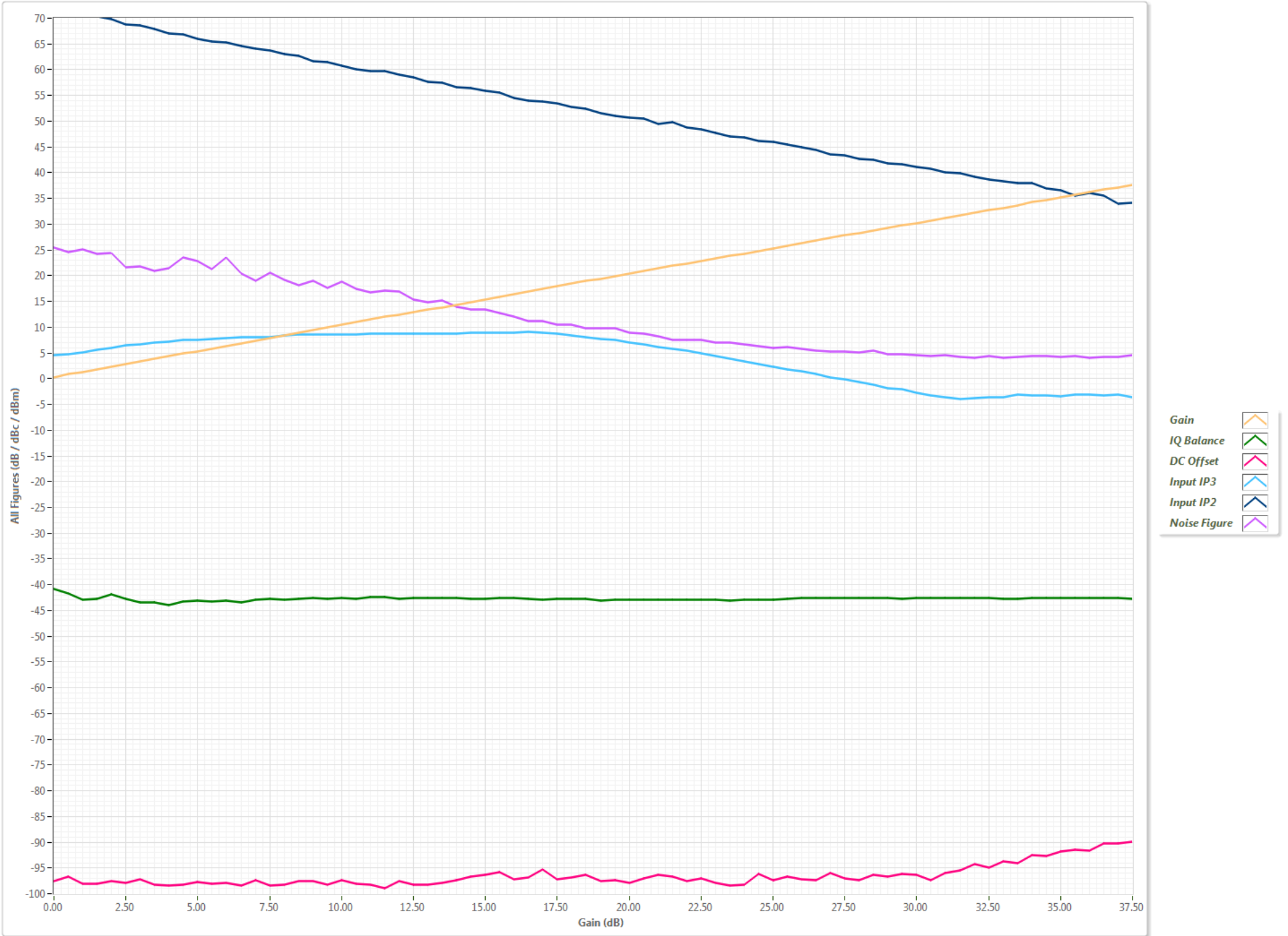
RX Figure vs Gain w/ Frequency=2500.00MHz



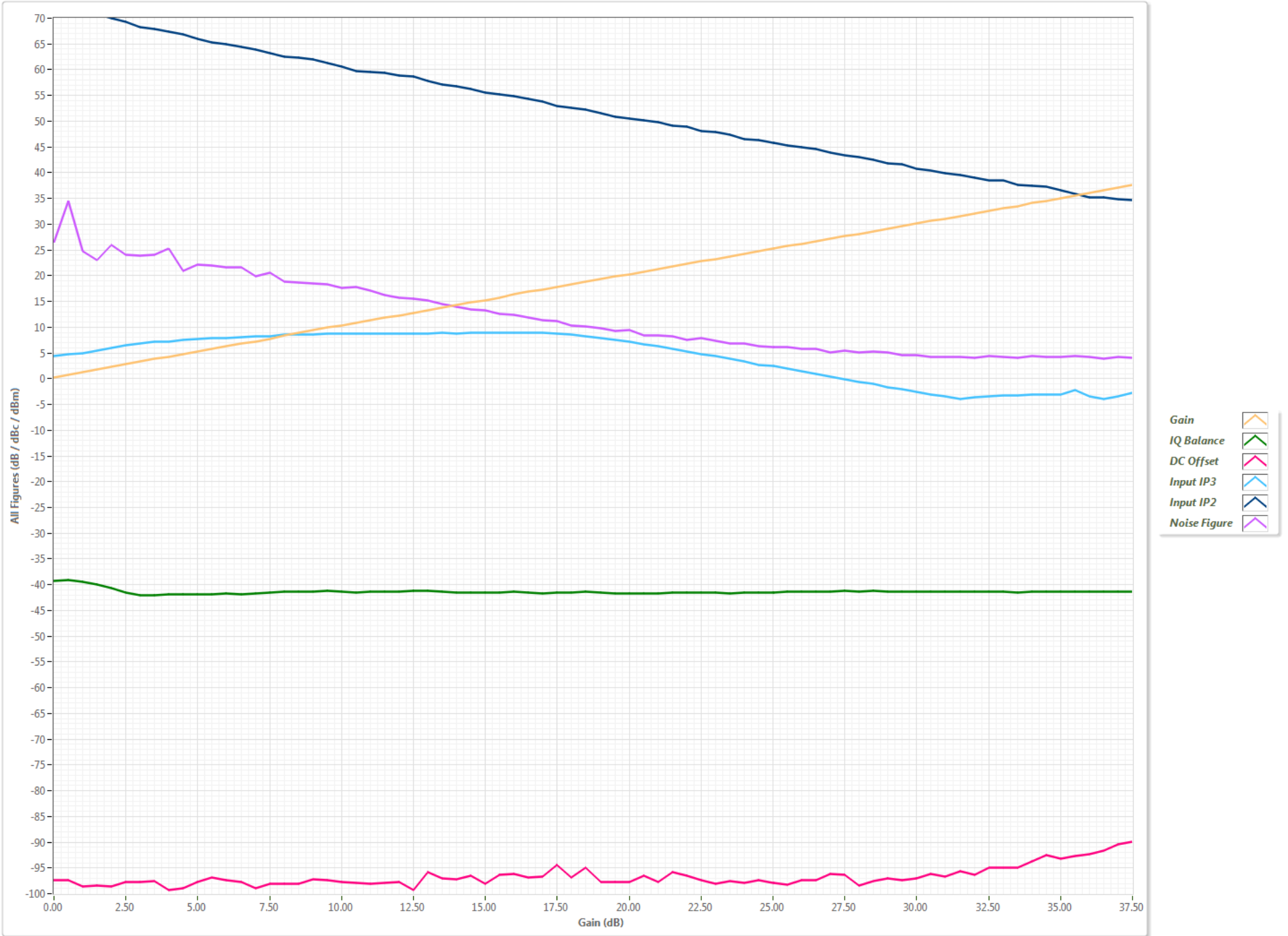
RX Figure vs Gain w/ Frequency=2550.00MHz



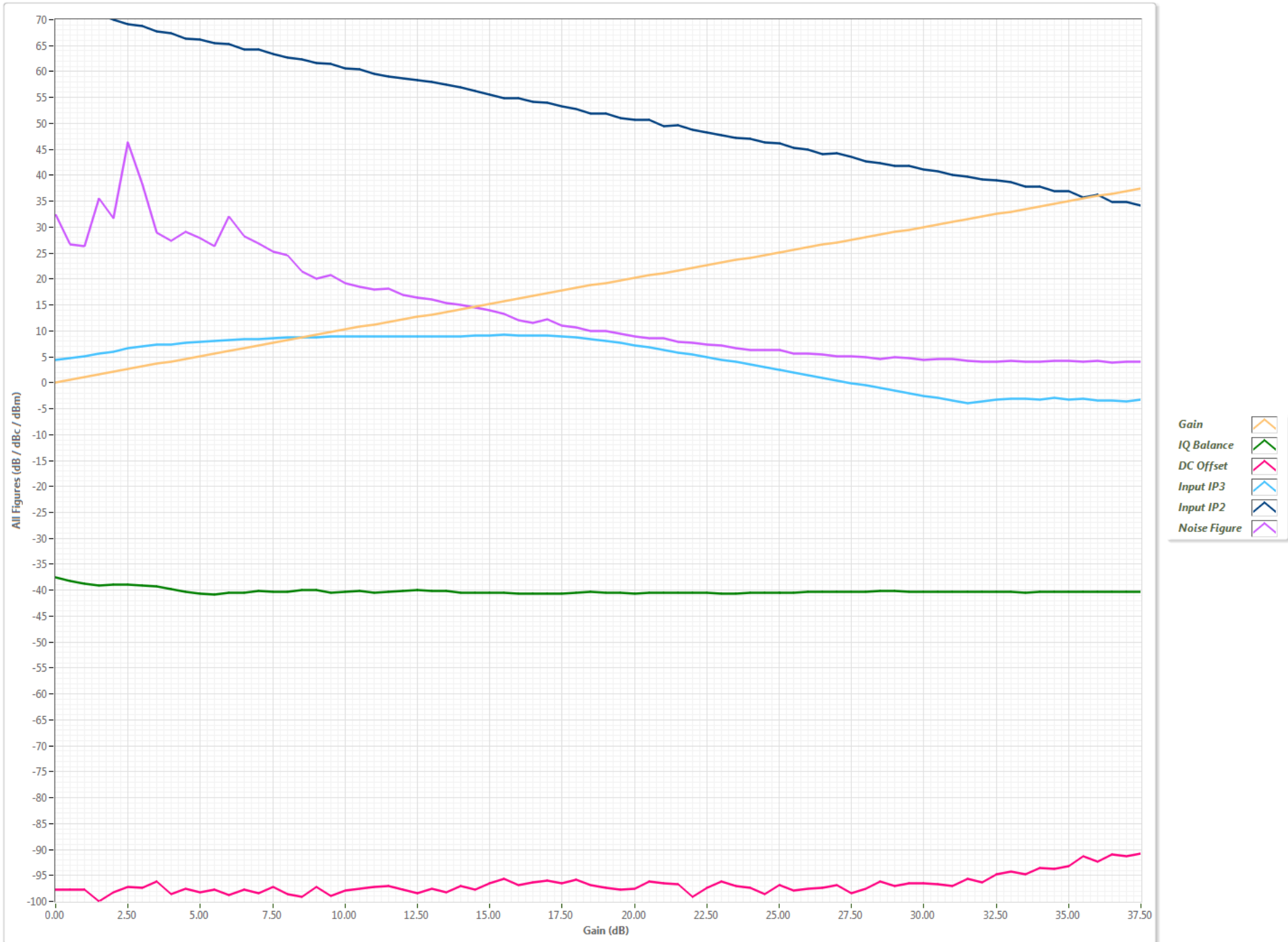
RX Figure vs Gain w/ Frequency=2600.00MHz



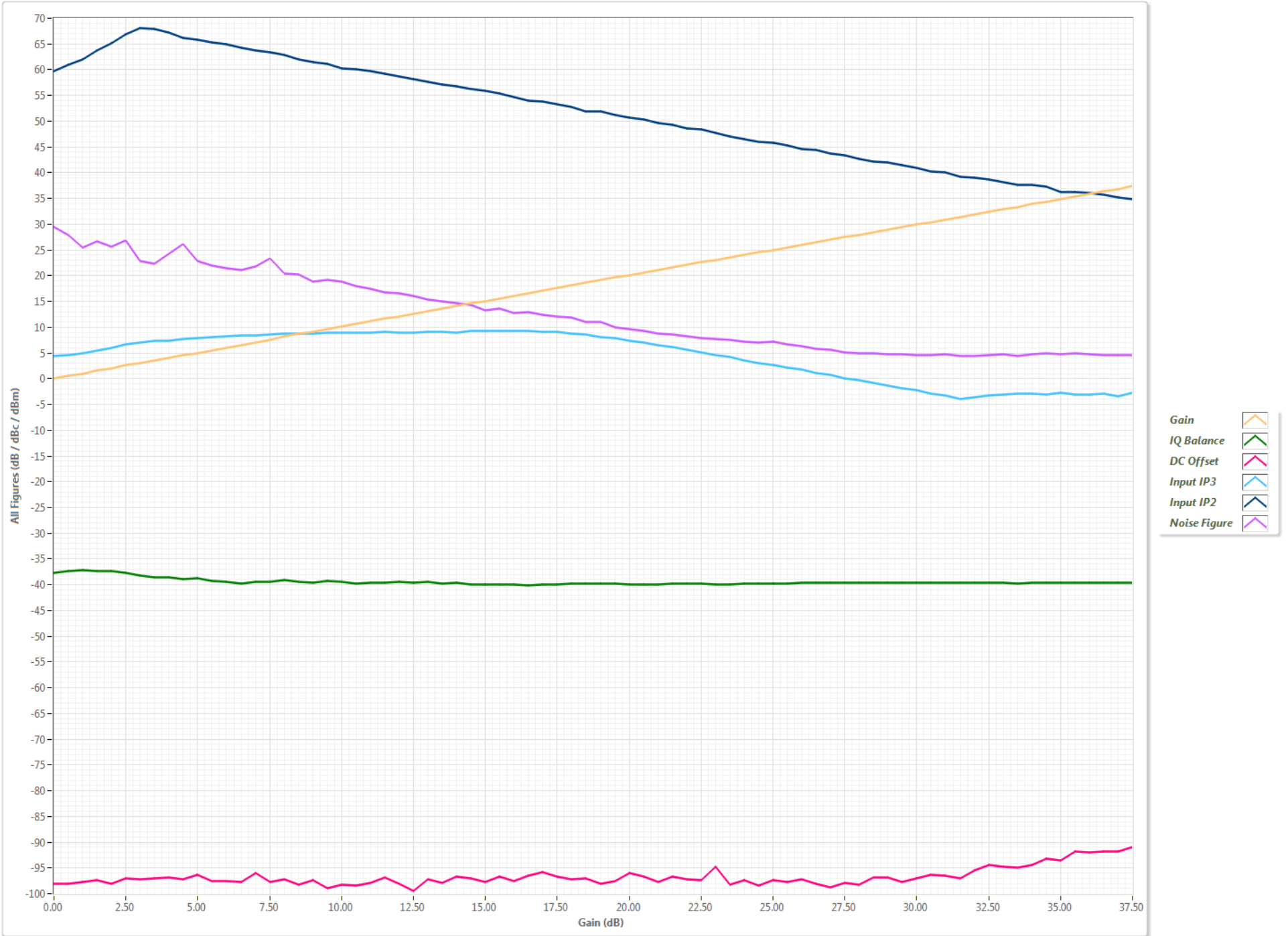
RX Figure vs Gain w/ Frequency=2650.00MHz



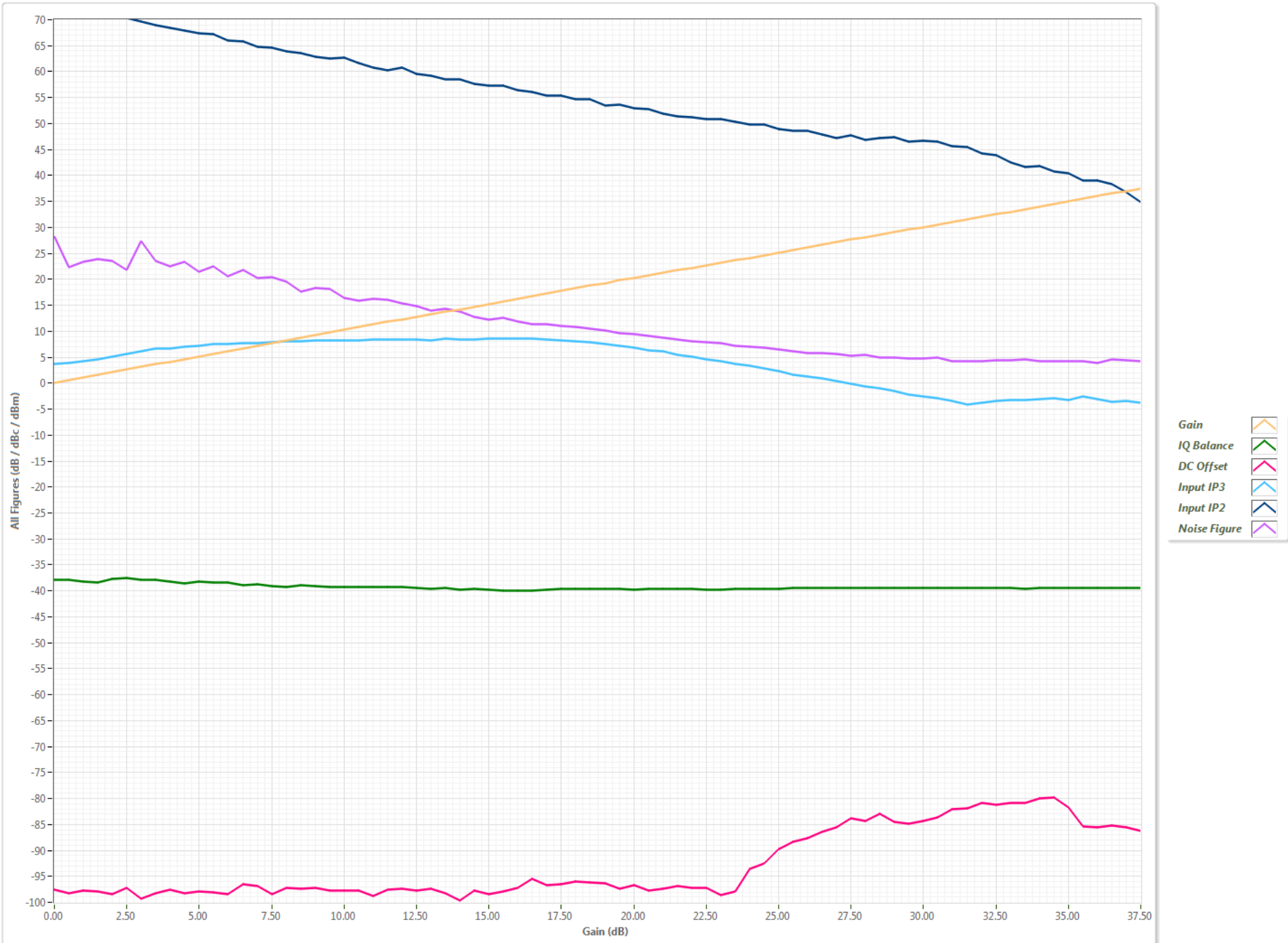
RX Figure vs Gain w/ Frequency=2700.00MHz



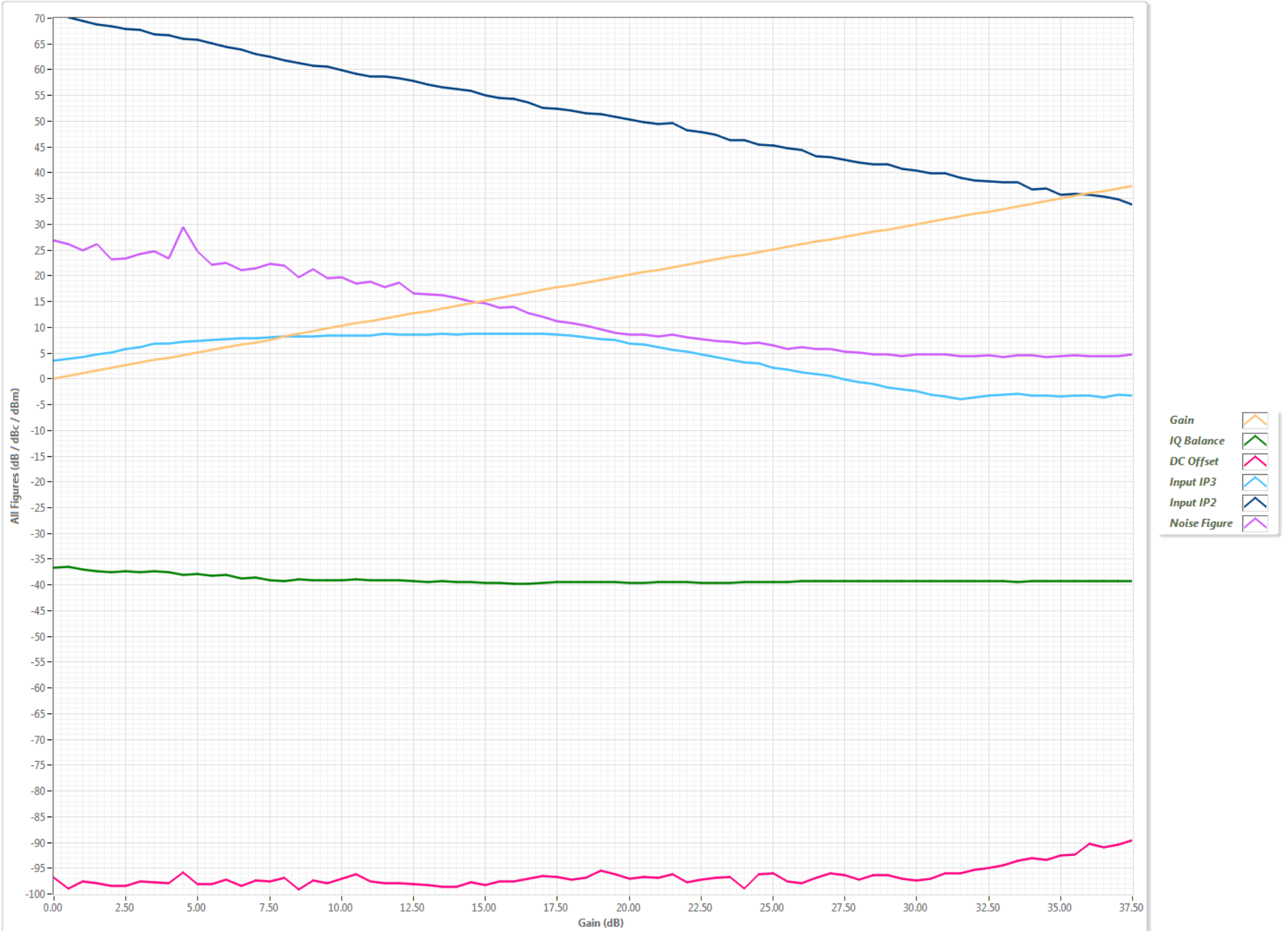
RX Figure vs Gain w/ Frequency=2750.00MHz



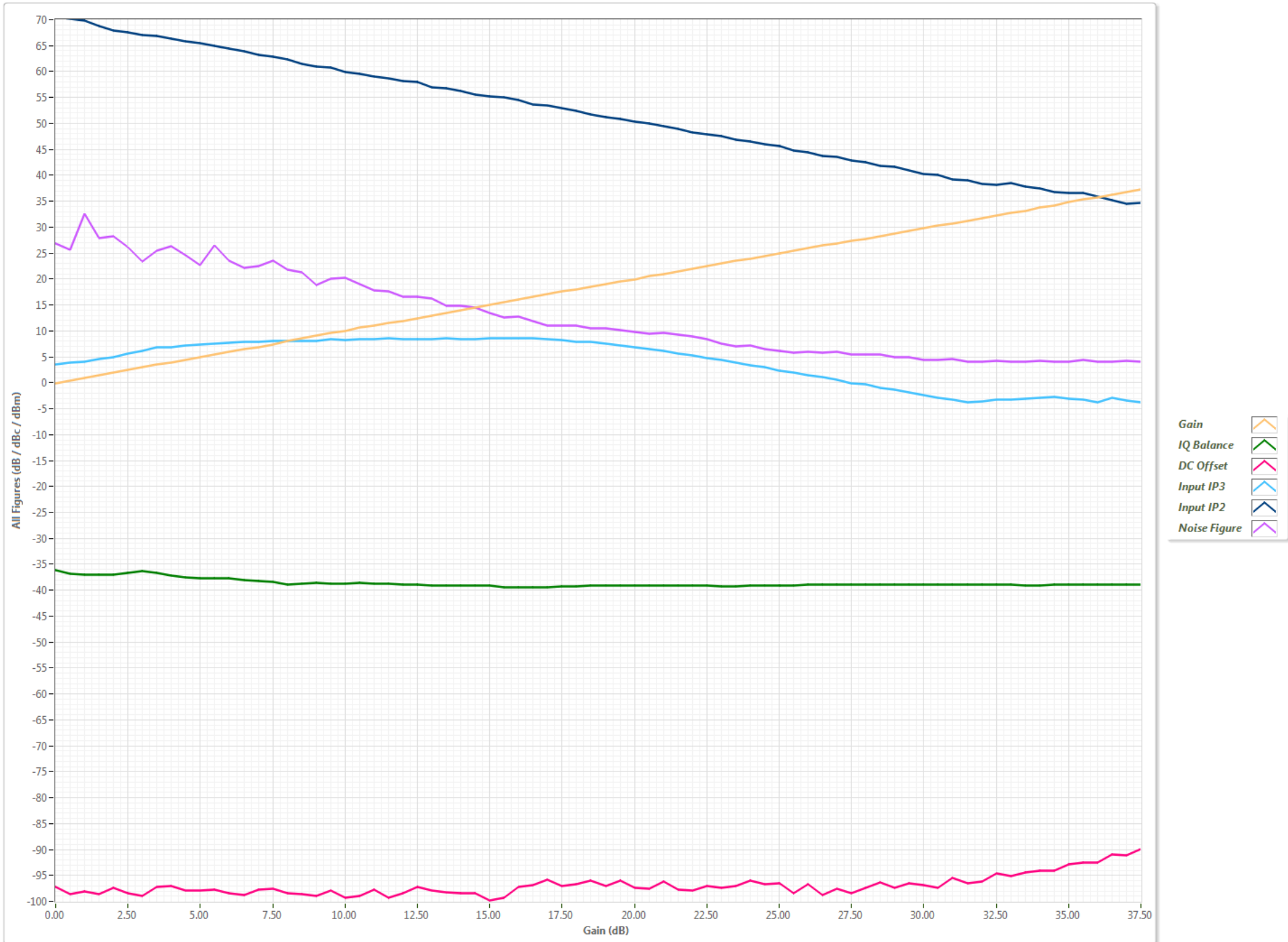
RX Figure vs Gain w/ Frequency=2800.00MHz



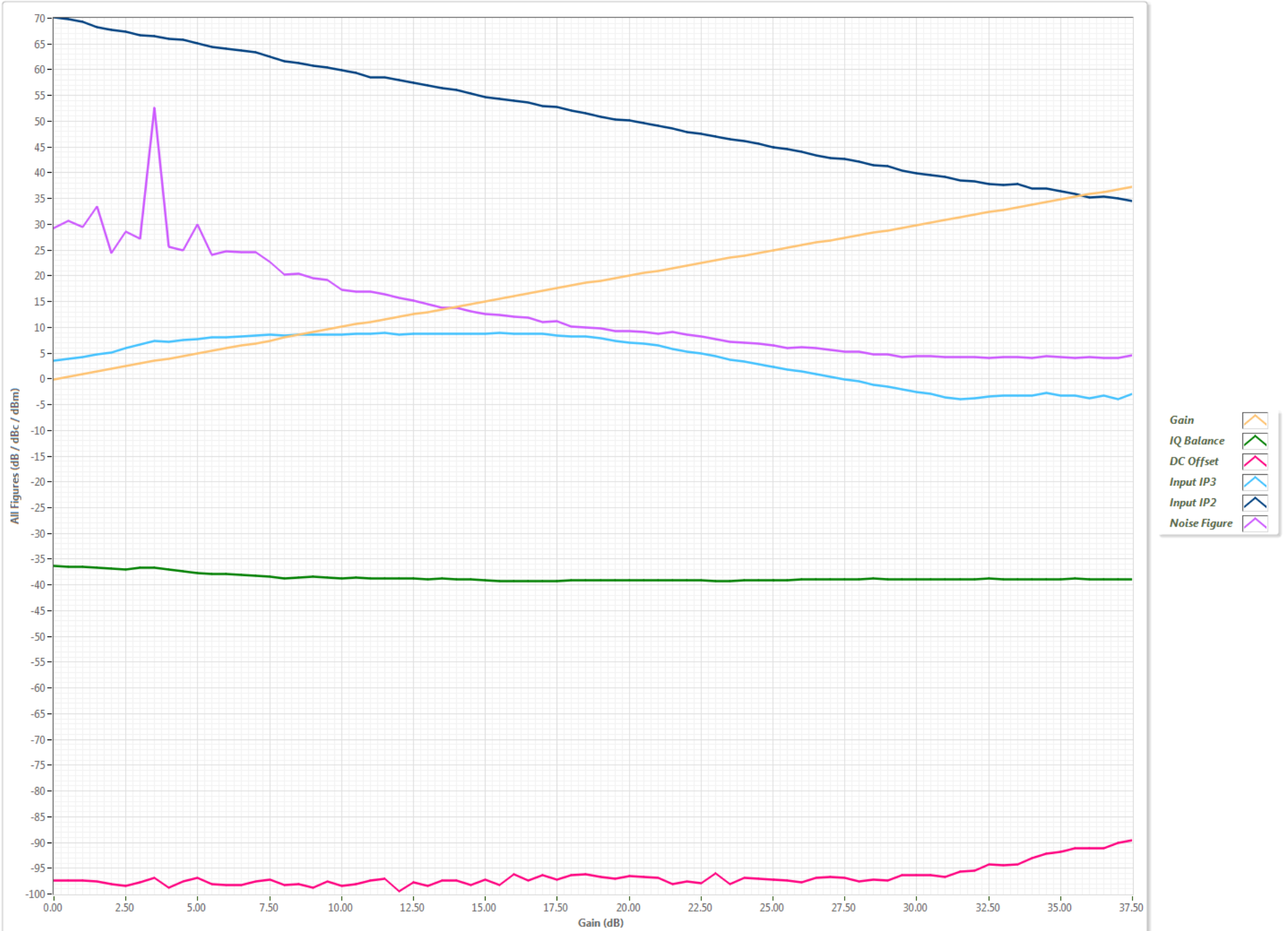
RX Figure vs Gain w/ Frequency=2850.00MHz



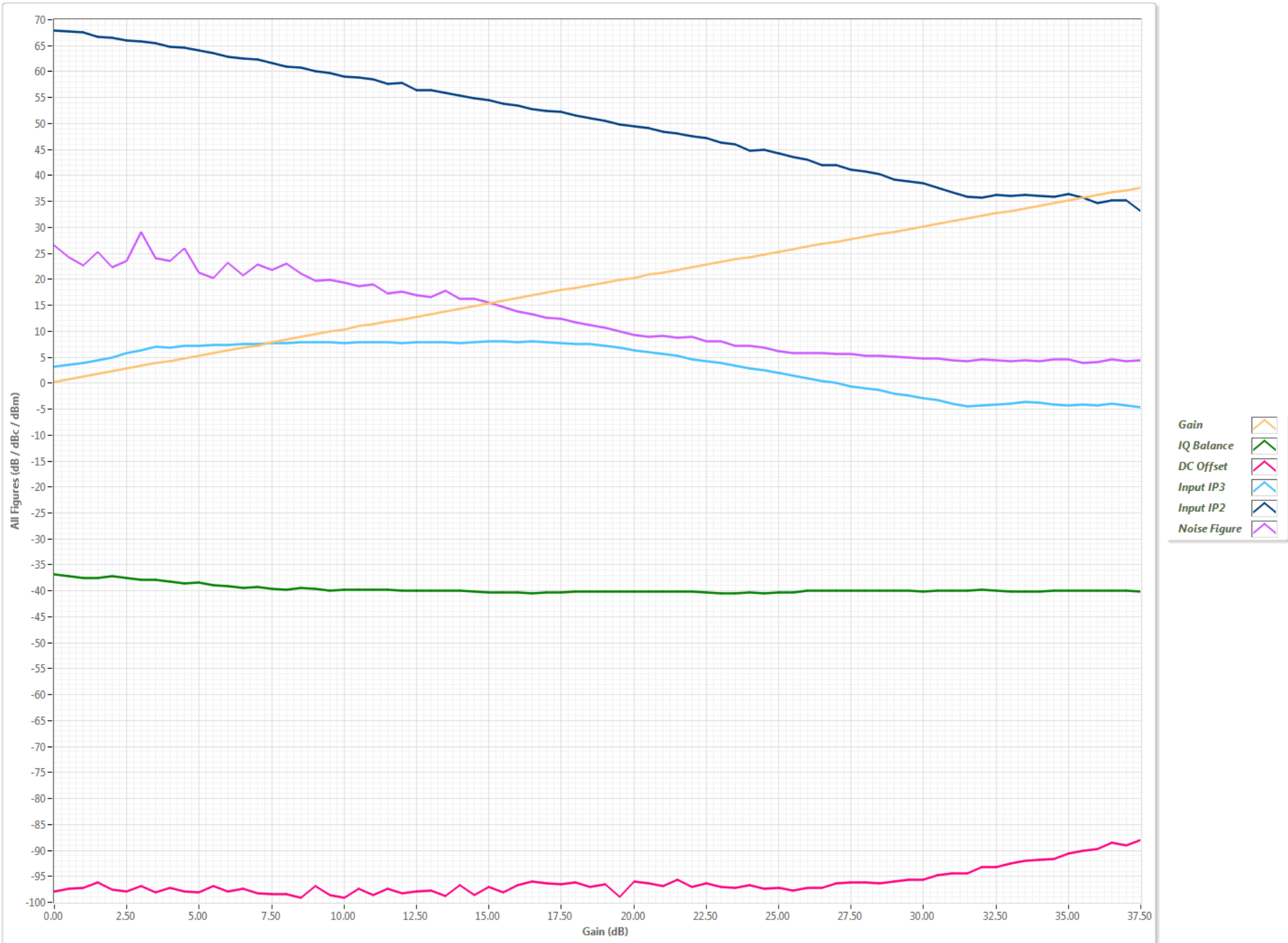
RX Figure vs Gain w/ Frequency=2900.00MHz



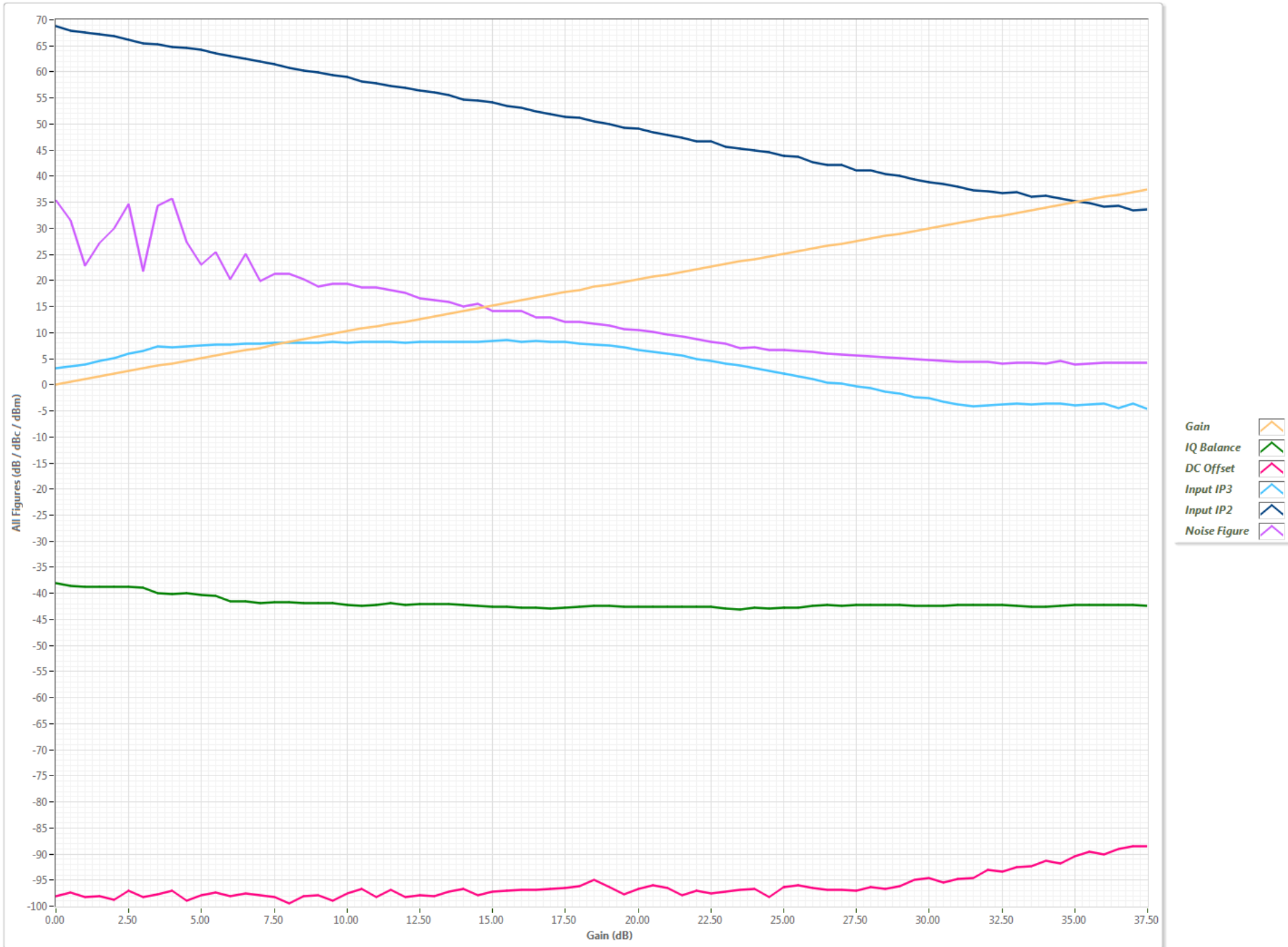
RX Figure vs Gain w/ Frequency=2950.00MHz



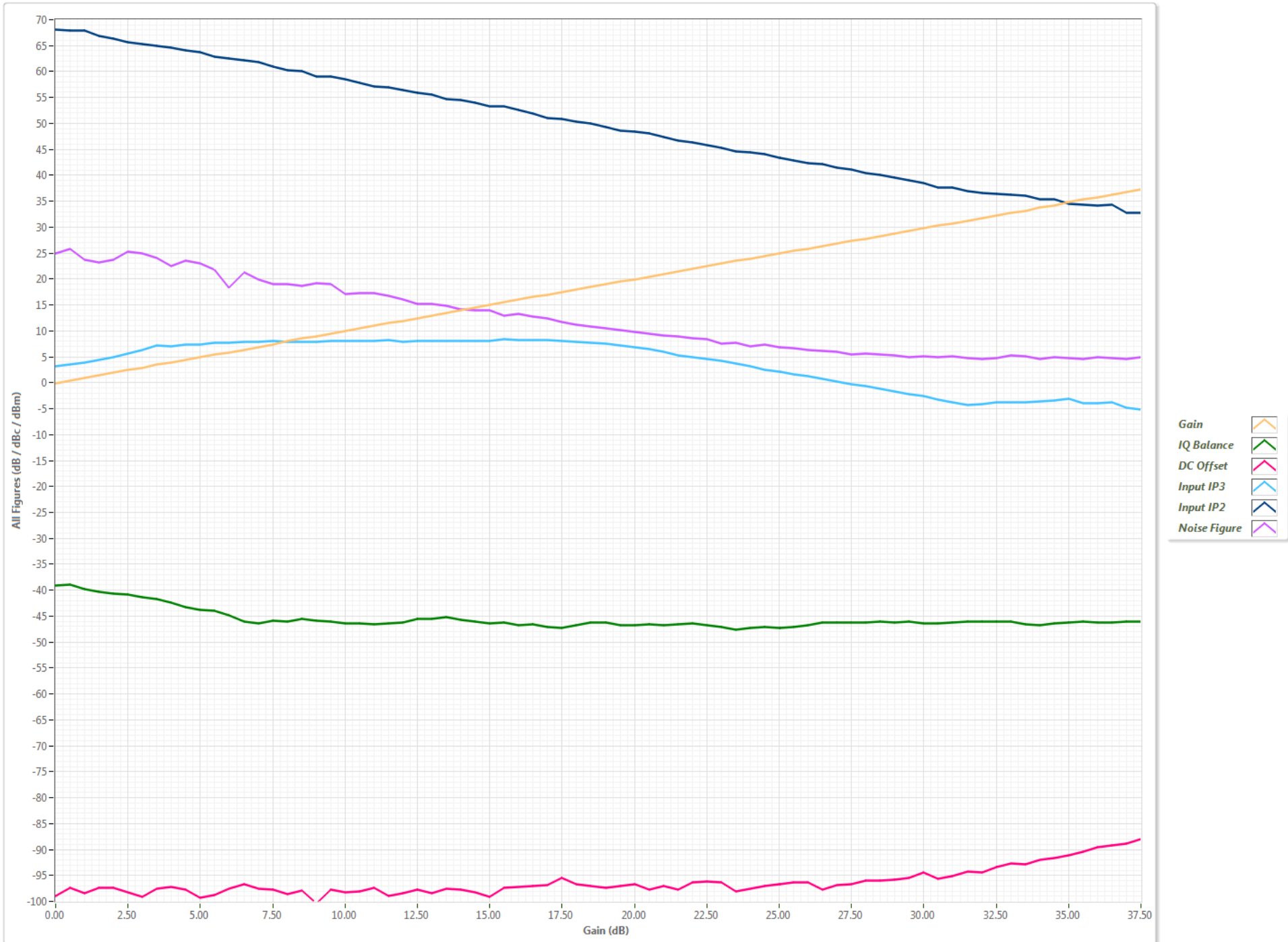
RX Figure vs Gain w/ Frequency=3000.00MHz



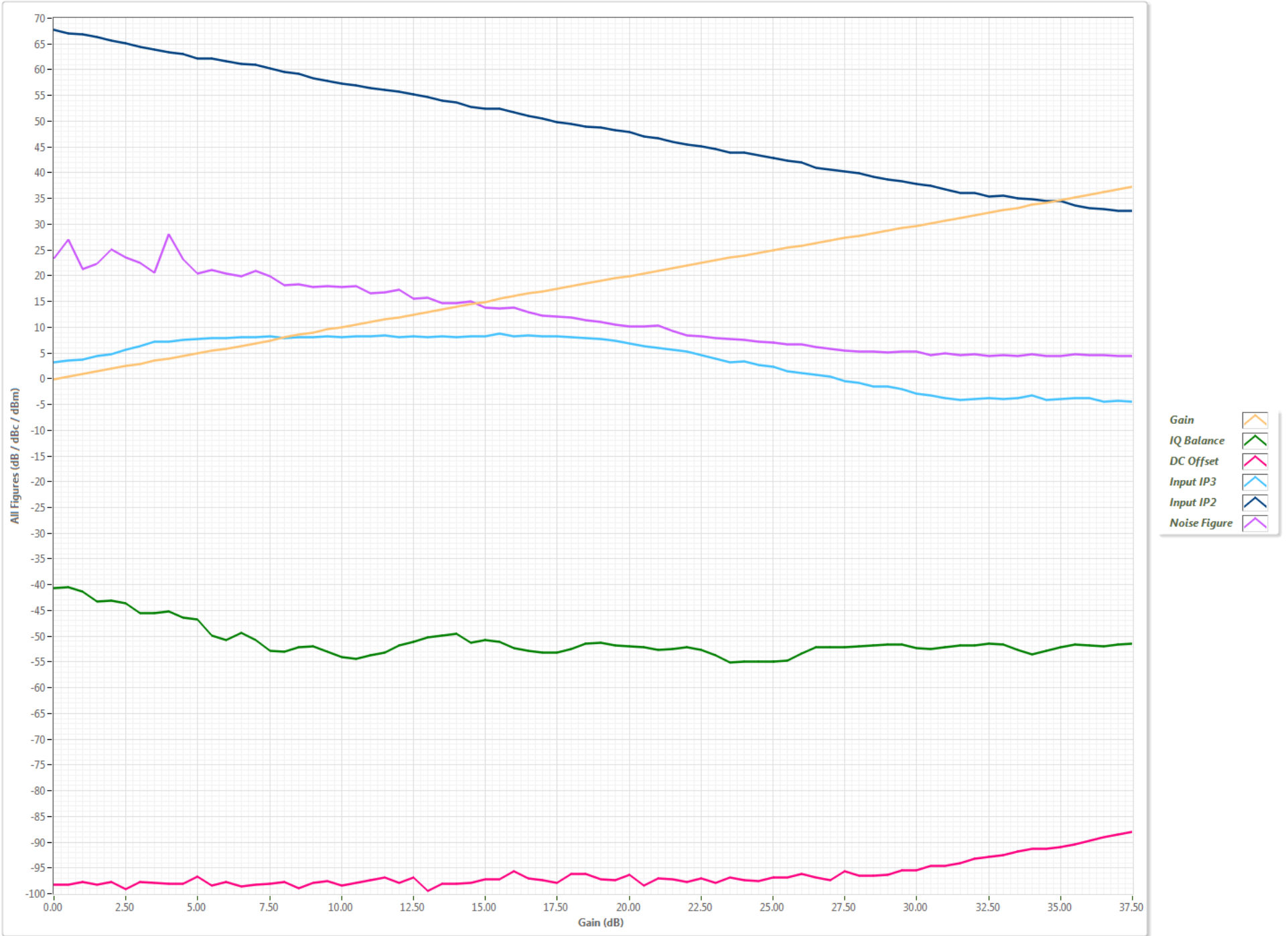
RX Figure vs Gain w/ Frequency=3050.00MHz



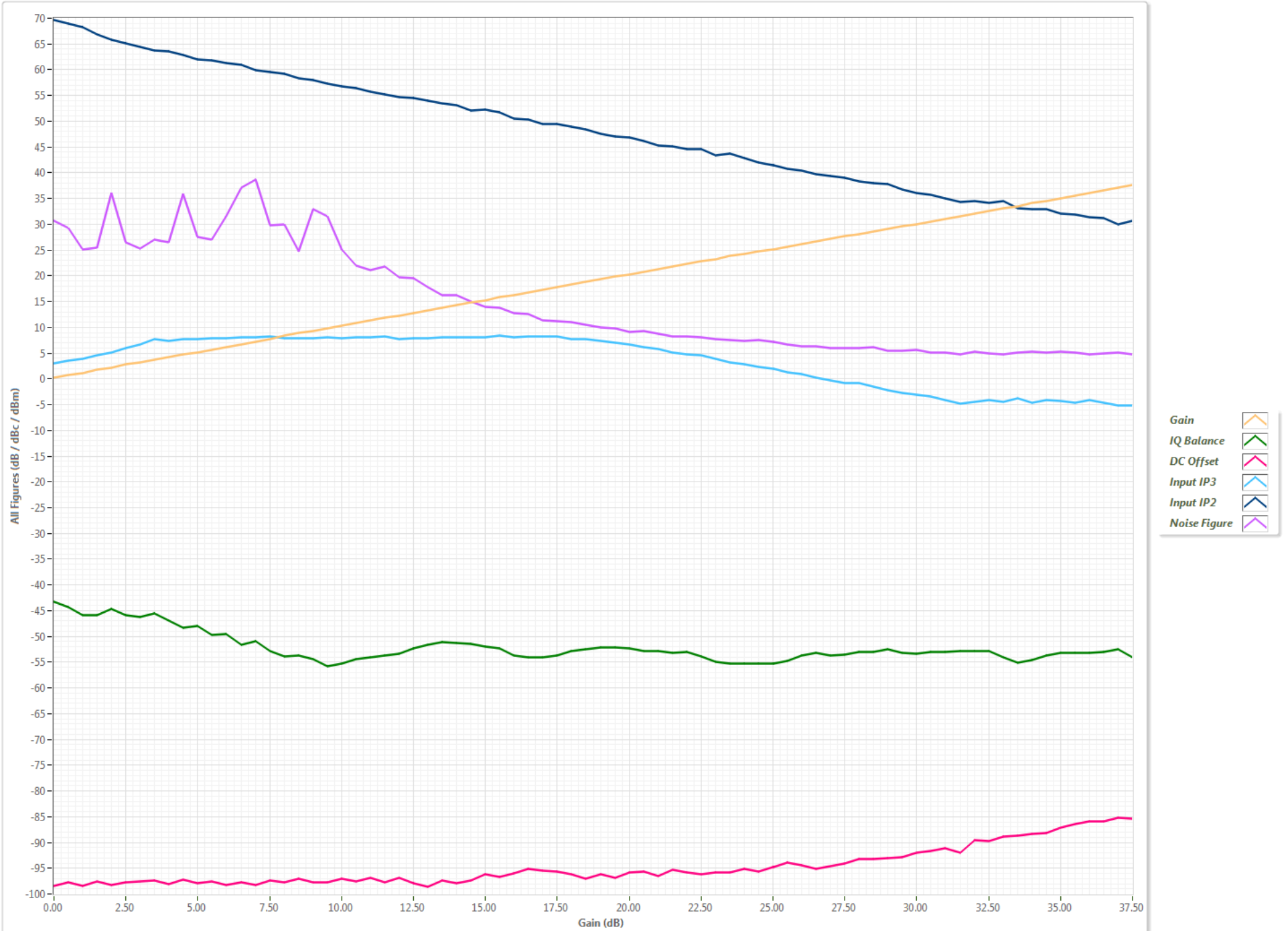
RX Figure vs Gain w/ Frequency=3100.00MHz



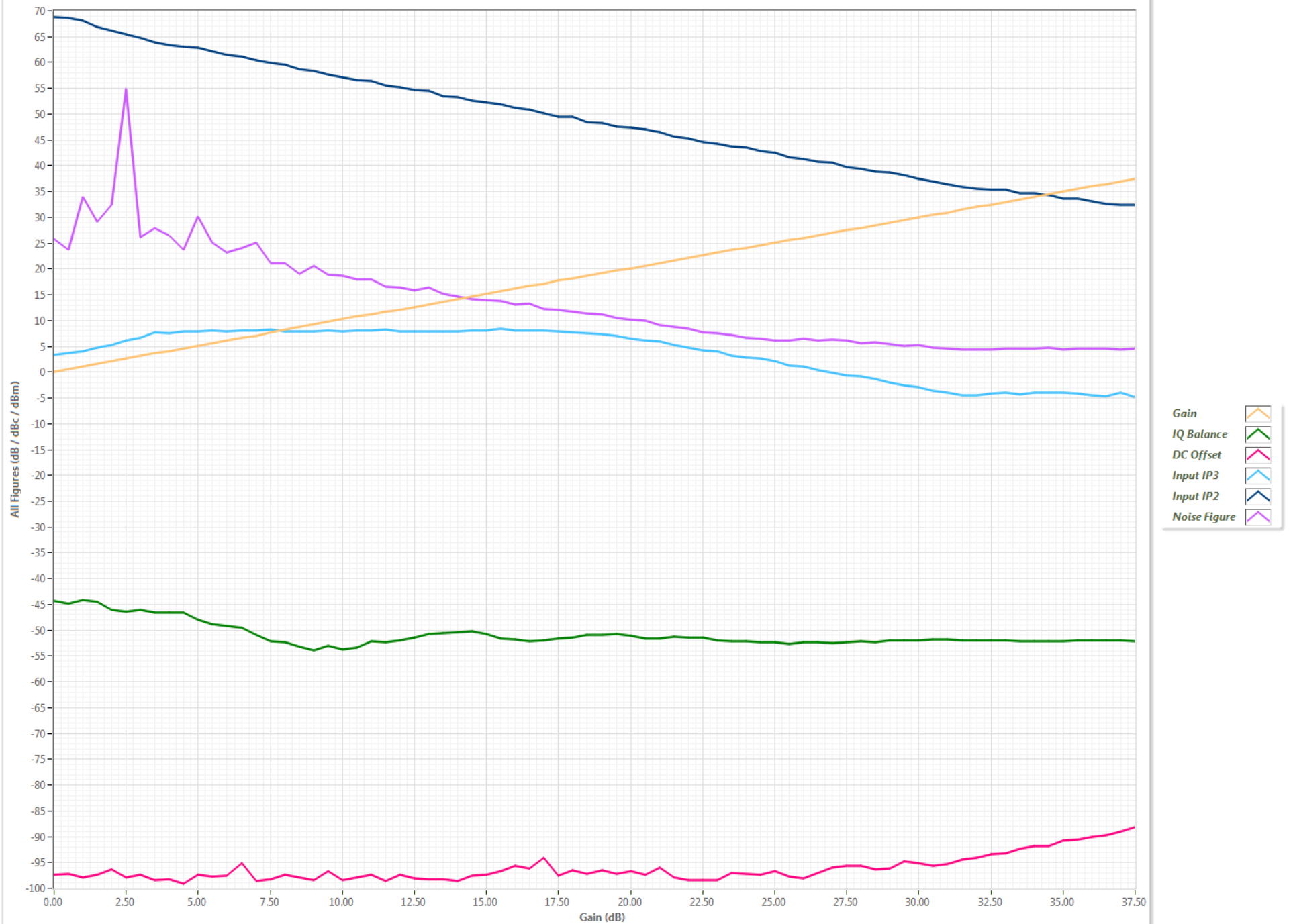
RX Figure vs Gain w/ Frequency=3150.00MHz



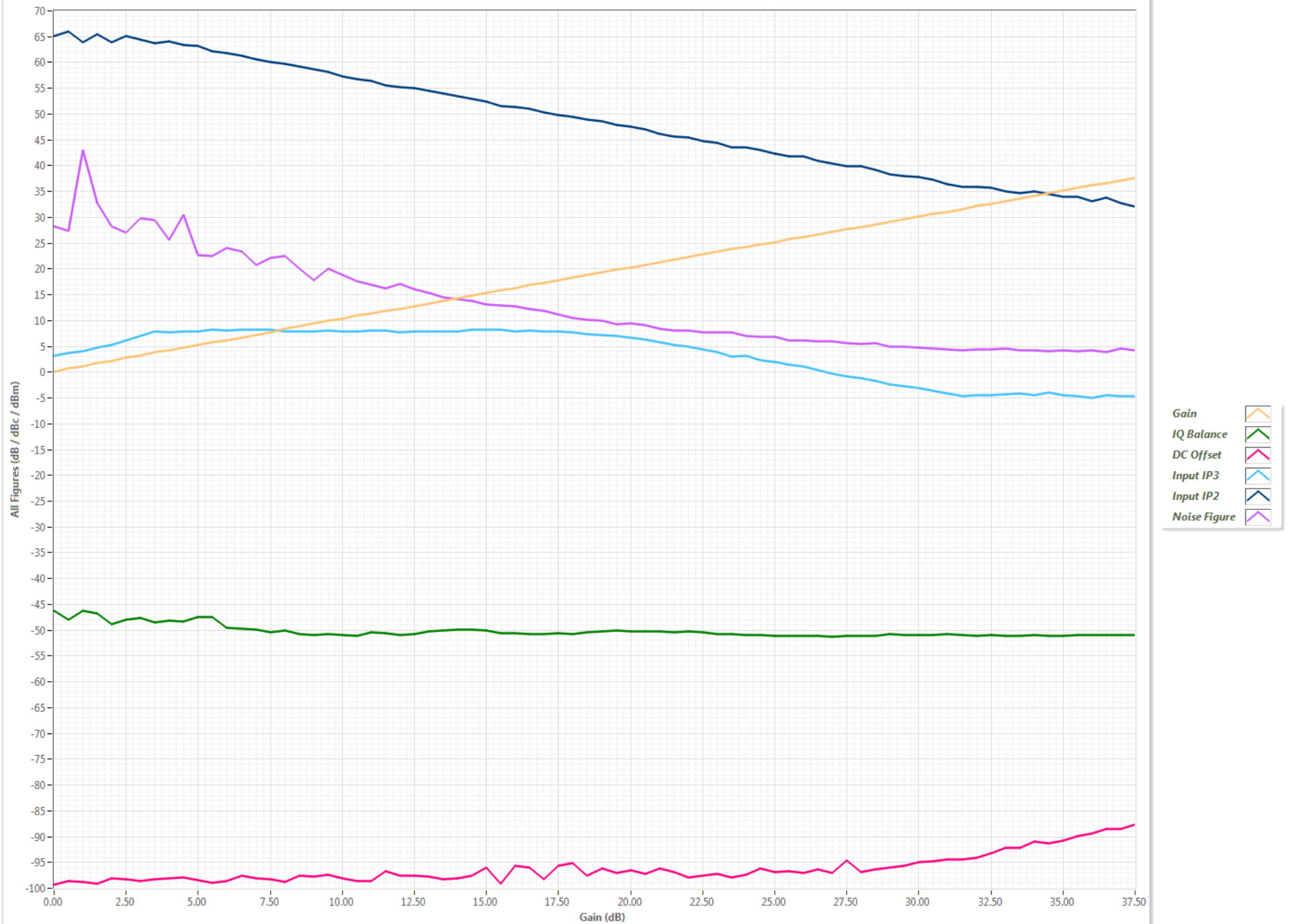
RX Figure vs Gain w/ Frequency=3200.00MHz



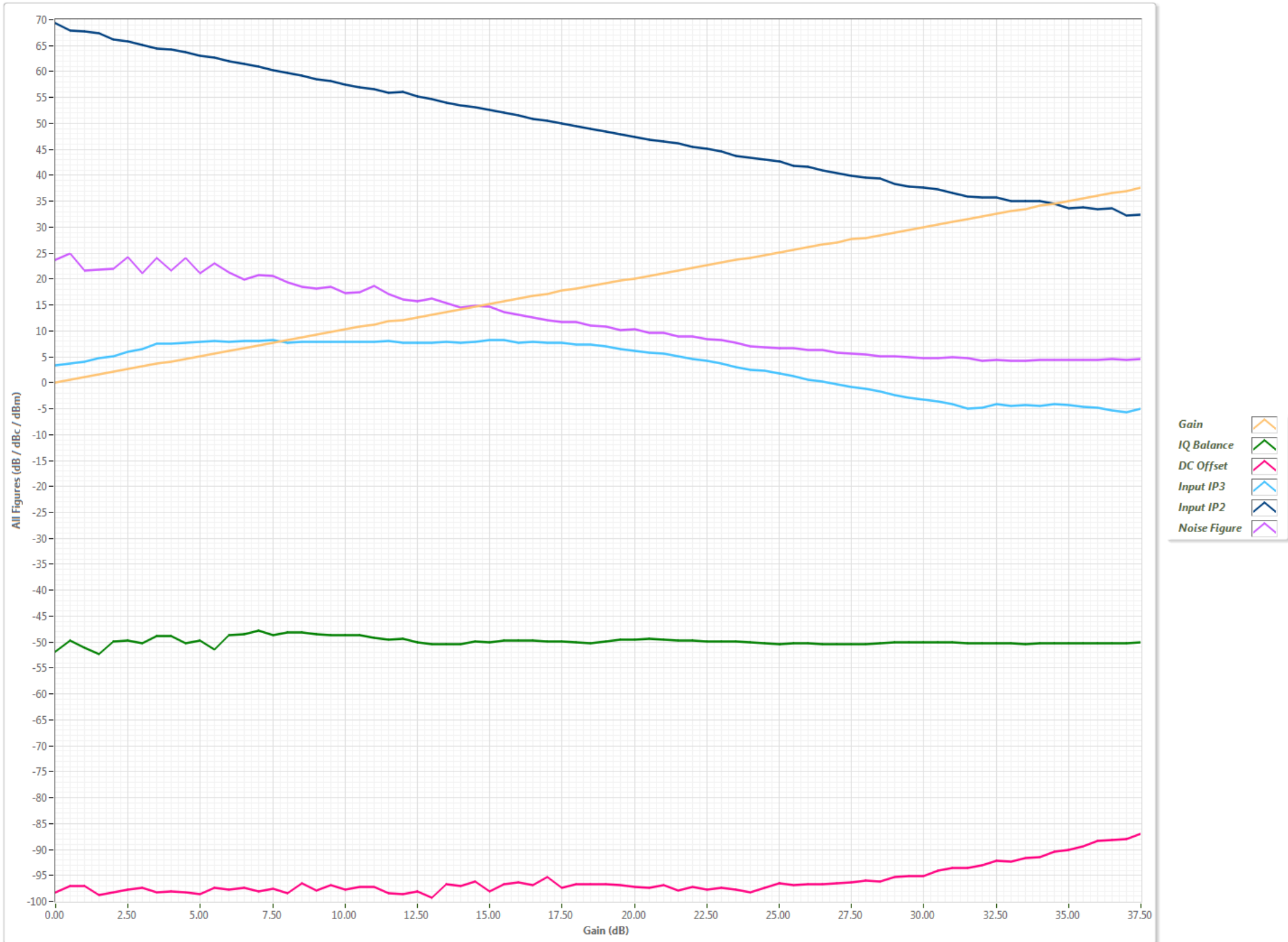
RX Figure vs Gain w/ Frequency=3250.00MHz



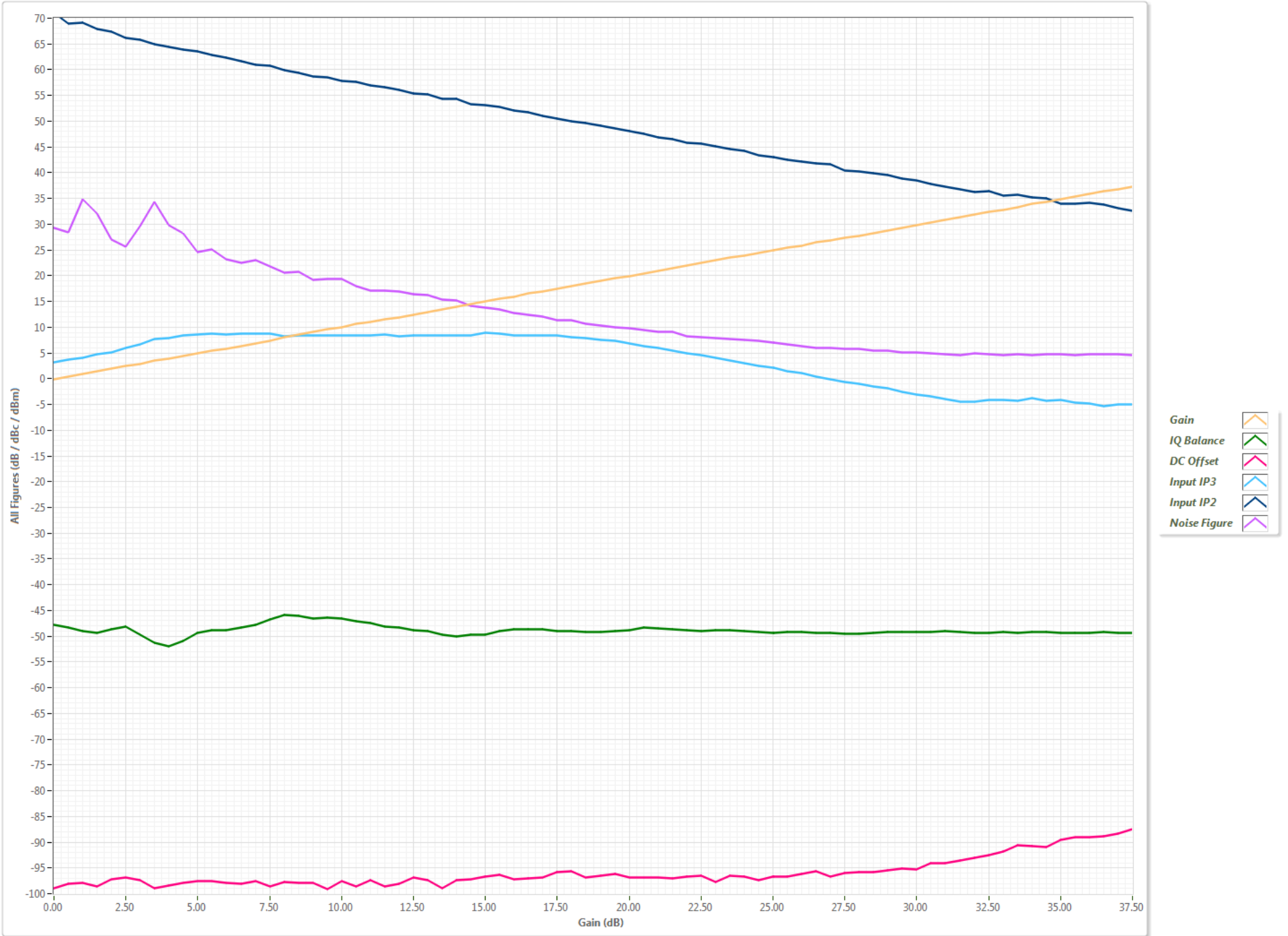
RX Figure vs Gain w/ Frequency=3300.00MHz



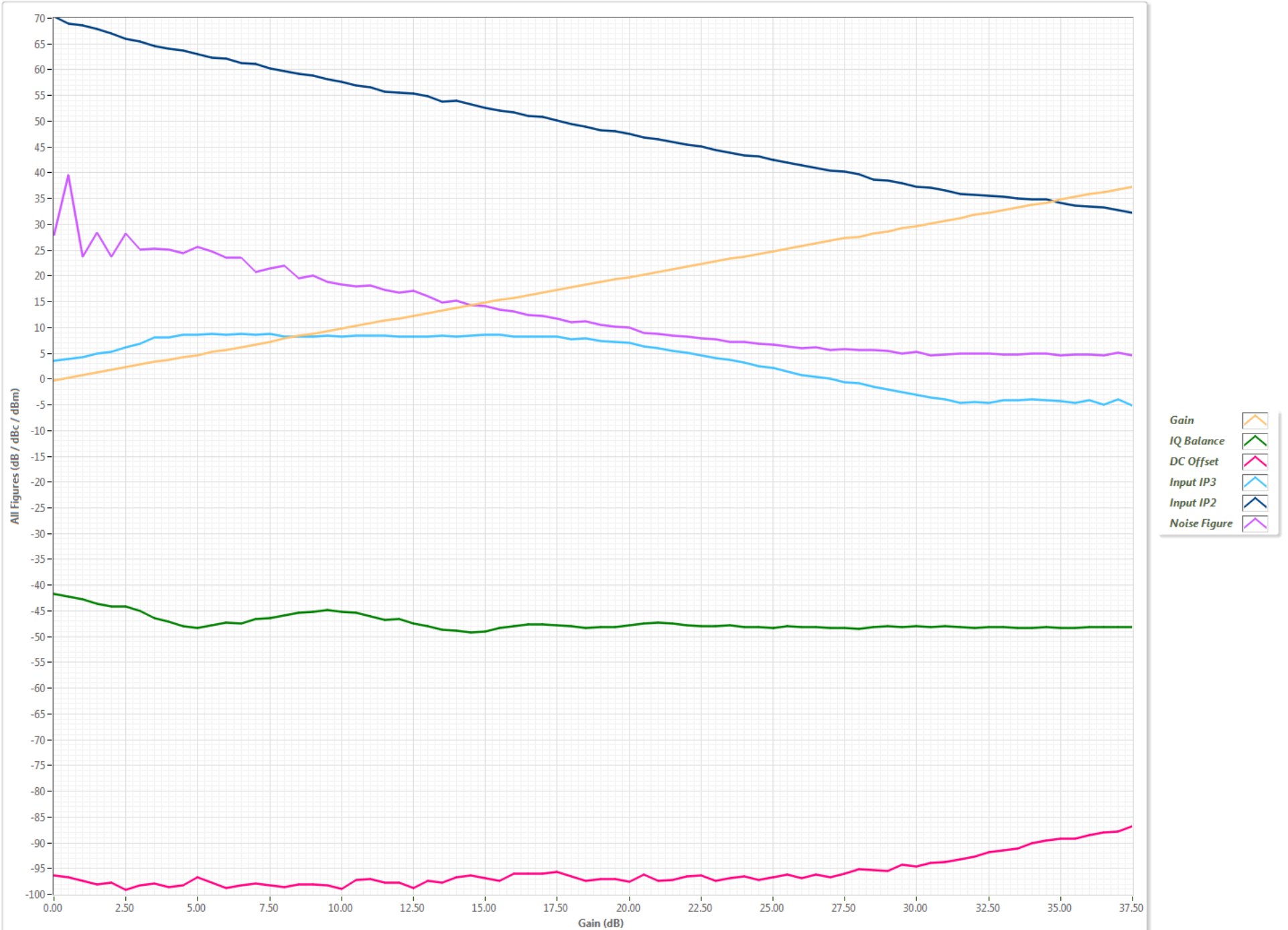
RX Figure vs Gain w/ Frequency=3350.00MHz



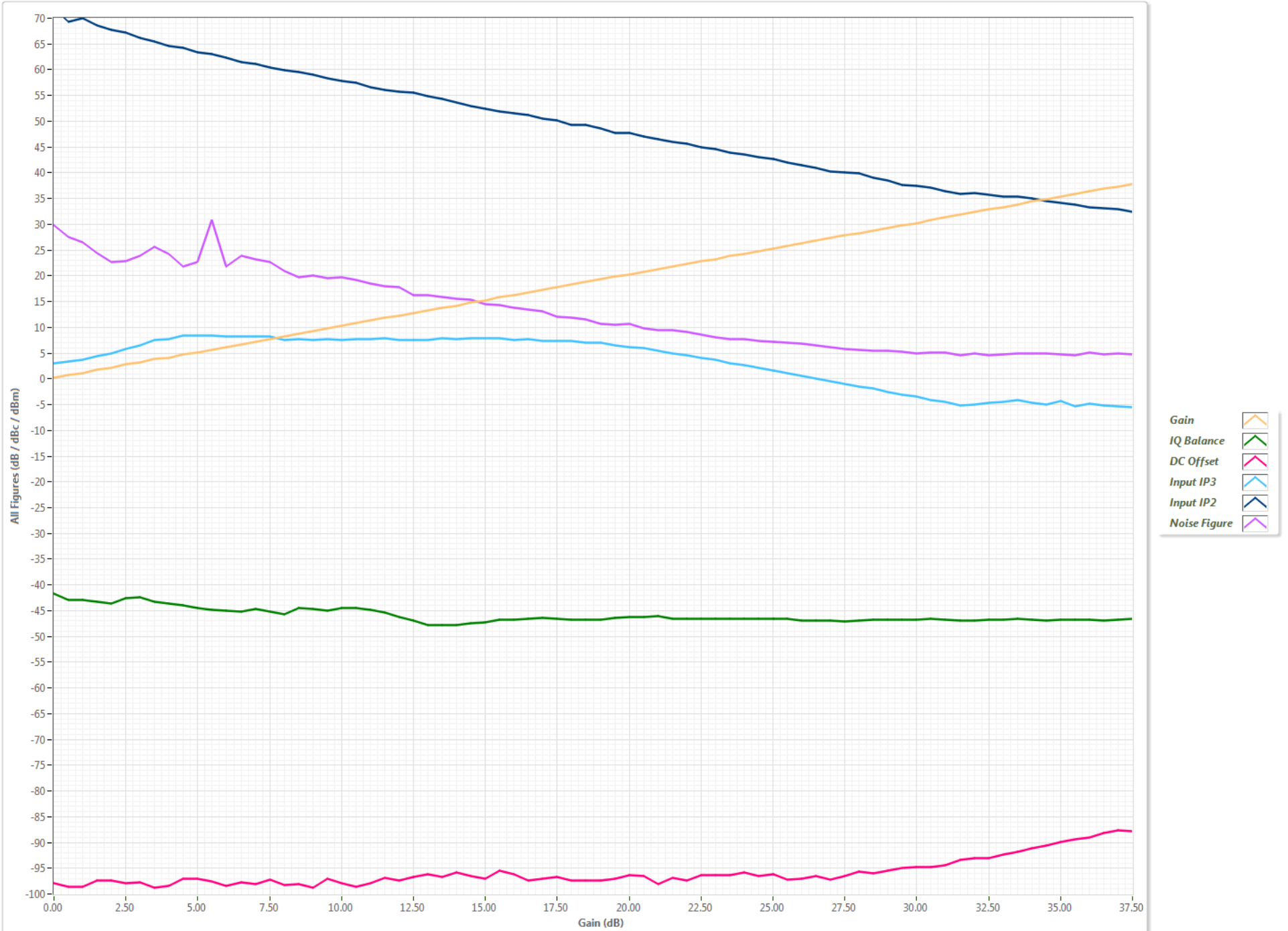
RX Figure vs Gain w/ Frequency=3400.00MHz



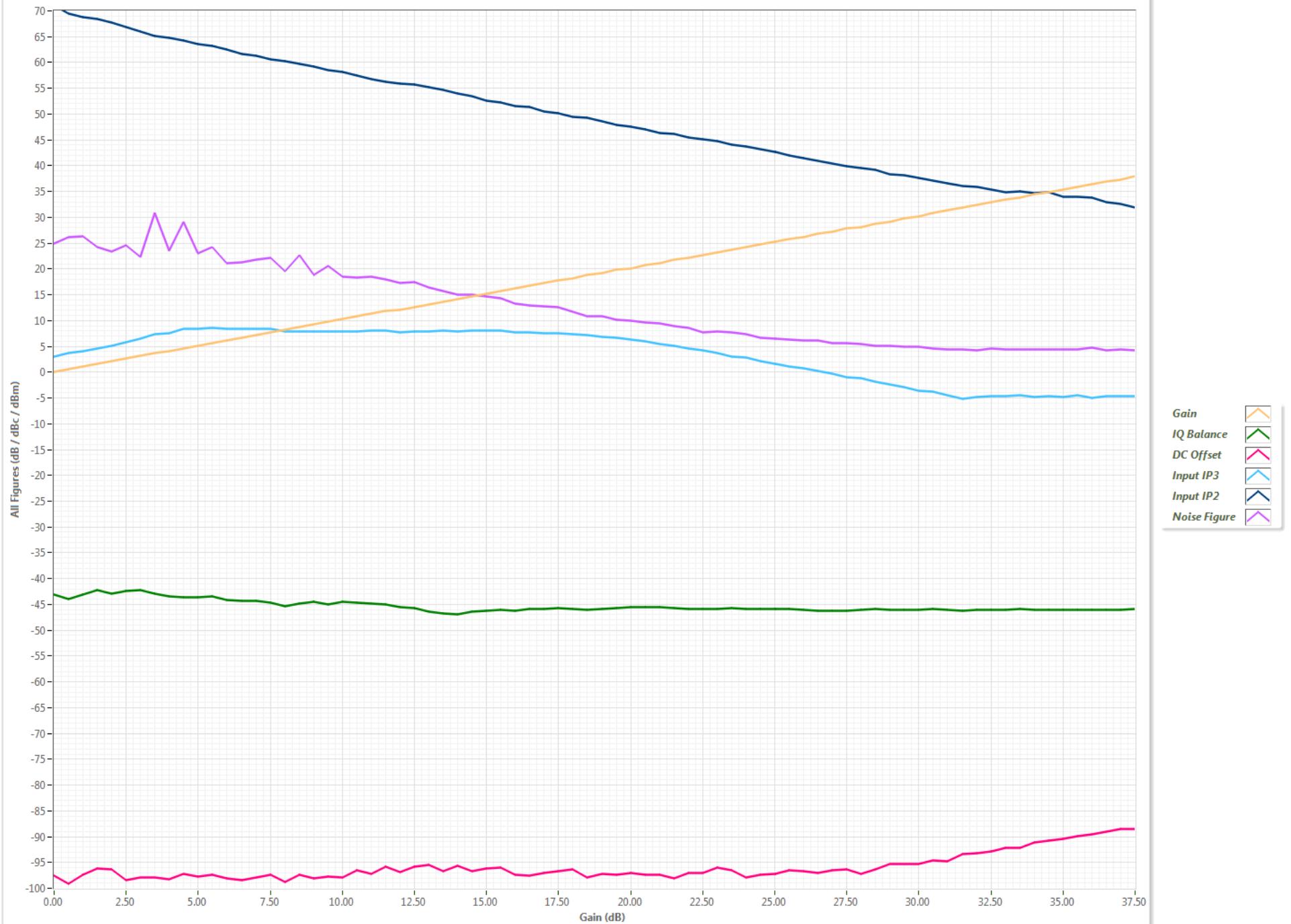
RX Figure vs Gain w/ Frequency=3450.00MHz



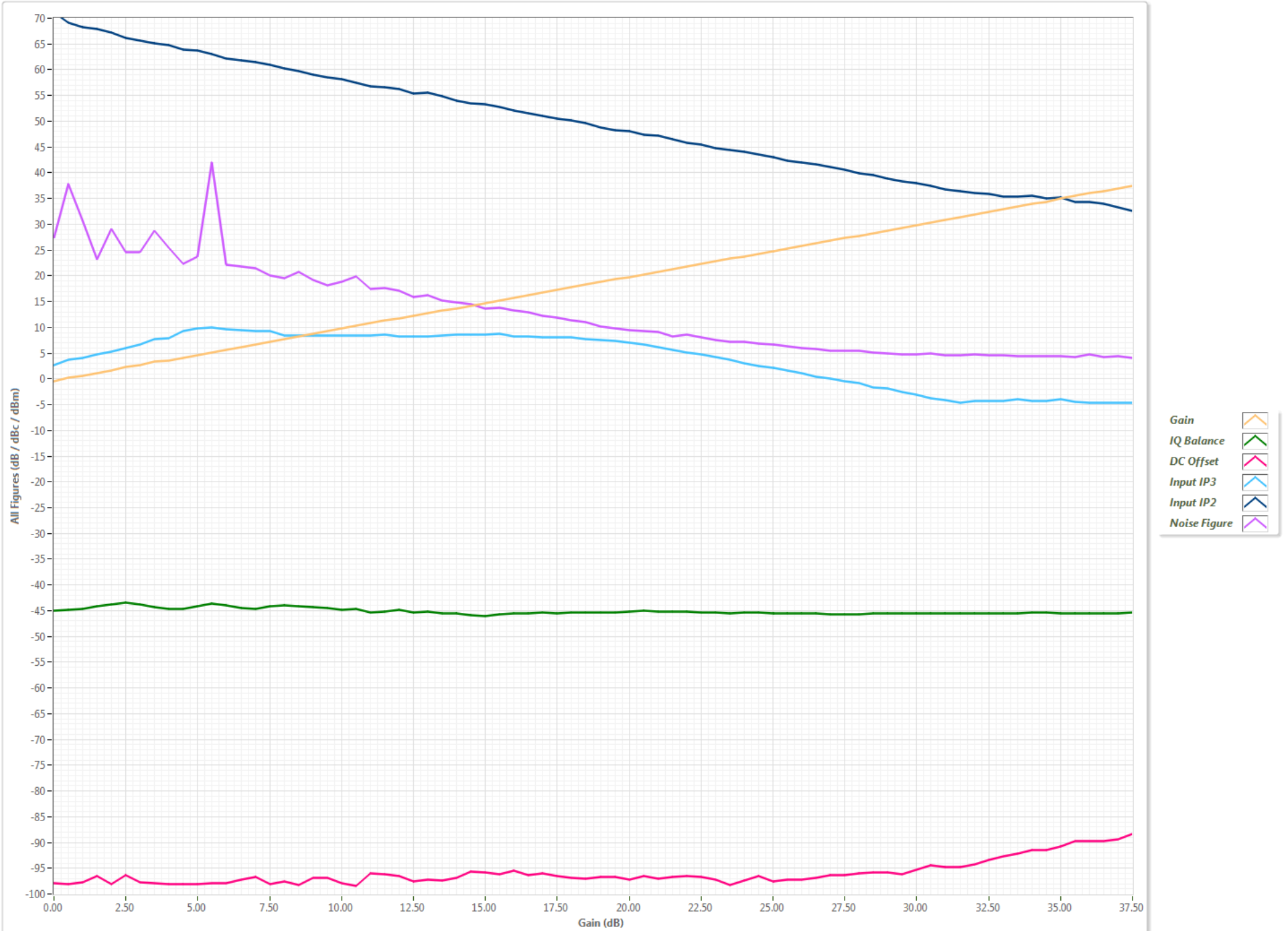
RX Figure vs Gain w/ Frequency=3500.00MHz



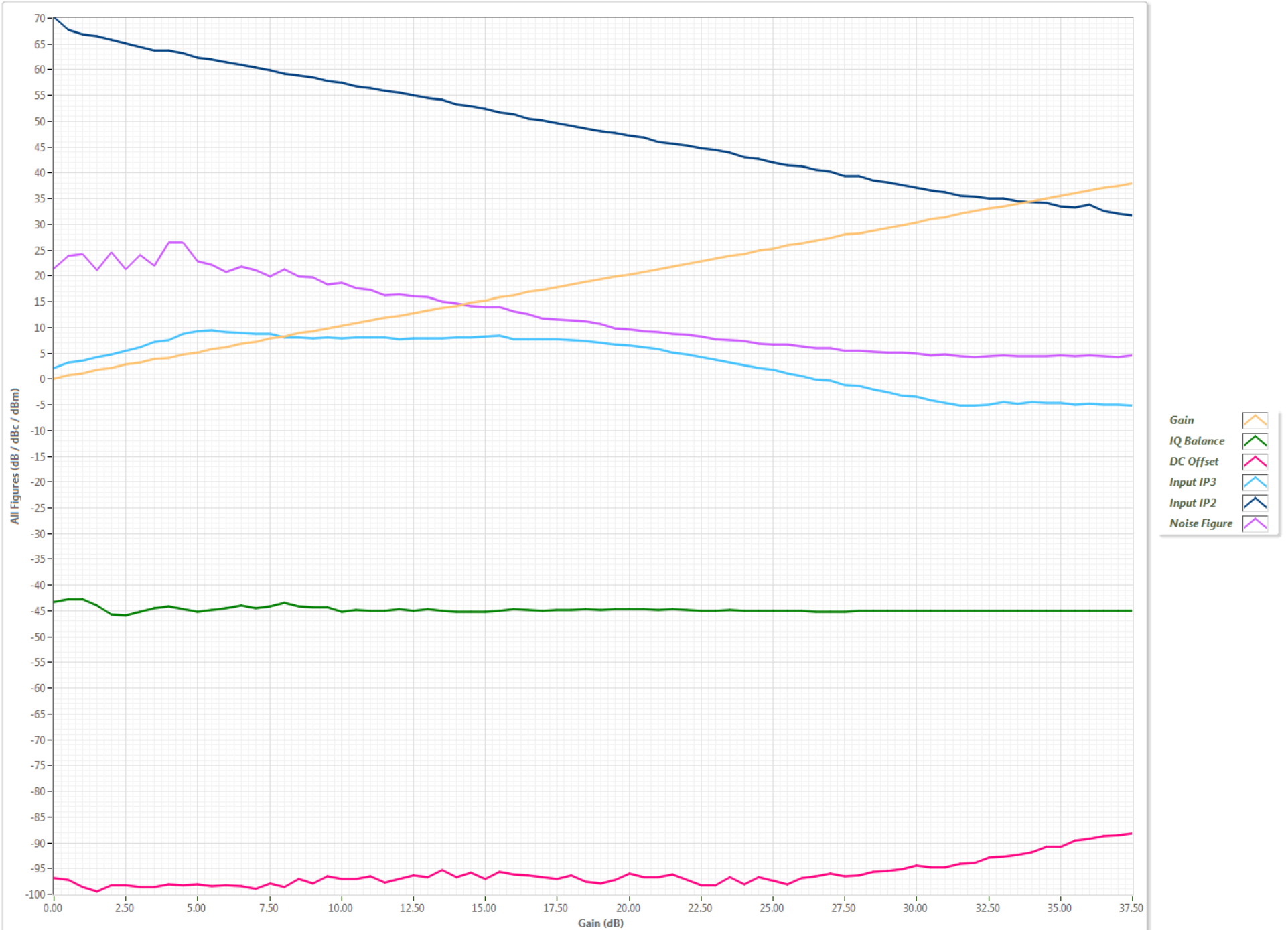
RX Figure vs Gain w/ Frequency=3550.00MHz



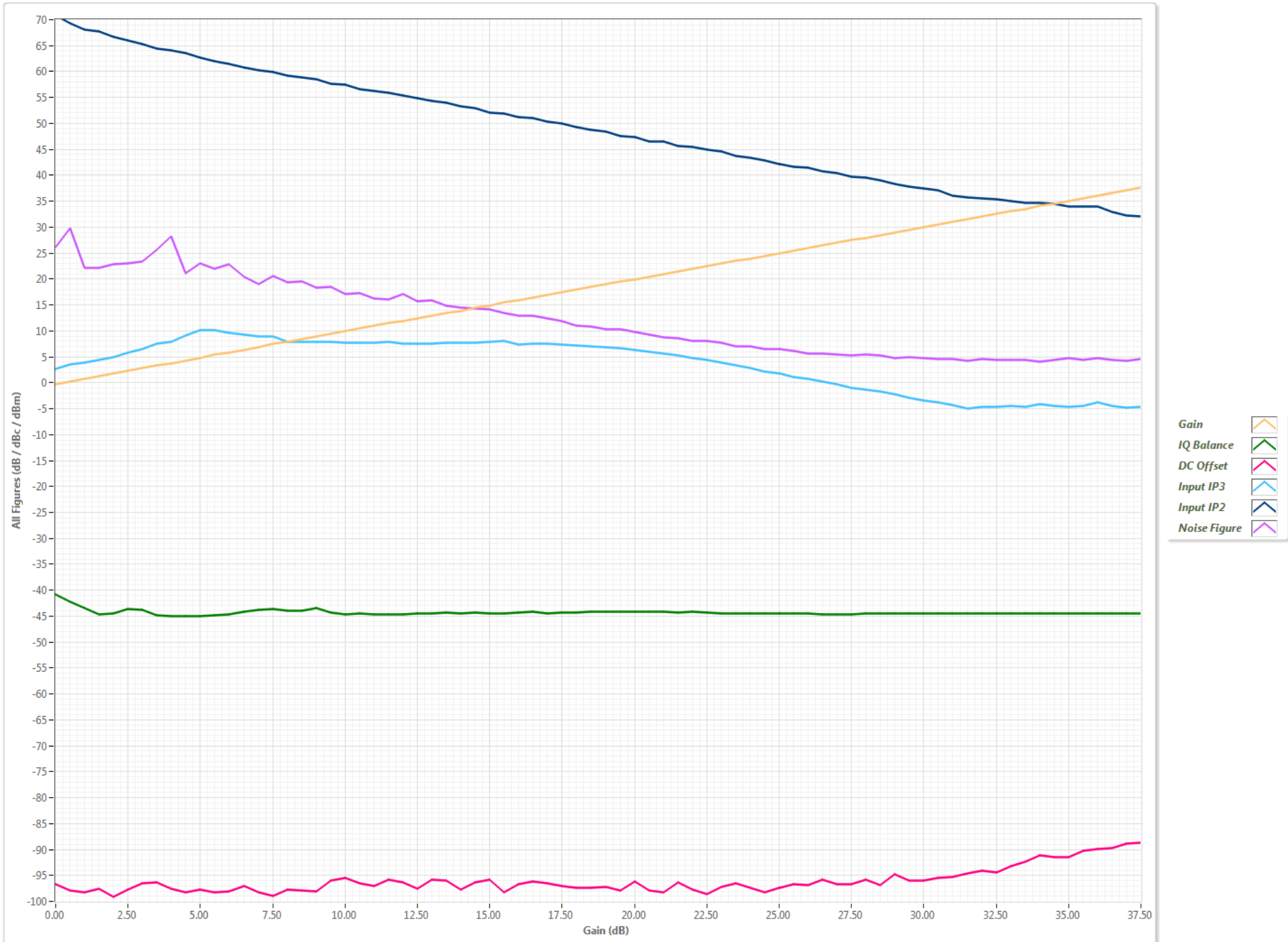
RX Figure vs Gain w/ Frequency=3600.00MHz



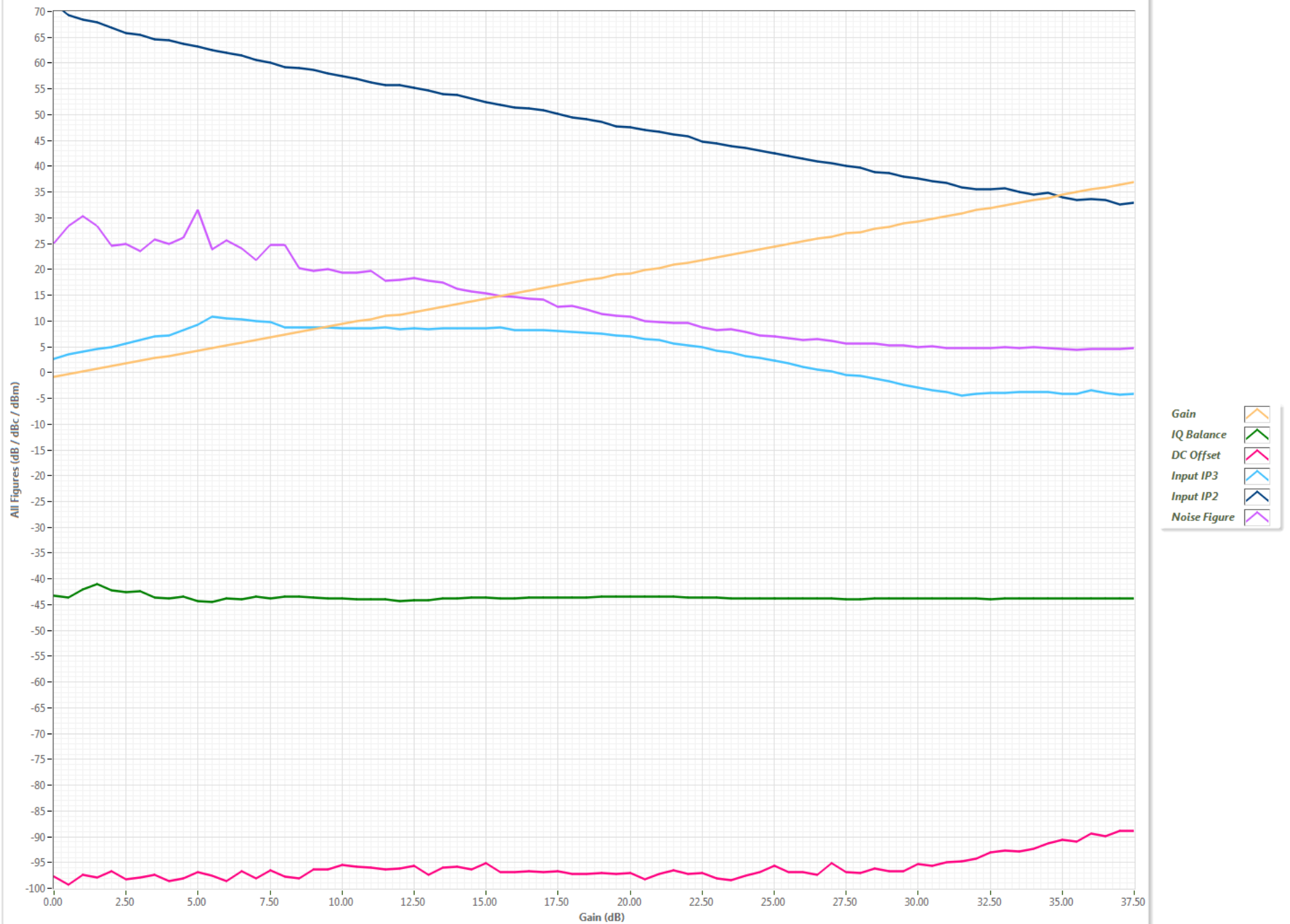
RX Figure vs Gain w/ Frequency=3650.00MHz



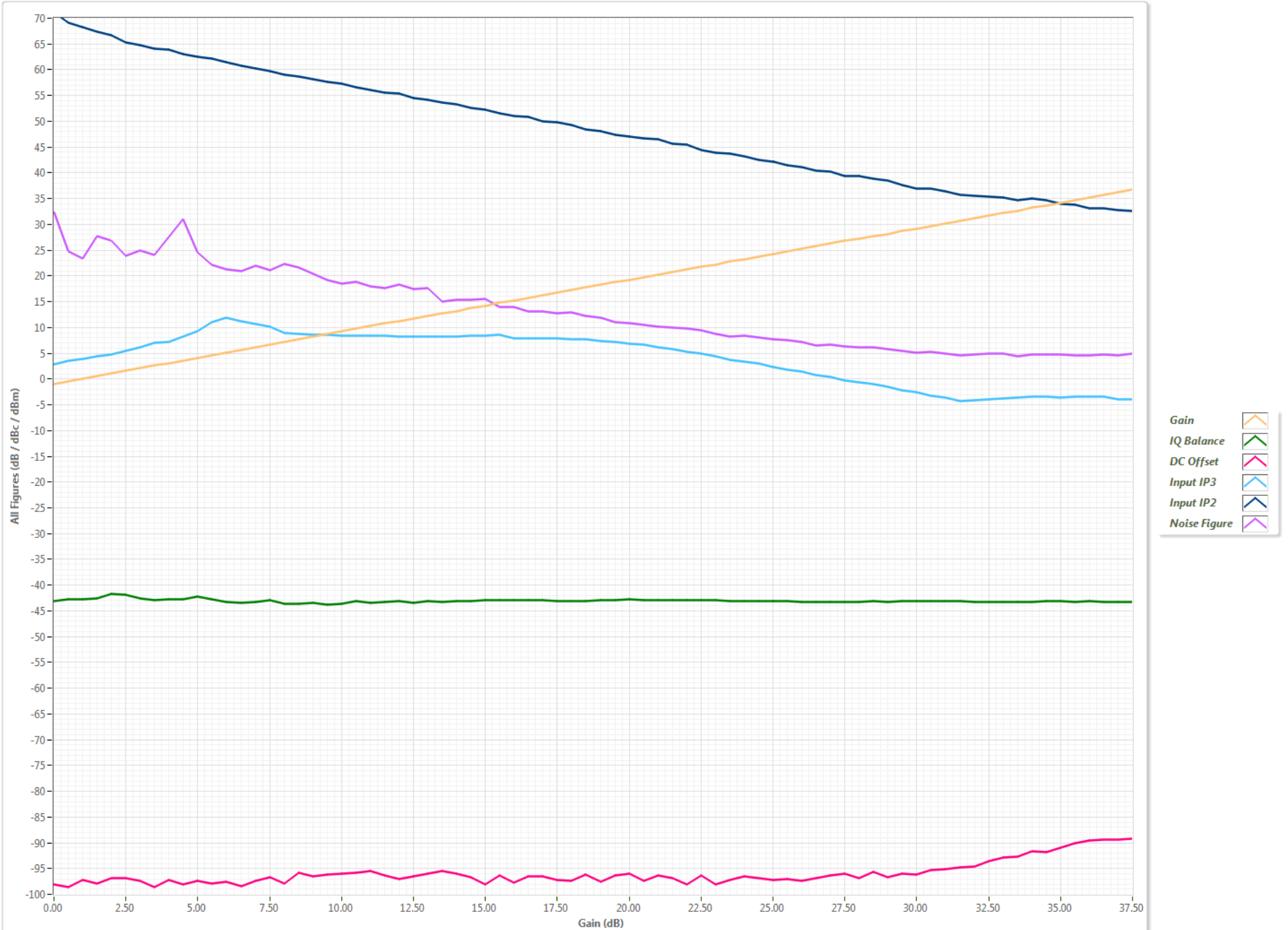
RX Figure vs Gain w/ Frequency=3700.00MHz



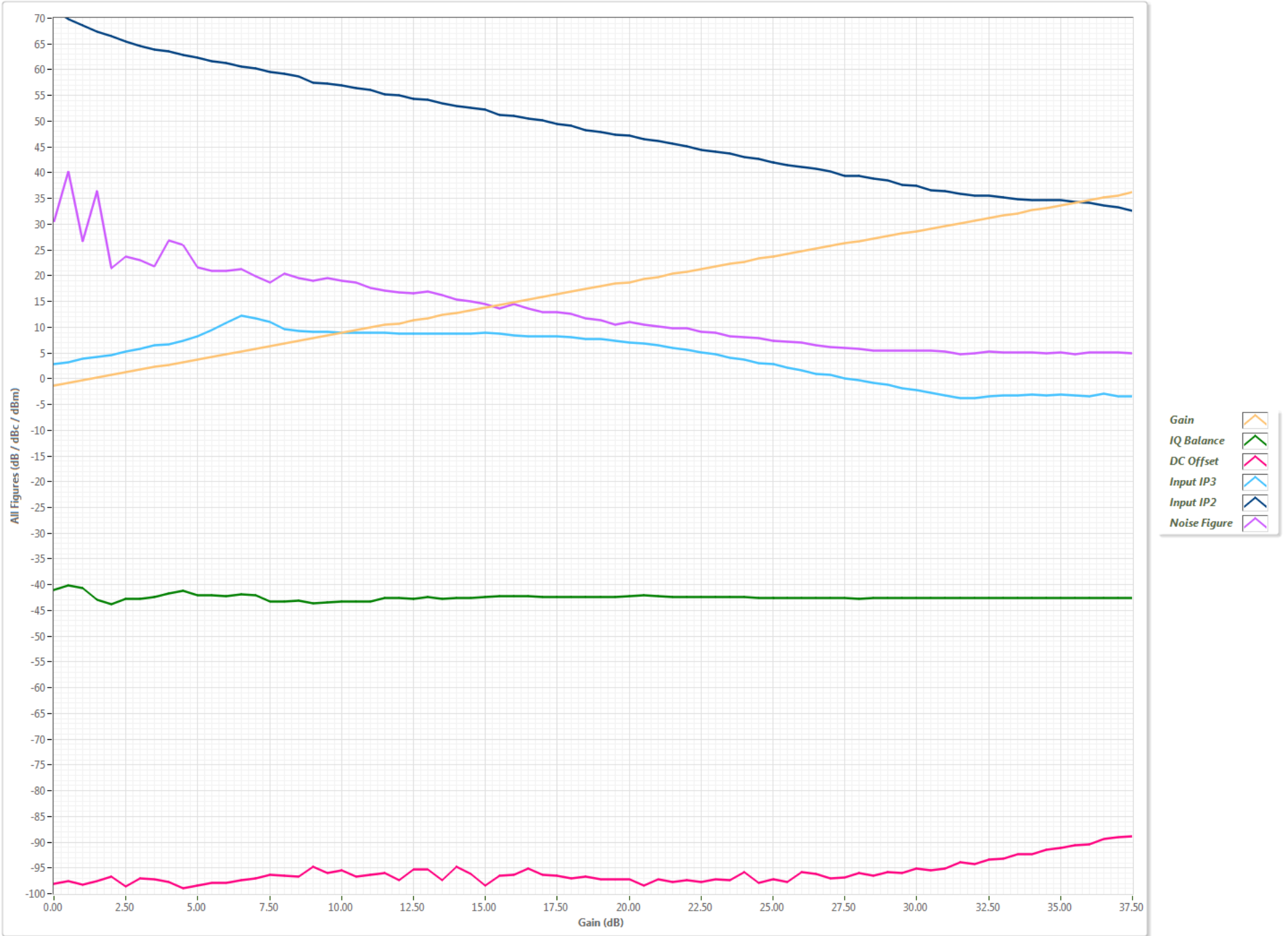
RX Figure vs Gain w/ Frequency=3750.00MHz



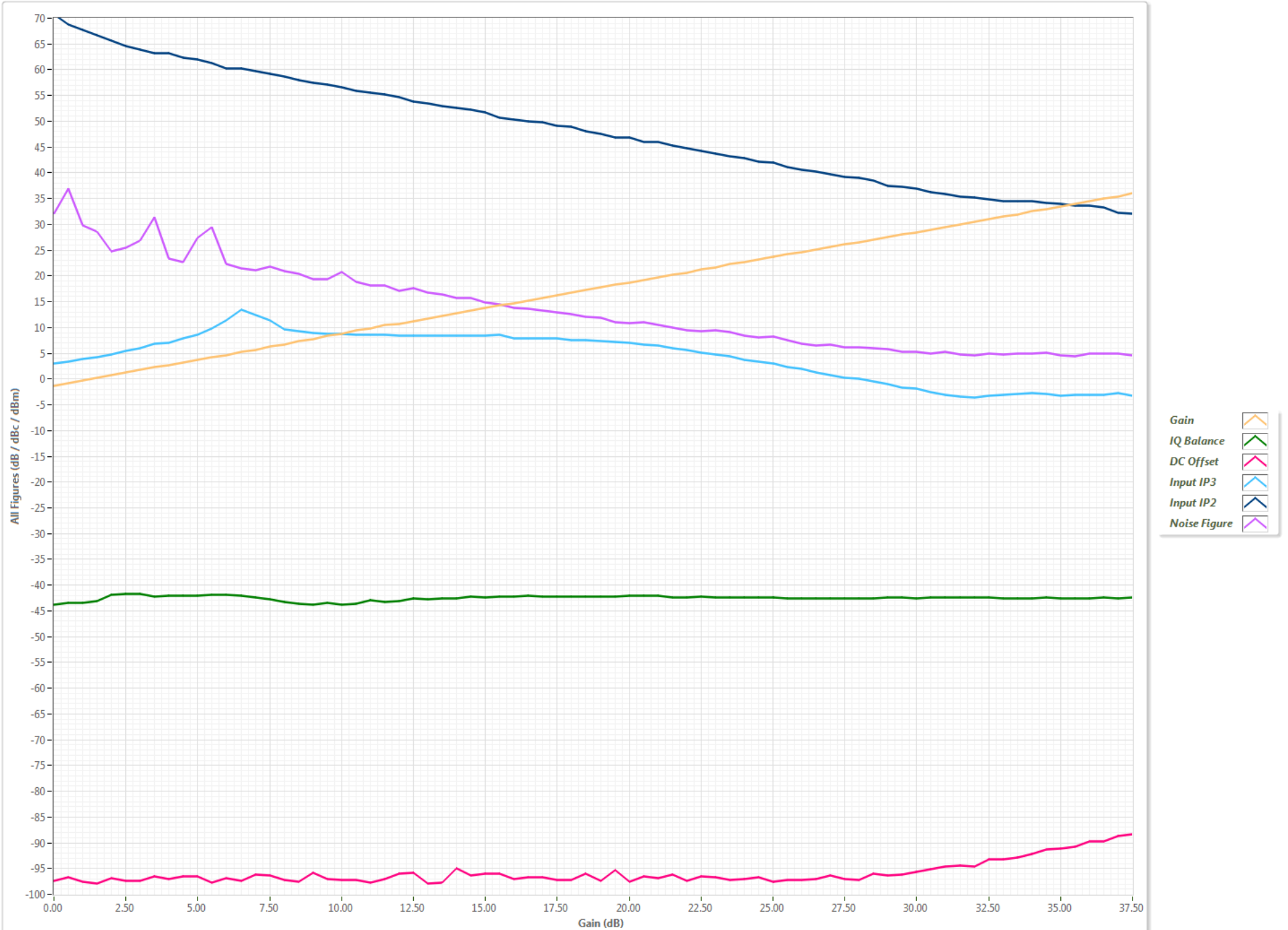
RX Figure vs Gain w/ Frequency=3800.00MHz



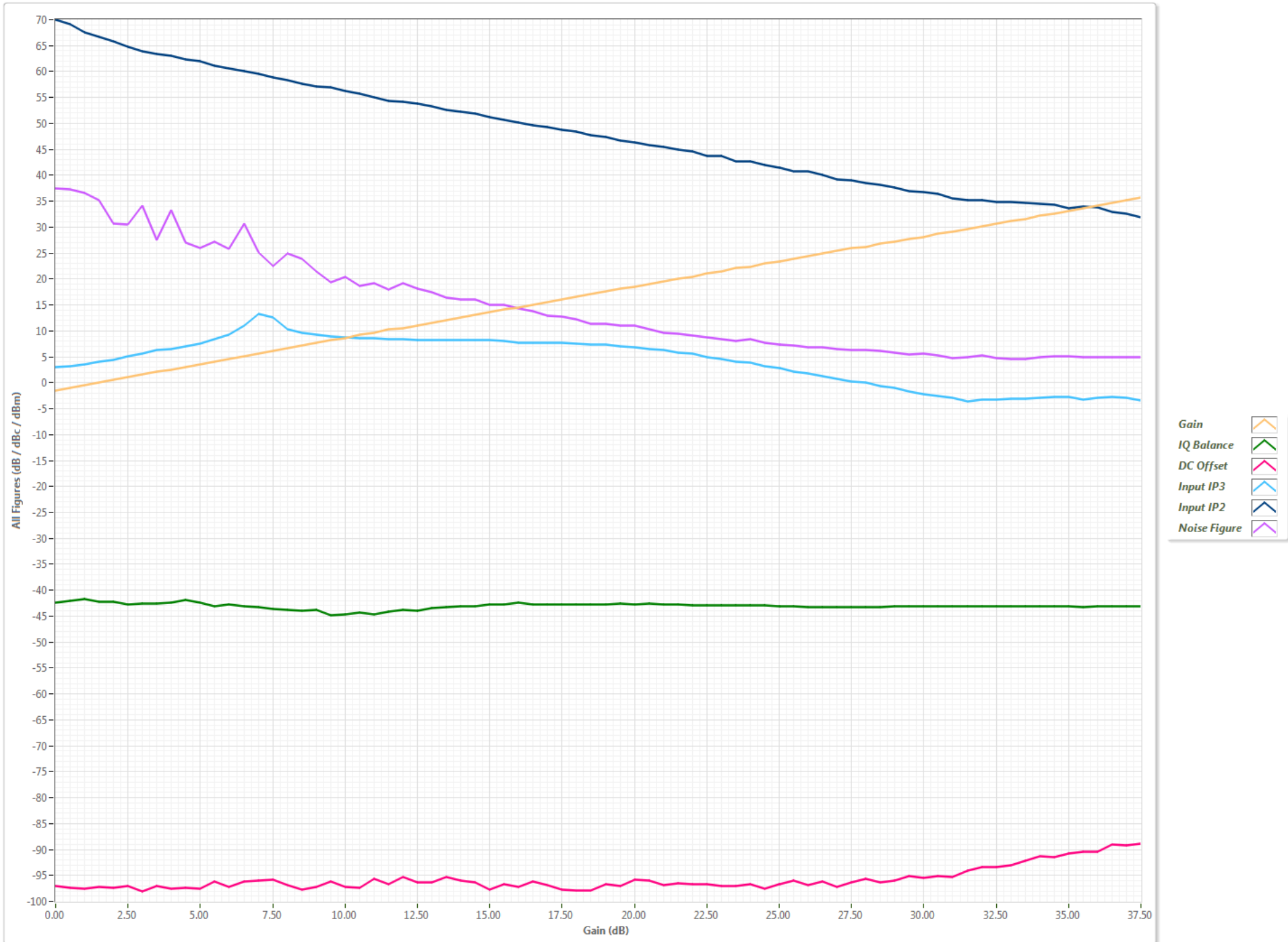
RX Figure vs Gain w/ Frequency=3850.00MHz



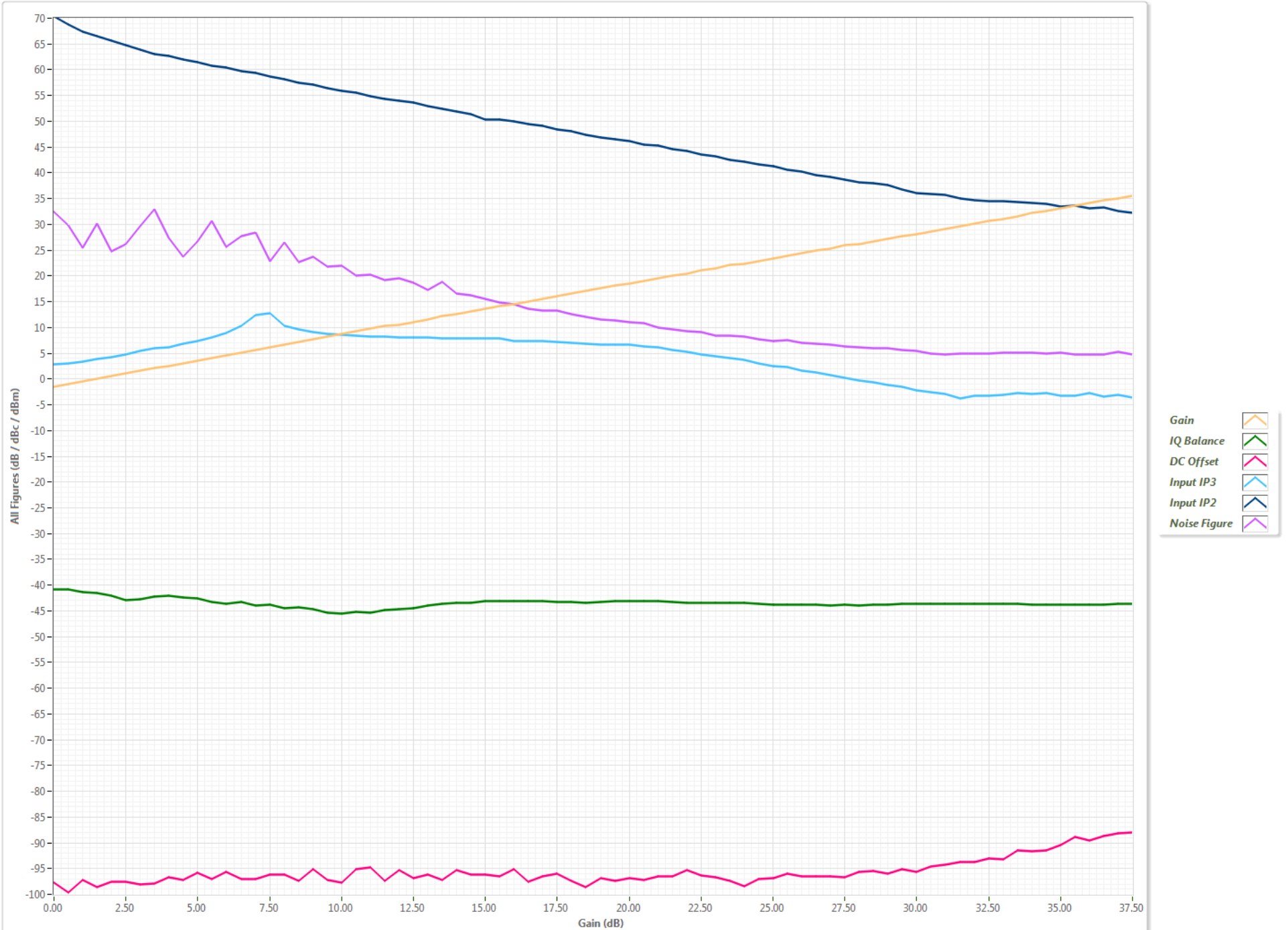
RX Figure vs Gain w/ Frequency=3900.00MHz



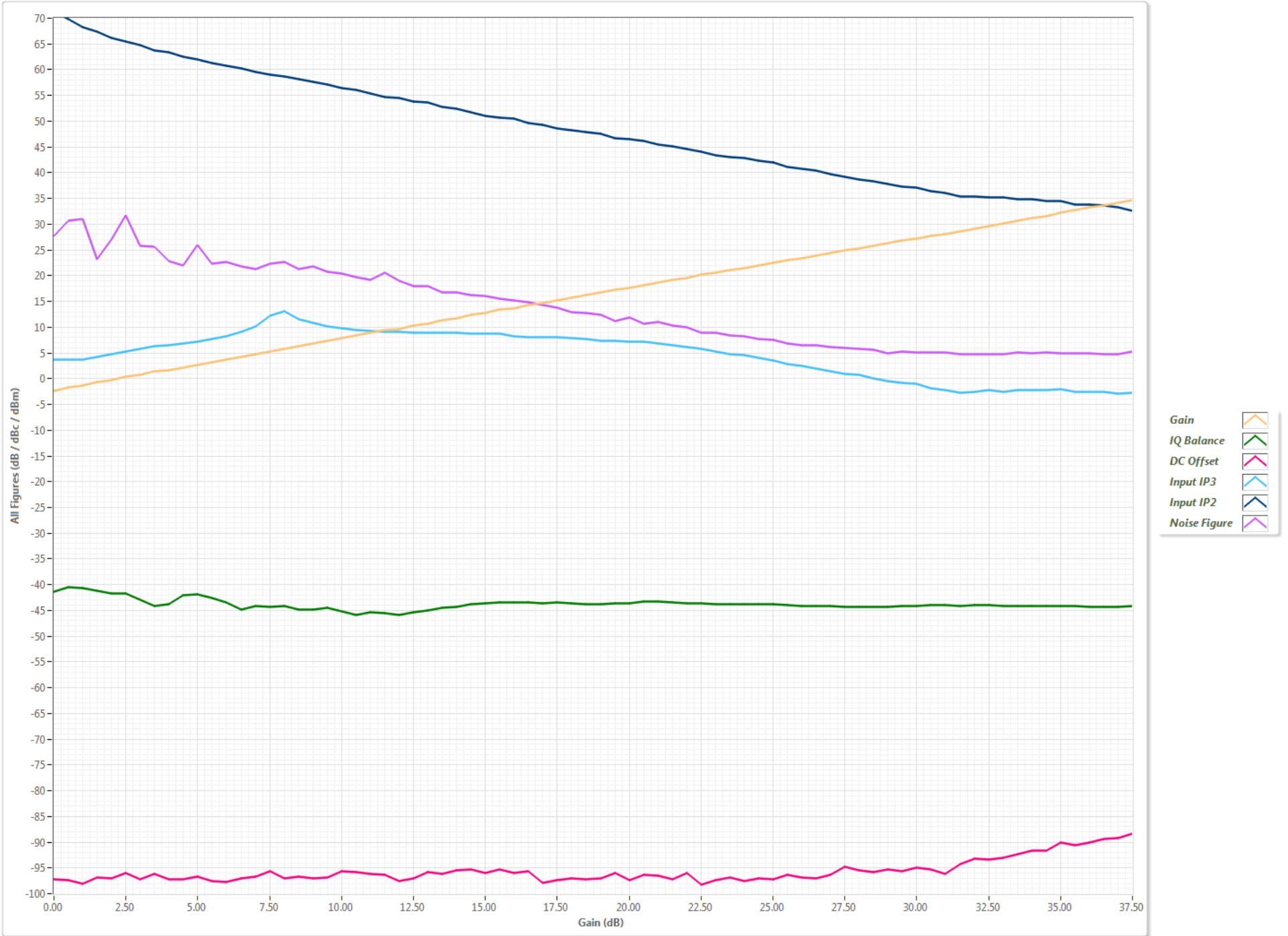
RX Figure vs Gain w/ Frequency=3950.00MHz



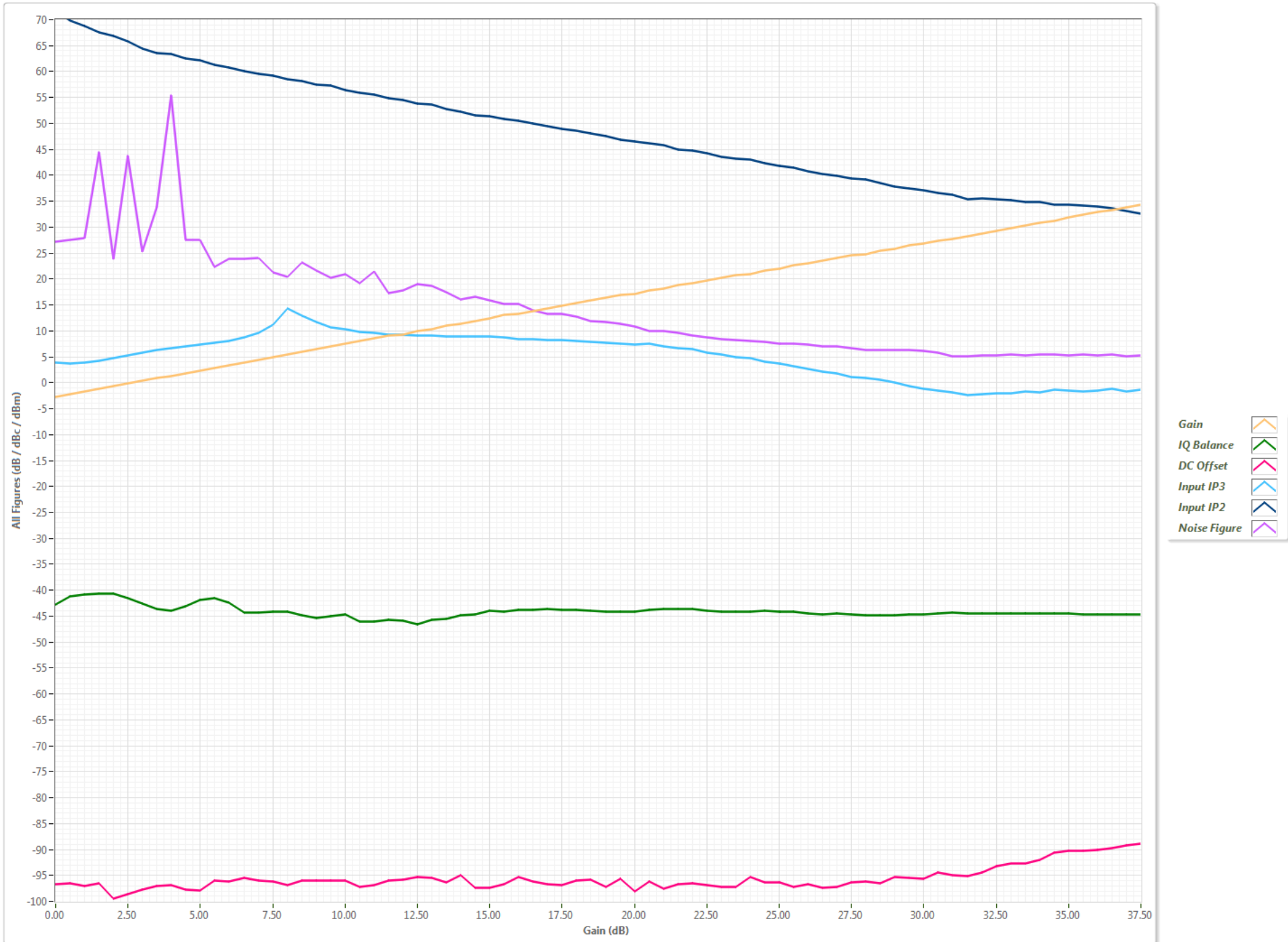
RX Figure vs Gain w/ Frequency=4000.00MHz



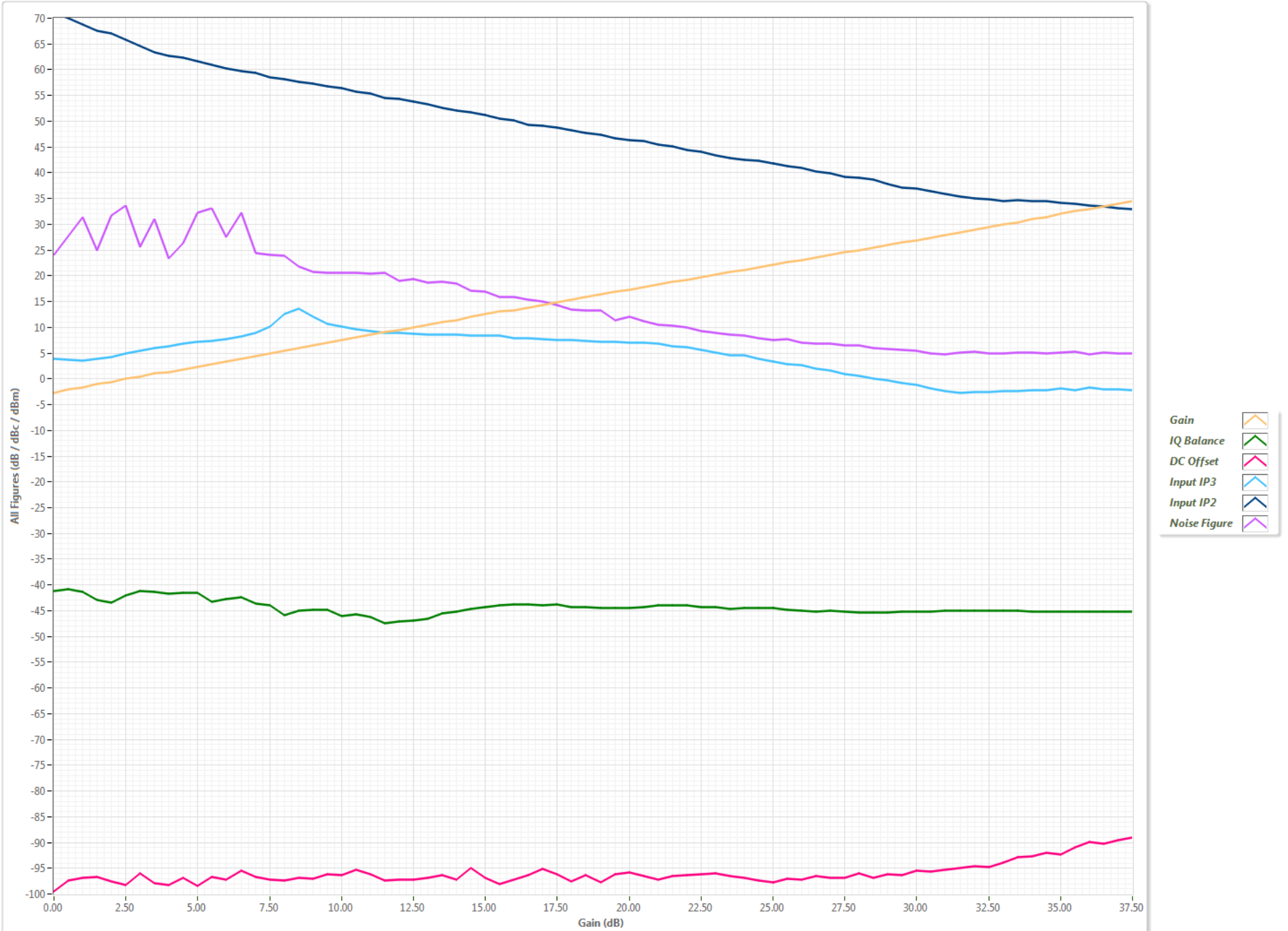
RX Figure vs Gain w/ Frequency=4050.00MHz



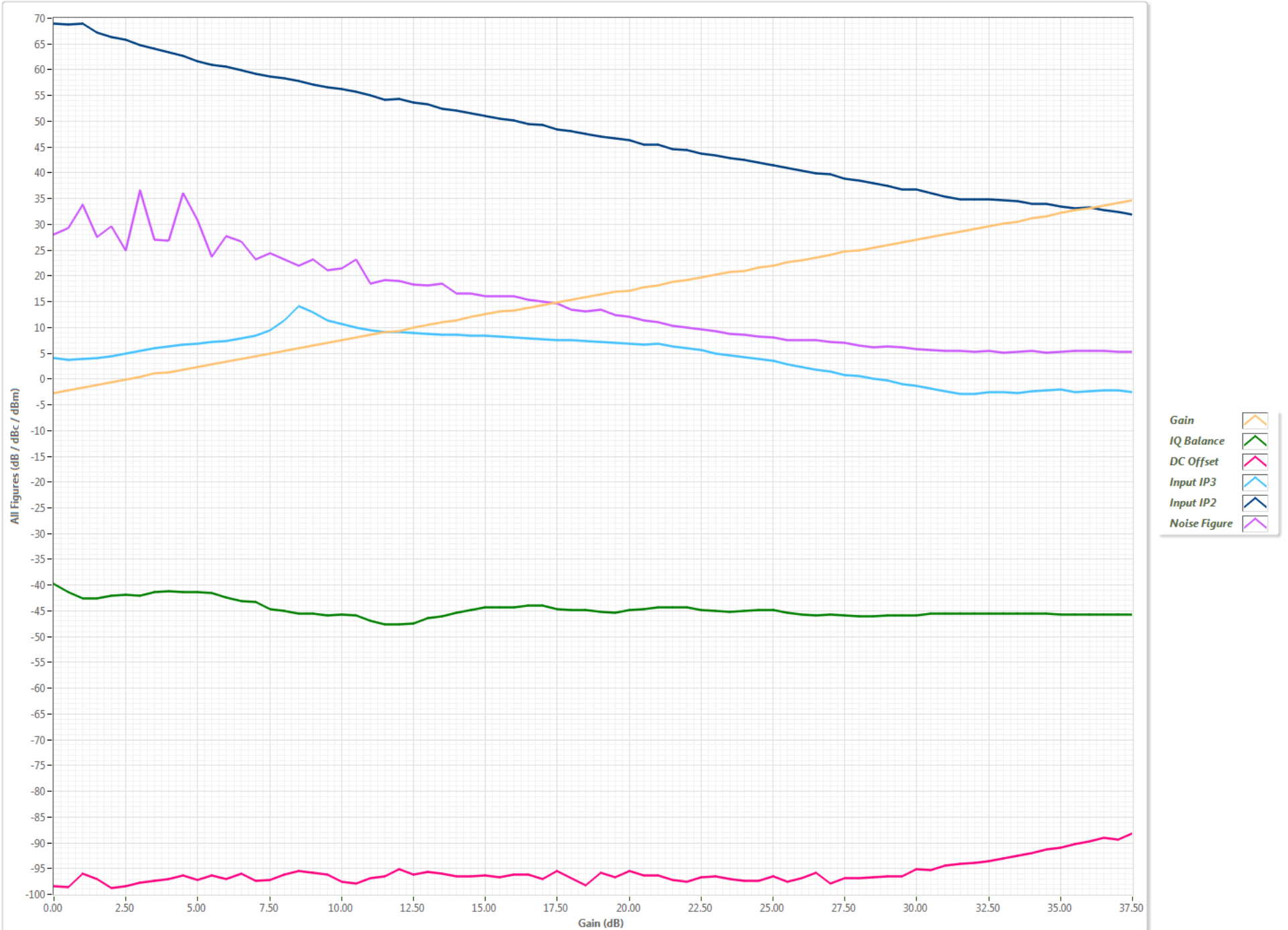
RX Figure vs Gain w/ Frequency=4100.00MHz



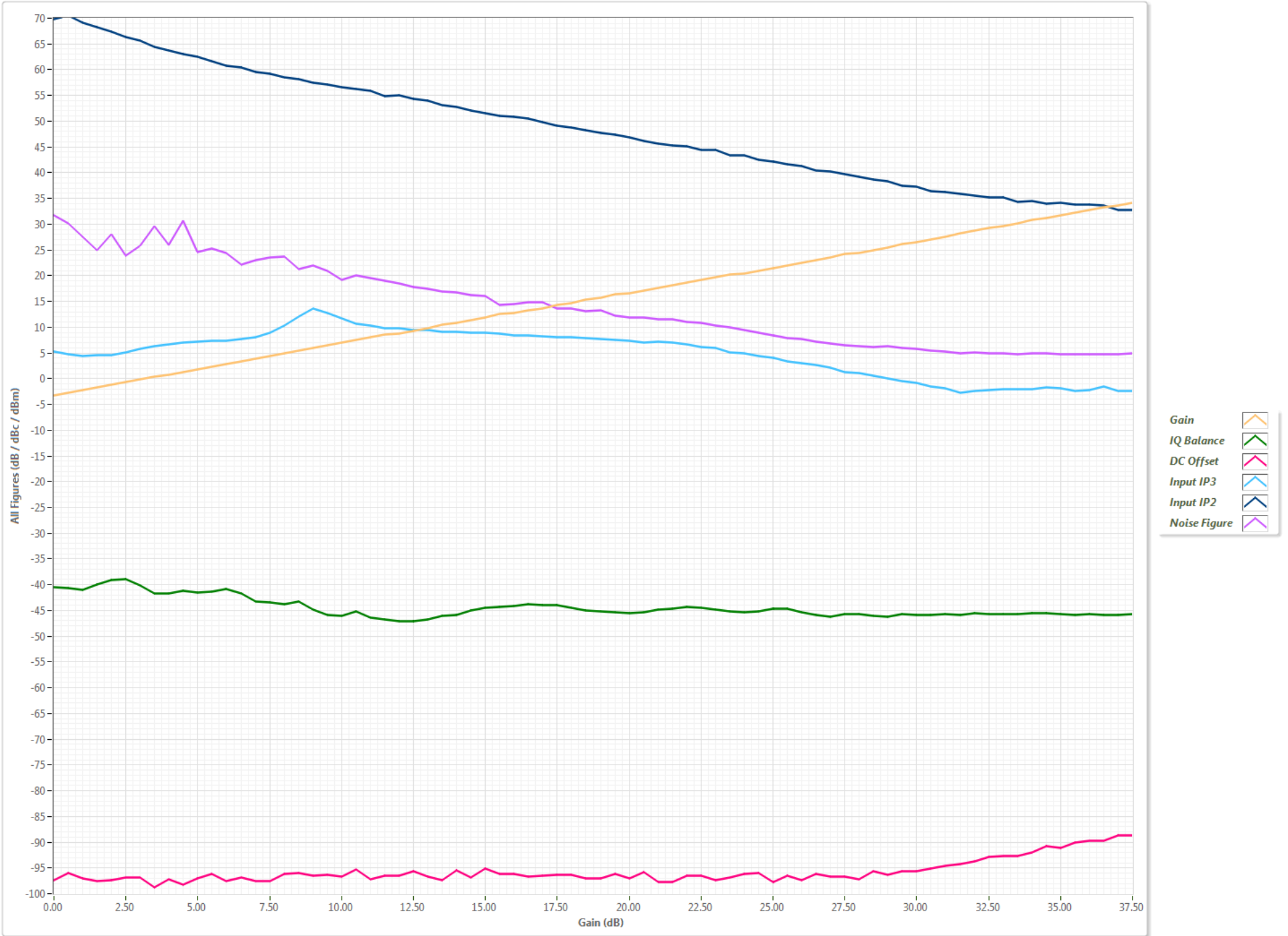
RX Figure vs Gain w/ Frequency=4150.00MHz



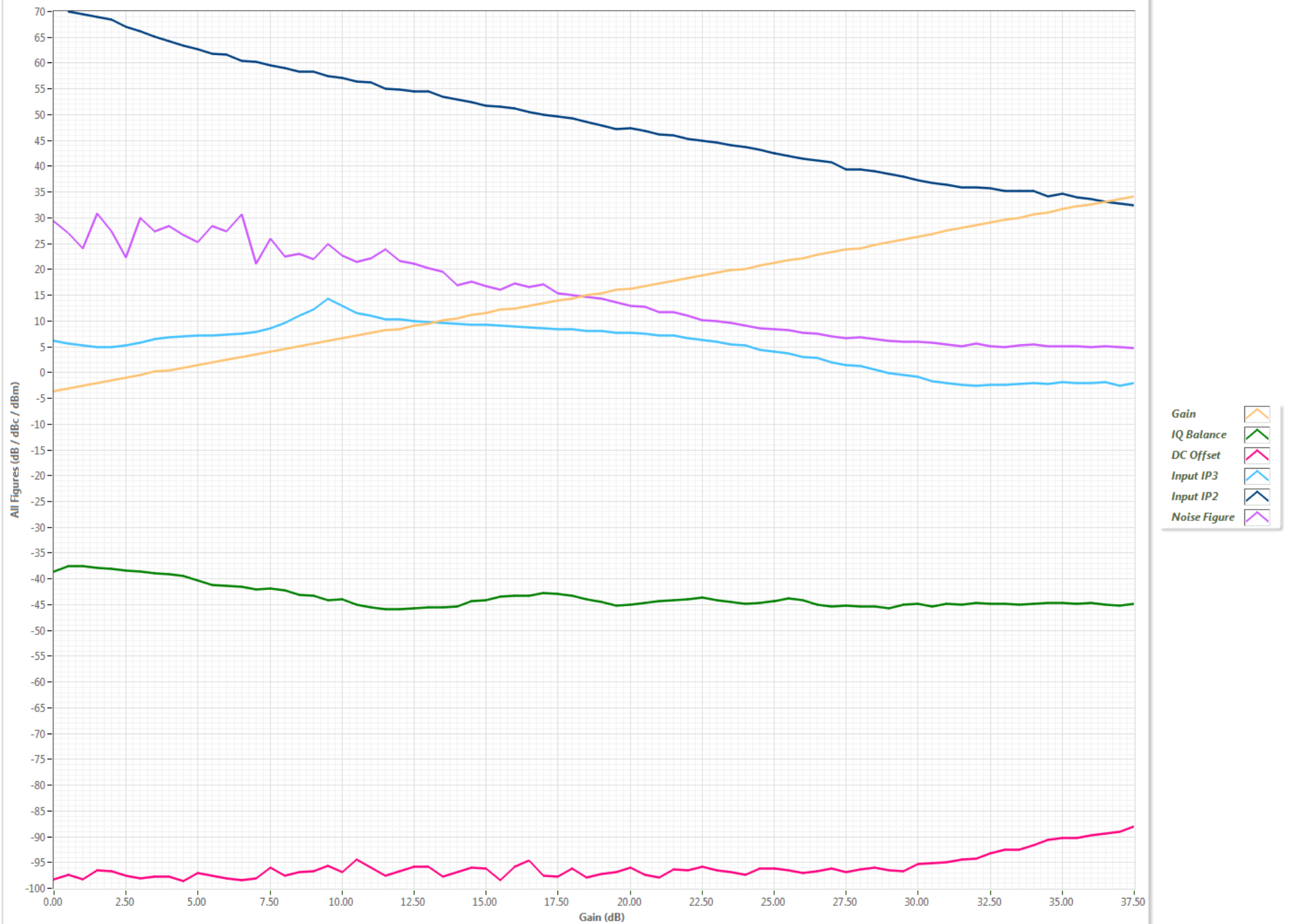
RX Figure vs Gain w/ Frequency=4200.00MHz



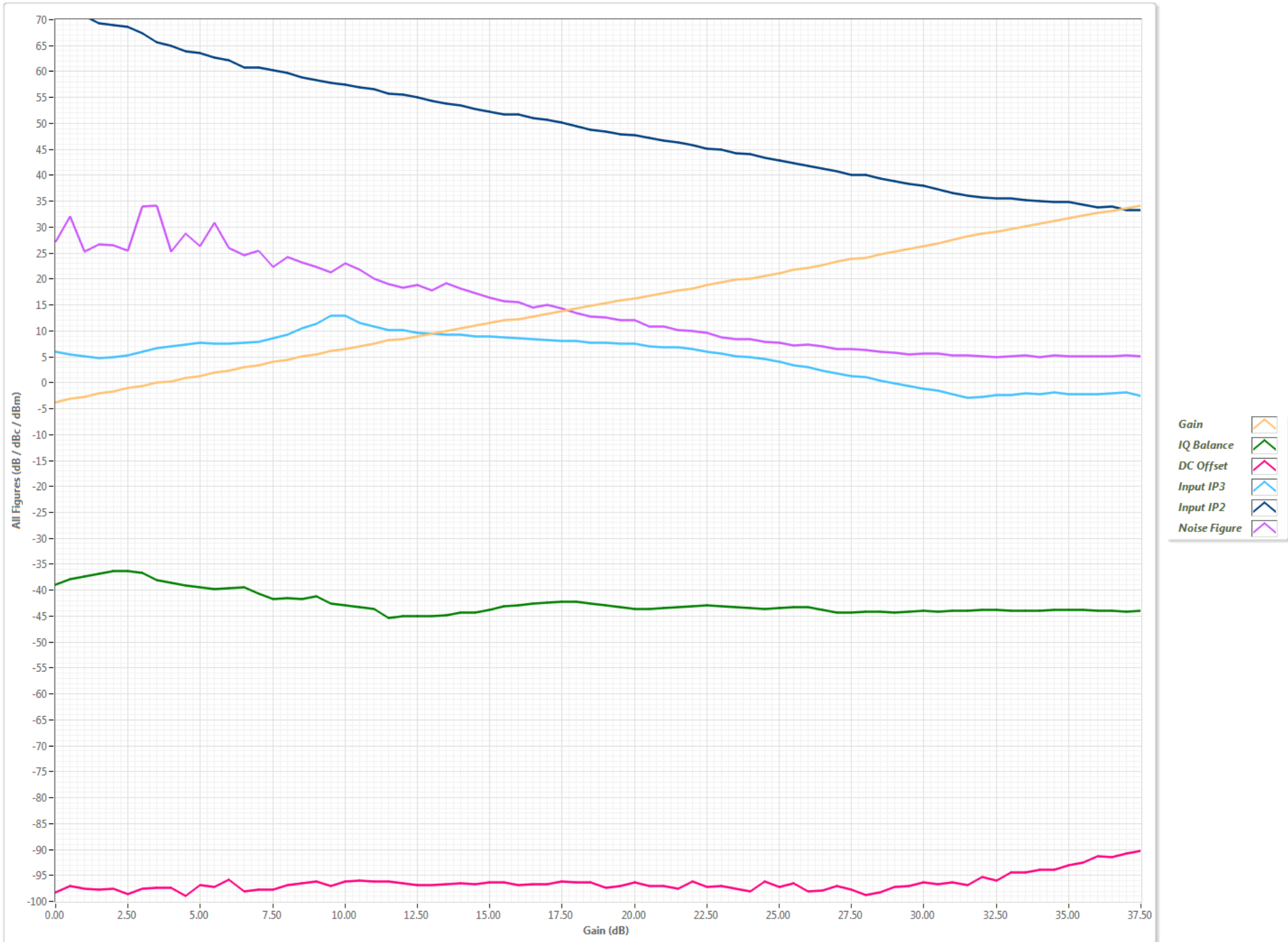
RX Figure vs Gain w/ Frequency=4250.00MHz



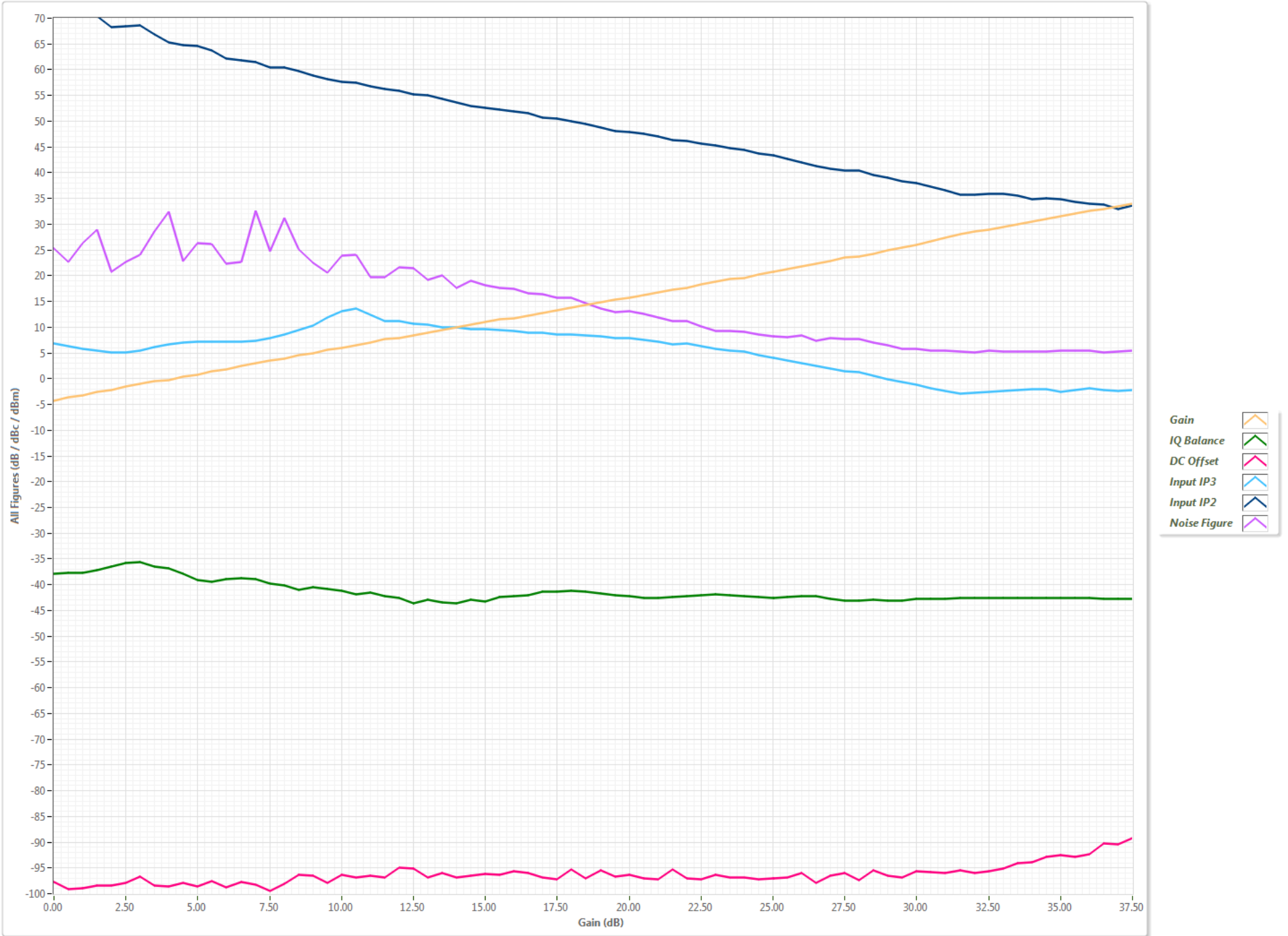
RX Figure vs Gain w/ Frequency=4300.00MHz



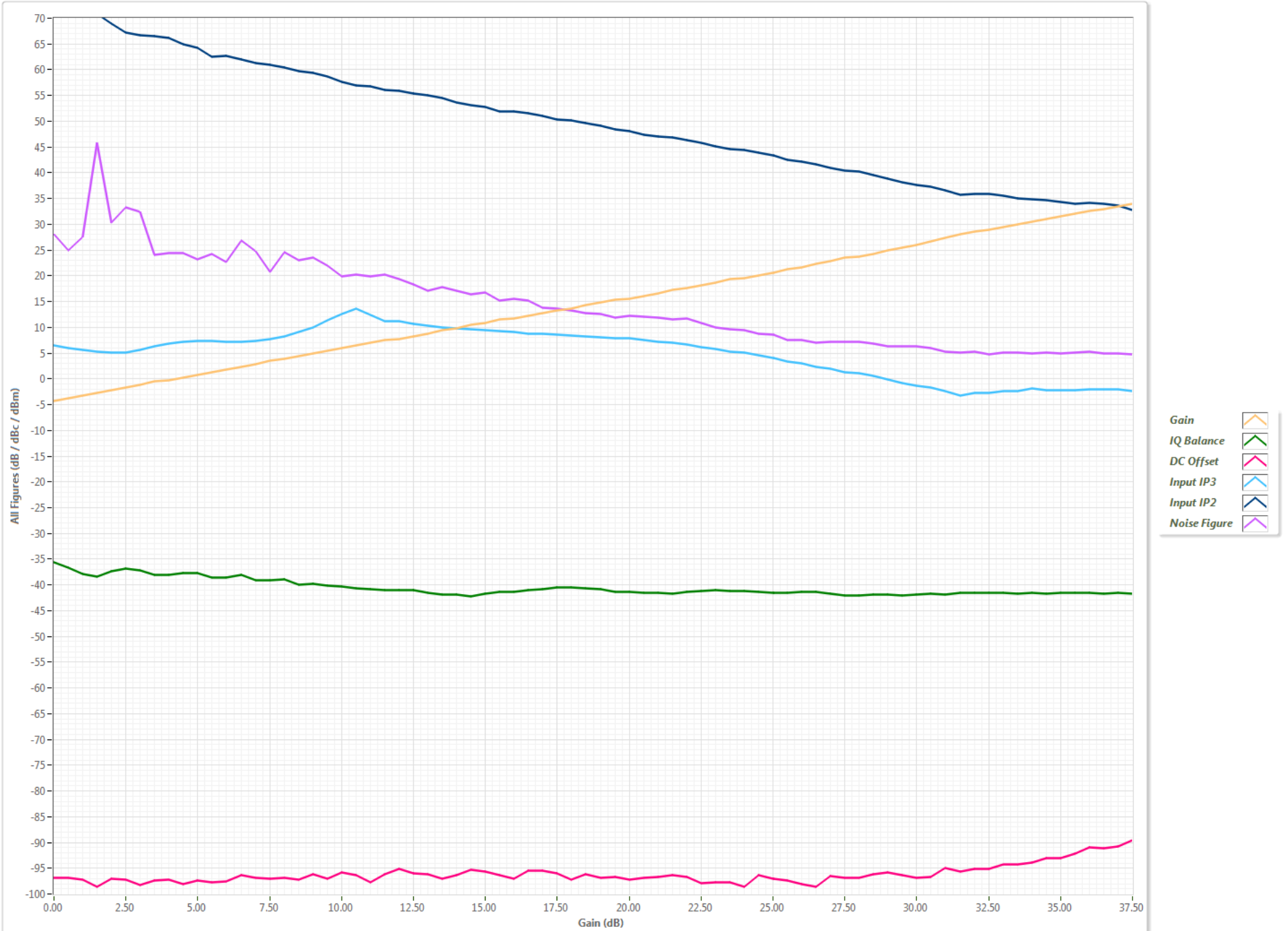
RX Figure vs Gain w/ Frequency=4350.00MHz



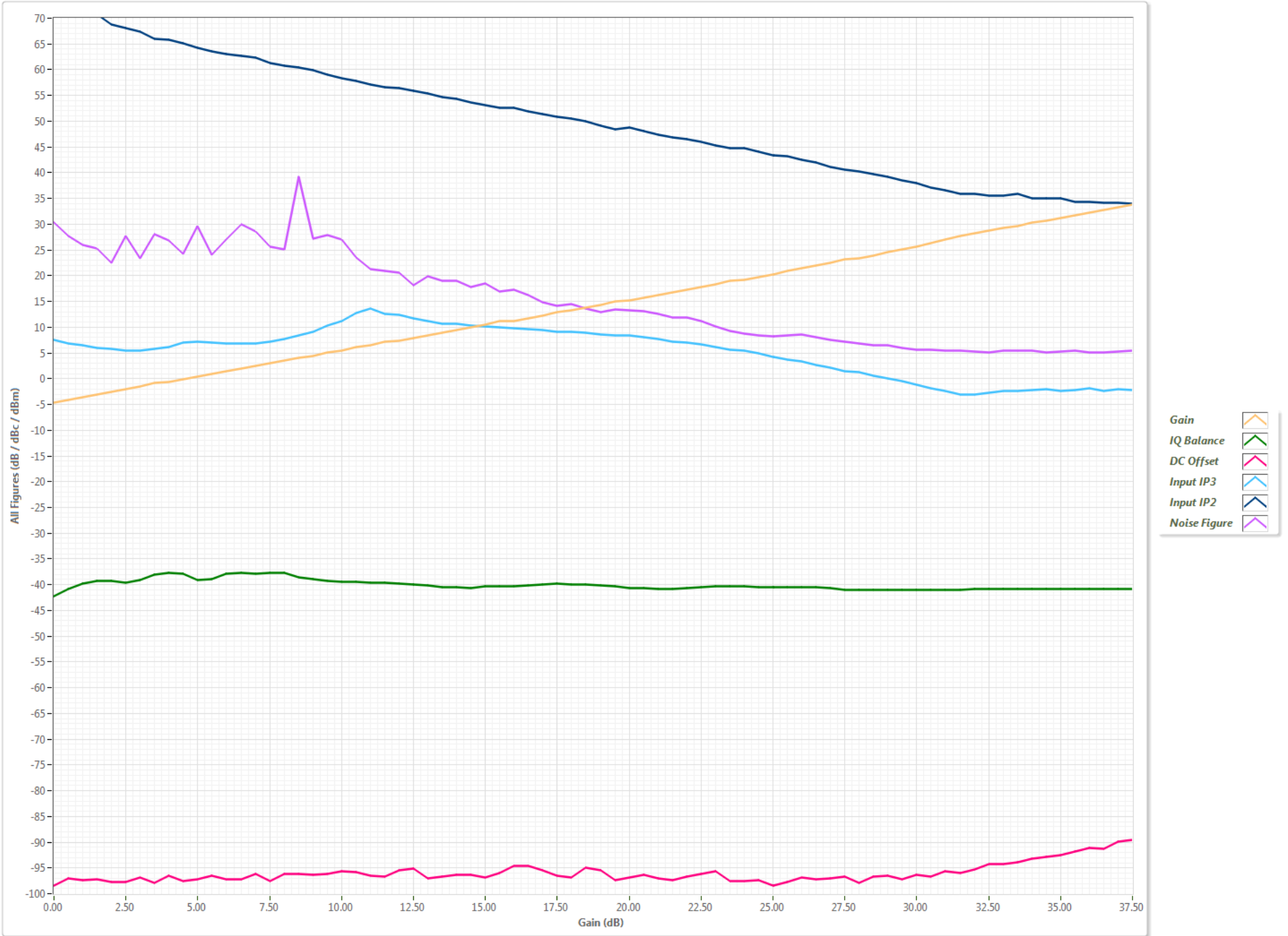
RX Figure vs Gain w/ Frequency=4400.00MHz



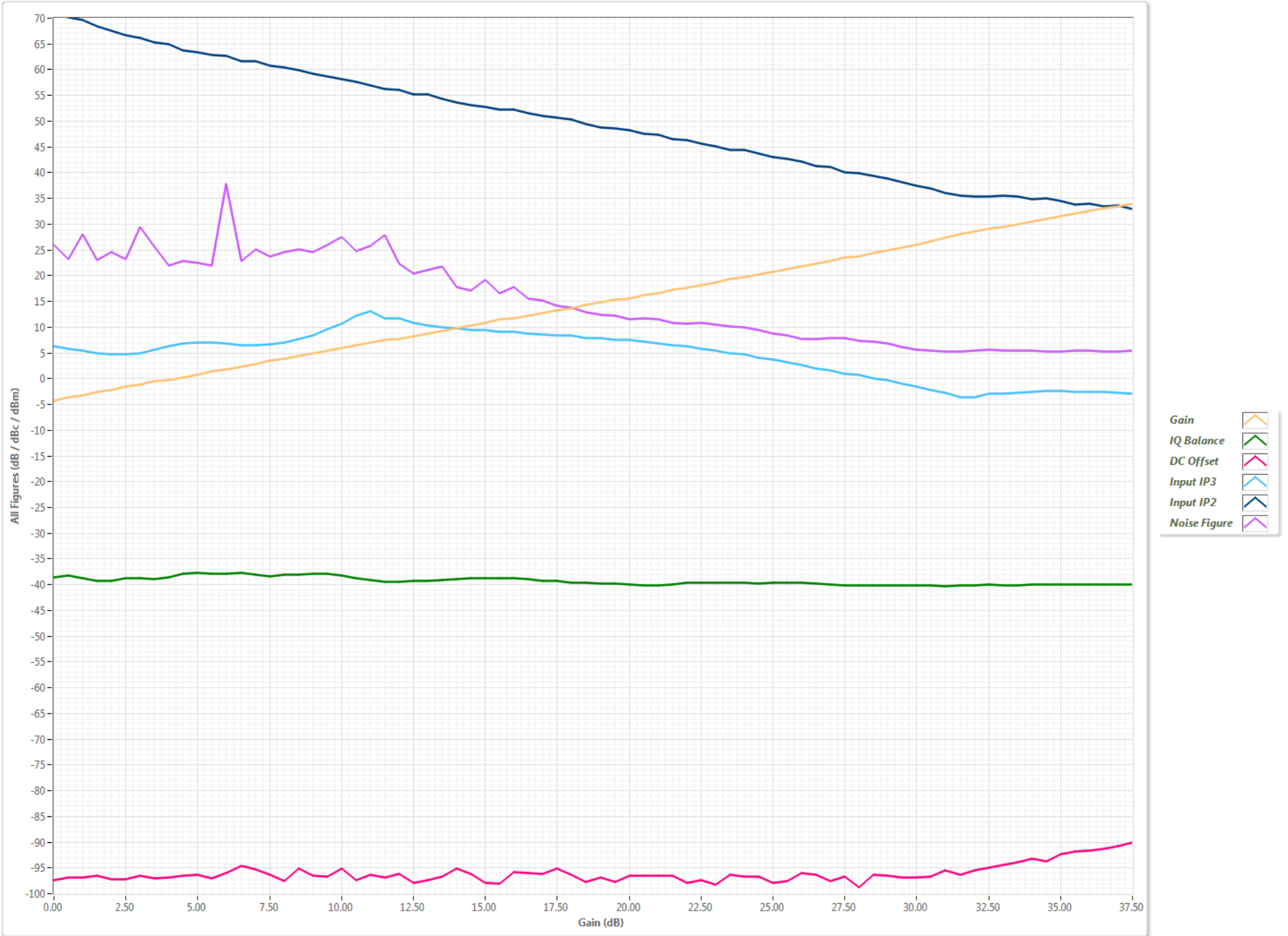
RX Figure vs Gain w/ Frequency=4450.00MHz



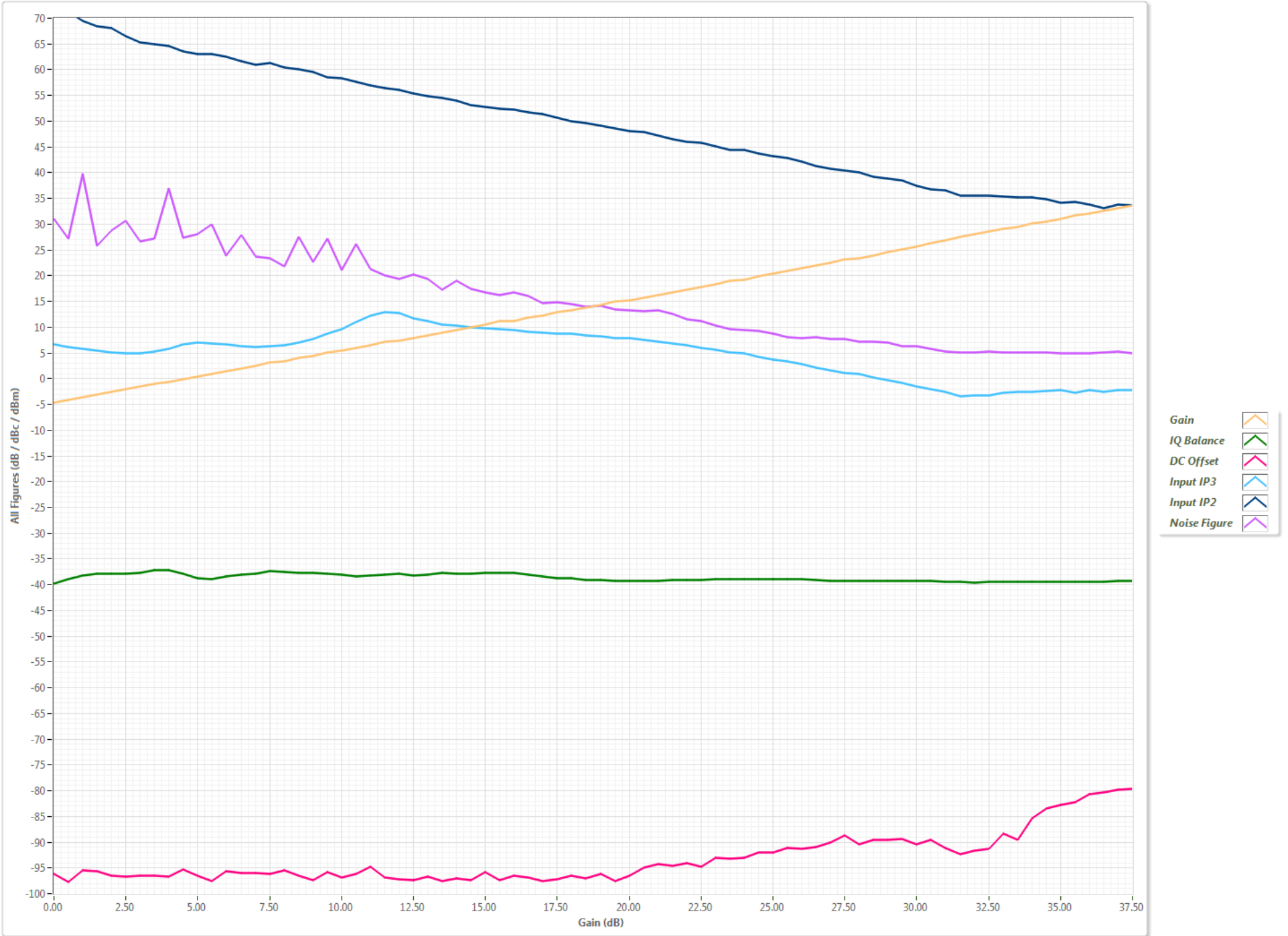
RX Figure vs Gain w/ Frequency=4500.00MHz



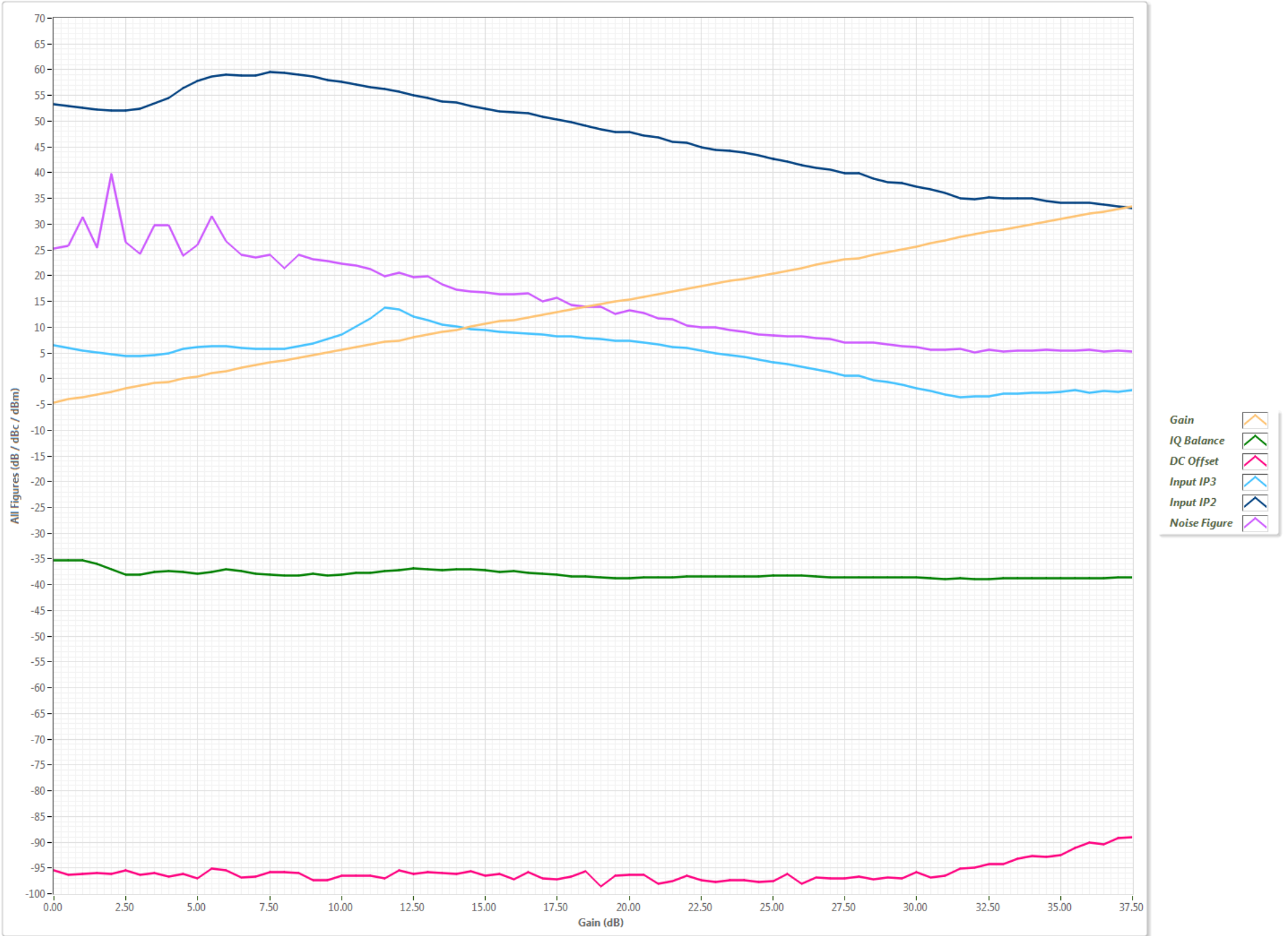
RX Figure vs Gain w/ Frequency=4550.00MHz



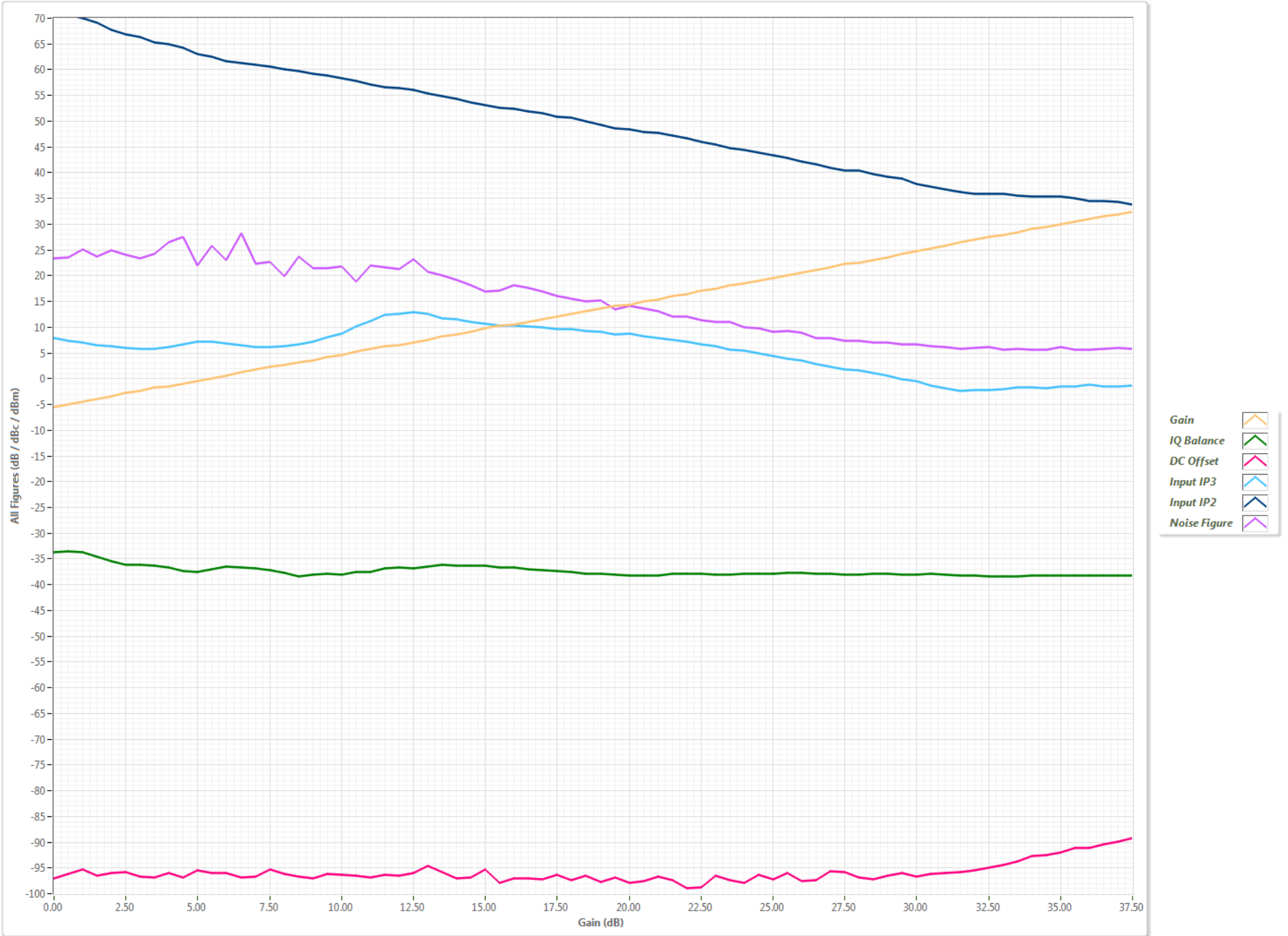
RX Figure vs Gain w/ Frequency=4600.00MHz



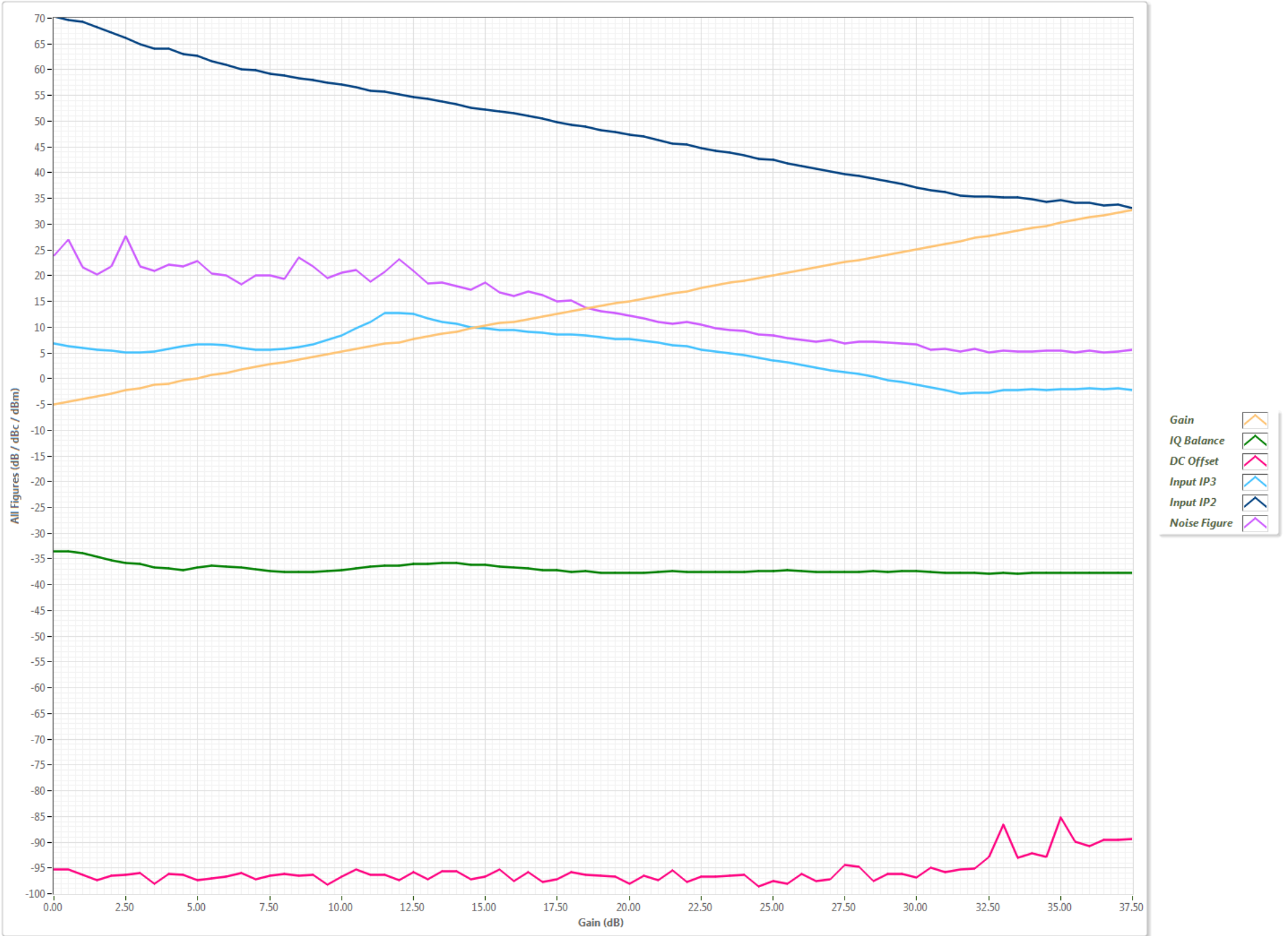
RX Figure vs Gain w/ Frequency=4650.00MHz



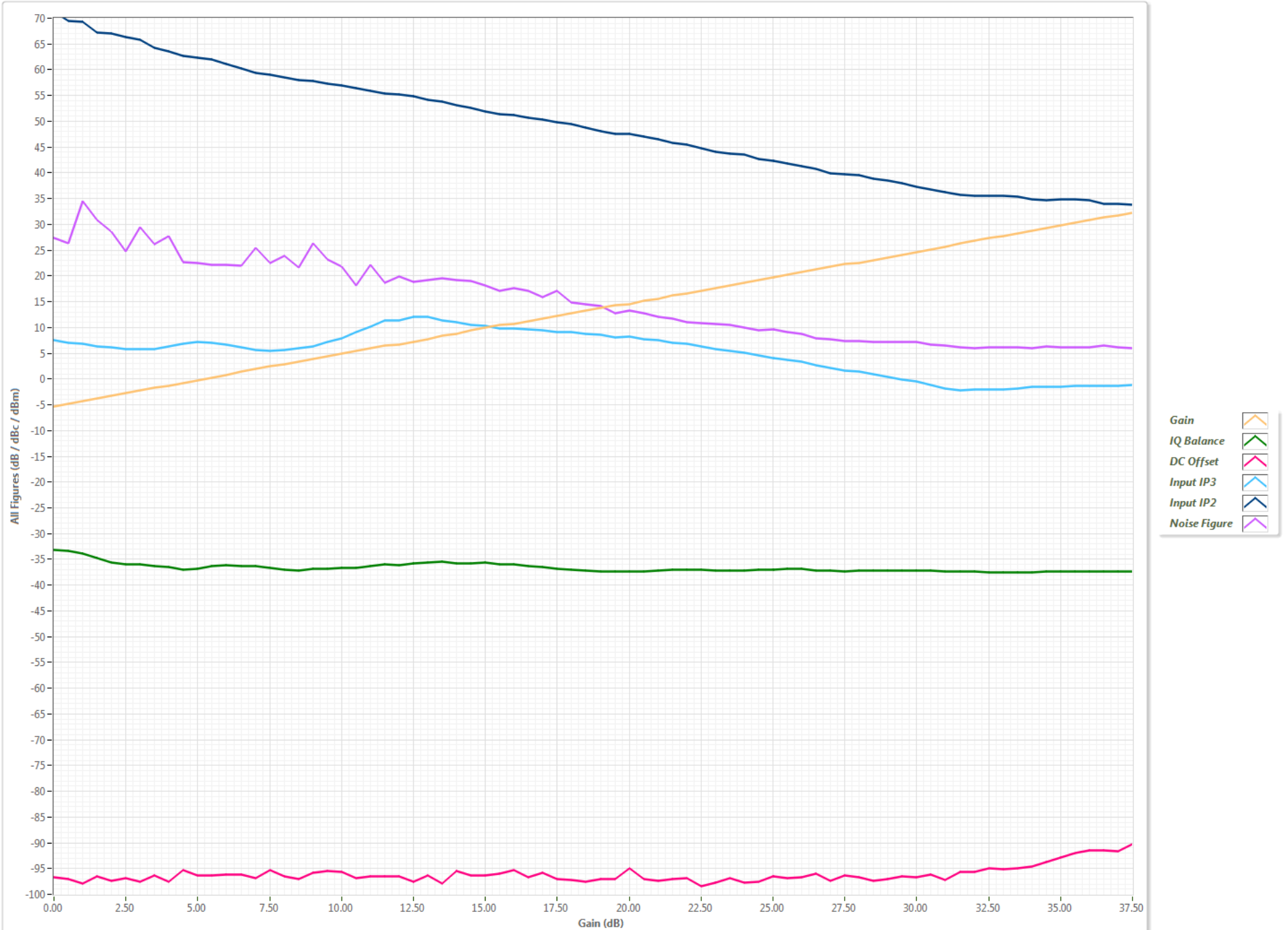
RX Figure vs Gain w/ Frequency=4700.00MHz



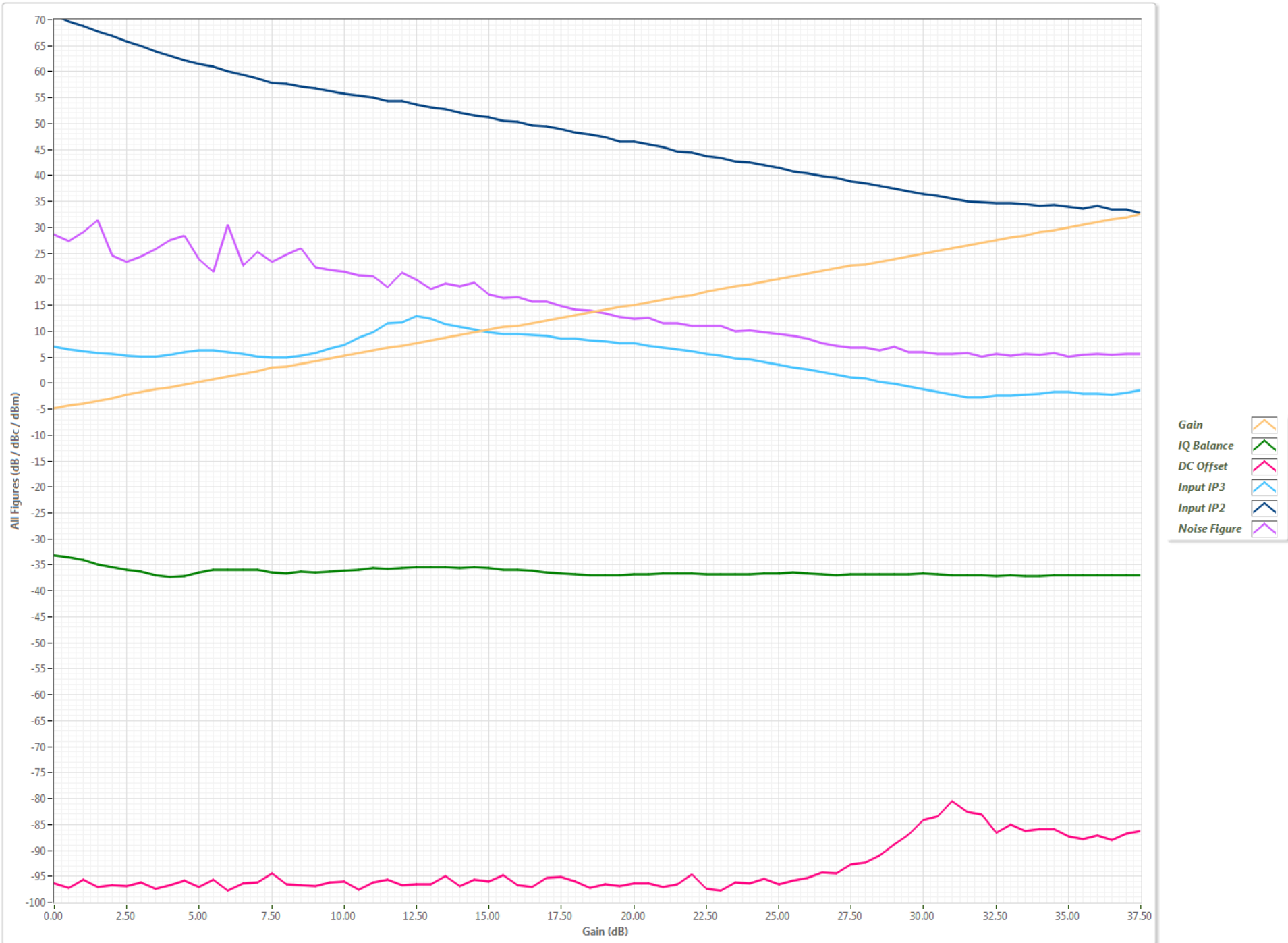
RX Figure vs Gain w/ Frequency=4750.00MHz



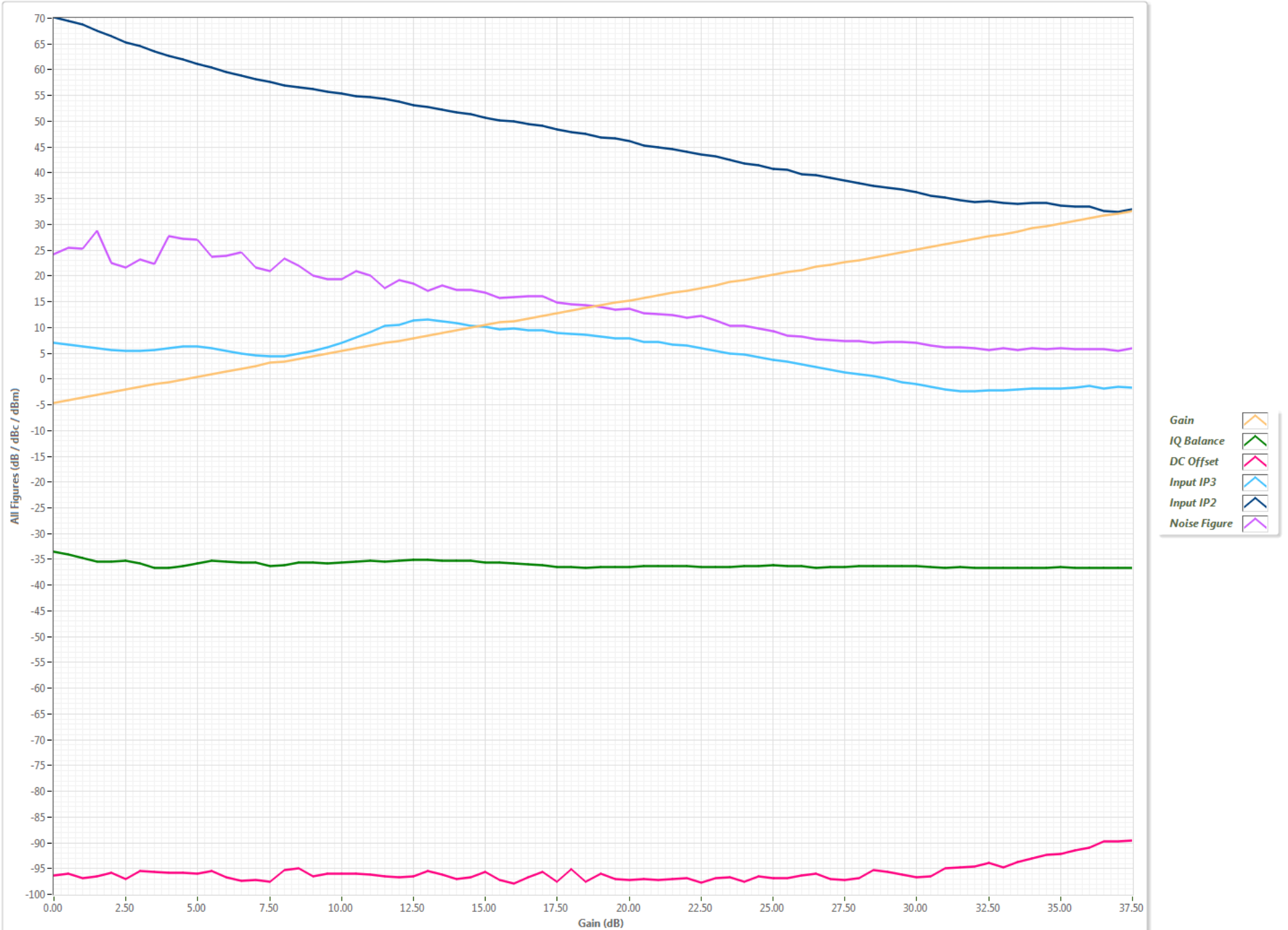
RX Figure vs Gain w/ Frequency=4800.00MHz



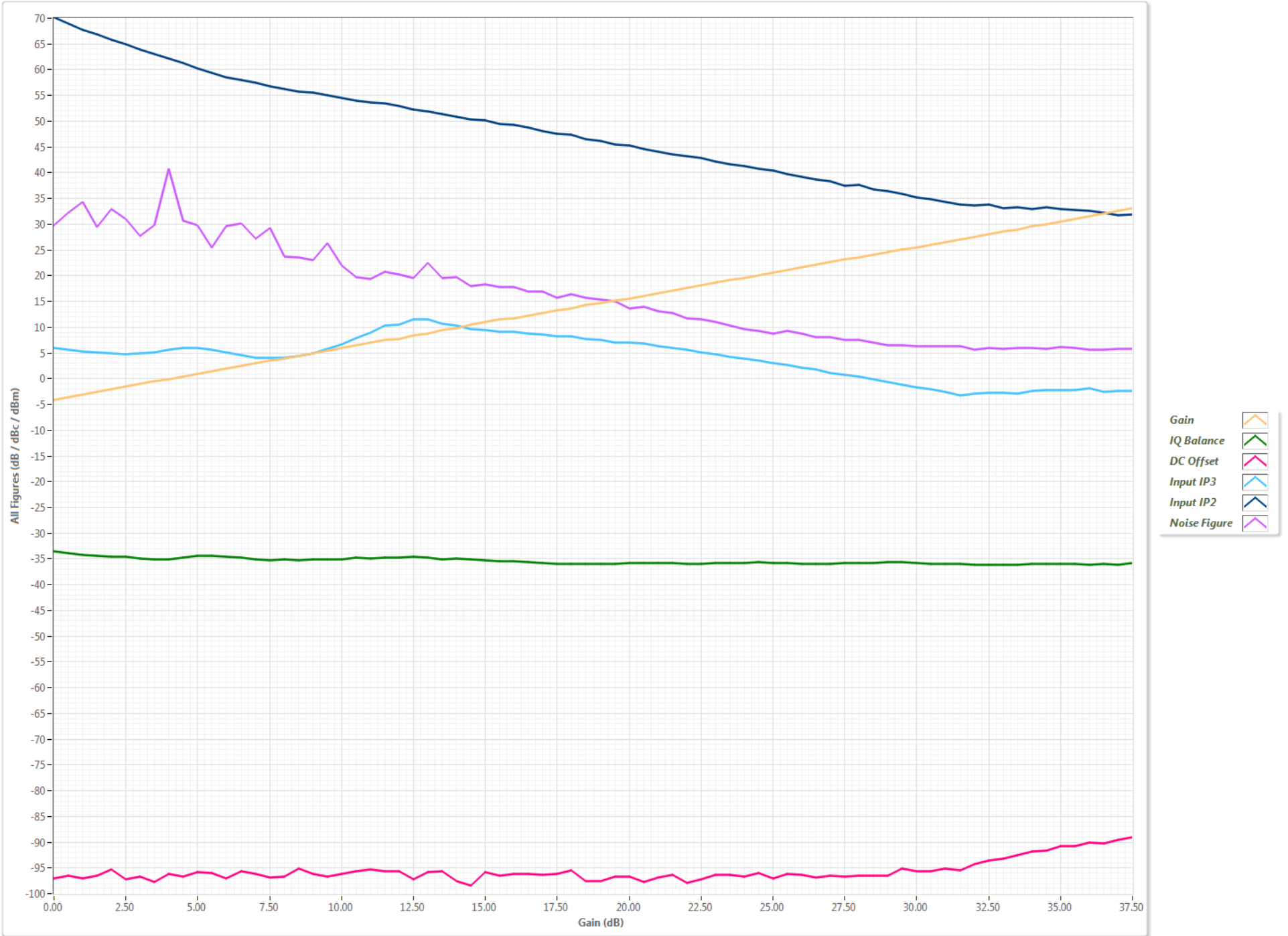
RX Figure vs Gain w/ Frequency=4850.00MHz



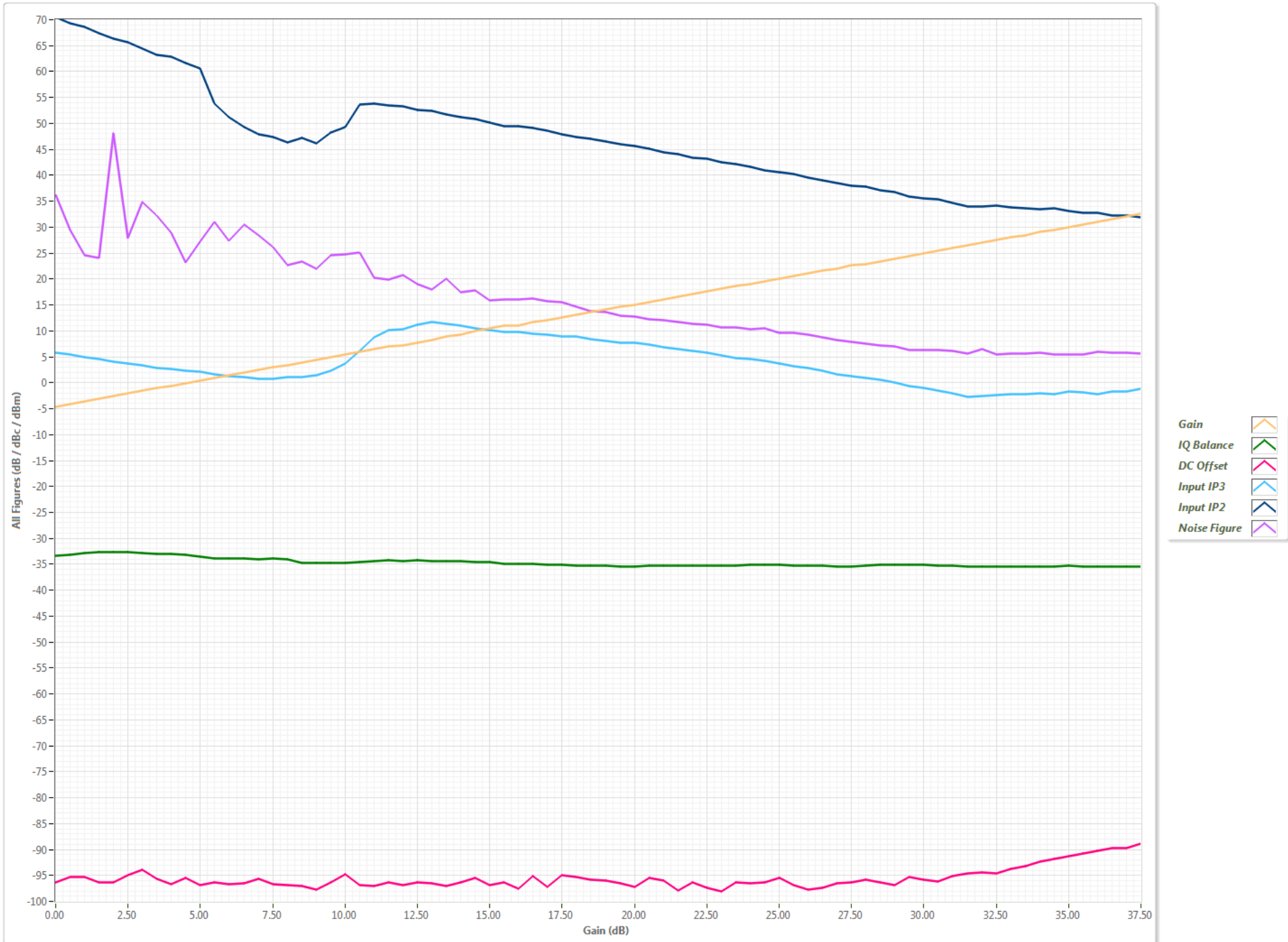
RX Figure vs Gain w/ Frequency=4900.00MHz



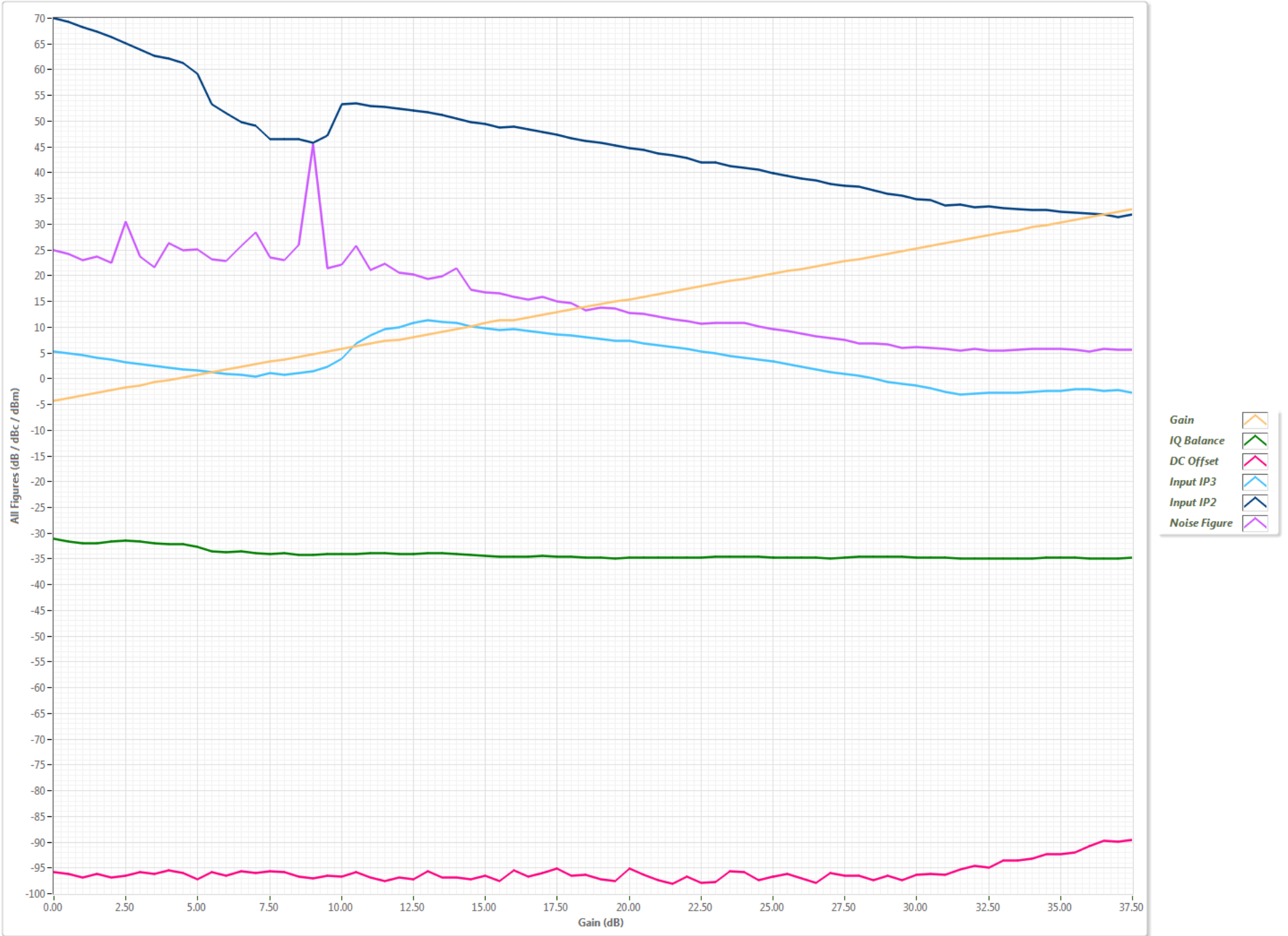
RX Figure vs Gain w/ Frequency=4950.00MHz



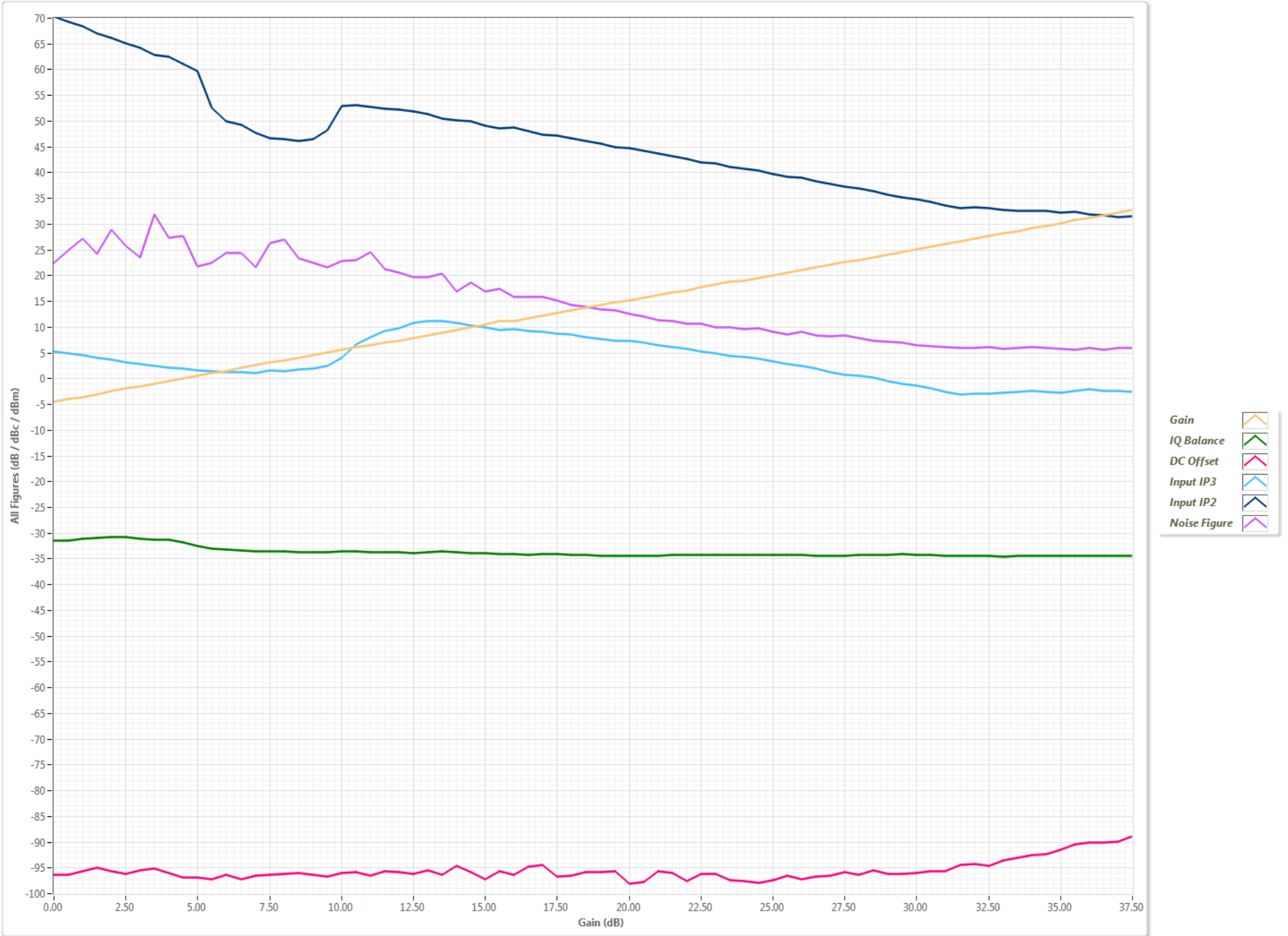
RX Figure vs Gain w/ Frequency=5000.00MHz



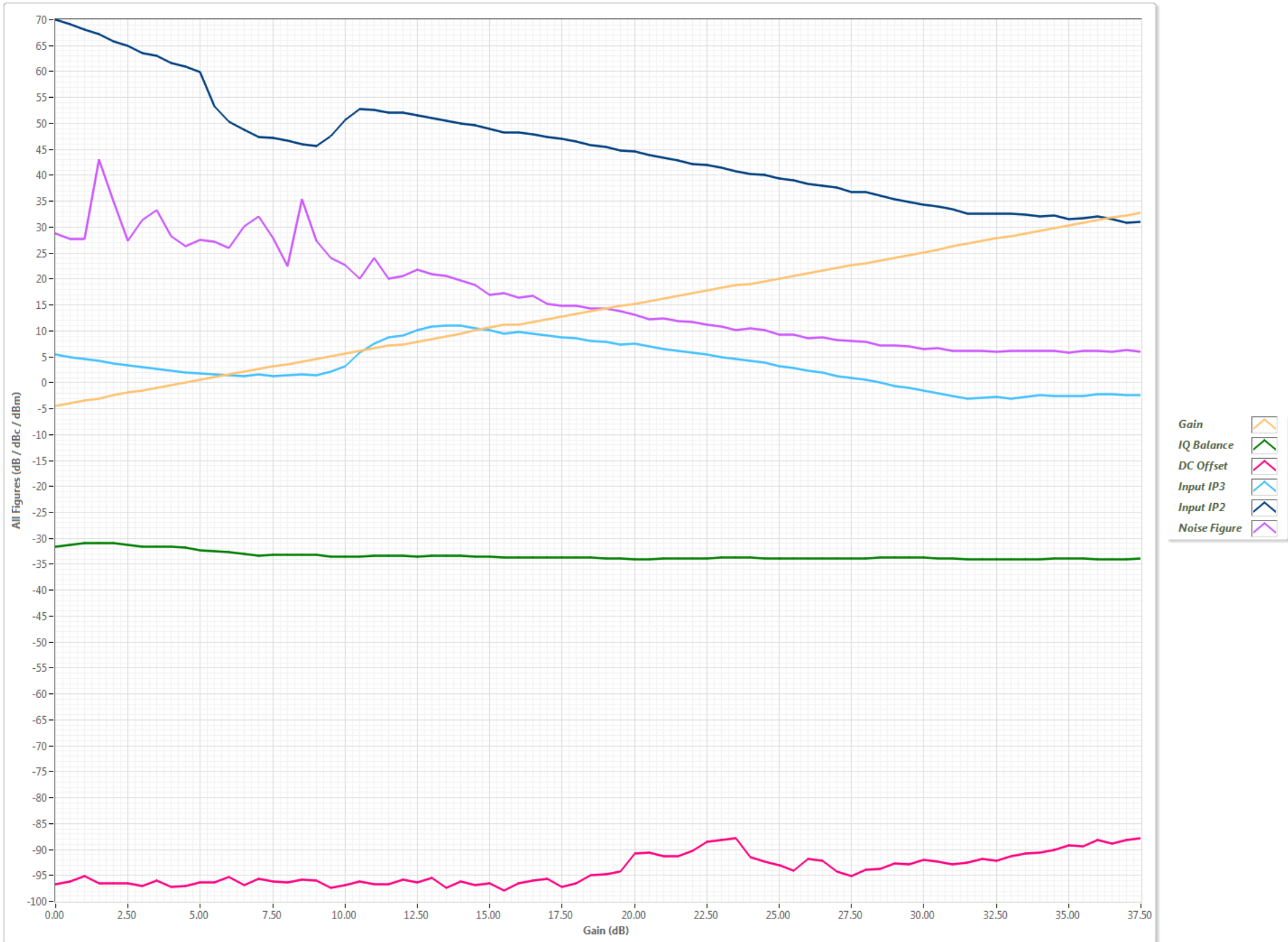
RX Figure vs Gain w/ Frequency=5050.00MHz



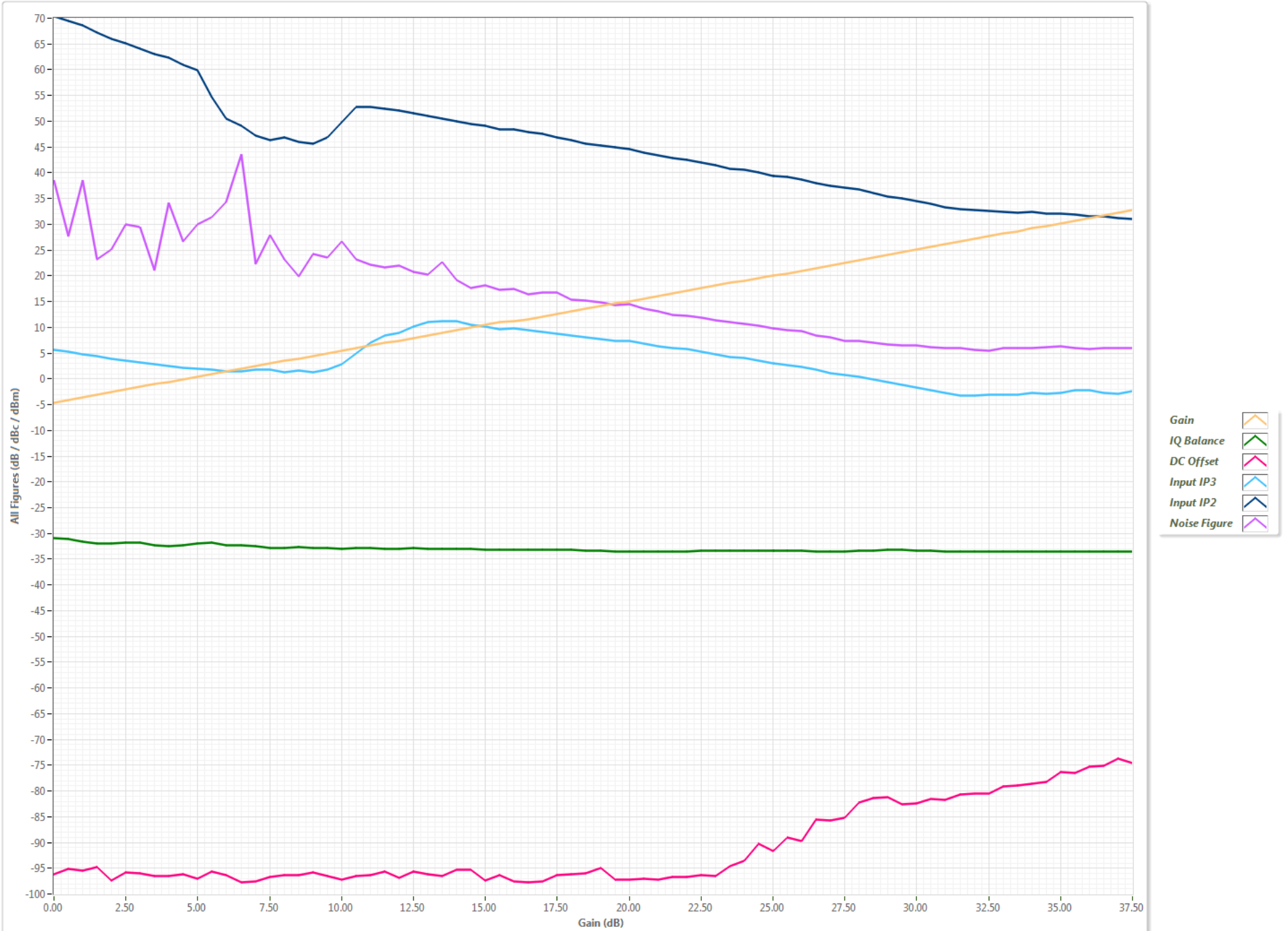
RX Figure vs Gain w/ Frequency=5100.00MHz



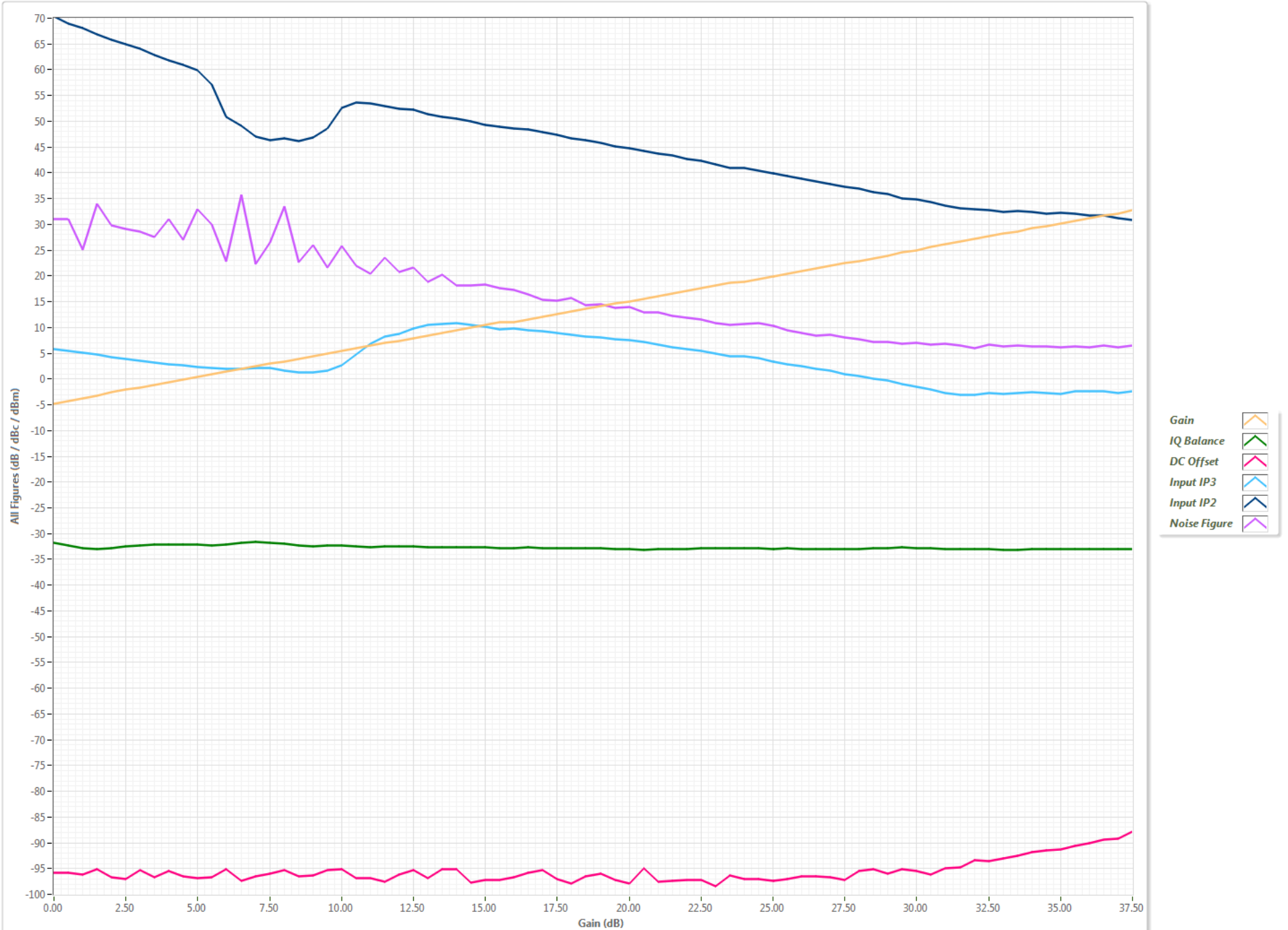
RX Figure vs Gain w/ Frequency=5150.00MHz



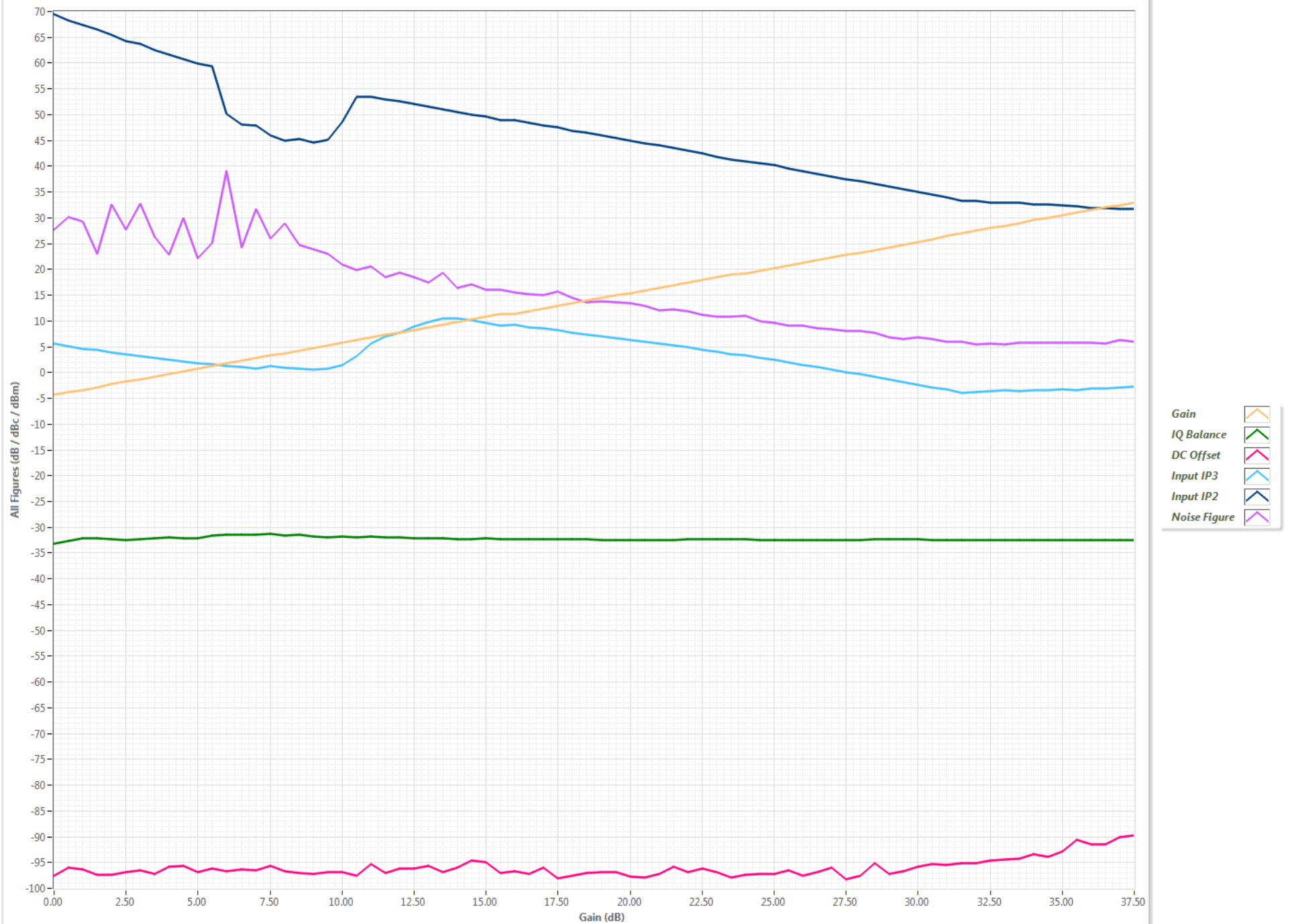
RX Figure vs Gain w/ Frequency=5200.00MHz



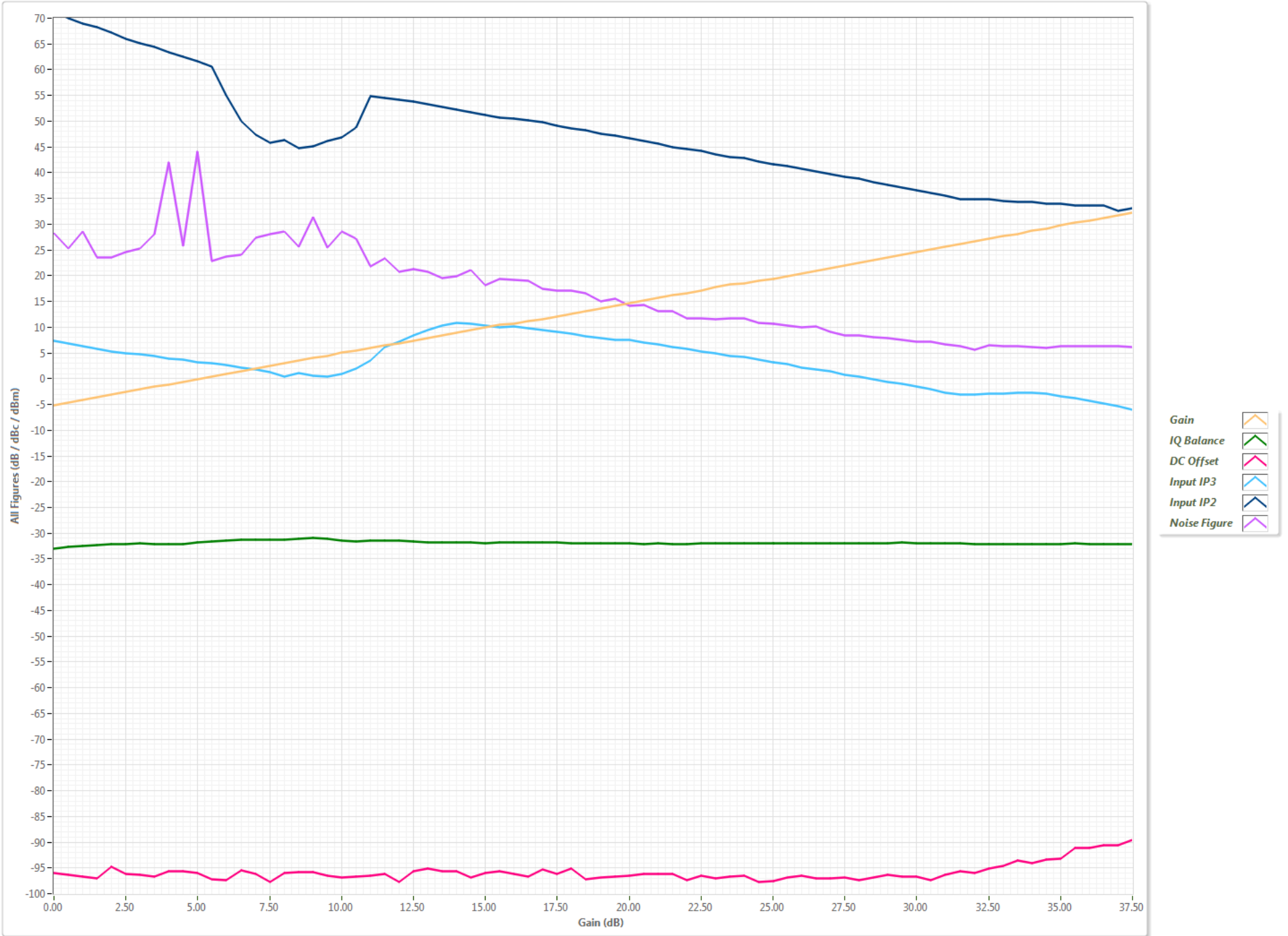
RX Figure vs Gain w/ Frequency=5250.00MHz



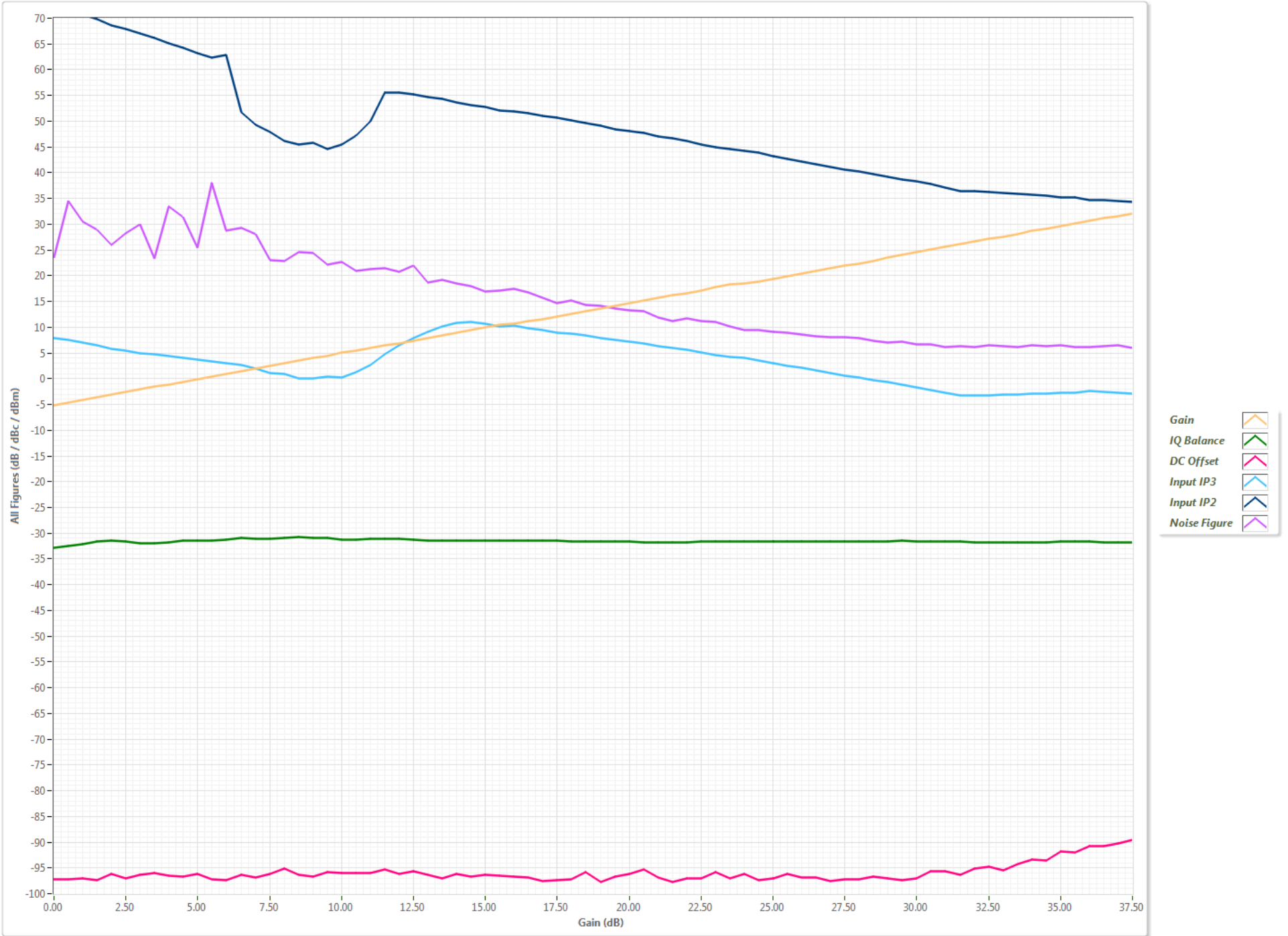
RX Figure vs Gain w/ Frequency=5300.00MHz



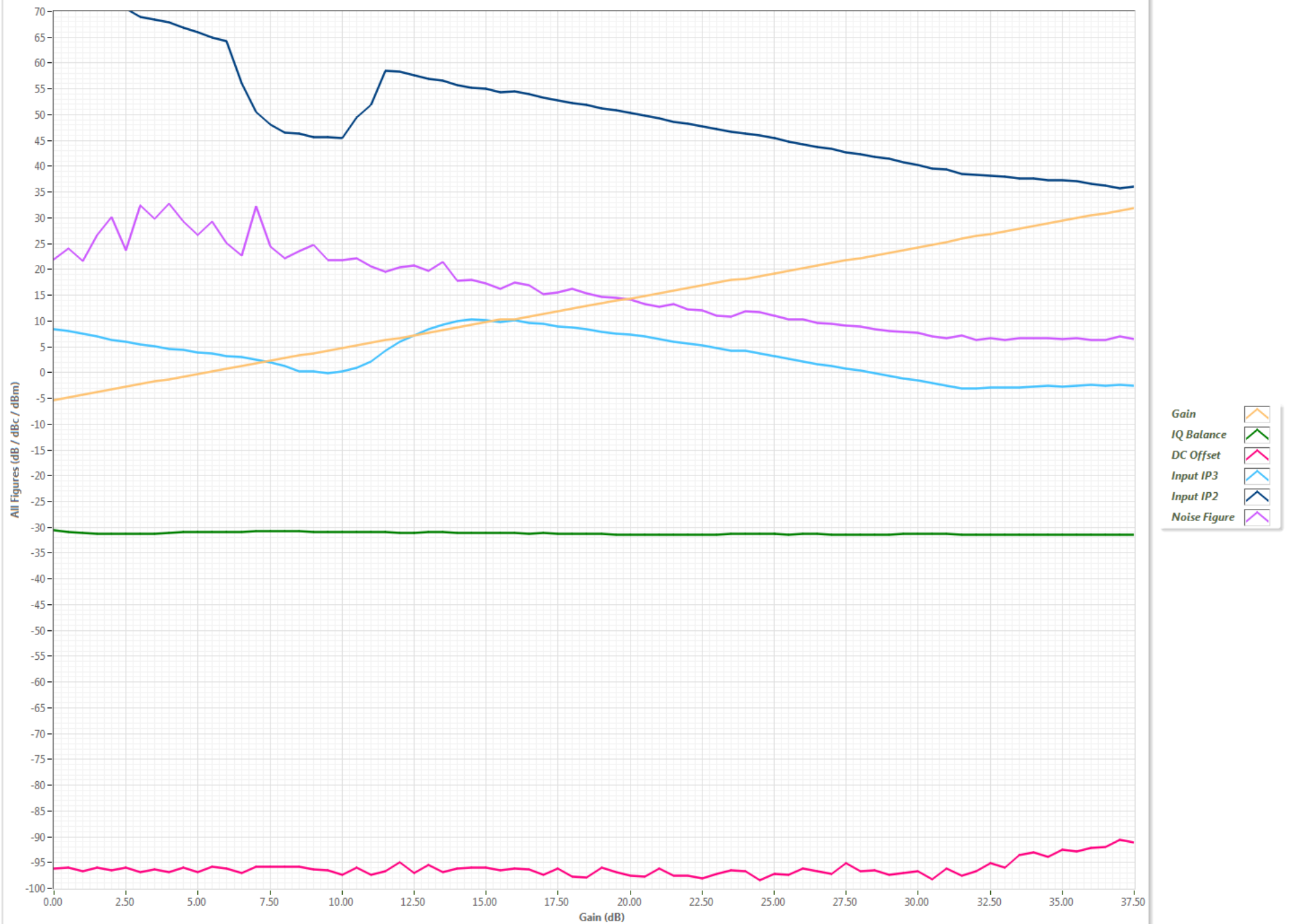
RX Figure vs Gain w/ Frequency=5350.00MHz



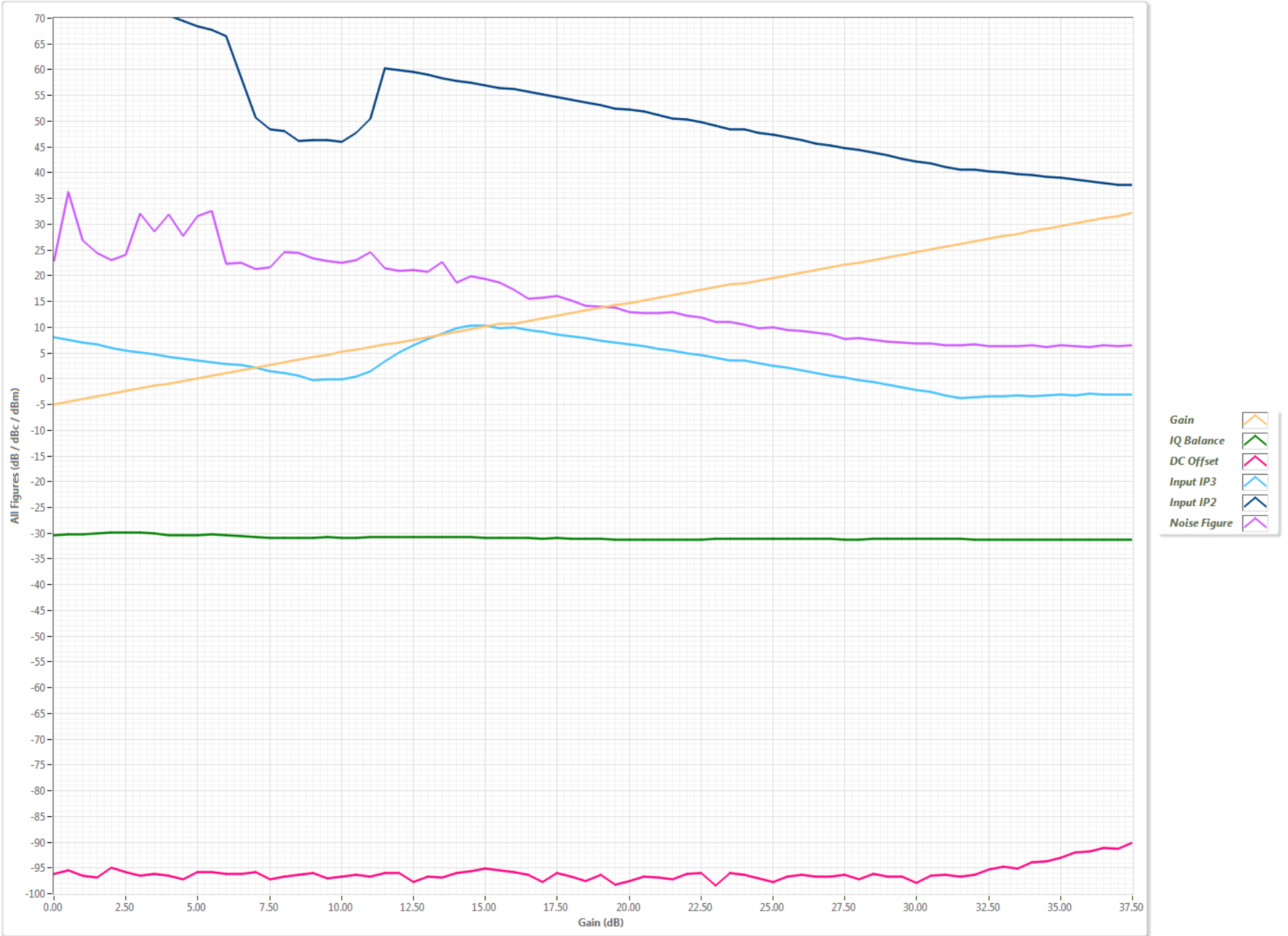
RX Figure vs Gain w/ Frequency=5400.00MHz



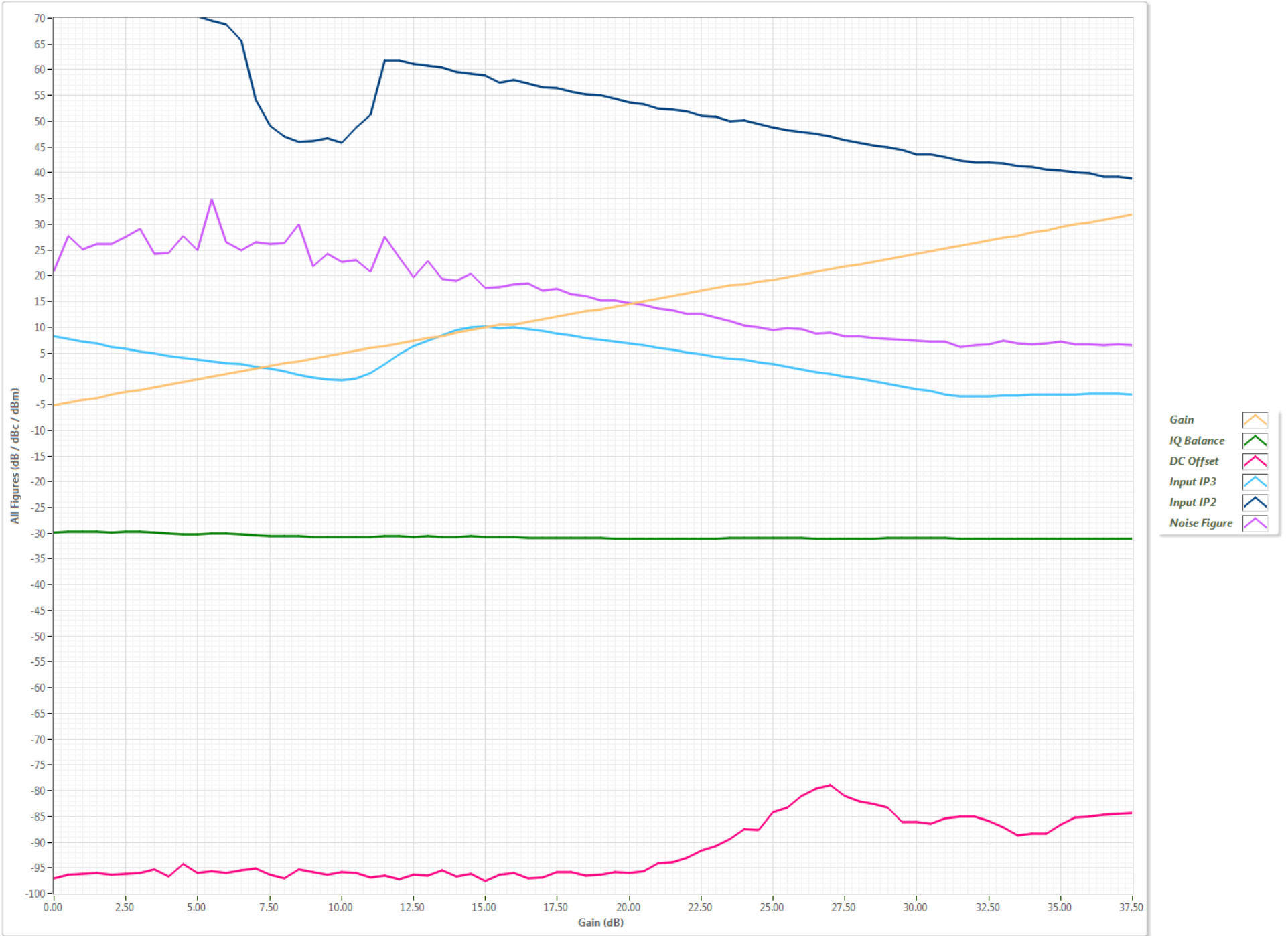
RX Figure vs Gain w/ Frequency=5450.00MHz



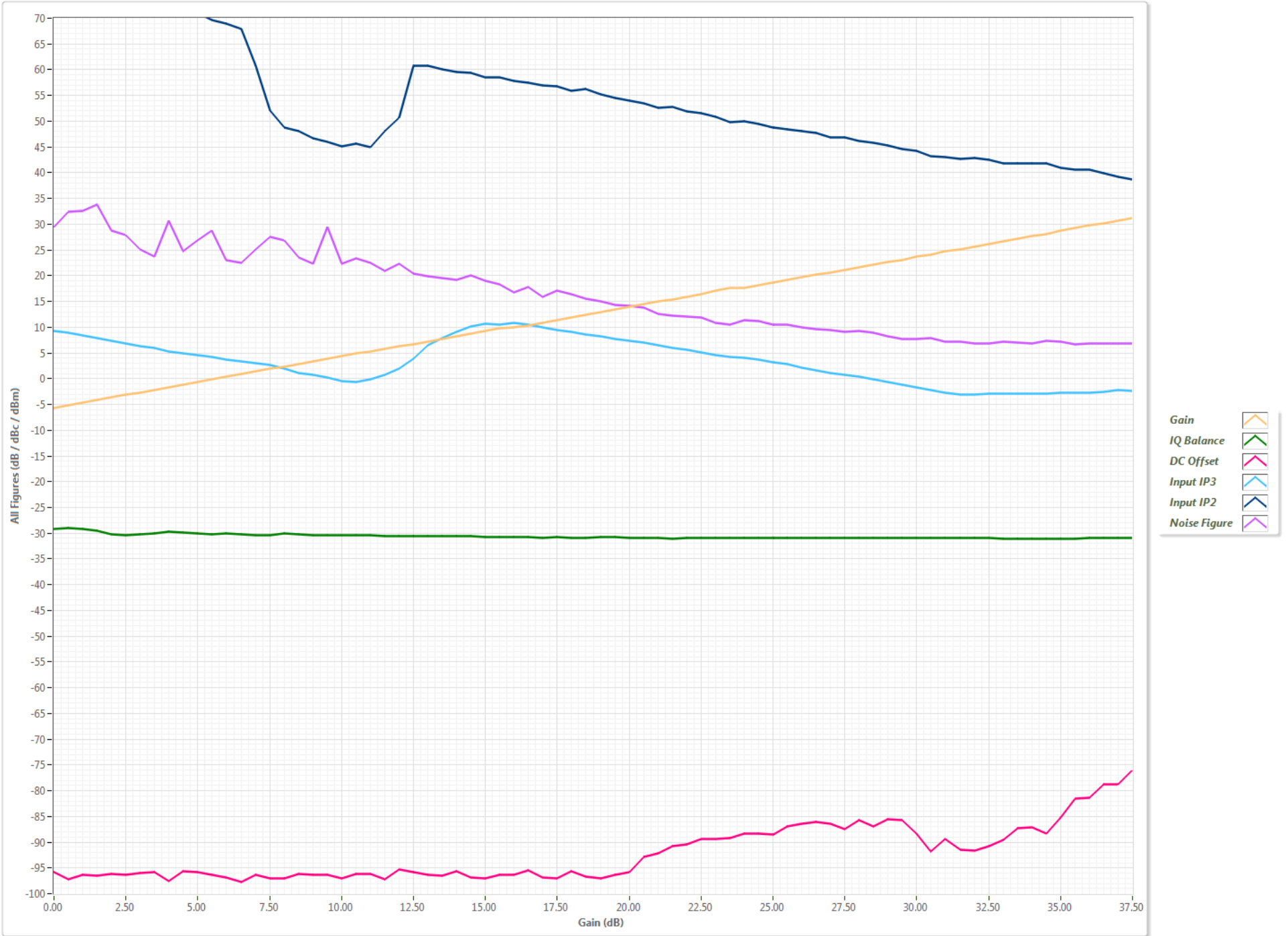
RX Figure vs Gain w/ Frequency=5500.00MHz



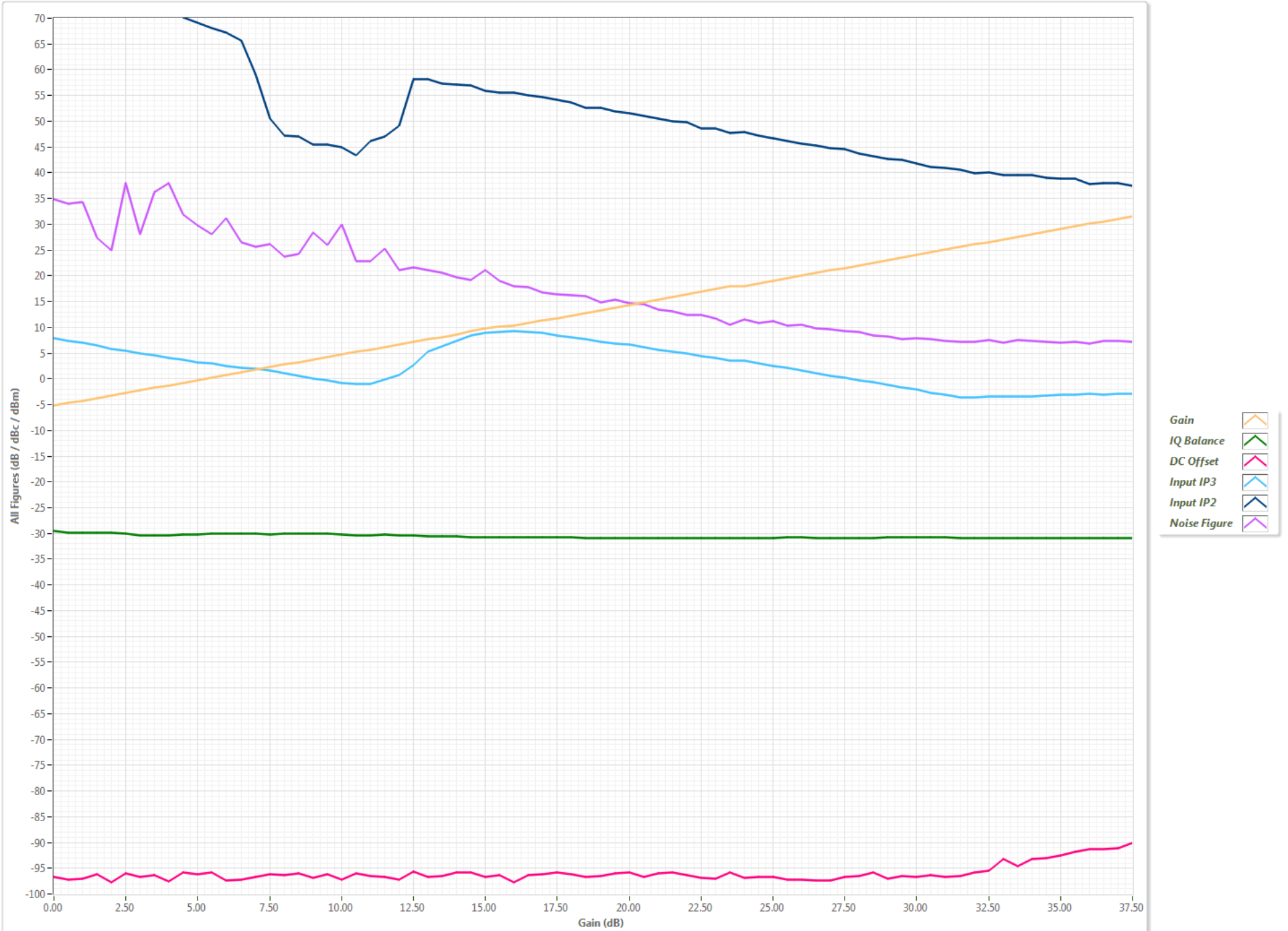
RX Figure vs Gain w/ Frequency=5550.00MHz



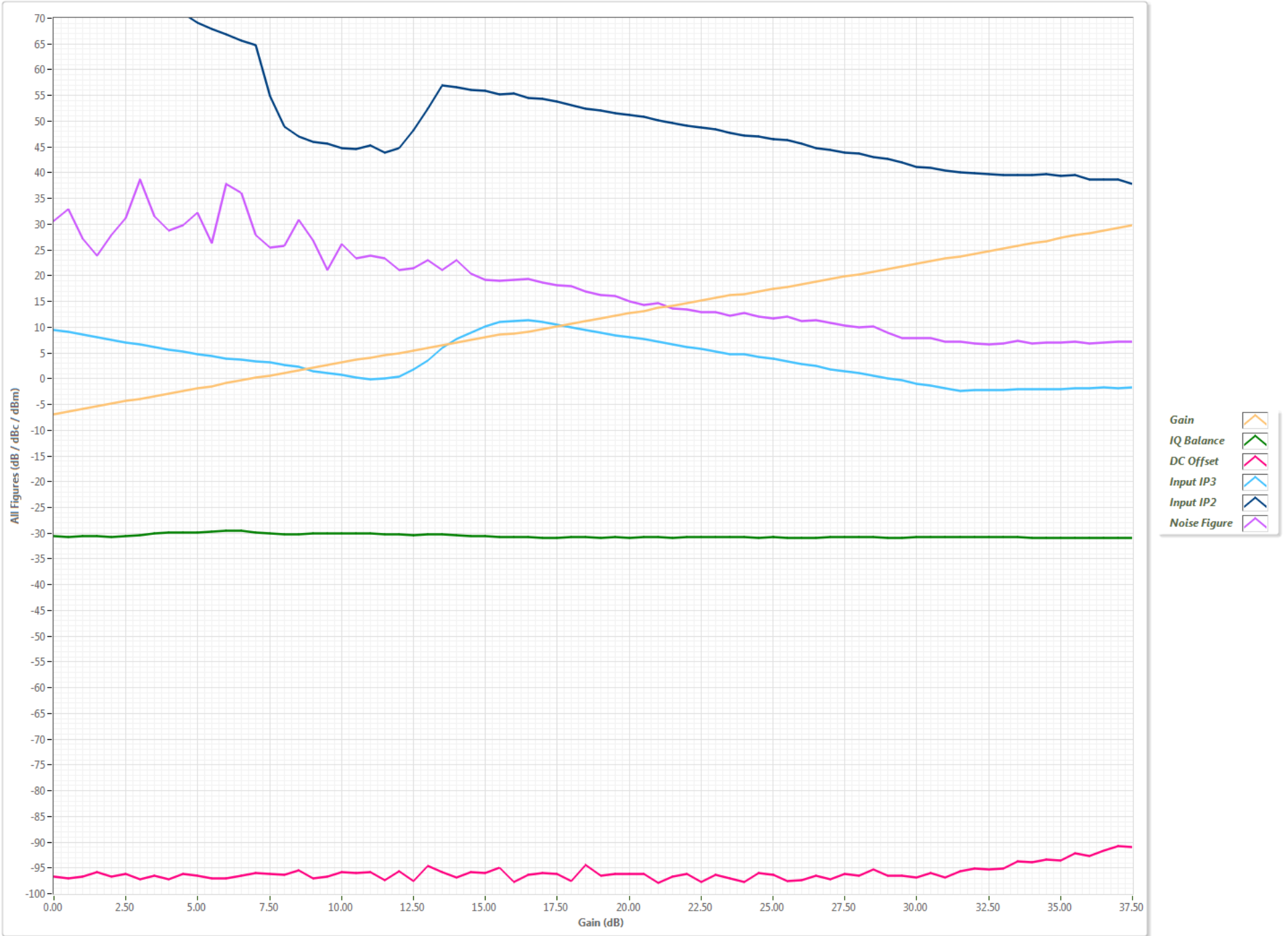
RX Figure vs Gain w/ Frequency=5600.00MHz



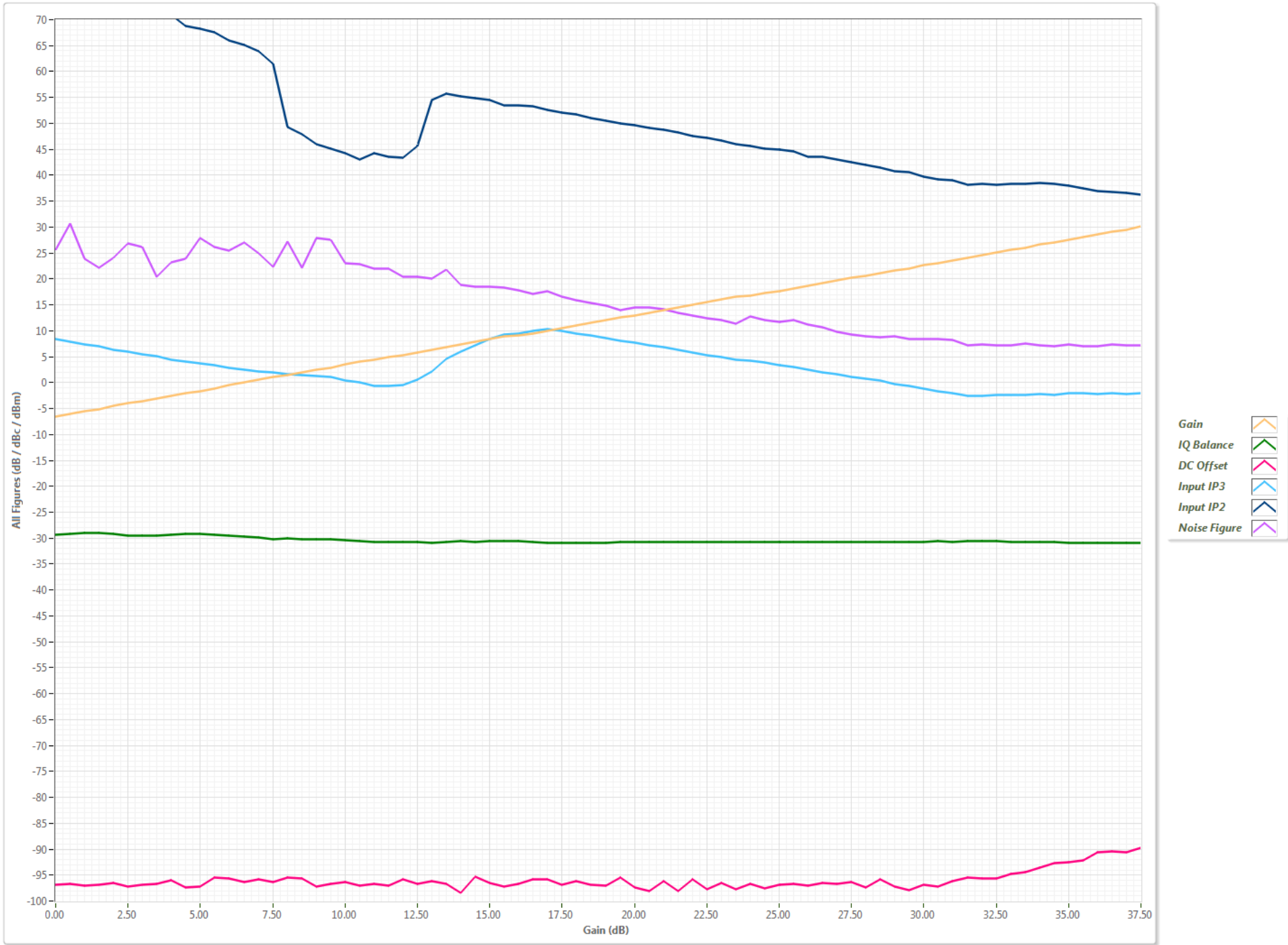
RX Figure vs Gain w/ Frequency=5650.00MHz



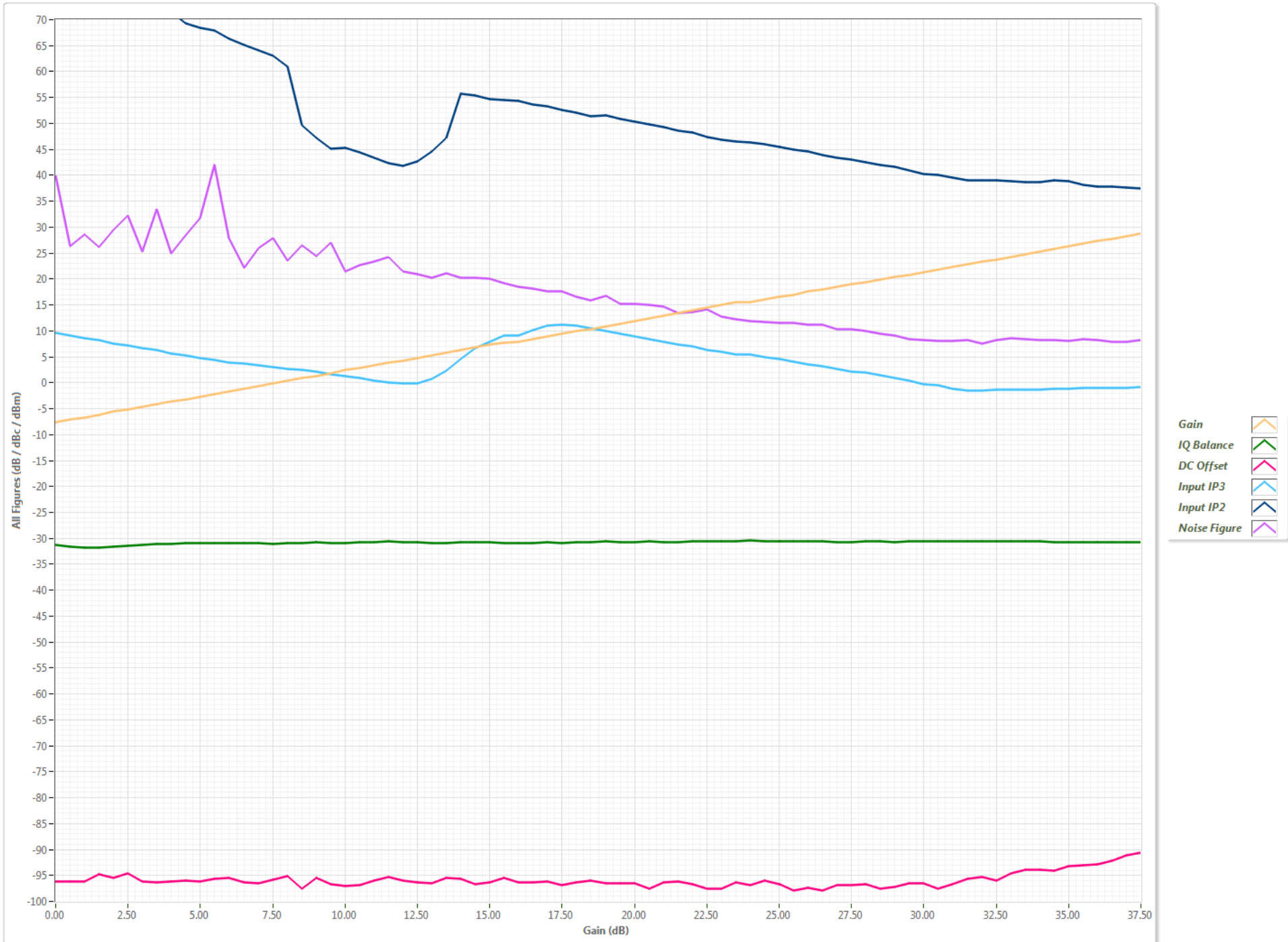
RX Figure vs Gain w/ Frequency=5700.00MHz



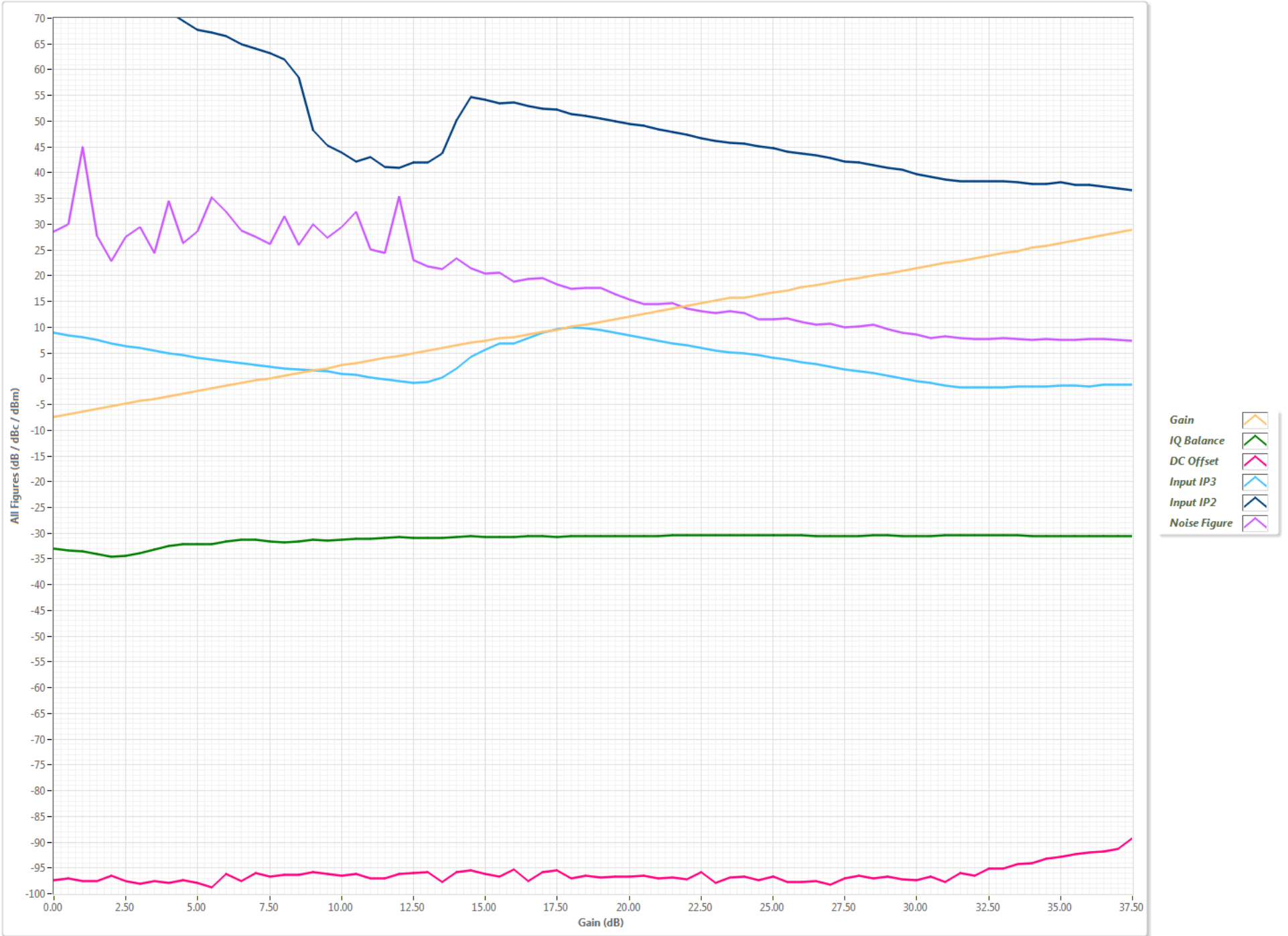
RX Figure vs Gain w/ Frequency=5750.00MHz



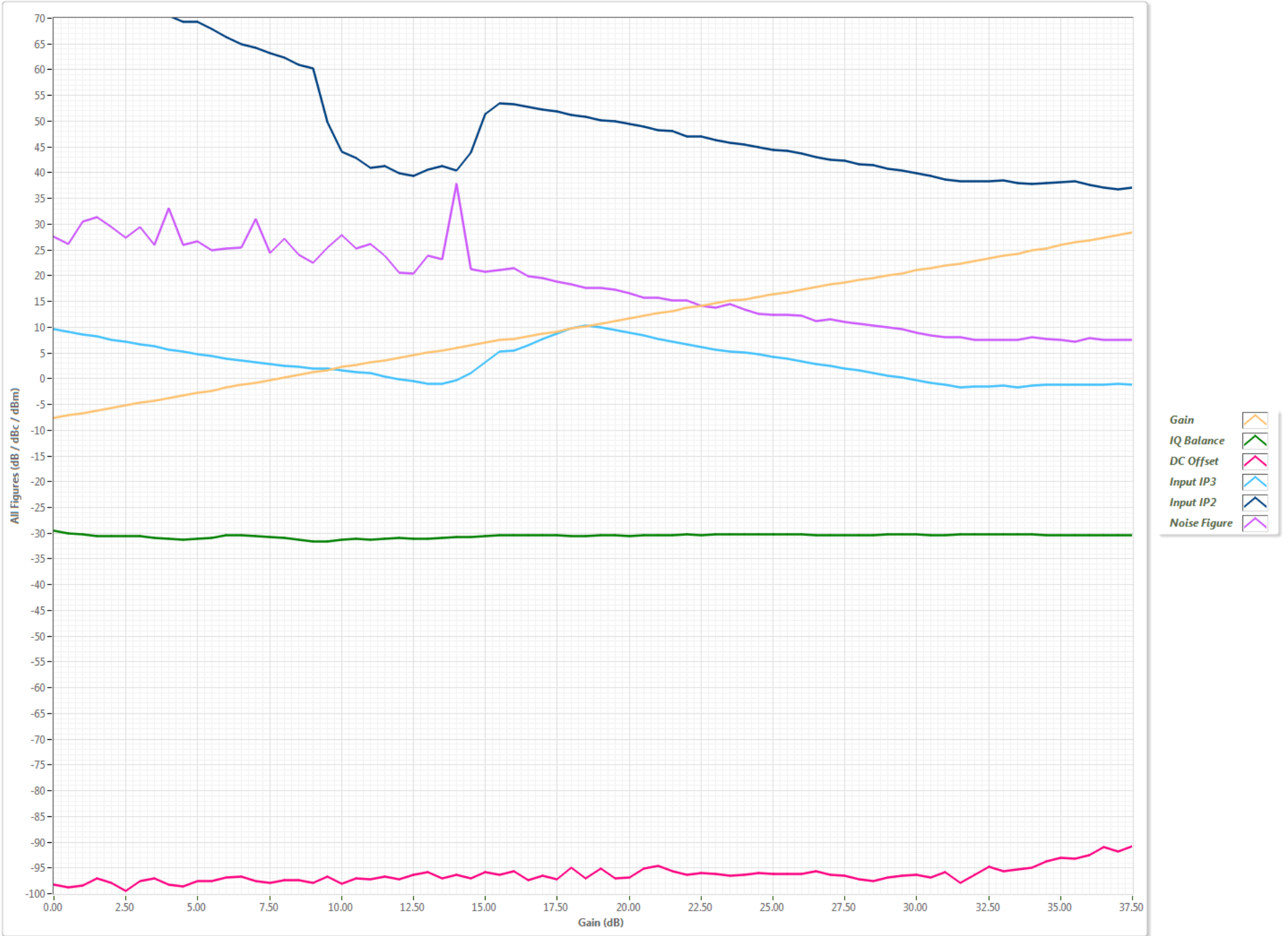
RX Figure vs Gain w/ Frequency=5800.00MHz



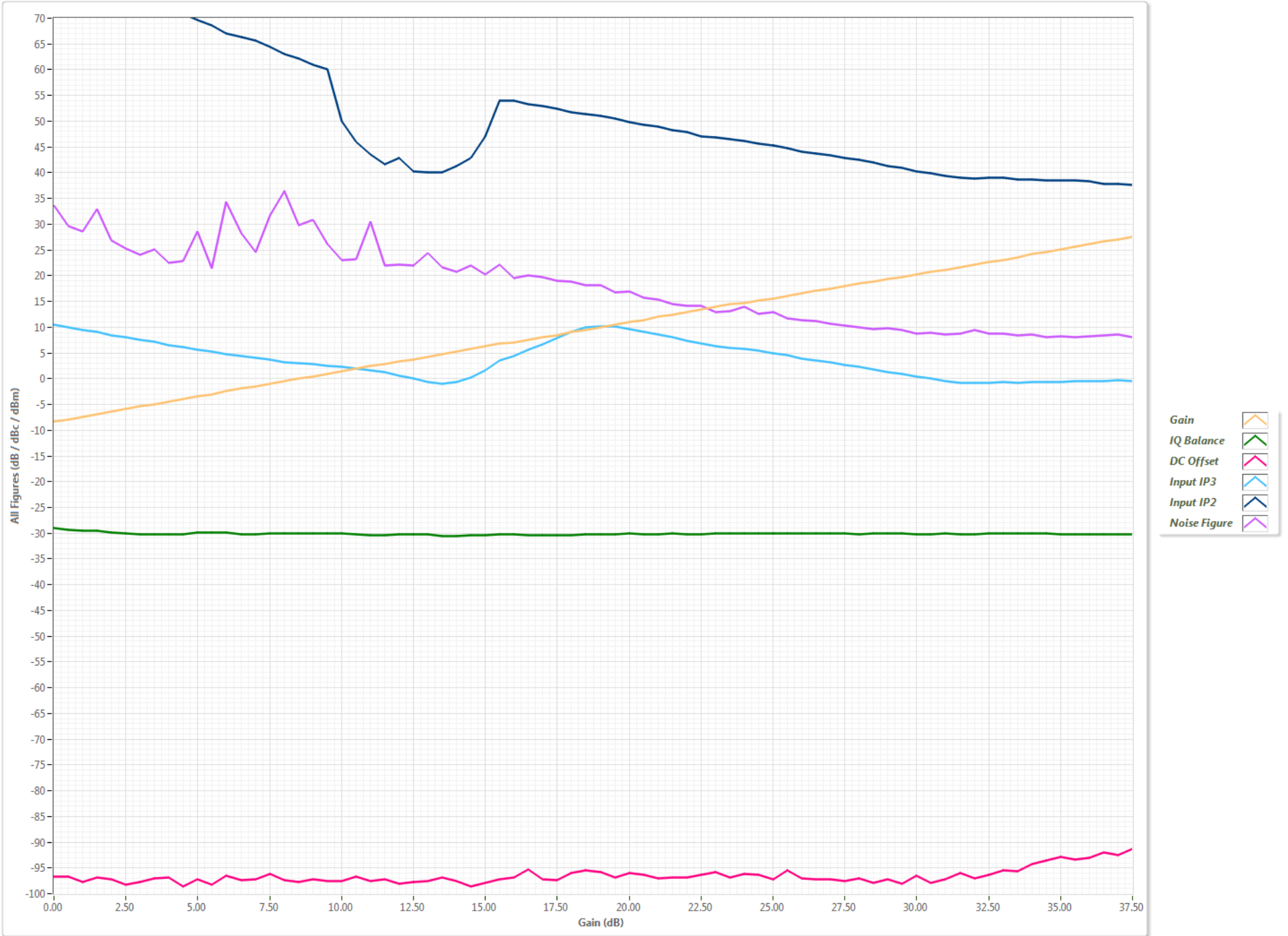
RX Figure vs Gain w/ Frequency=5850.00MHz



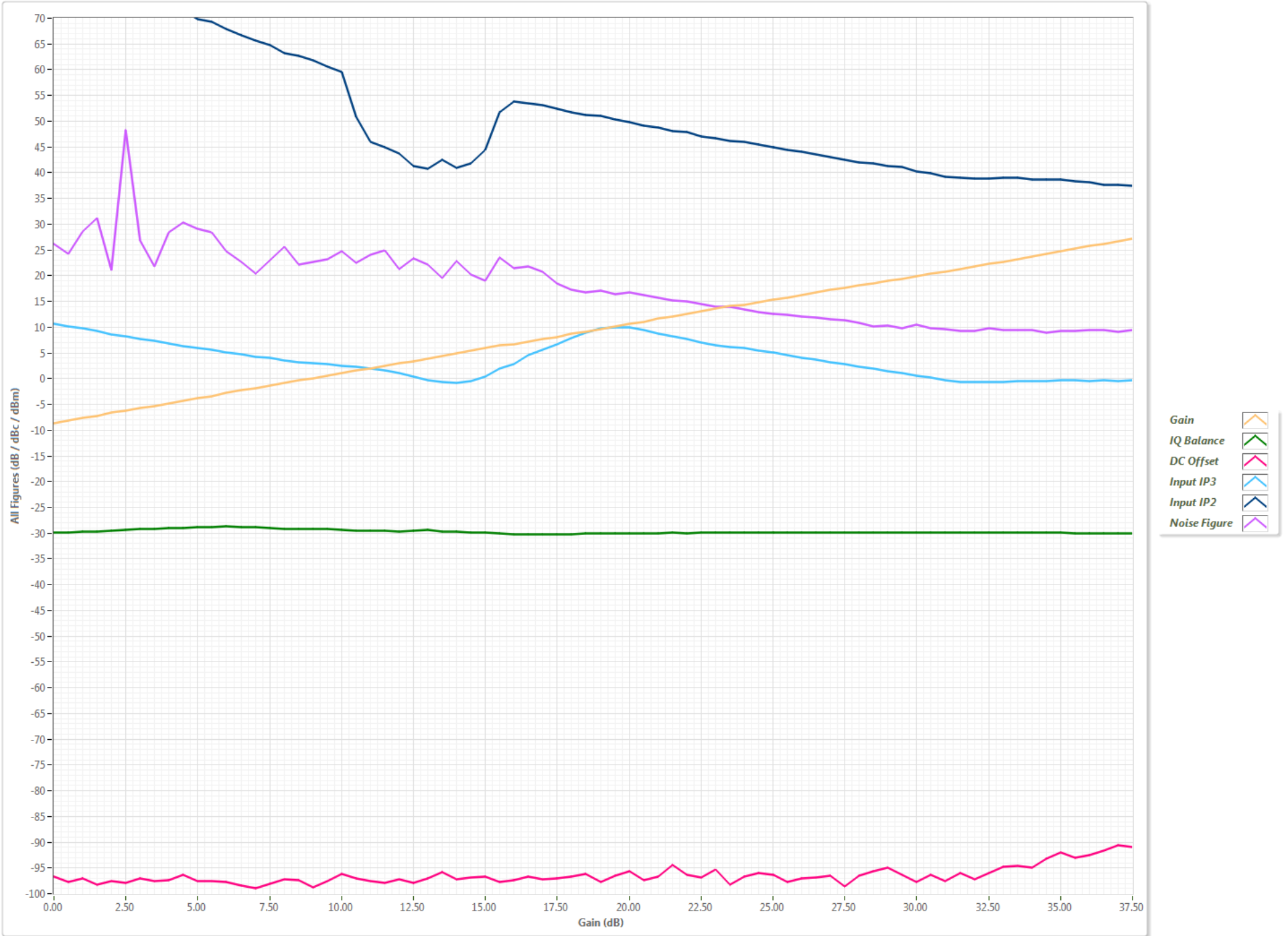
RX Figure vs Gain w/ Frequency=5900.00MHz



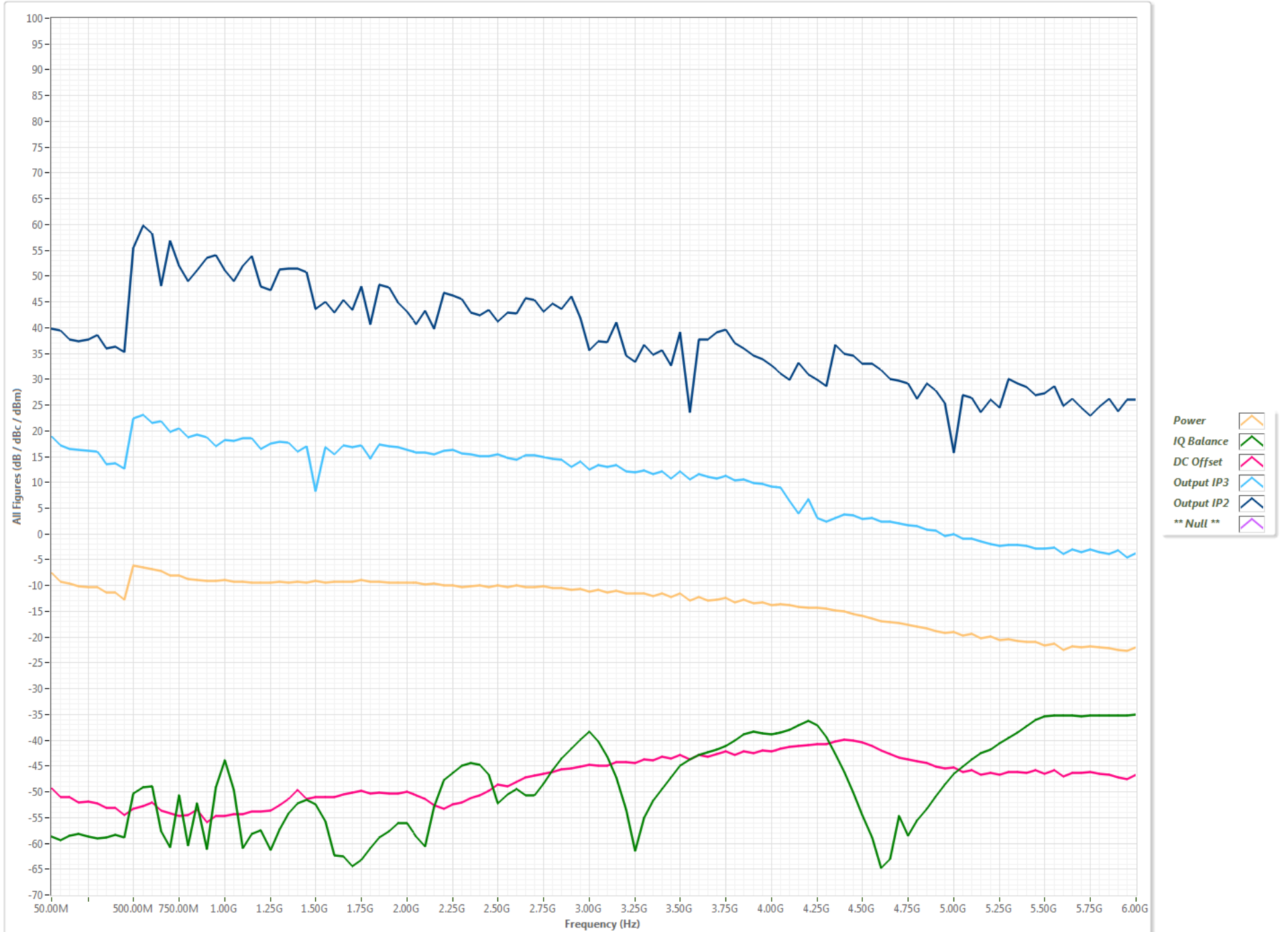
RX Figure vs Gain w/ Frequency=5950.00MHz



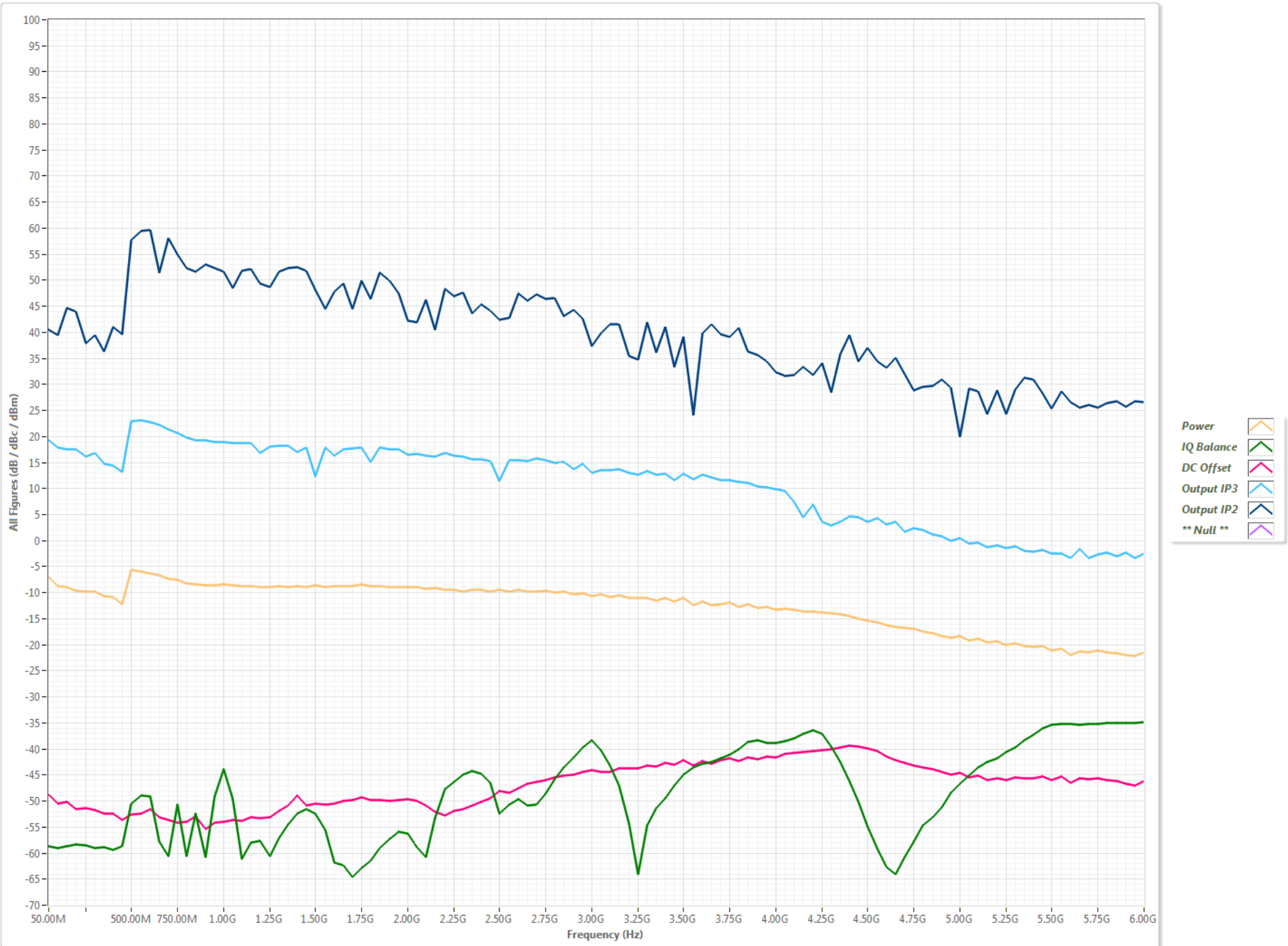
RX Figure vs Gain w/ Frequency=6000.00MHz



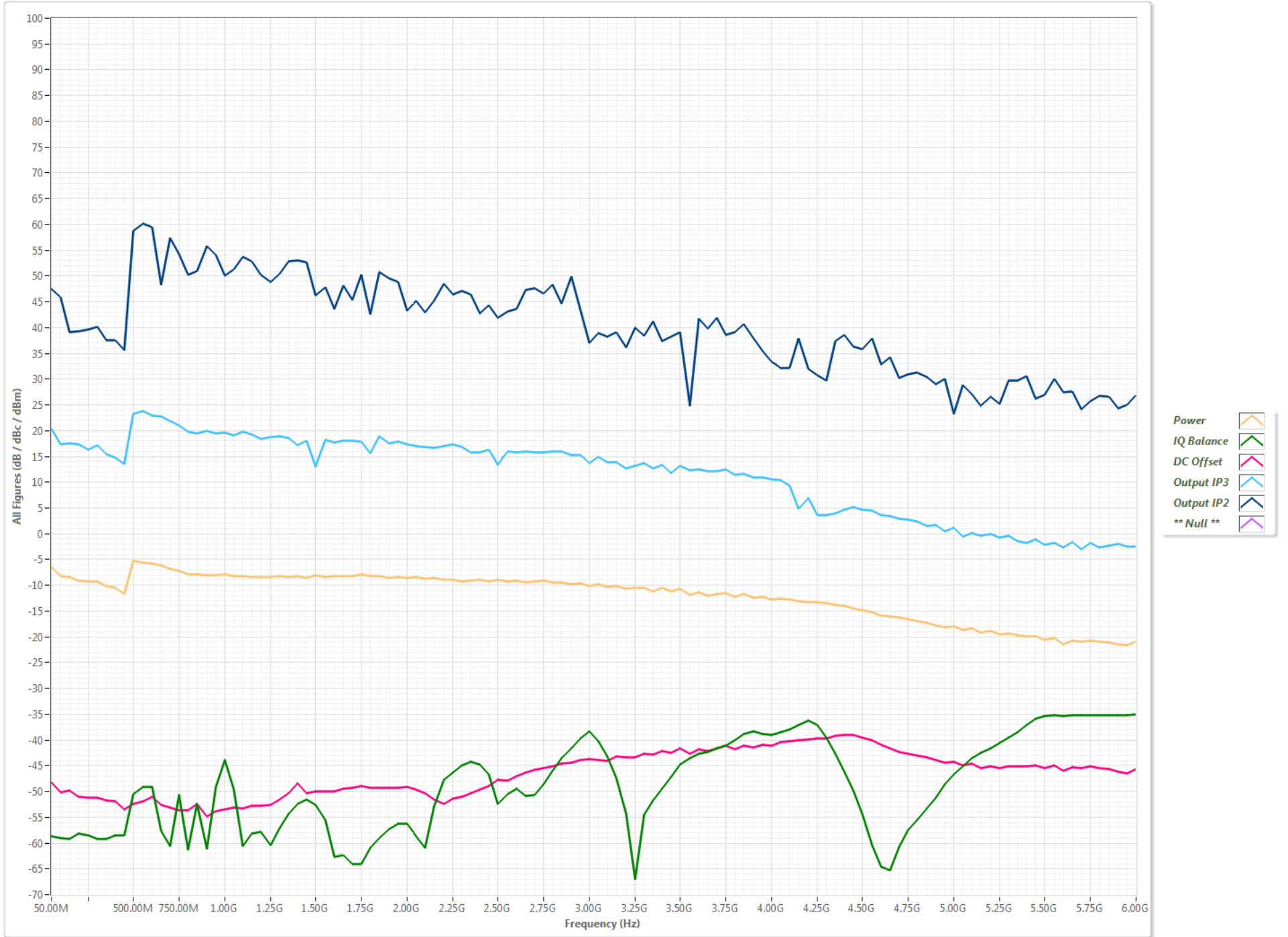
TX Figure vs Frequency w/ Gain=0.00dB



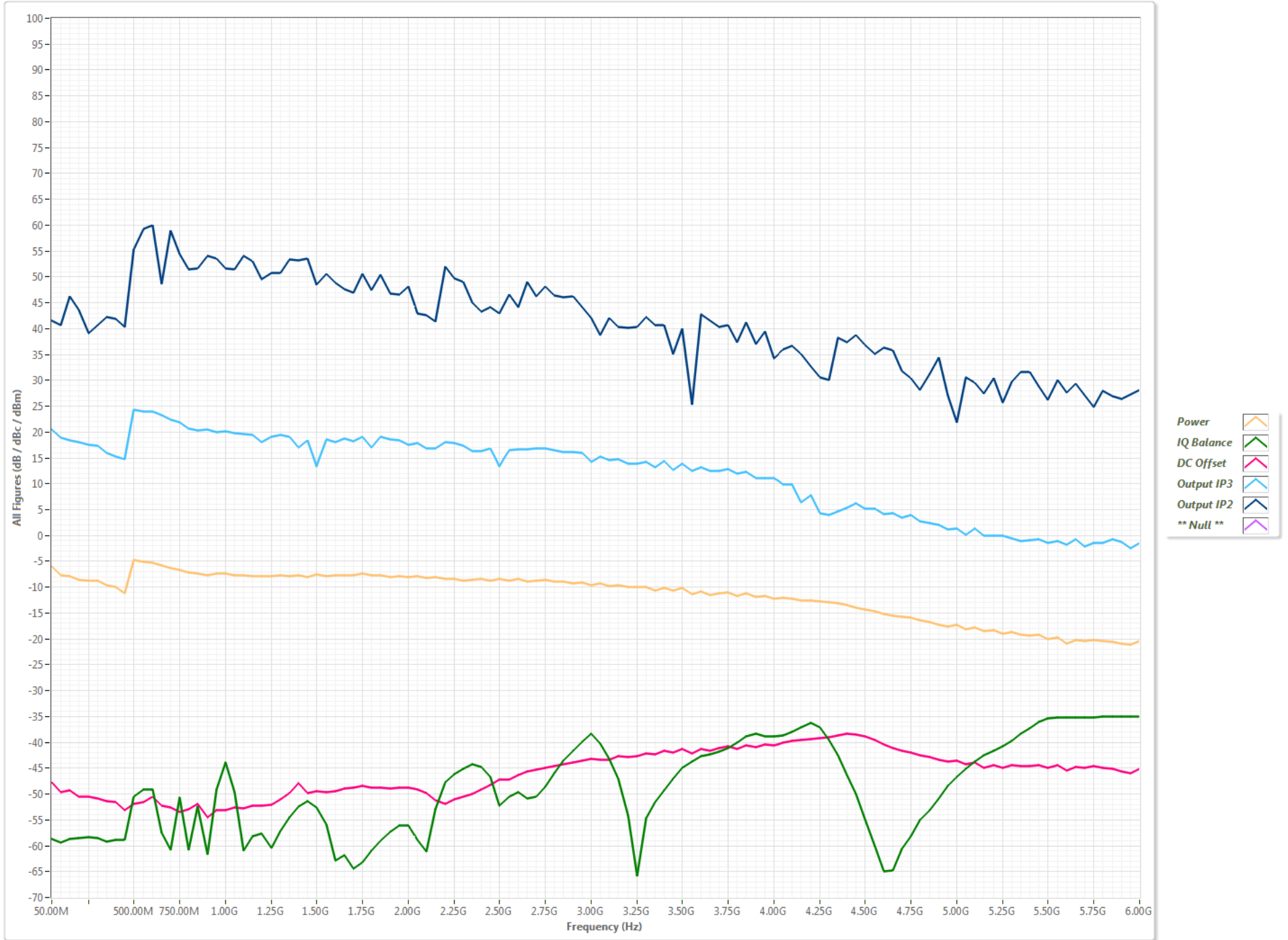
TX Figure vs Frequency w/ Gain=0.50dB



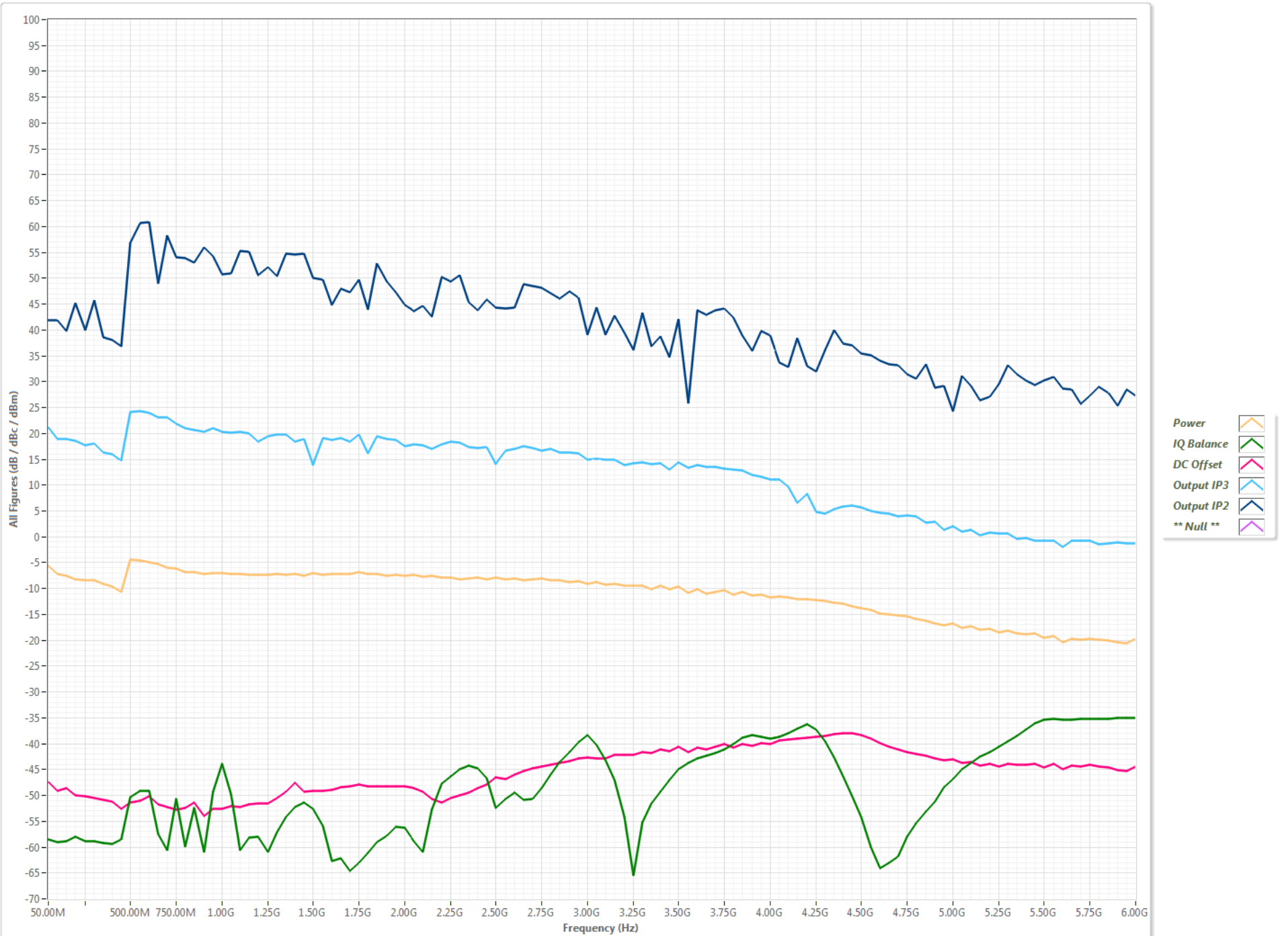
TX Figure vs Frequency w/ Gain=1.00dB



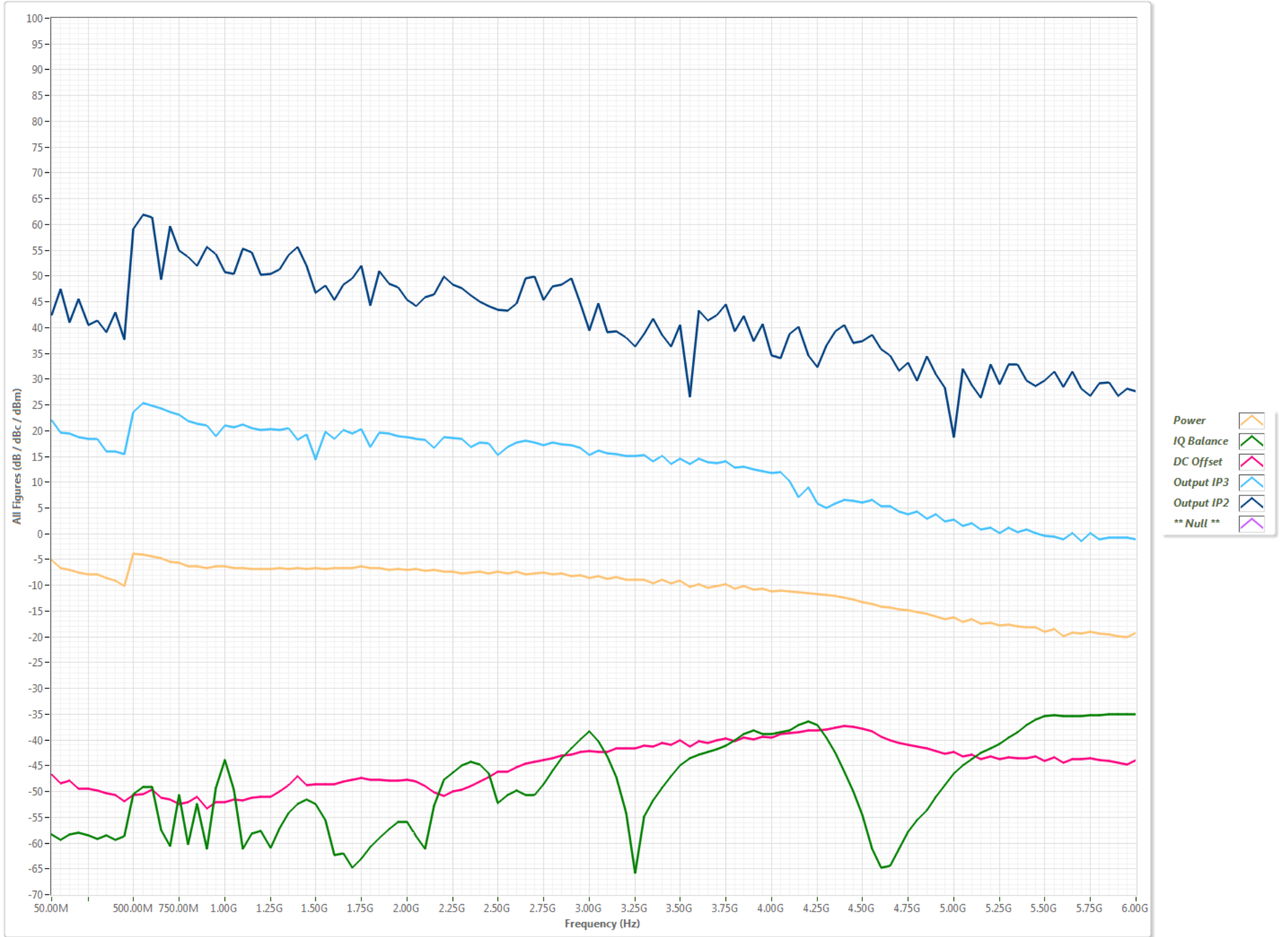
TX Figure vs Frequency w/ Gain=1.50dB



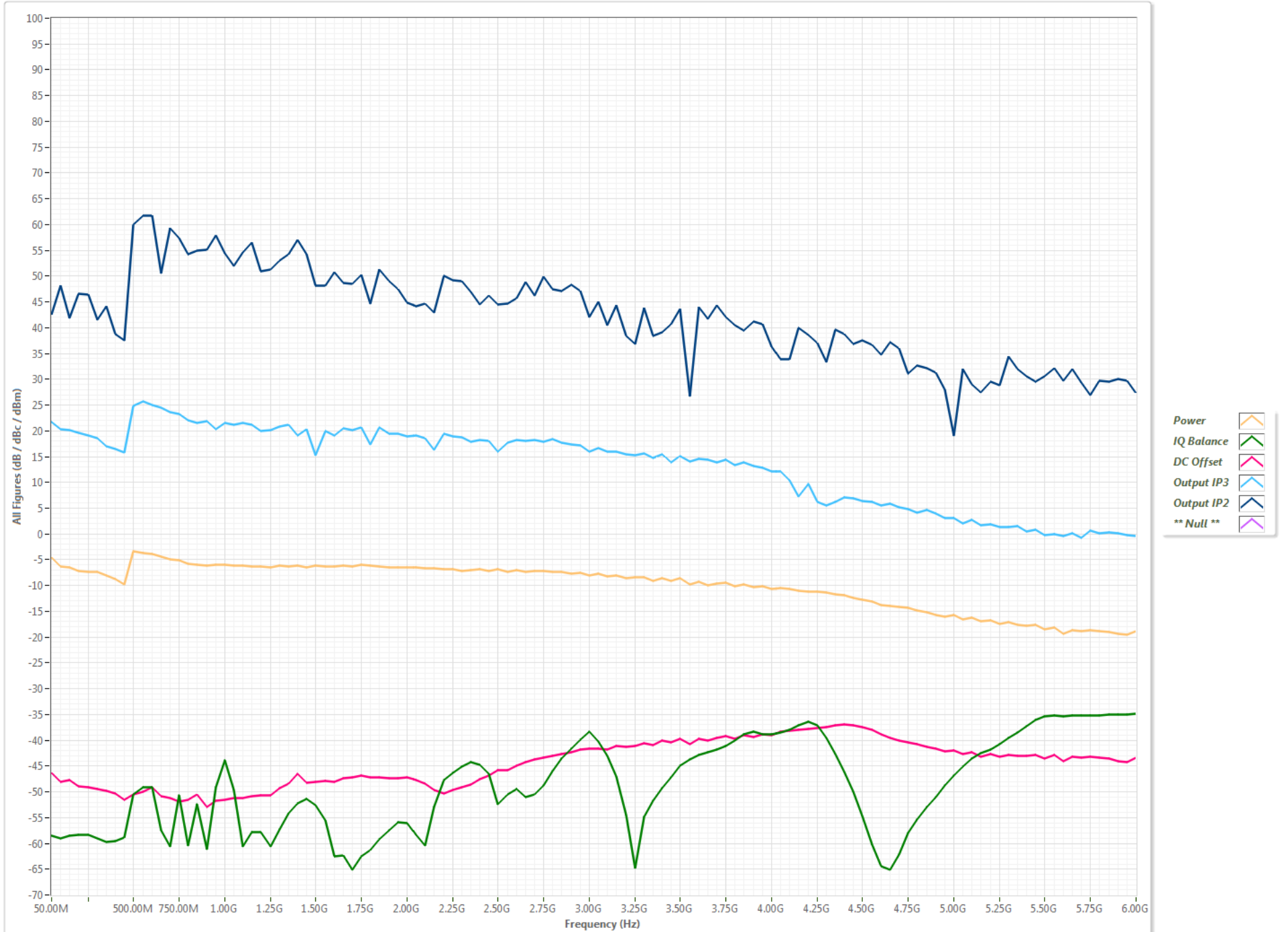
TX Figure vs Frequency w/ Gain=2.00dB



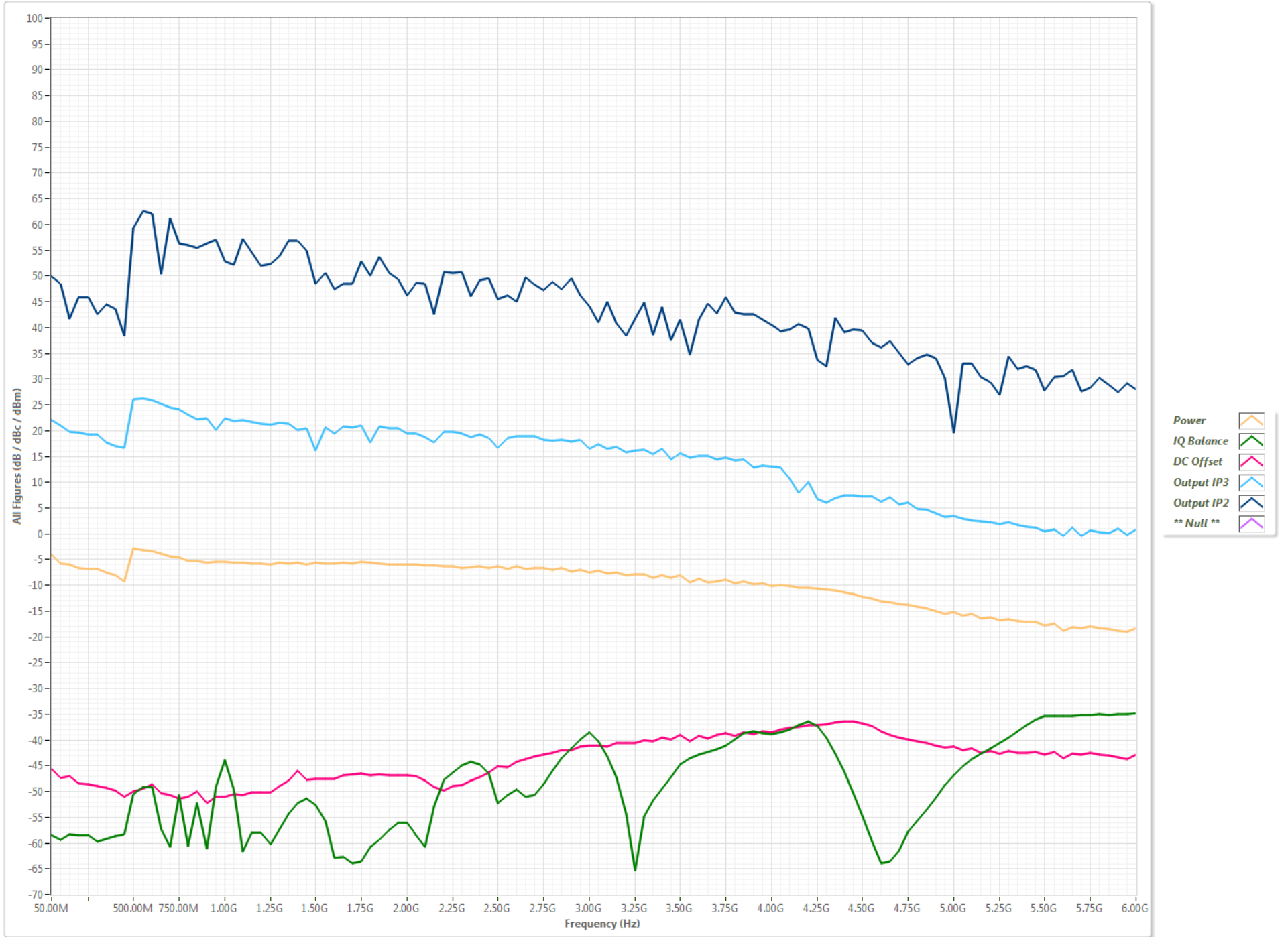
TX Figure vs Frequency w/ Gain=2.50dB



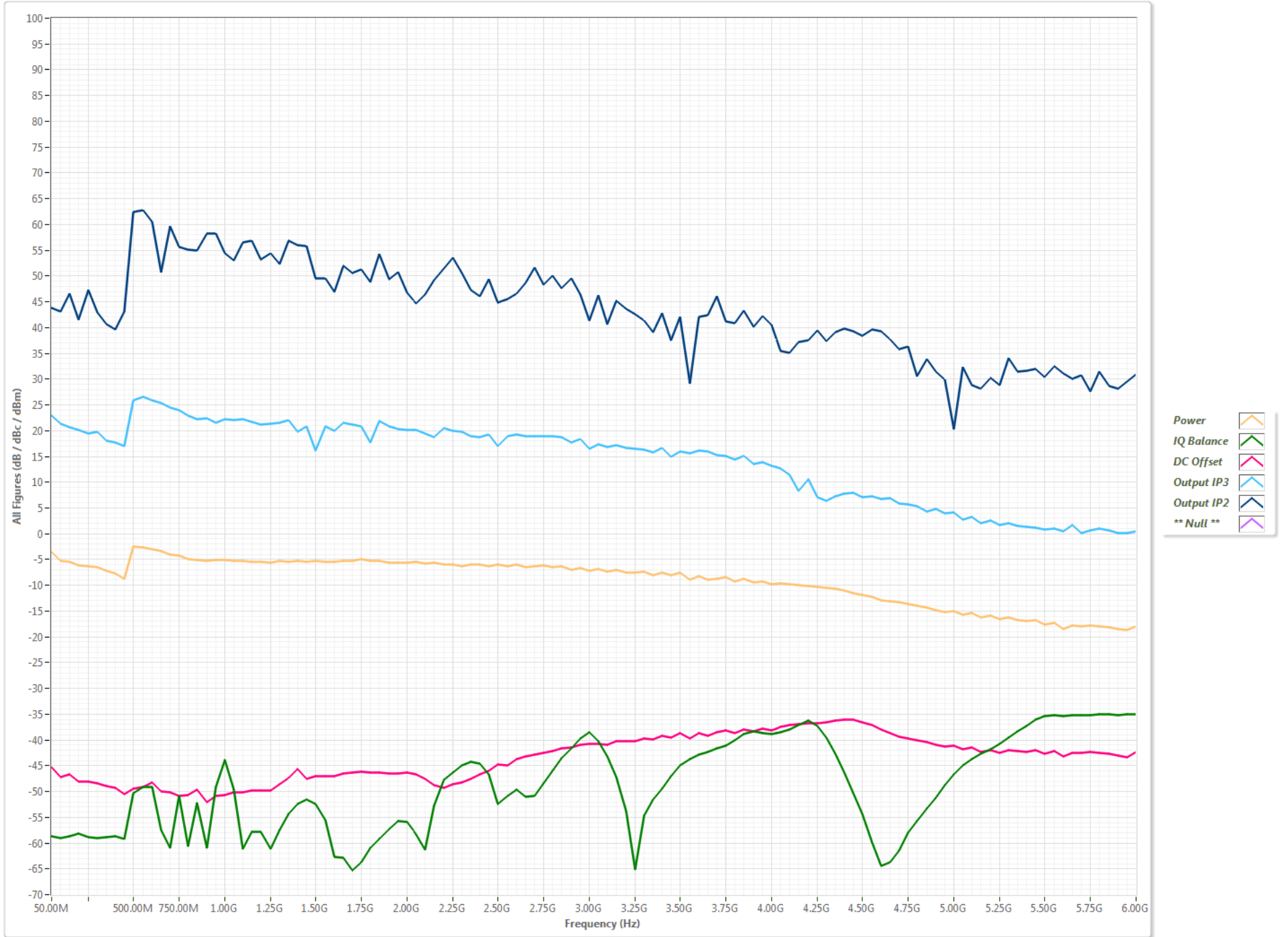
TX Figure vs Frequency w/ Gain=3.00dB



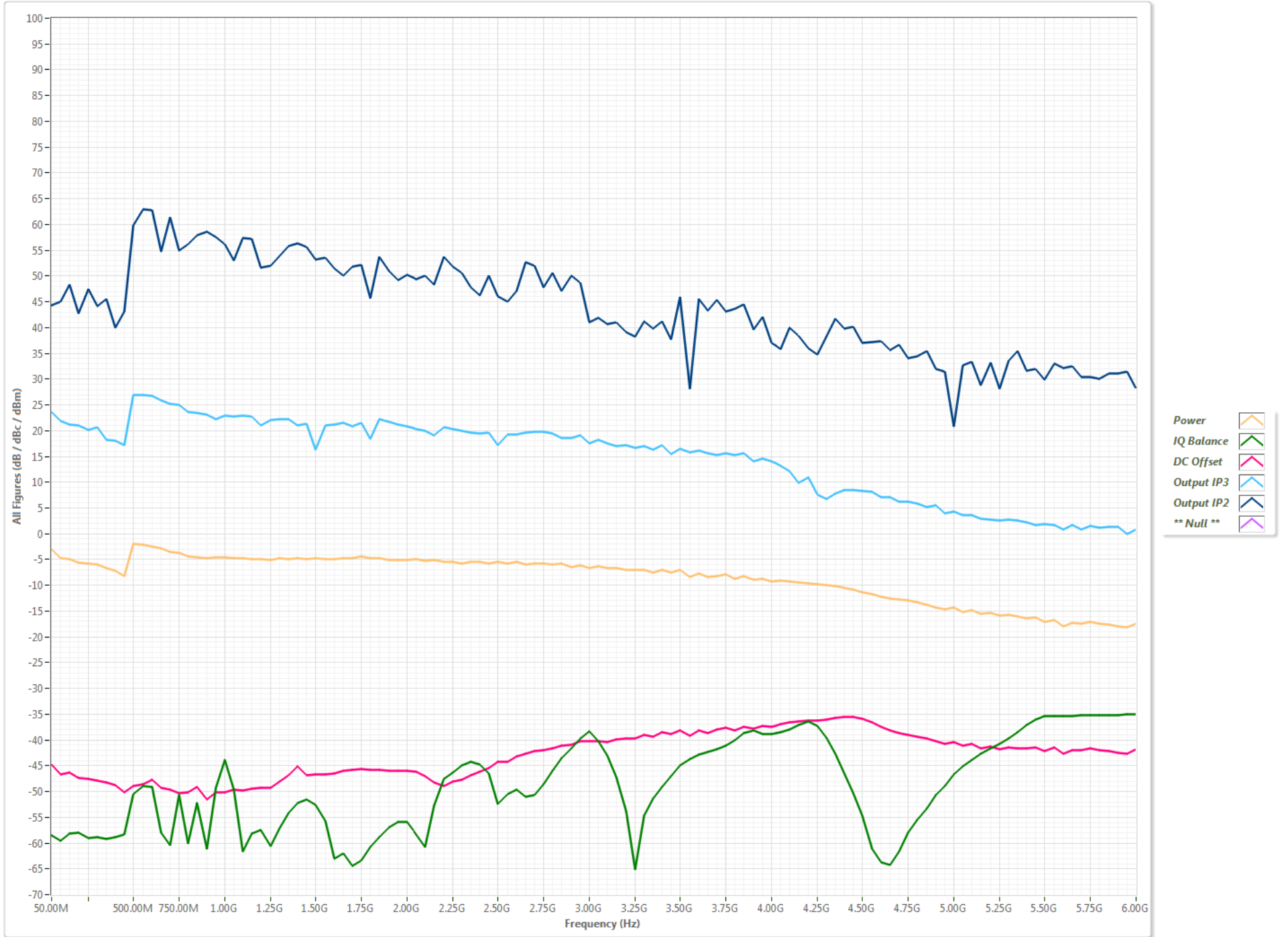
TX Figure vs Frequency w/ Gain=3.50dB



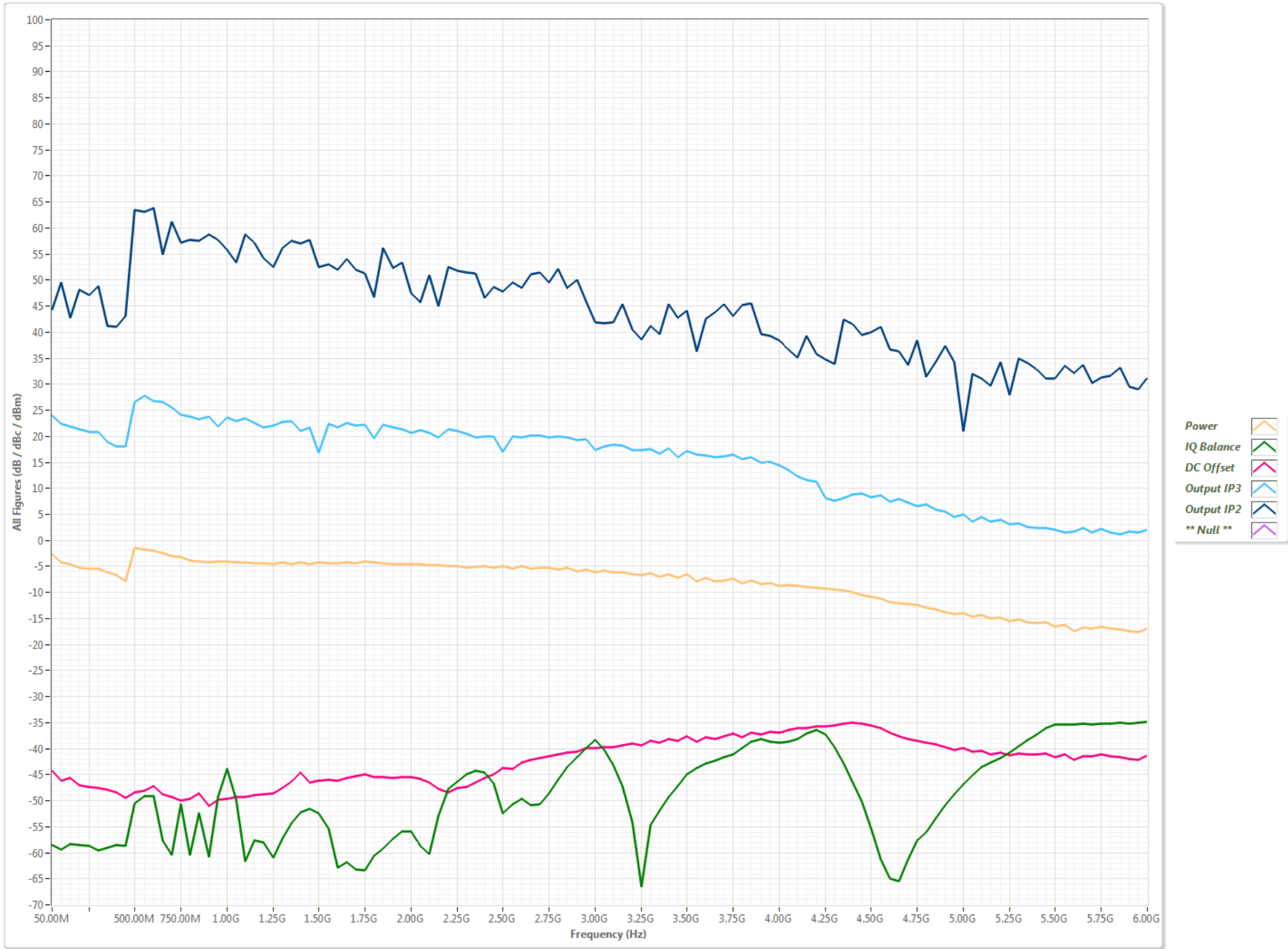
TX Figure vs Frequency w/ Gain=4.00dB



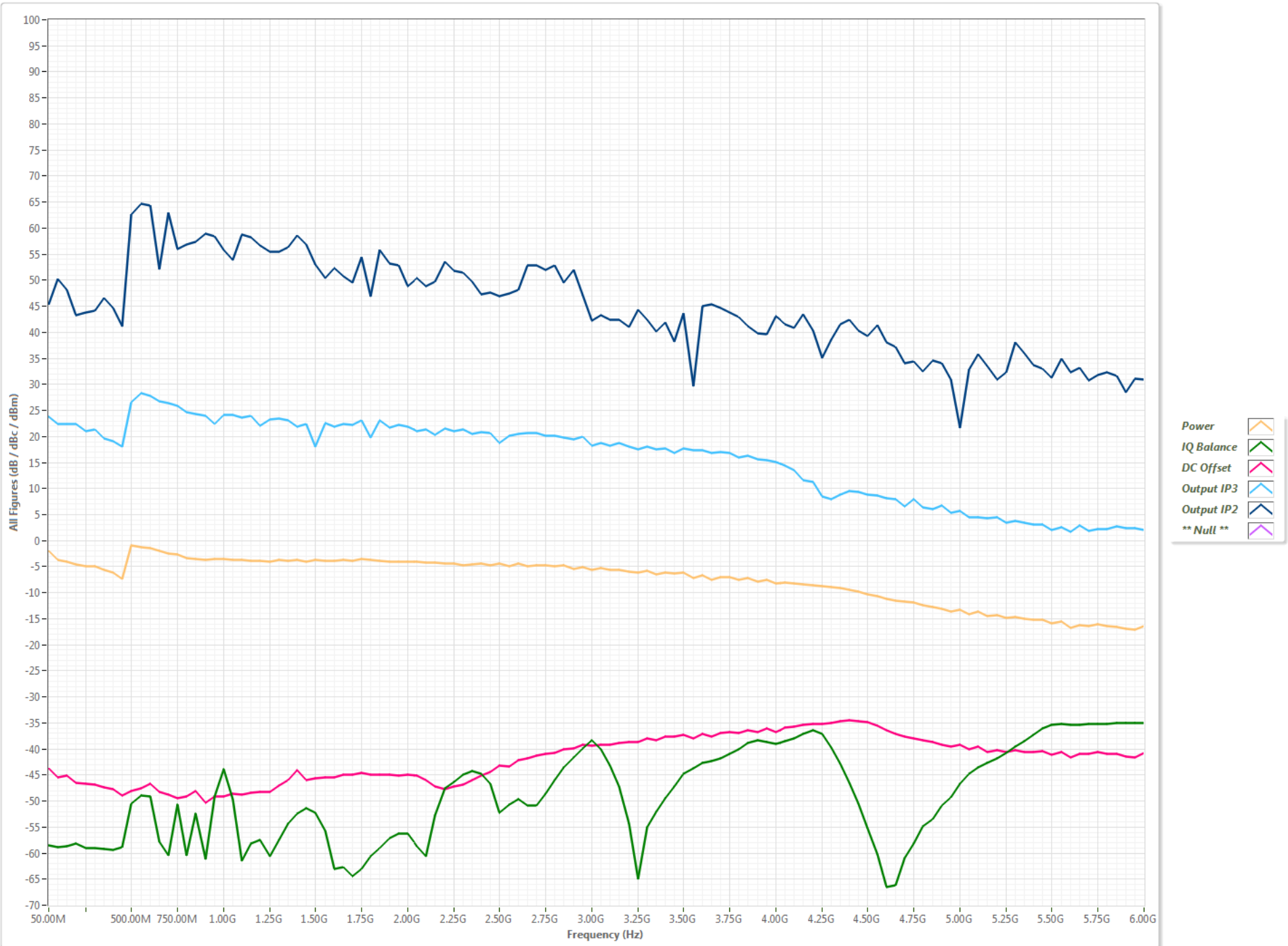
TX Figure vs Frequency w/ Gain=4.50dB



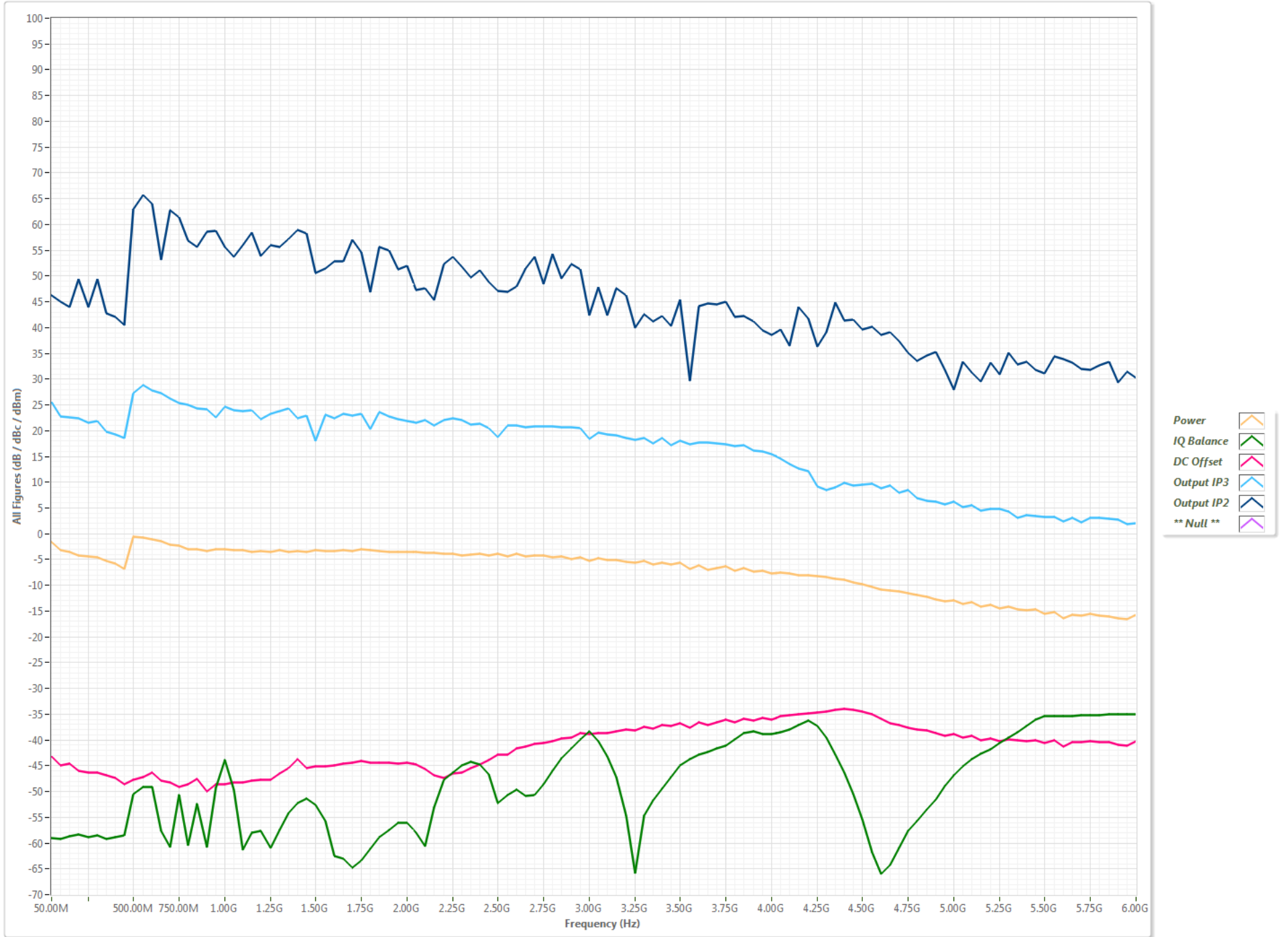
TX Figure vs Frequency w/ Gain=5.00dB



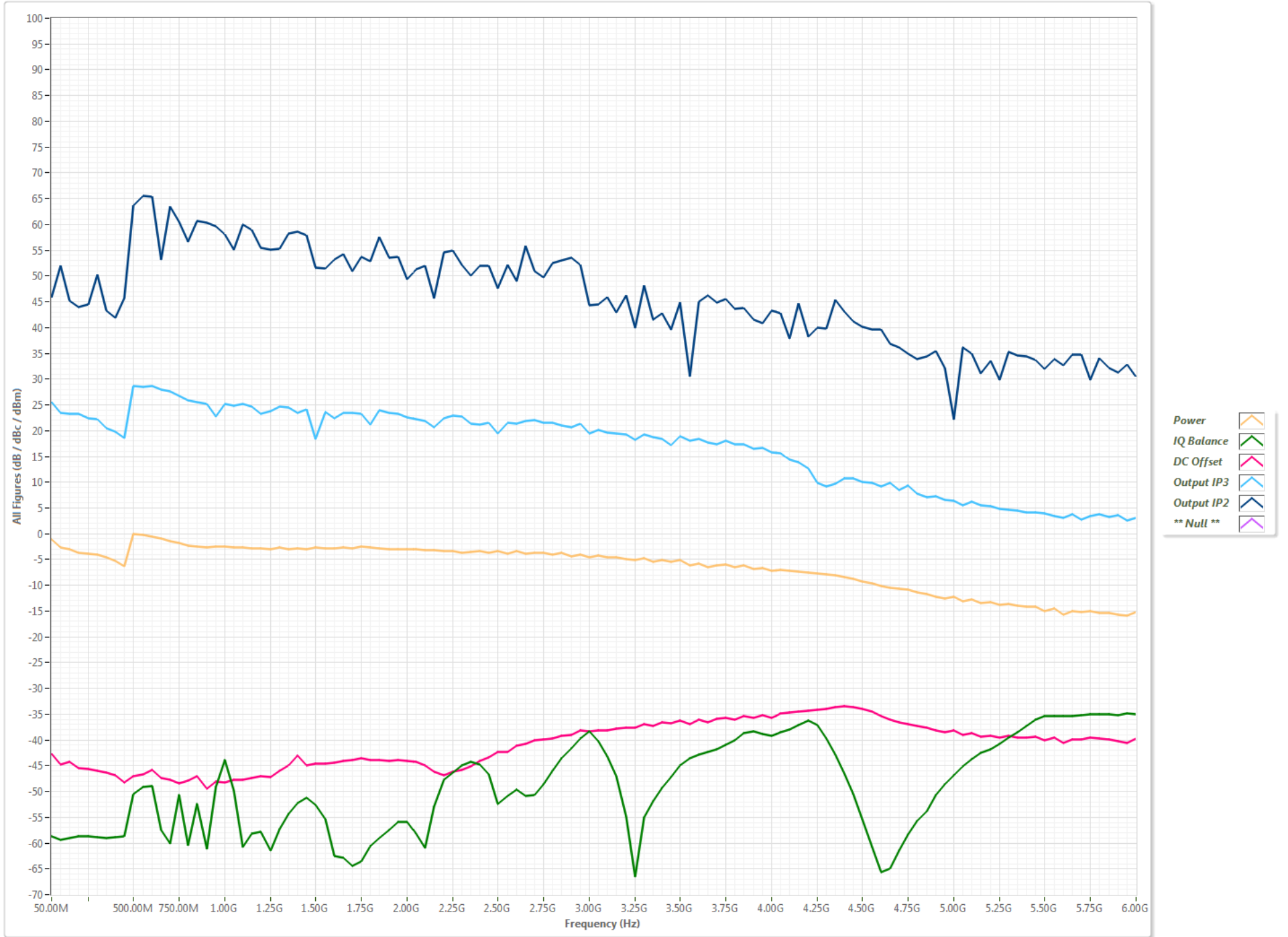
TX Figure vs Frequency w/ Gain=5.50dB



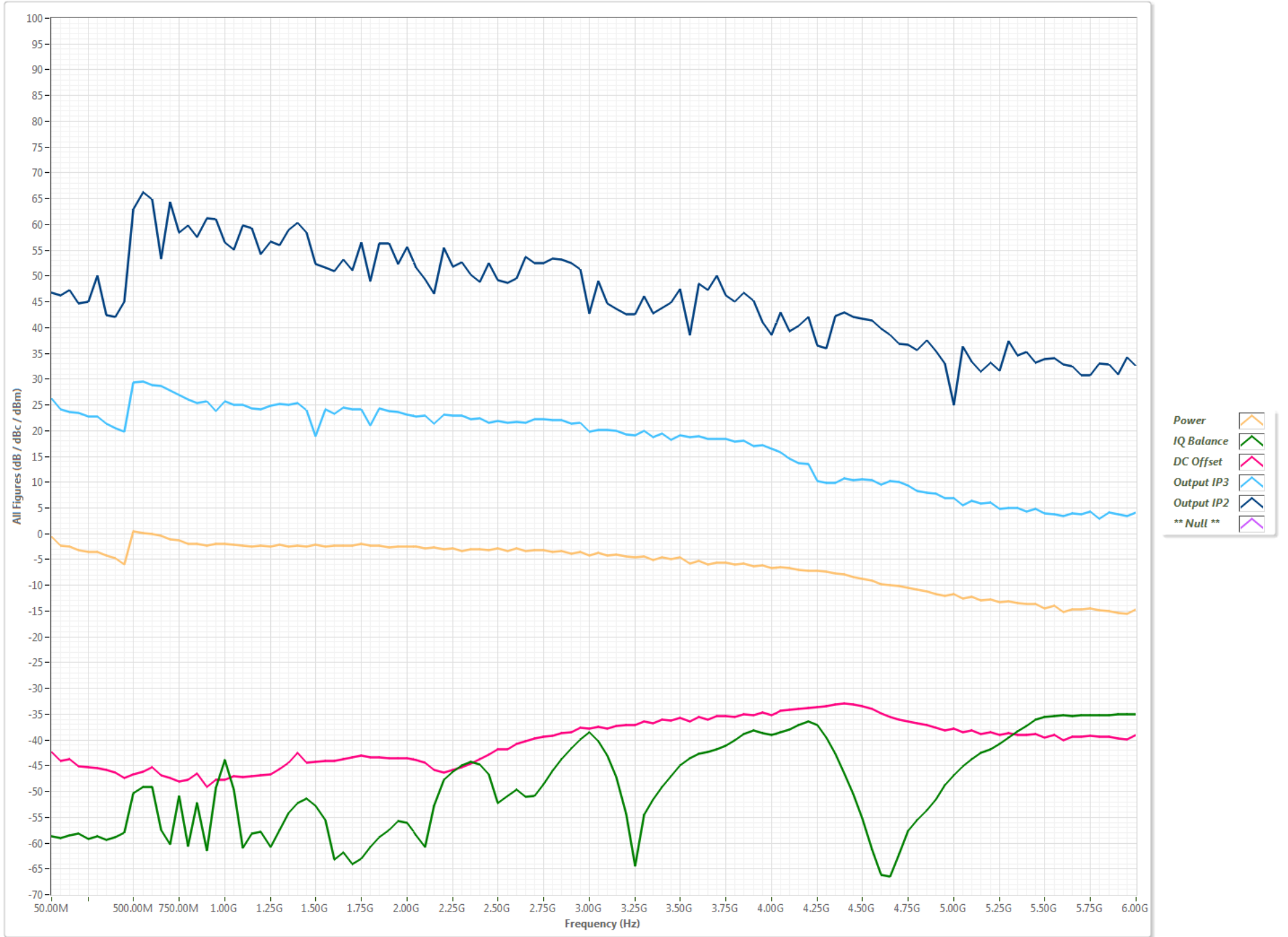
TX Figure vs Frequency w/ Gain=6.00dB



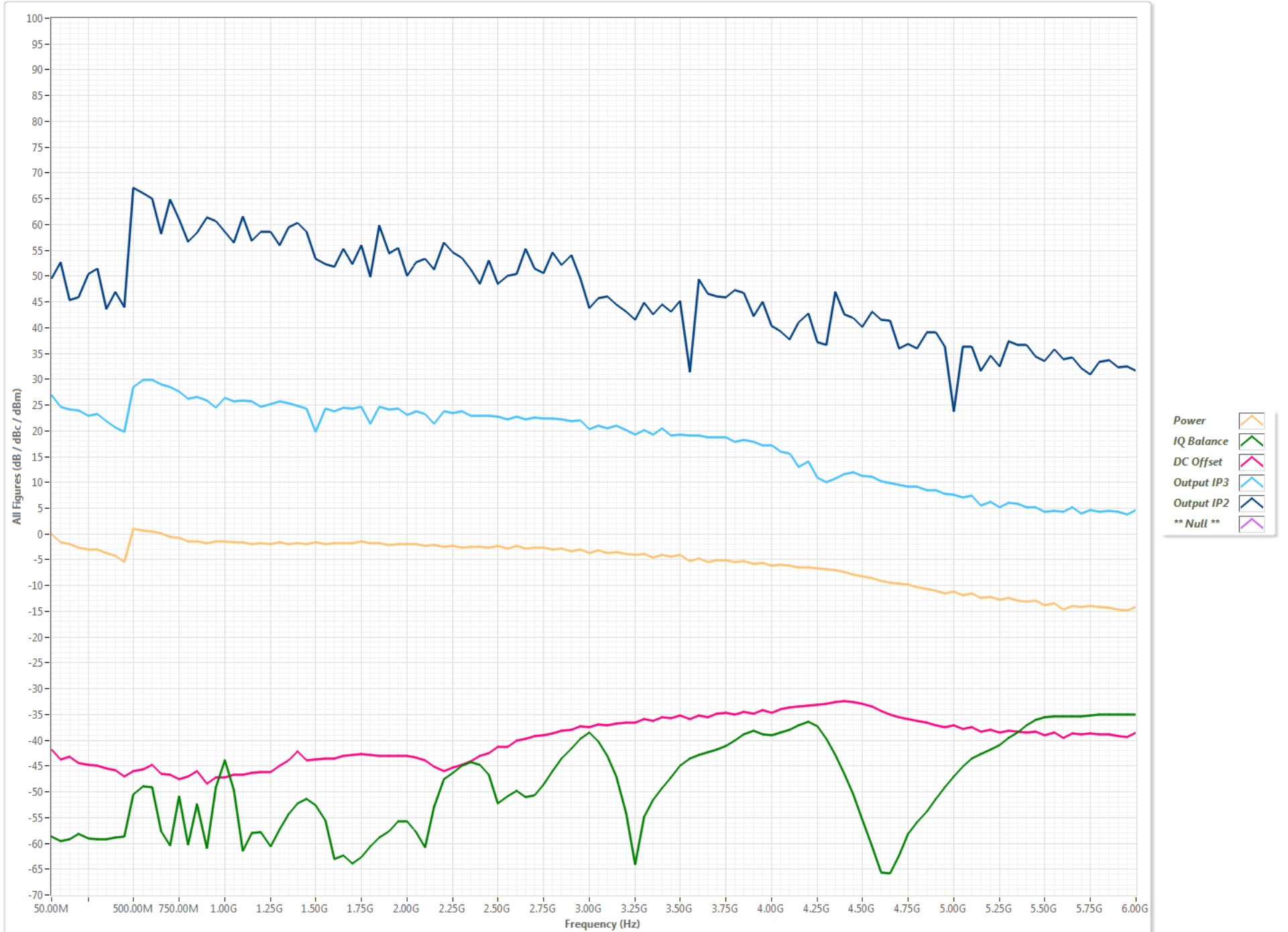
TX Figure vs Frequency w/ Gain=6.50dB



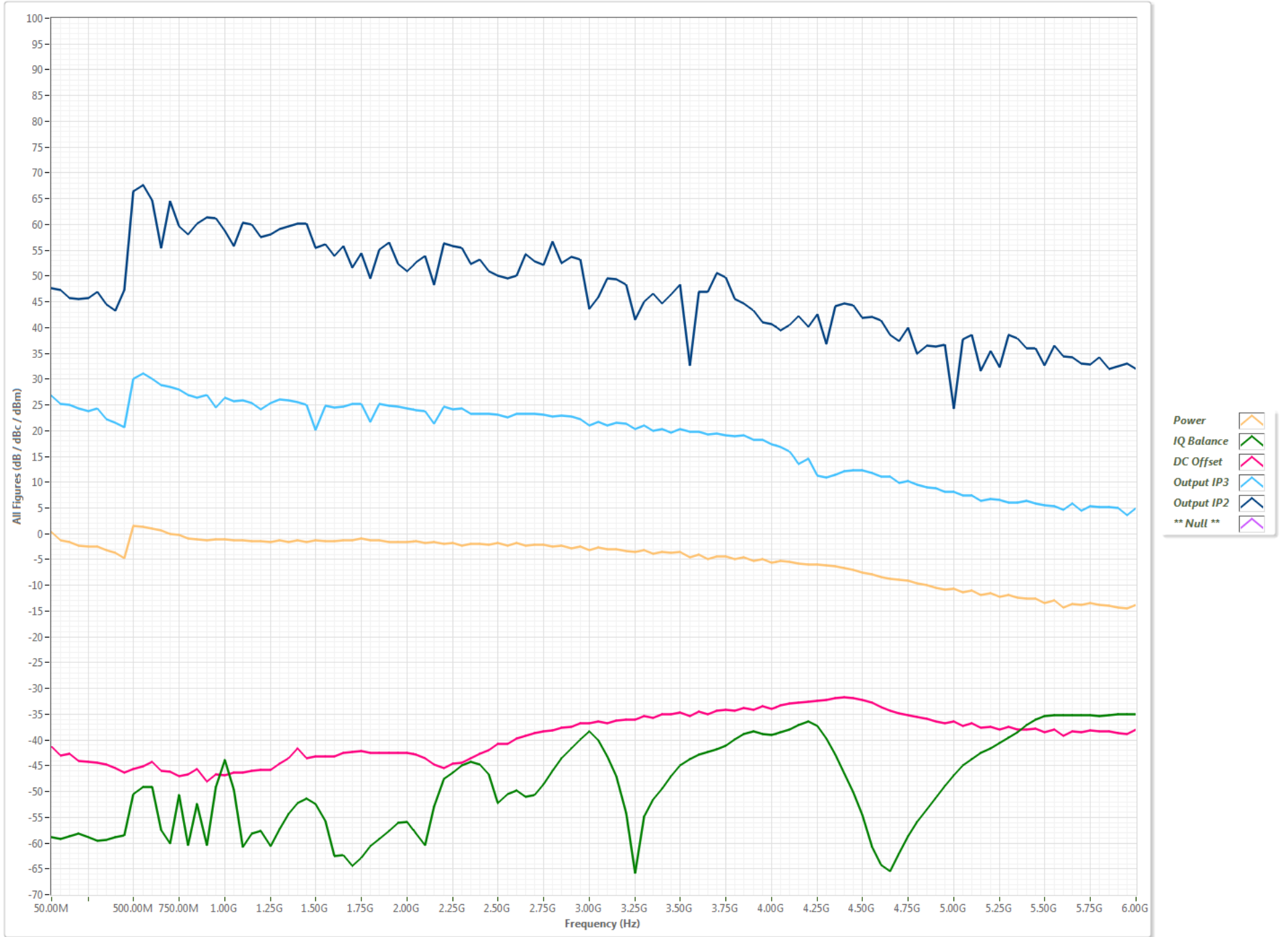
TX Figure vs Frequency w/ Gain=7.00dB



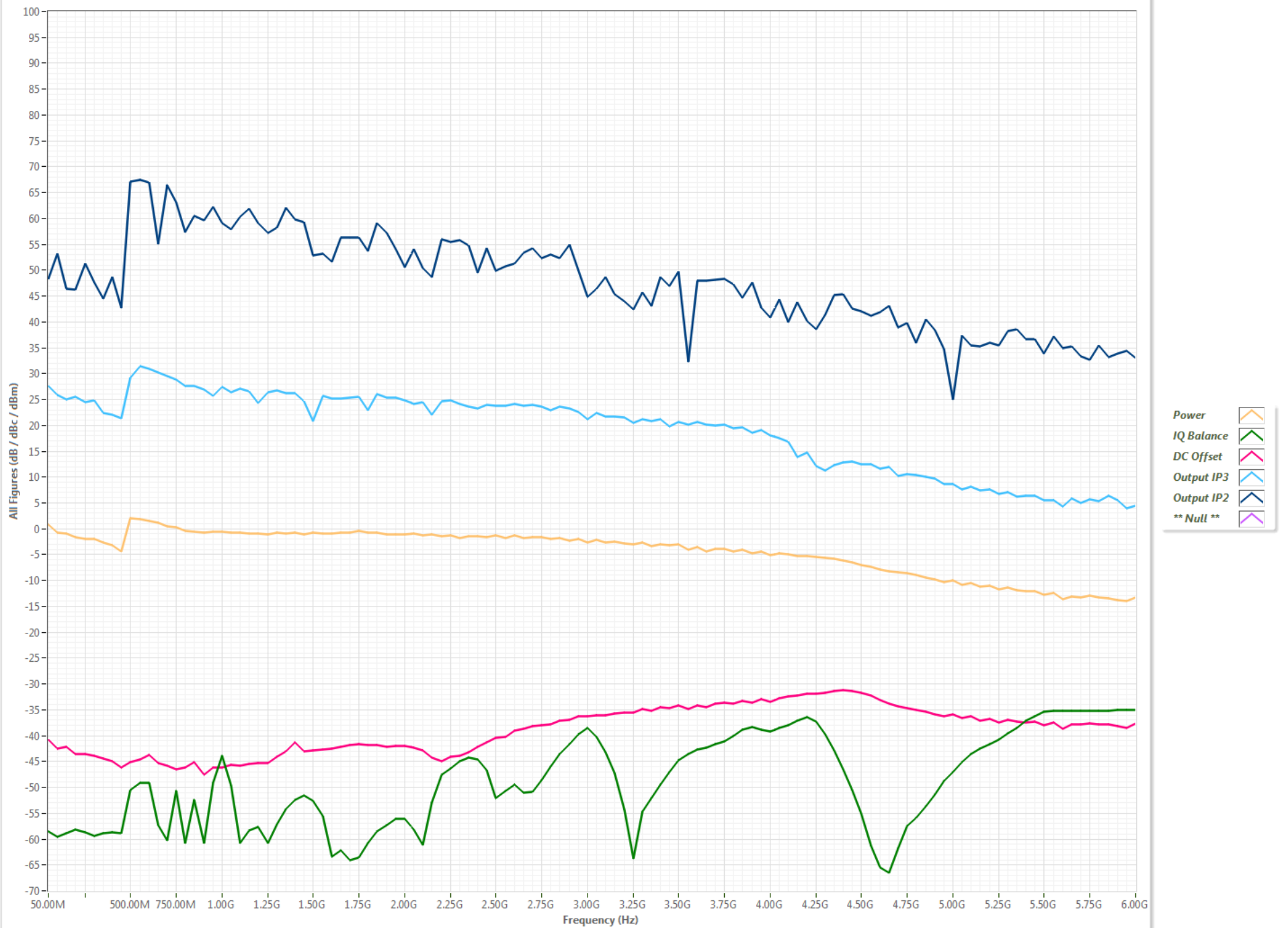
TX Figure vs Frequency w/ Gain=7.50dB



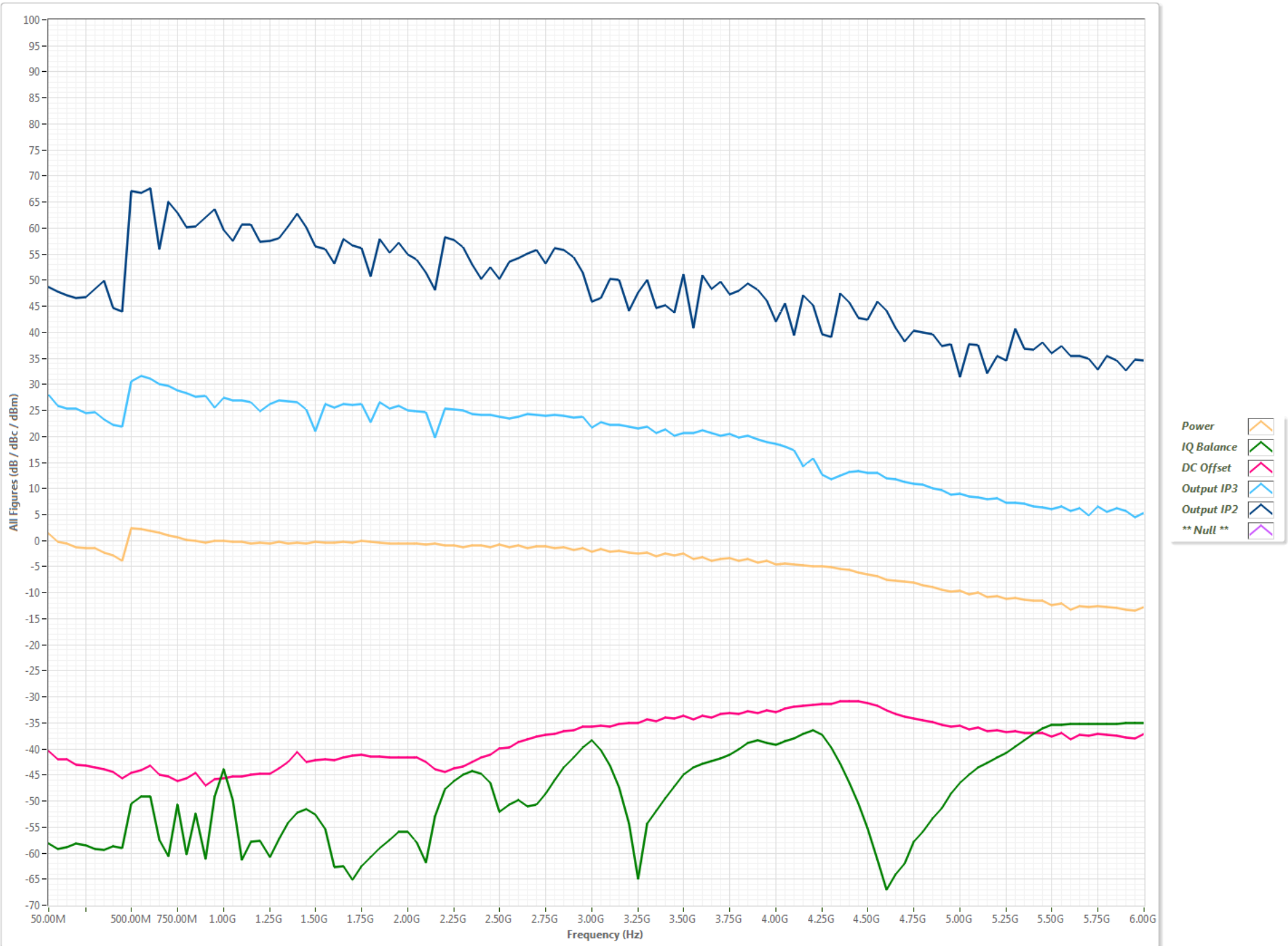
TX Figure vs Frequency w/ Gain=8.00dB



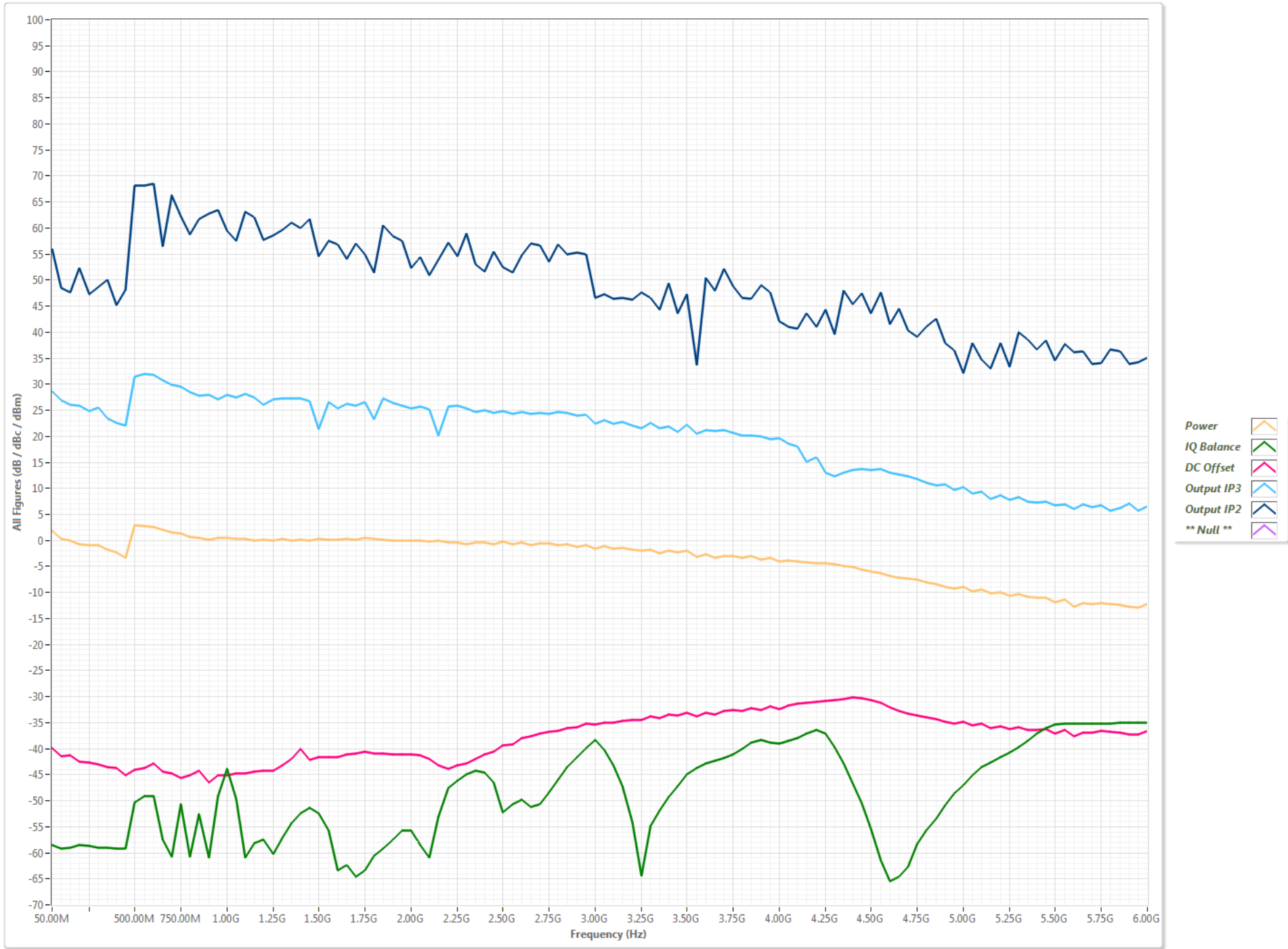
TX Figure vs Frequency w/ Gain=8.50dB



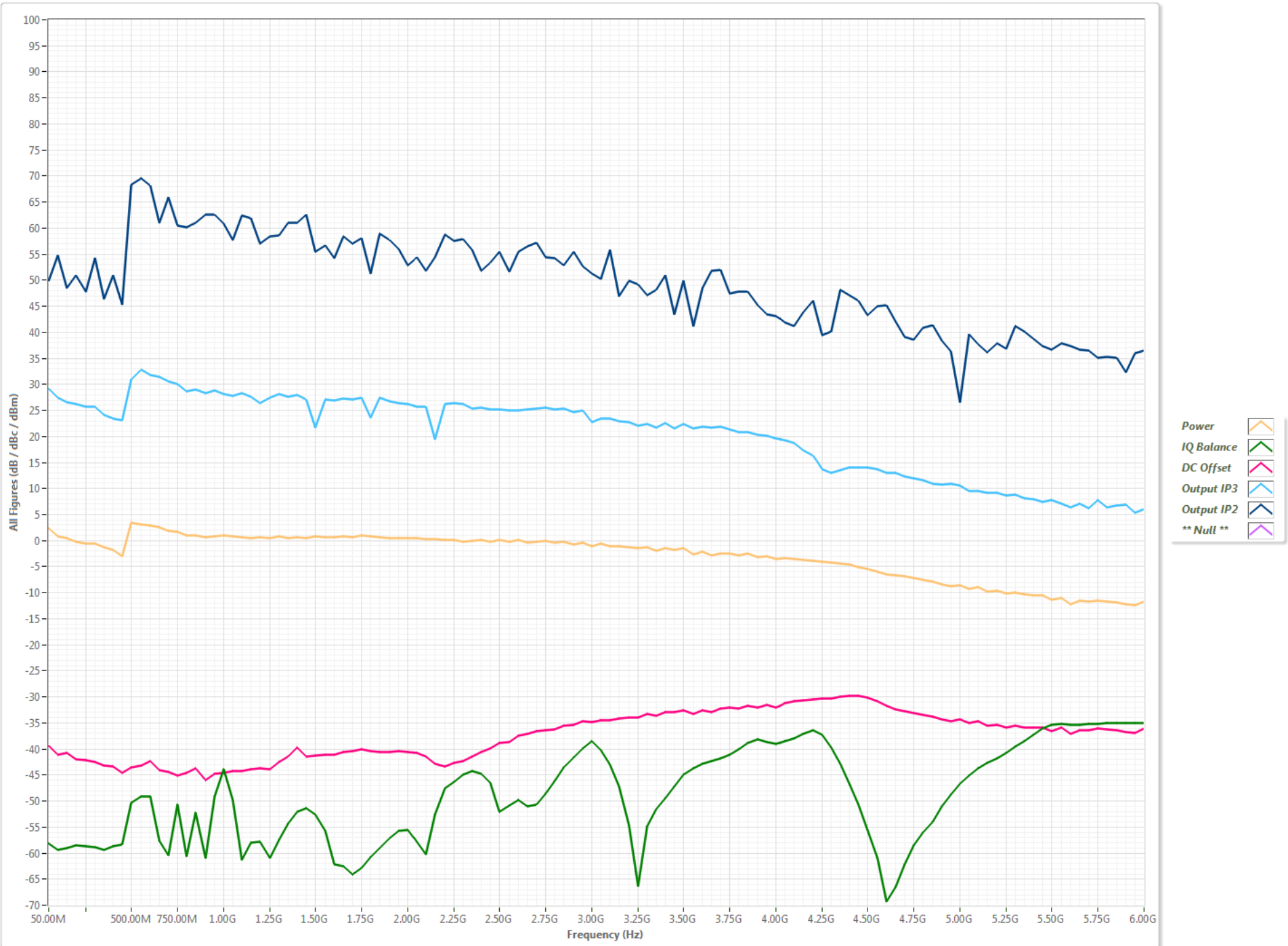
TX Figure vs Frequency w/ Gain=9.00dB



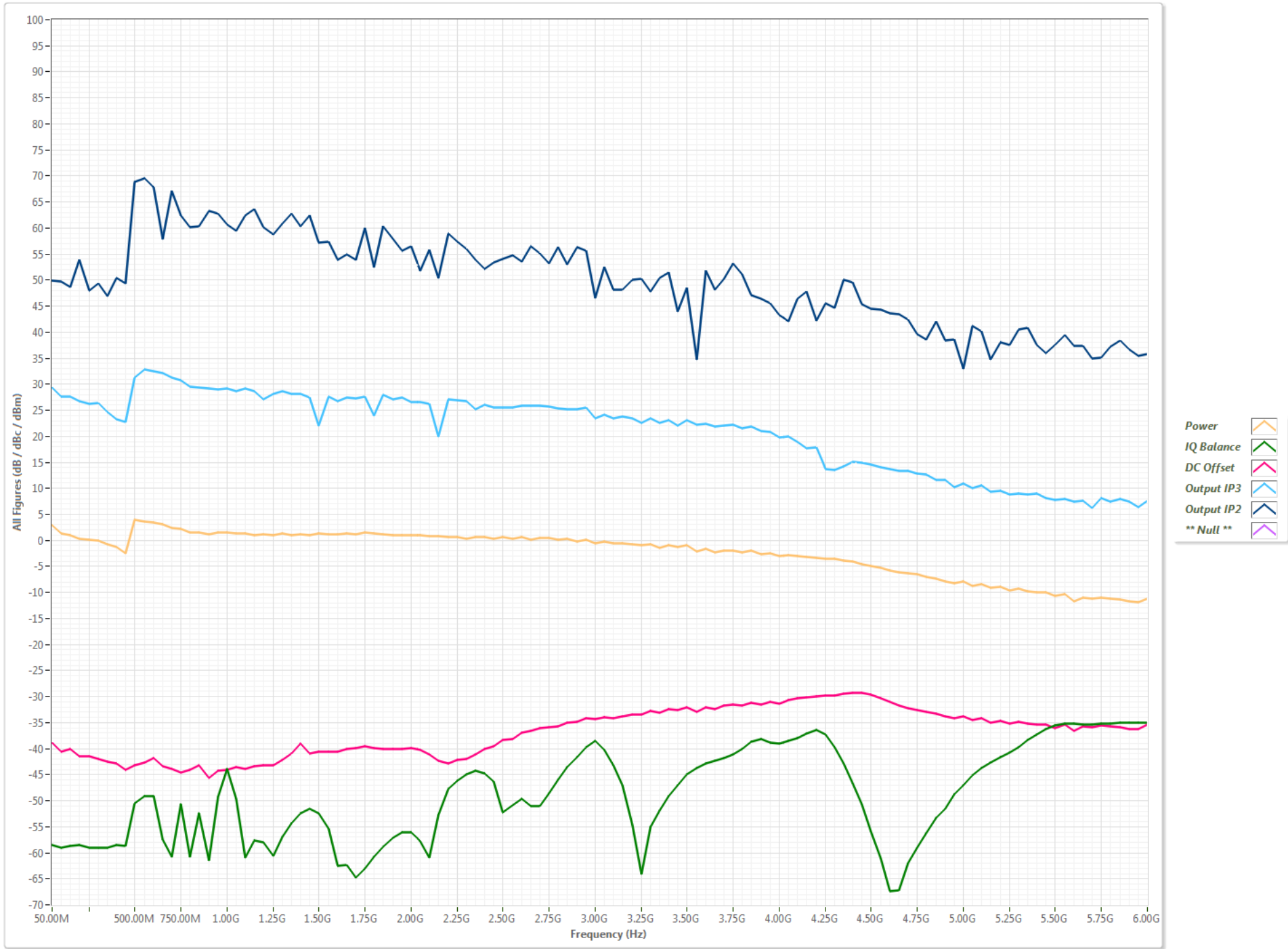
TX Figure vs Frequency w/ Gain=9.50dB



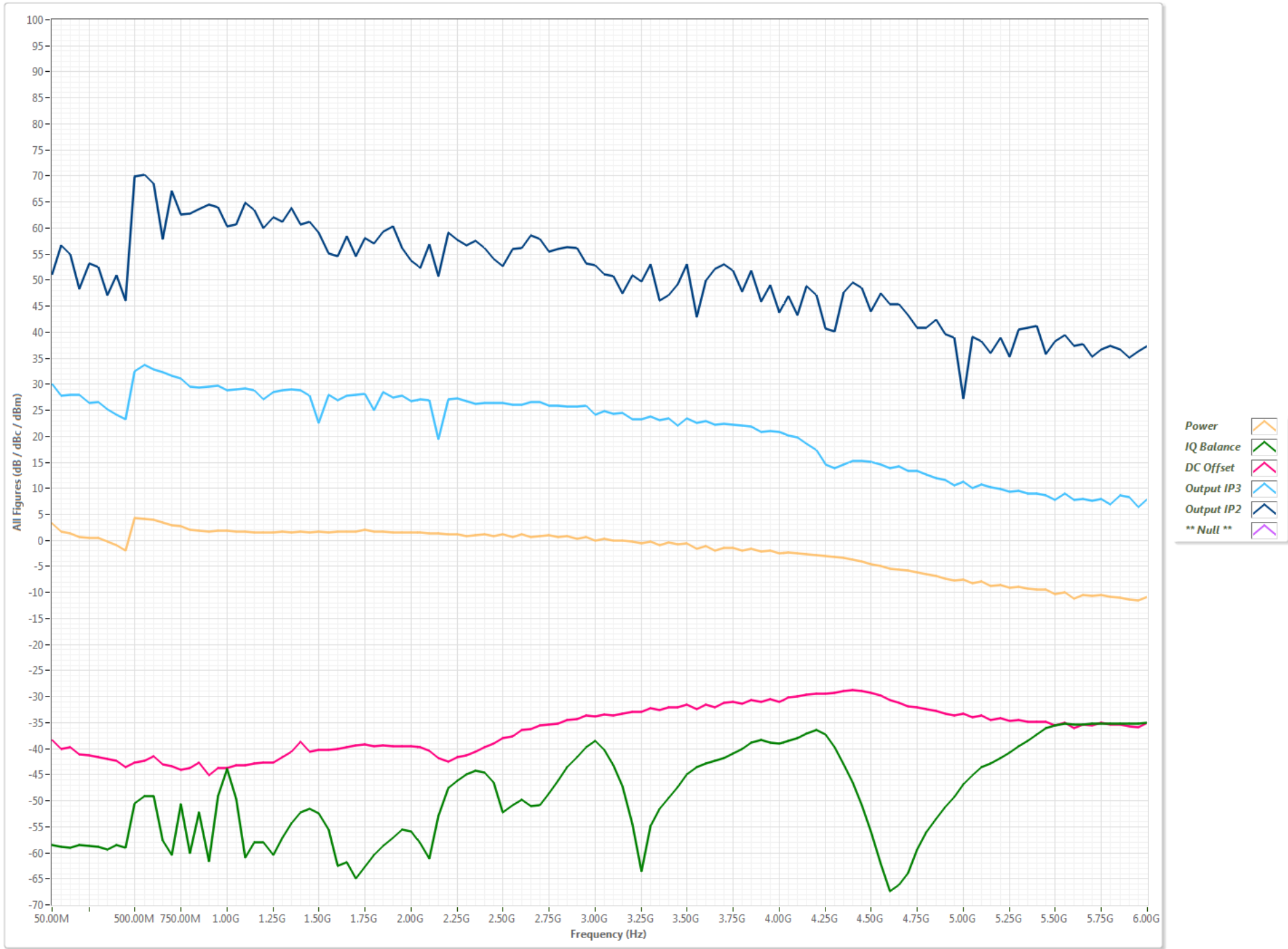
TX Figure vs Frequency w/ Gain=10.00dB



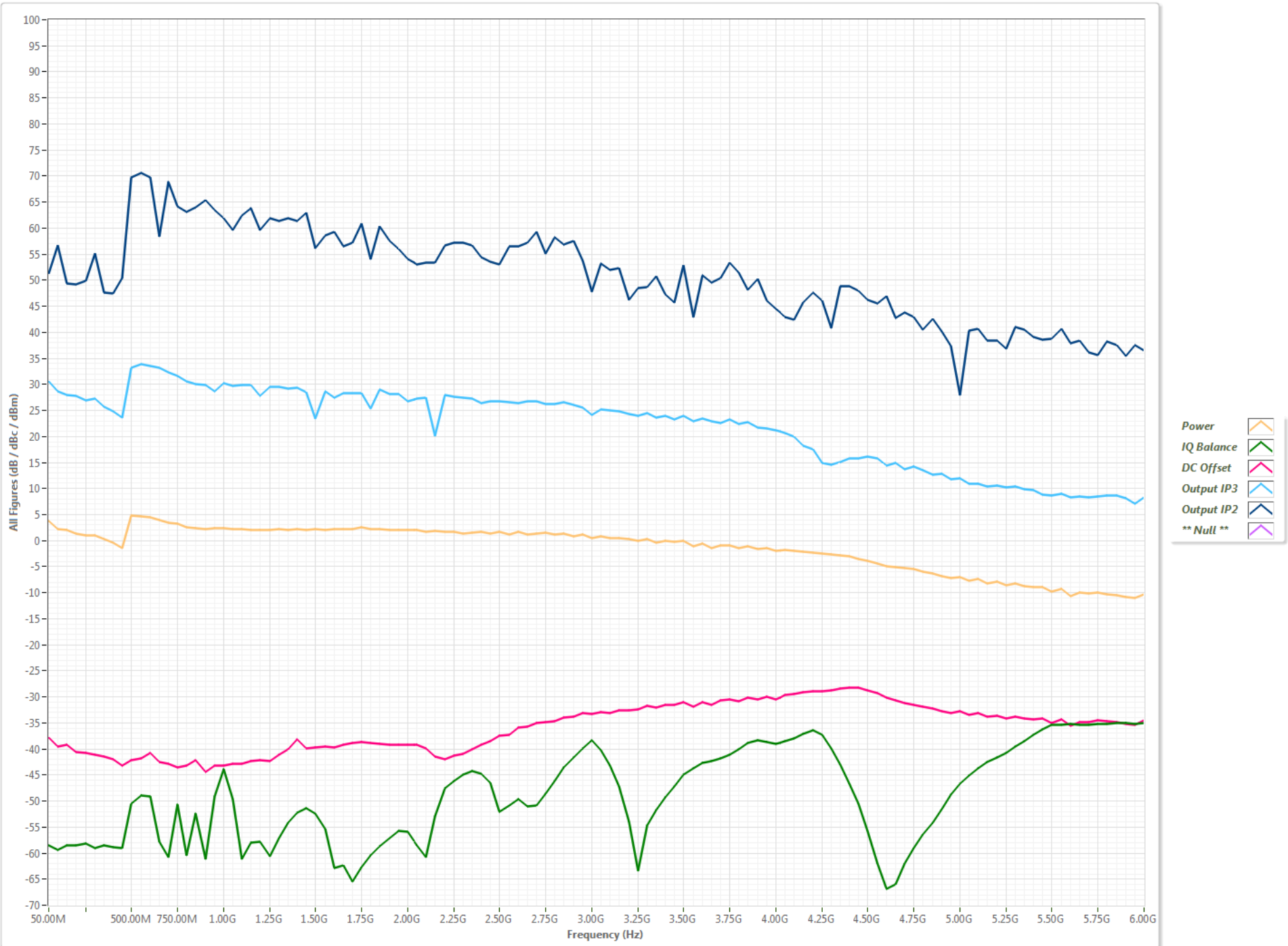
TX Figure vs Frequency w/ Gain=10.50dB



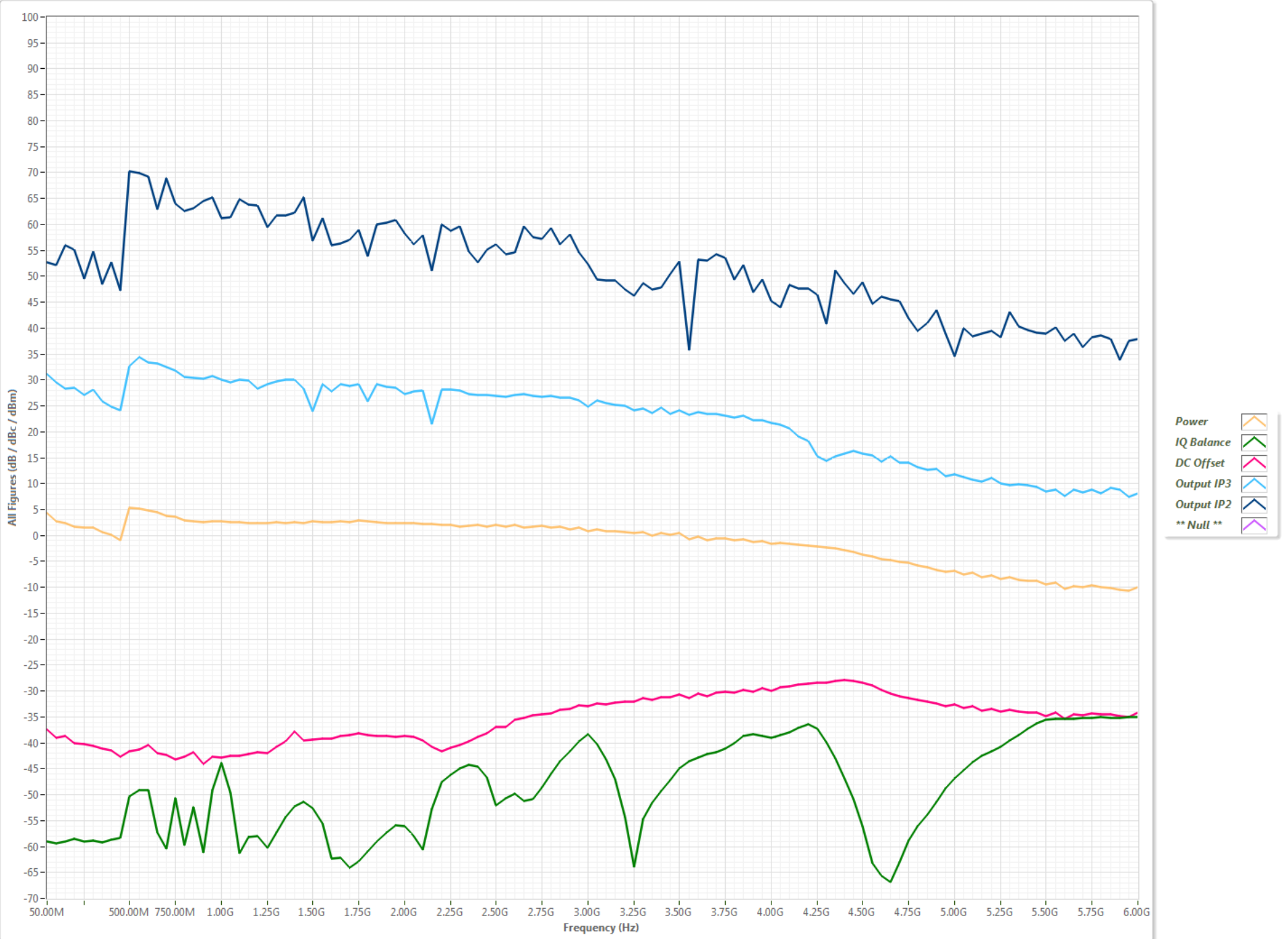
TX Figure vs Frequency w/ Gain=11.00dB



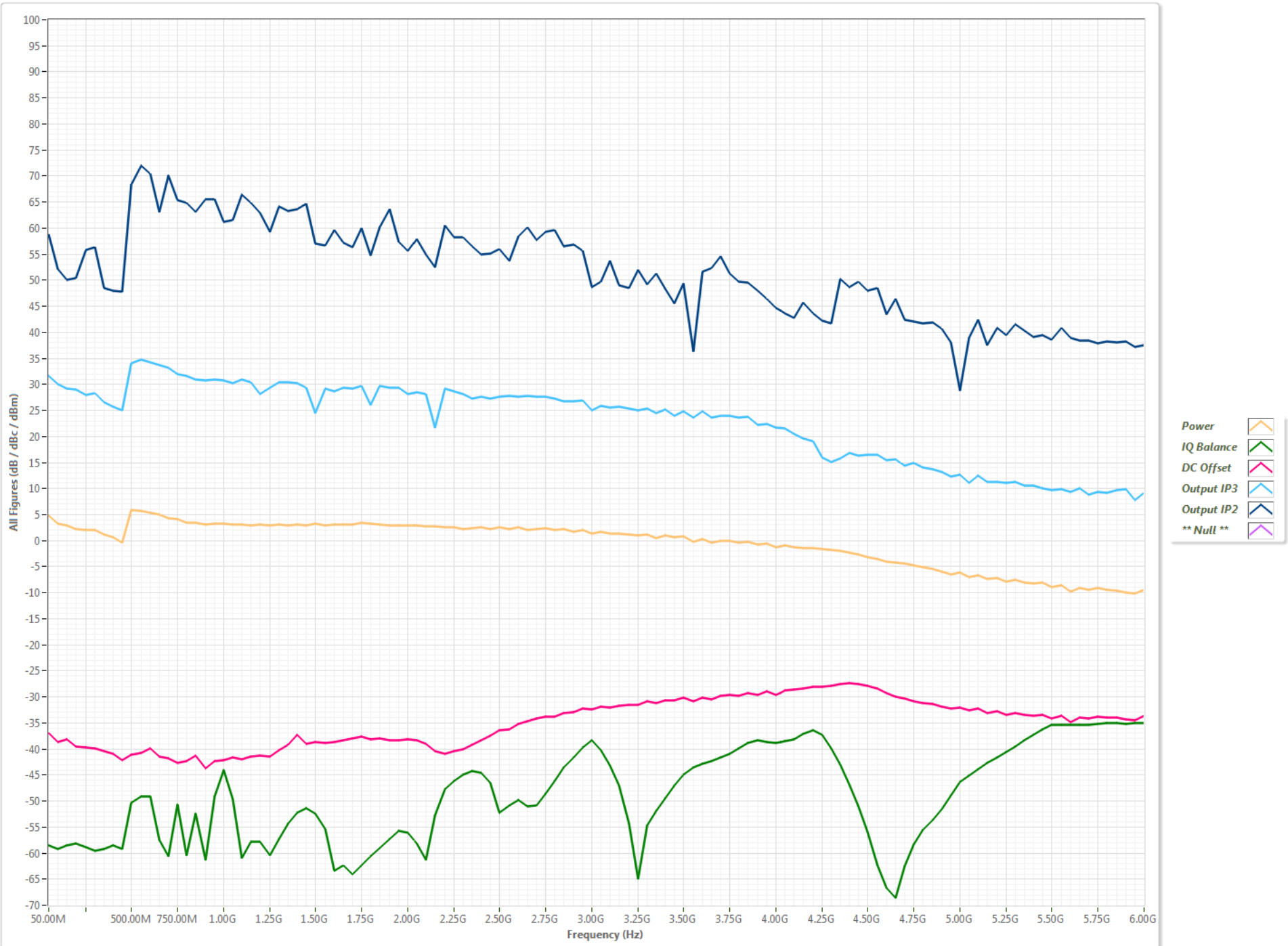
TX Figure vs Frequency w/ Gain=11.50dB



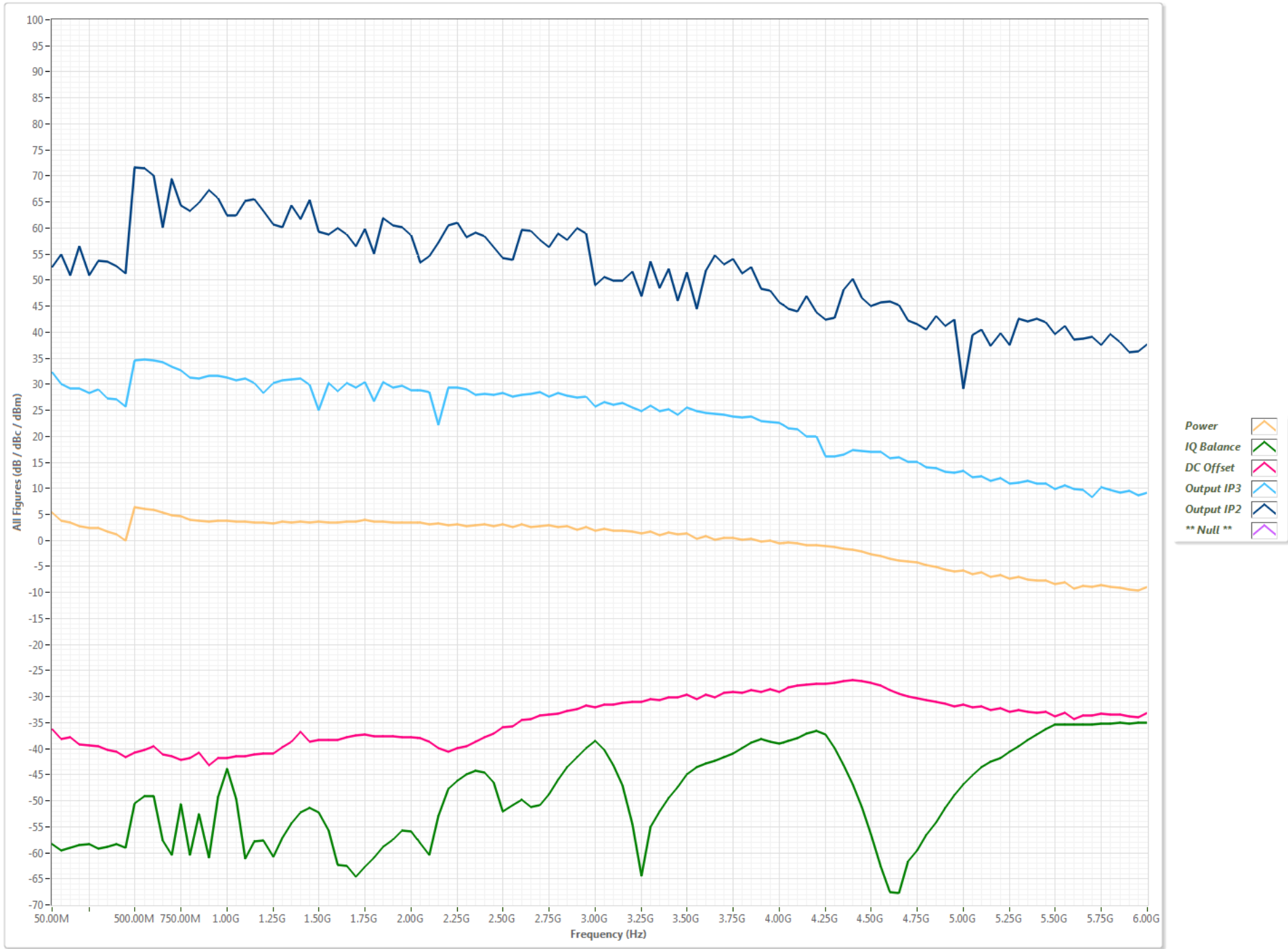
TX Figure vs Frequency w/ Gain=12.00dB



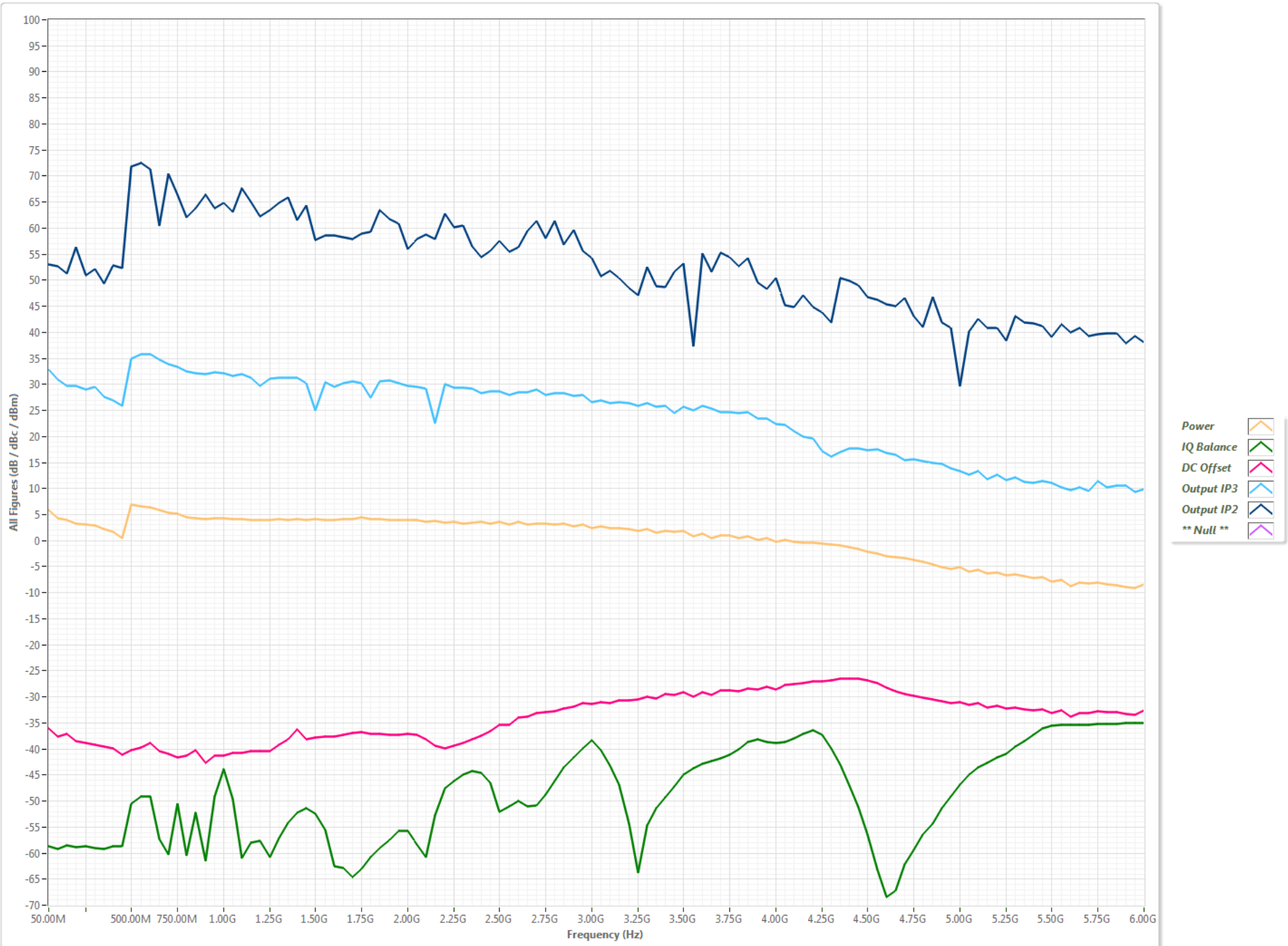
TX Figure vs Frequency w/ Gain=12.50dB



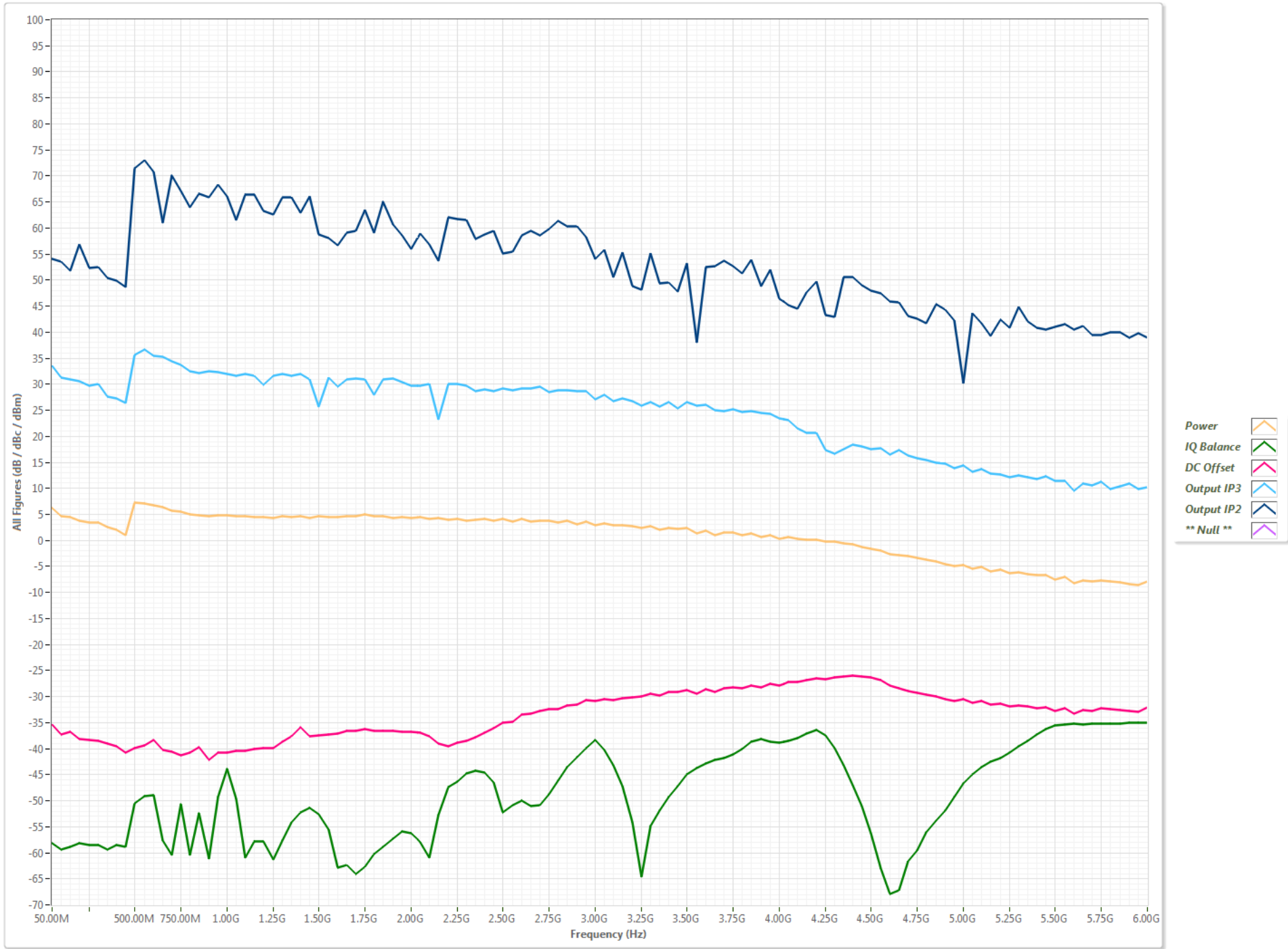
TX Figure vs Frequency w/ Gain=13.00dB



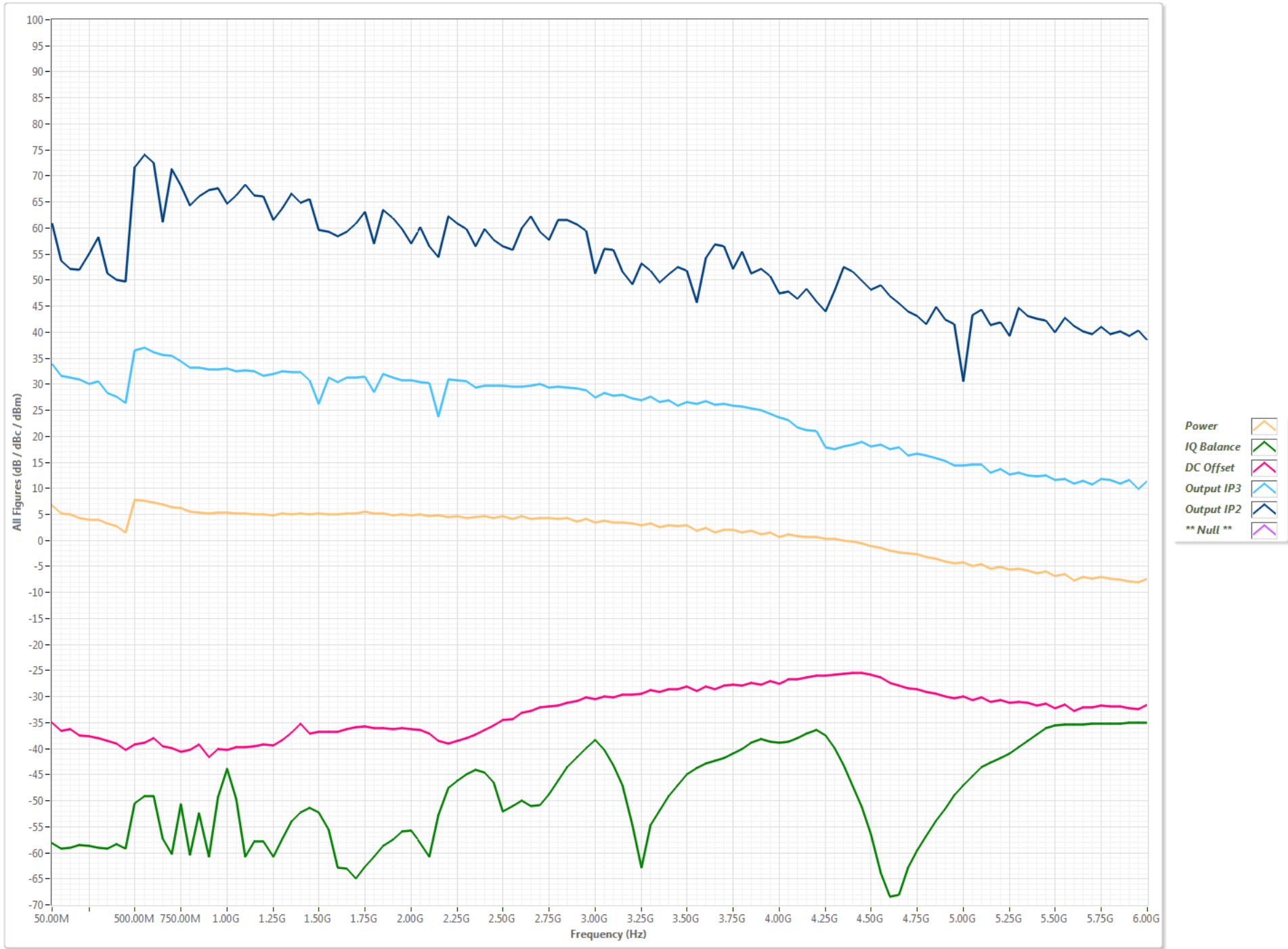
TX Figure vs Frequency w/ Gain=13.50dB



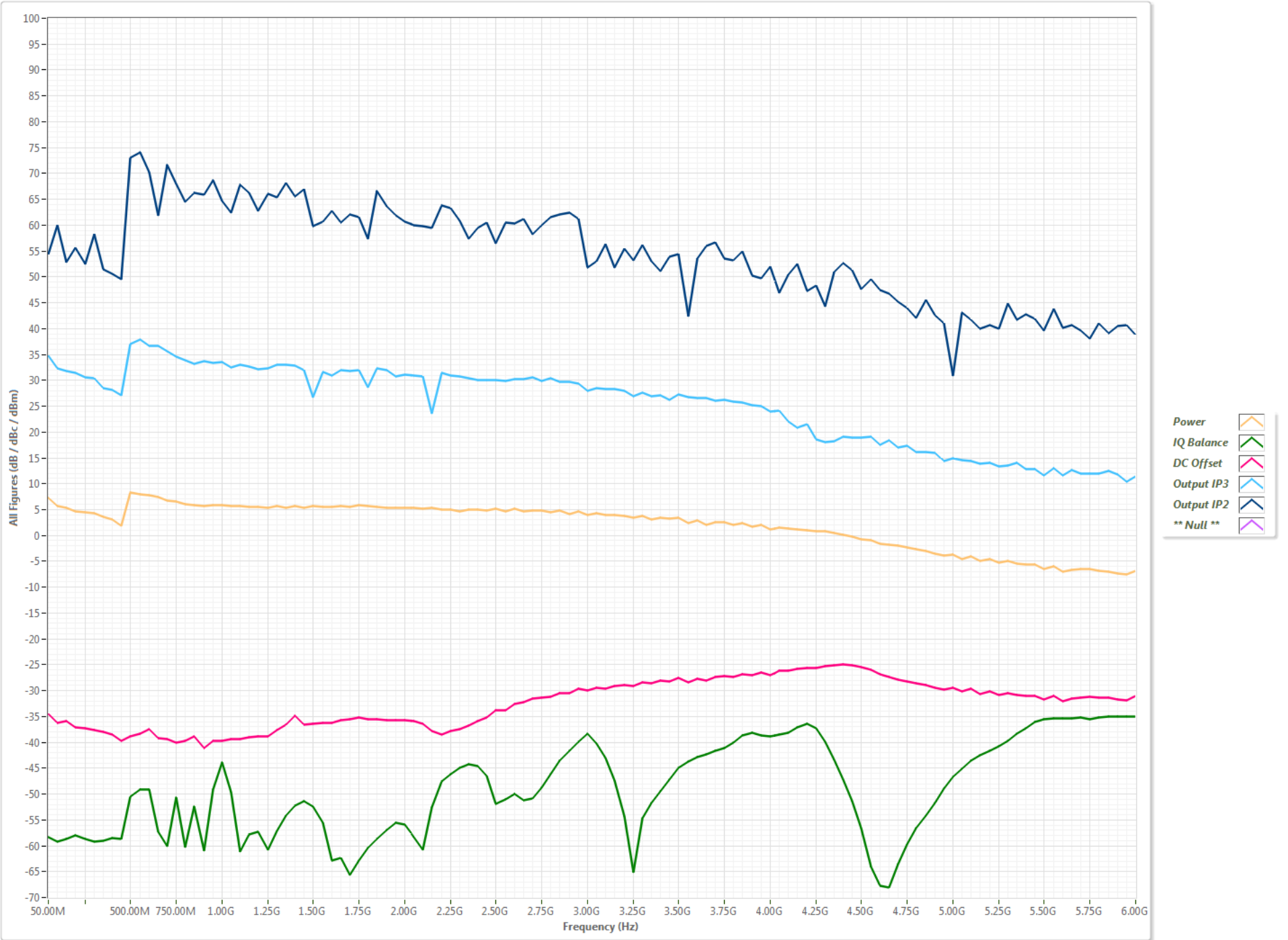
TX Figure vs Frequency w/ Gain=14.00dB



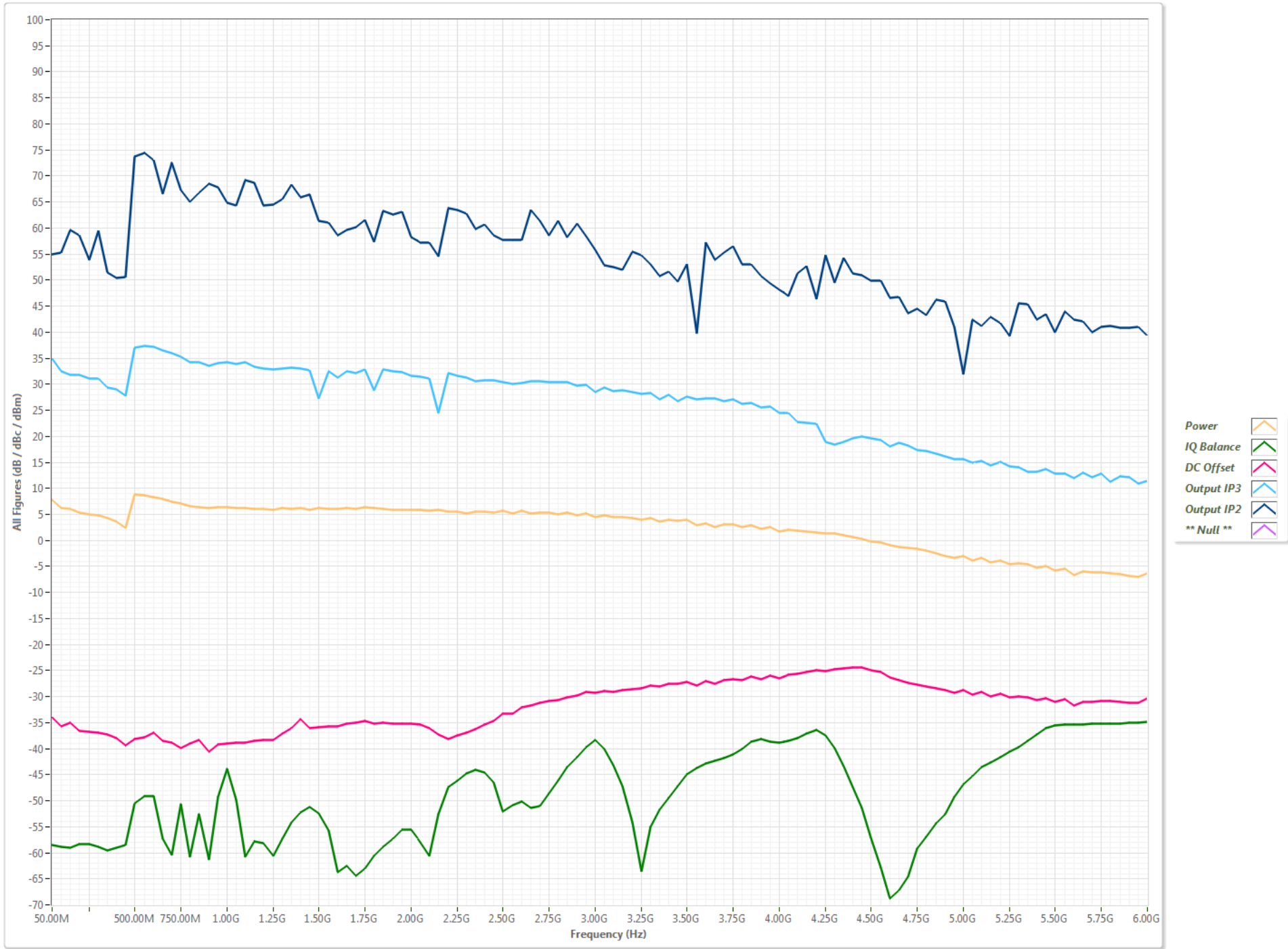
TX Figure vs Frequency w/ Gain=14.50dB



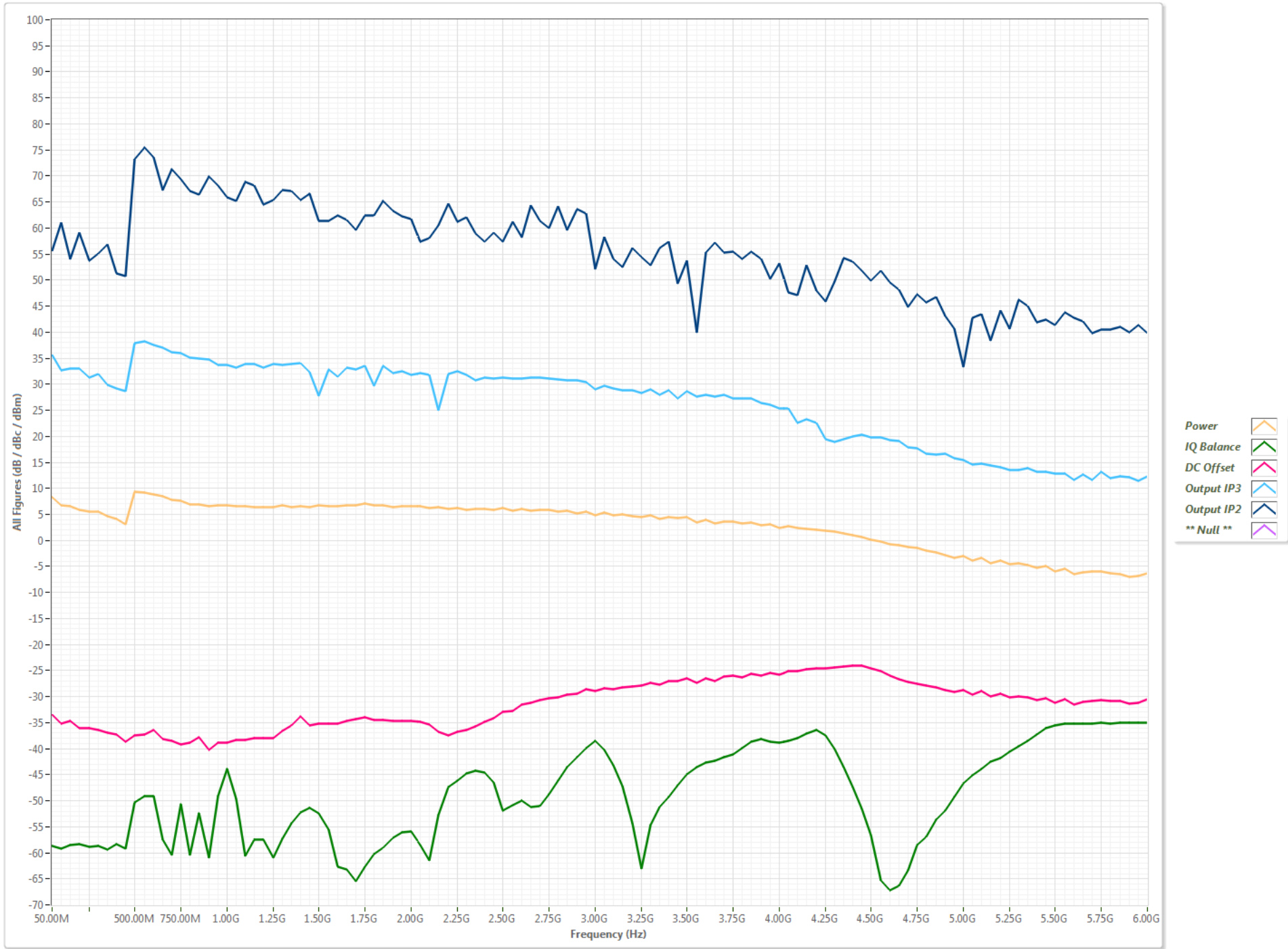
TX Figure vs Frequency w/ Gain=15.00dB



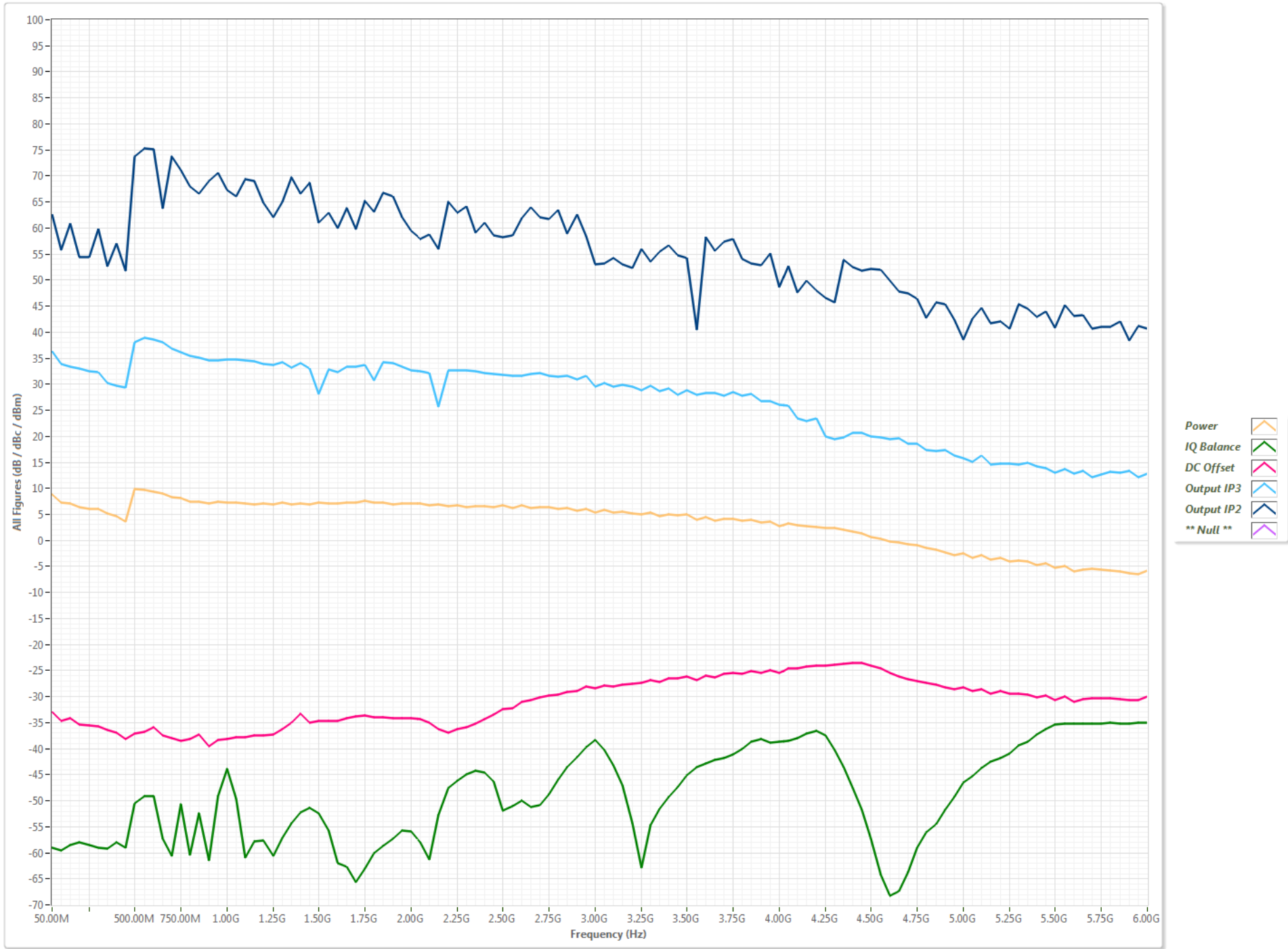
TX Figure vs Frequency w/ Gain=15.50dB



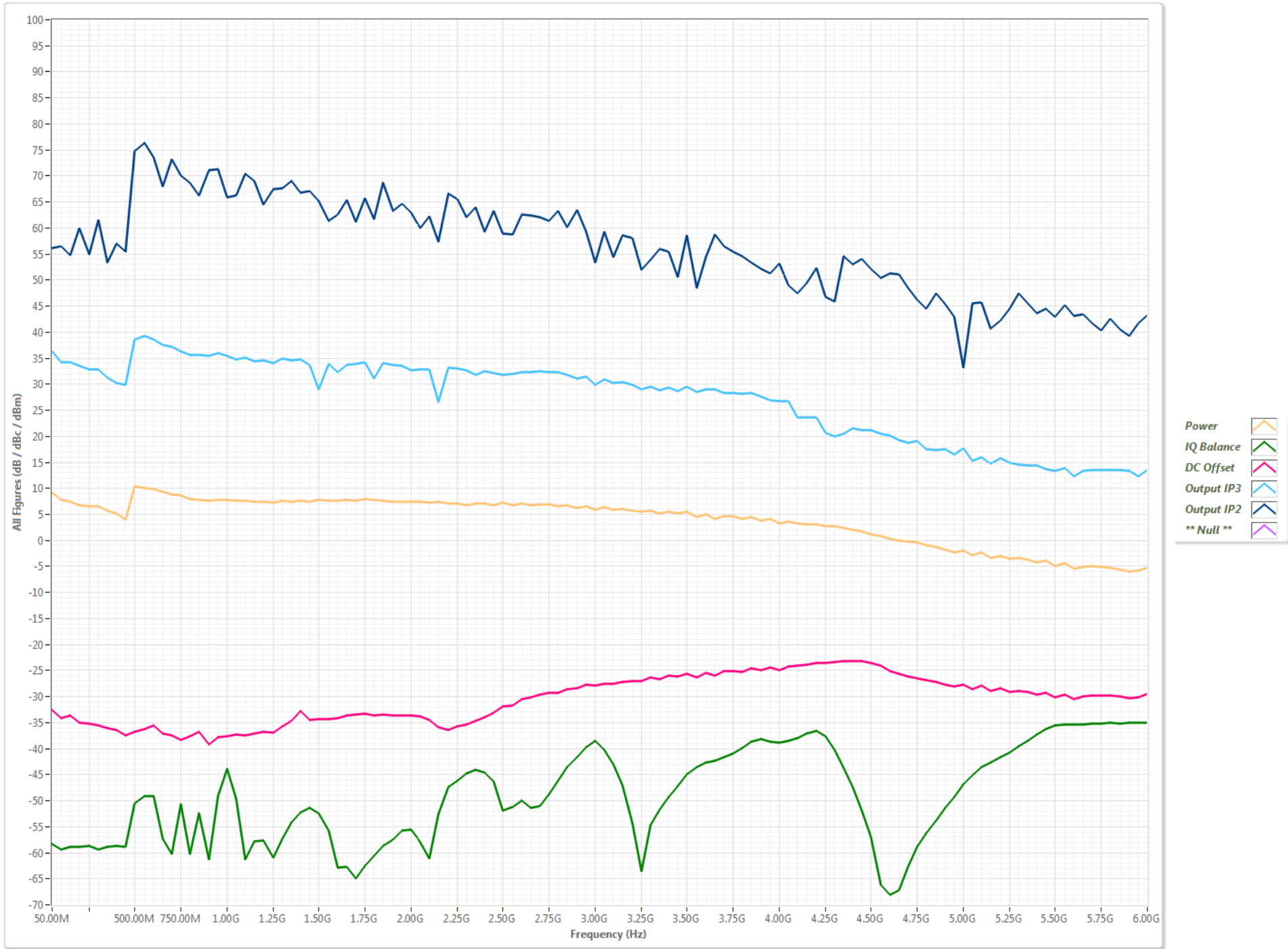
TX Figure vs Frequency w/ Gain=16.00dB



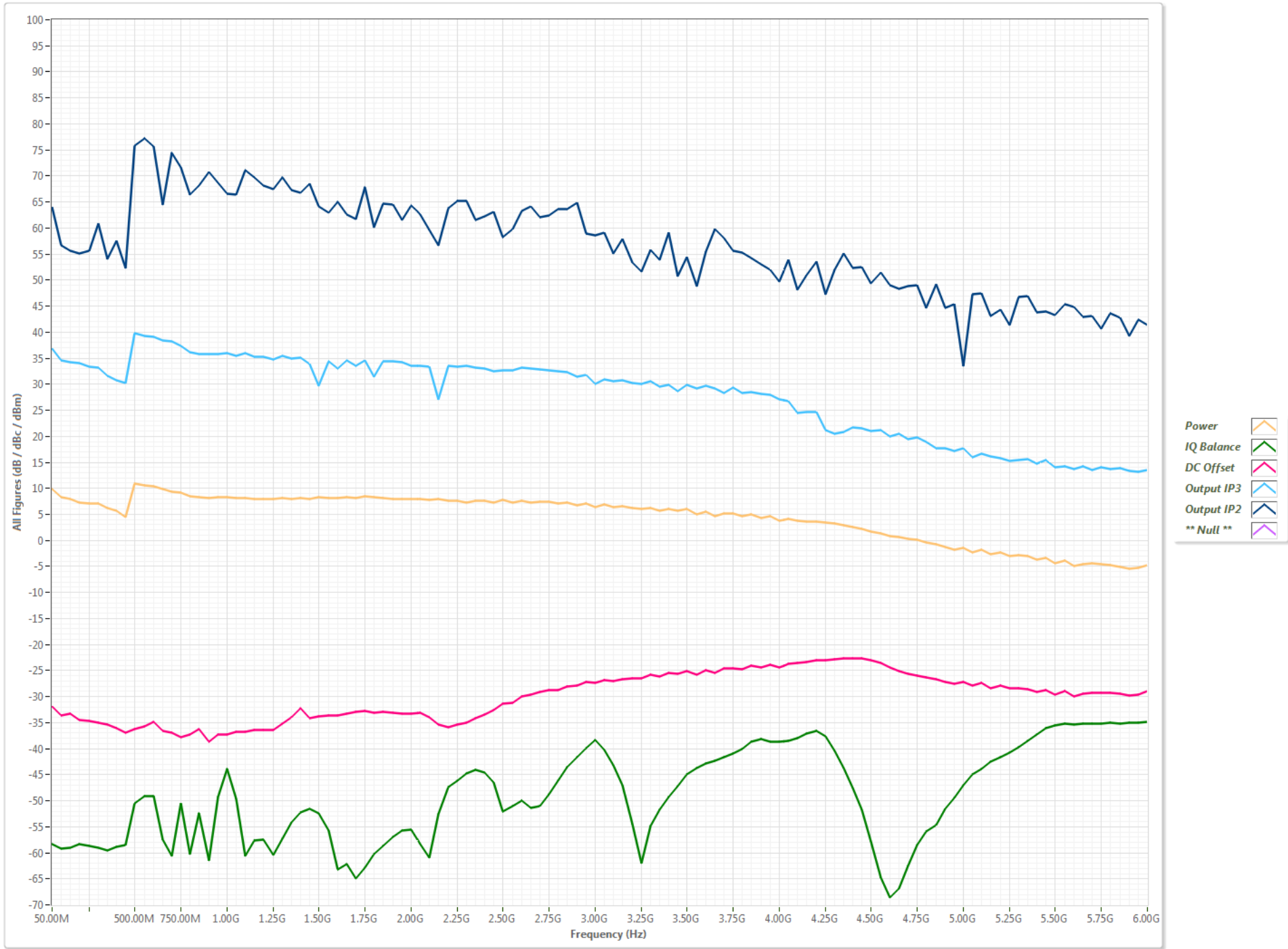
TX Figure vs Frequency w/ Gain=16.50dB



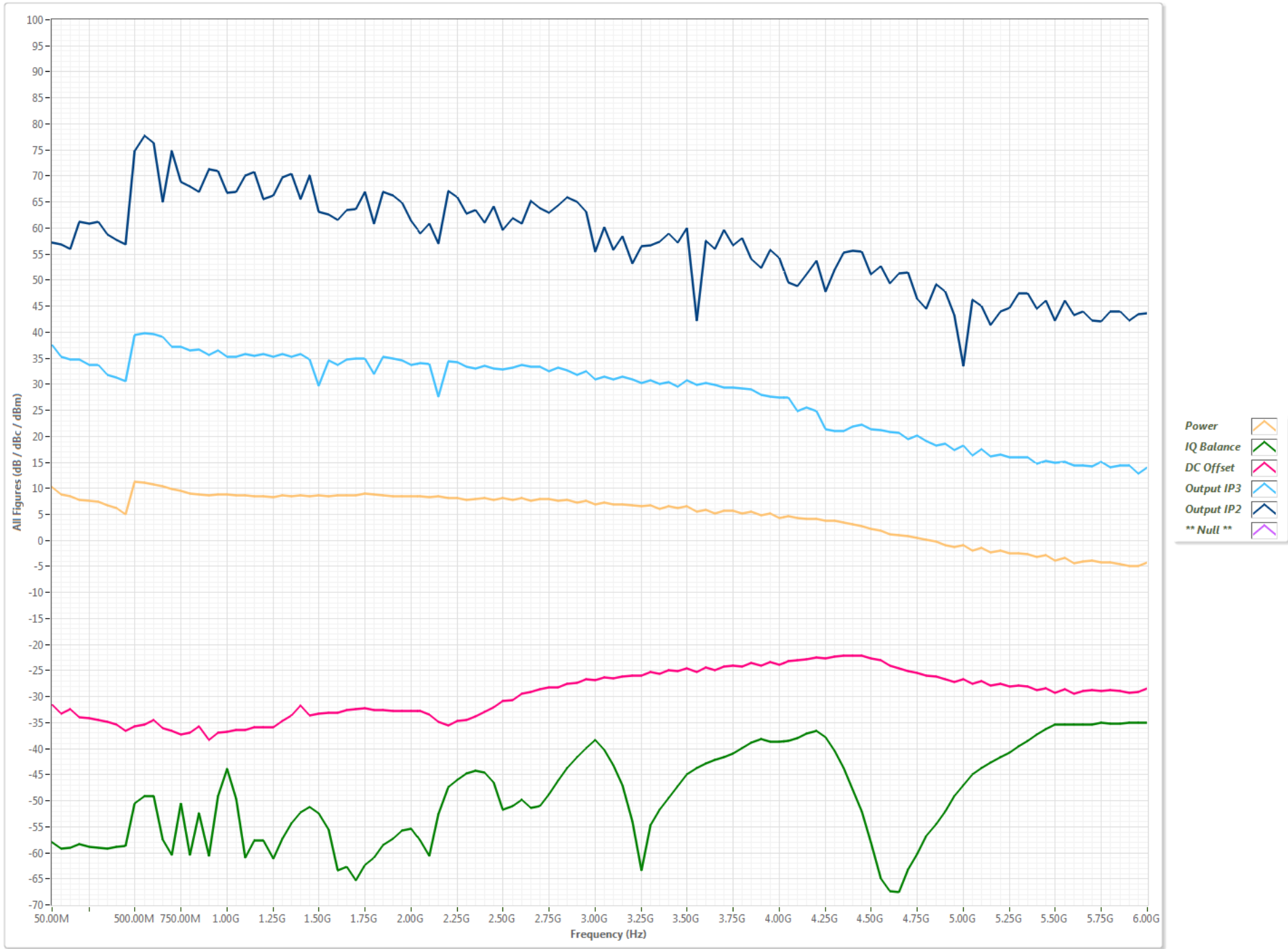
TX Figure vs Frequency w/ Gain=17.00dB



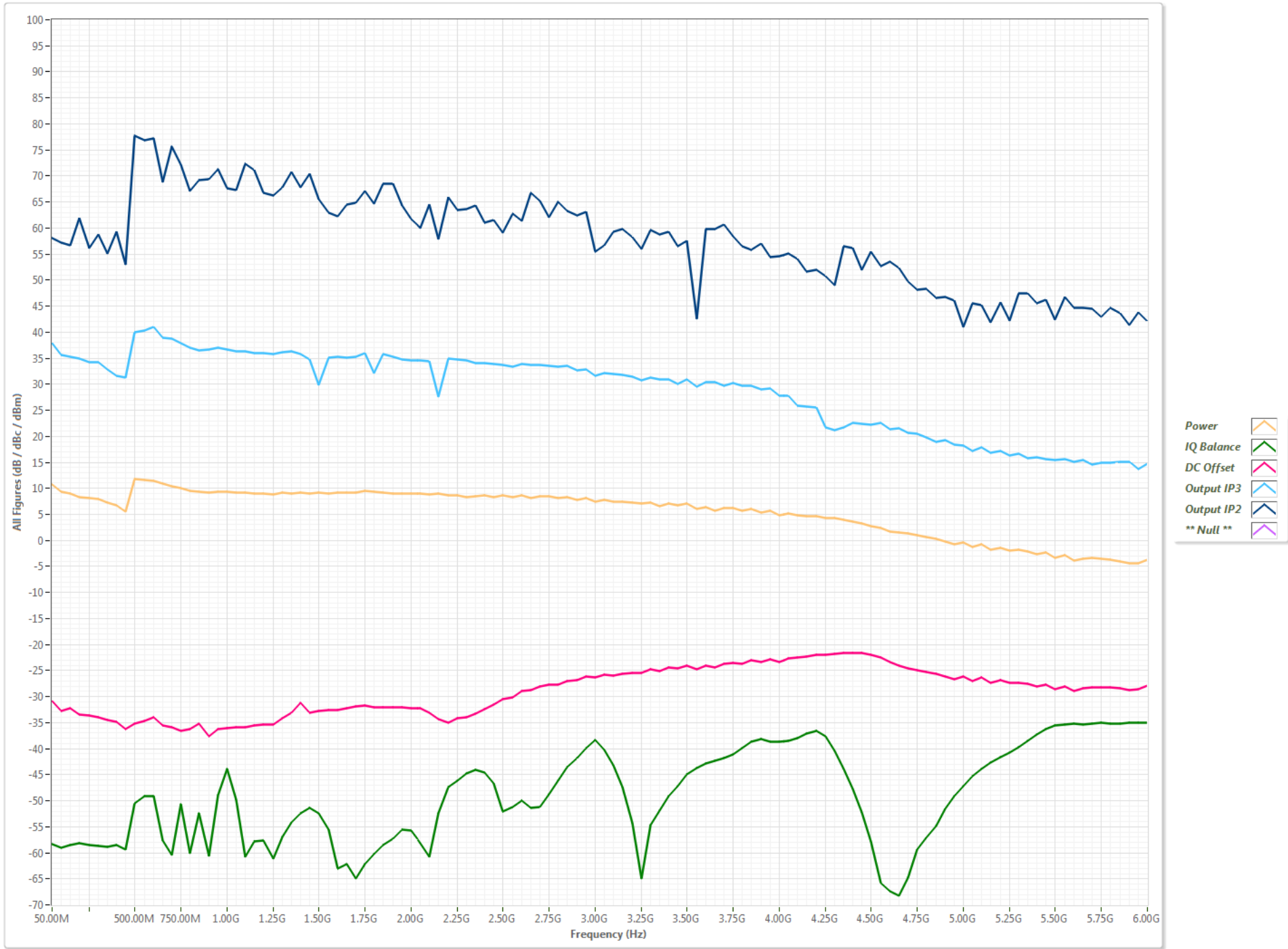
TX Figure vs Frequency w/ Gain=17.50dB



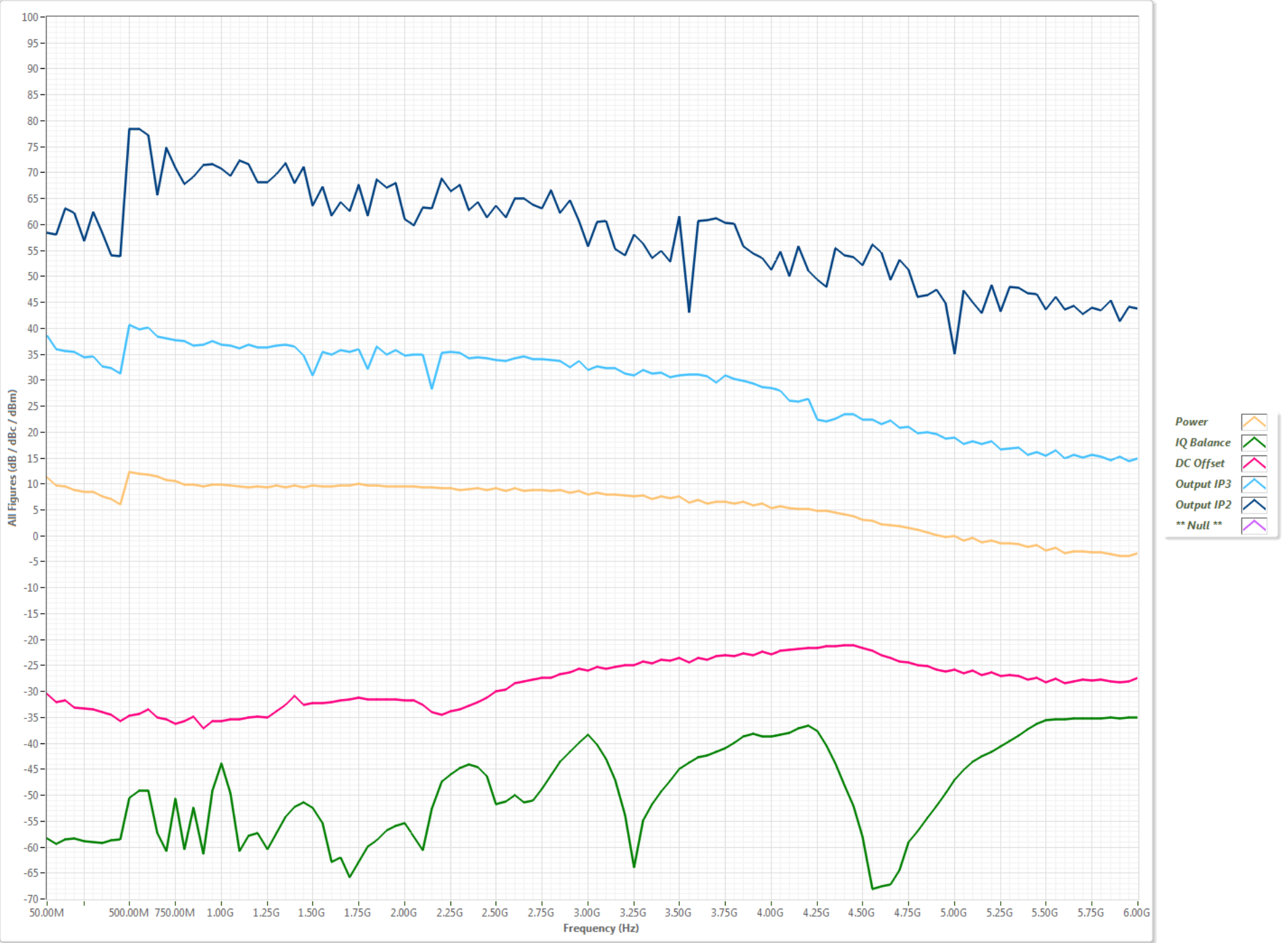
TX Figure vs Frequency w/ Gain=18.00dB



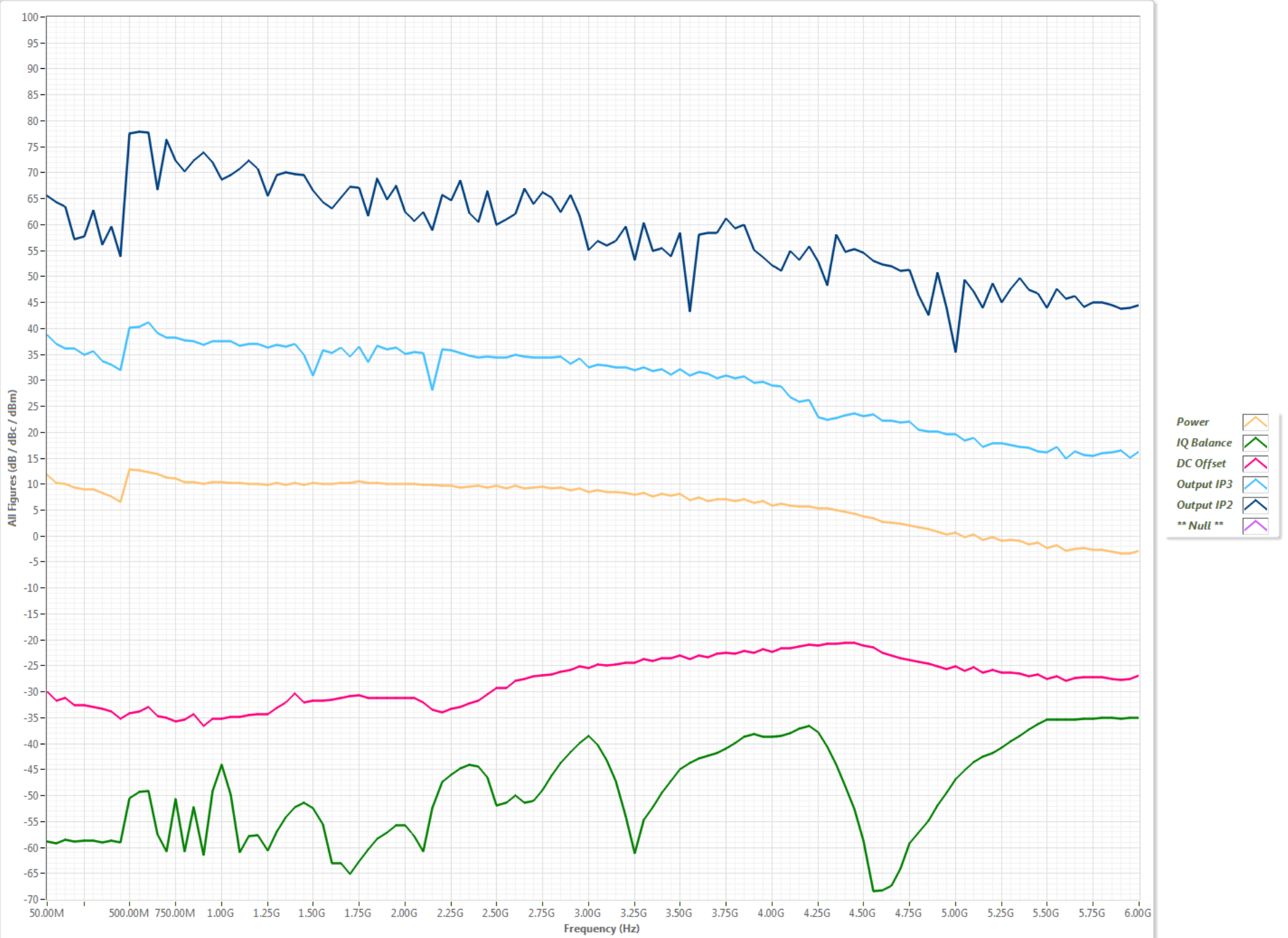
TX Figure vs Frequency w/ Gain=18.50dB



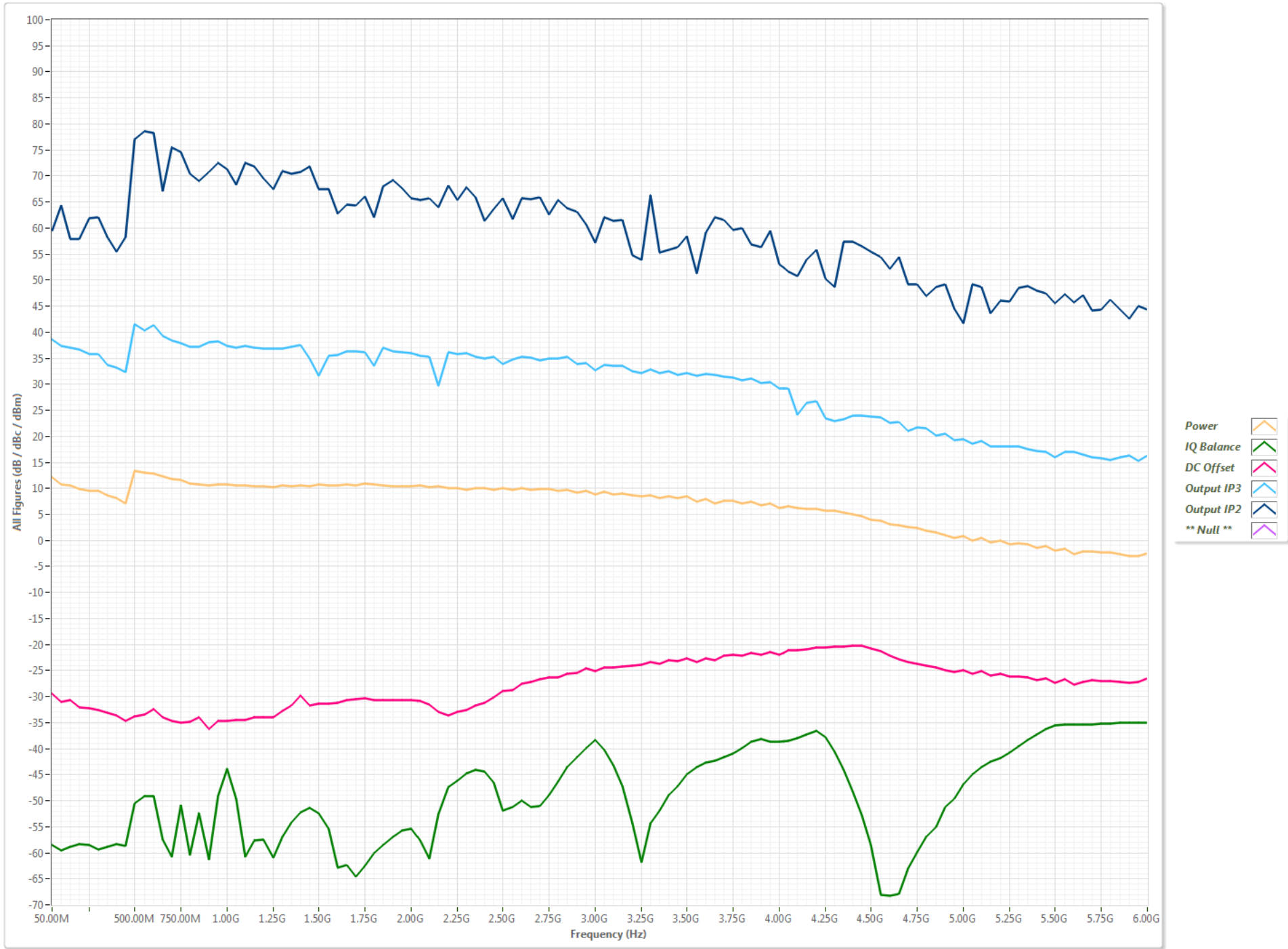
TX Figure vs Frequency w/ Gain=19.00dB



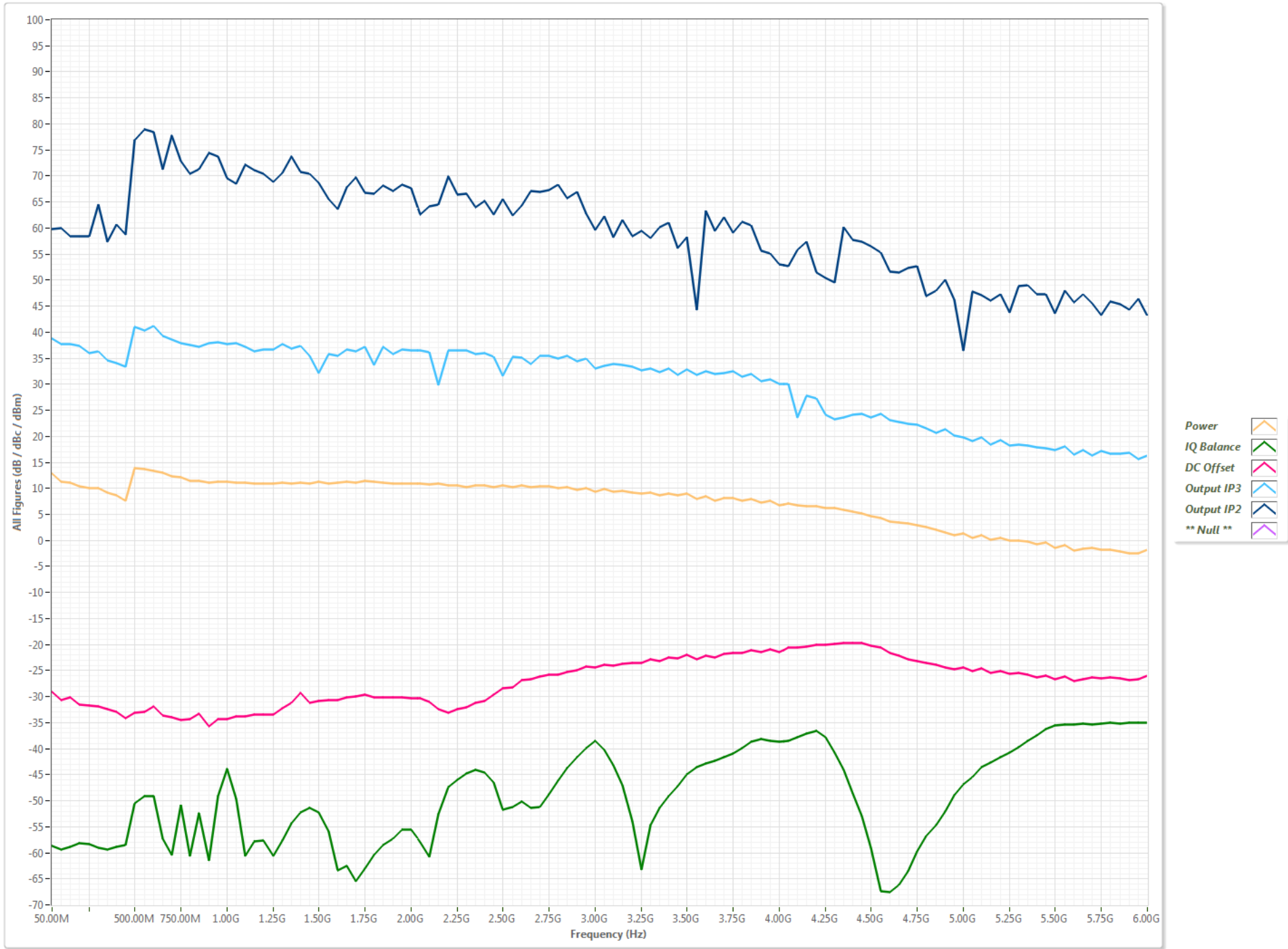
TX Figure vs Frequency w/ Gain=19.50dB



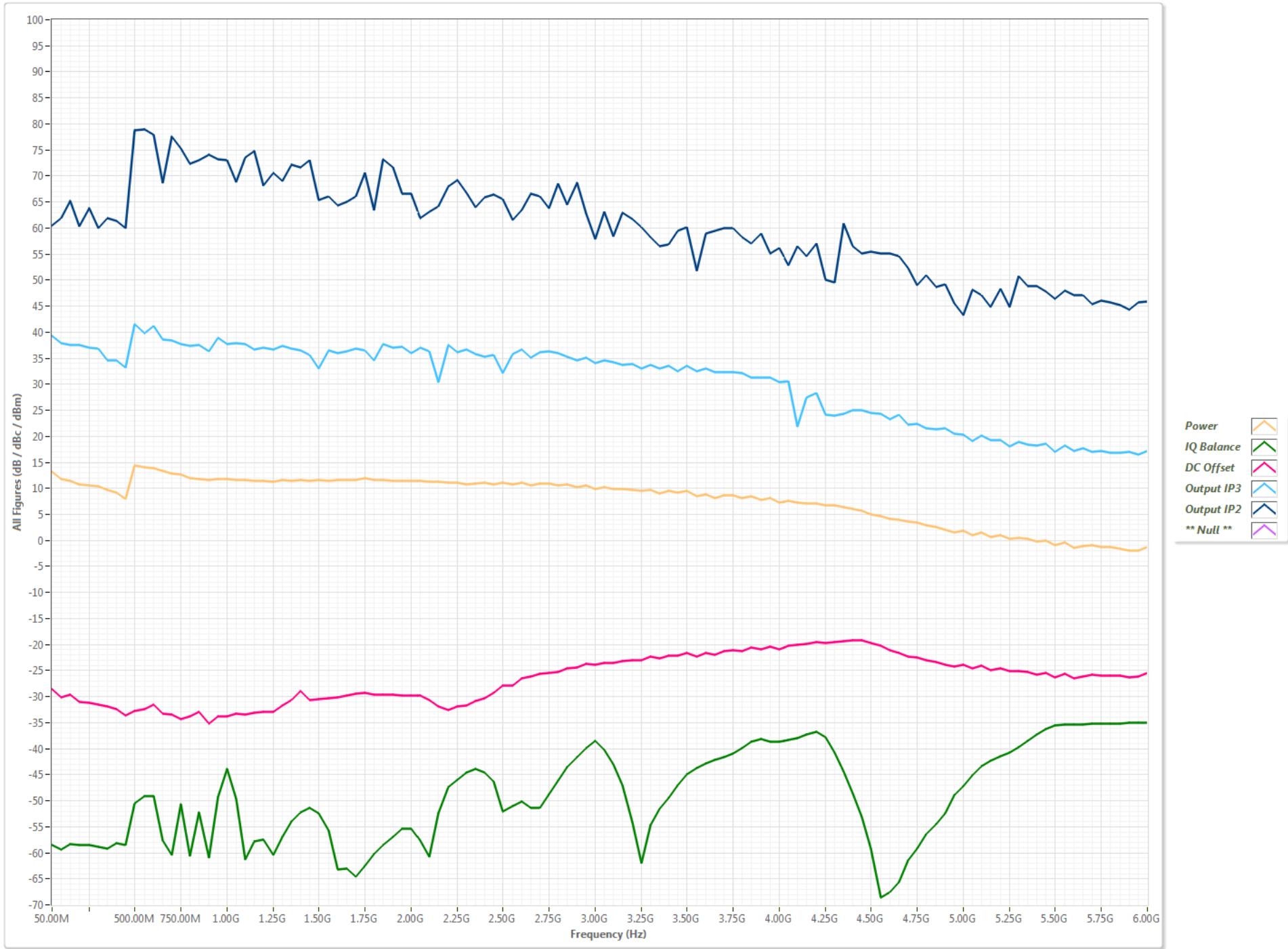
TX Figure vs Frequency w/ Gain=20.00dB



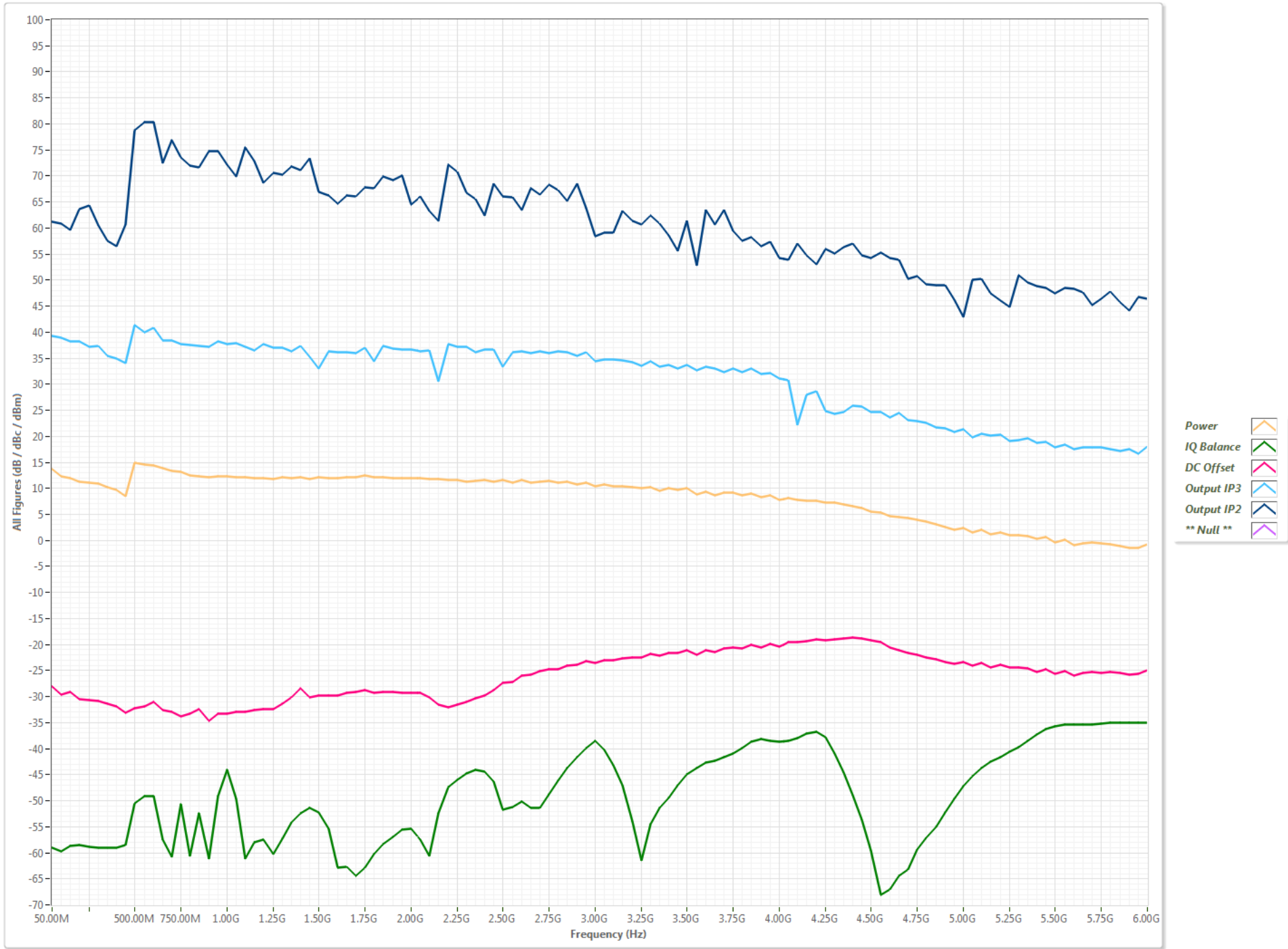
TX Figure vs Frequency w/ Gain=20.50dB



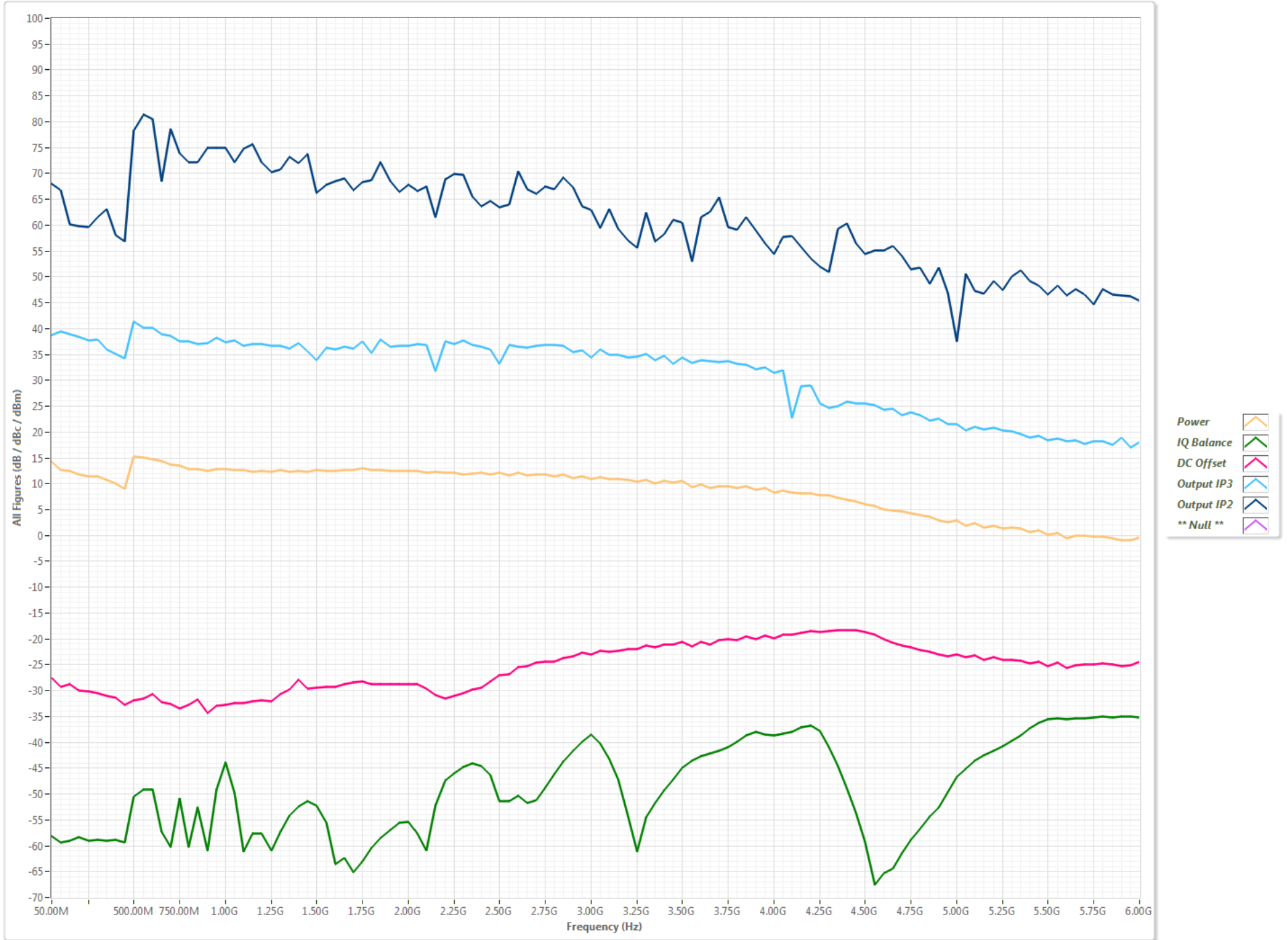
TX Figure vs Frequency w/ Gain=21.00dB



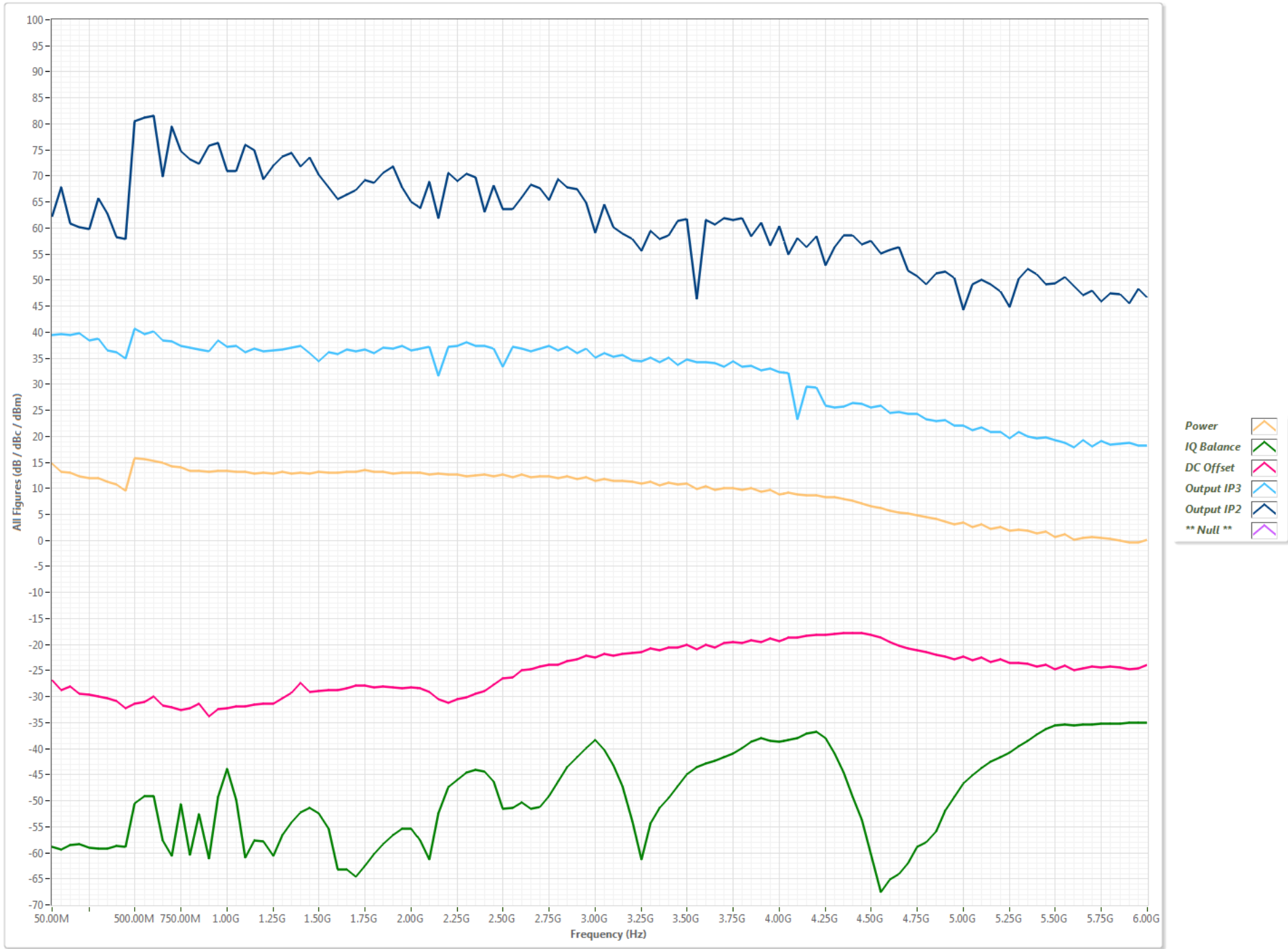
TX Figure vs Frequency w/ Gain=21.50dB



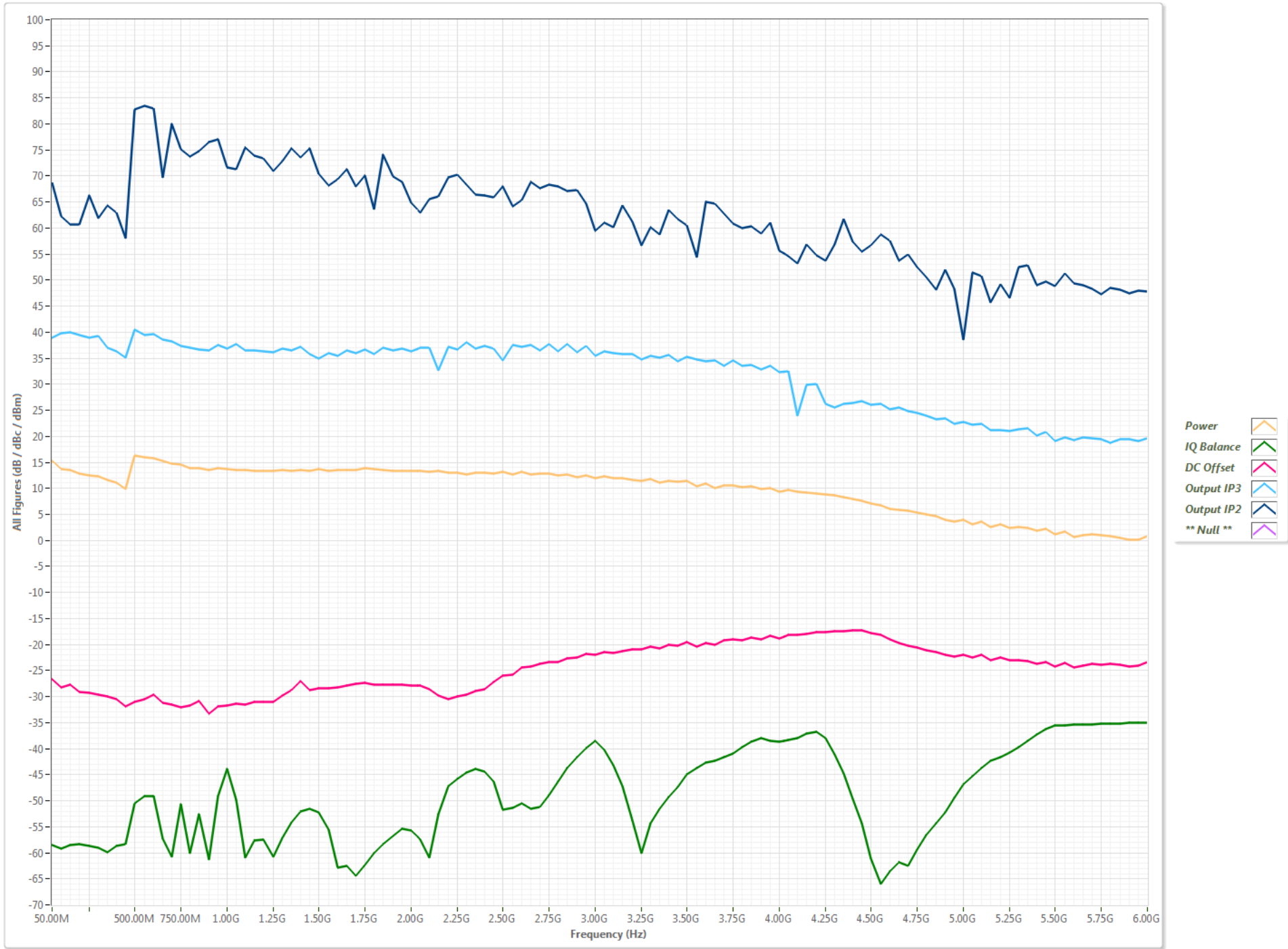
TX Figure vs Frequency w/ Gain=22.00dB



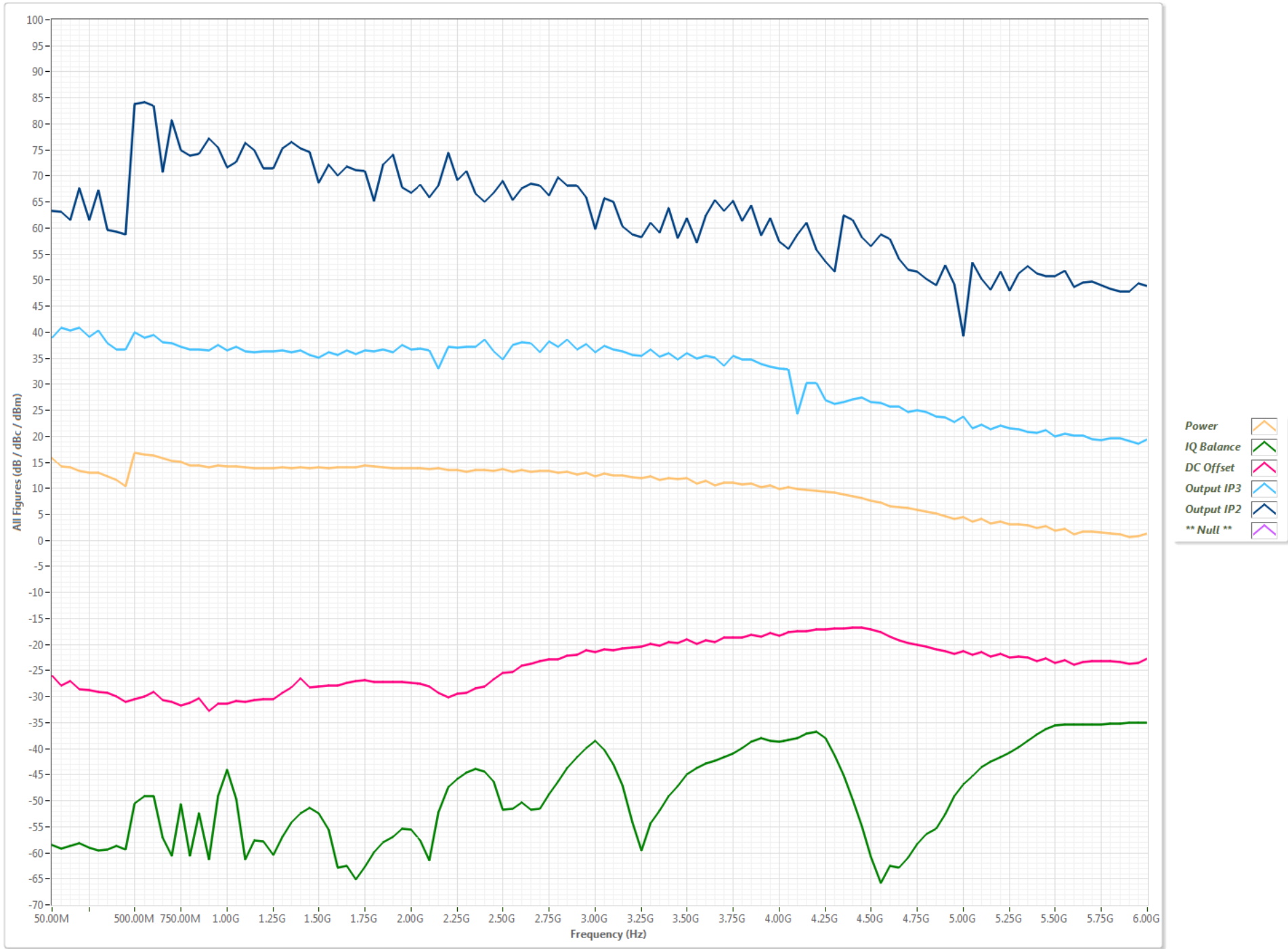
TX Figure vs Frequency w/ Gain=22.50dB



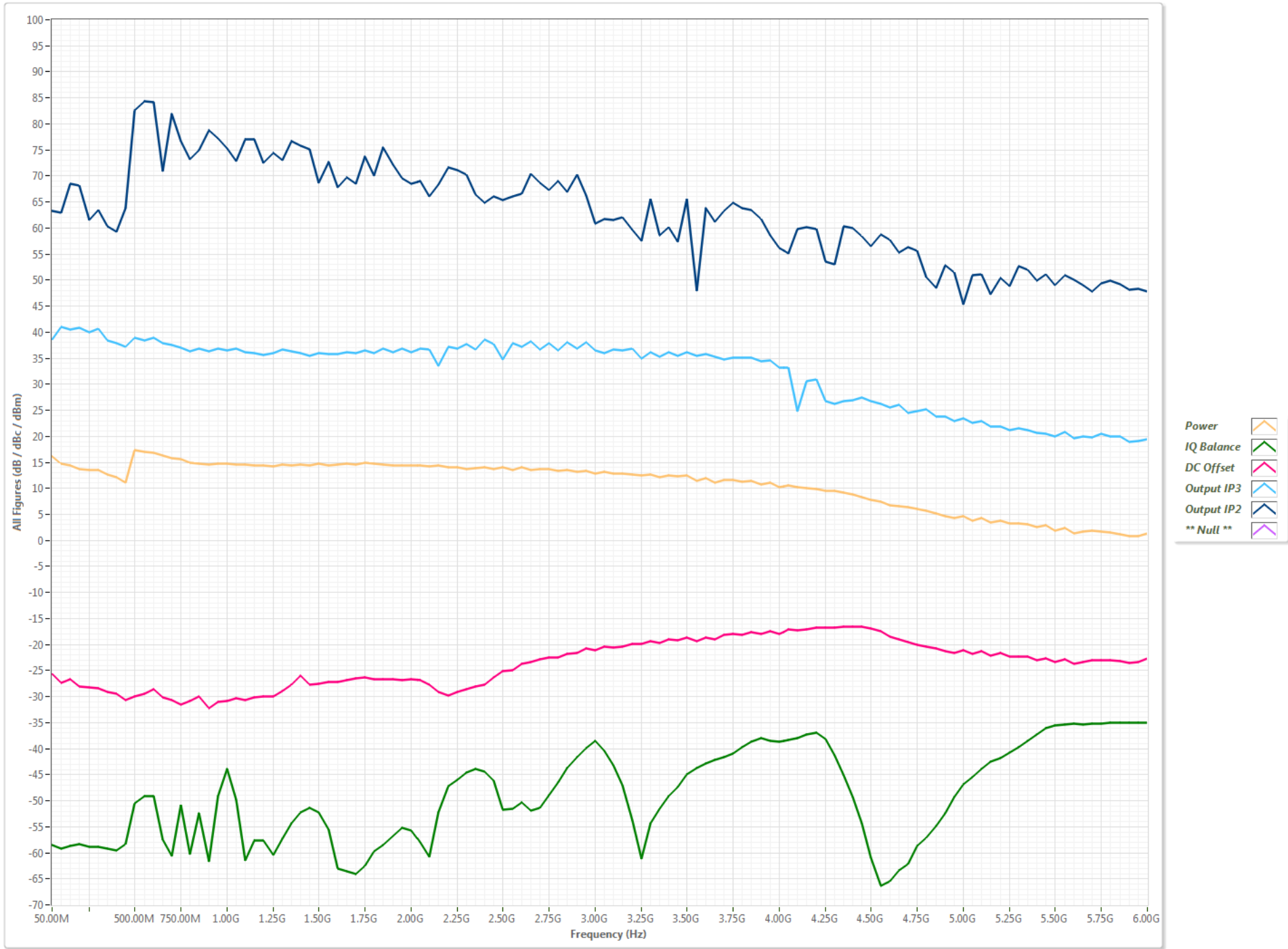
TX Figure vs Frequency w/ Gain=23.00dB



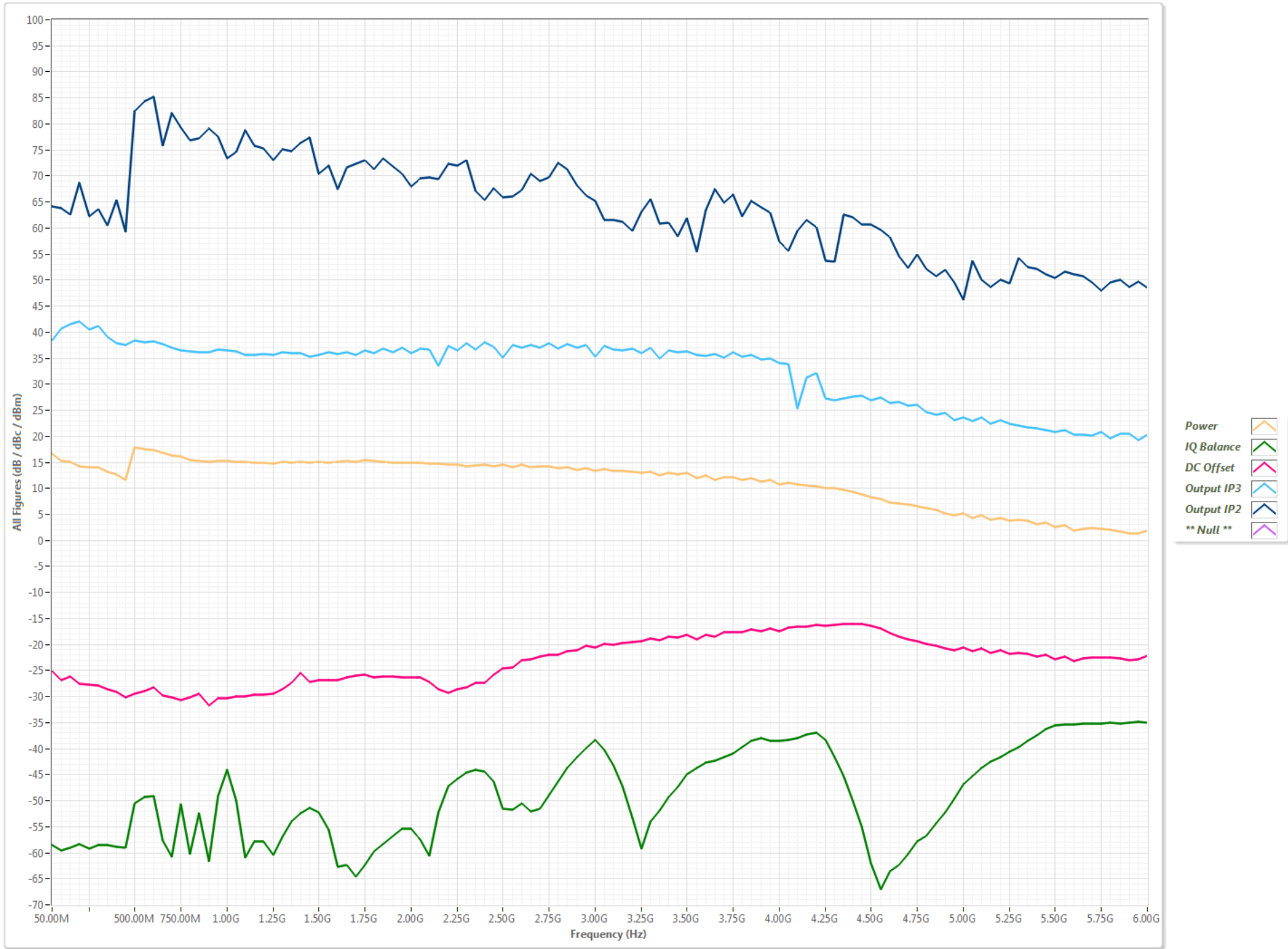
TX Figure vs Frequency w/ Gain=23.50dB



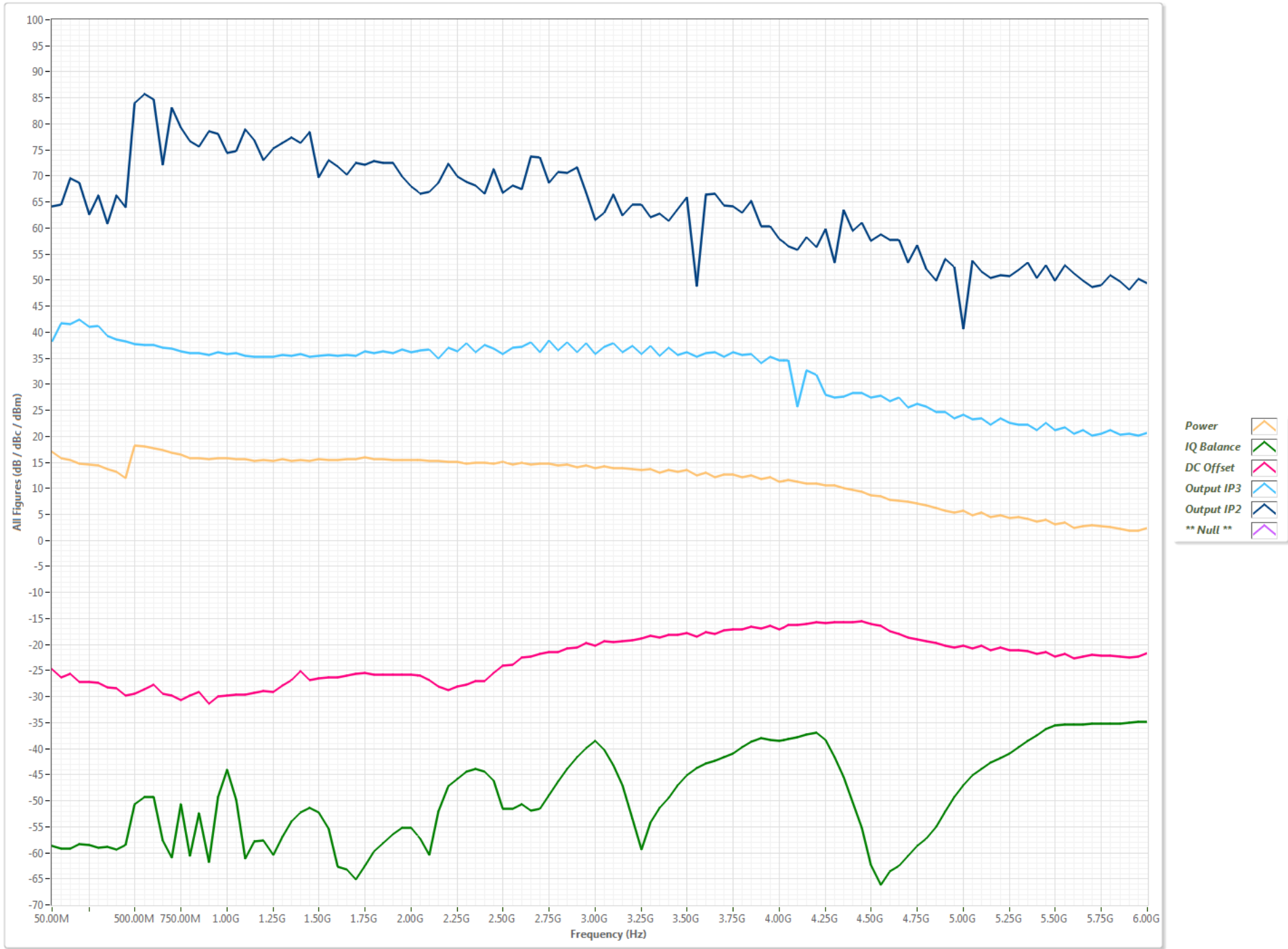
TX Figure vs Frequency w/ Gain=24.00dB



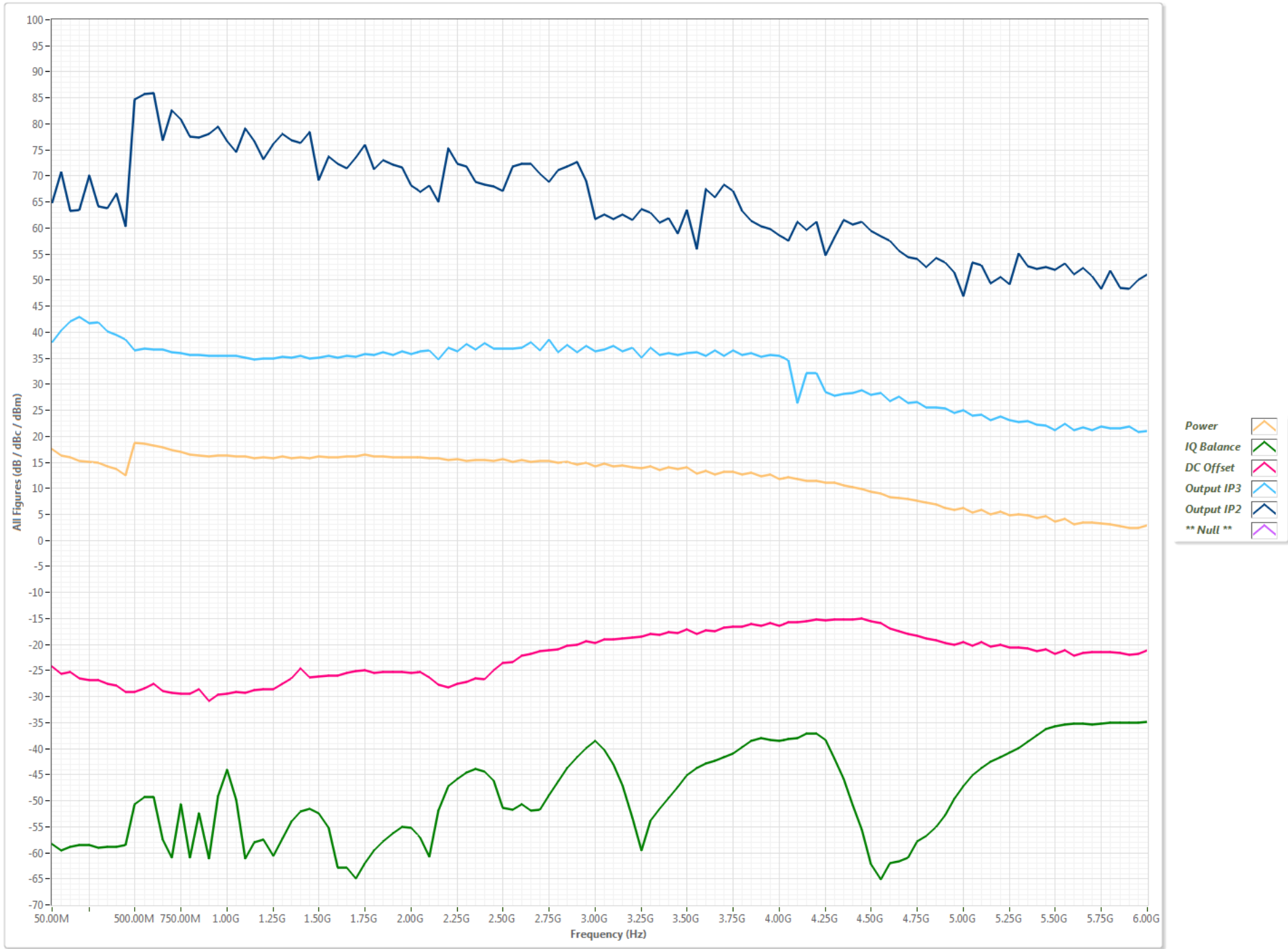
TX Figure vs Frequency w/ Gain=24.50dB



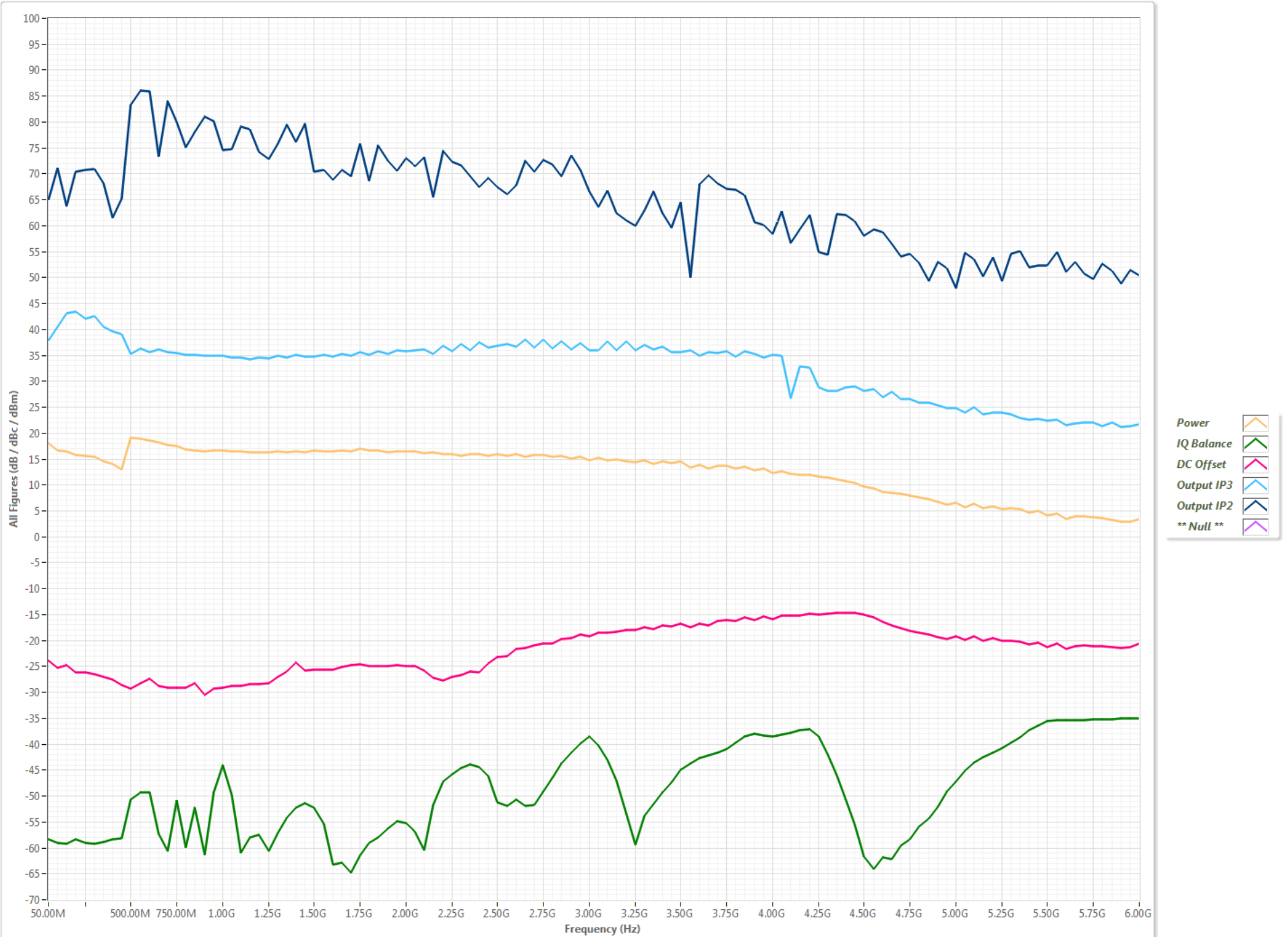
TX Figure vs Frequency w/ Gain=25.00dB



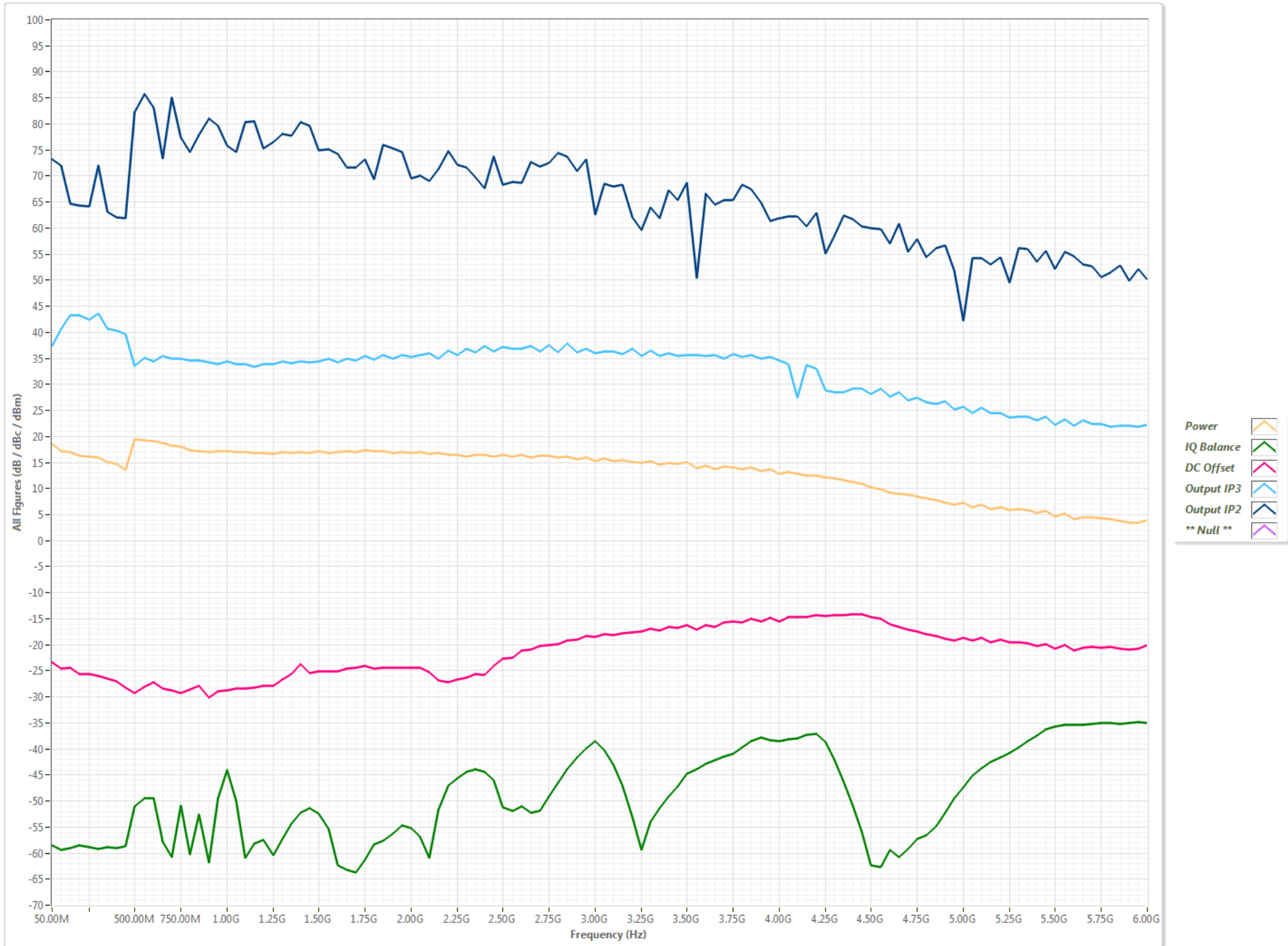
TX Figure vs Frequency w/ Gain=25.50dB



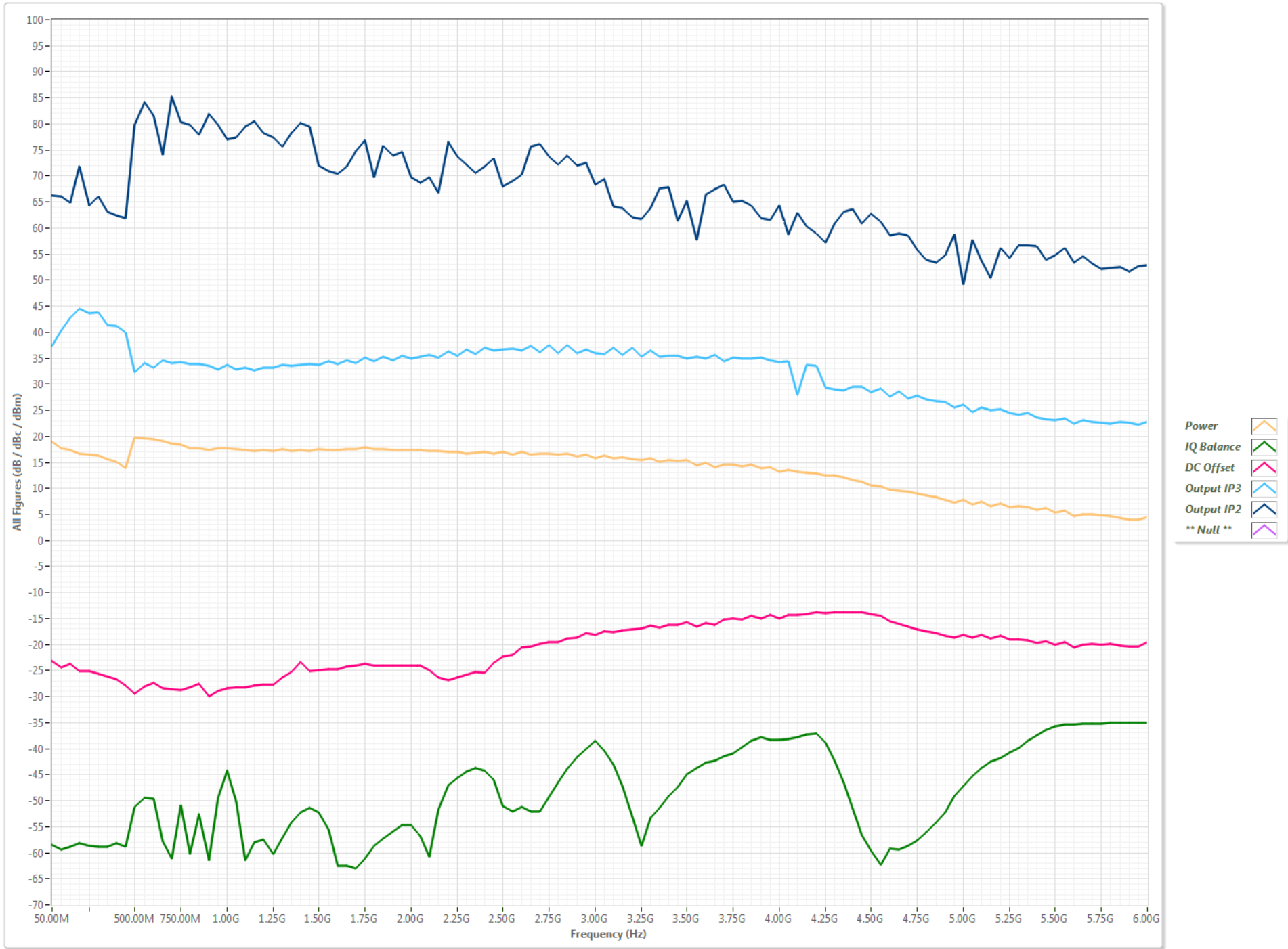
TX Figure vs Frequency w/ Gain=26.00dB



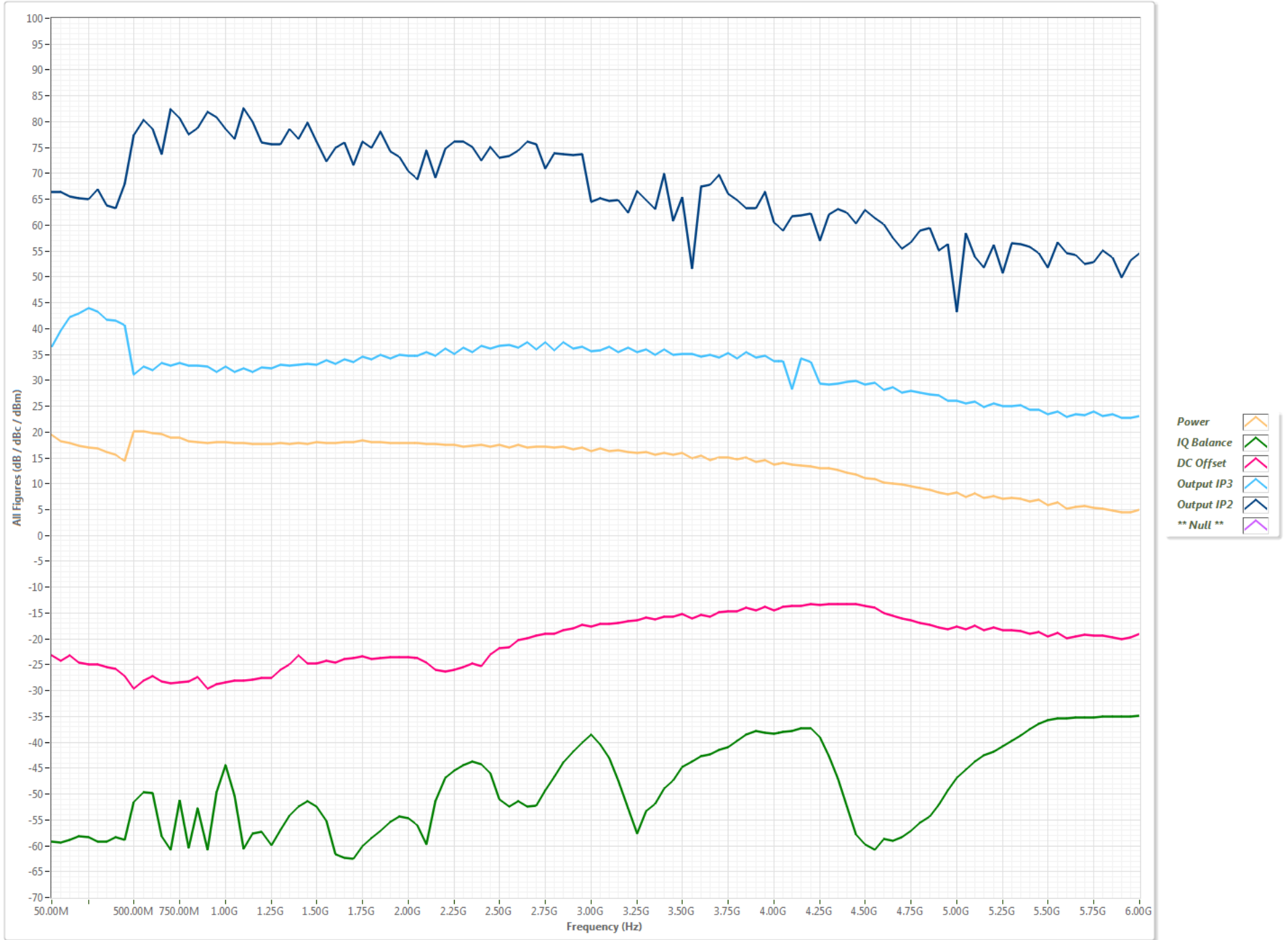
TX Figure vs Frequency w/ Gain=26.50dB



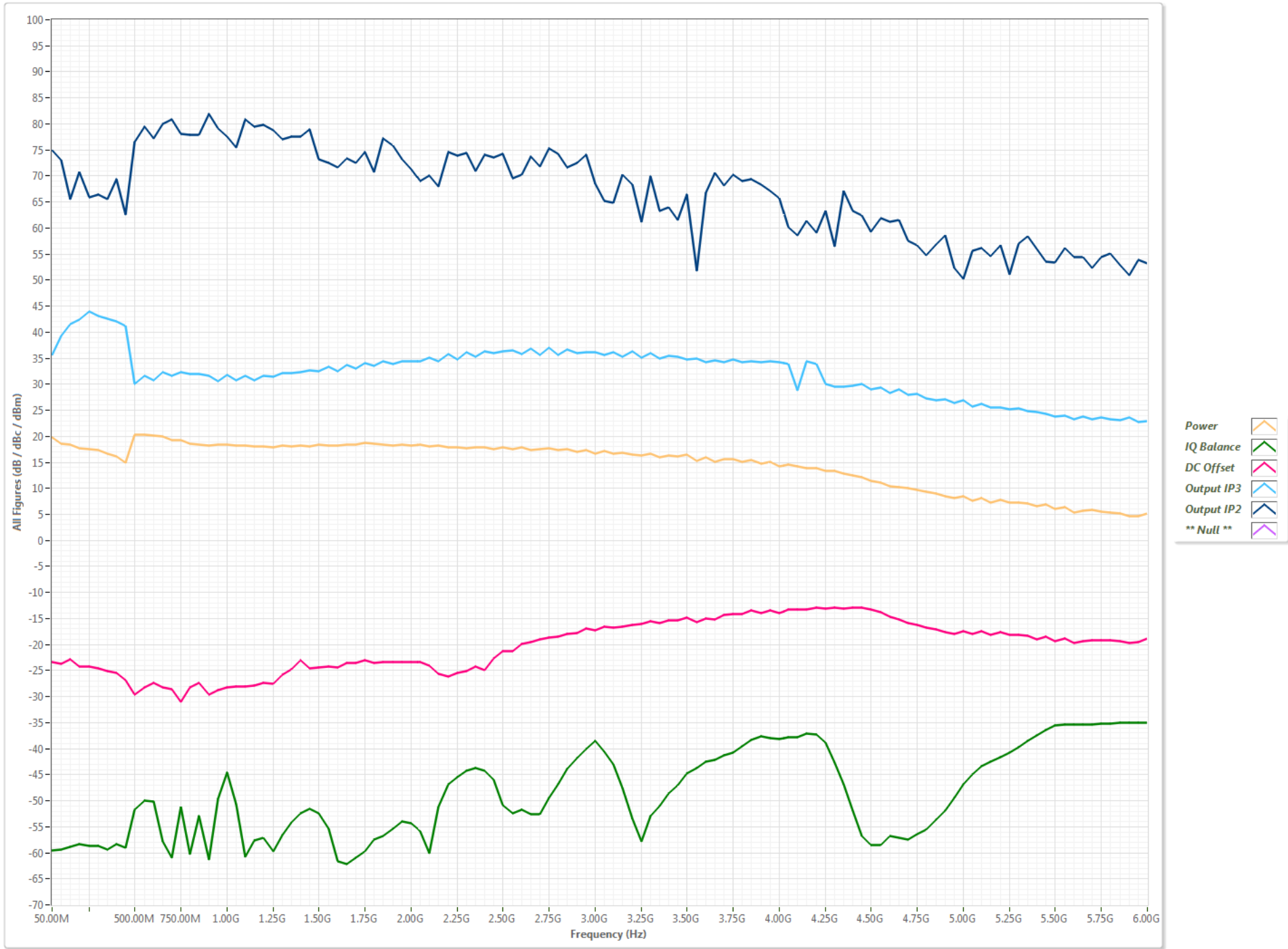
TX Figure vs Frequency w/ Gain=27.00dB



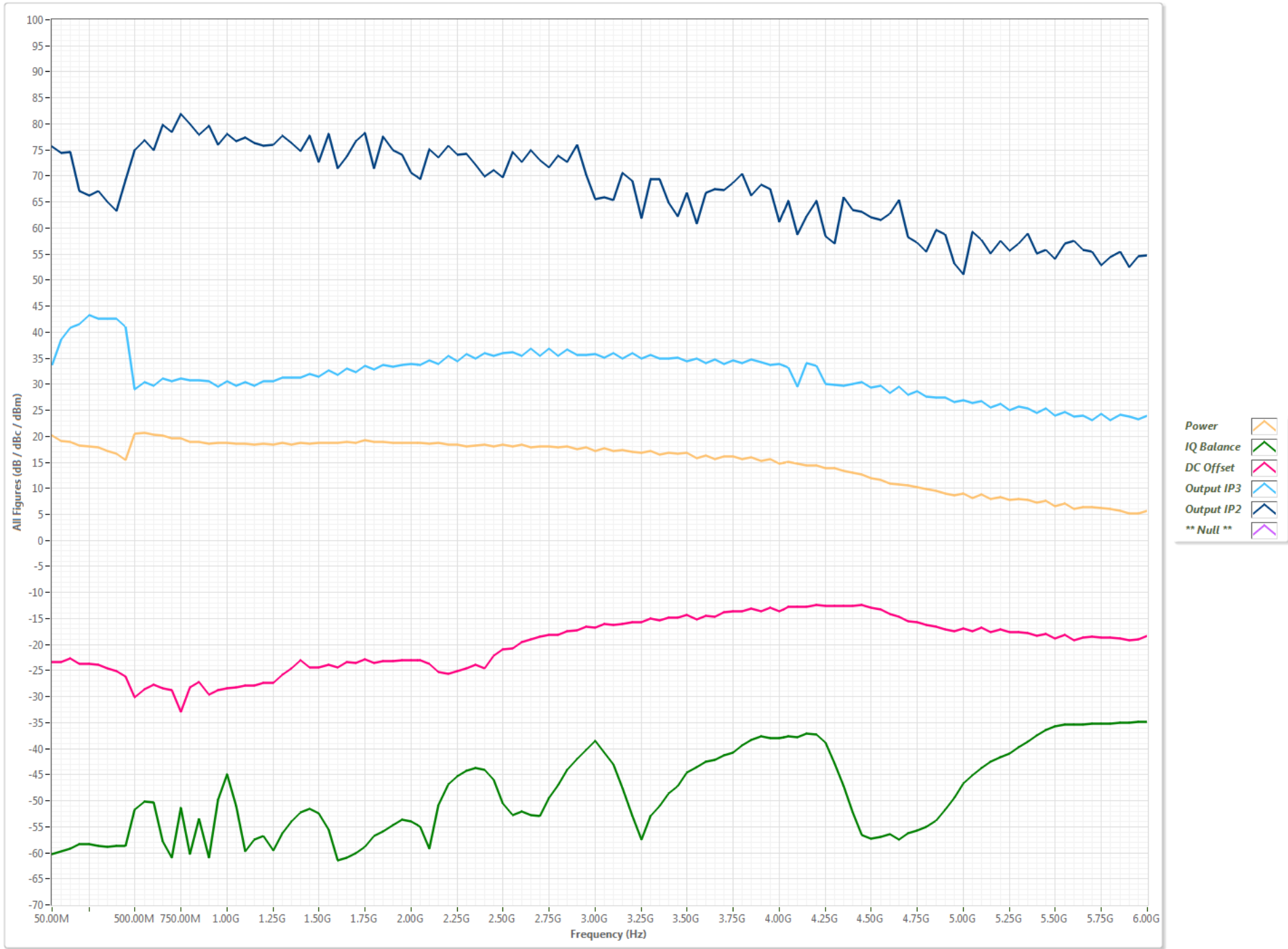
TX Figure vs Frequency w/ Gain=27.50dB



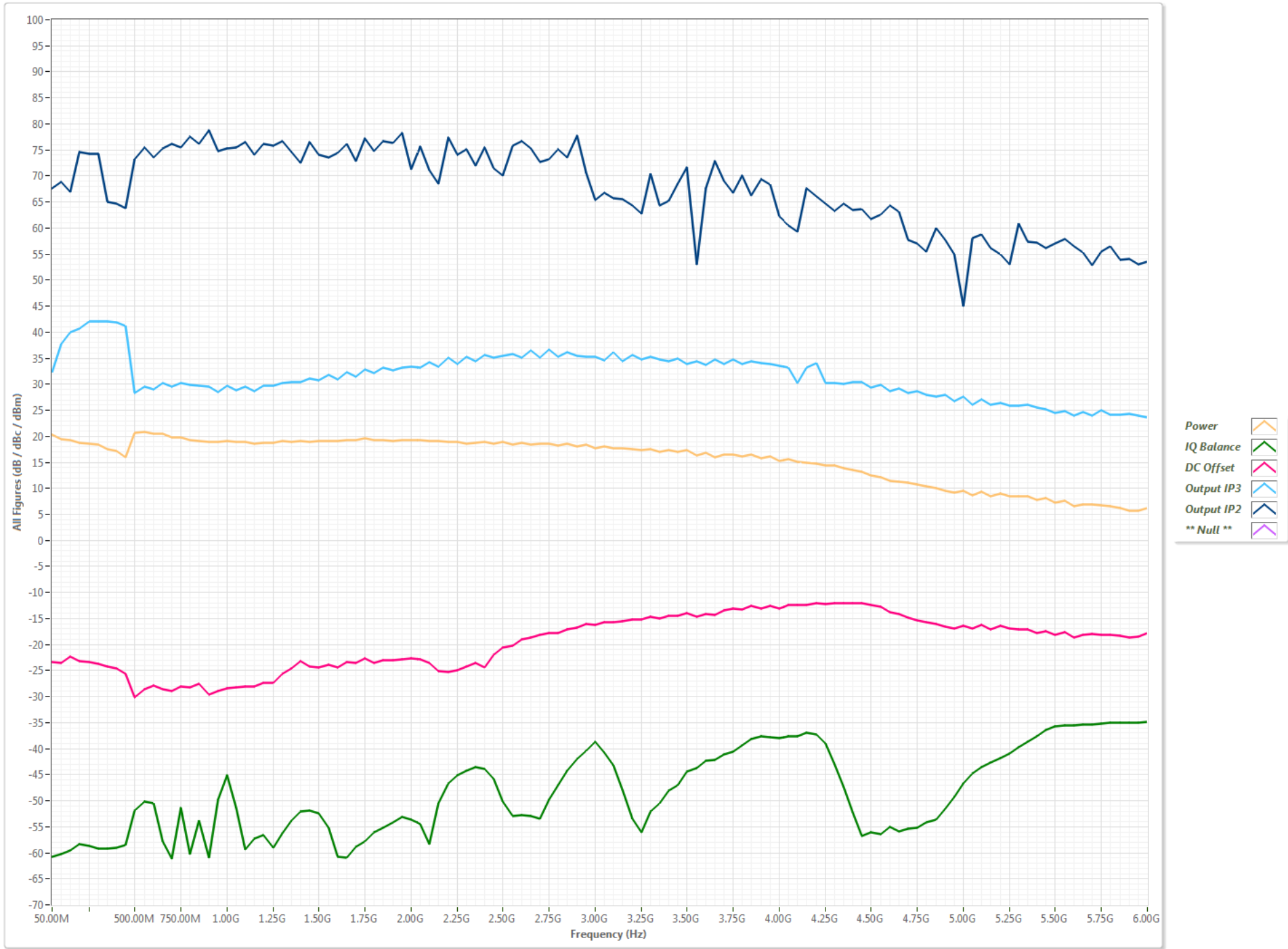
TX Figure vs Frequency w/ Gain=28.00dB



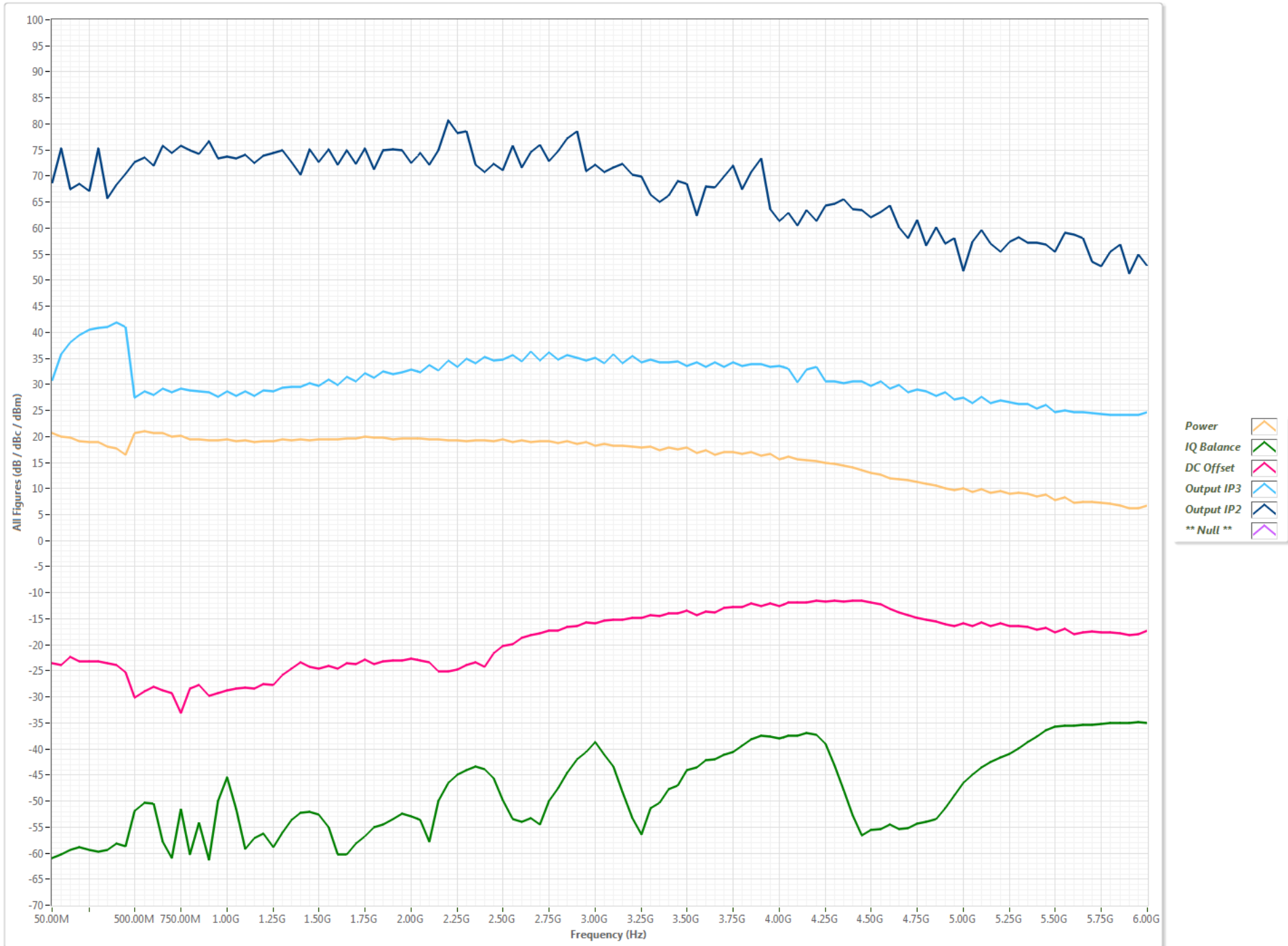
TX Figure vs Frequency w/ Gain=28.50dB



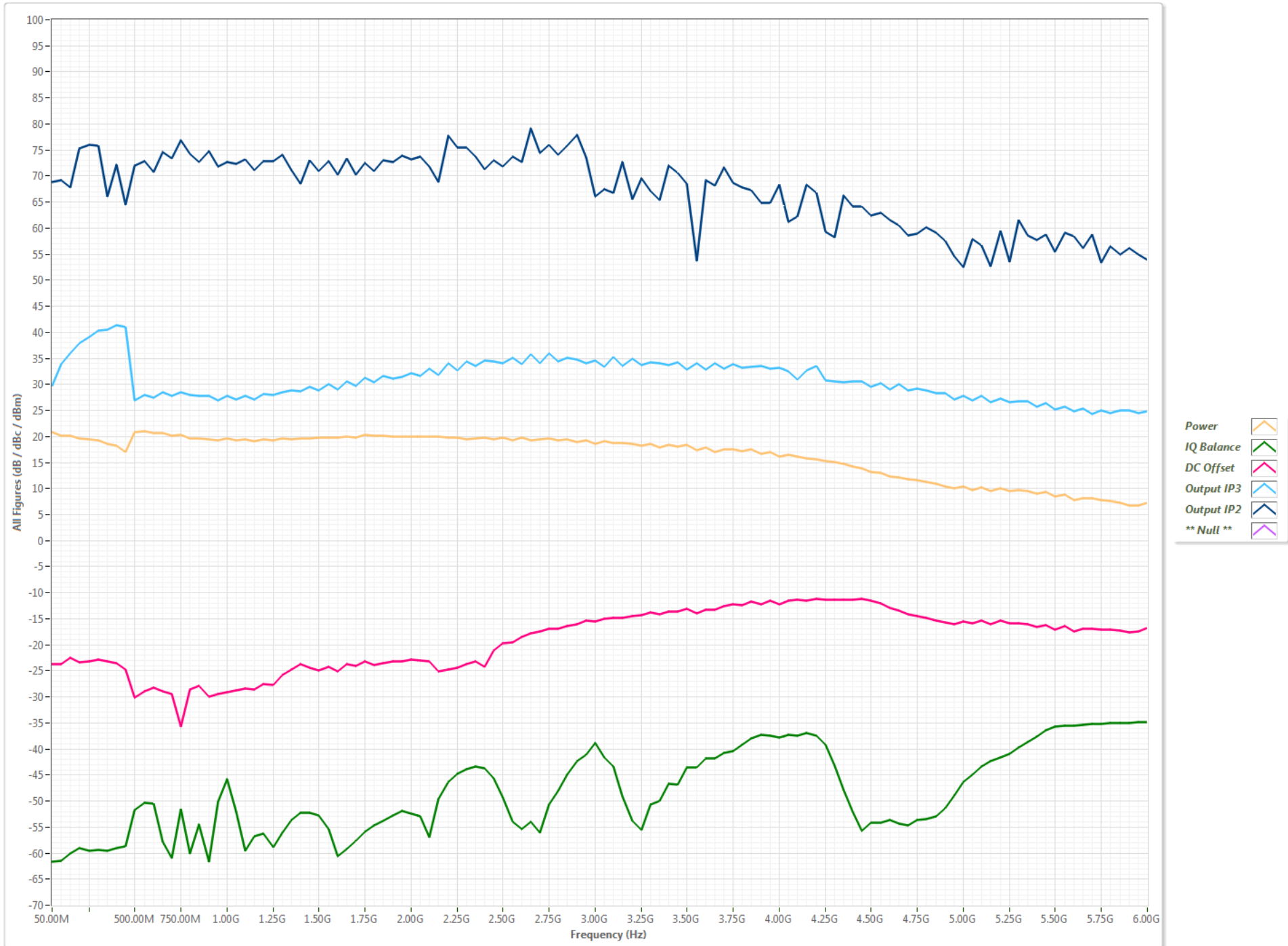
TX Figure vs Frequency w/ Gain=29.00dB



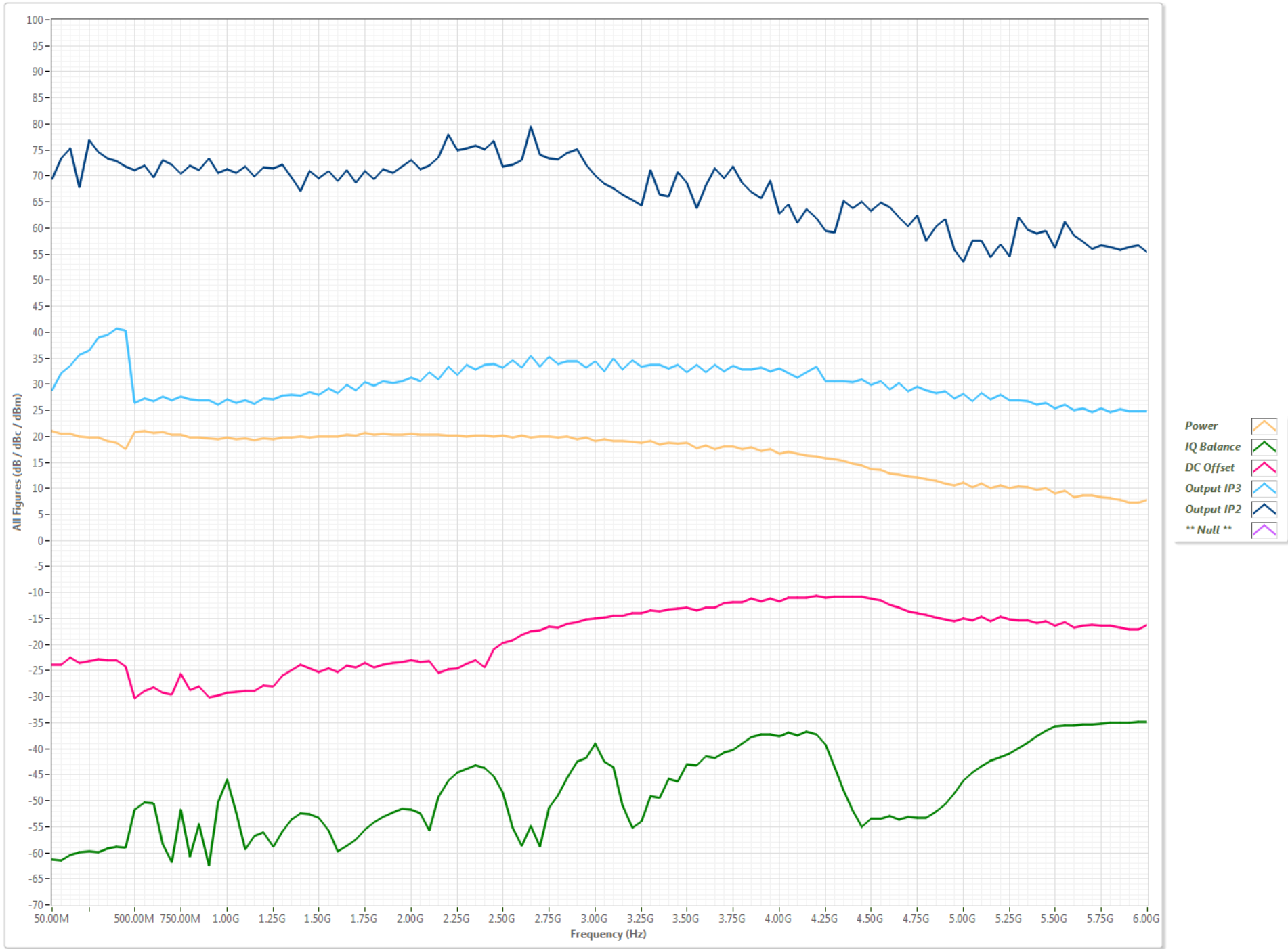
TX Figure vs Frequency w/ Gain=29.50dB



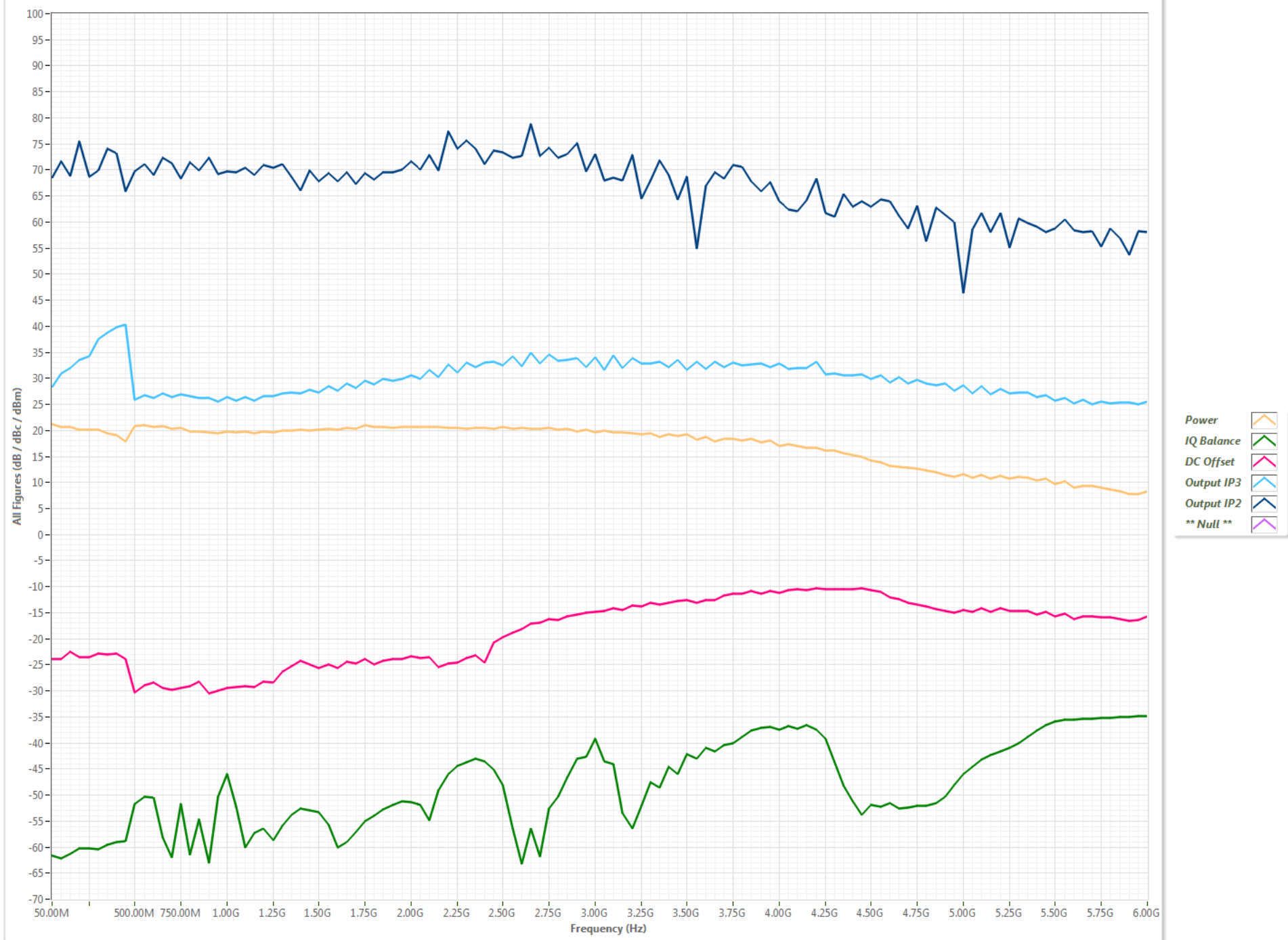
TX Figure vs Frequency w/ Gain=30.00dB



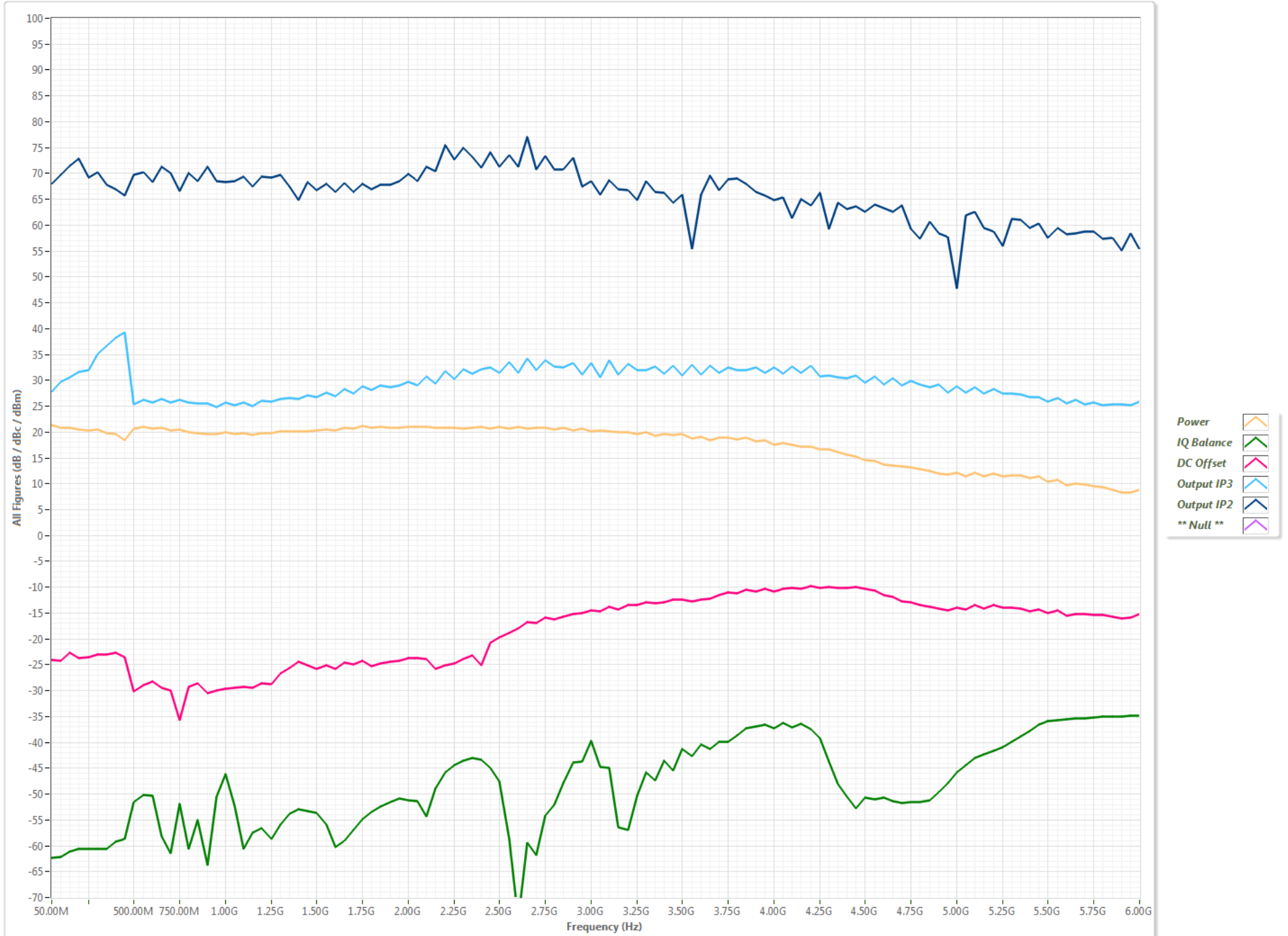
TX Figure vs Frequency w/ Gain=30.50dB



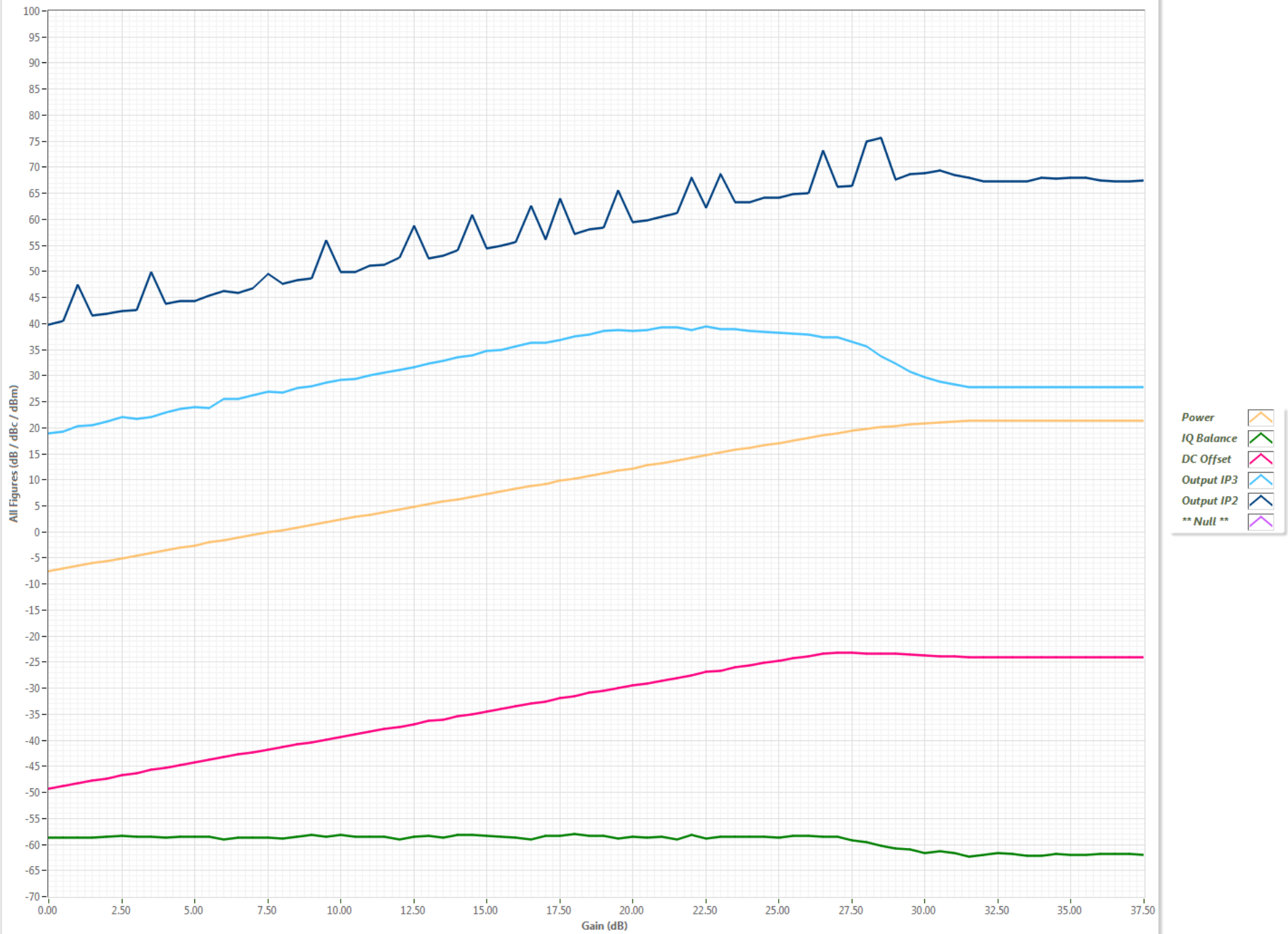
TX Figure vs Frequency w/ Gain=31.00dB



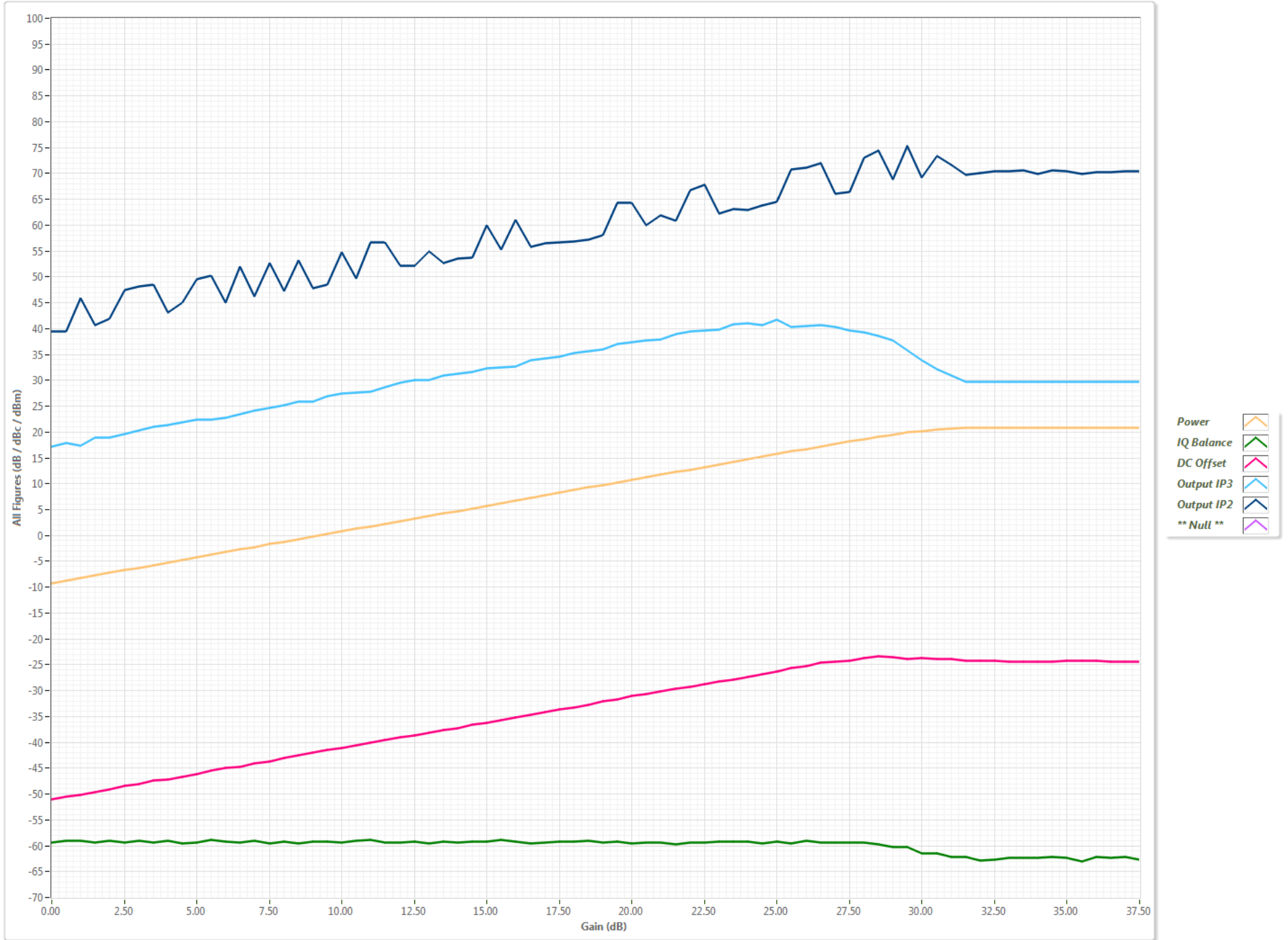
TX Figure vs Frequency w/ Gain=31.50dB



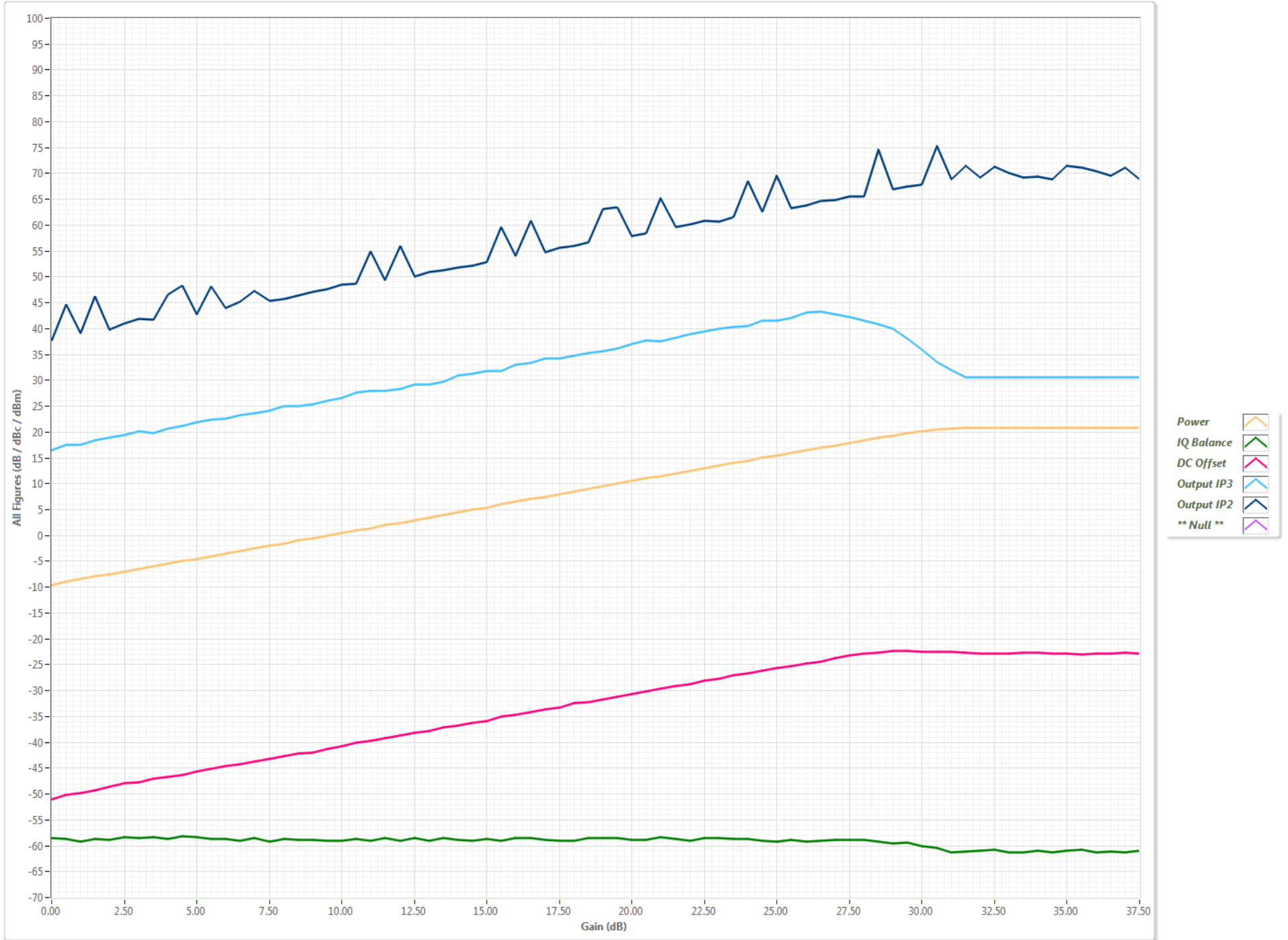
TX Figure vs Gain w/ Frequency=50.00MHz



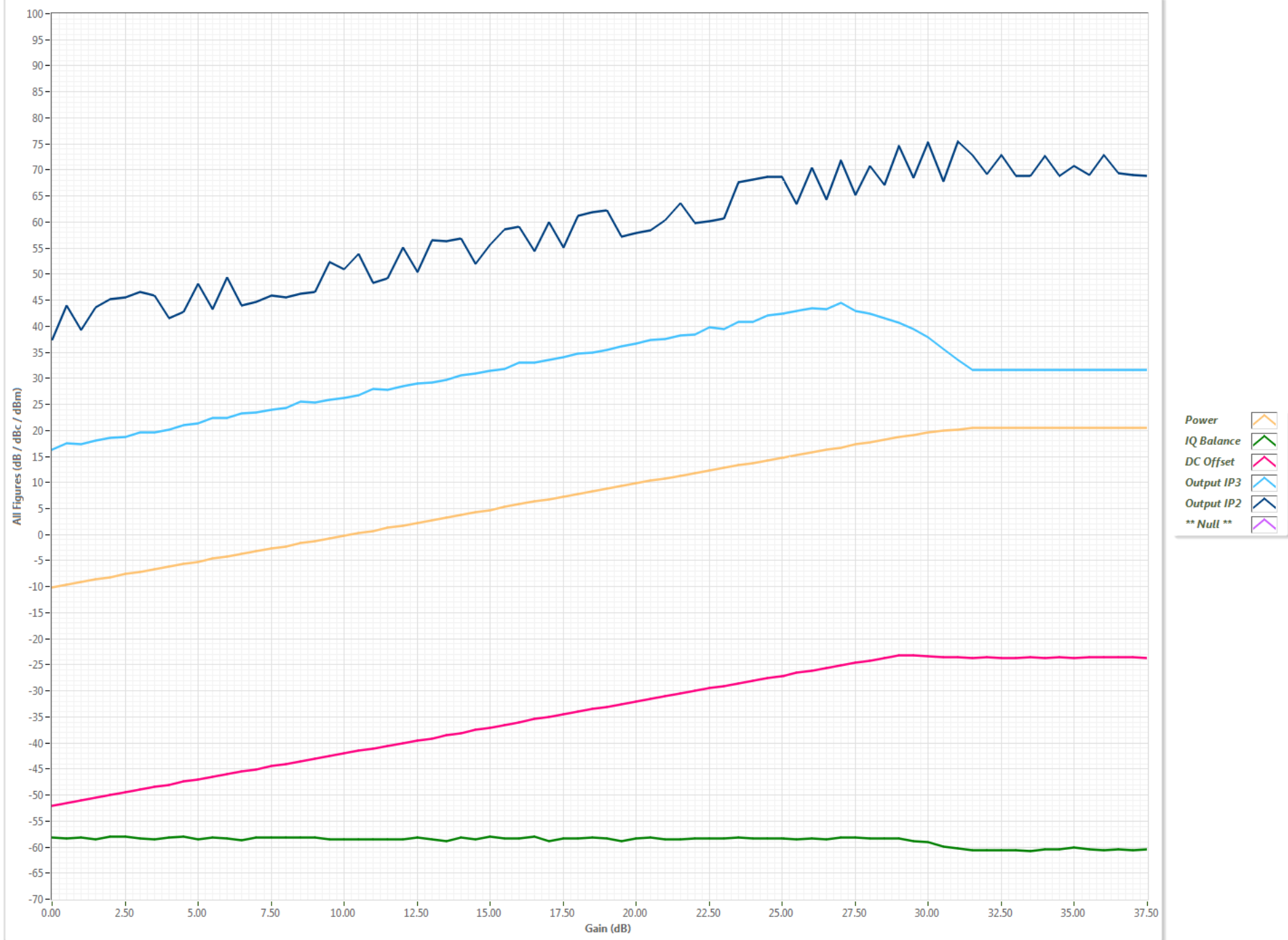
TX Figure vs Gain w/ Frequency=100.00MHz



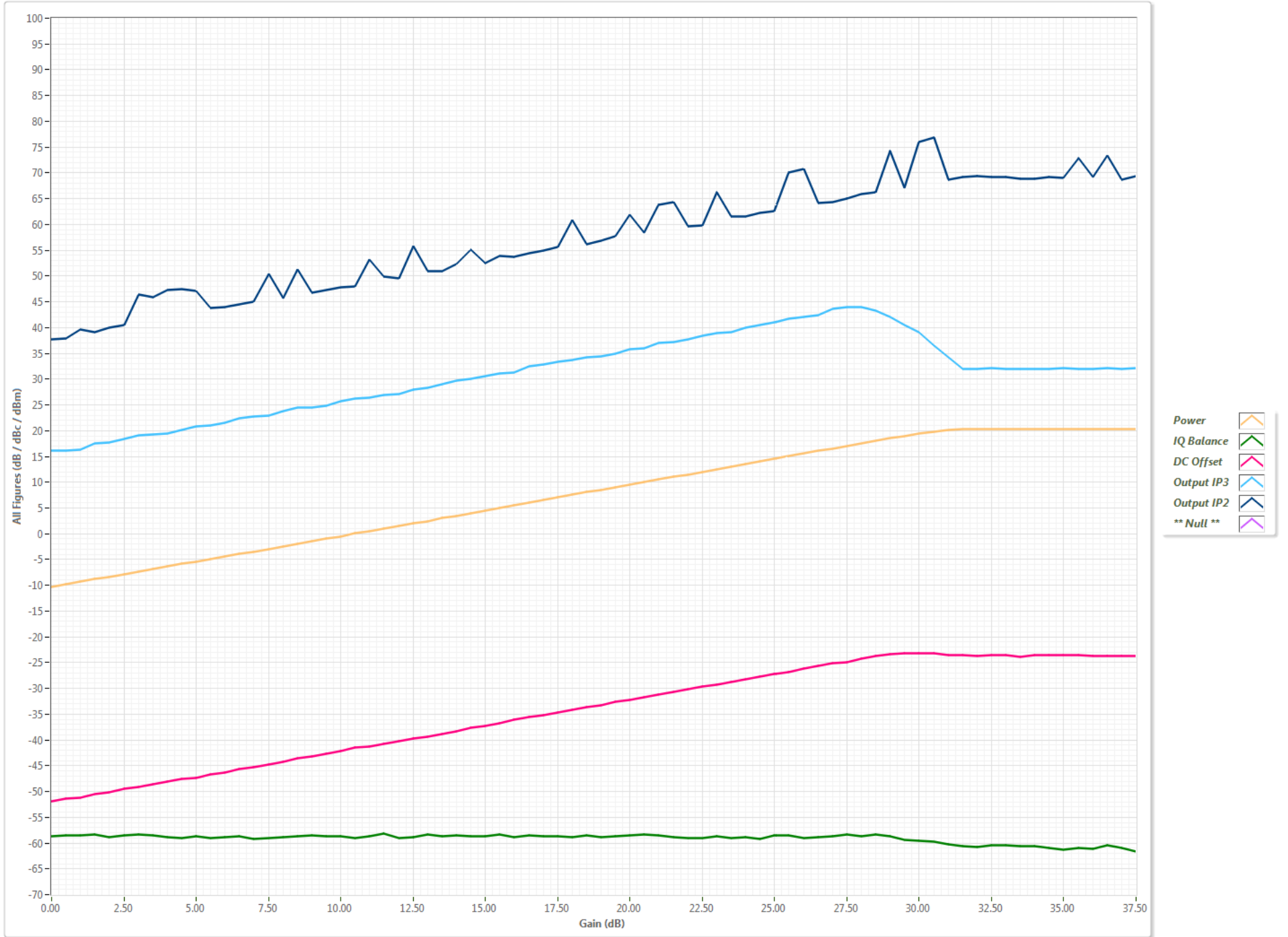
TX Figure vs Gain w/ Frequency=150.00MHz



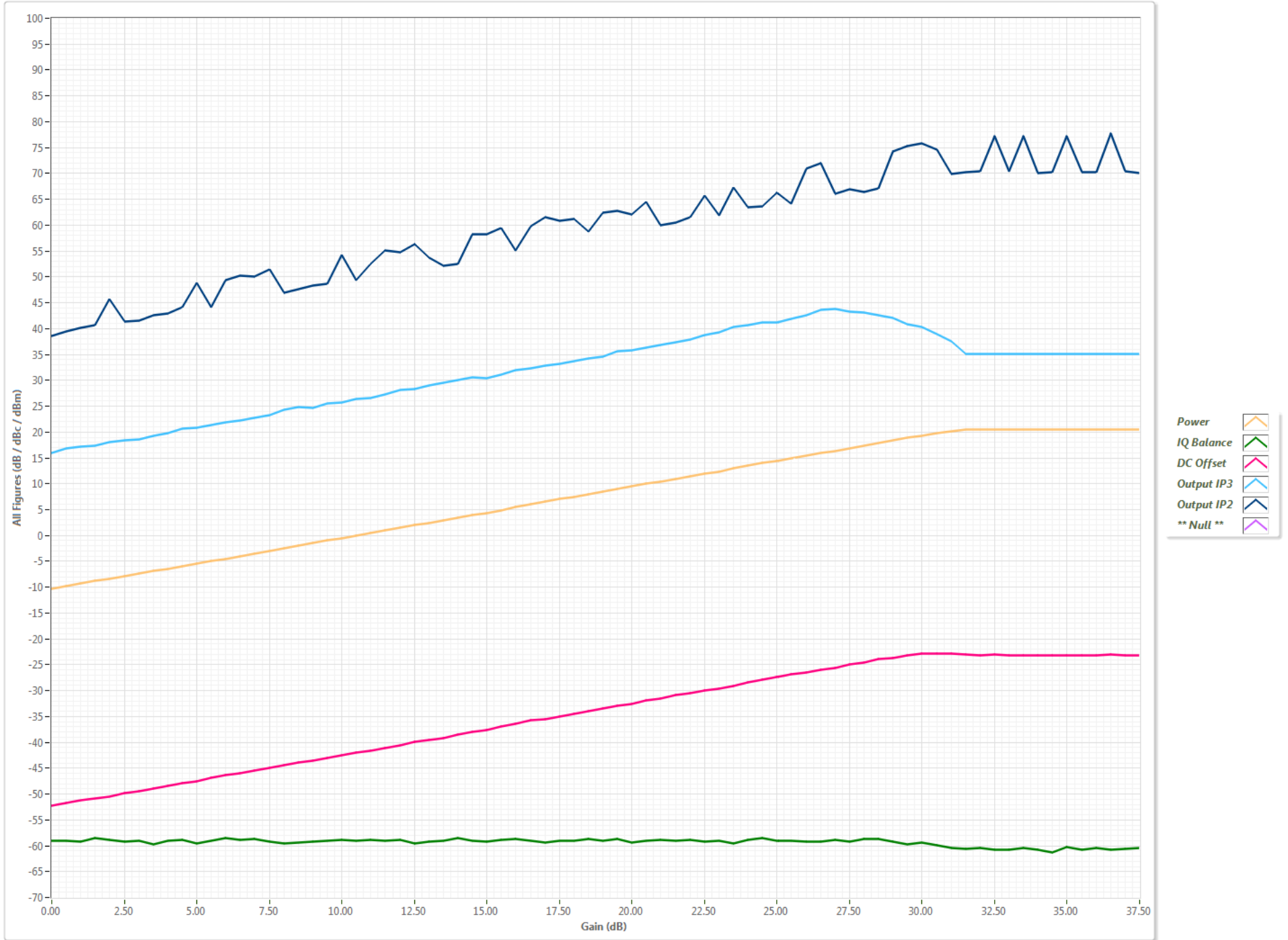
TX Figure vs Gain w/ Frequency=200.00MHz



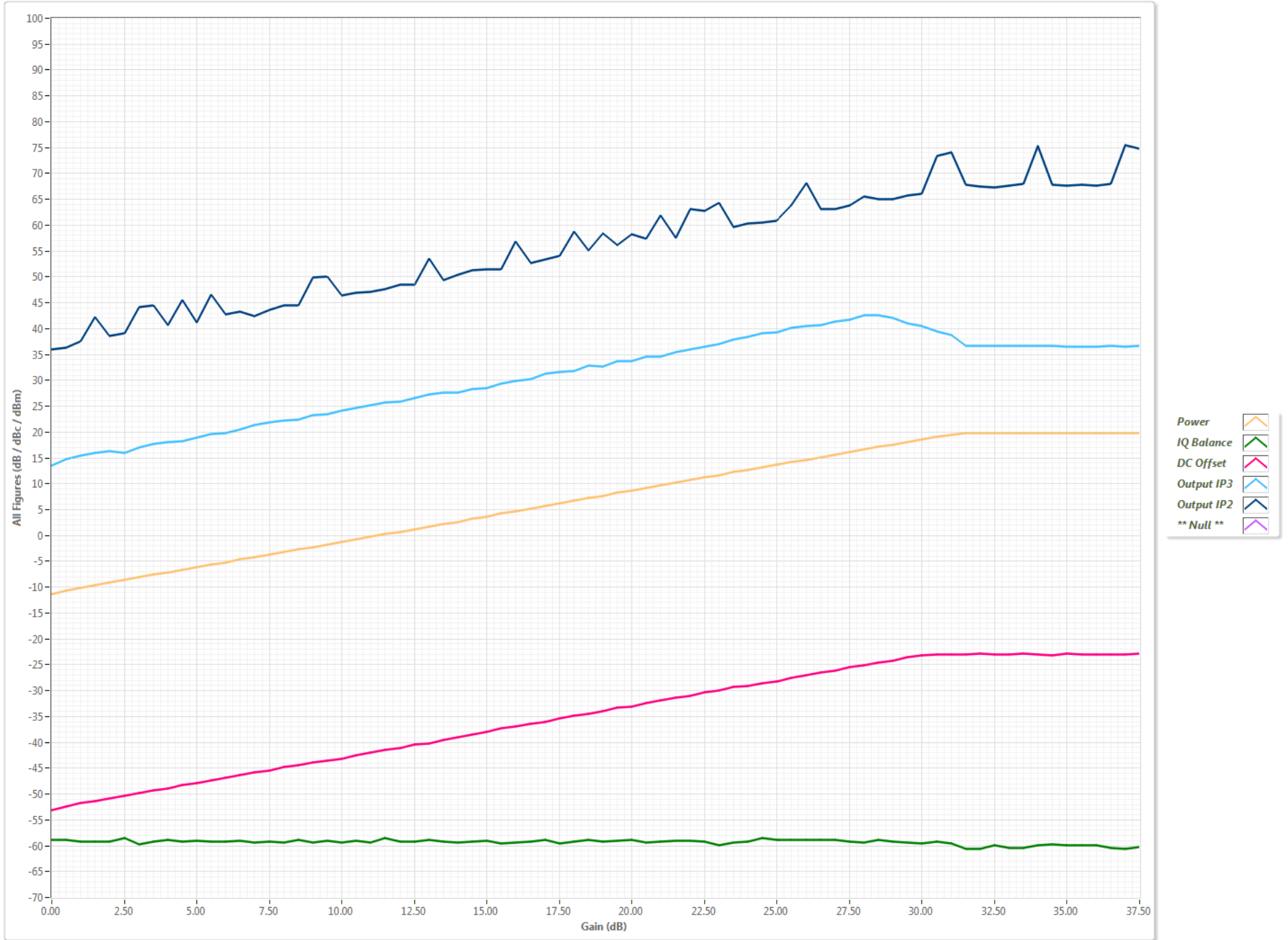
TX Figure vs Gain w/ Frequency=250.00MHz



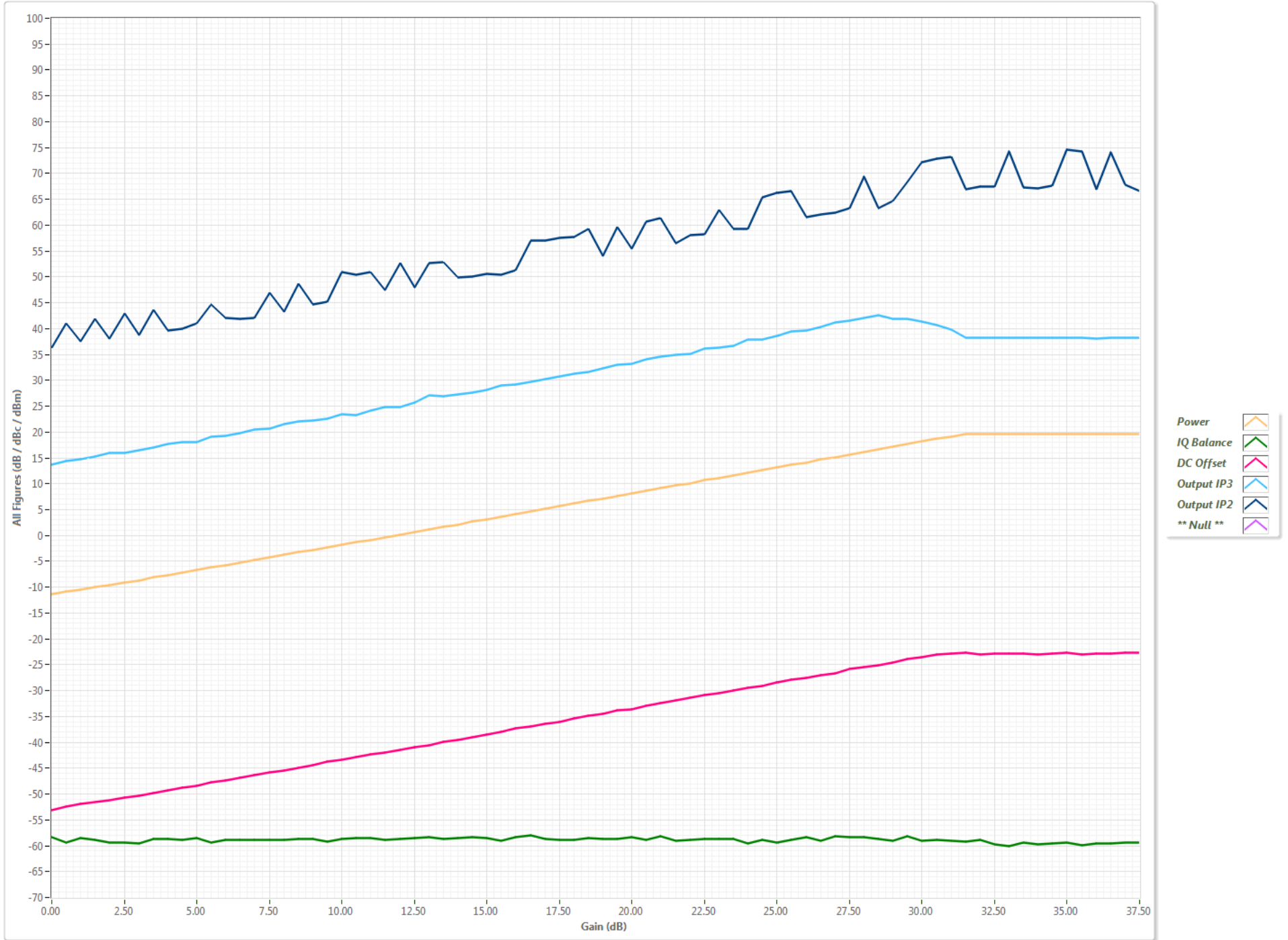
TX Figure vs Gain w/ Frequency=300.00MHz



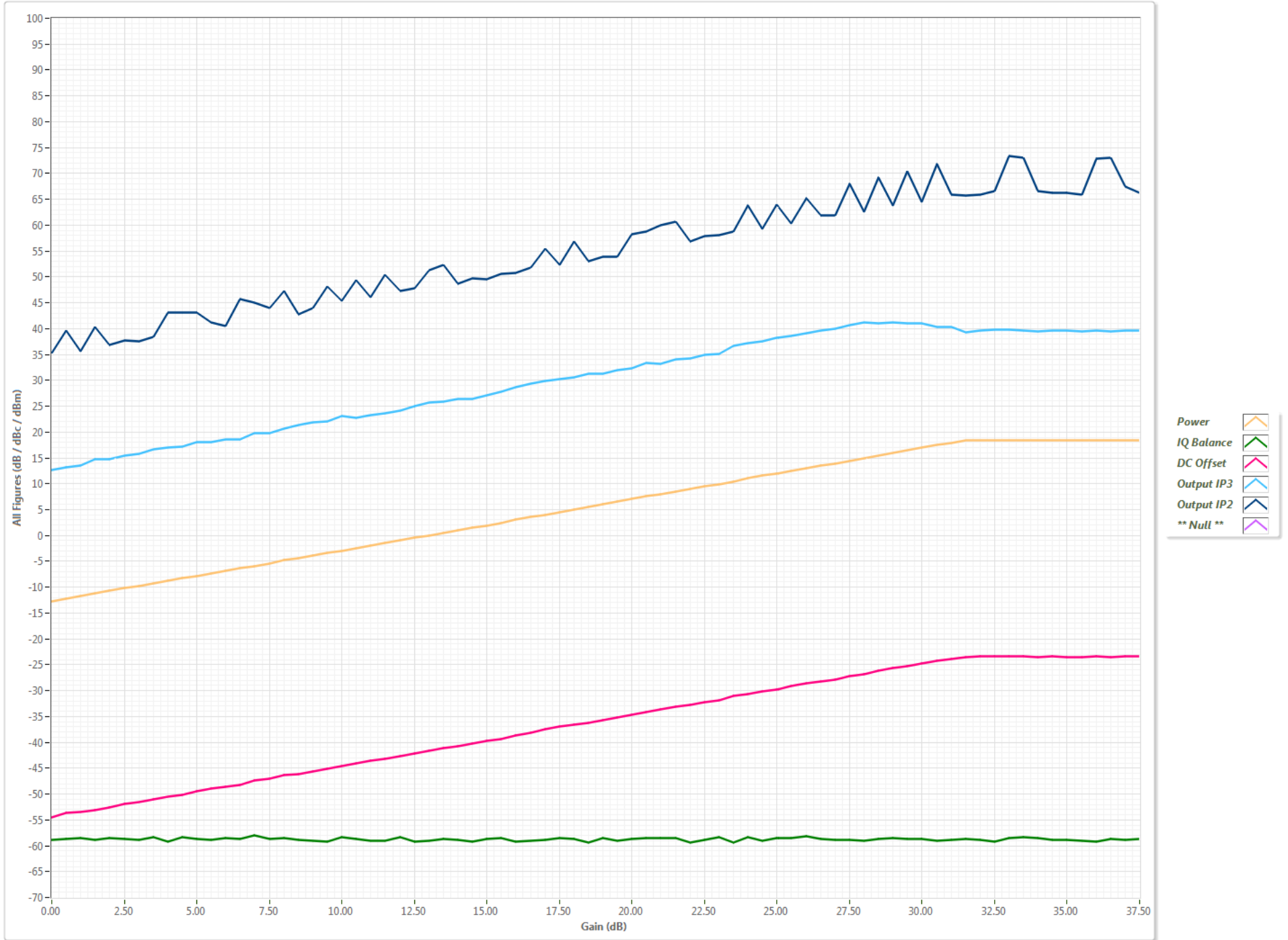
TX Figure vs Gain w/ Frequency=350.00MHz



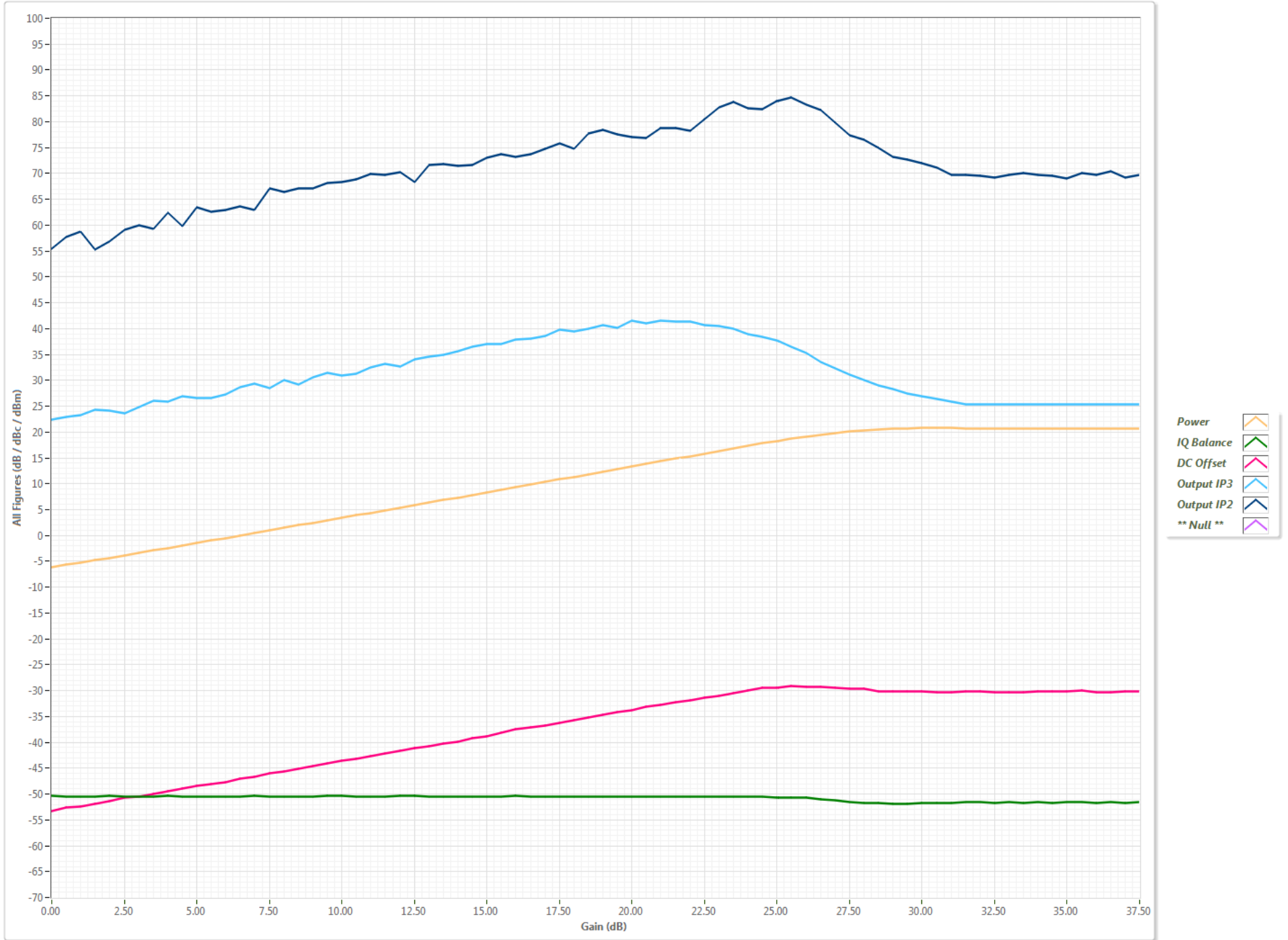
TX Figure vs Gain w/ Frequency=400.00MHz



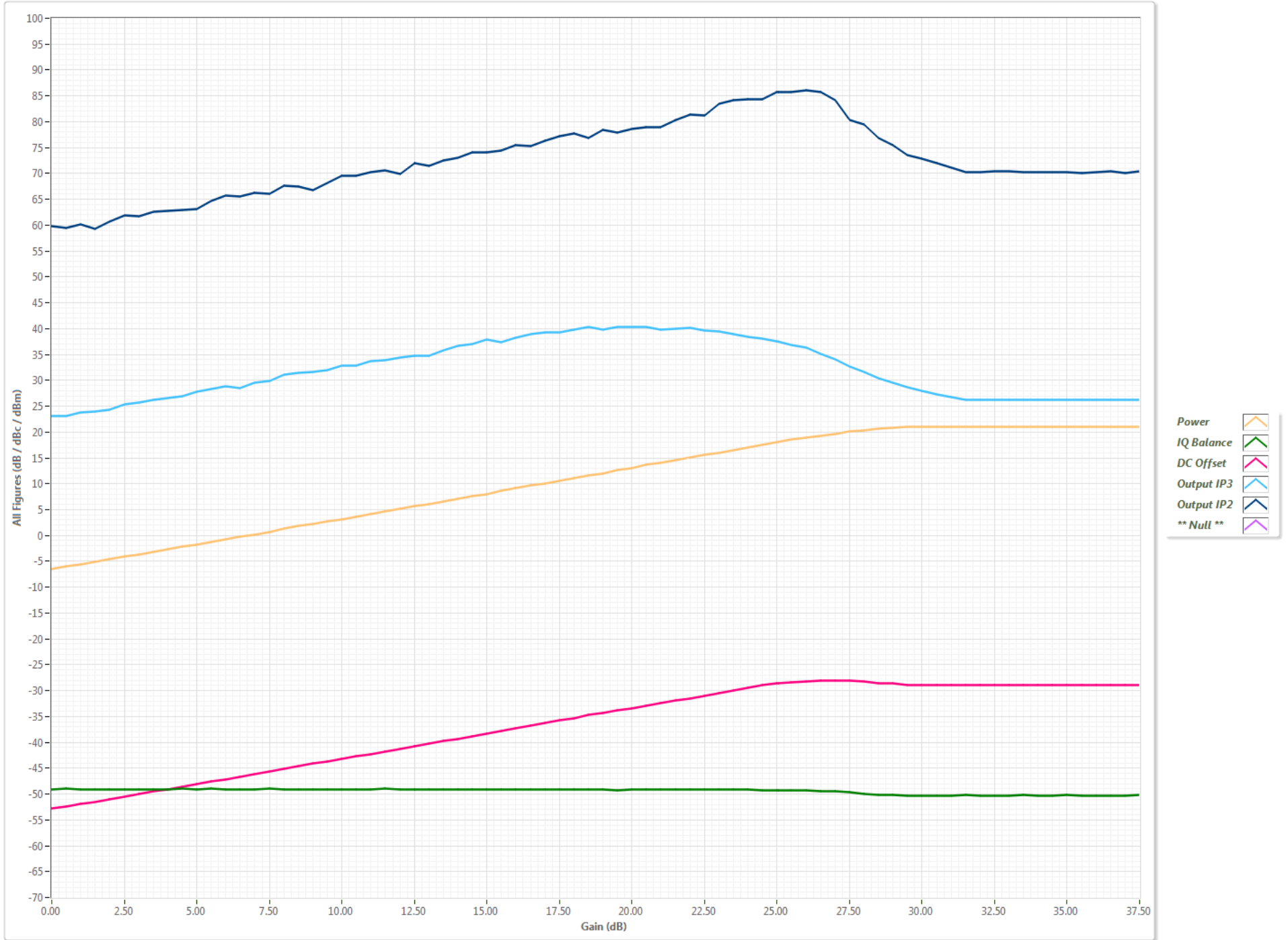
TX Figure vs Gain w/ Frequency=450.00MHz



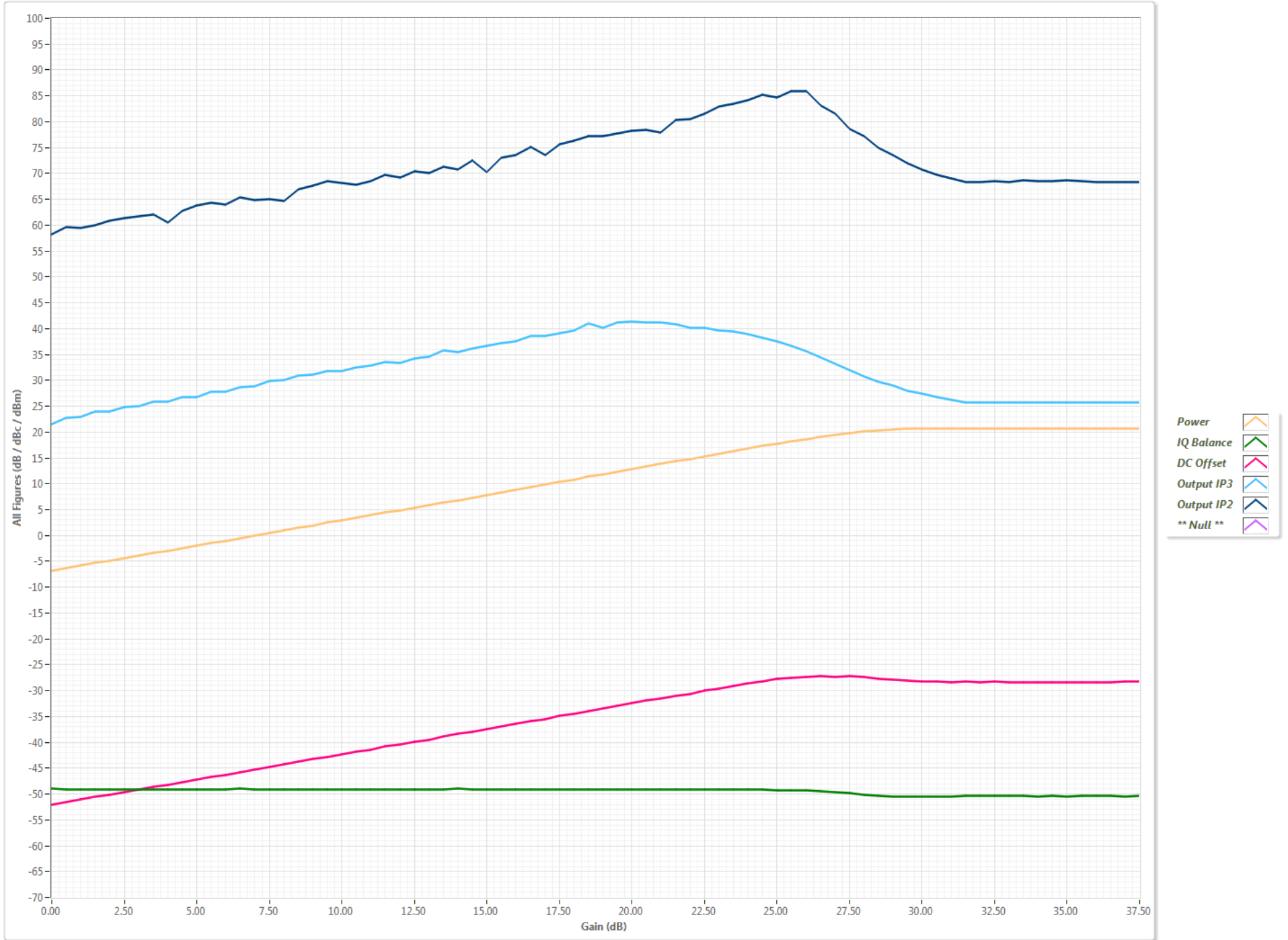
TX Figure vs Gain w/ Frequency=500.00MHz



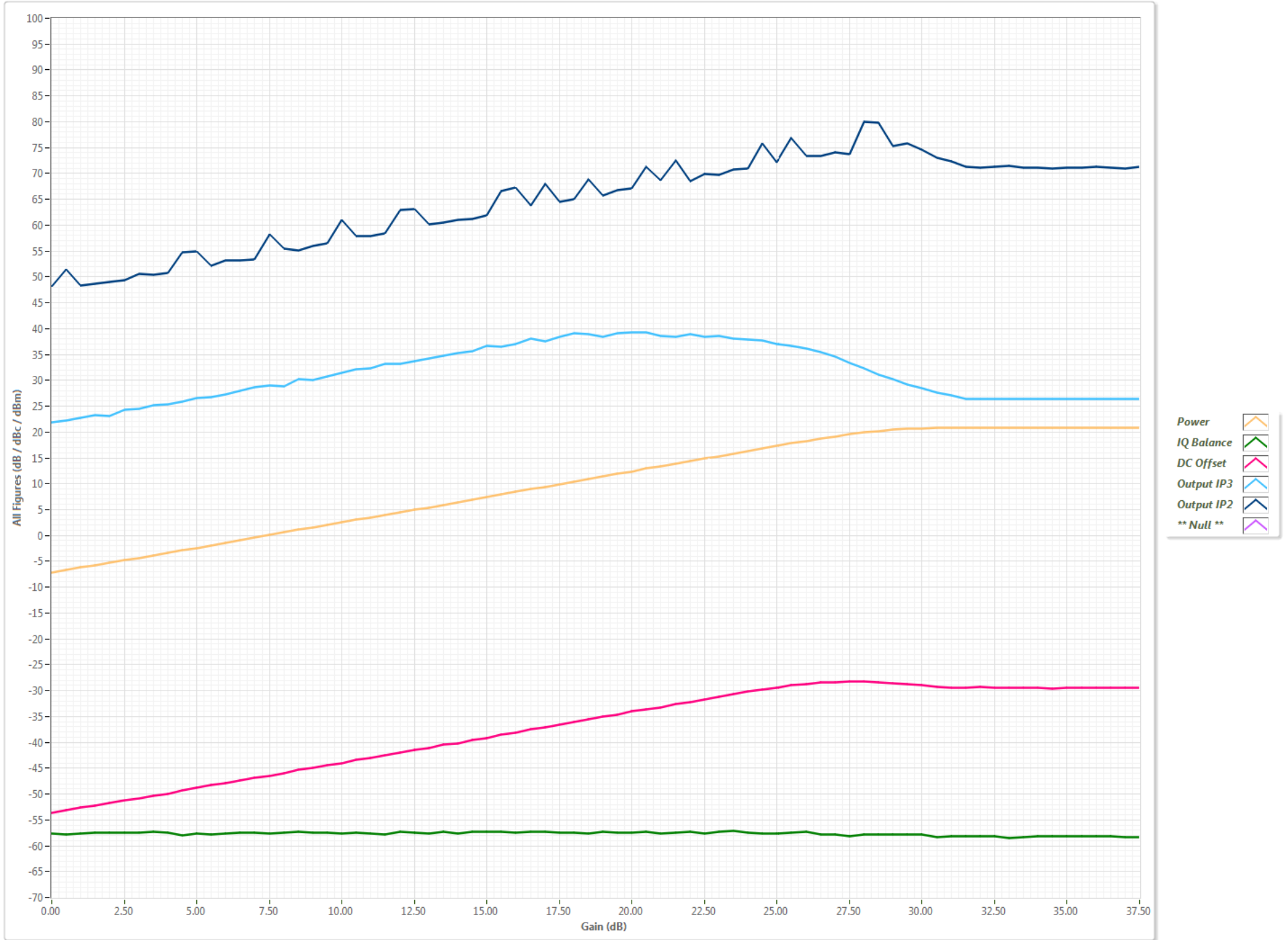
TX Figure vs Gain w/ Frequency=550.00MHz



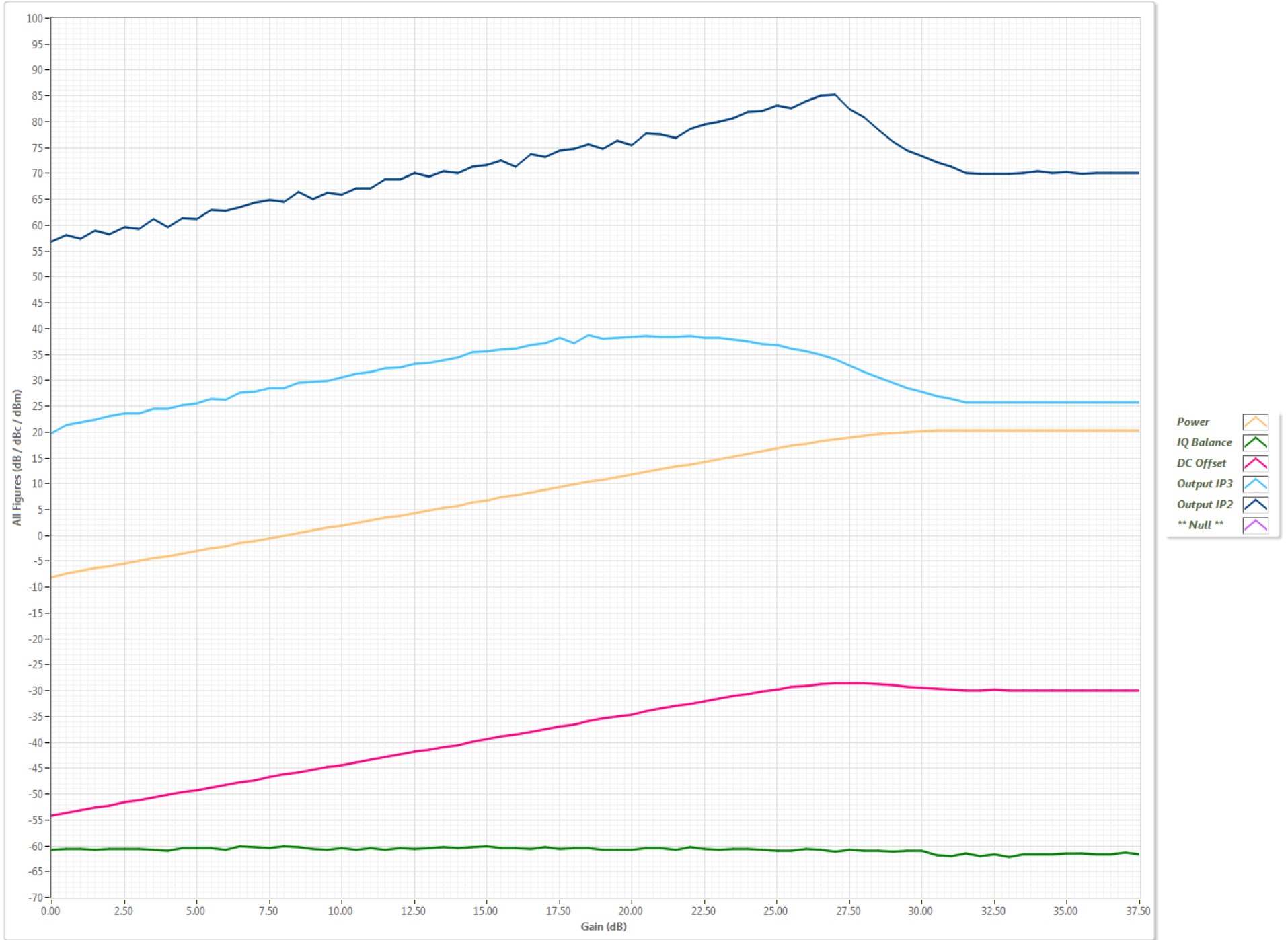
TX Figure vs Gain w/ Frequency=600.00MHz



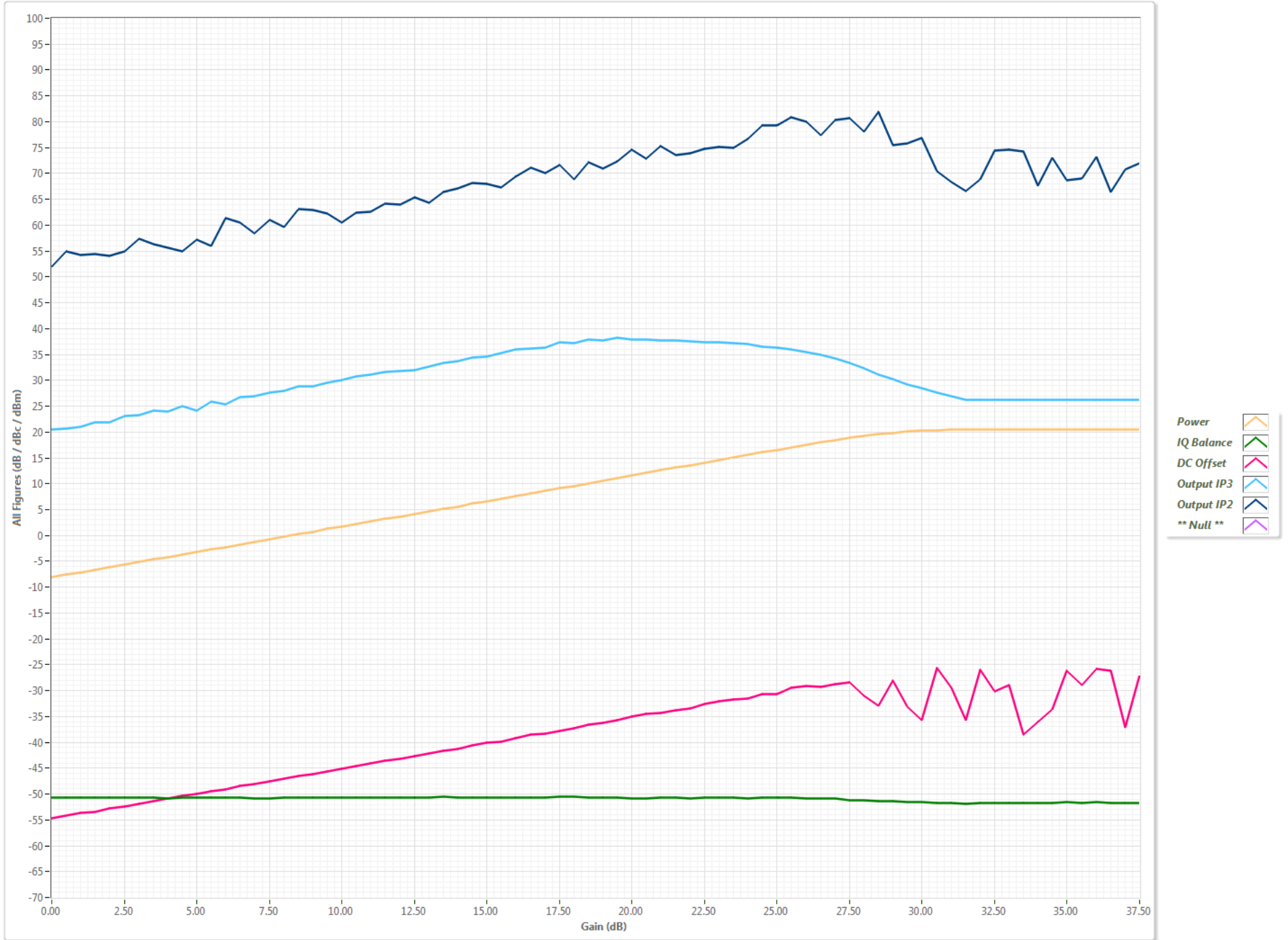
TX Figure vs Gain w/ Frequency=650.00MHz



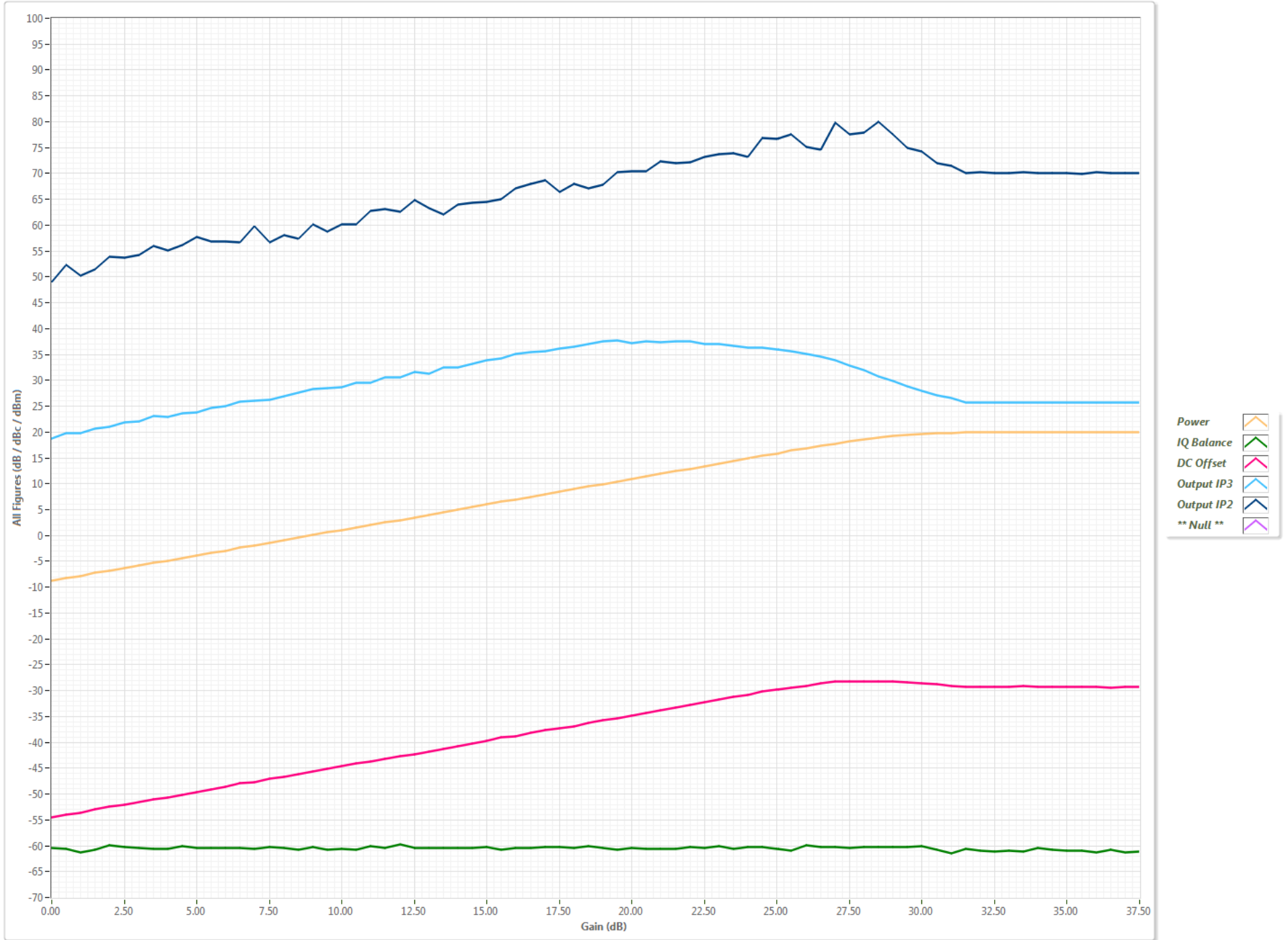
TX Figure vs Gain w/ Frequency=700.00MHz



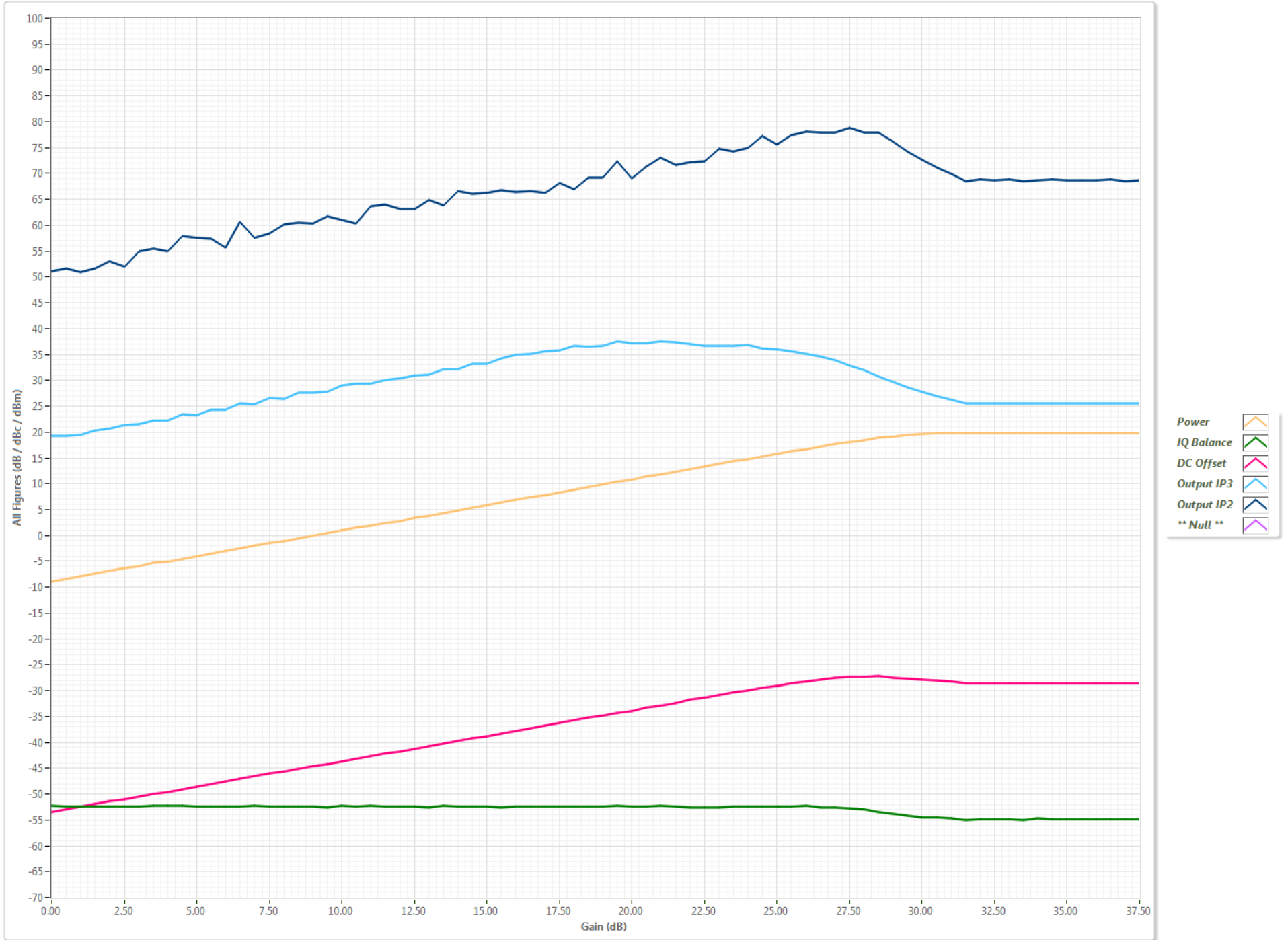
TX Figure vs Gain w/ Frequency=750.00MHz



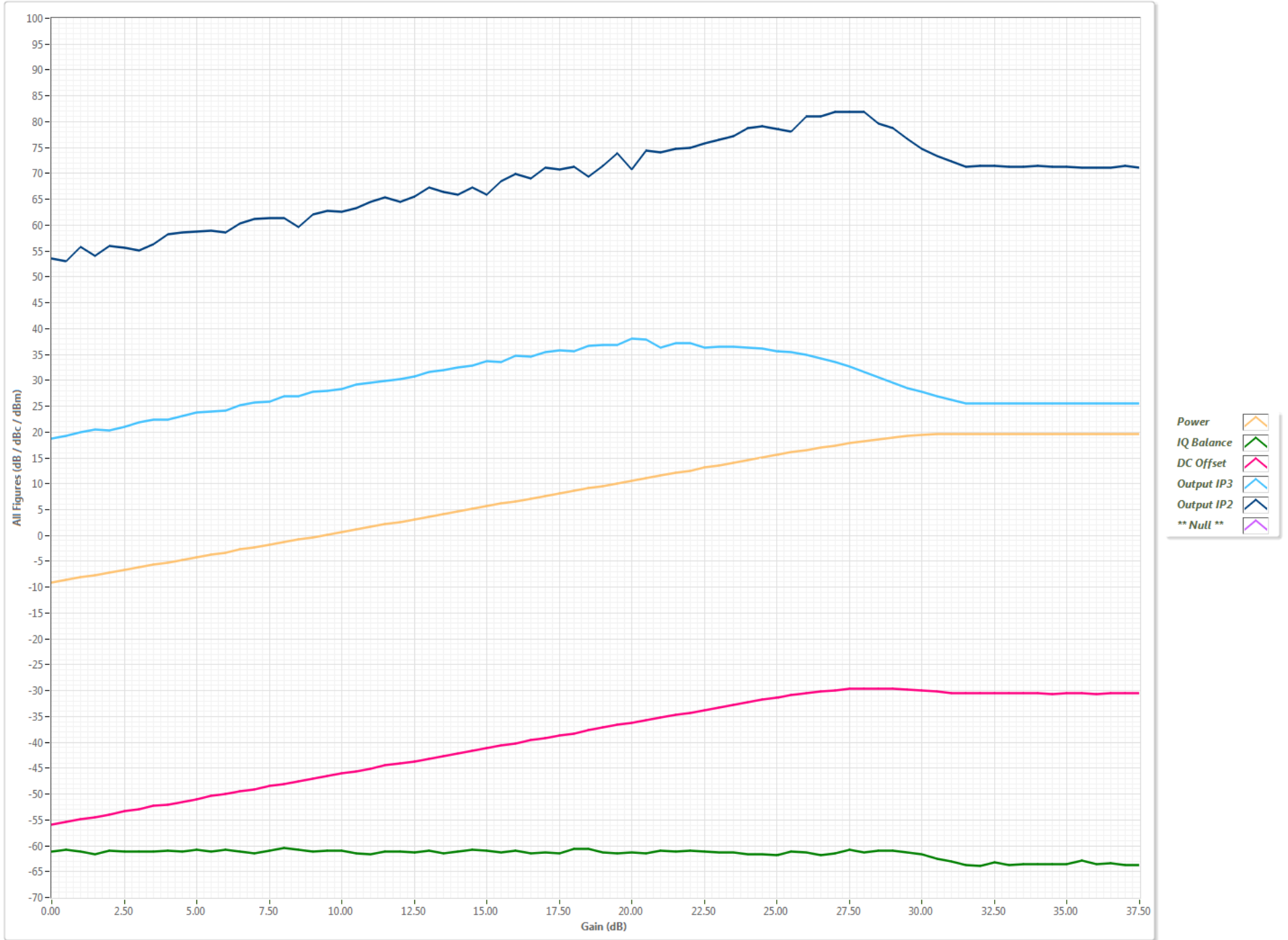
TX Figure vs Gain w/ Frequency=800.00MHz



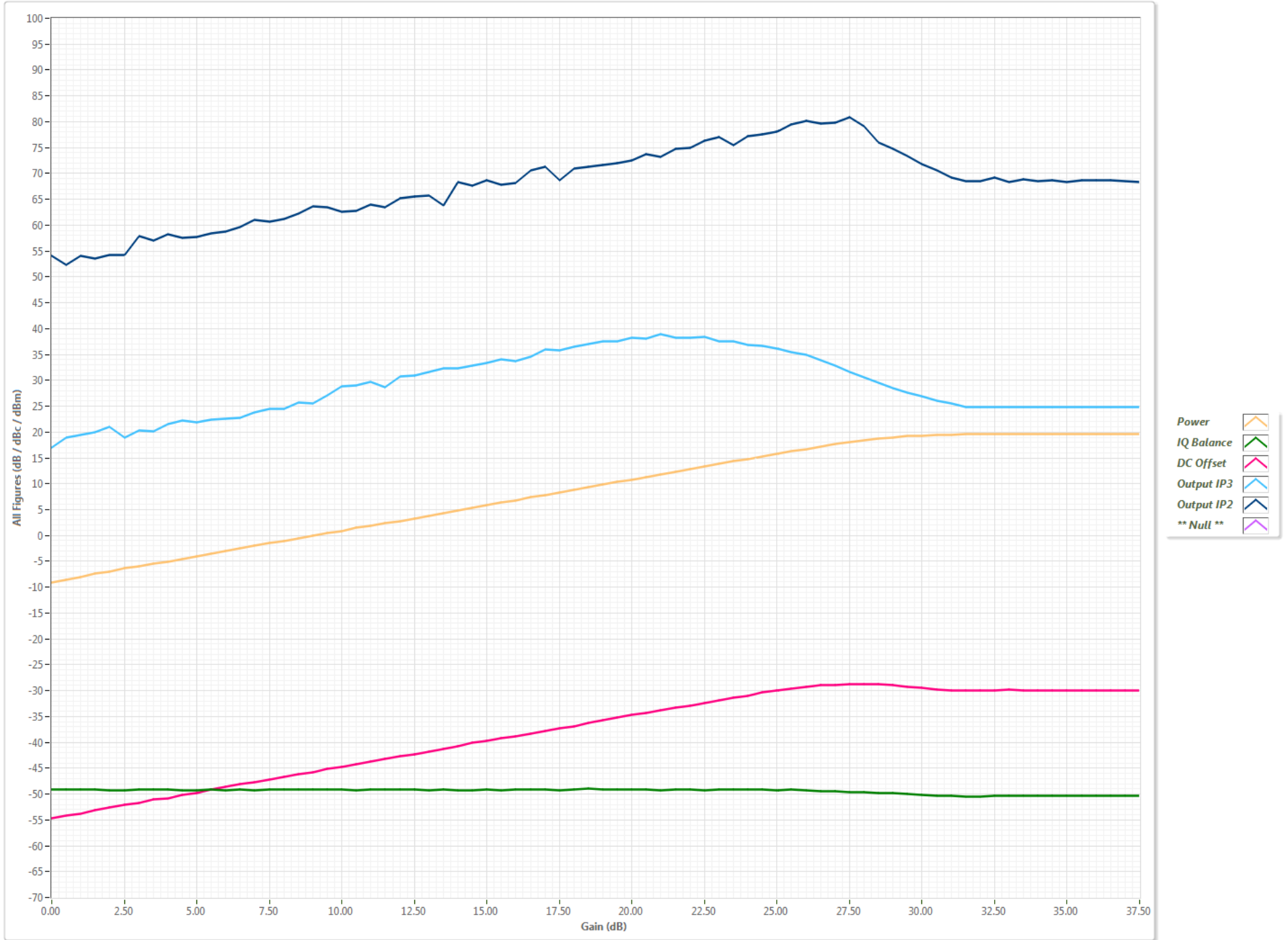
TX Figure vs Gain w/ Frequency=850.00MHz



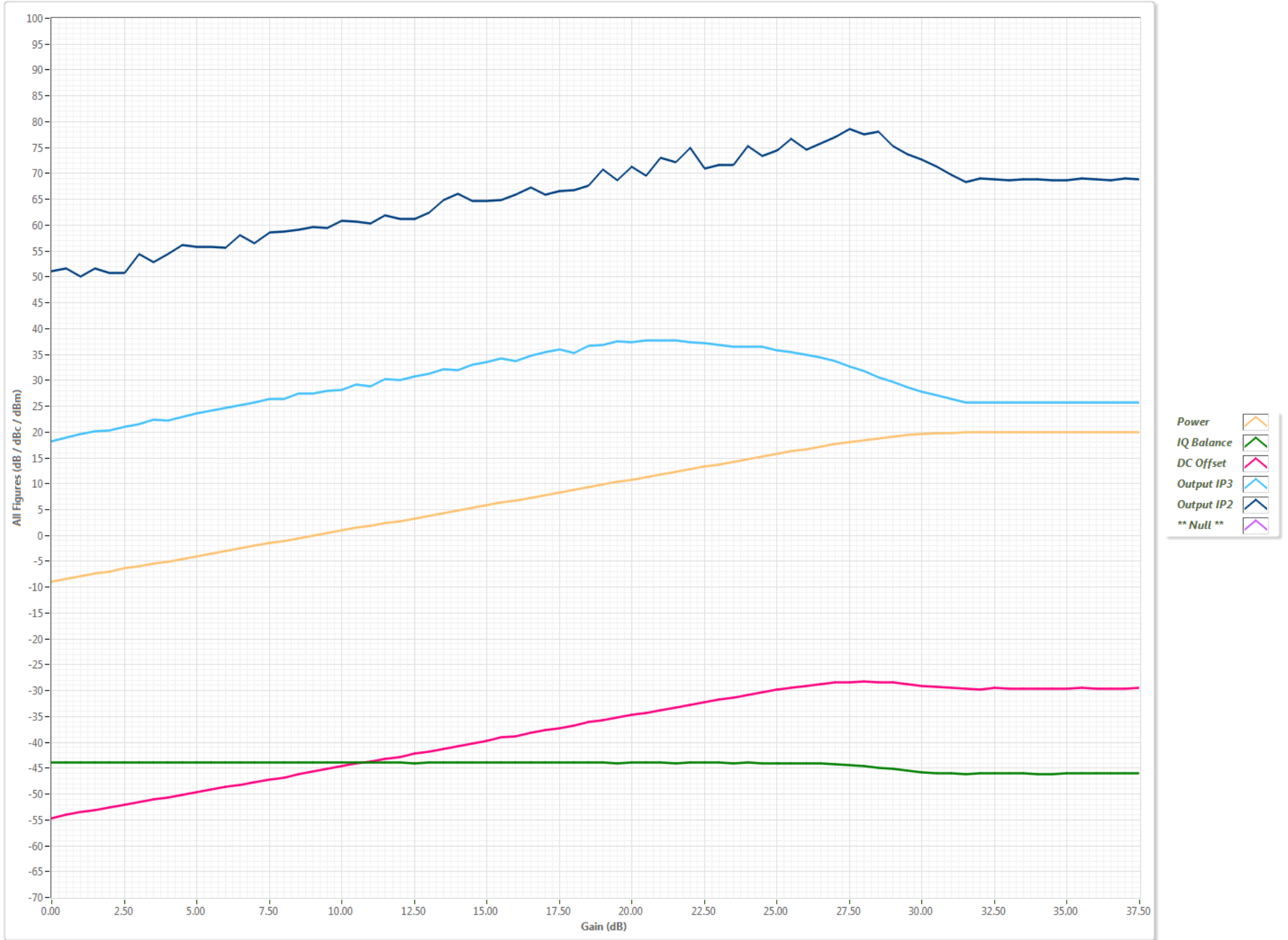
TX Figure vs Gain w/ Frequency=900.00MHz



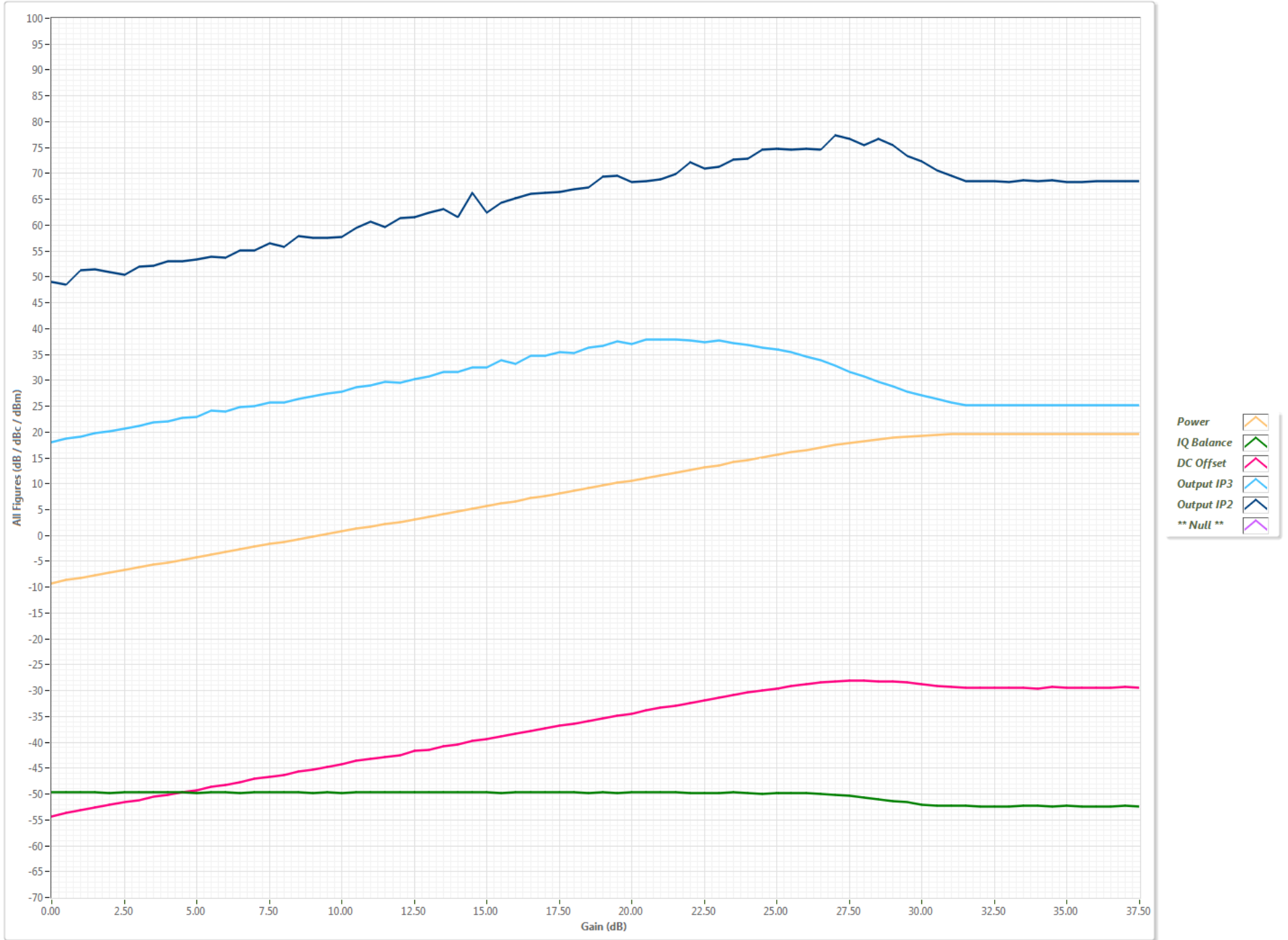
TX Figure vs Gain w/ Frequency=950.00MHz



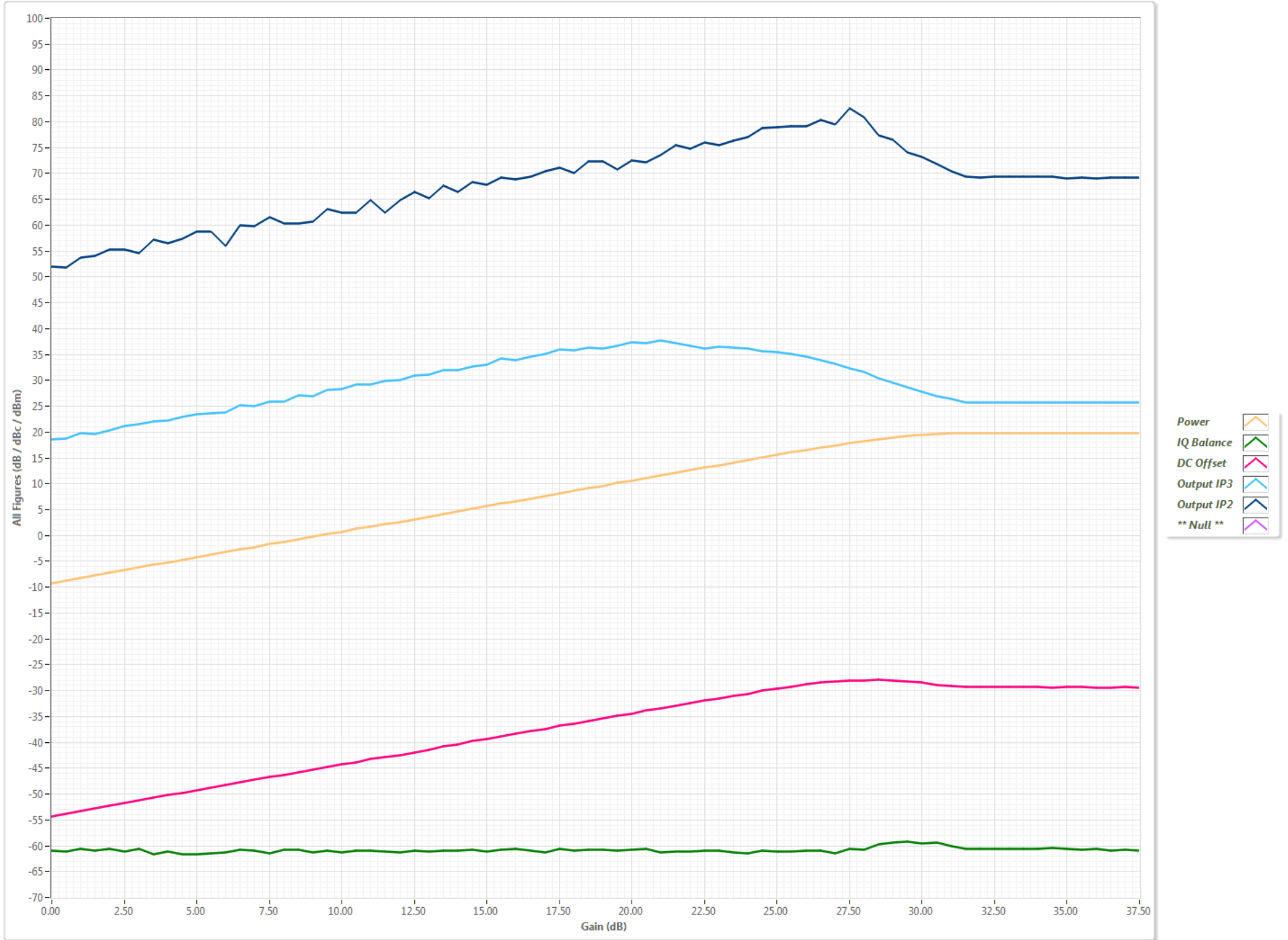
TX Figure vs Gain w/ Frequency=1000.00MHz



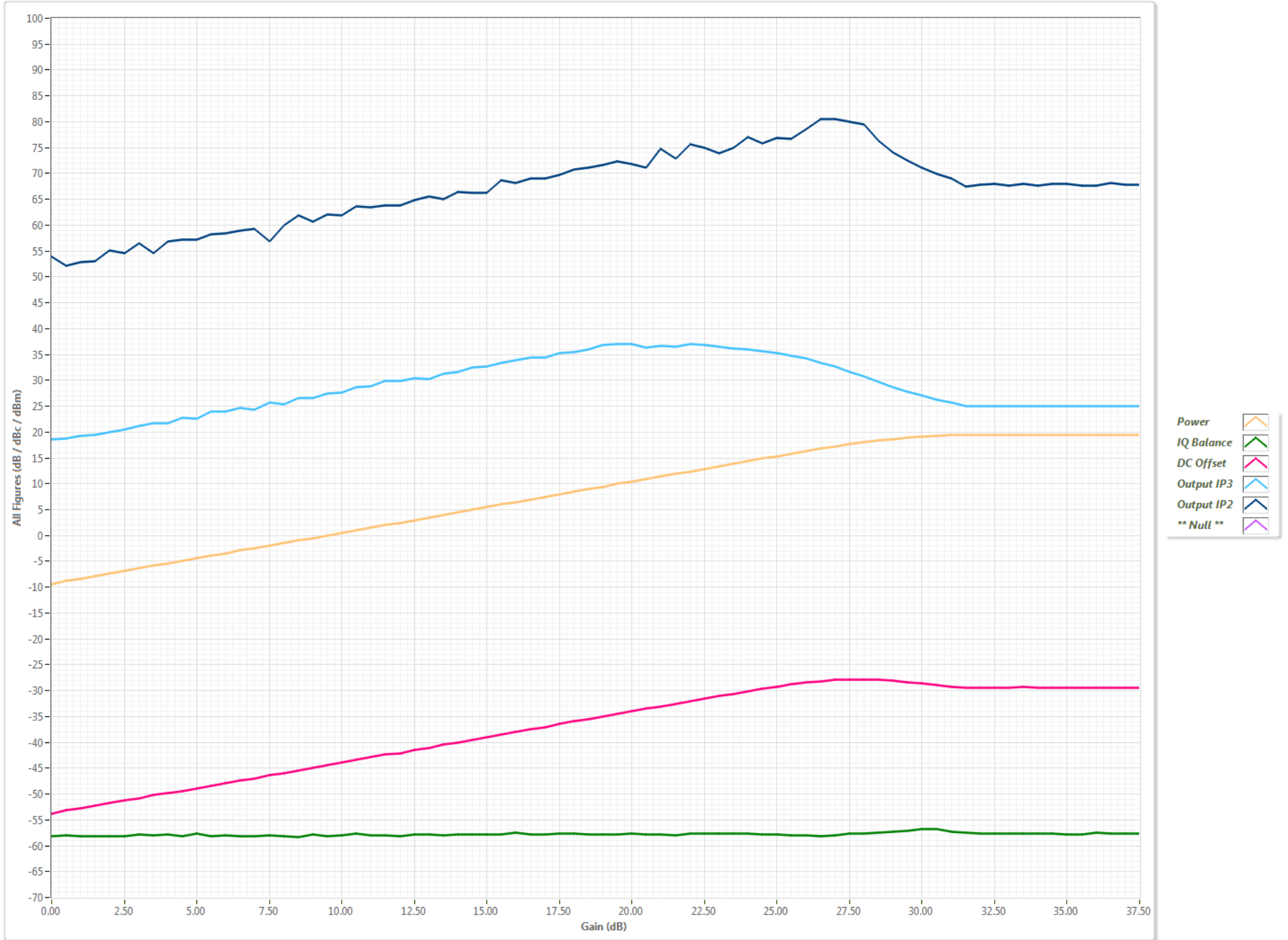
TX Figure vs Gain w/ Frequency=1050.00MHz



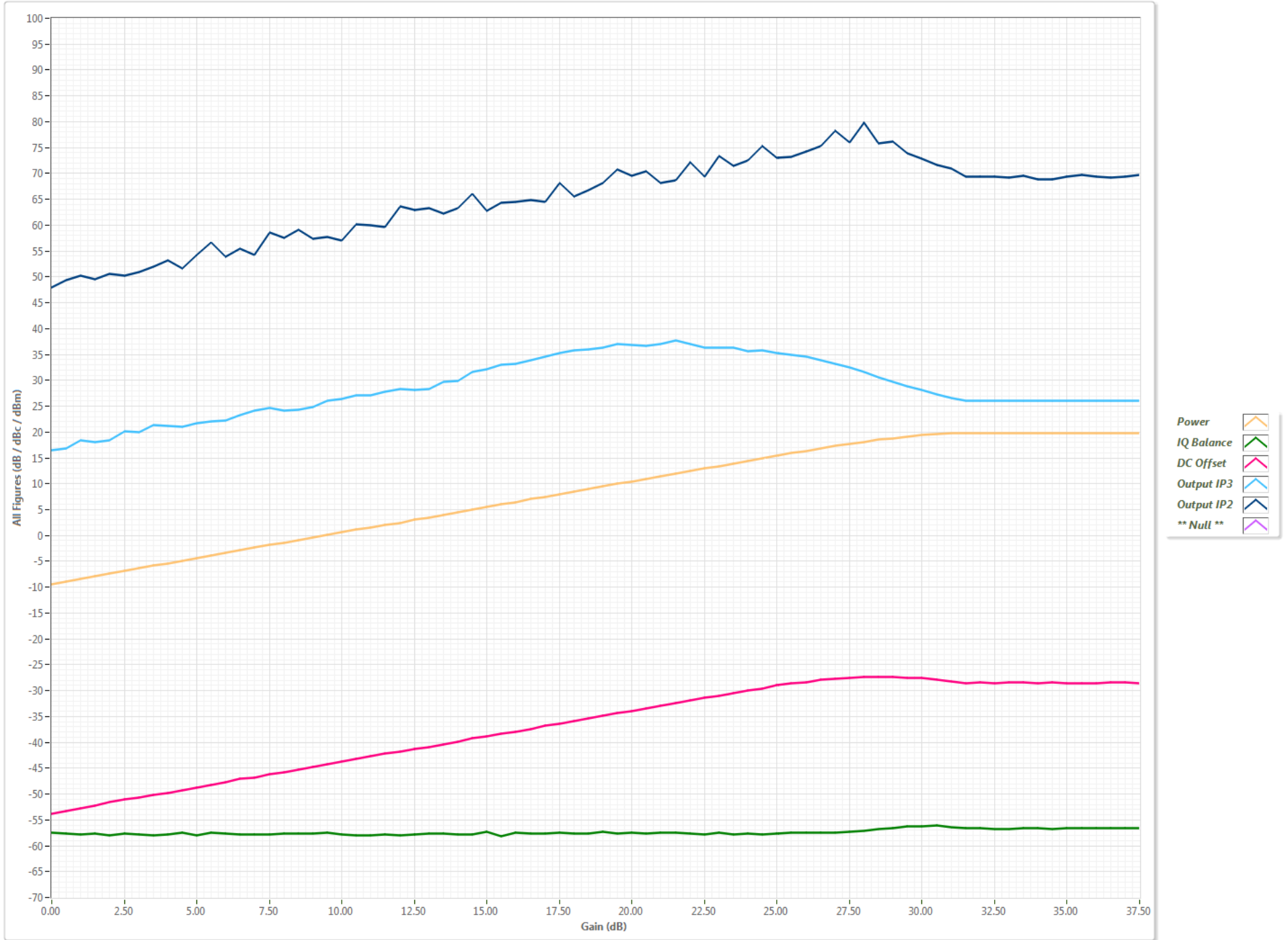
TX Figure vs Gain w/ Frequency=1100.00MHz



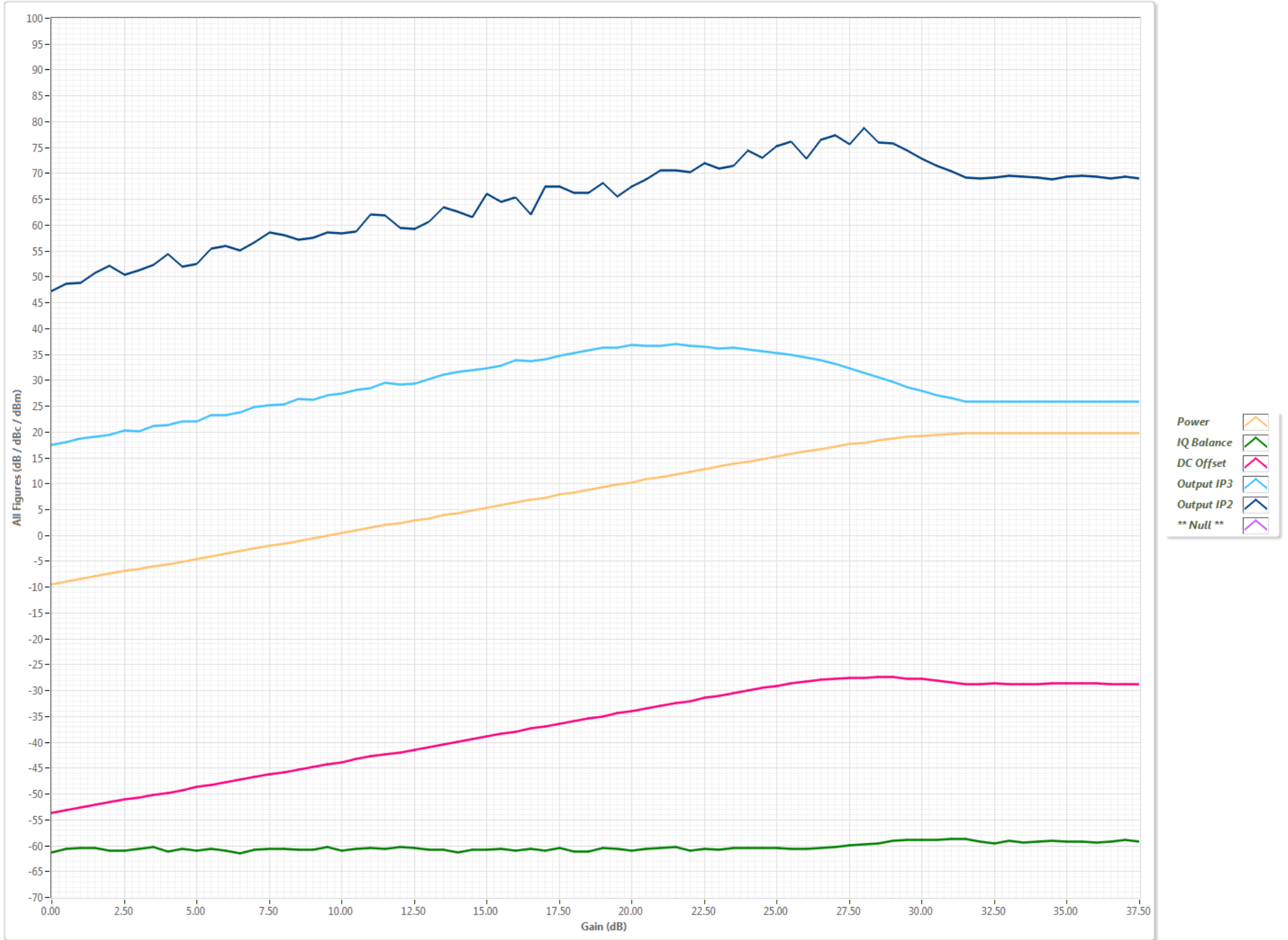
TX Figure vs Gain w/ Frequency=1150.00MHz



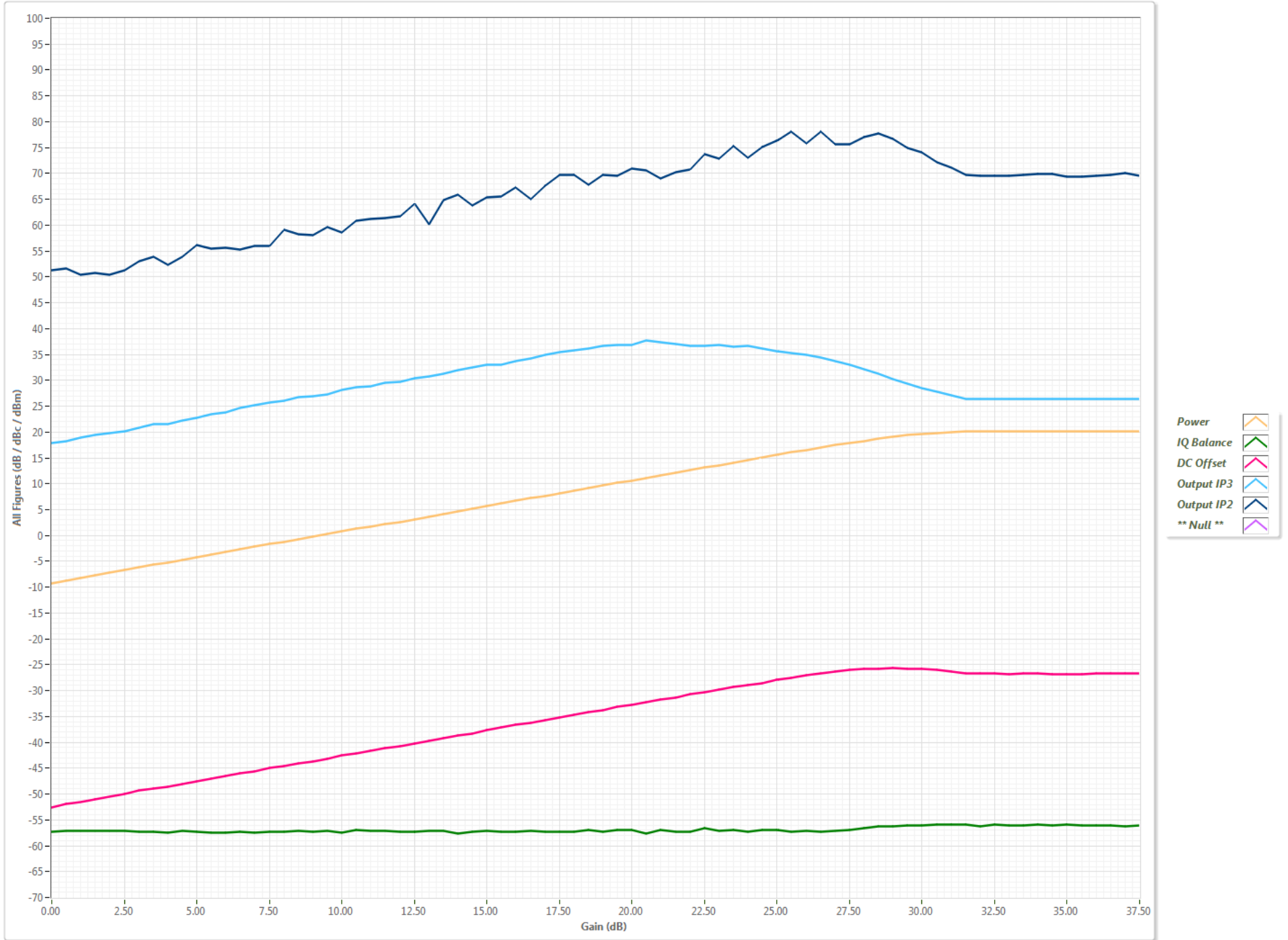
TX Figure vs Gain w/ Frequency=1200.00MHz



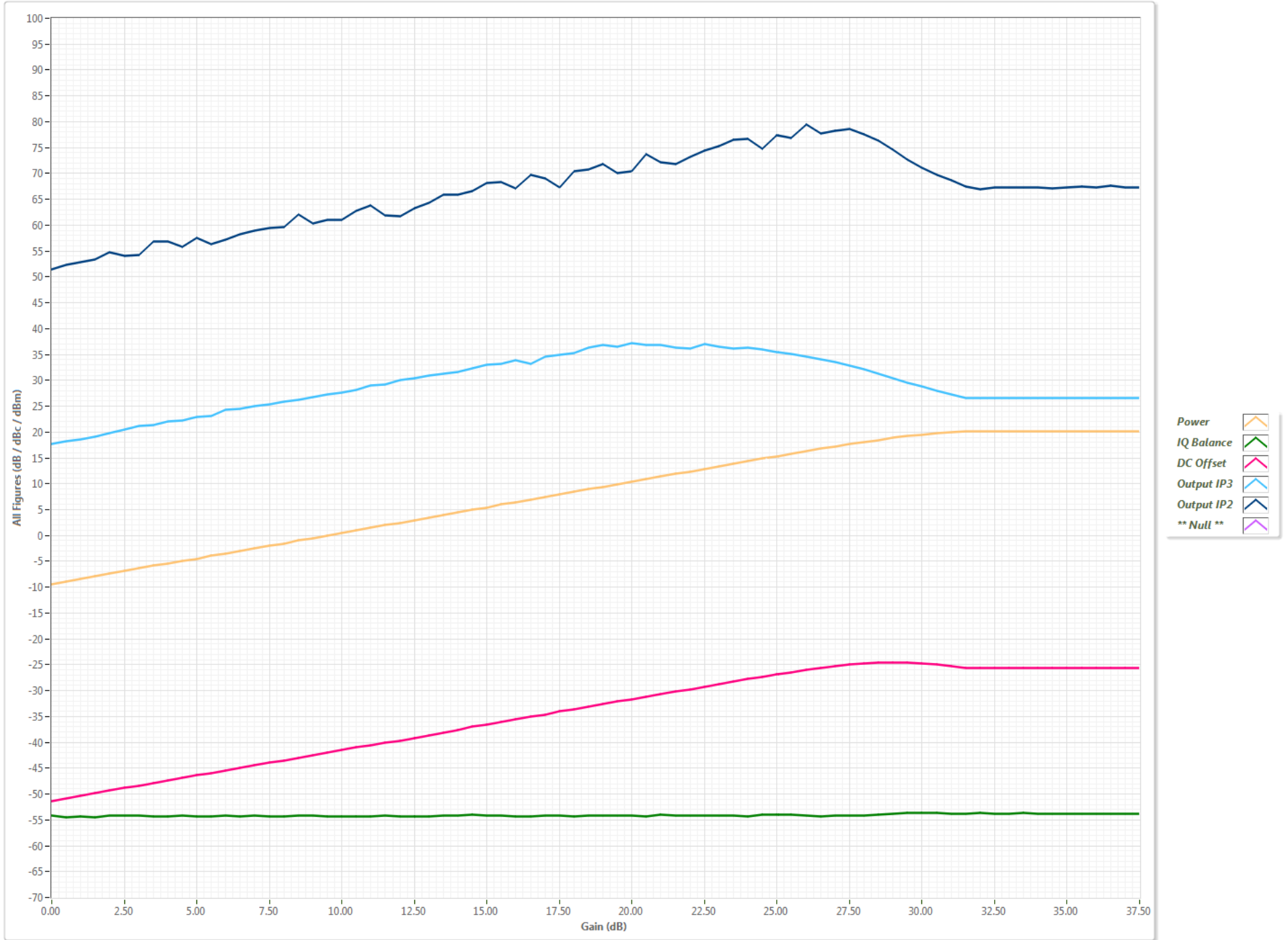
TX Figure vs Gain w/ Frequency=1250.00MHz



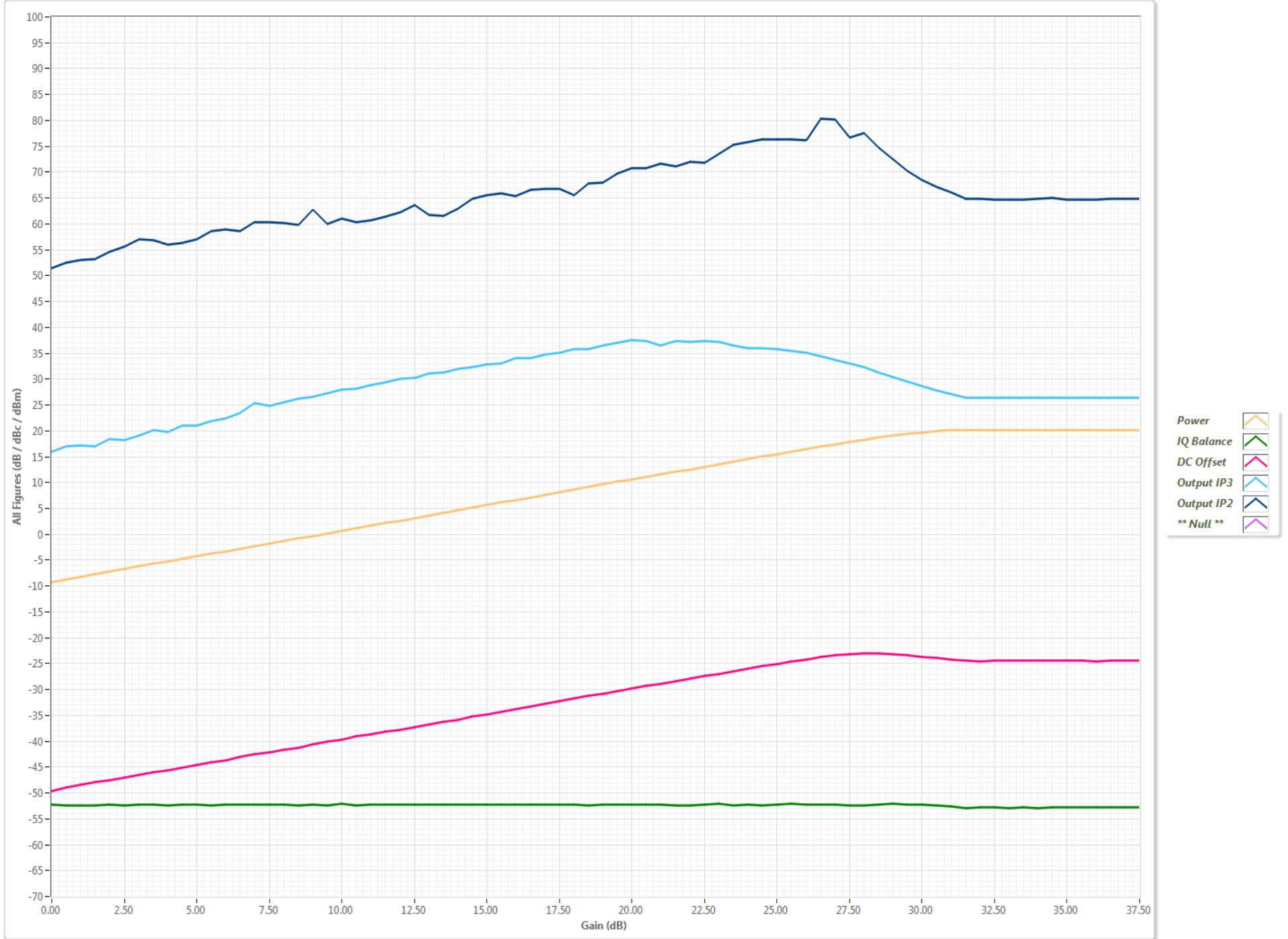
TX Figure vs Gain w/ Frequency=1300.00MHz



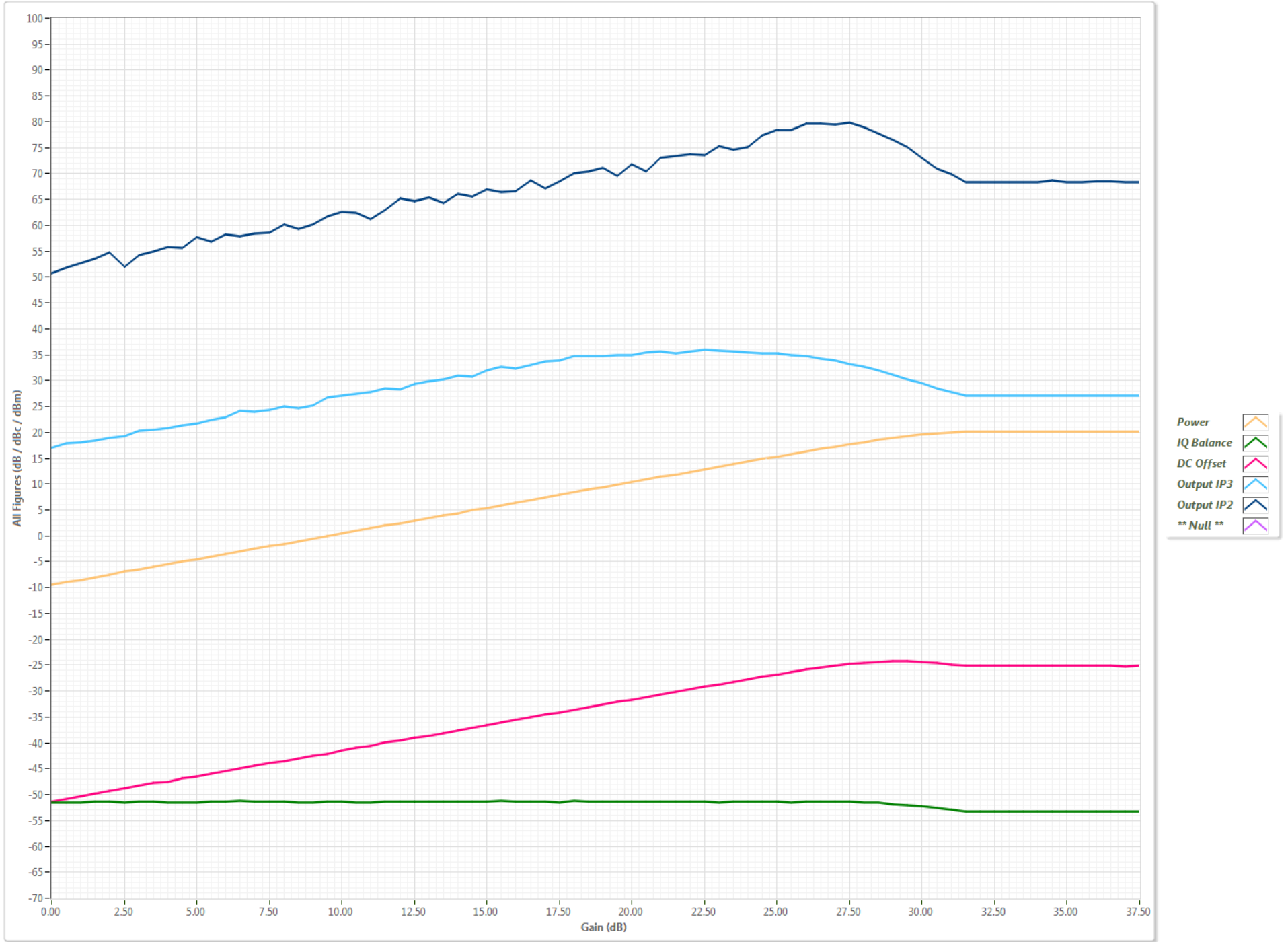
TX Figure vs Gain w/ Frequency=1350.00MHz



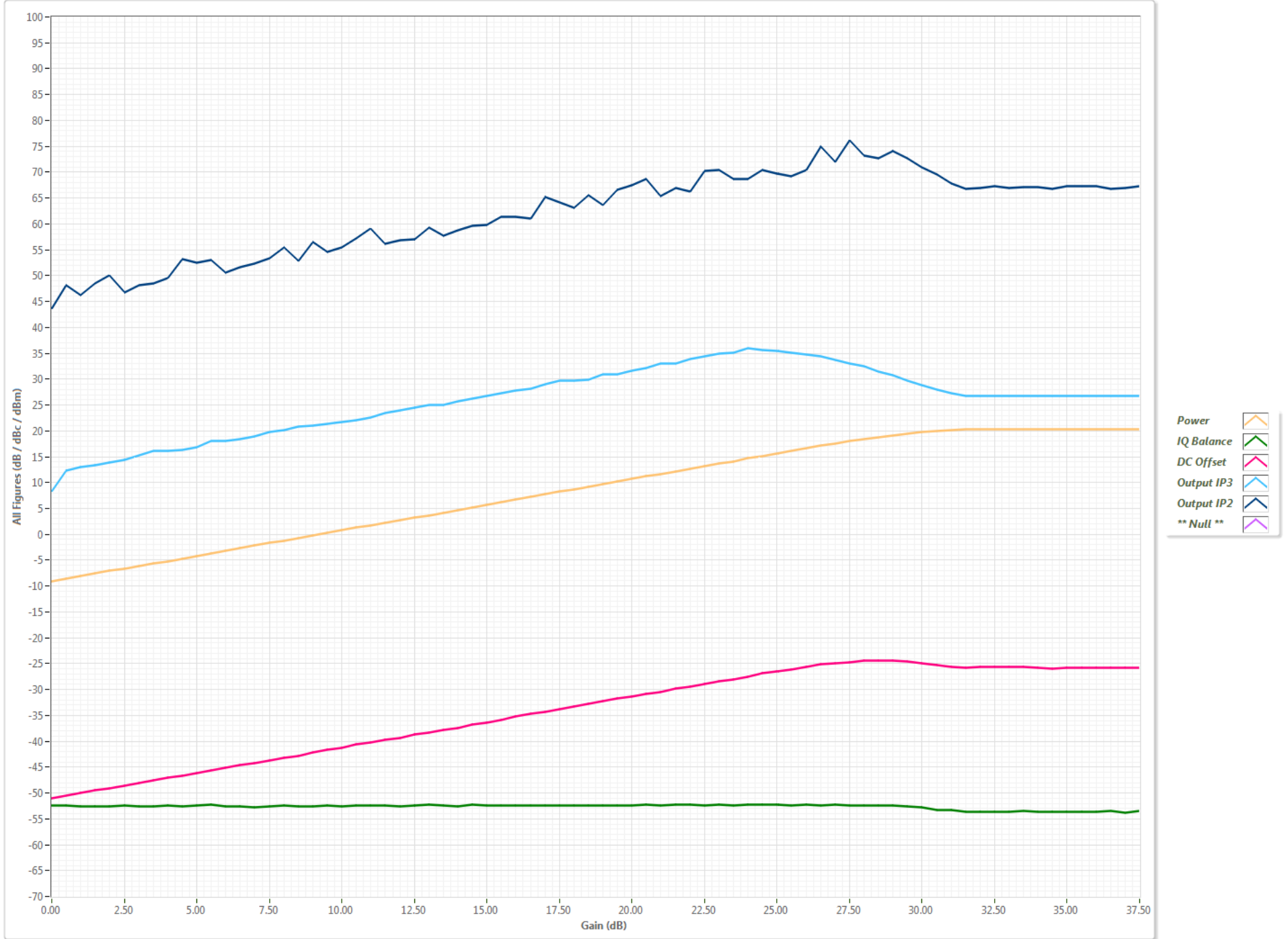
TX Figure vs Gain w/ Frequency=1400.00MHz



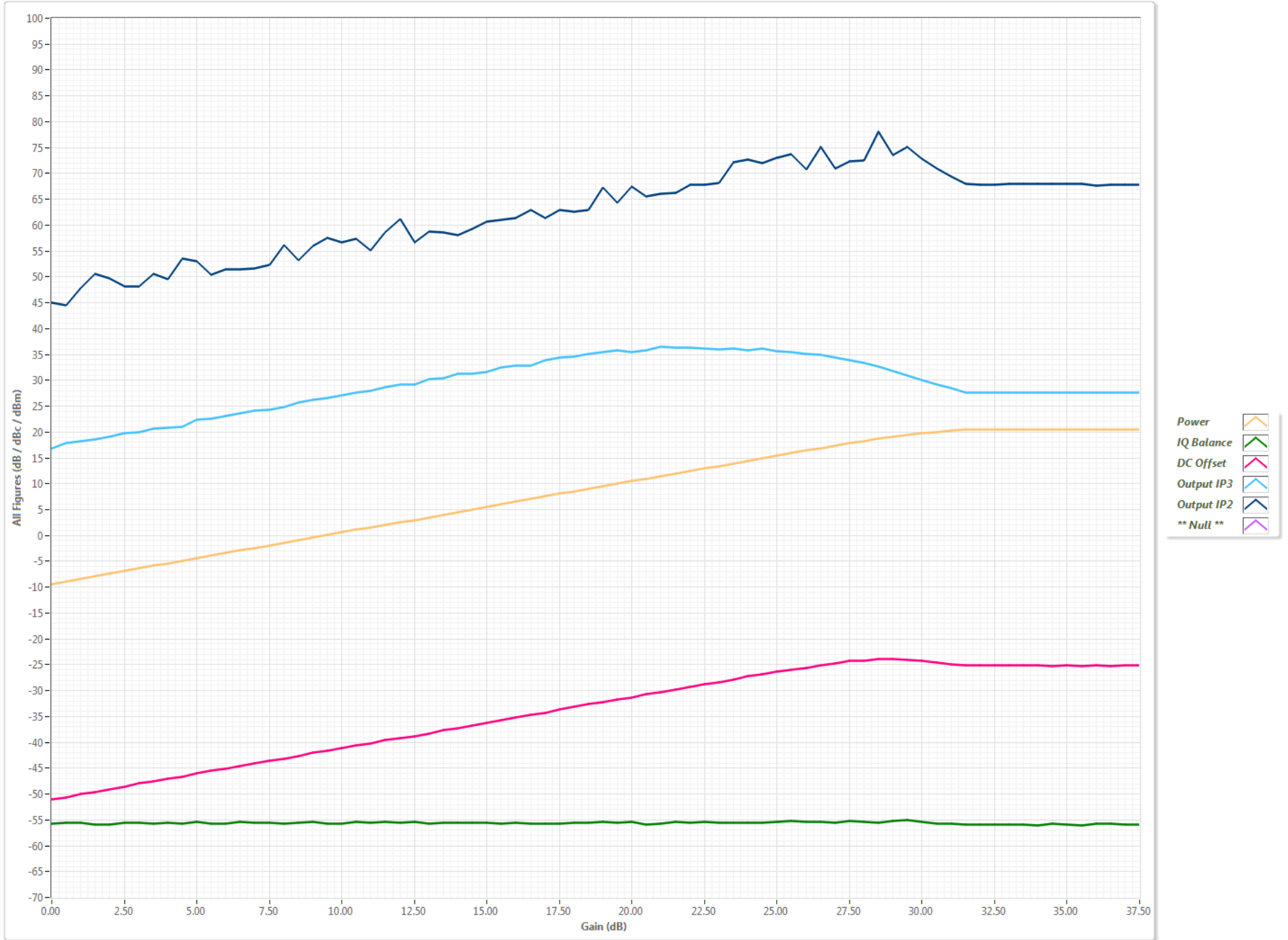
TX Figure vs Gain w/ Frequency=1450.00MHz



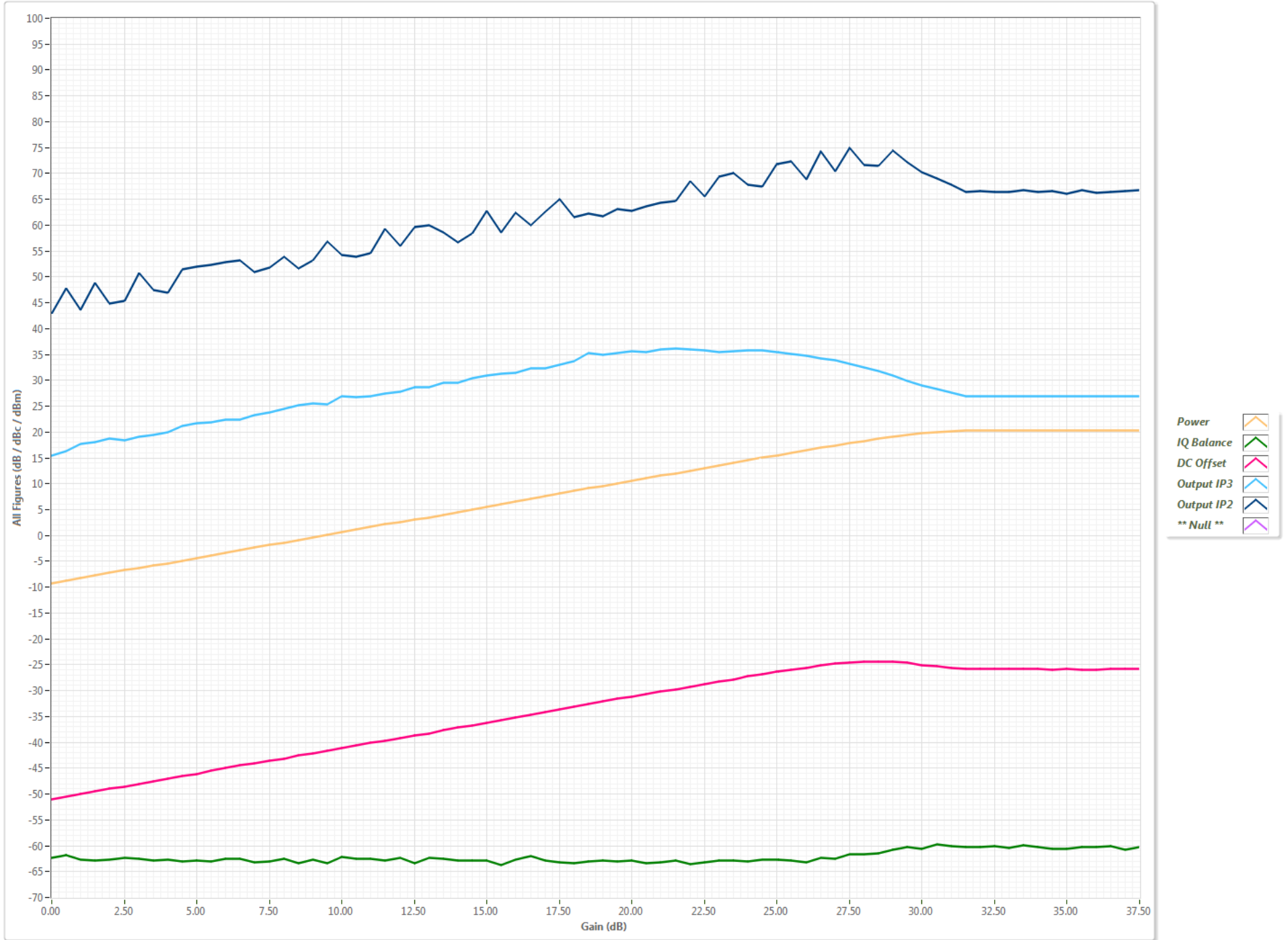
TX Figure vs Gain w/ Frequency=1500.00MHz



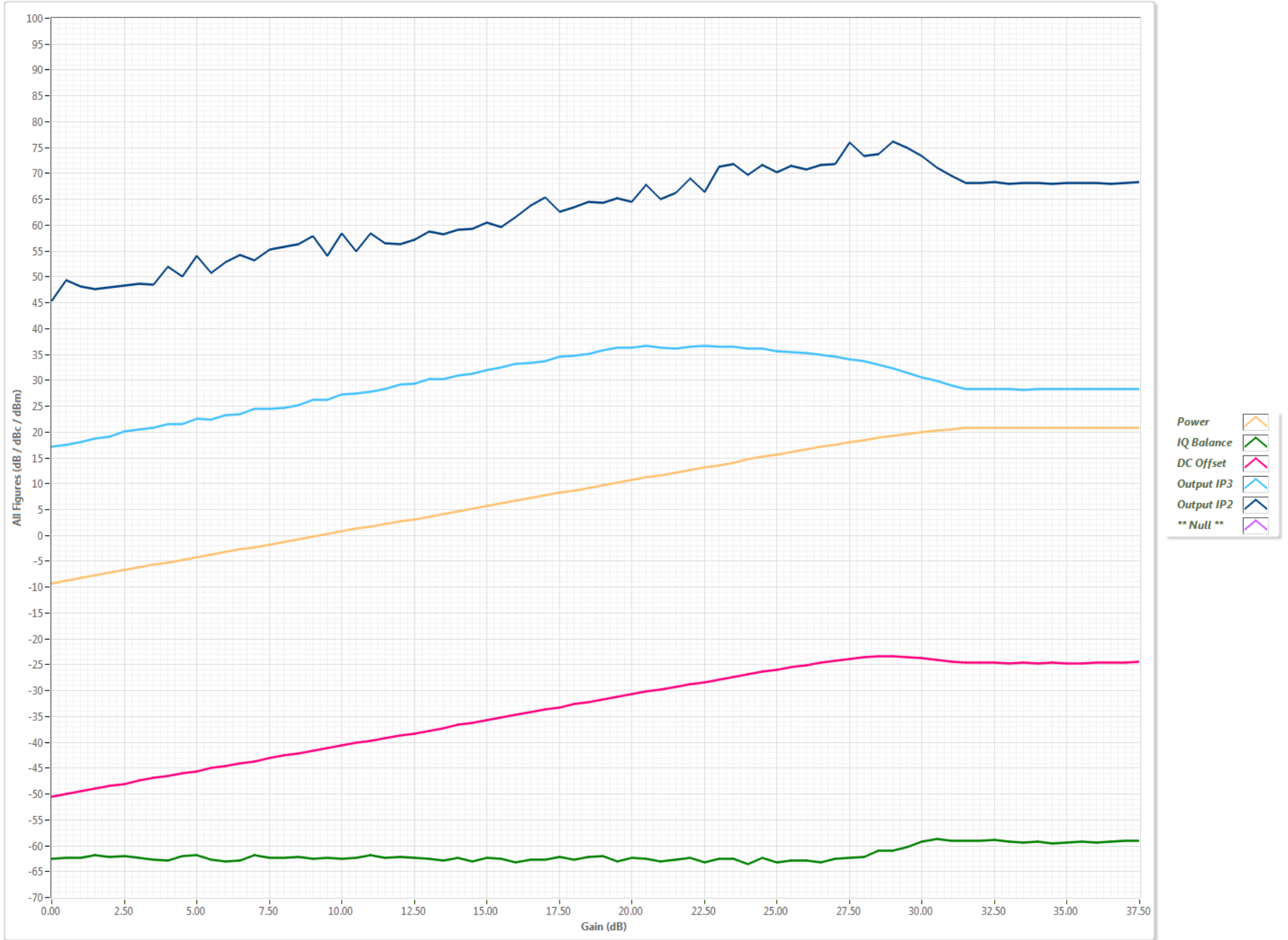
TX Figure vs Gain w/ Frequency=1550.00MHz



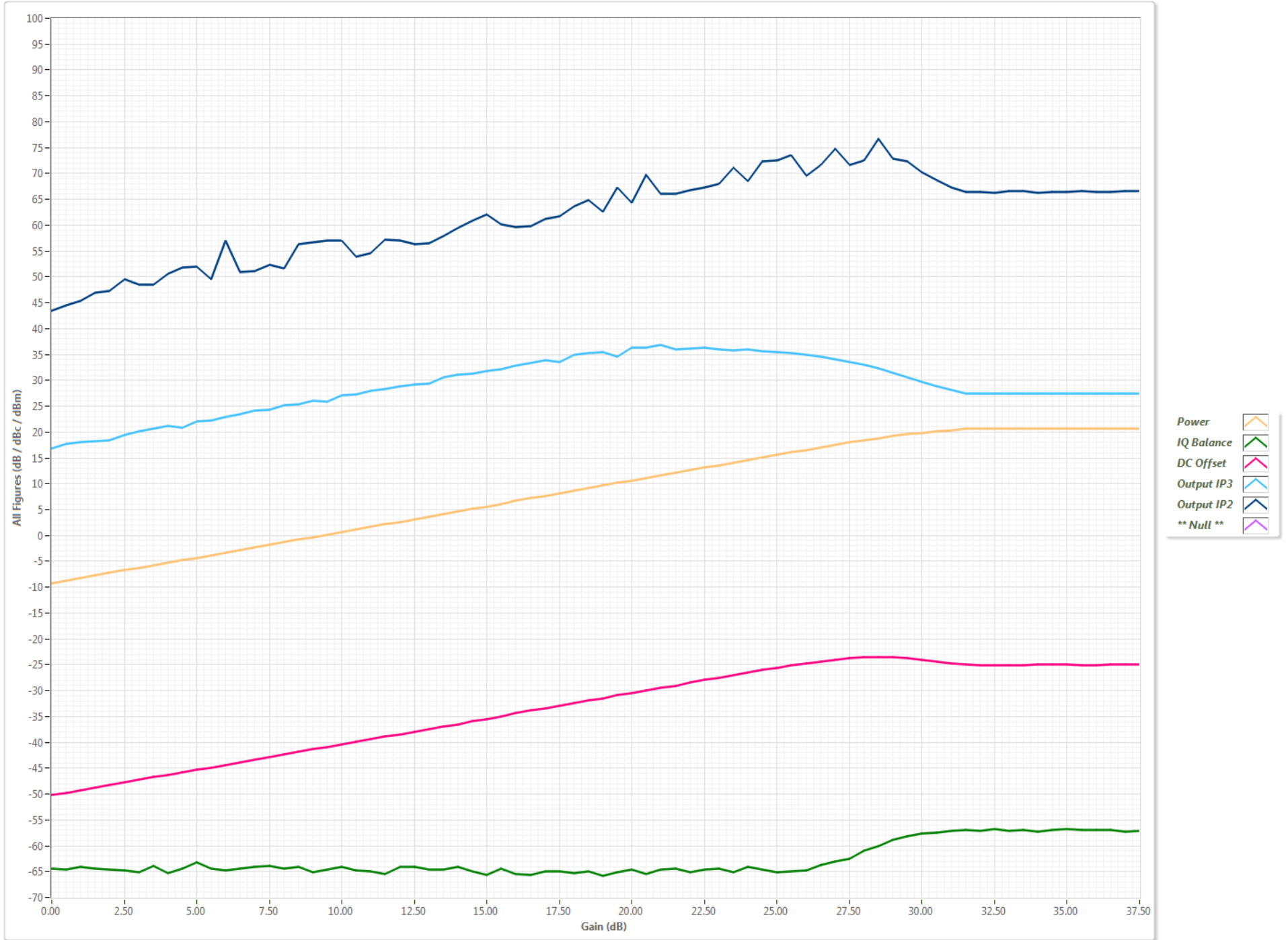
TX Figure vs Gain w/ Frequency=1600.00MHz



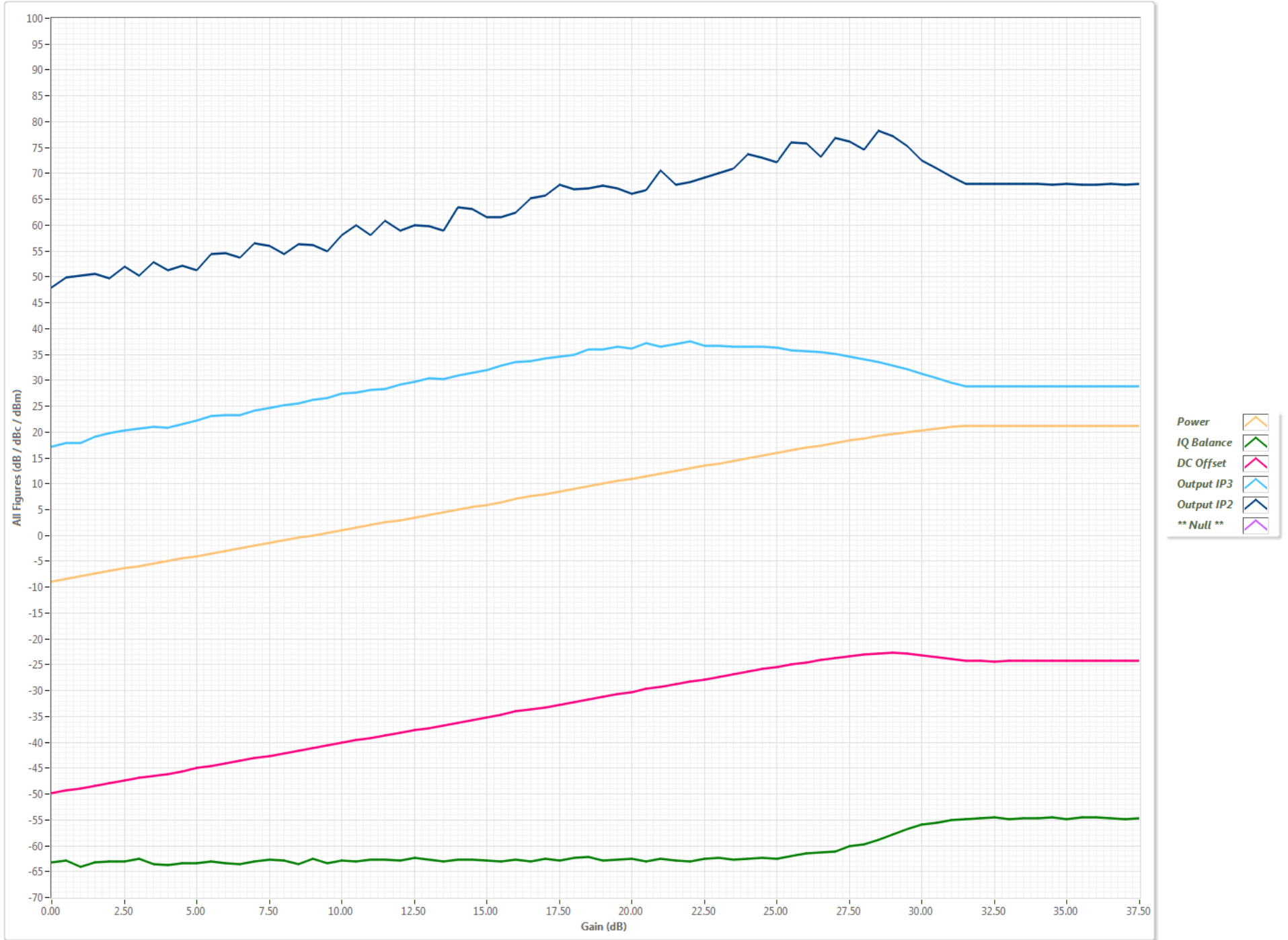
TX Figure vs Gain w/ Frequency=1650.00MHz



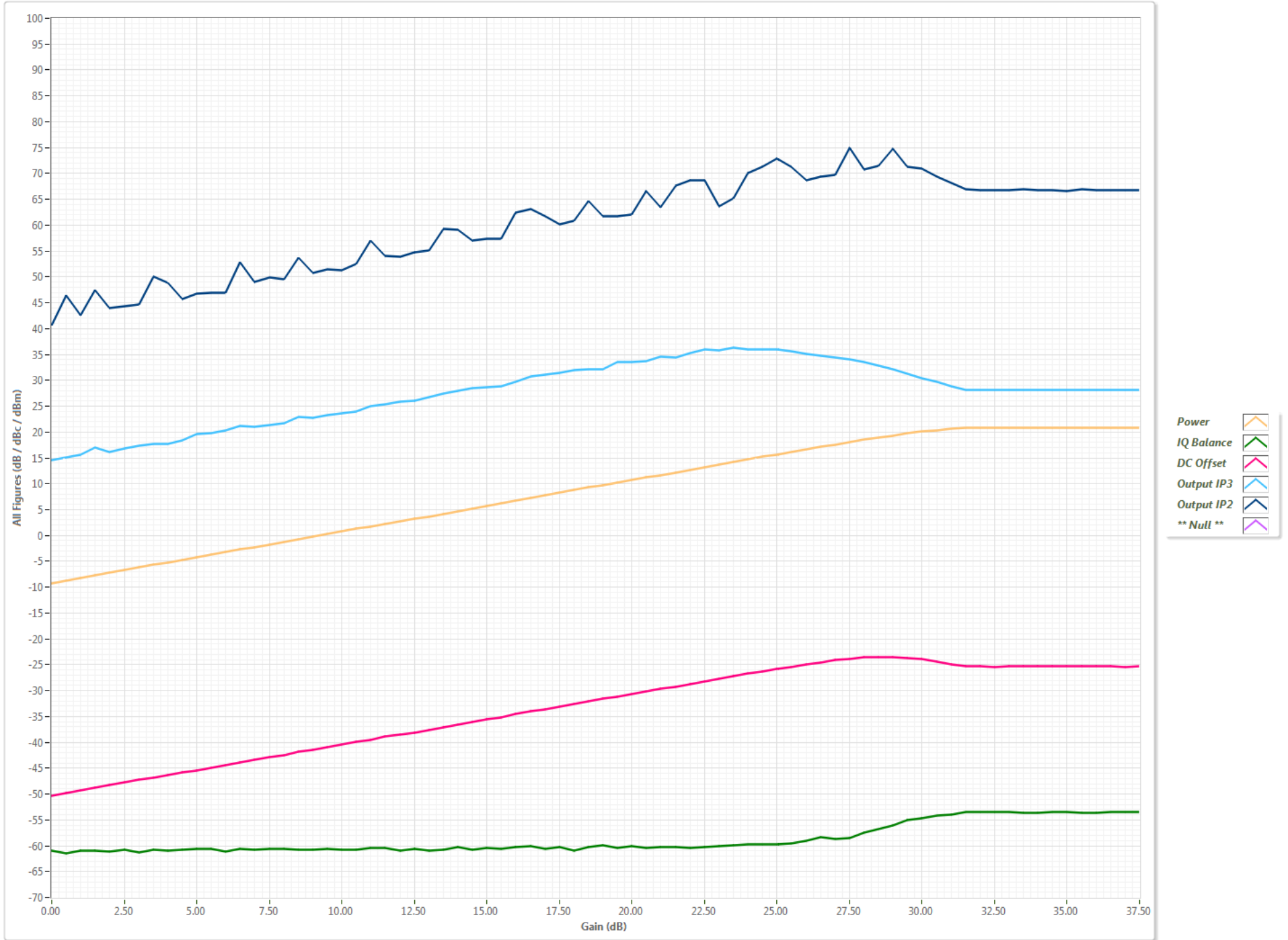
TX Figure vs Gain w/ Frequency=1700.00MHz



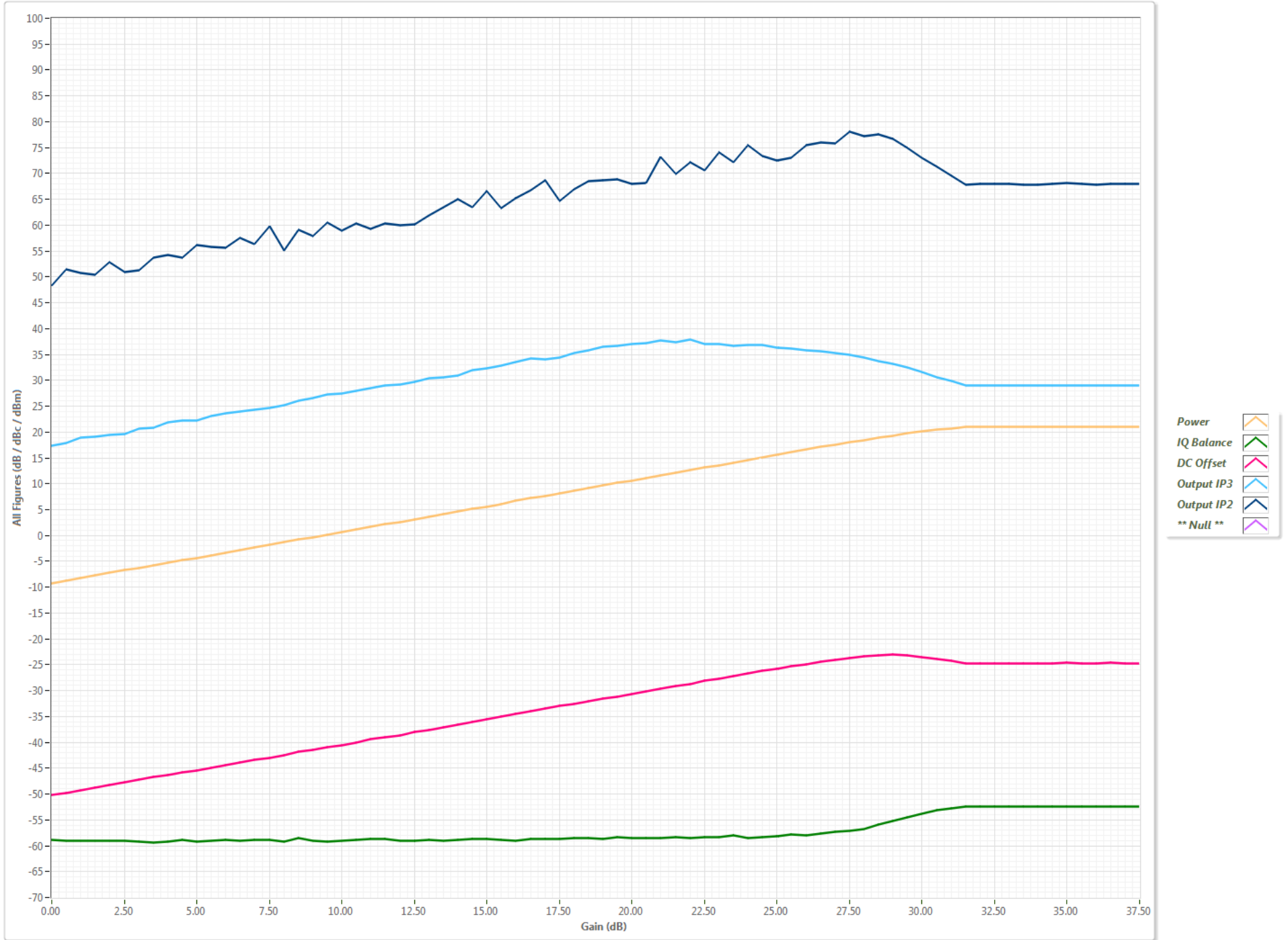
TX Figure vs Gain w/ Frequency=1750.00MHz



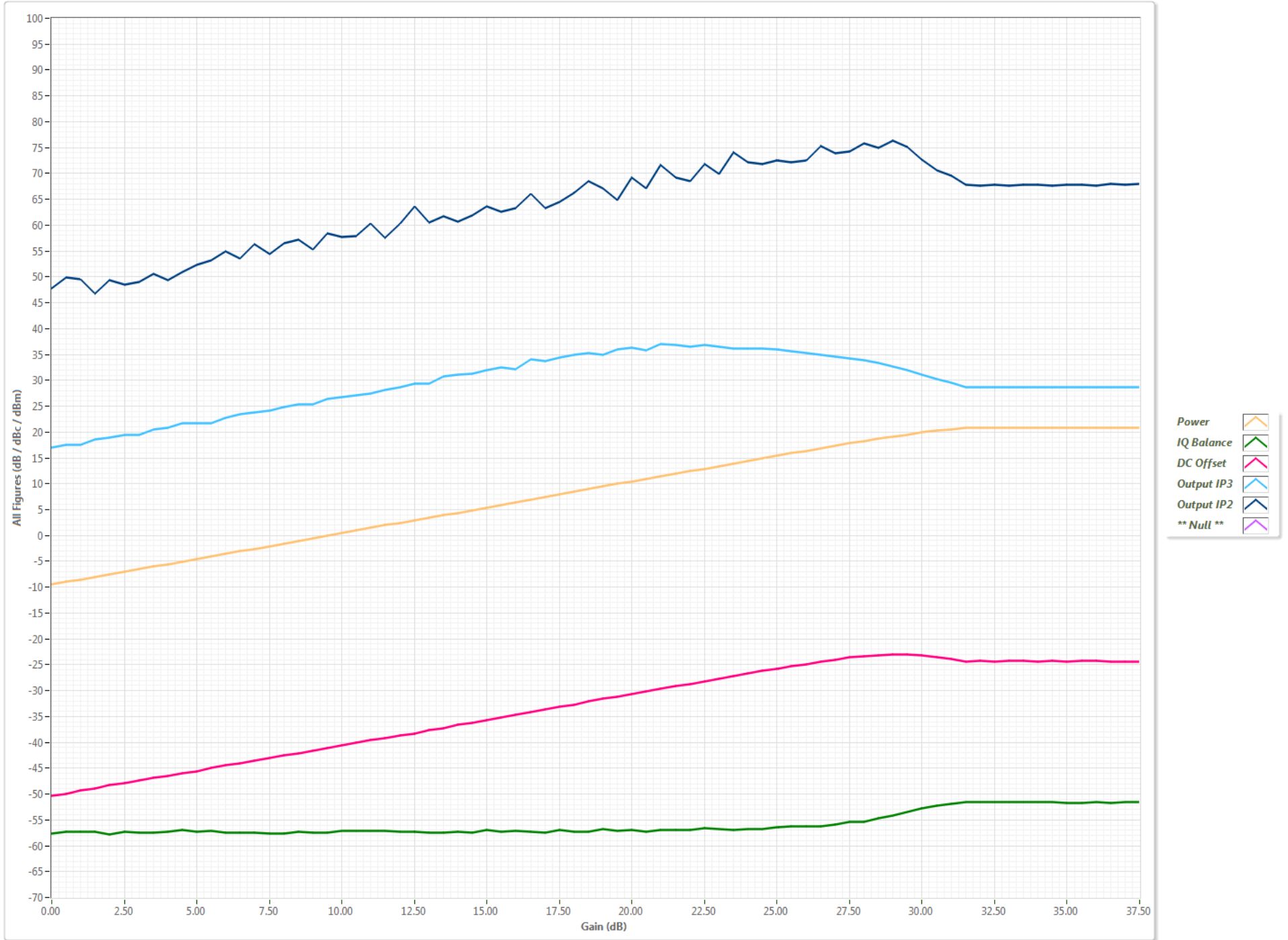
TX Figure vs Gain w/ Frequency=1800.00MHz



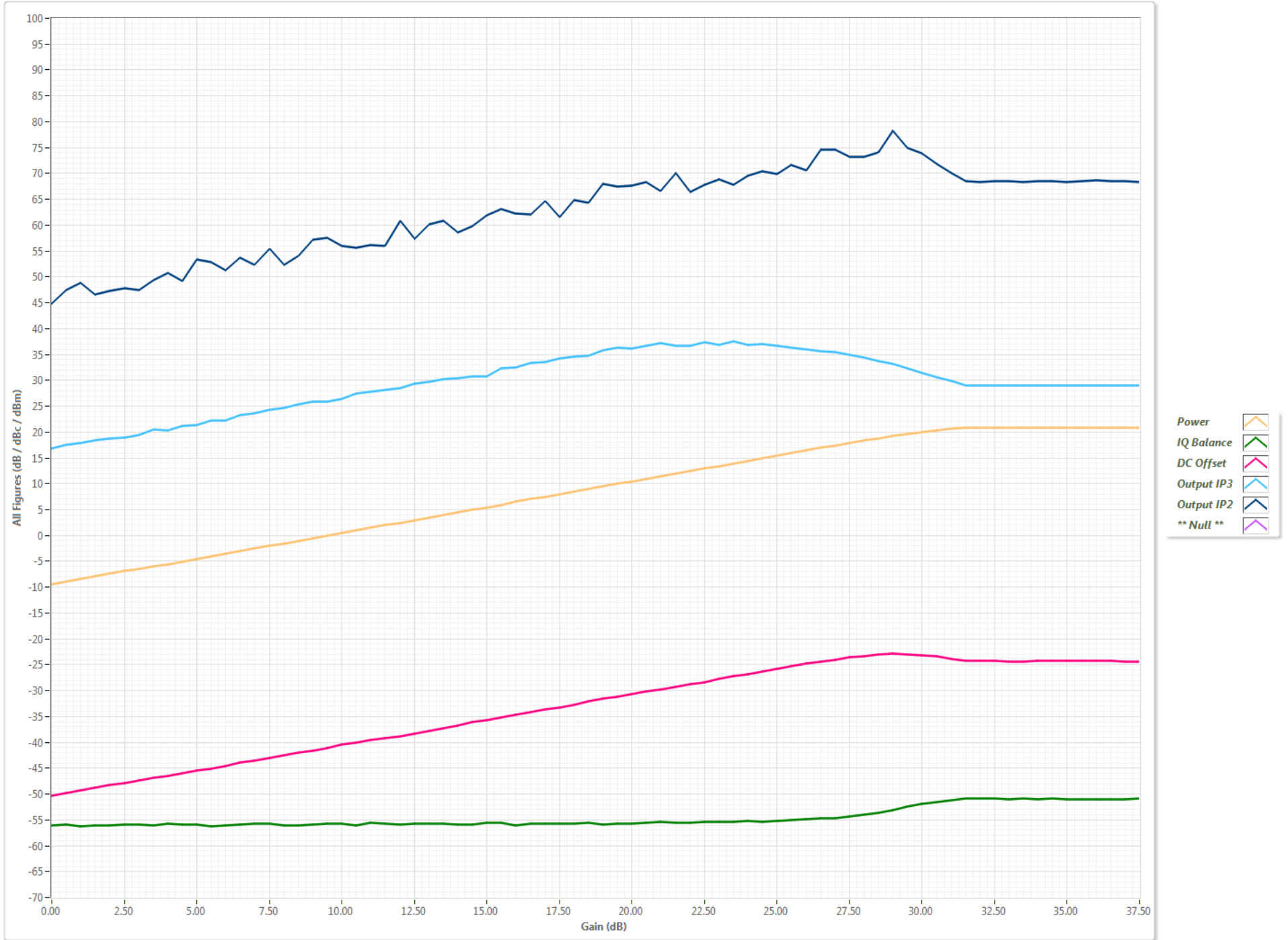
TX Figure vs Gain w/ Frequency=1850.00MHz



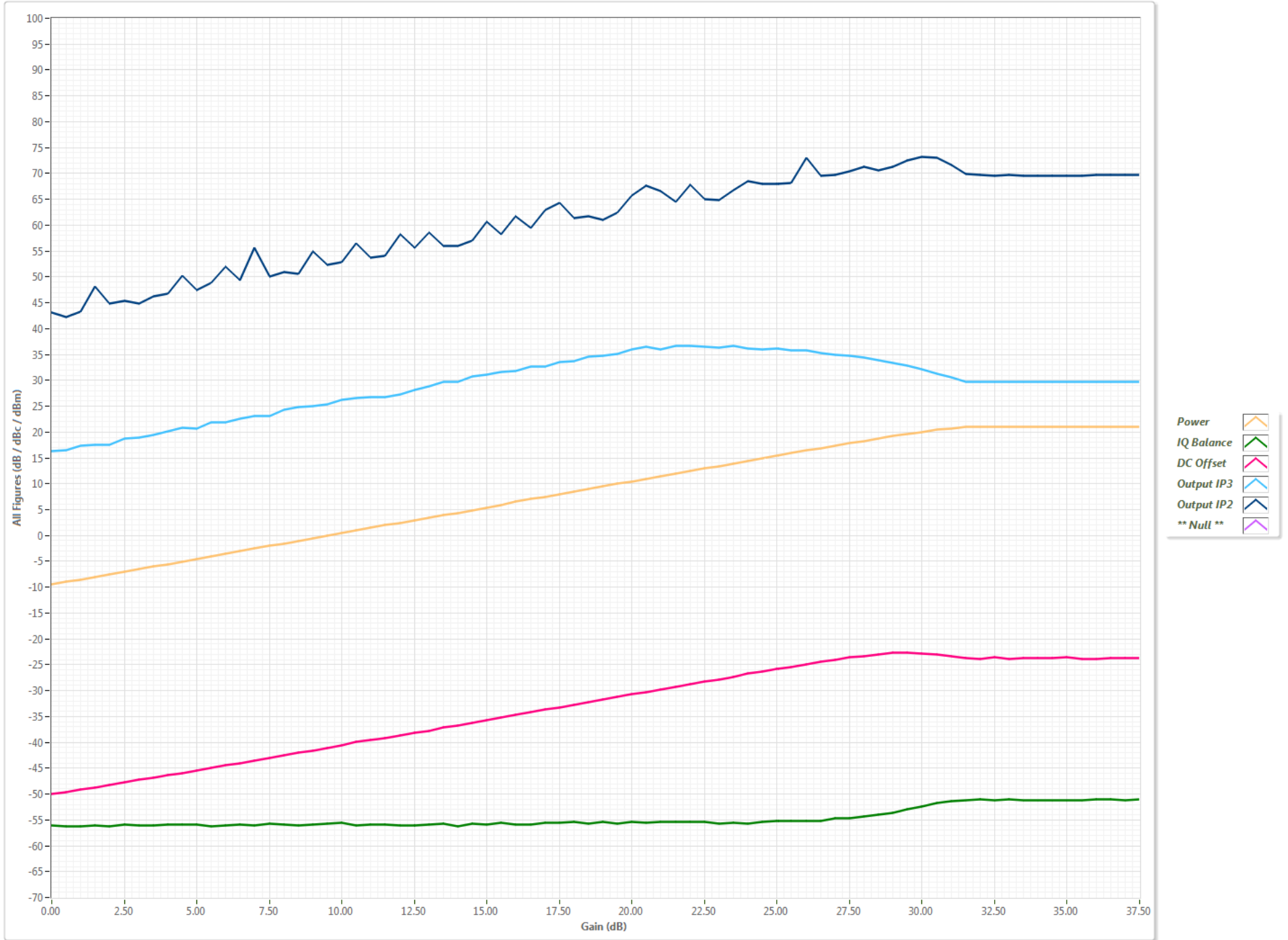
TX Figure vs Gain w/ Frequency=1900.00MHz



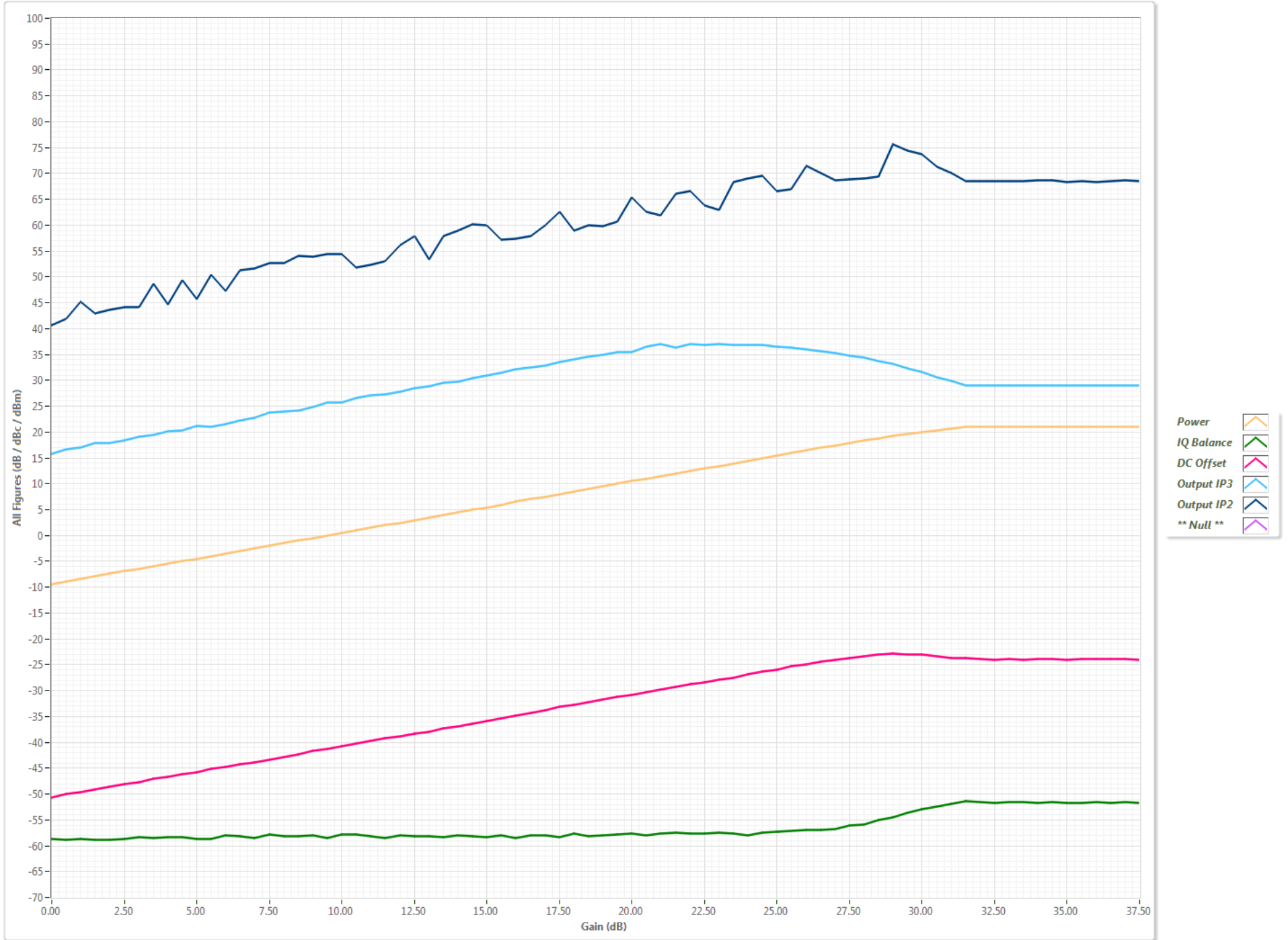
TX Figure vs Gain w/ Frequency=1950.00MHz



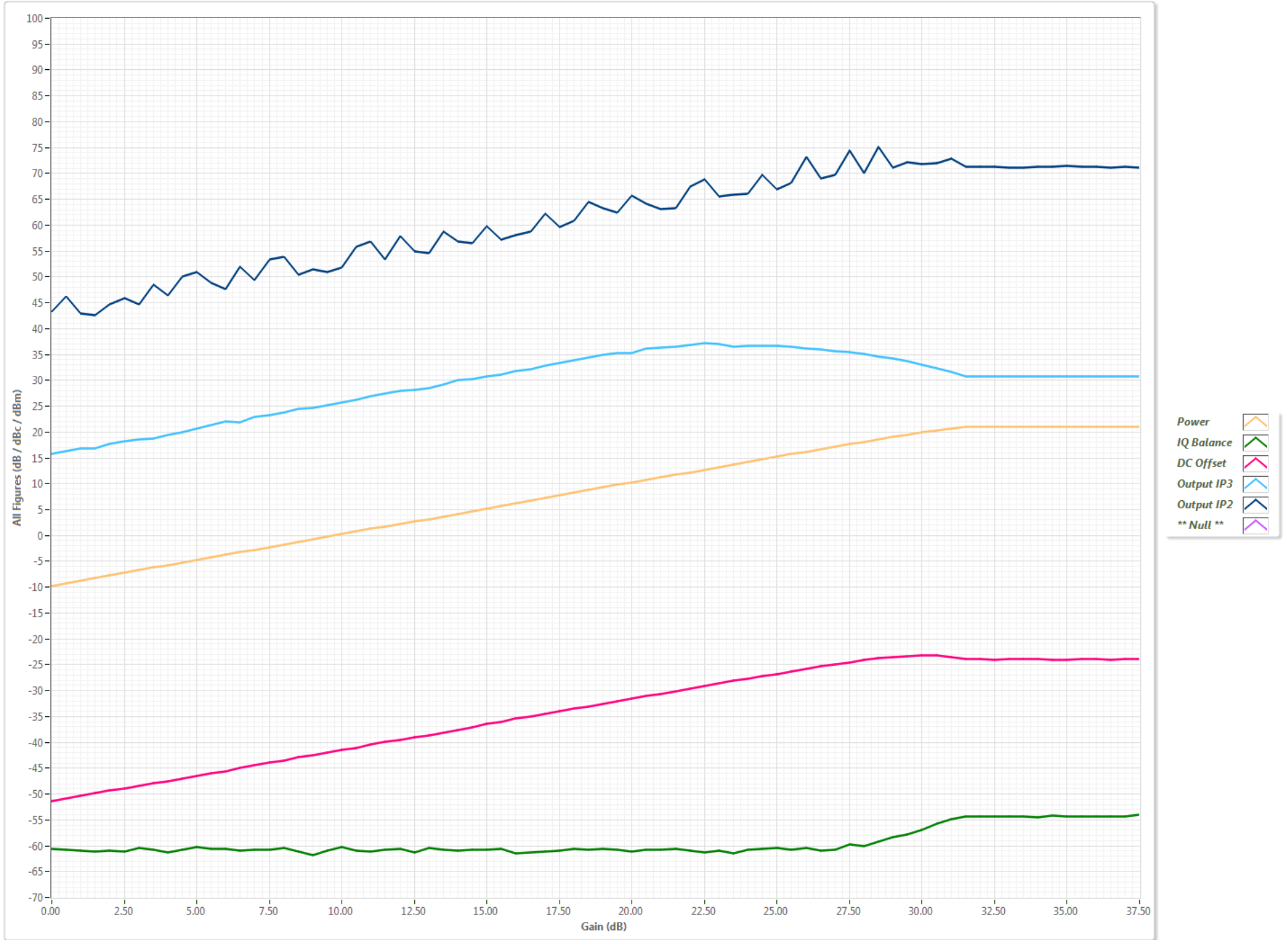
TX Figure vs Gain w/ Frequency=2000.00MHz



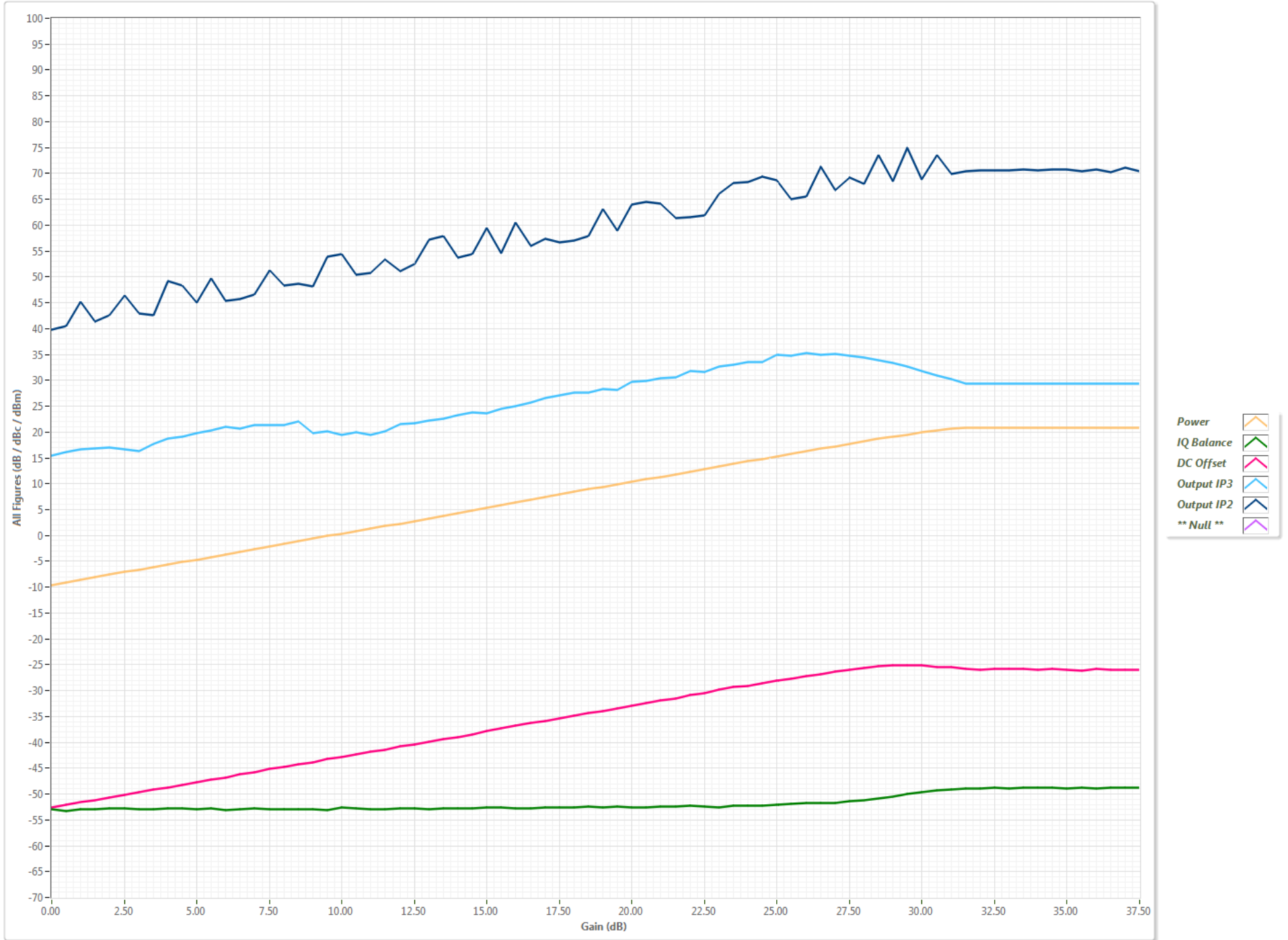
TX Figure vs Gain w/ Frequency=2050.00MHz



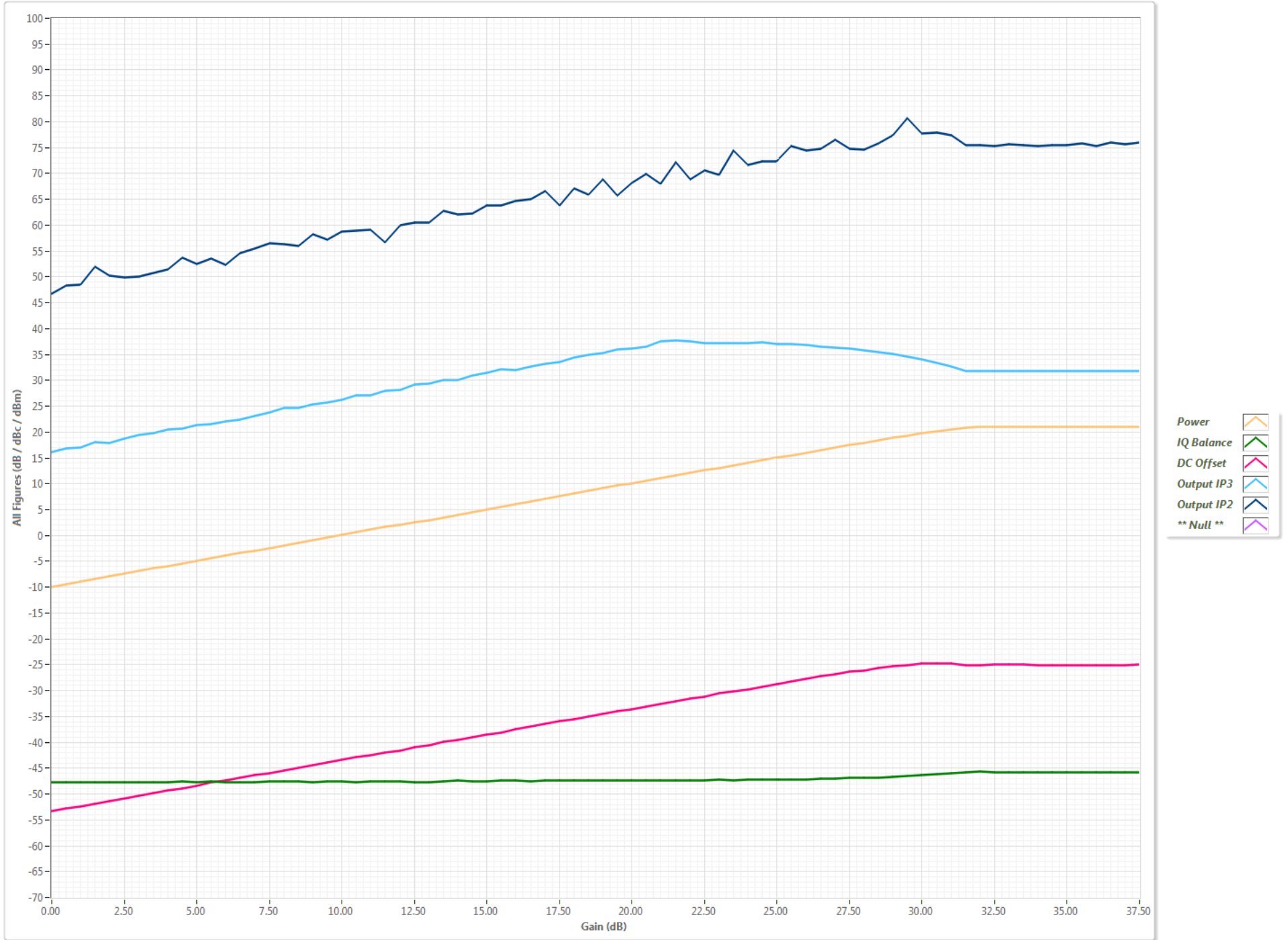
TX Figure vs Gain w/ Frequency=2100.00MHz



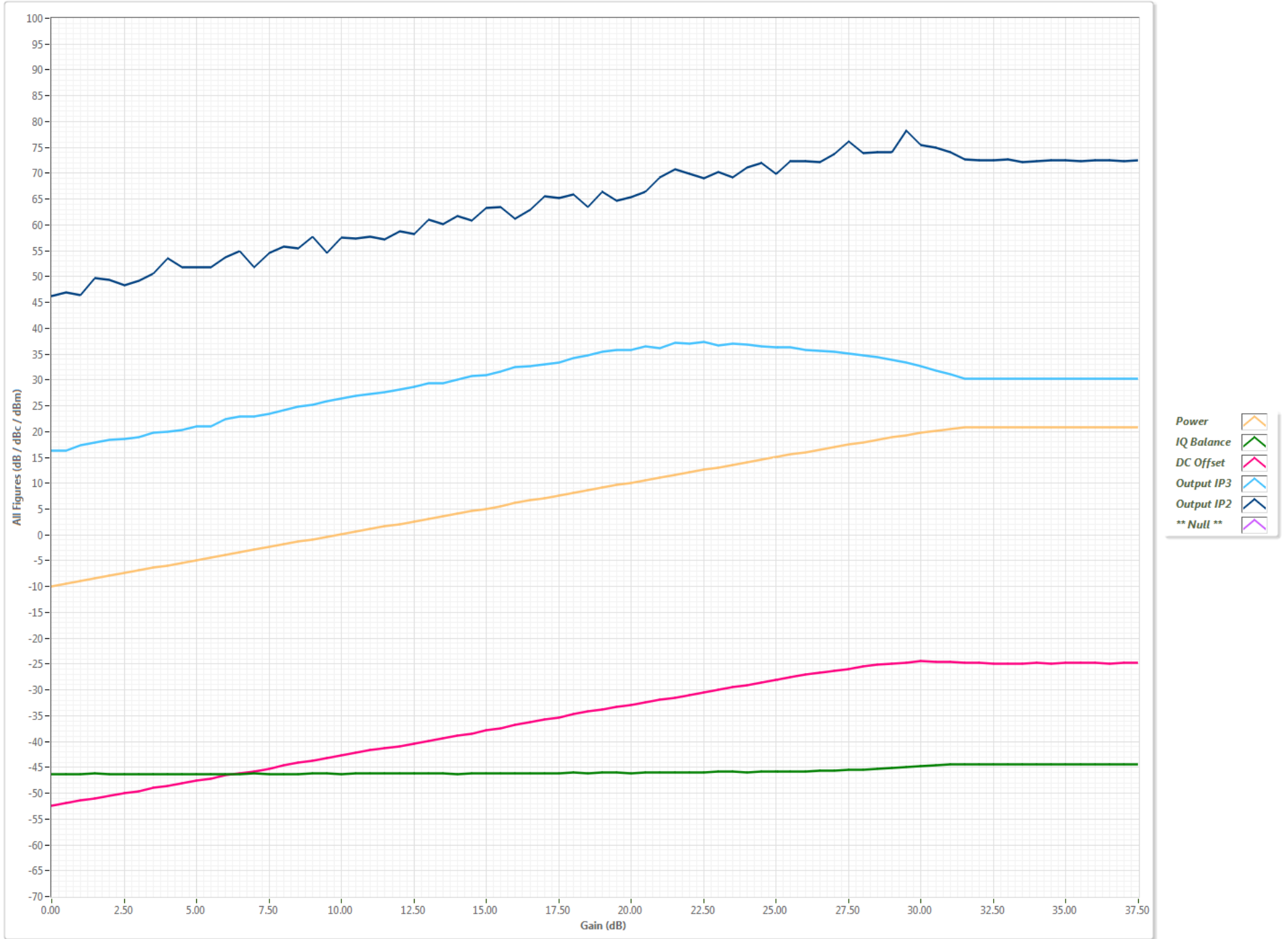
TX Figure vs Gain w/ Frequency=2150.00MHz



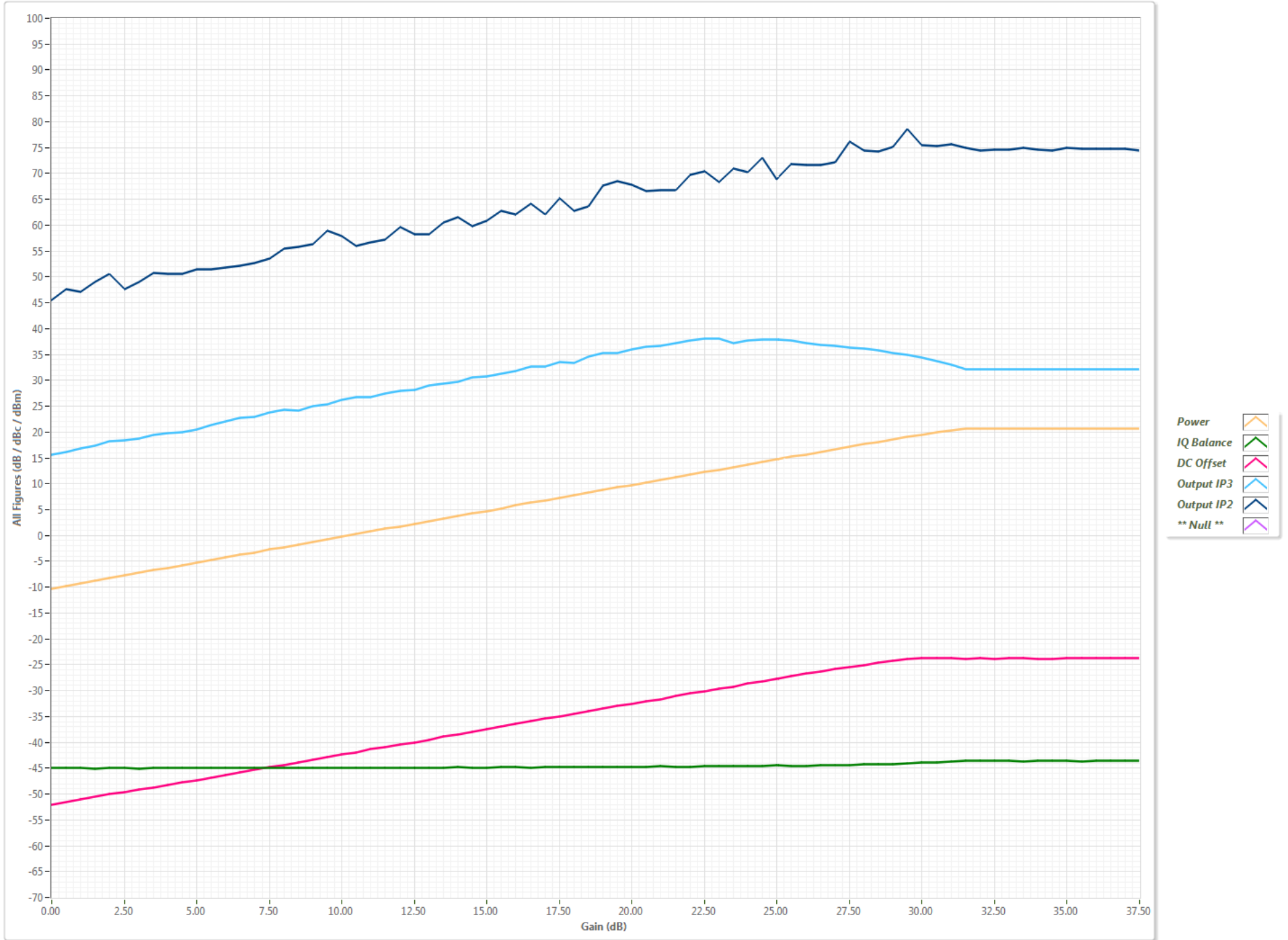
TX Figure vs Gain w/ Frequency=2200.00MHz



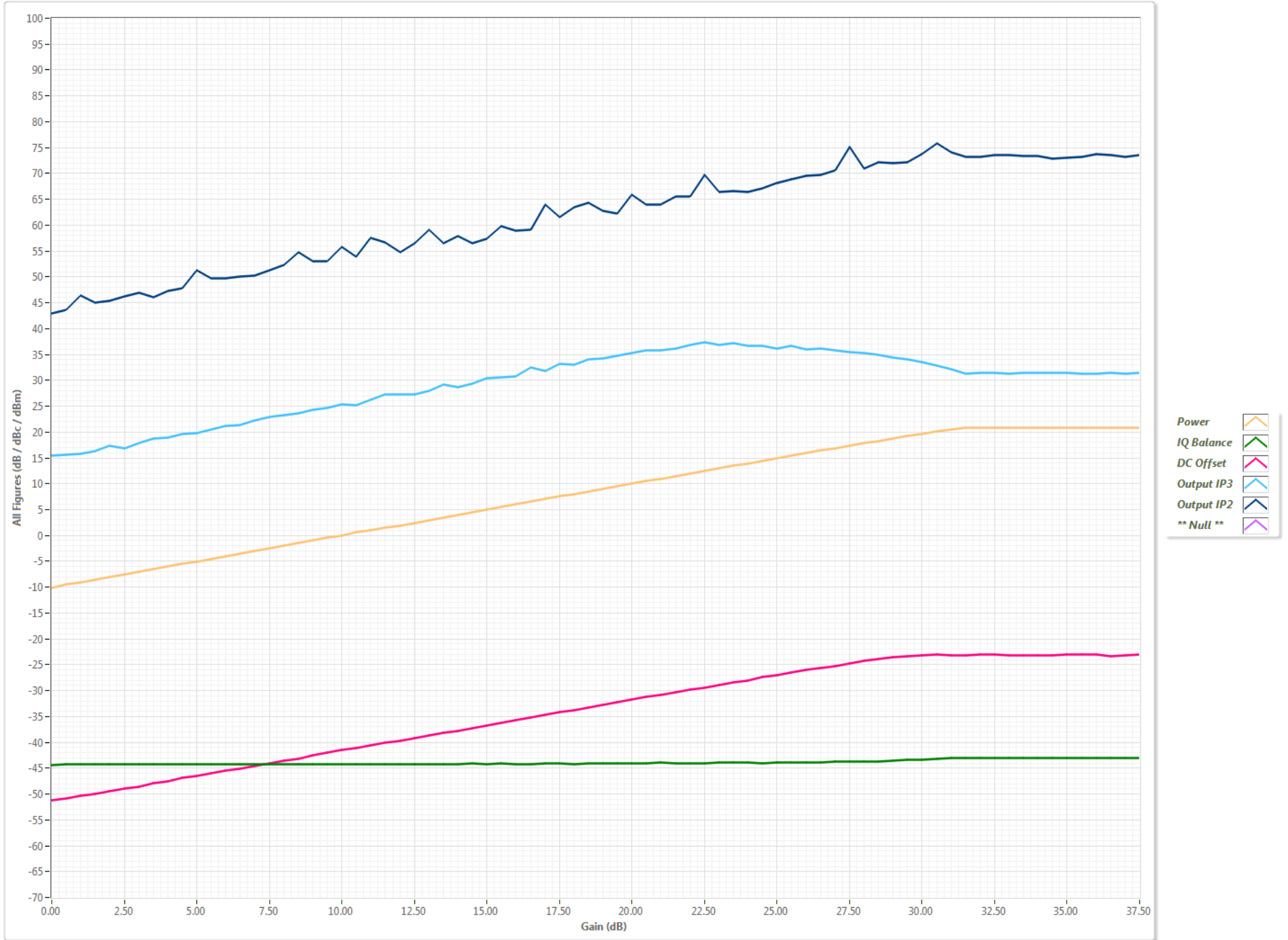
TX Figure vs Gain w/ Frequency=2250.00MHz



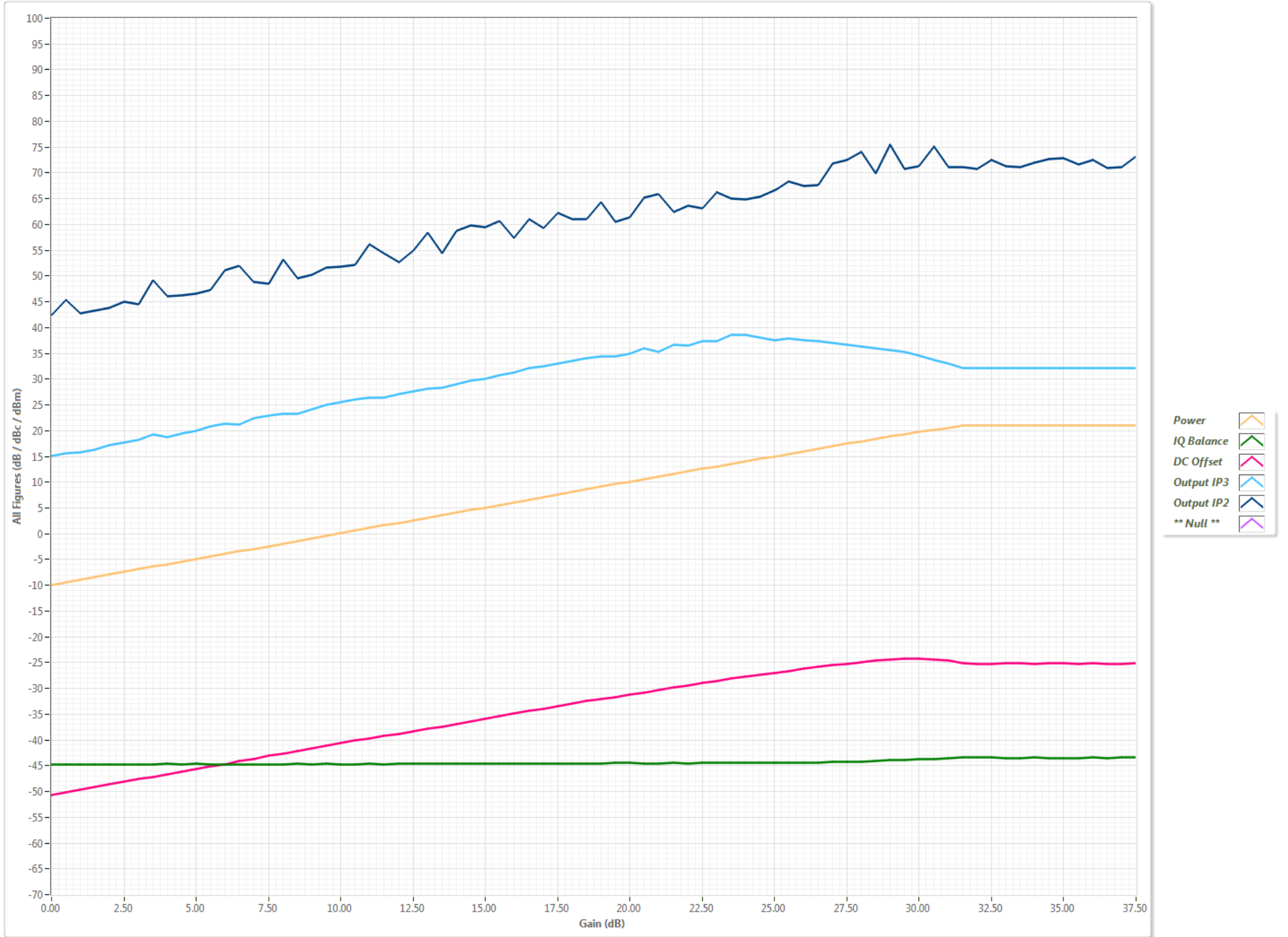
TX Figure vs Gain w/ Frequency=2300.00MHz



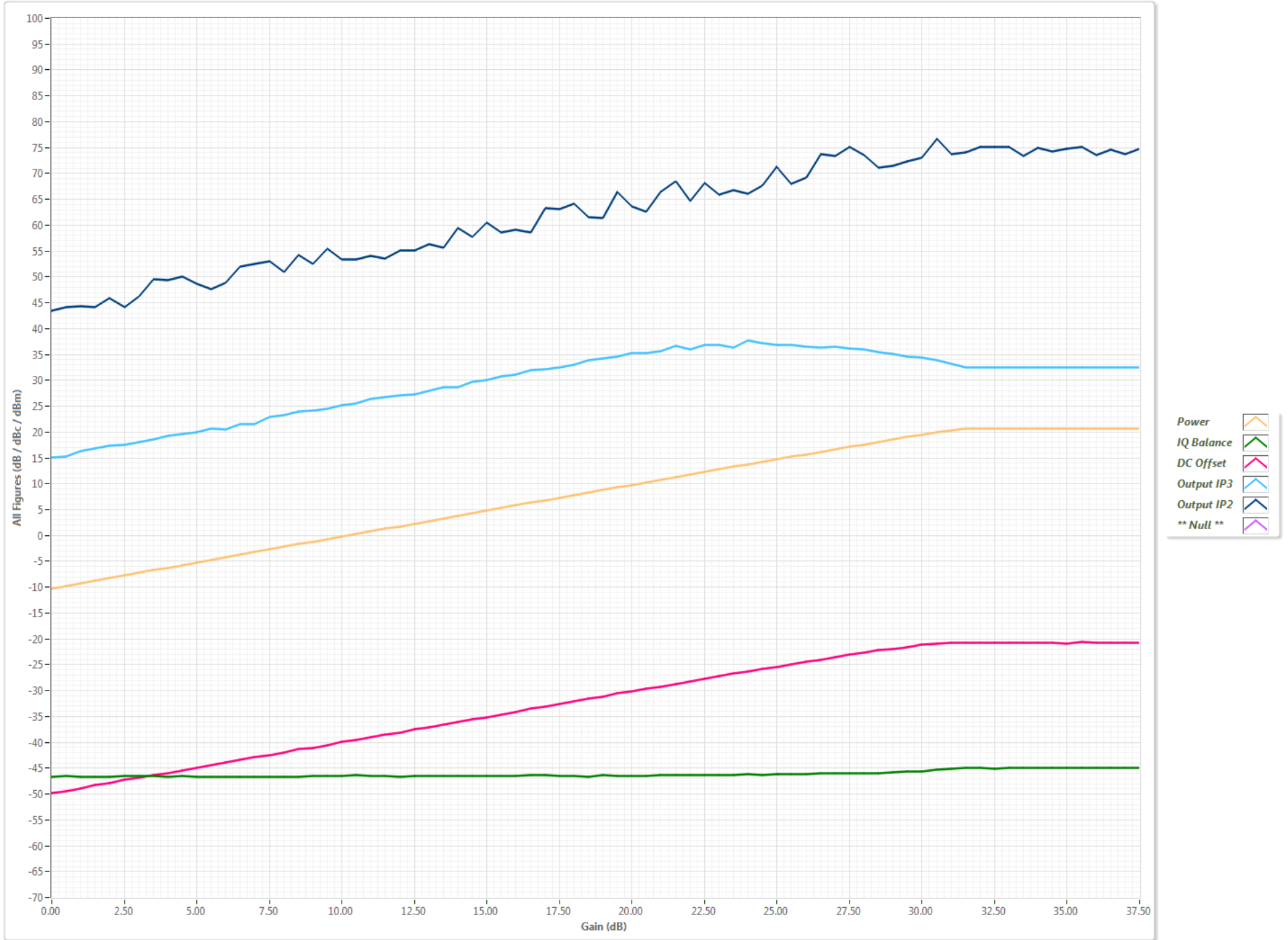
TX Figure vs Gain w/ Frequency=2350.00MHz



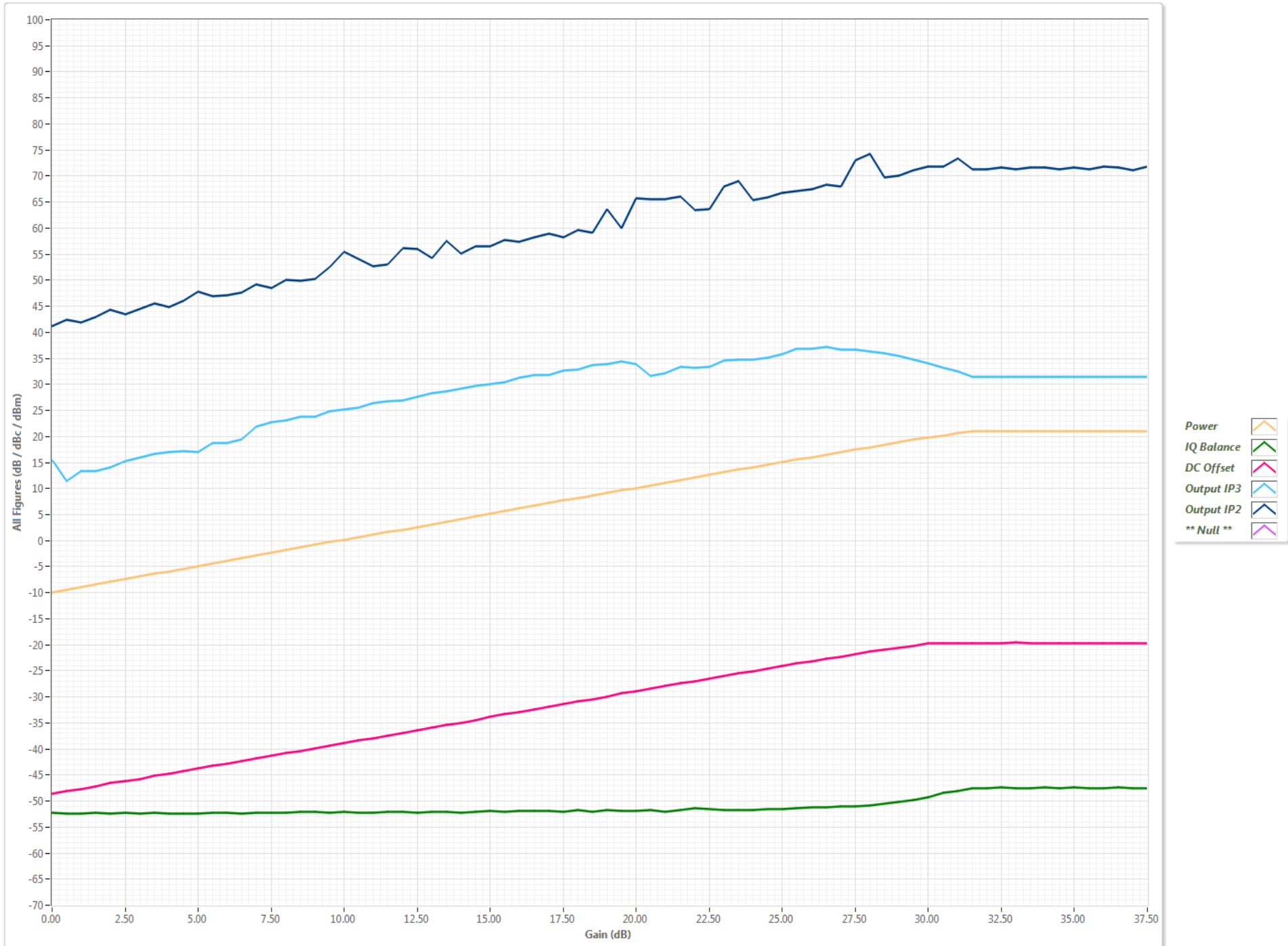
TX Figure vs Gain w/ Frequency=2400.00MHz



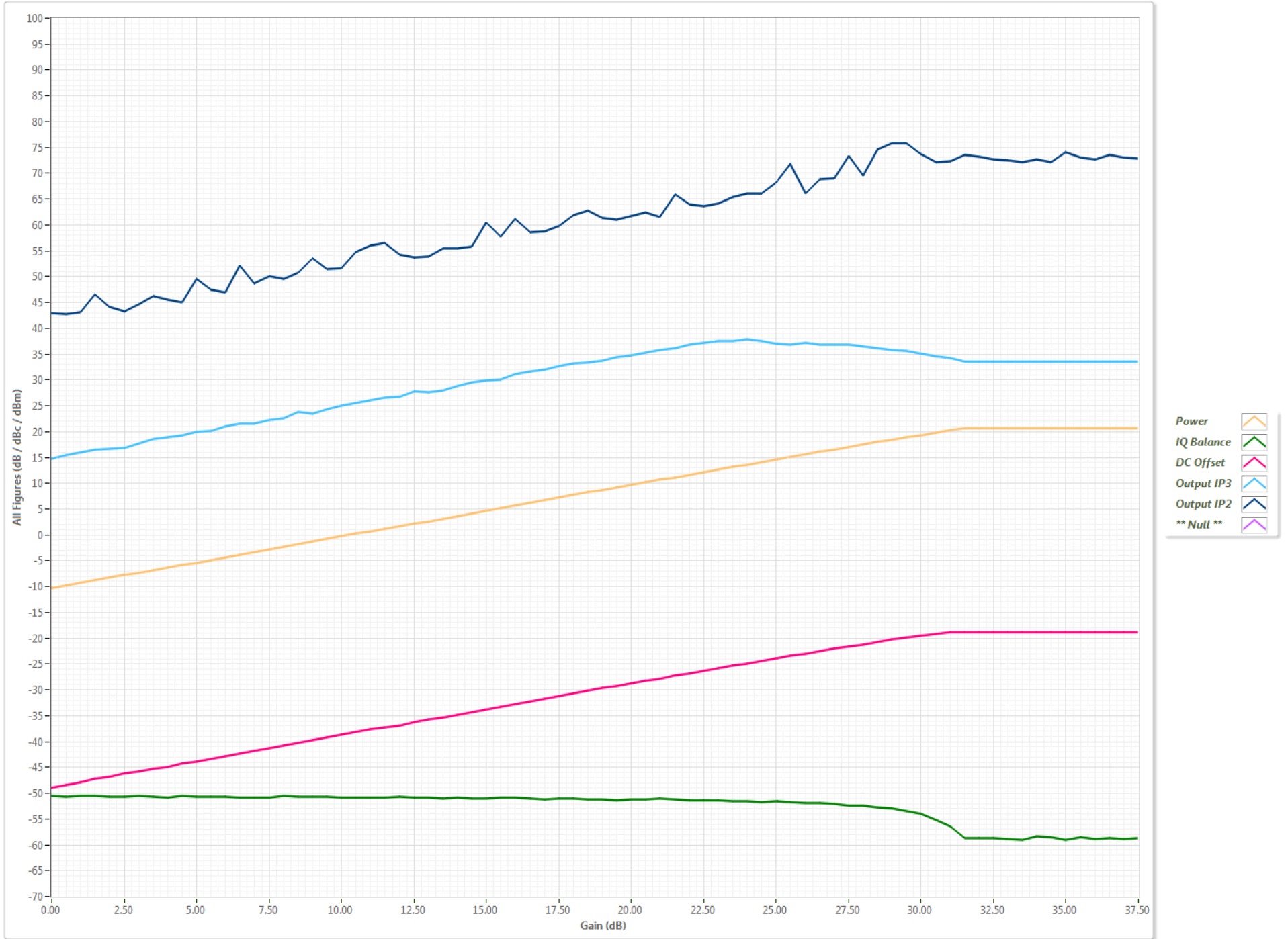
TX Figure vs Gain w/ Frequency=2450.00MHz



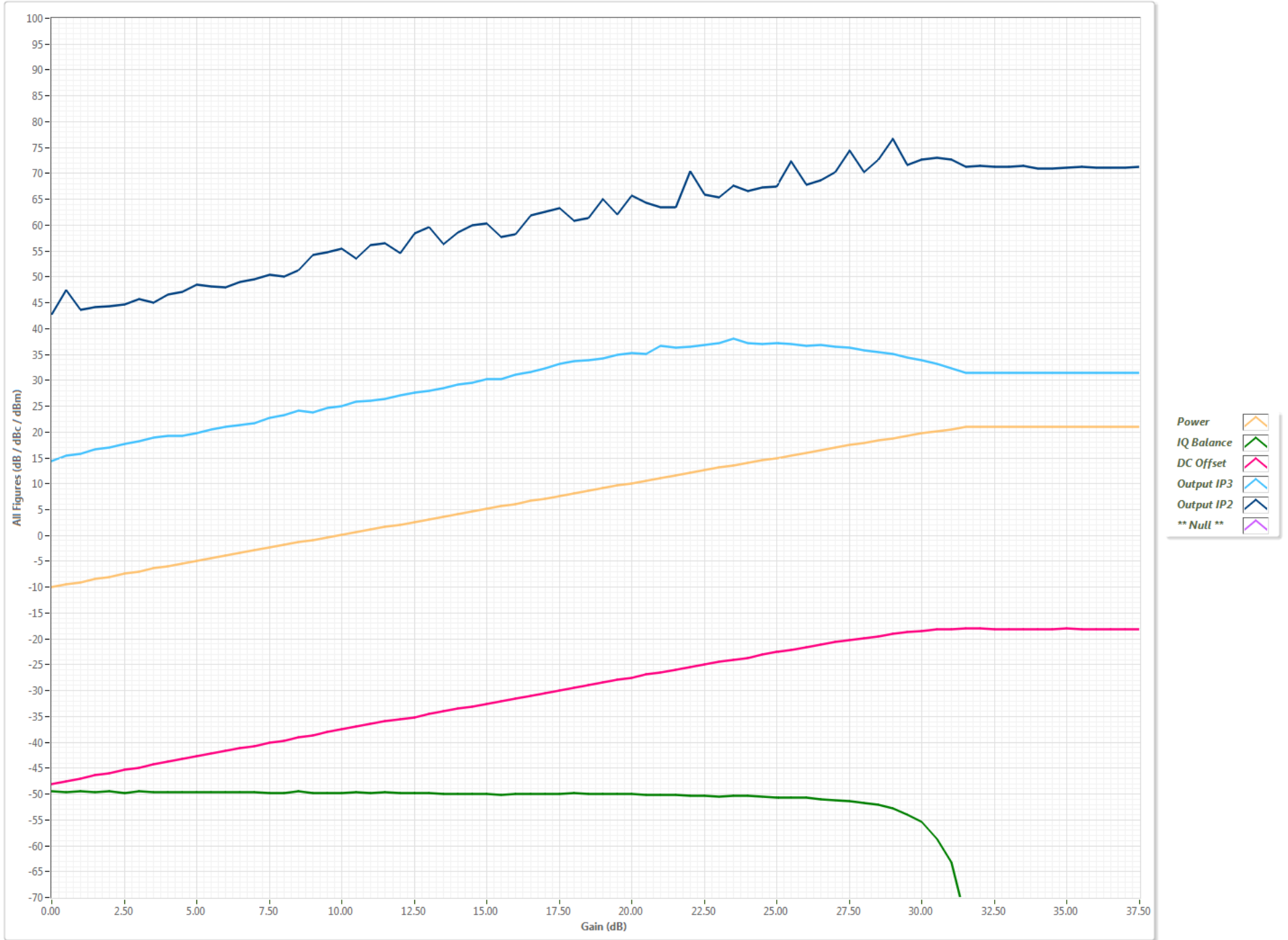
TX Figure vs Gain w/ Frequency=2500.00MHz



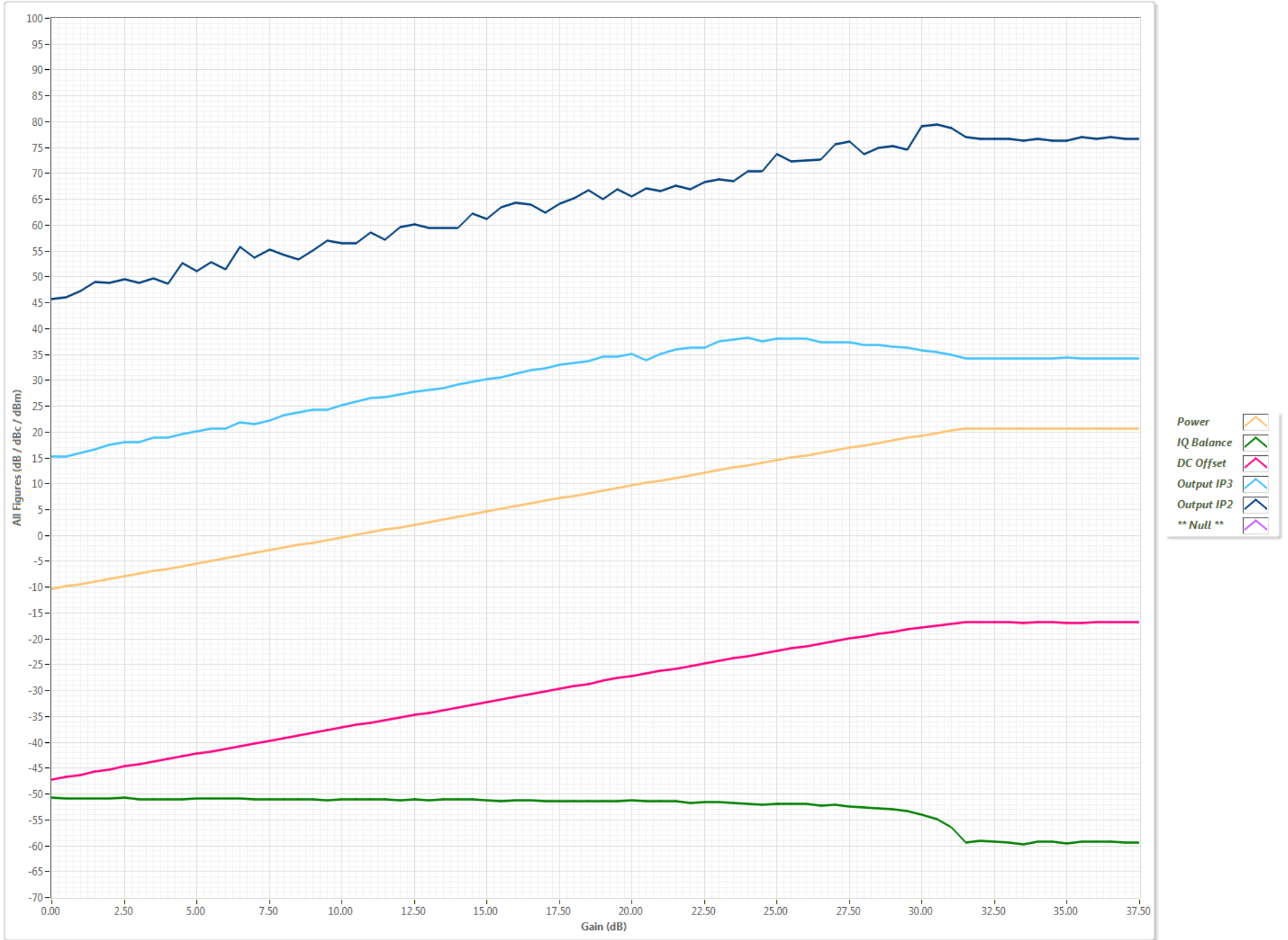
TX Figure vs Gain w/ Frequency=2550.00MHz



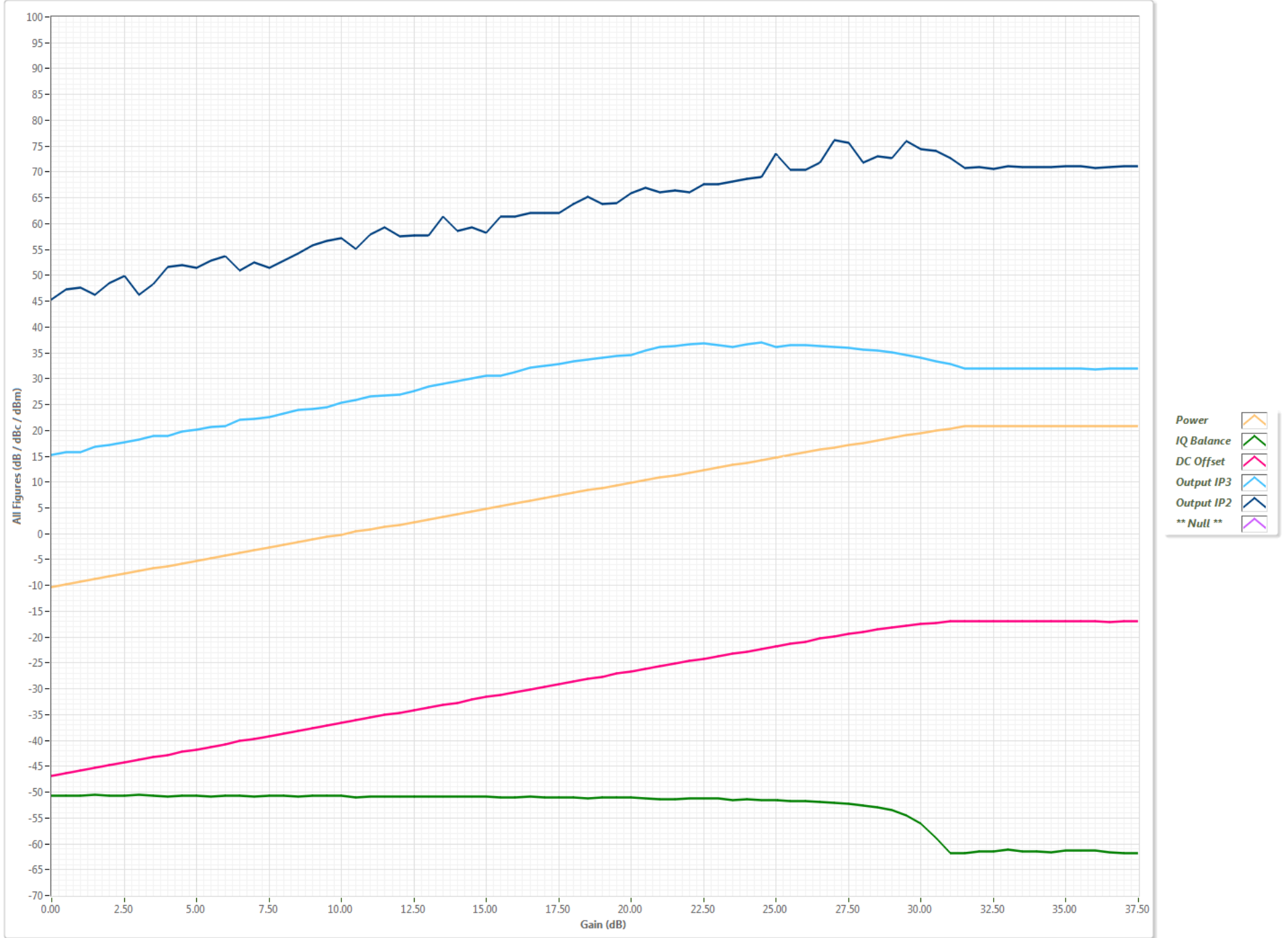
TX Figure vs Gain w/ Frequency=2600.00MHz



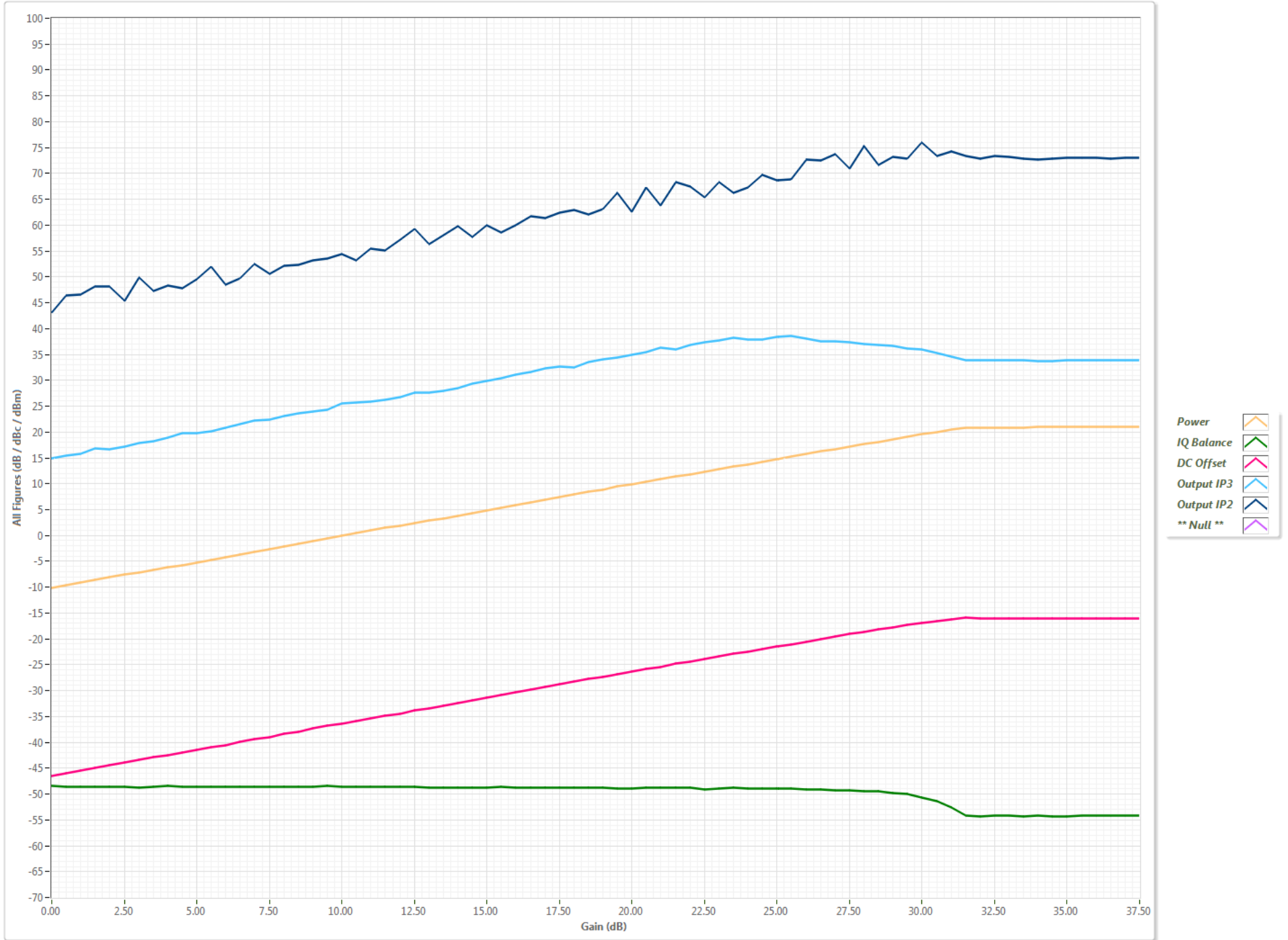
TX Figure vs Gain w/ Frequency=2650.00MHz



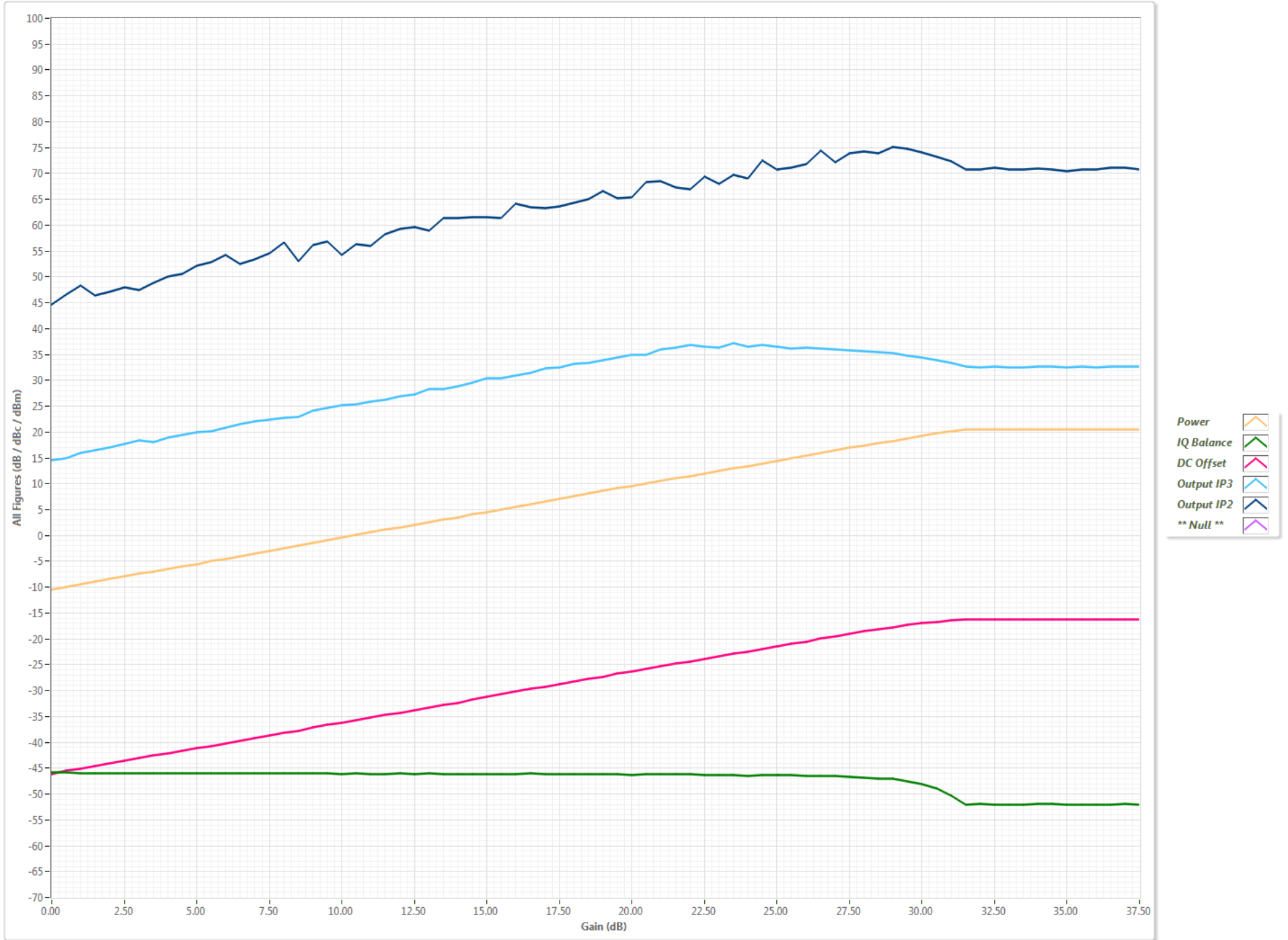
TX Figure vs Gain w/ Frequency=2700.00MHz



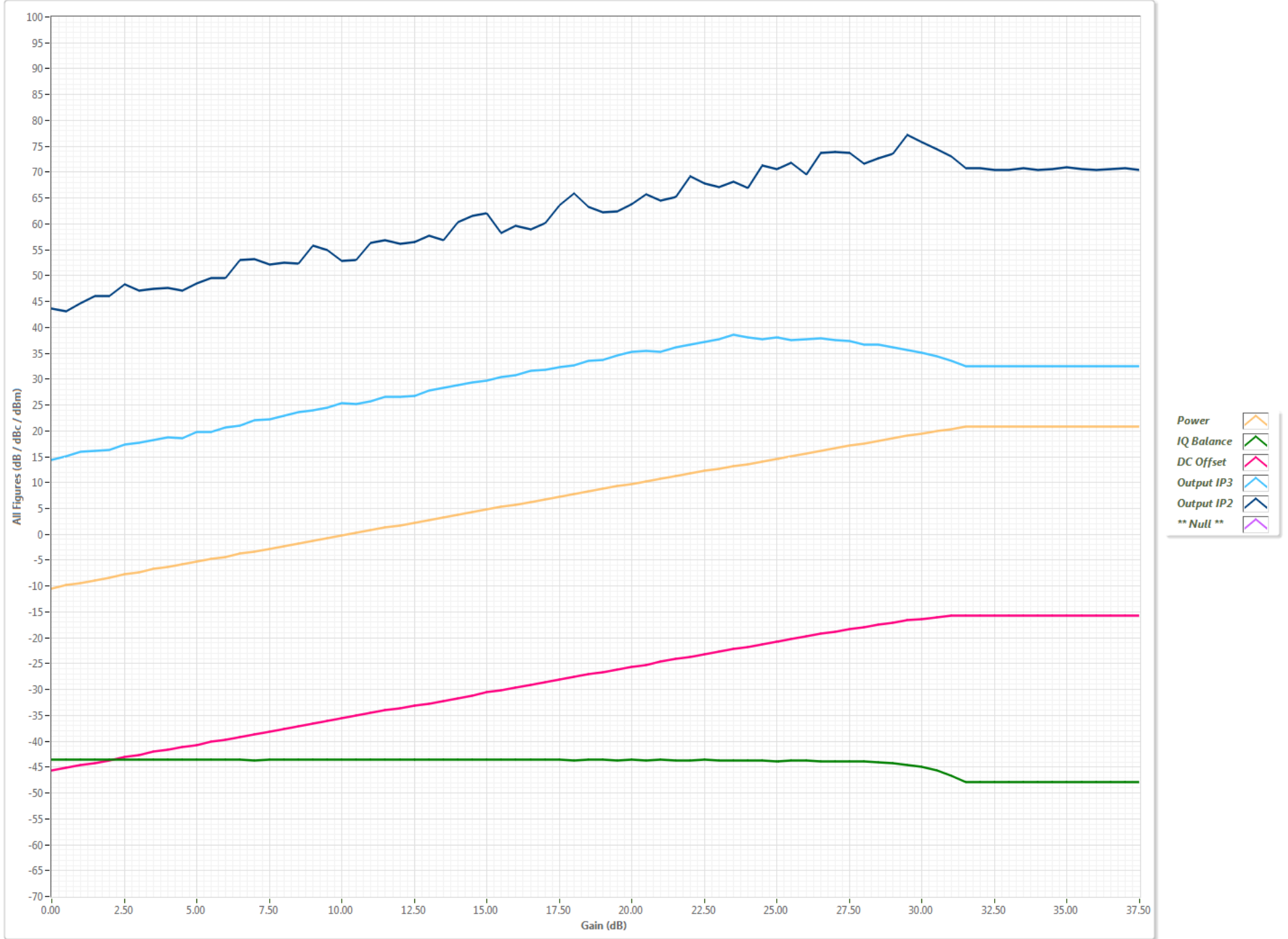
TX Figure vs Gain w/ Frequency=2750.00MHz



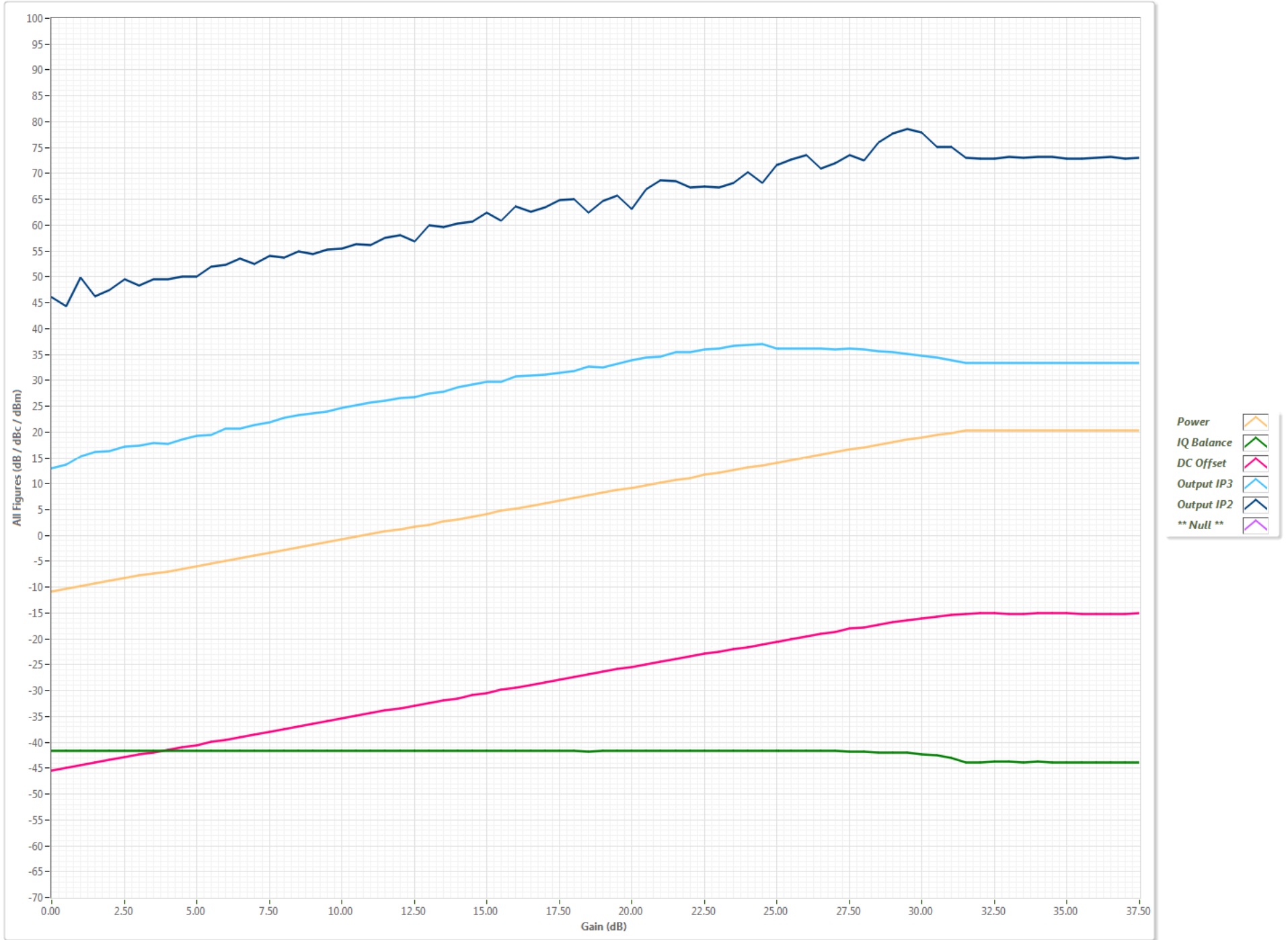
TX Figure vs Gain w/ Frequency=2800.00MHz



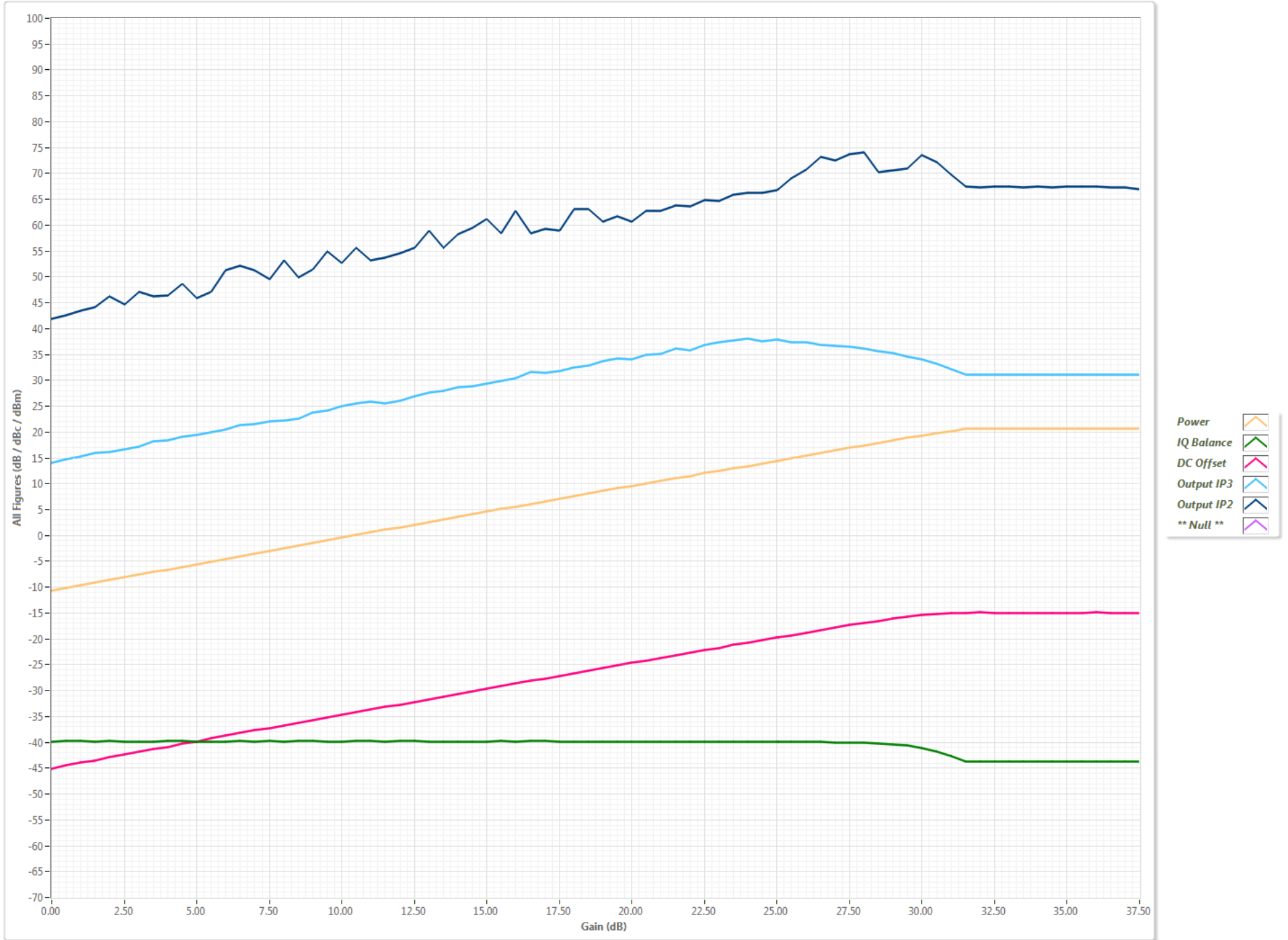
TX Figure vs Gain w/ Frequency=2850.00MHz



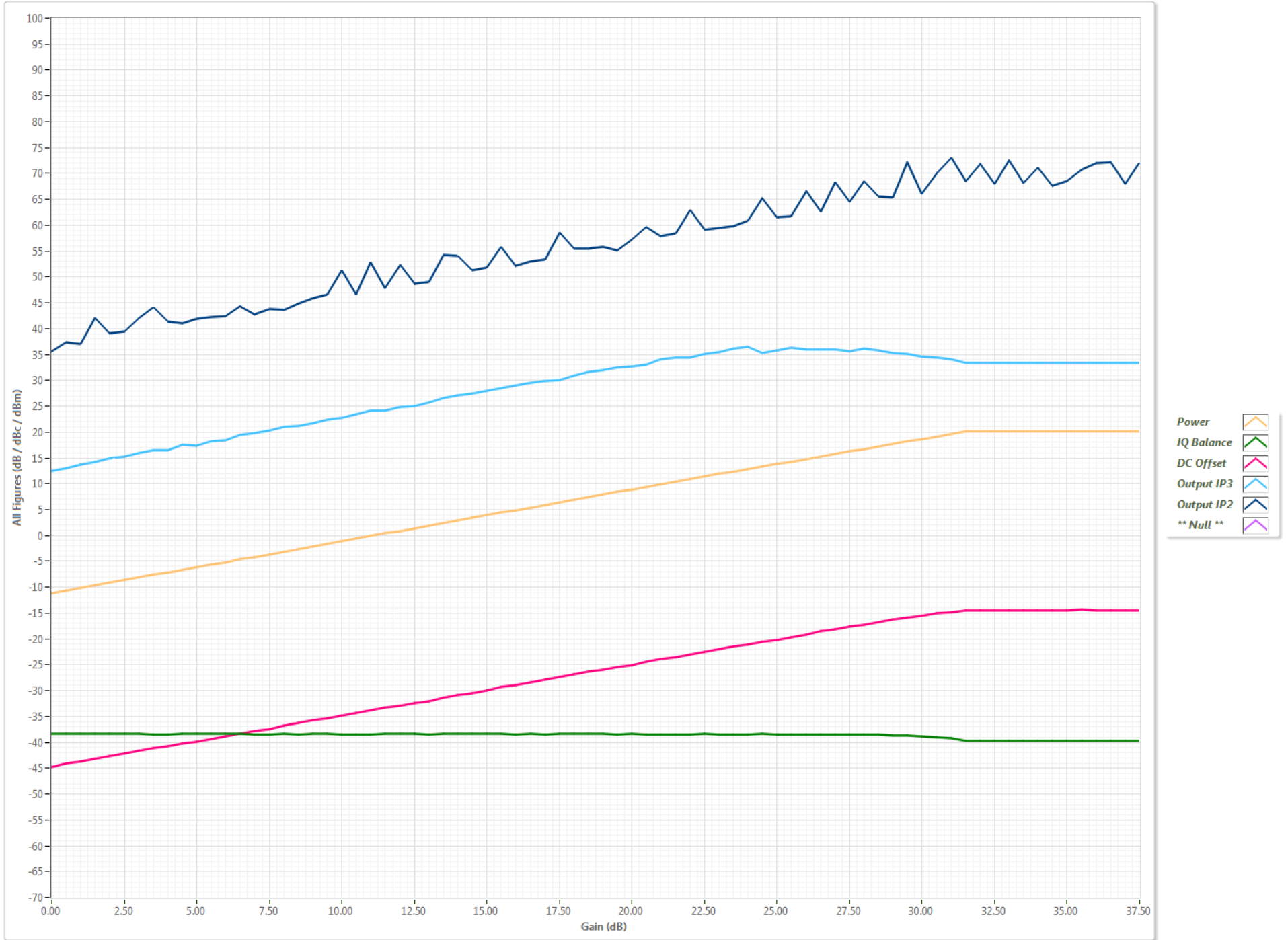
TX Figure vs Gain w/ Frequency=2900.00MHz



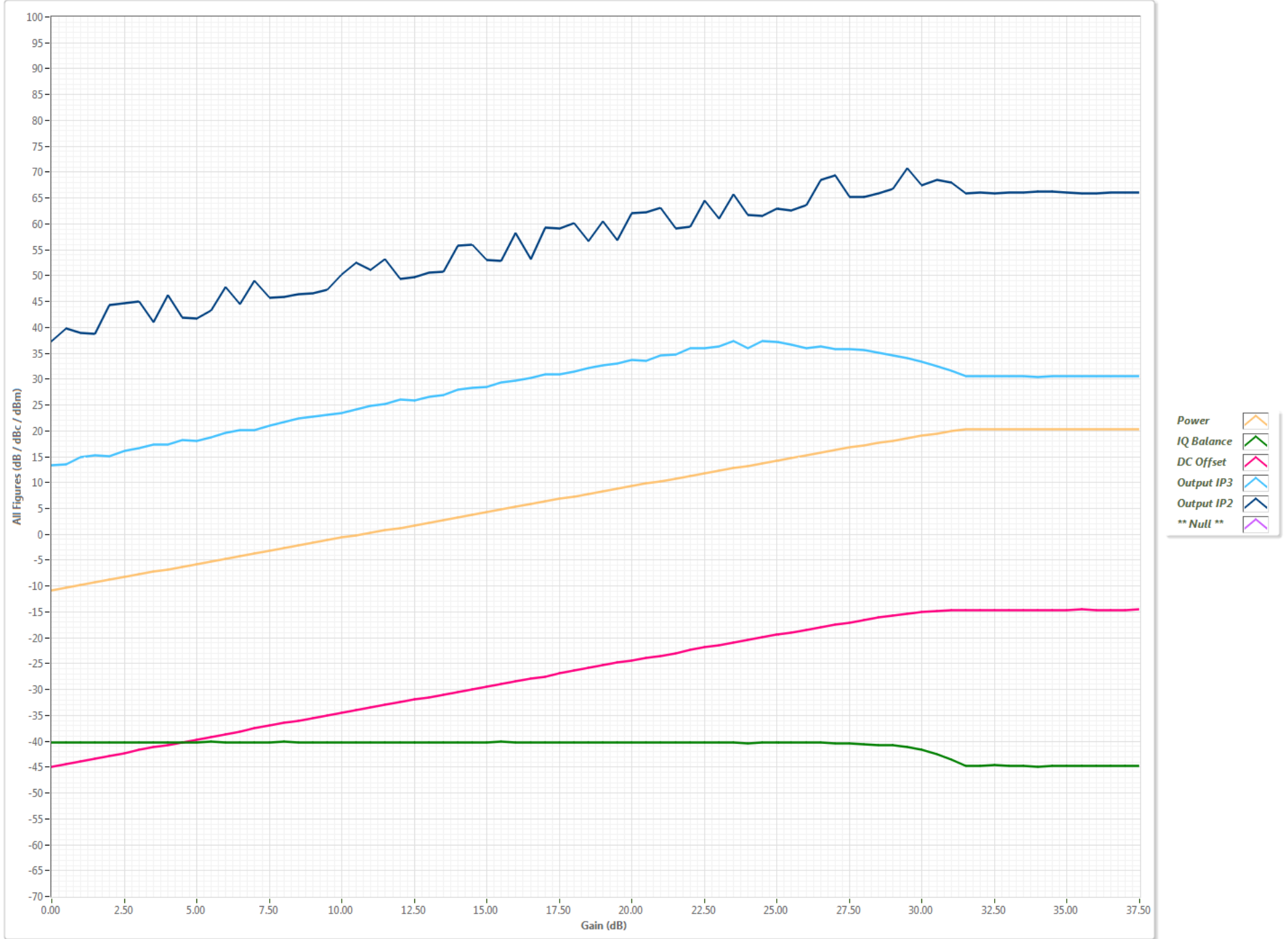
TX Figure vs Gain w/ Frequency=2950.00MHz



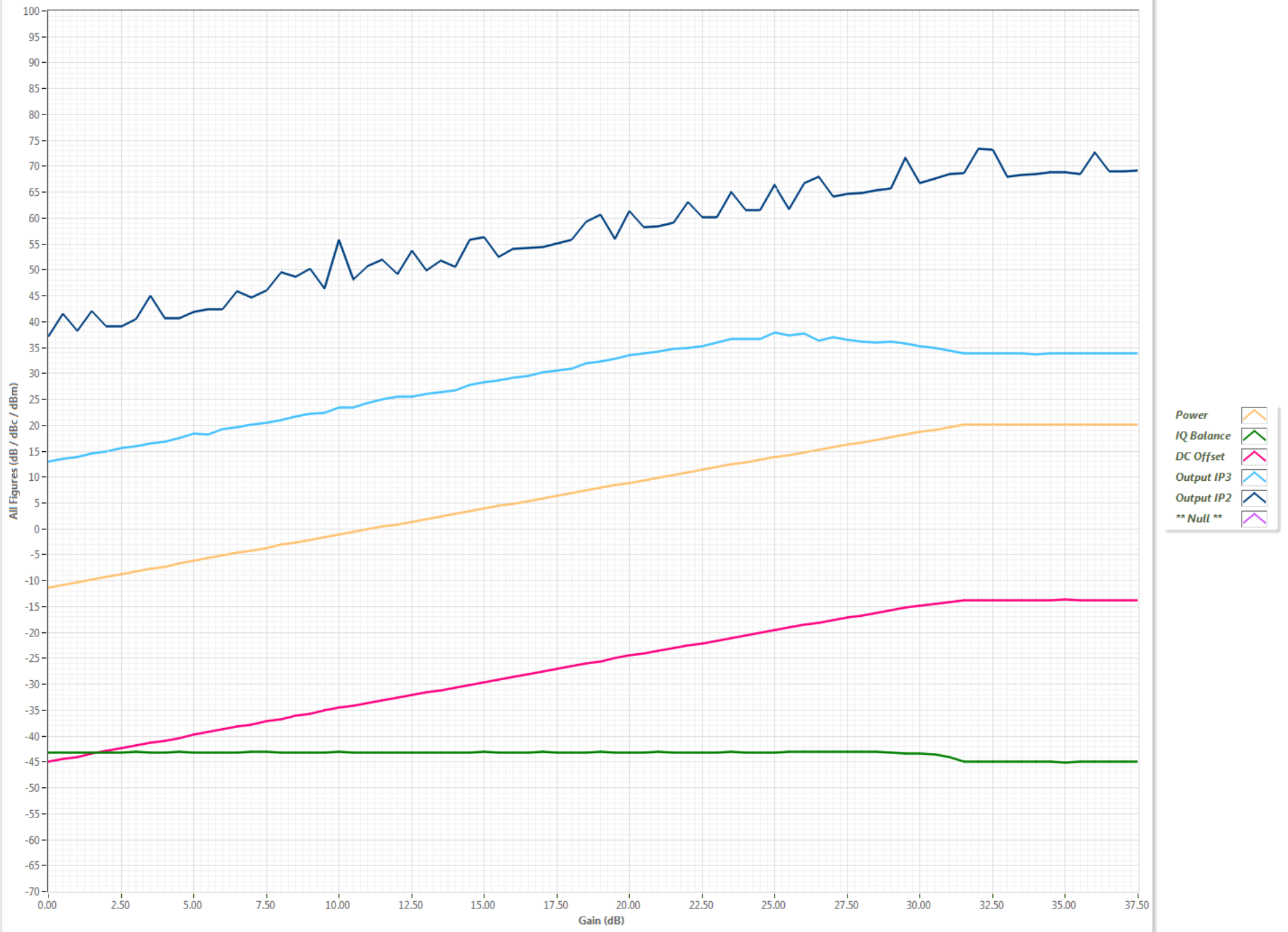
TX Figure vs Gain w/ Frequency=3000.00MHz



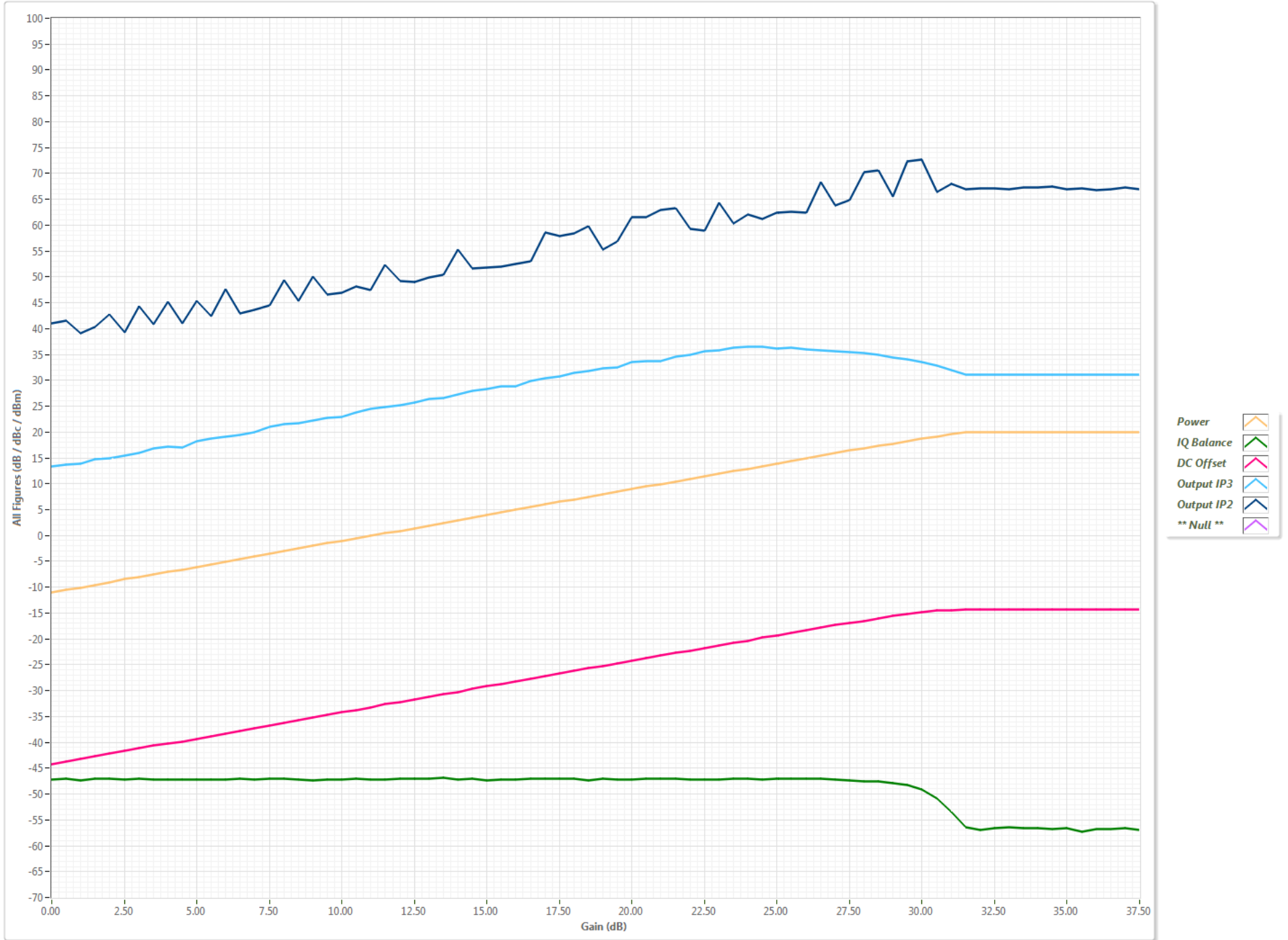
TX Figure vs Gain w/ Frequency=3050.00MHz



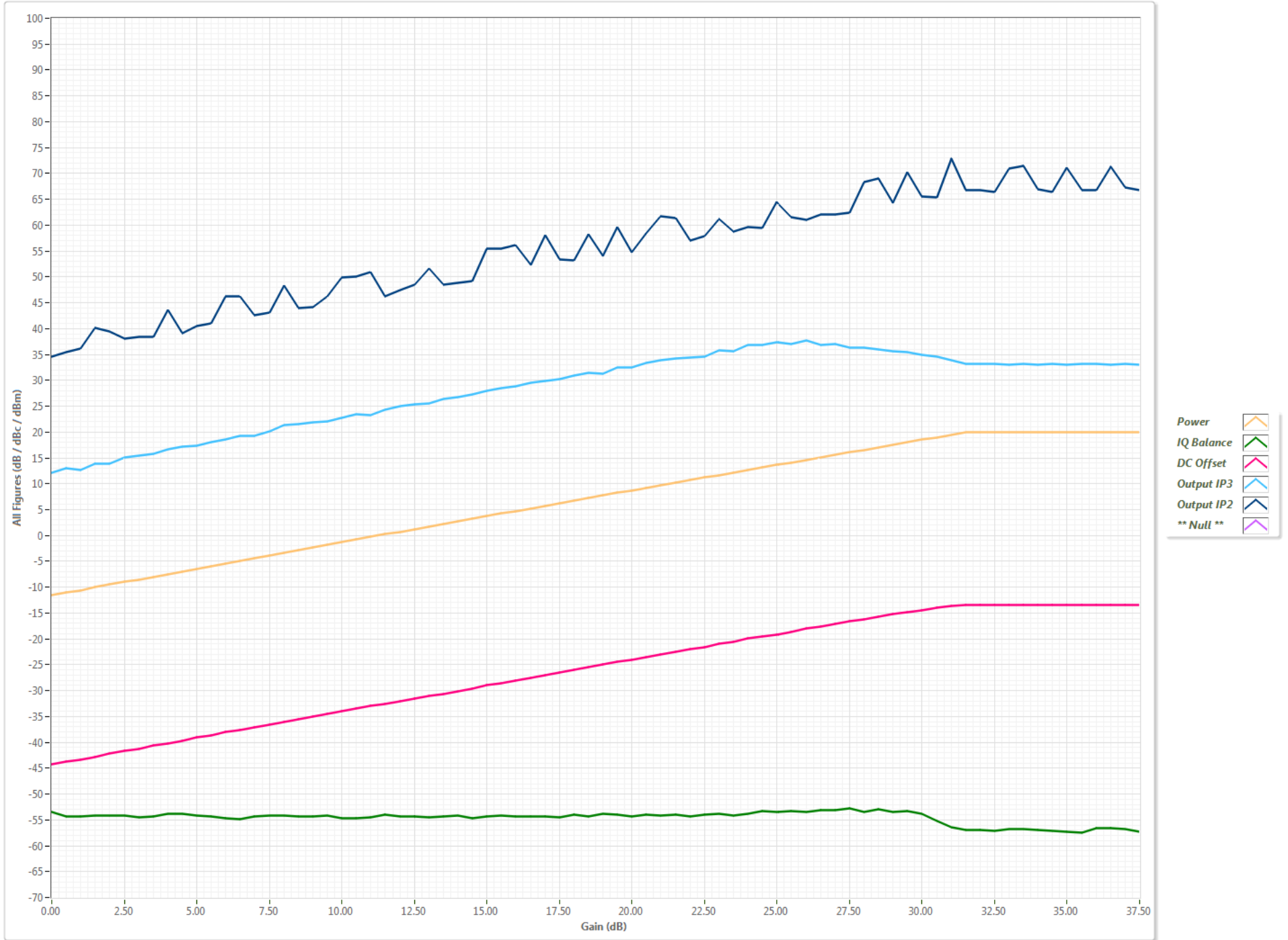
TX Figure vs Gain w/ Frequency=3100.00MHz



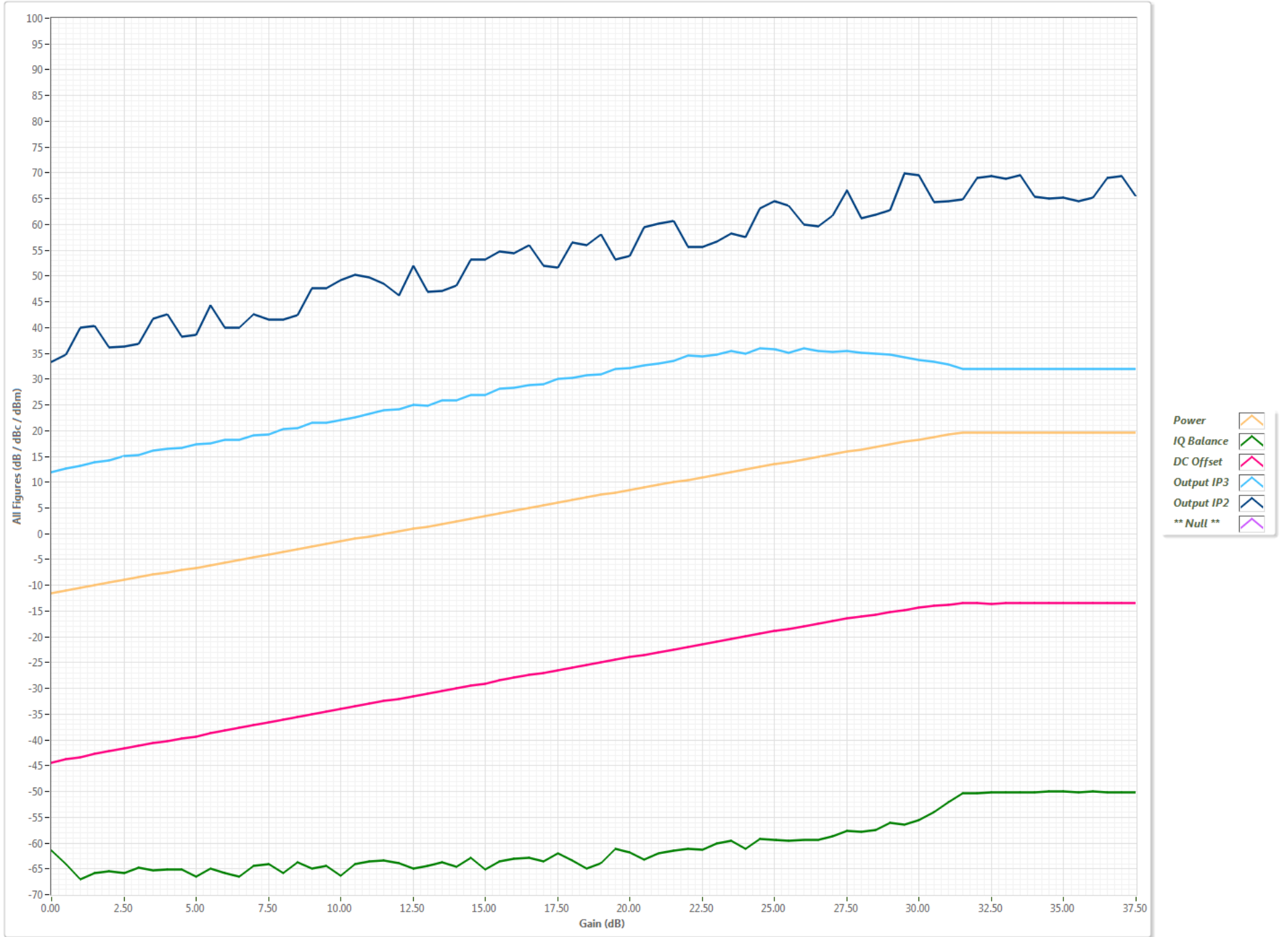
TX Figure vs Gain w/ Frequency=3150.00MHz



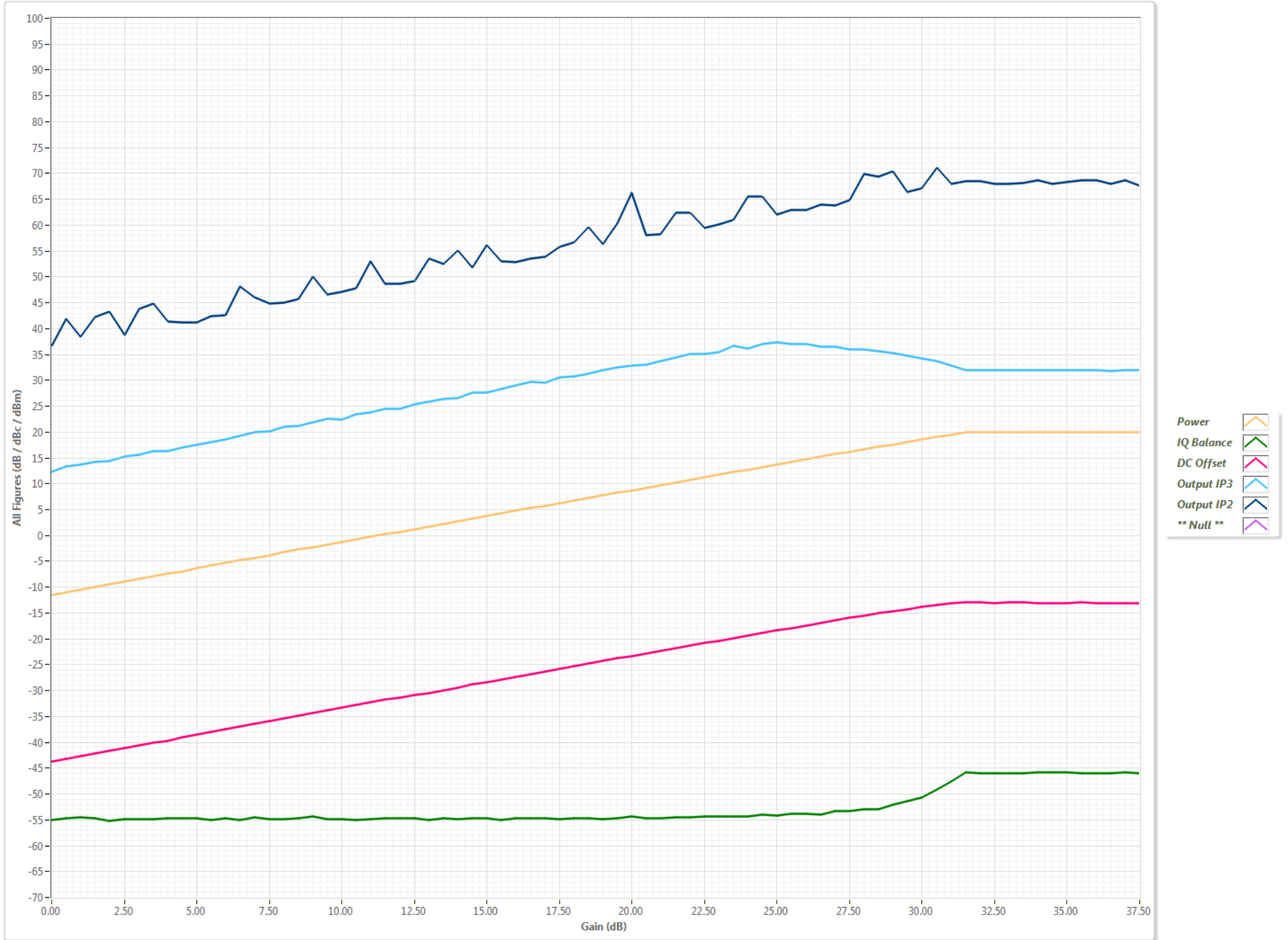
TX Figure vs Gain w/ Frequency=3200.00MHz



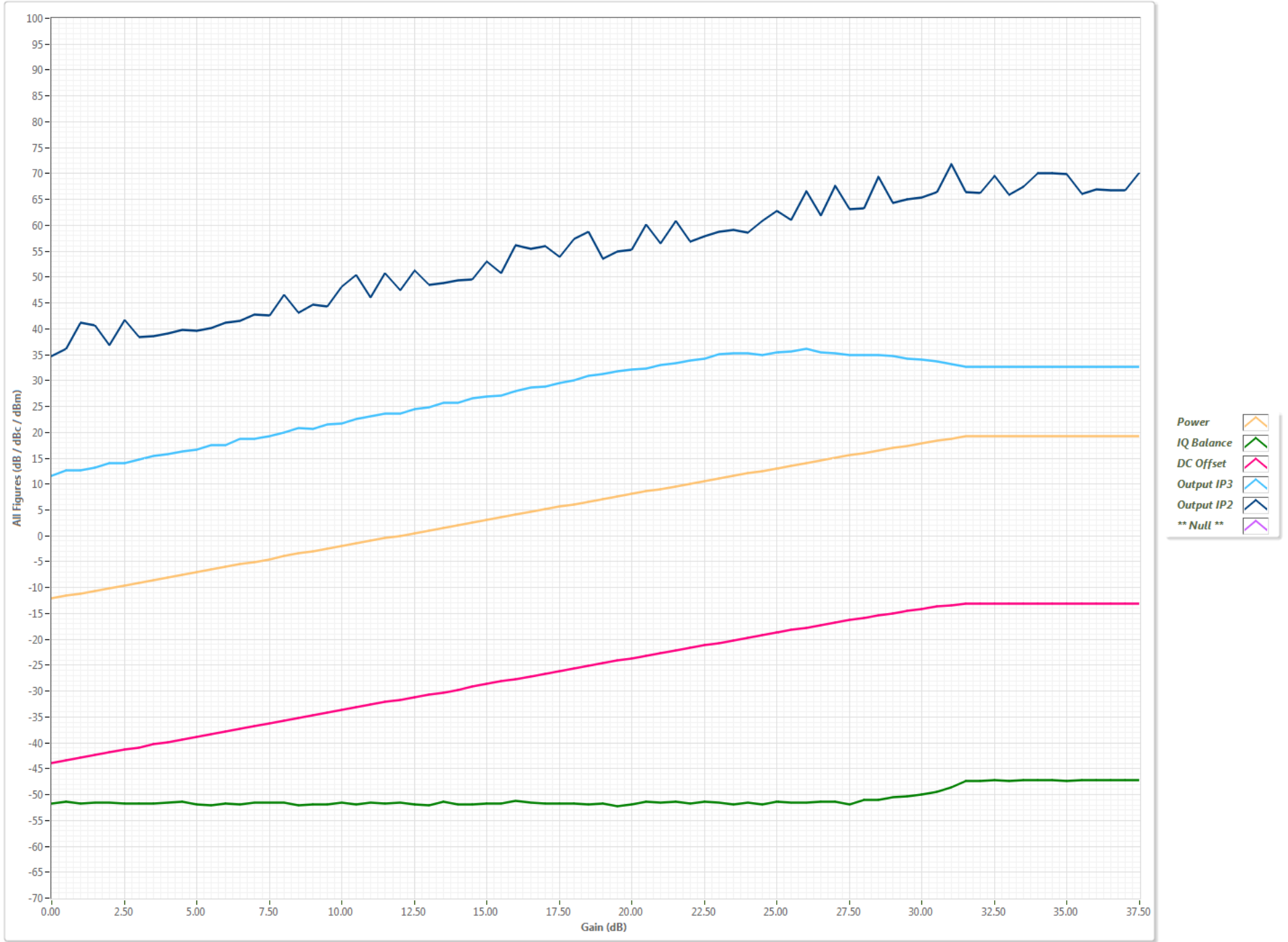
TX Figure vs Gain w/ Frequency=3250.00MHz



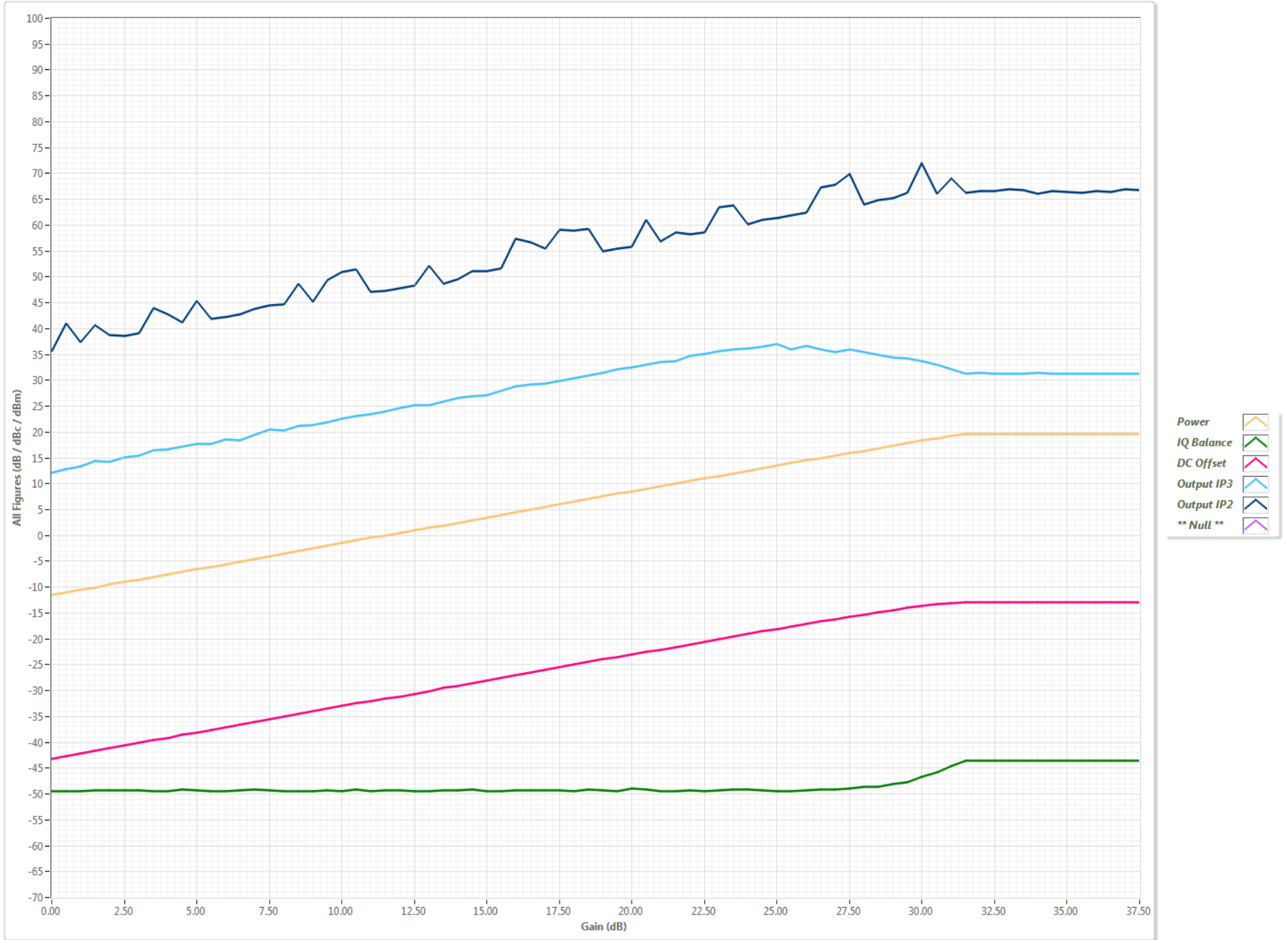
TX Figure vs Gain w/ Frequency=3300.00MHz



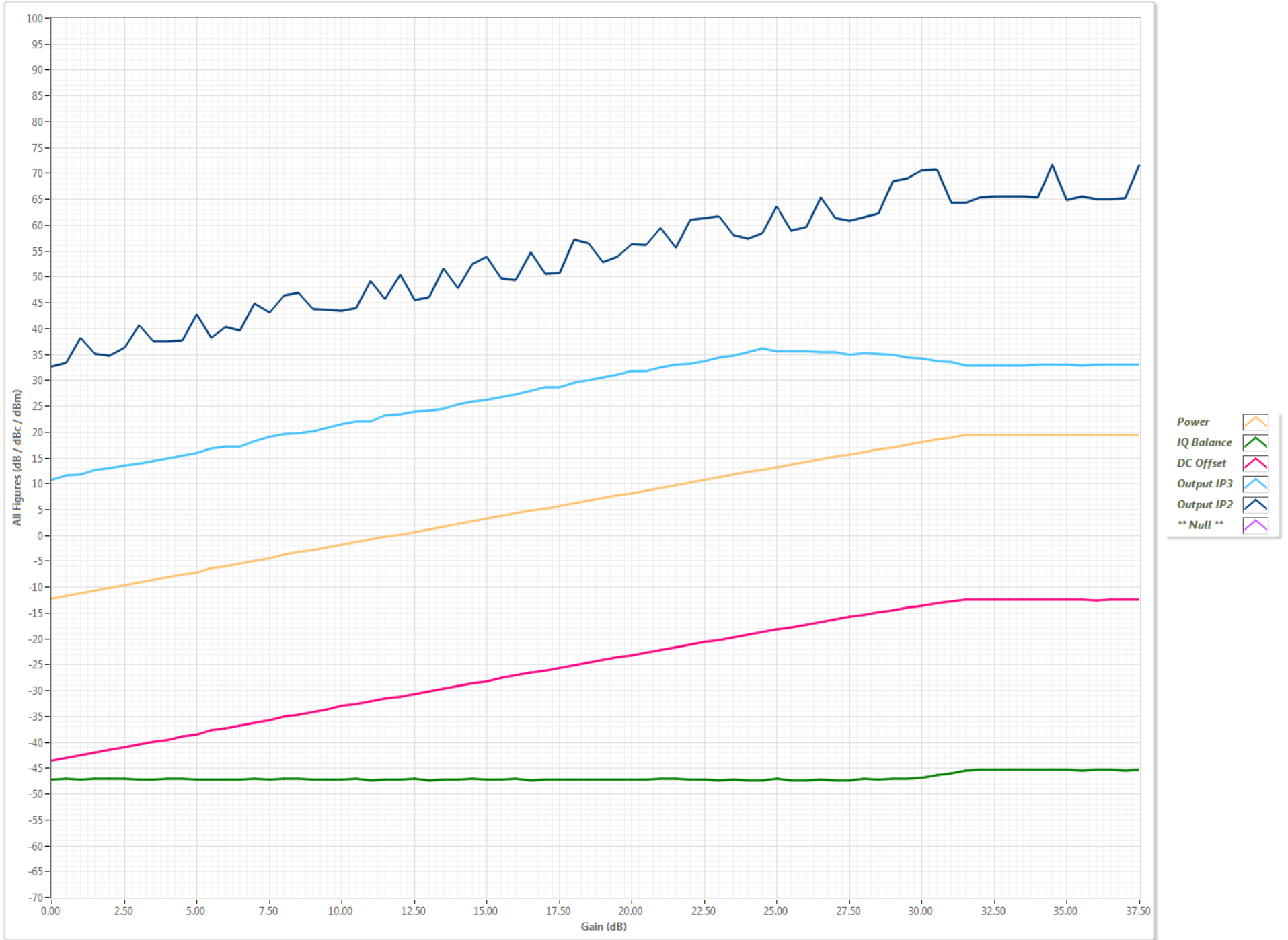
TX Figure vs Gain w/ Frequency=3350.00MHz



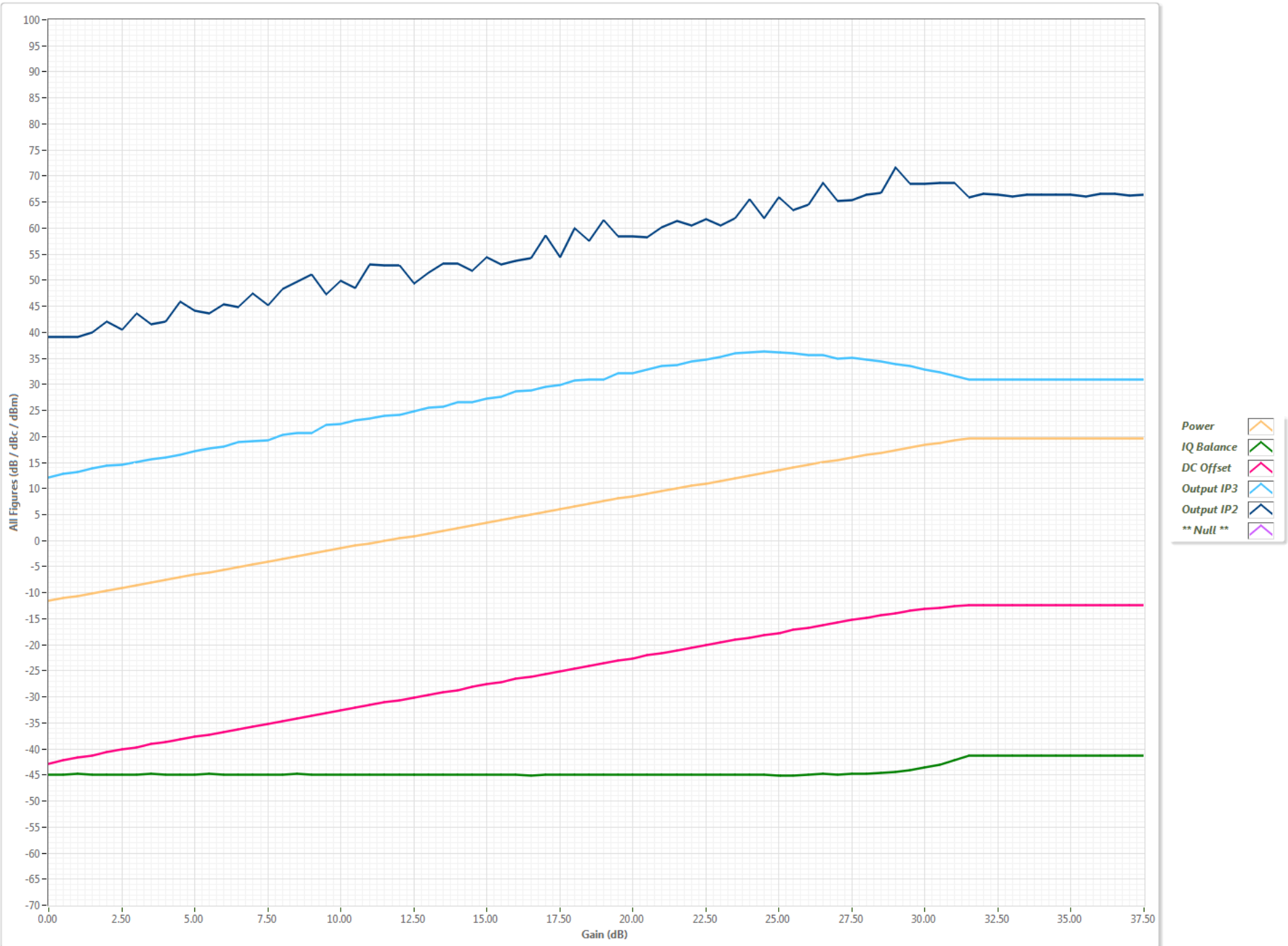
TX Figure vs Gain w/ Frequency=3400.00MHz



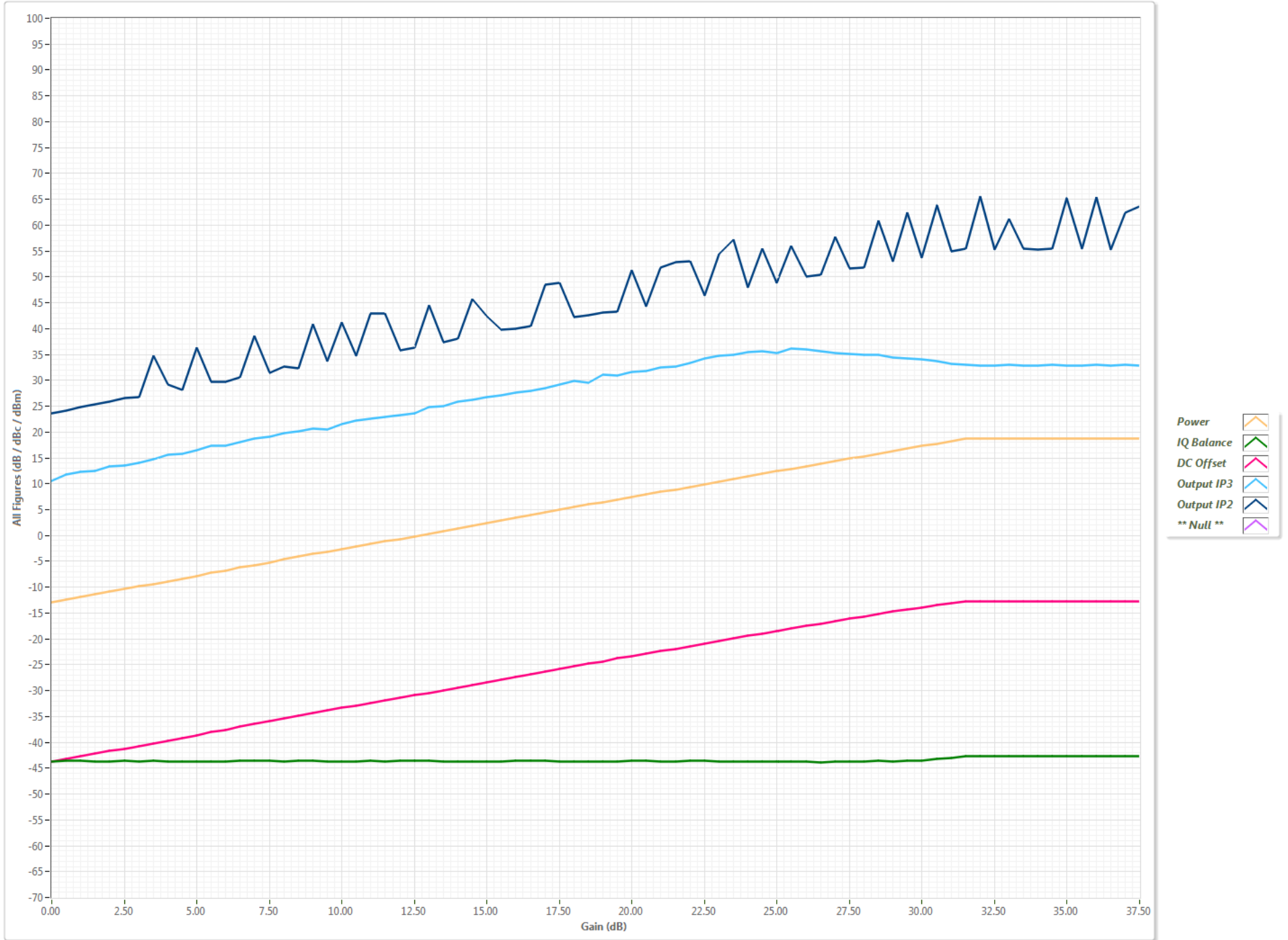
TX Figure vs Gain w/ Frequency=3450.00MHz



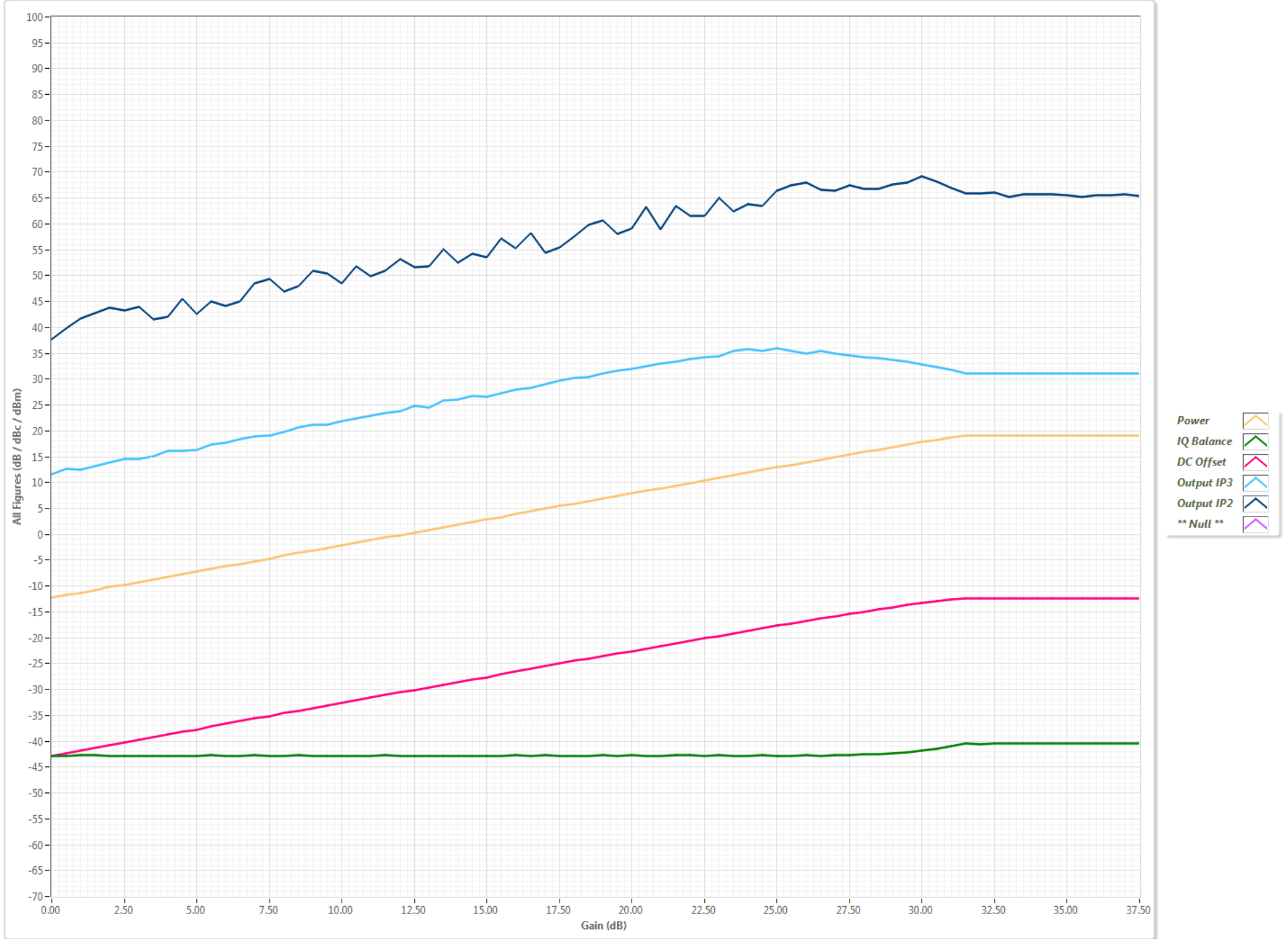
TX Figure vs Gain w/ Frequency=3500.00MHz



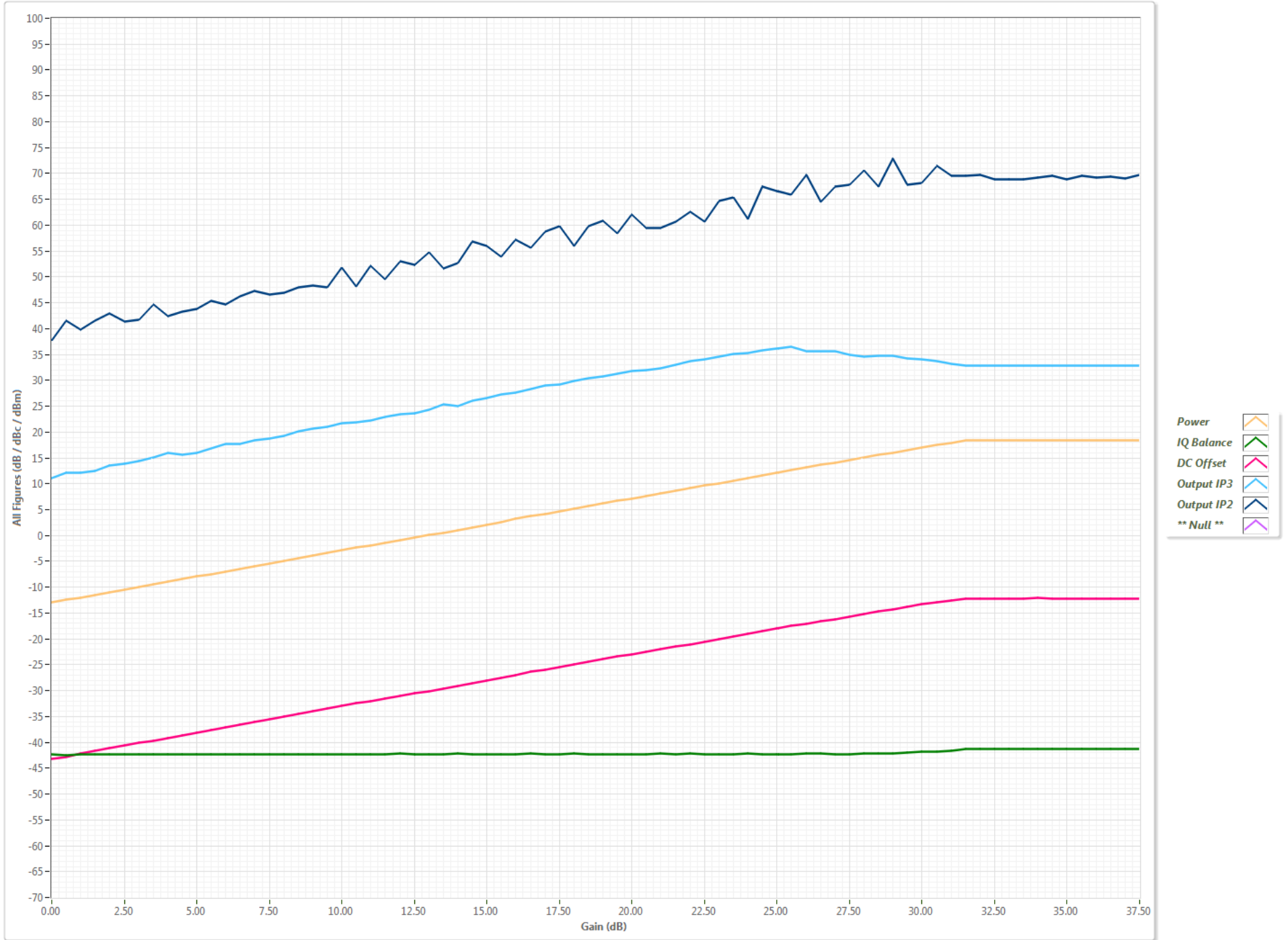
TX Figure vs Gain w/ Frequency=3550.00MHz



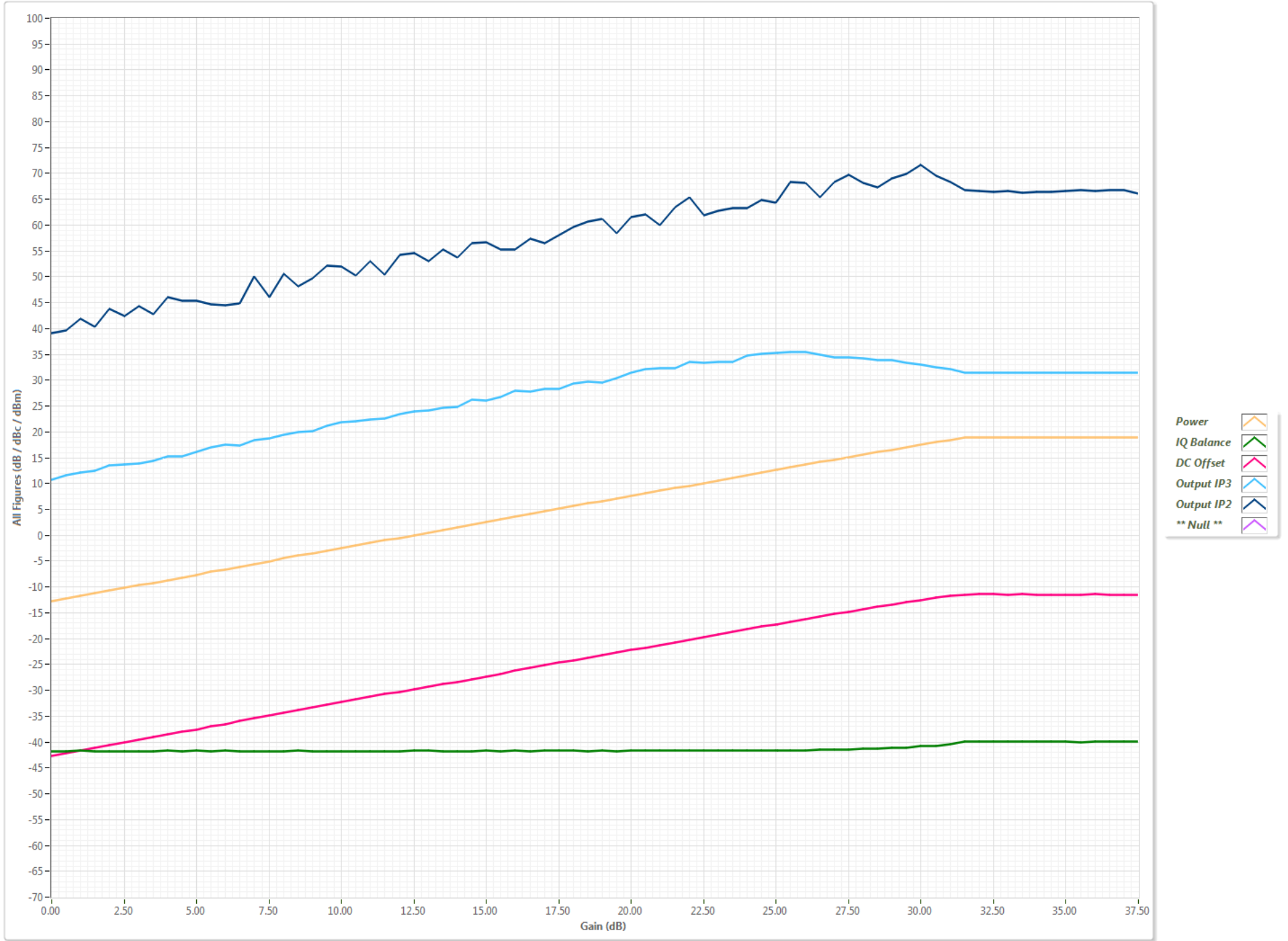
TX Figure vs Gain w/ Frequency=3600.00MHz



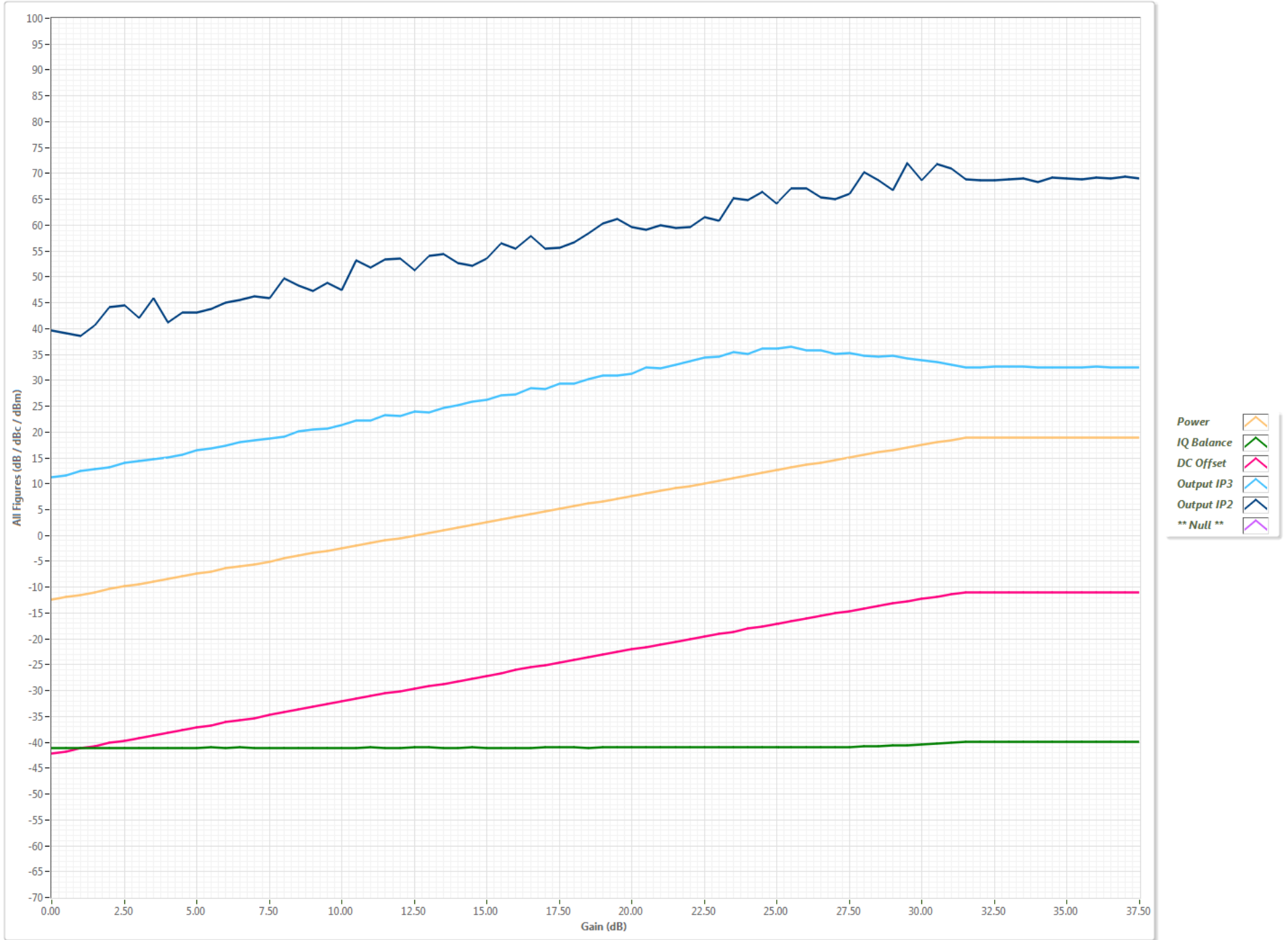
TX Figure vs Gain w/ Frequency=3650.00MHz



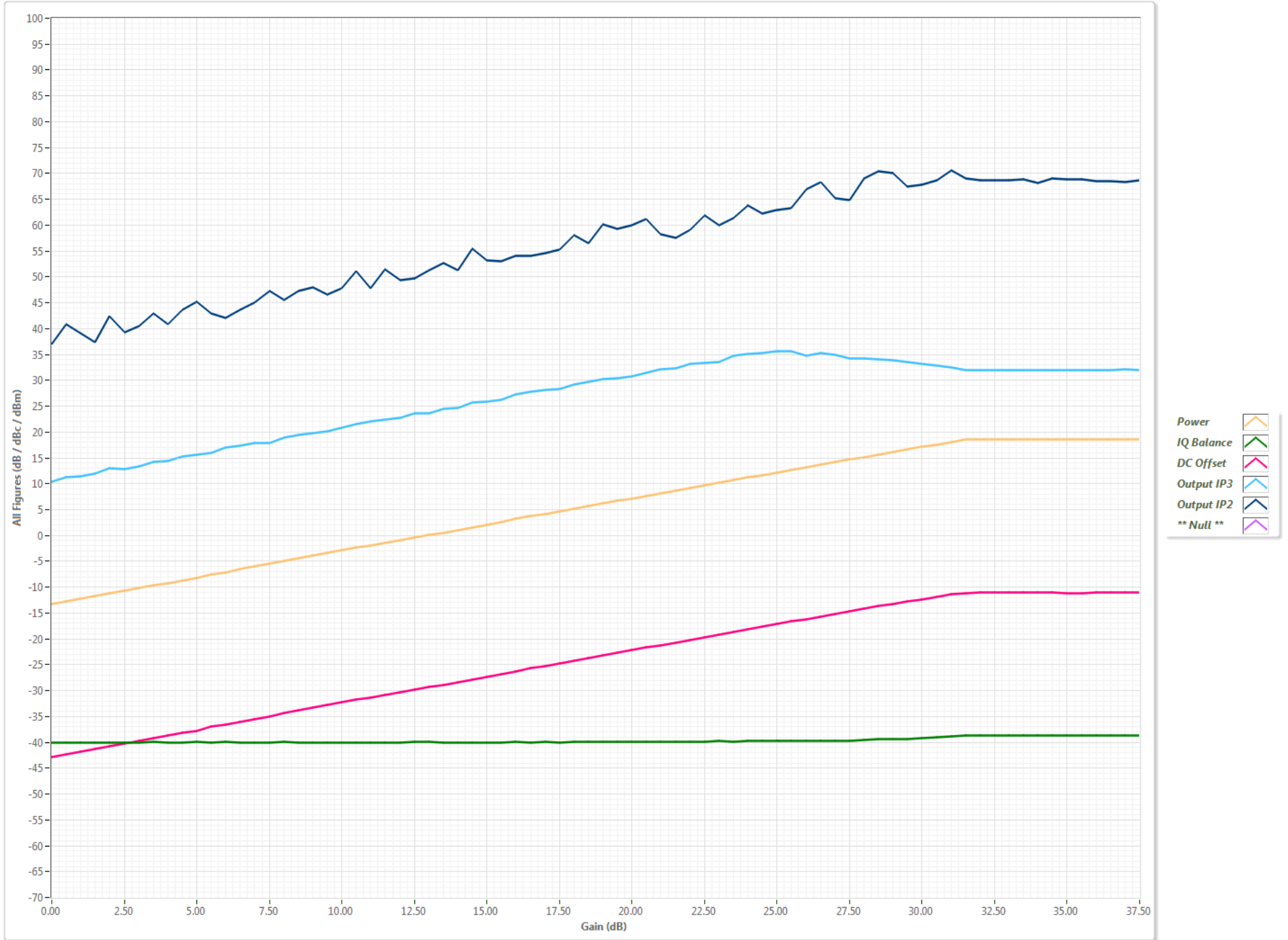
TX Figure vs Gain w/ Frequency=3700.00MHz



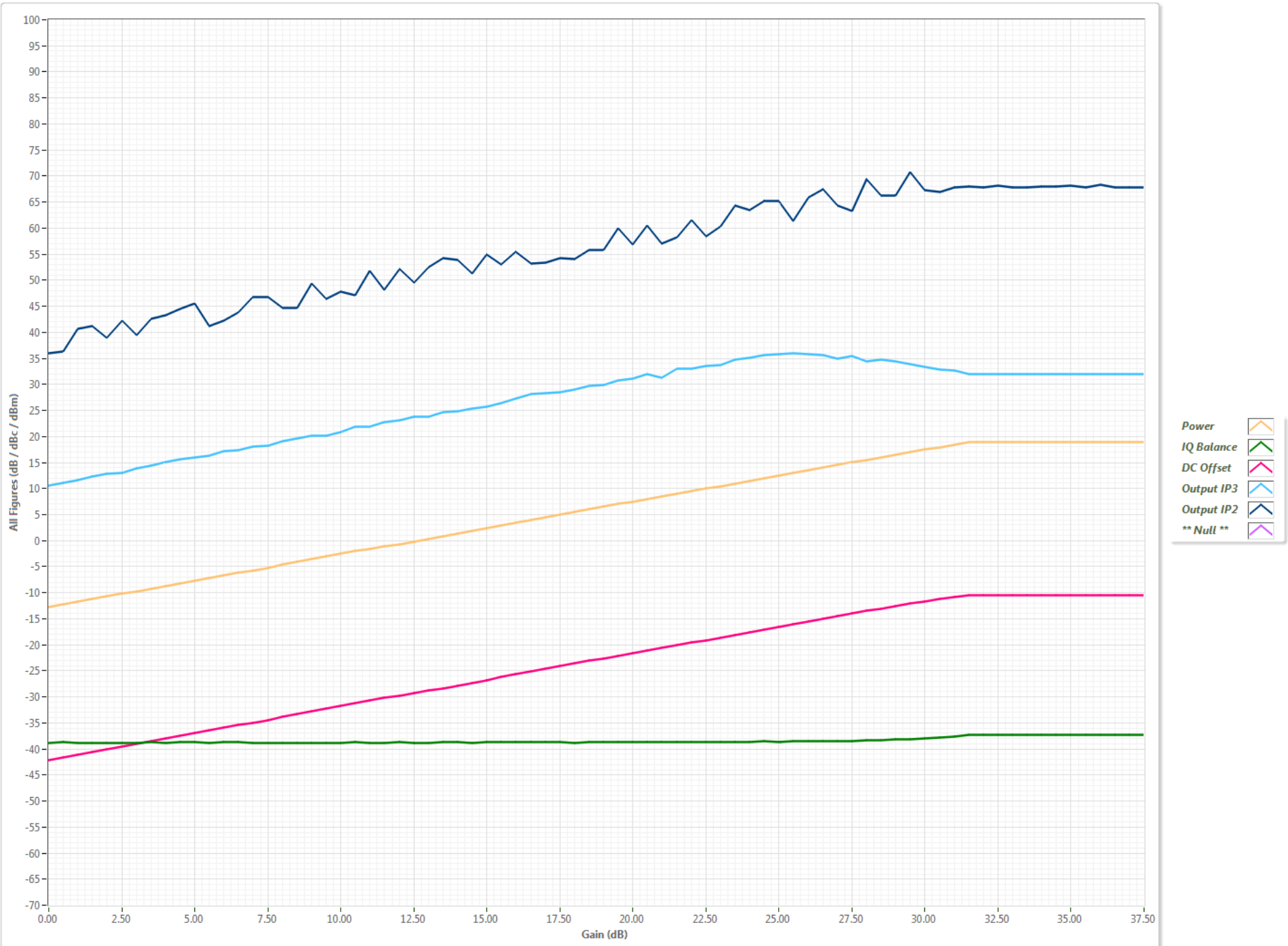
TX Figure vs Gain w/ Frequency=3750.00MHz



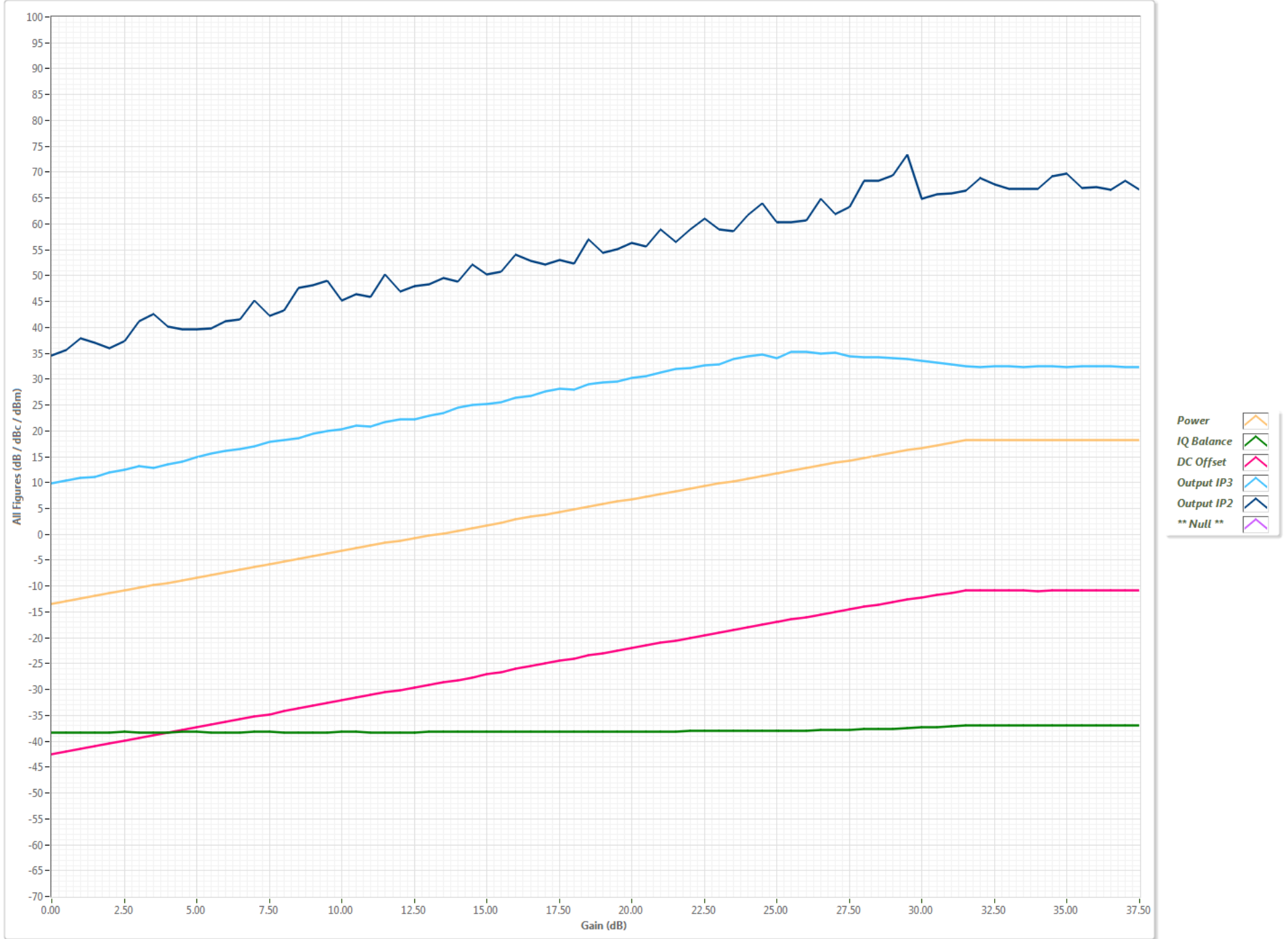
TX Figure vs Gain w/ Frequency=3800.00MHz



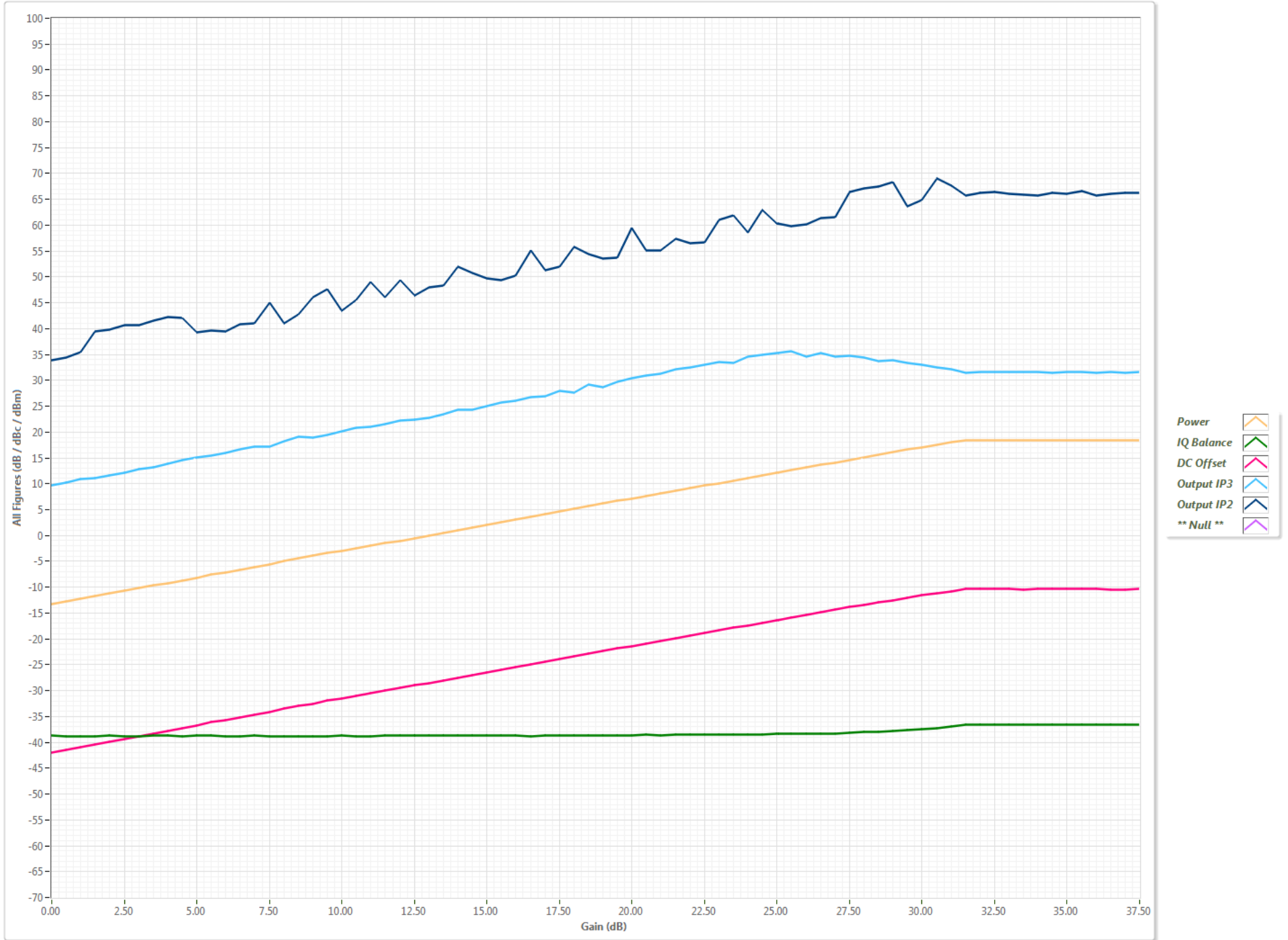
TX Figure vs Gain w/ Frequency=3850.00MHz



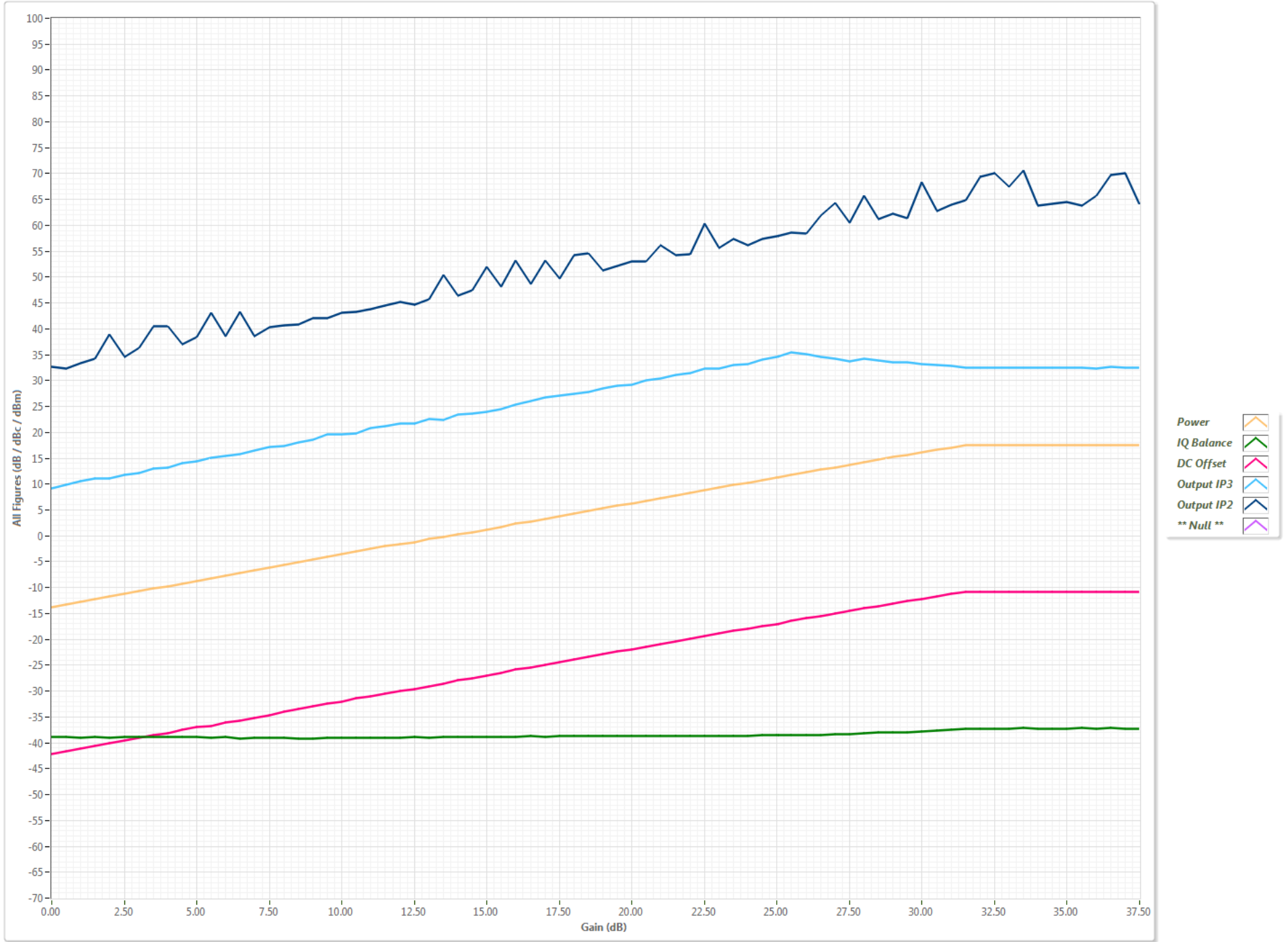
TX Figure vs Gain w/ Frequency=3900.00MHz



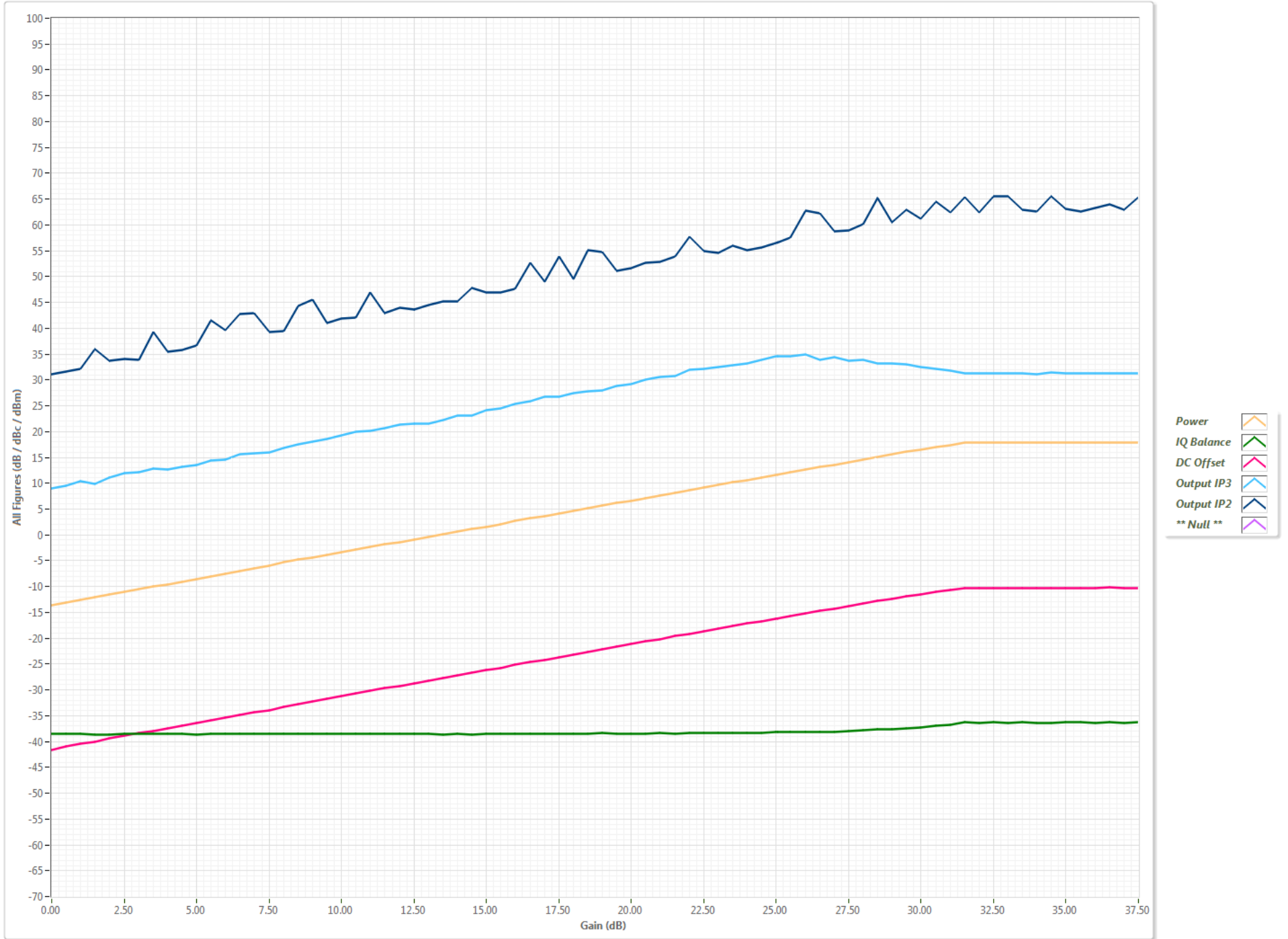
TX Figure vs Gain w/ Frequency=3950.00MHz



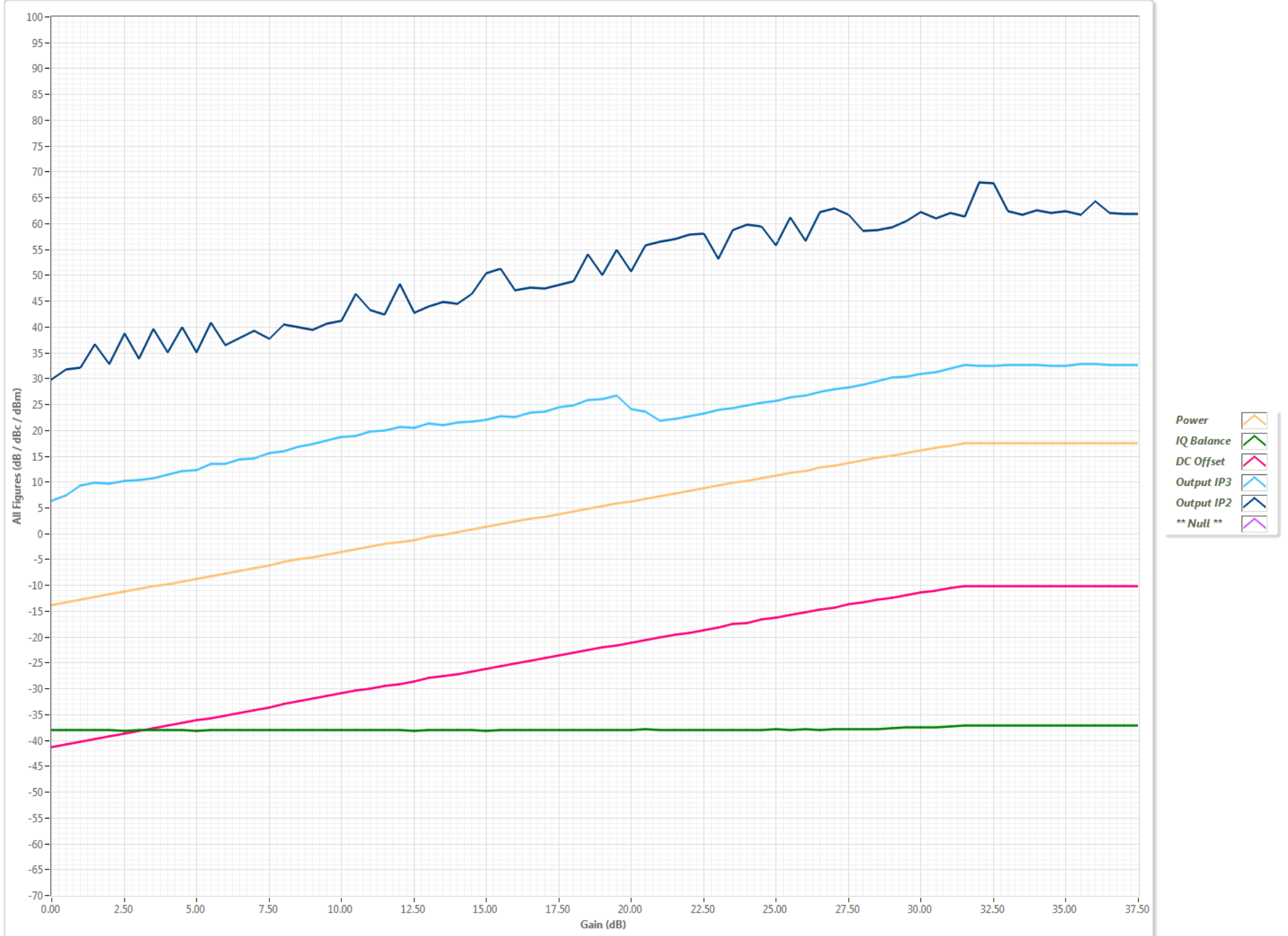
TX Figure vs Gain w/ Frequency=4000.00MHz



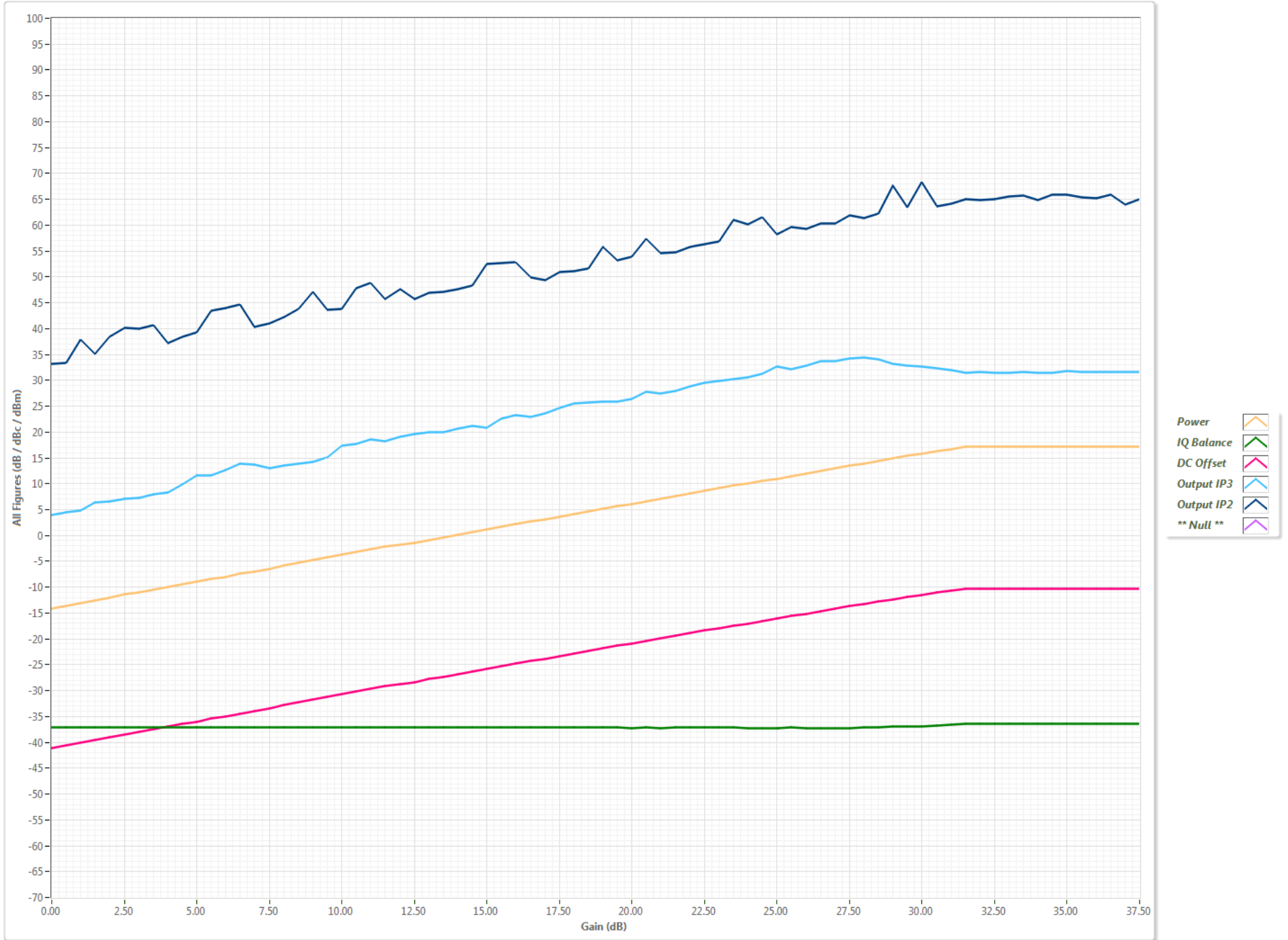
TX Figure vs Gain w/ Frequency=4050.00MHz



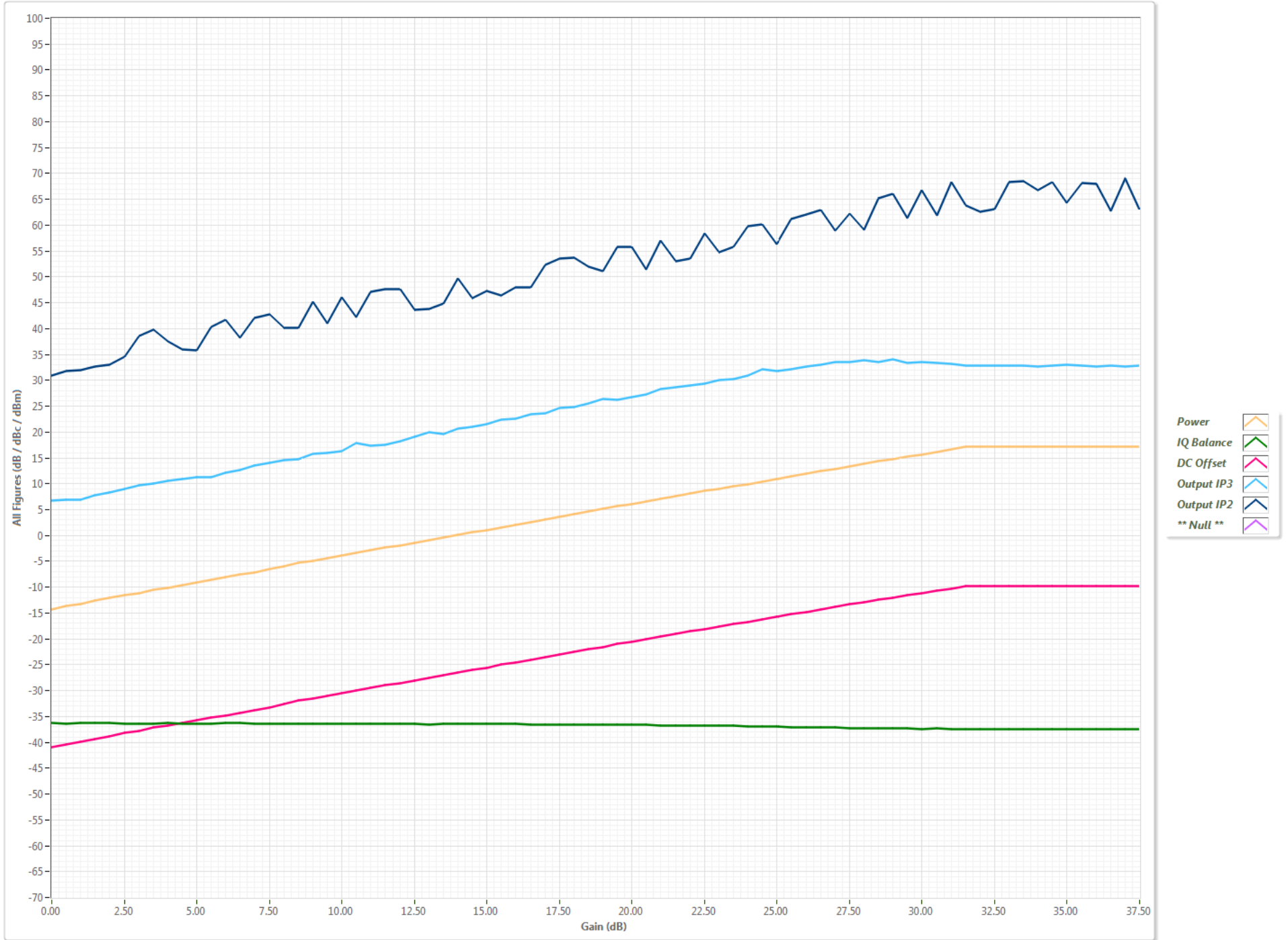
TX Figure vs Gain w/ Frequency=4100.00MHz



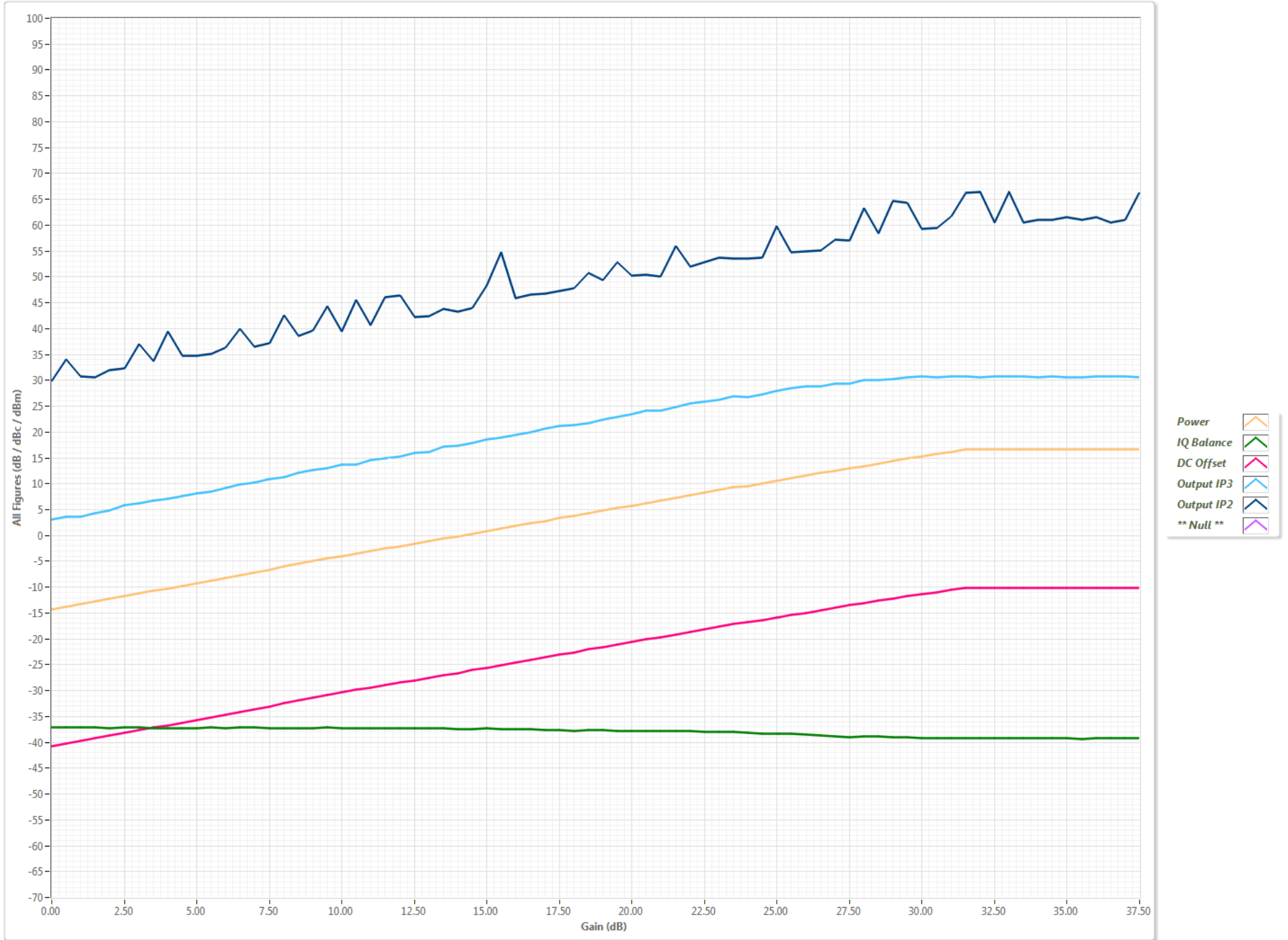
TX Figure vs Gain w/ Frequency=4150.00MHz



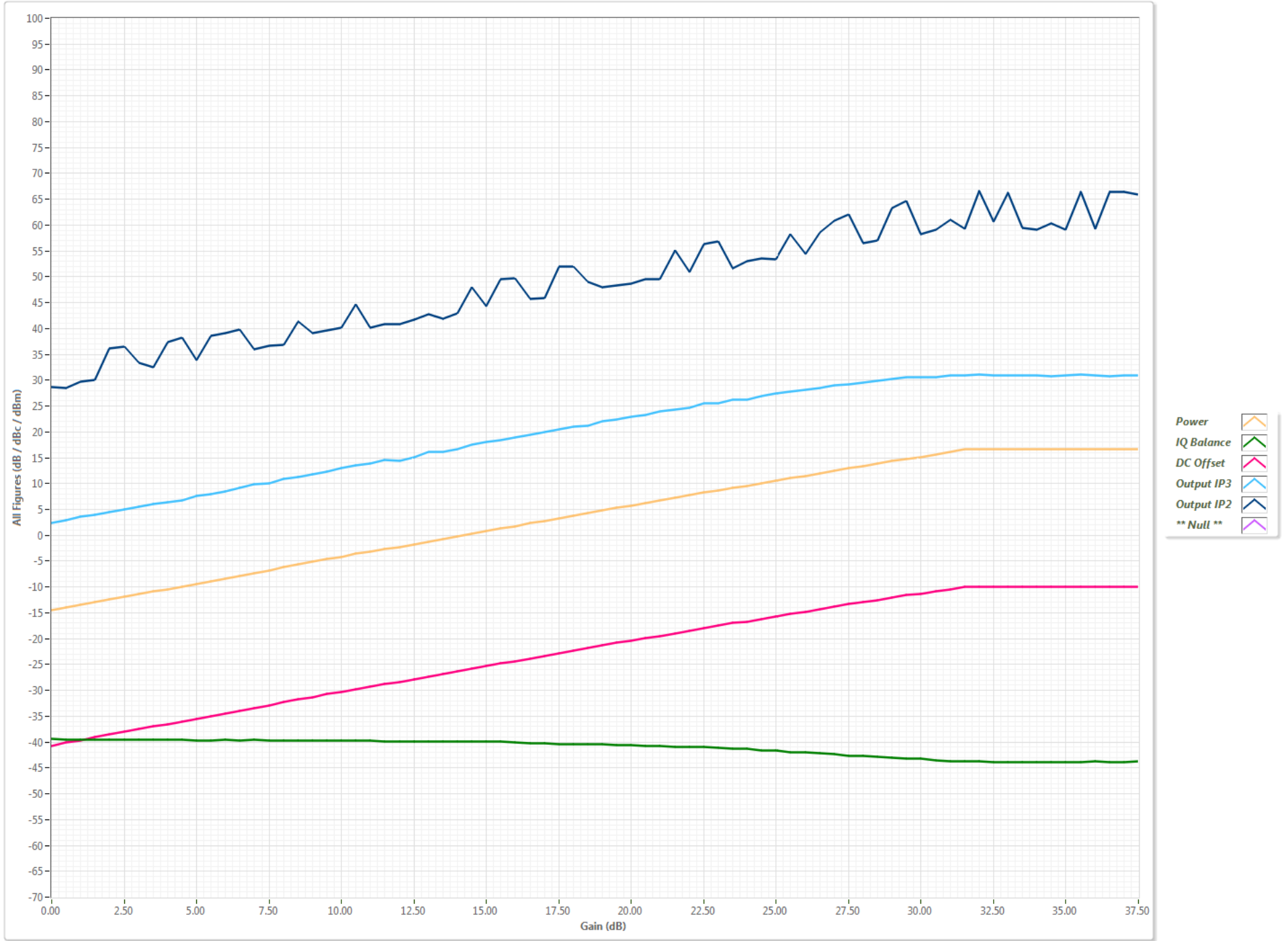
TX Figure vs Gain w/ Frequency=4200.00MHz



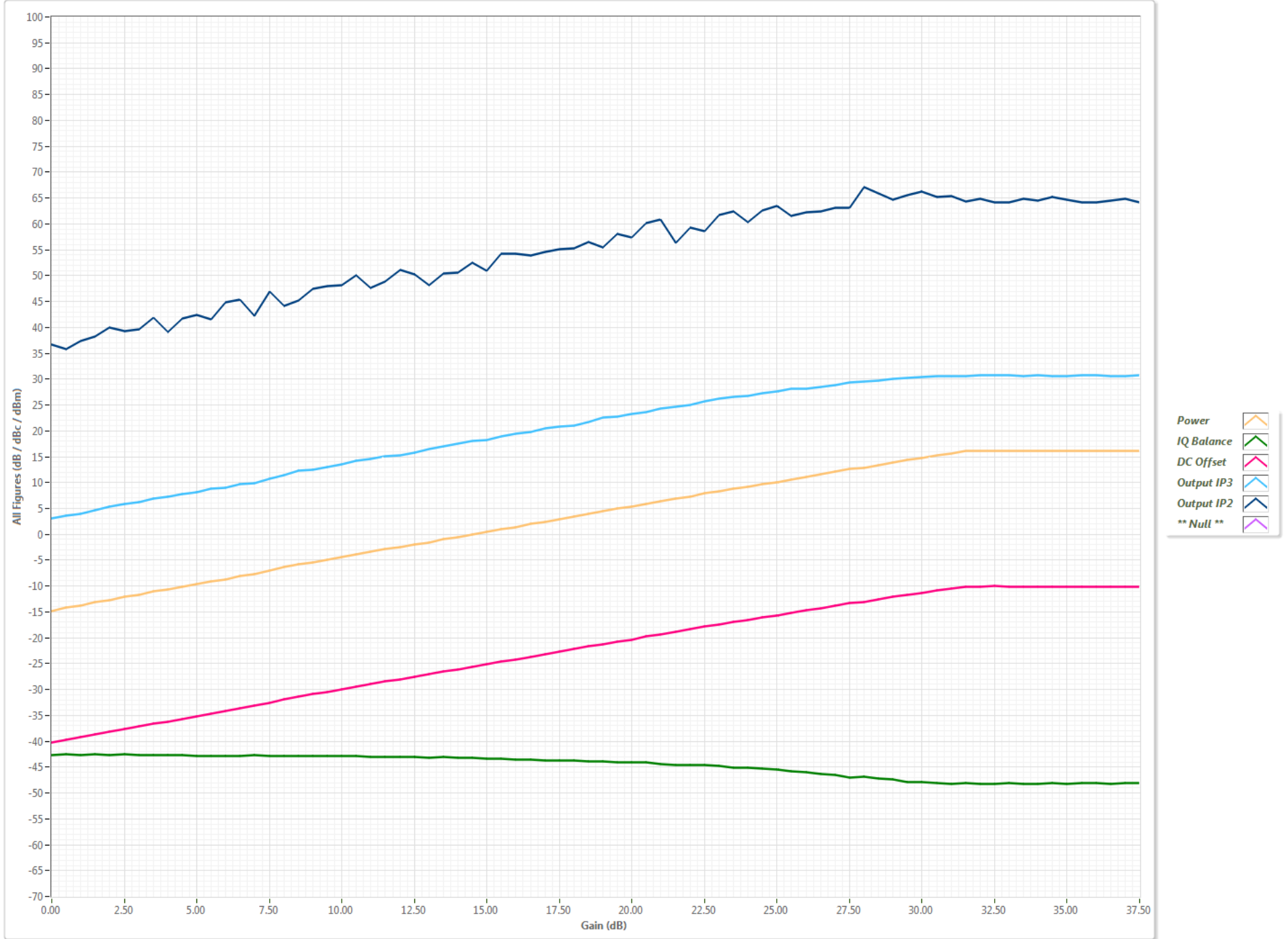
TX Figure vs Gain w/ Frequency=4250.00MHz



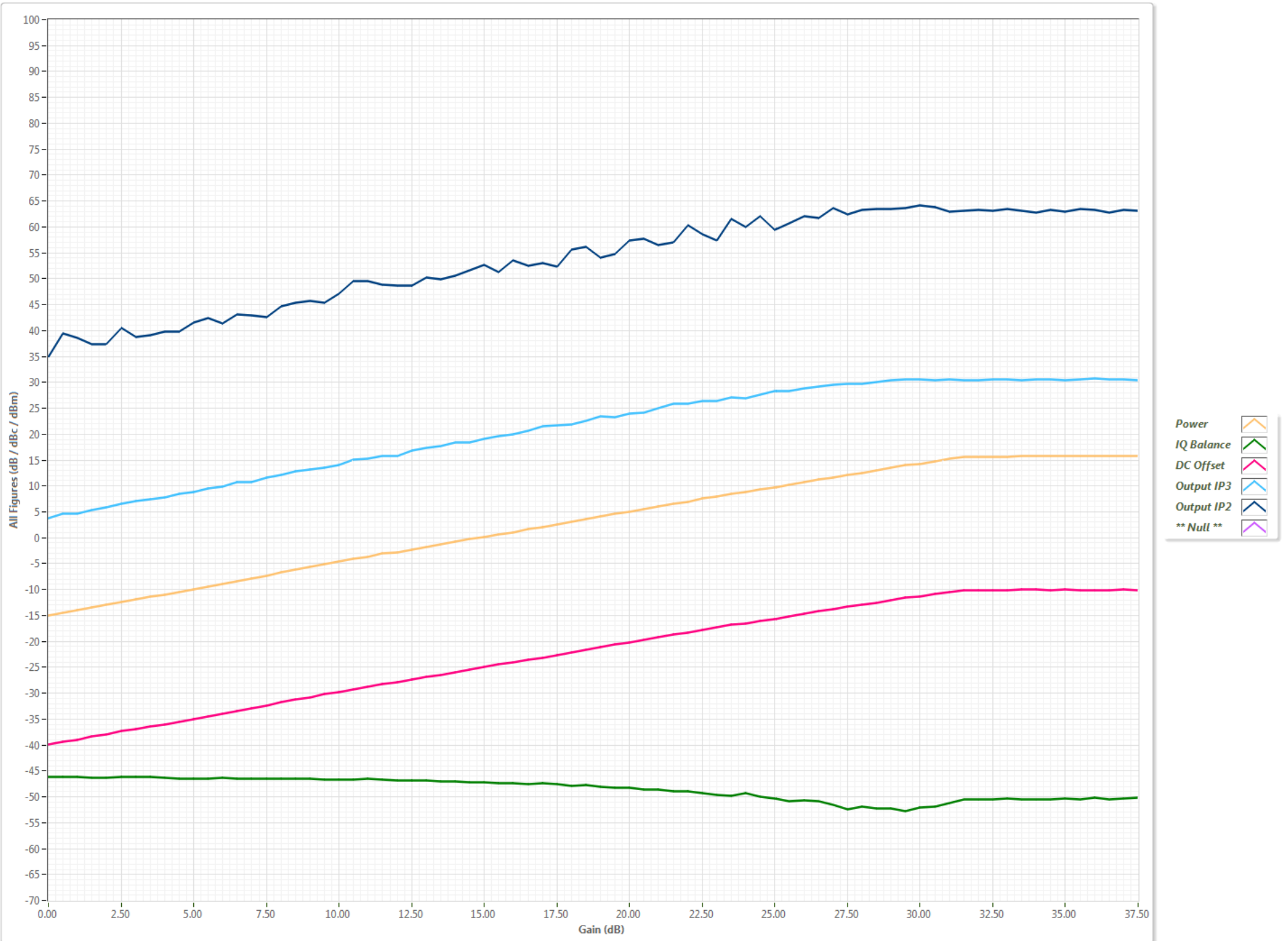
TX Figure vs Gain w/ Frequency=4300.00MHz



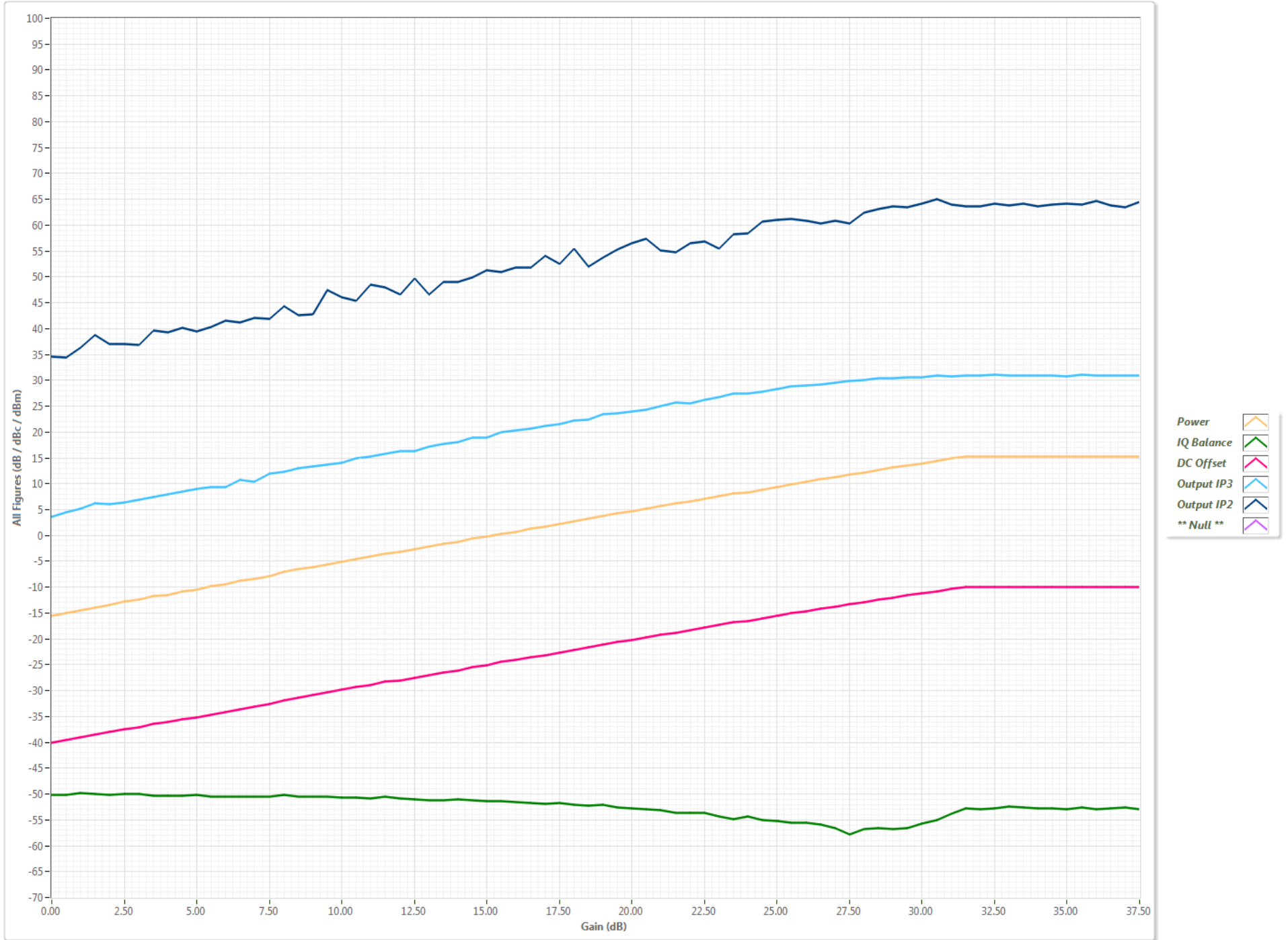
TX Figure vs Gain w/ Frequency=4350.00MHz



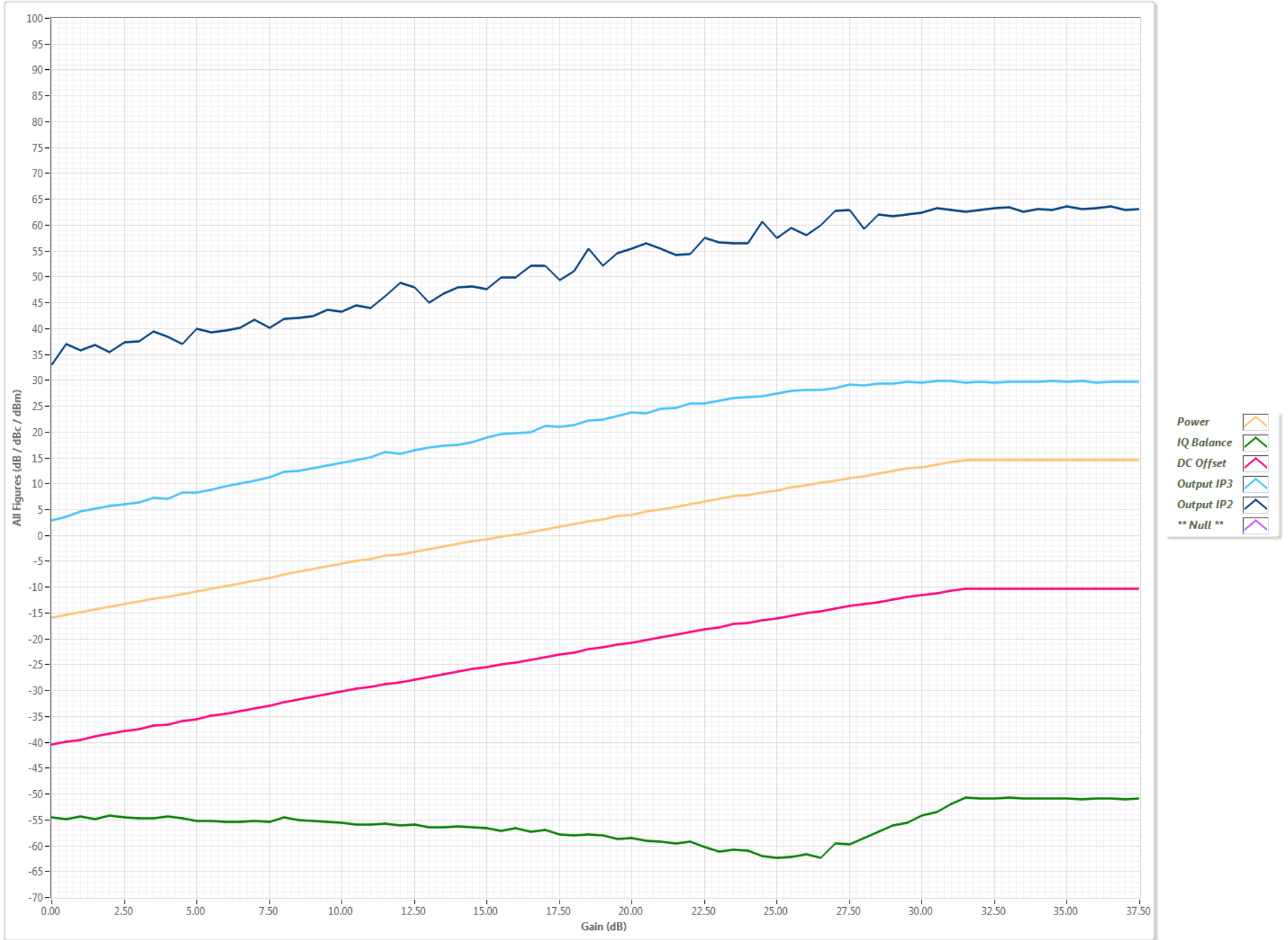
TX Figure vs Gain w/ Frequency=4400.00MHz



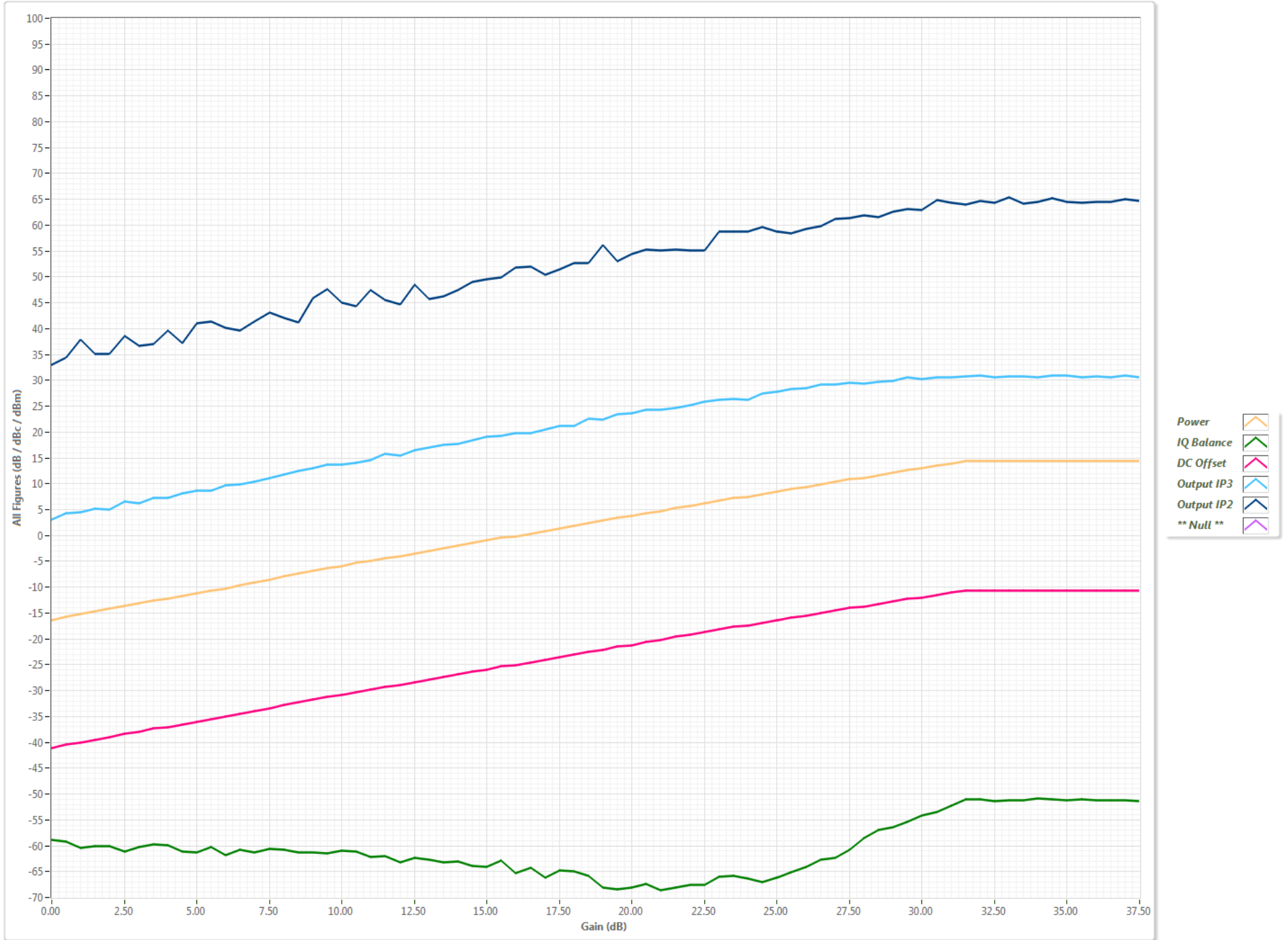
TX Figure vs Gain w/ Frequency=4450.00MHz



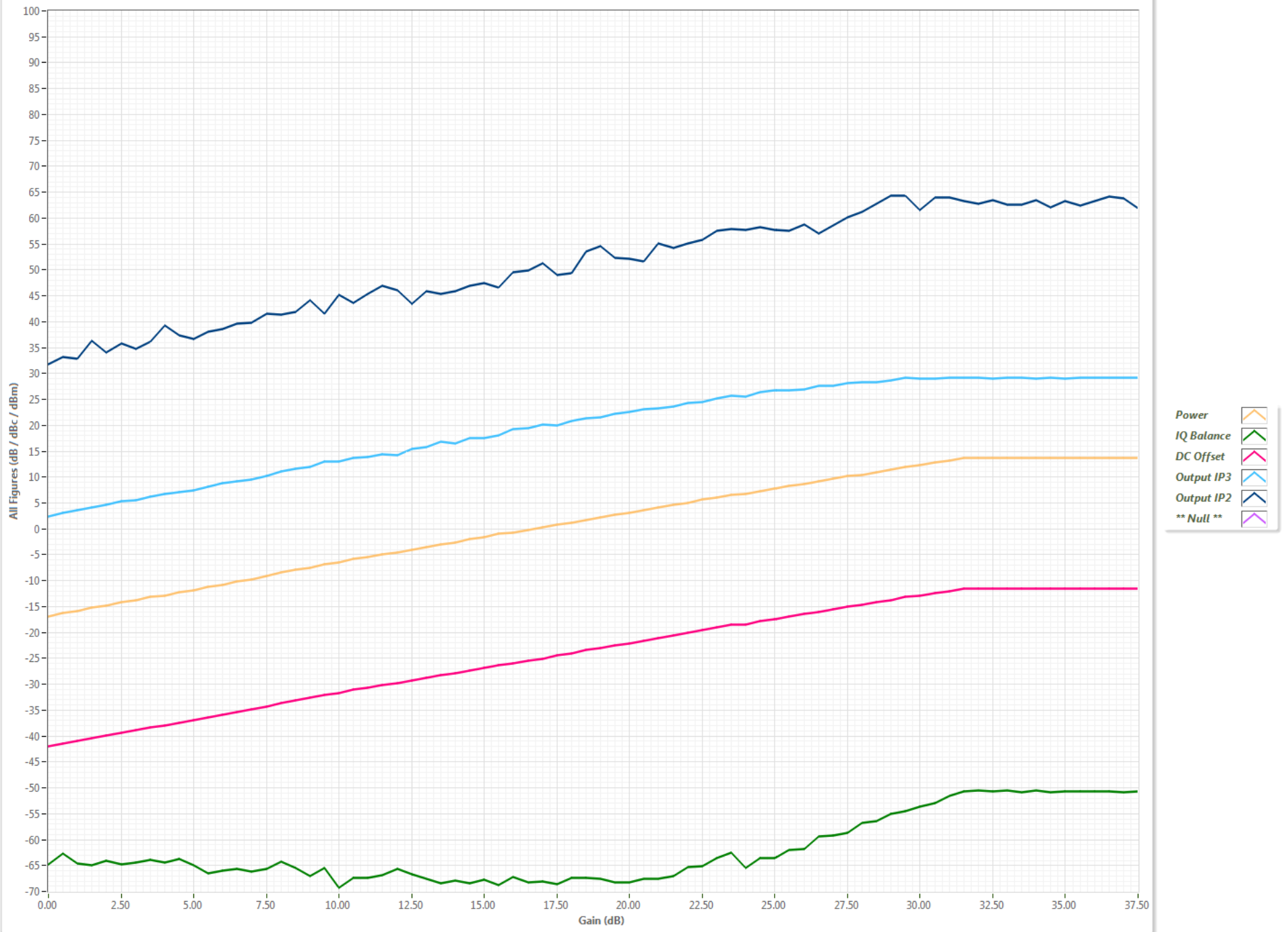
TX Figure vs Gain w/ Frequency=4500.00MHz



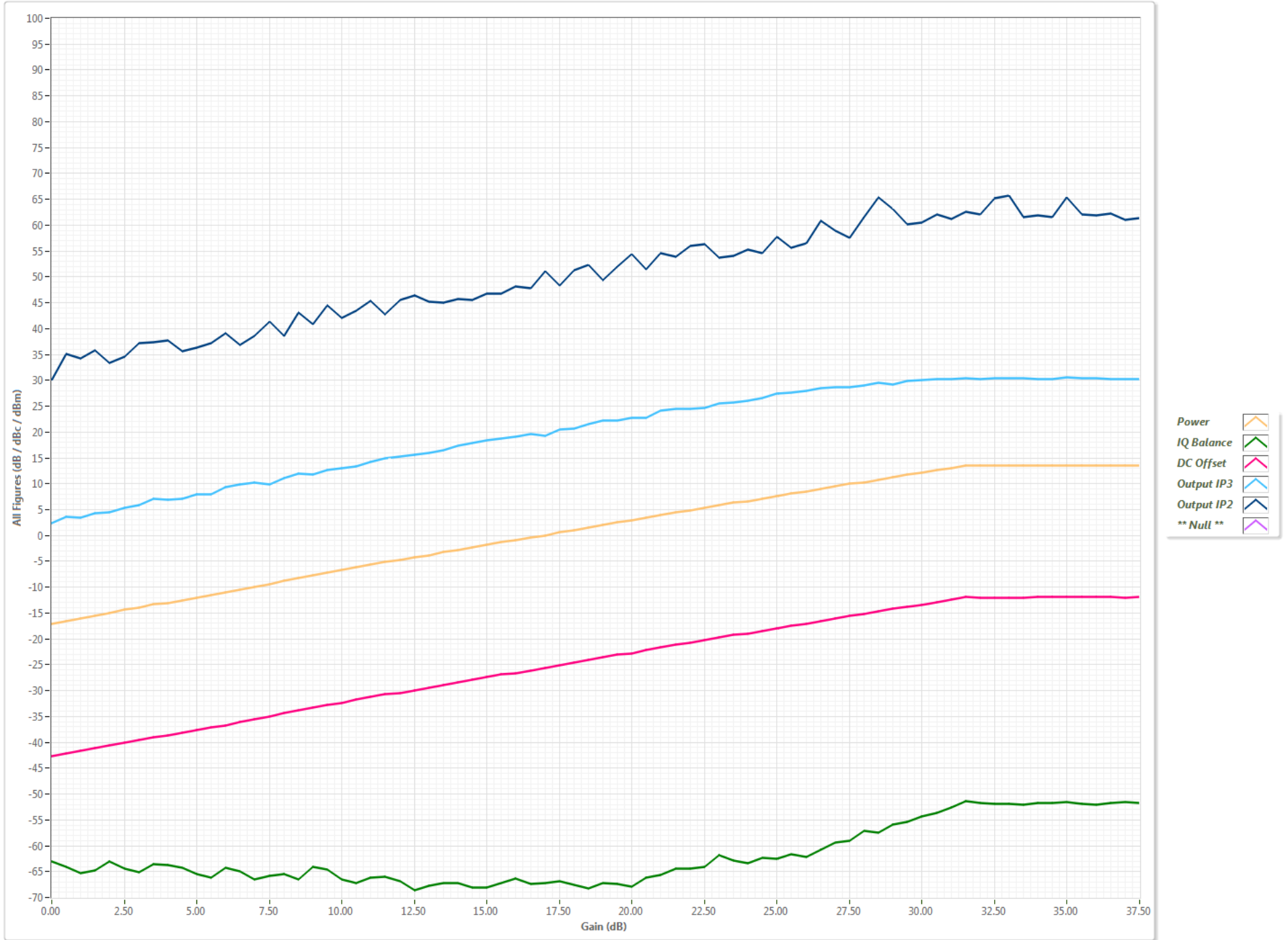
TX Figure vs Gain w/ Frequency=4550.00MHz



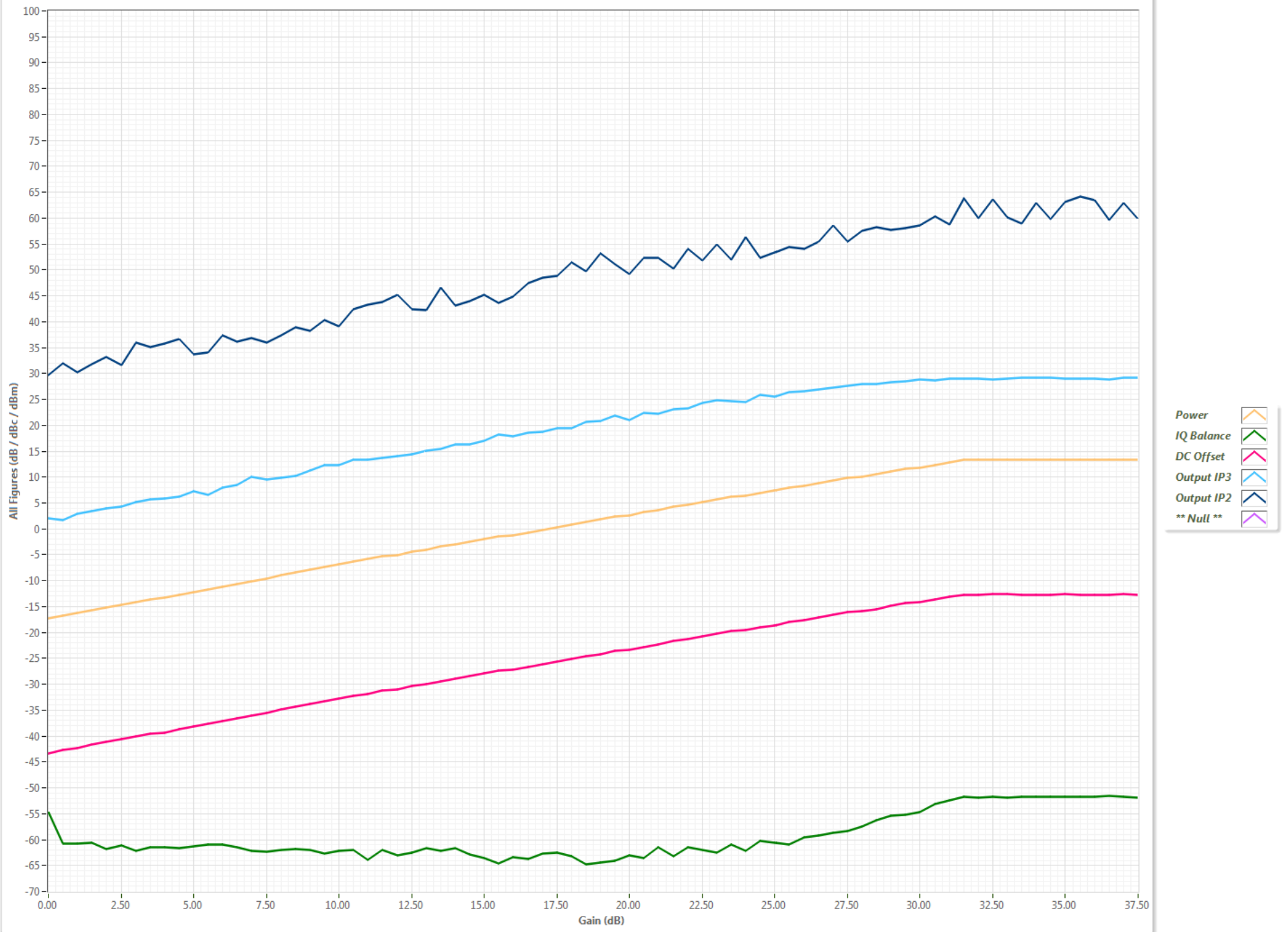
TX Figure vs Gain w/ Frequency=4600.00MHz



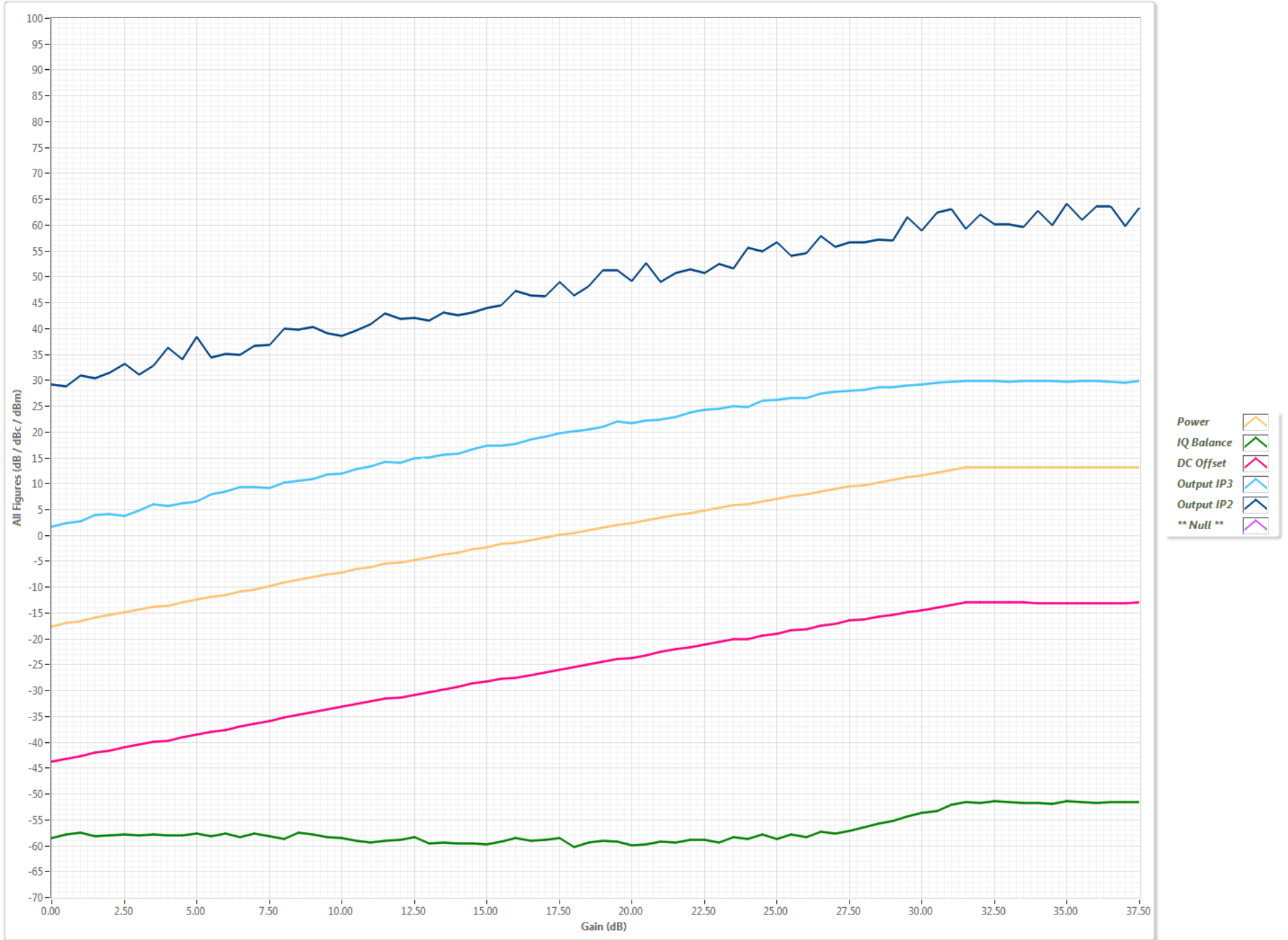
TX Figure vs Gain w/ Frequency=4650.00MHz



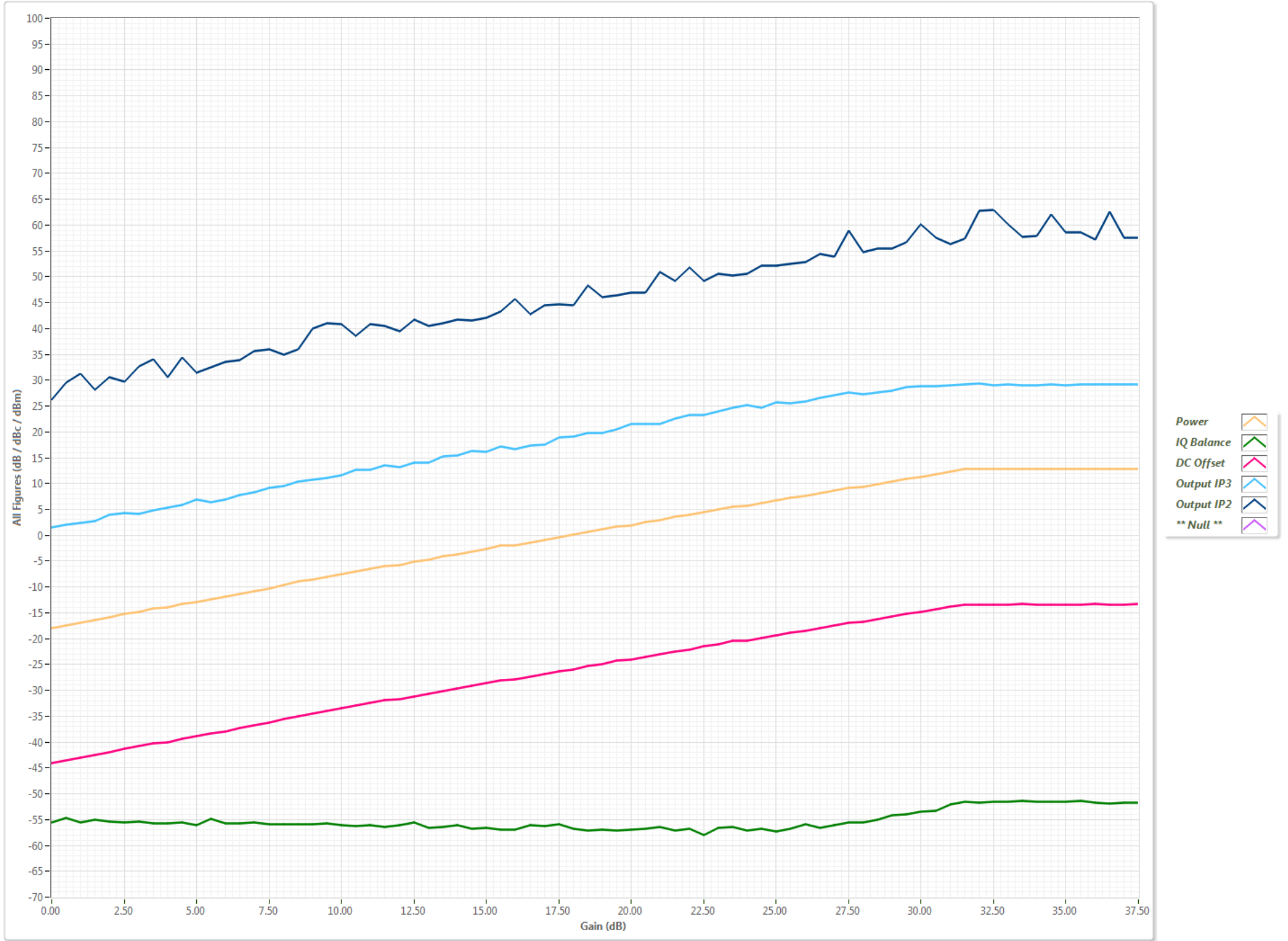
TX Figure vs Gain w/ Frequency=4700.00MHz



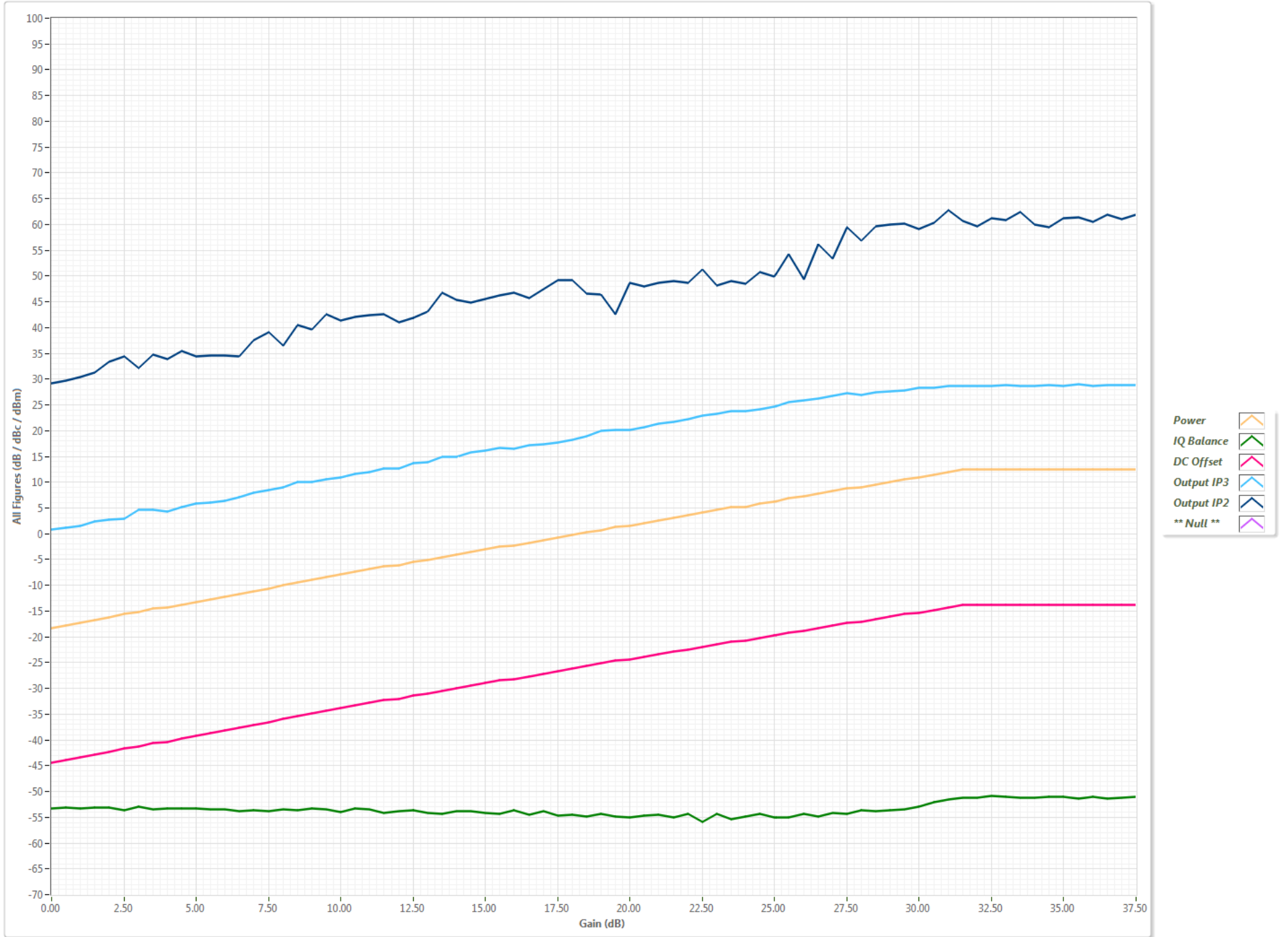
TX Figure vs Gain w/ Frequency=4750.00MHz



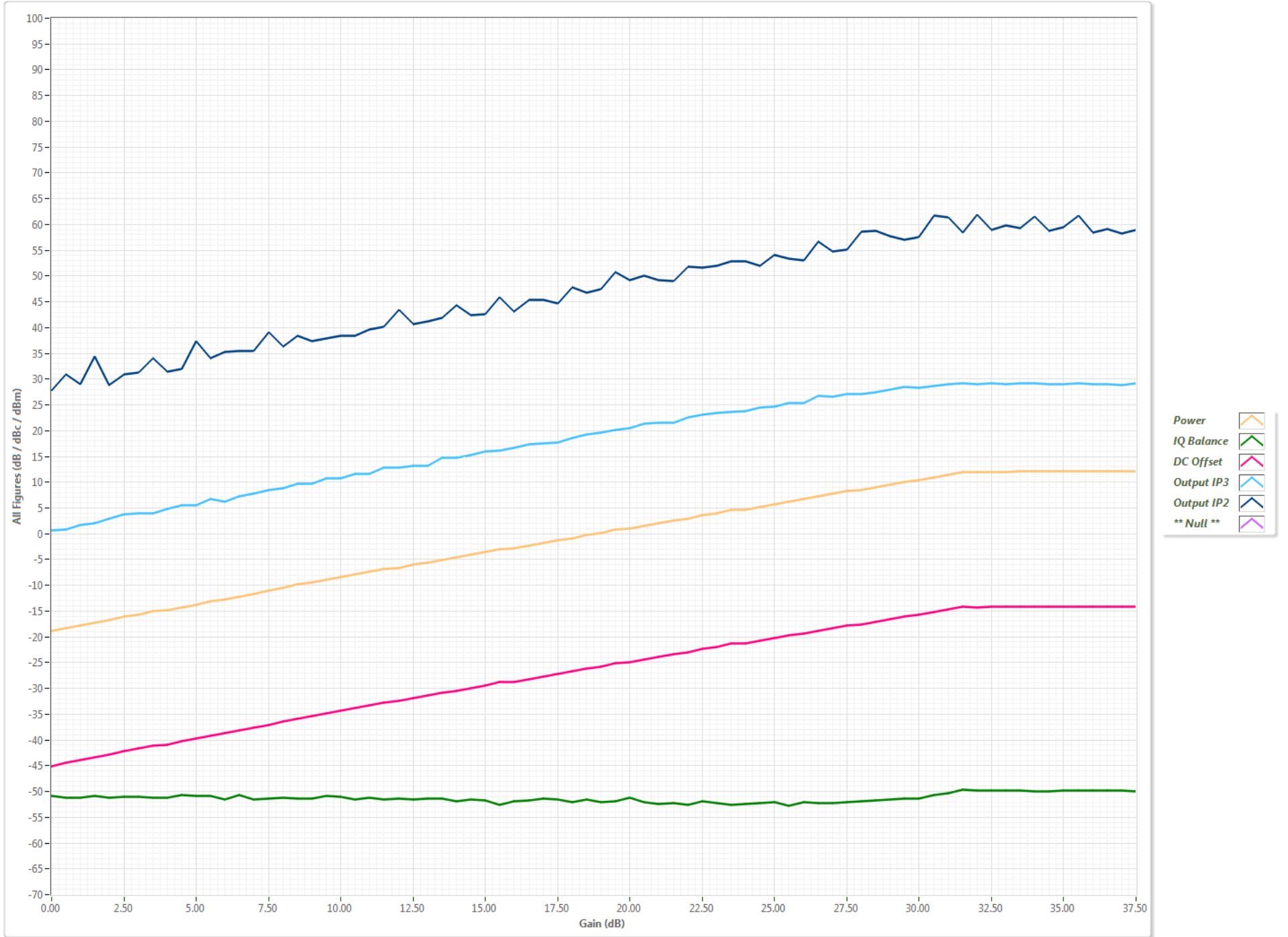
TX Figure vs Gain w/ Frequency=4800.00MHz



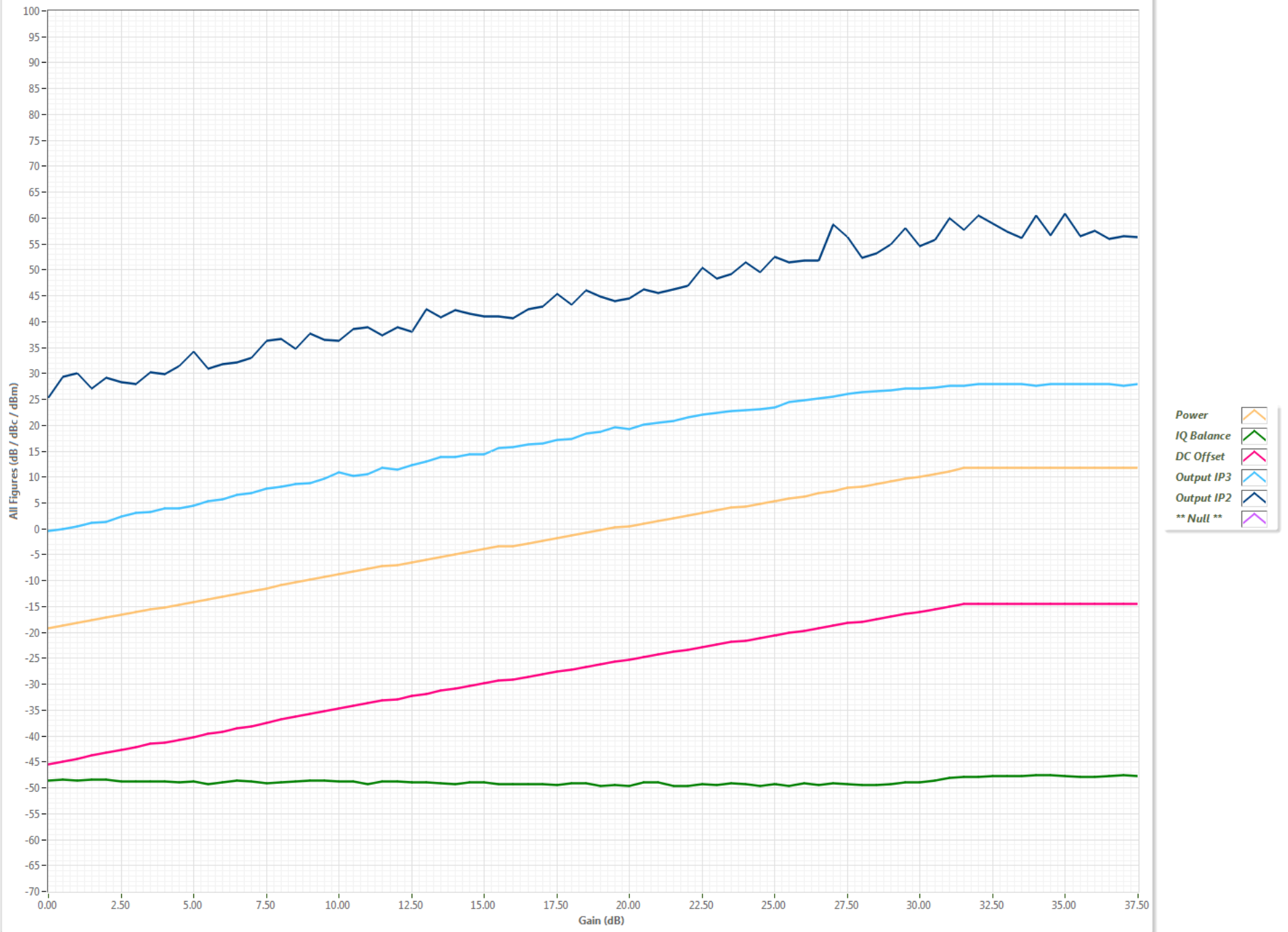
TX Figure vs Gain w/ Frequency=4850.00MHz



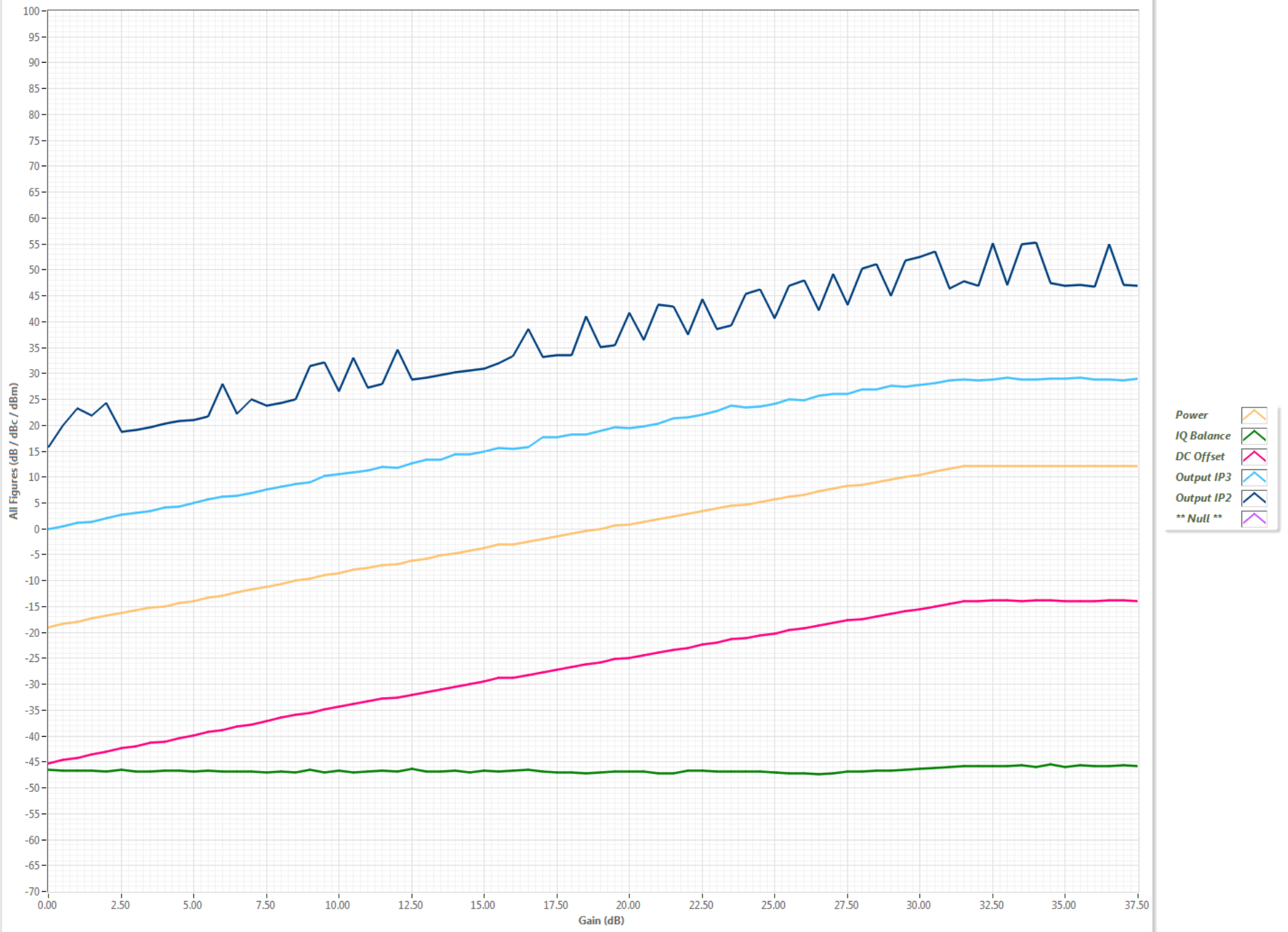
TX Figure vs Gain w/ Frequency=4900.00MHz



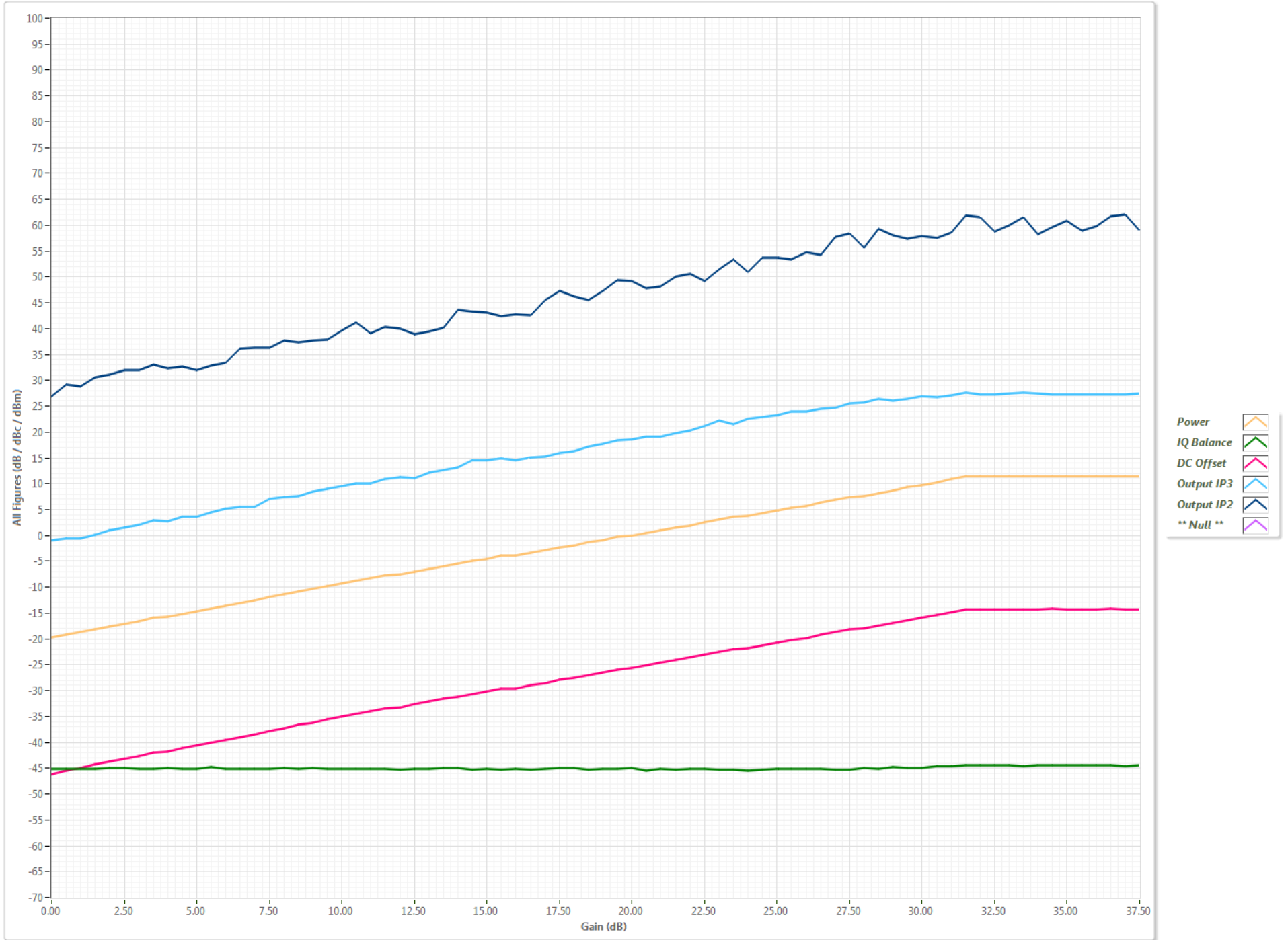
TX Figure vs Gain w/ Frequency=4950.00MHz



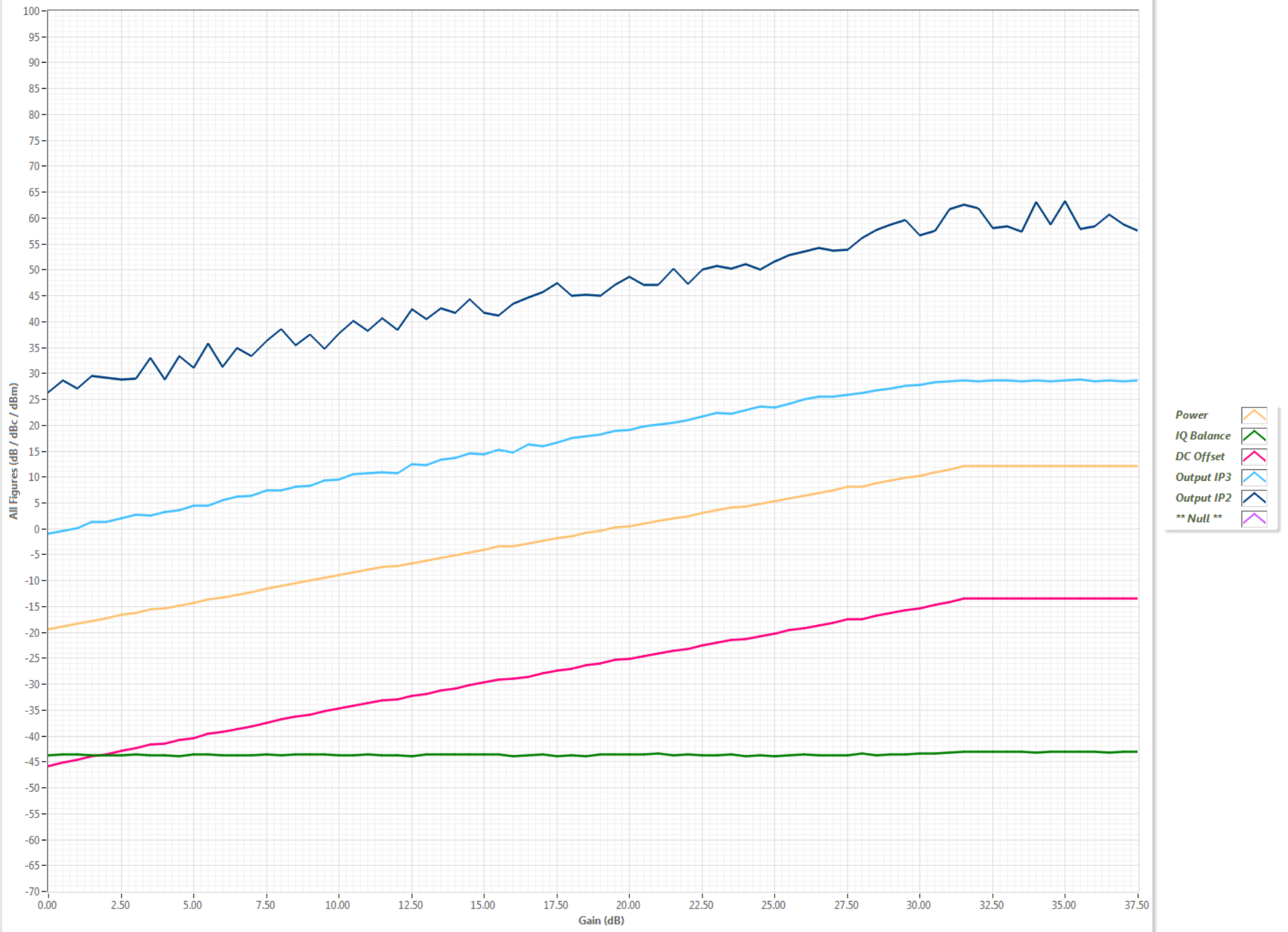
TX Figure vs Gain w/ Frequency=5000.00MHz



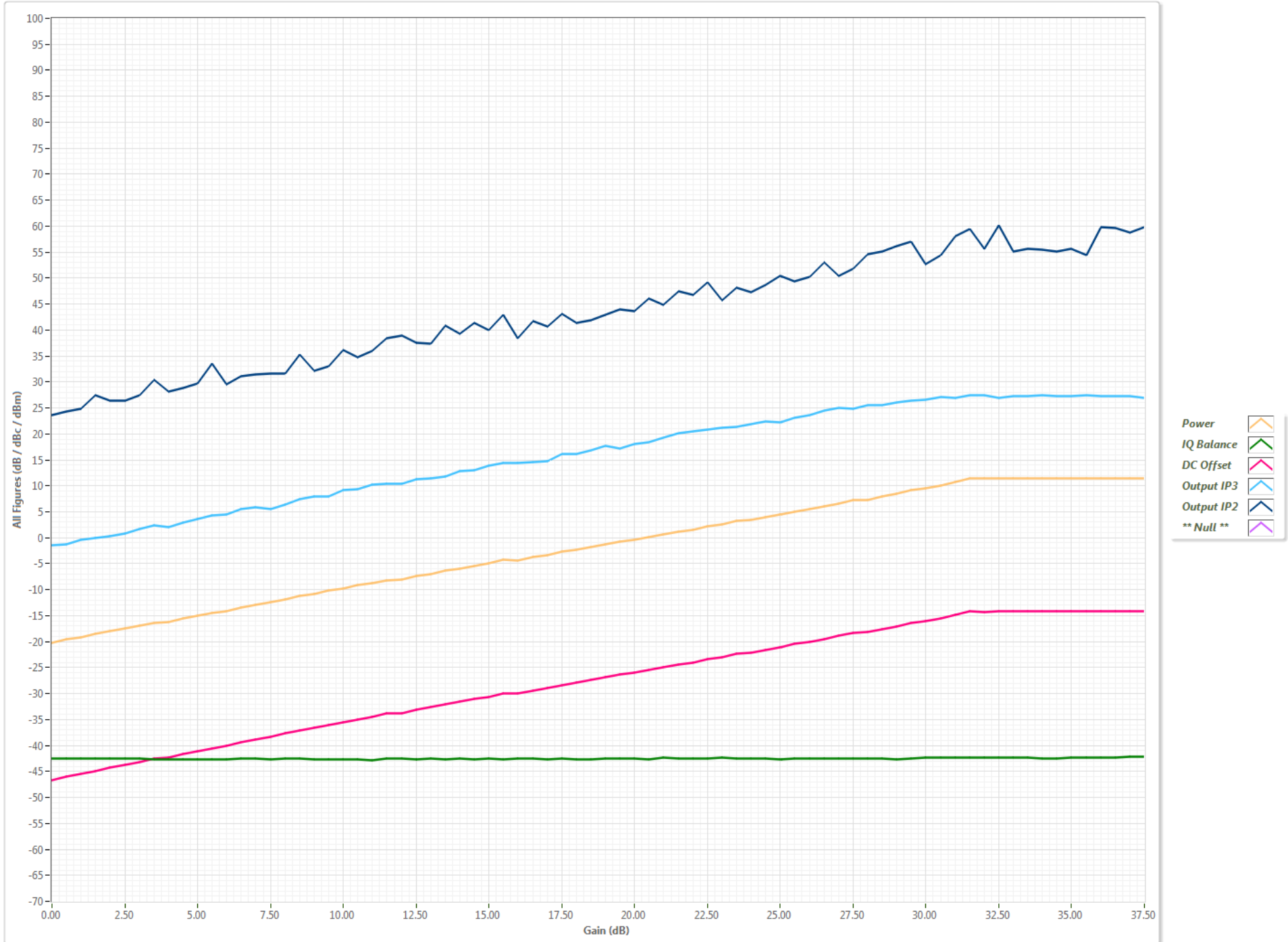
TX Figure vs Gain w/ Frequency=5050.00MHz



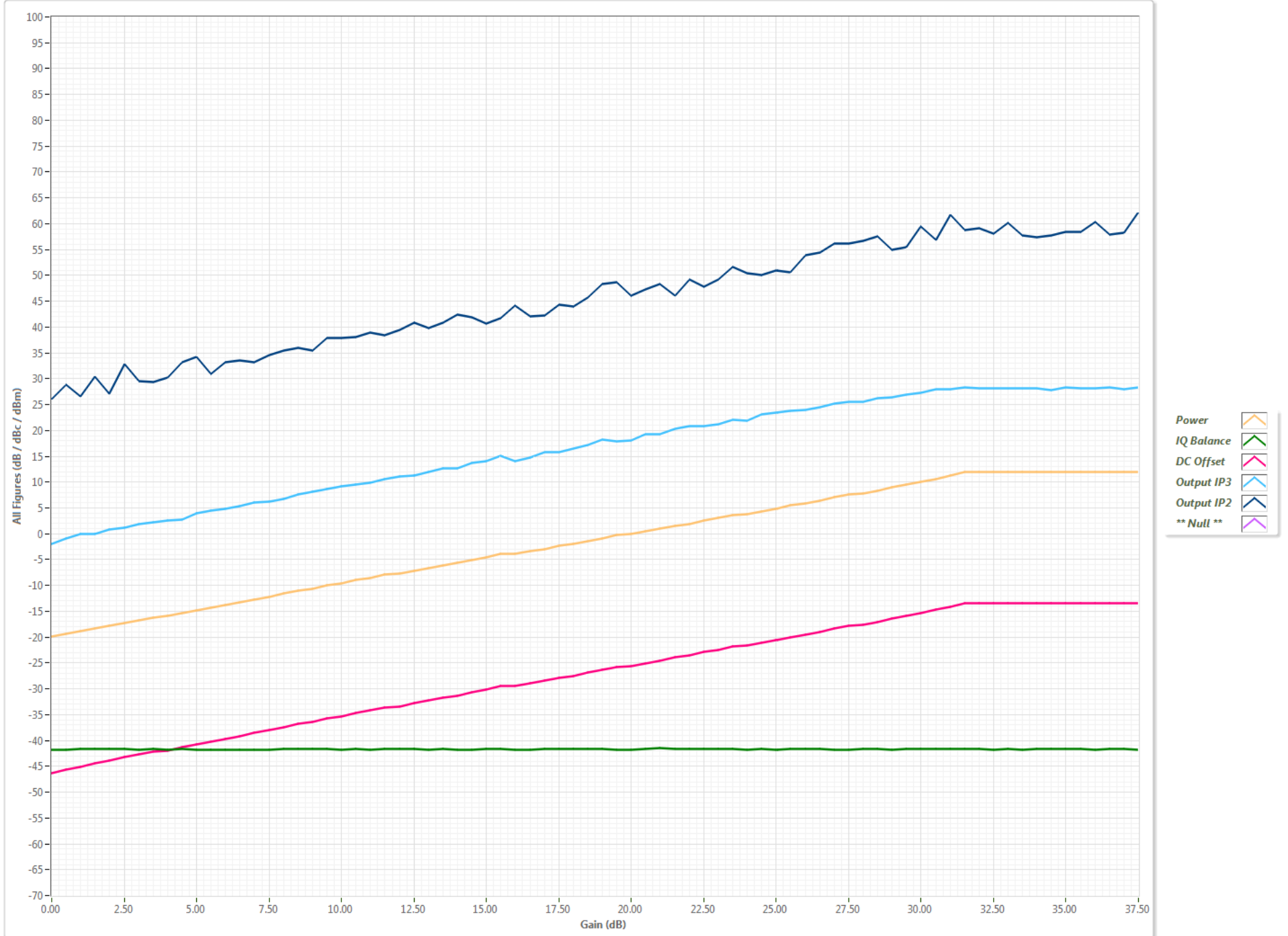
TX Figure vs Gain w/ Frequency=5100.00MHz



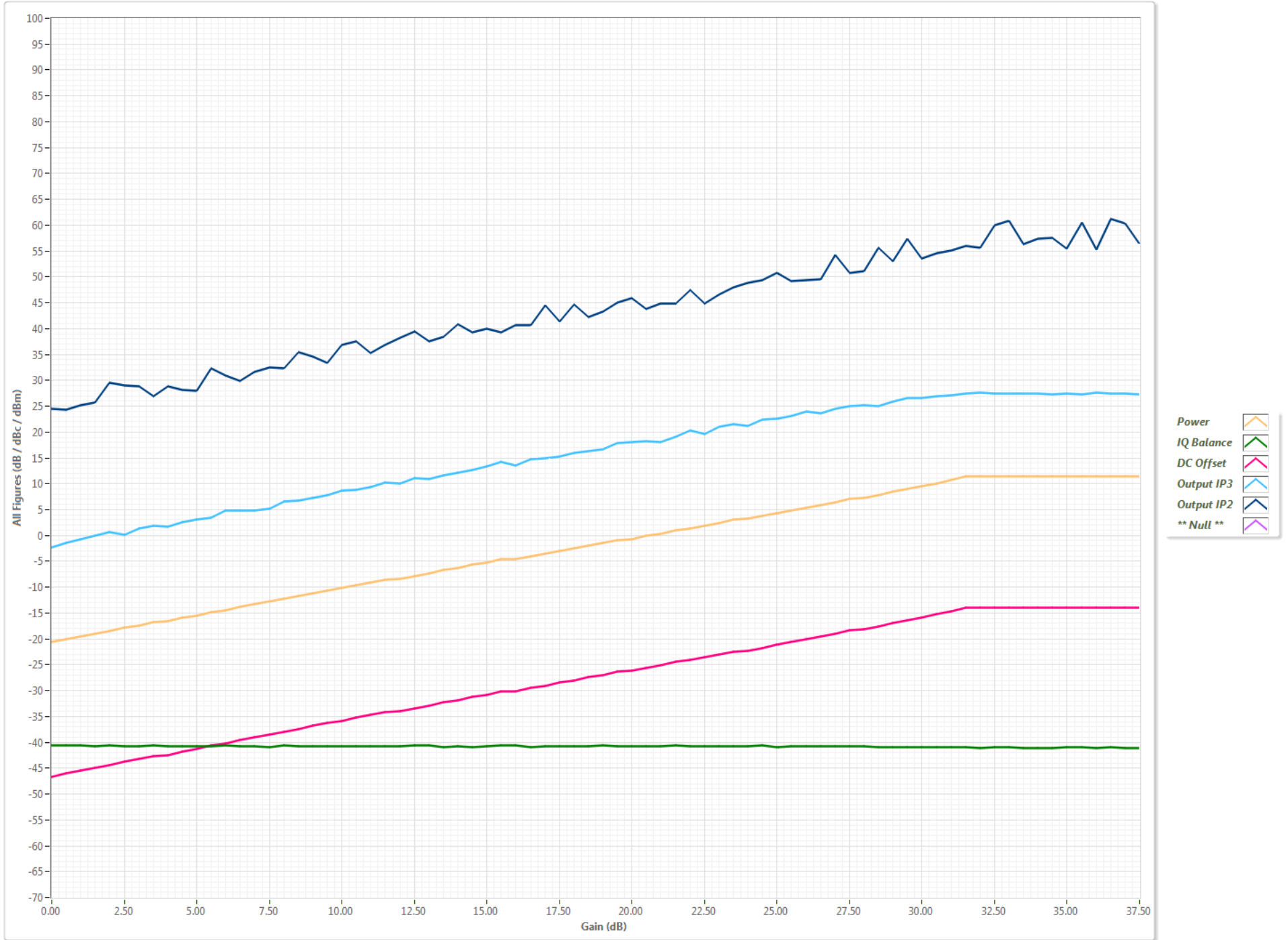
TX Figure vs Gain w/ Frequency=5150.00MHz



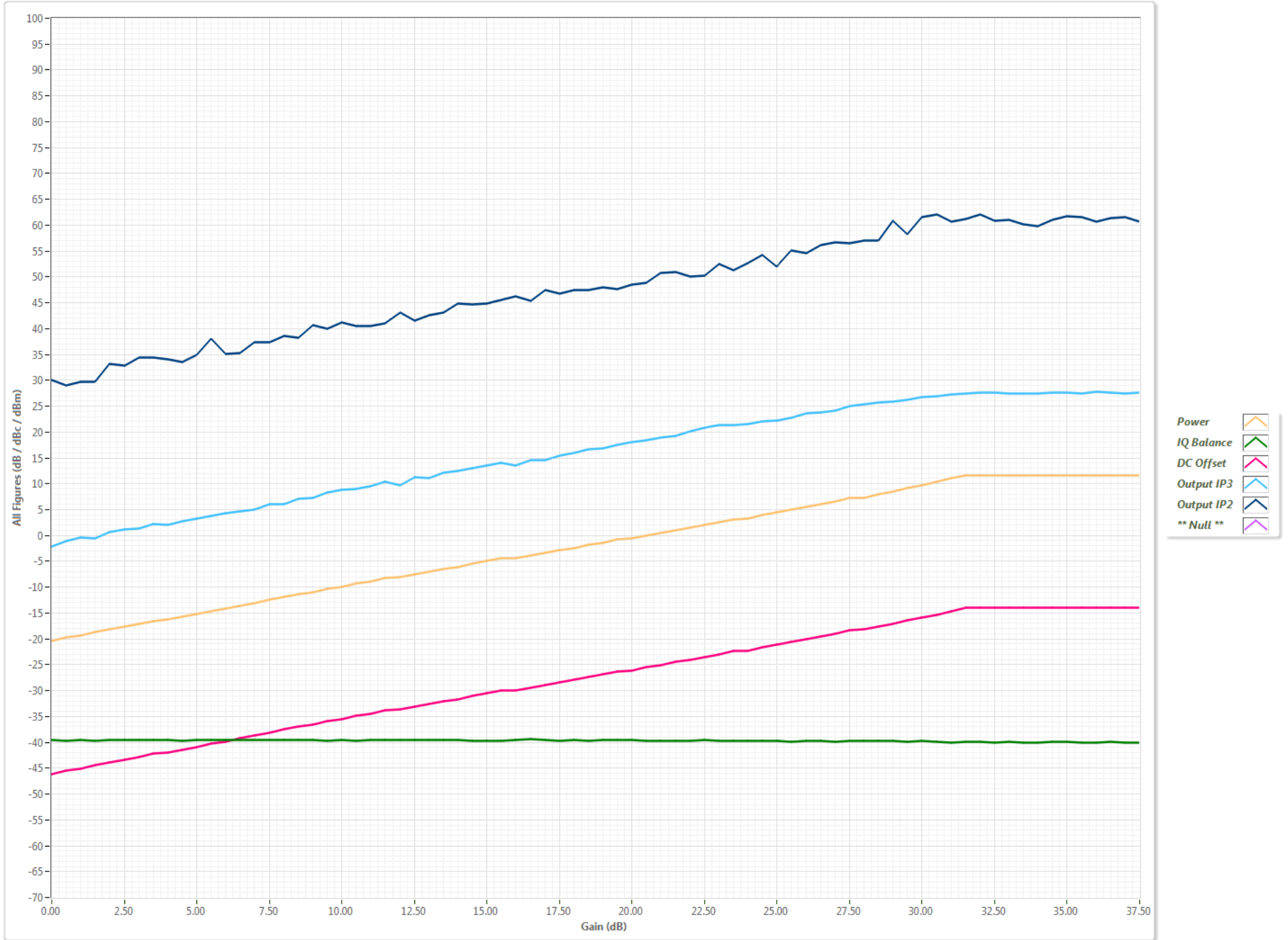
TX Figure vs Gain w/ Frequency=5200.00MHz



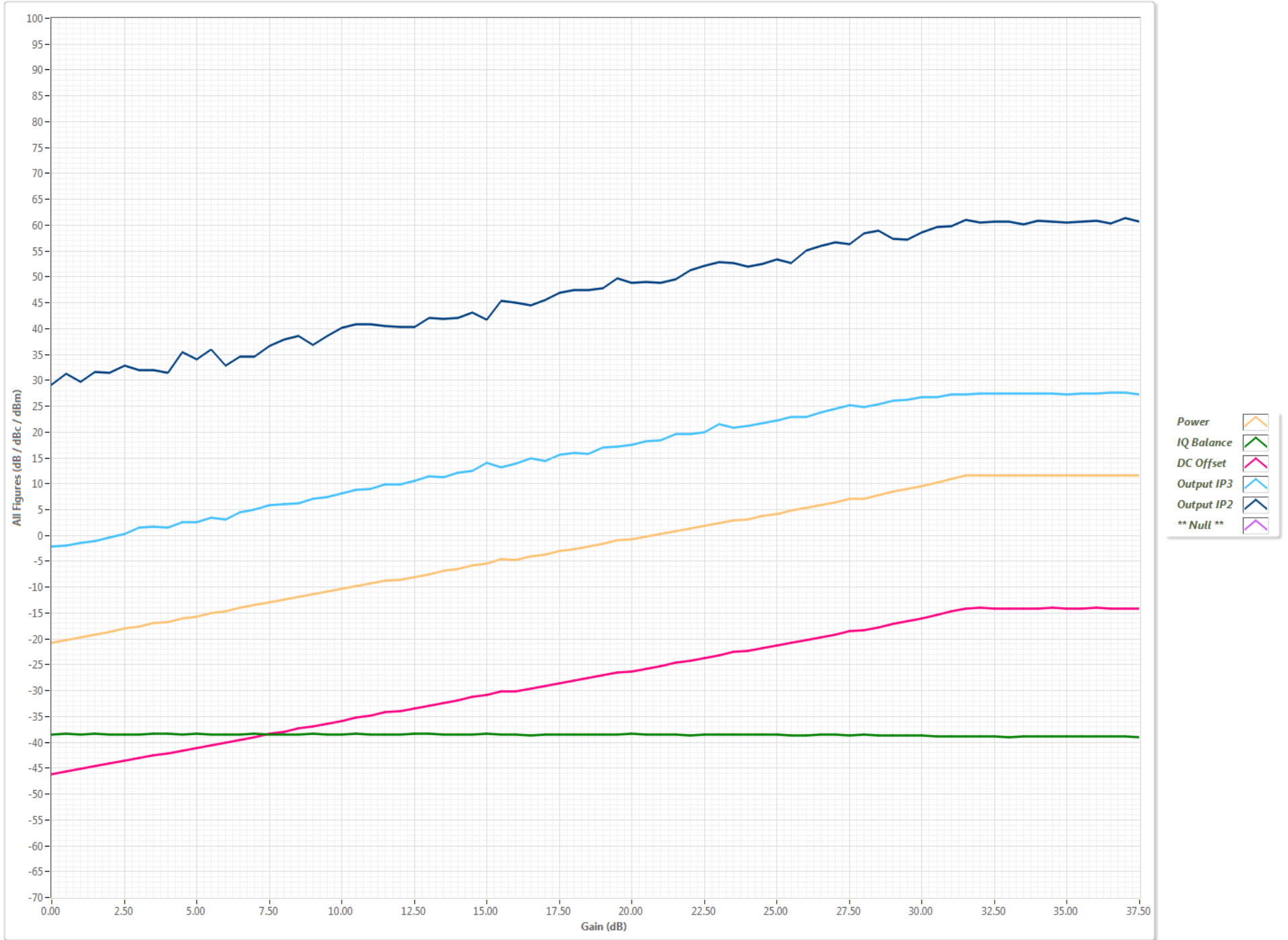
TX Figure vs Gain w/ Frequency=5250.00MHz



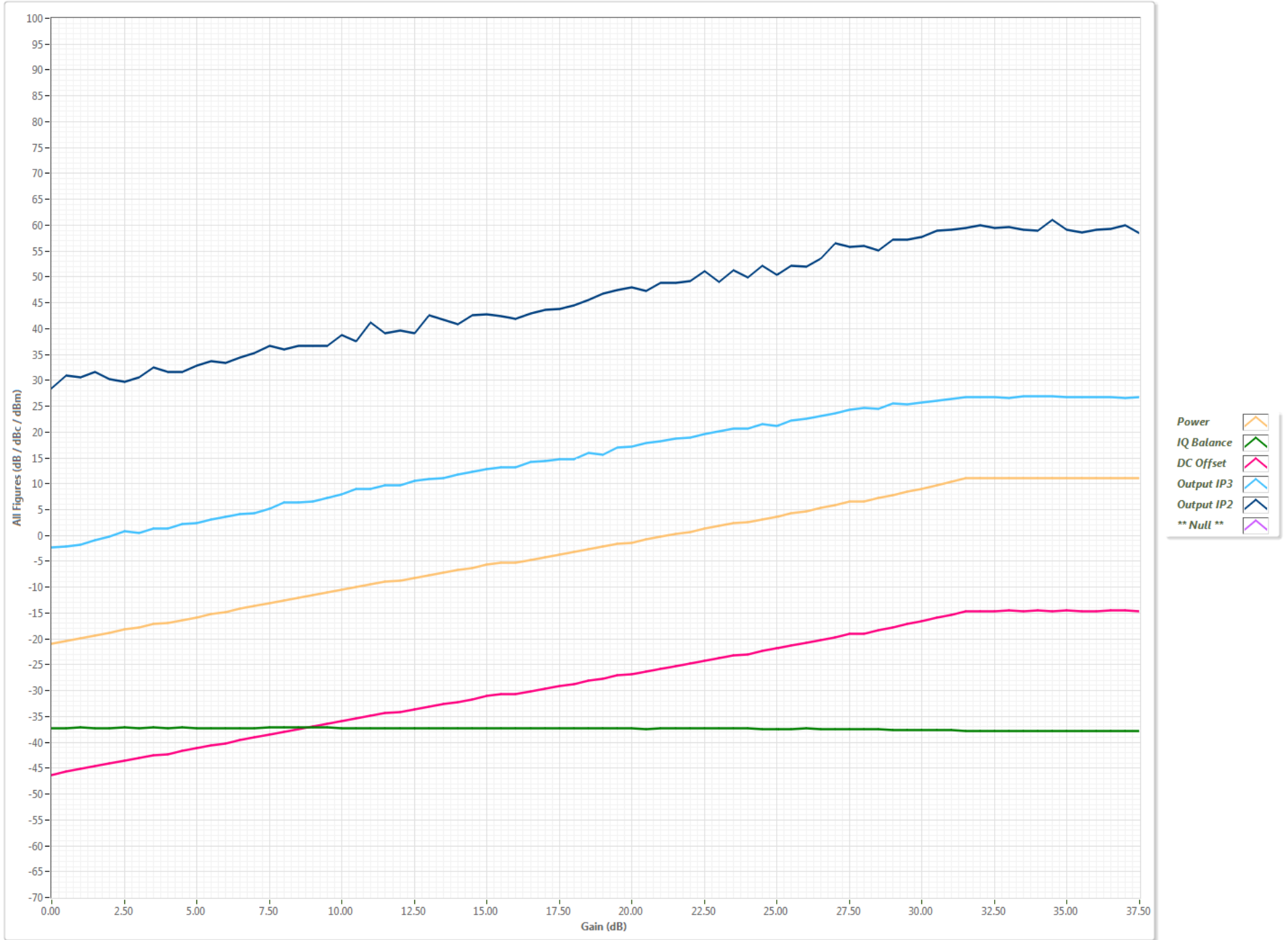
TX Figure vs Gain w/ Frequency=5300.00MHz



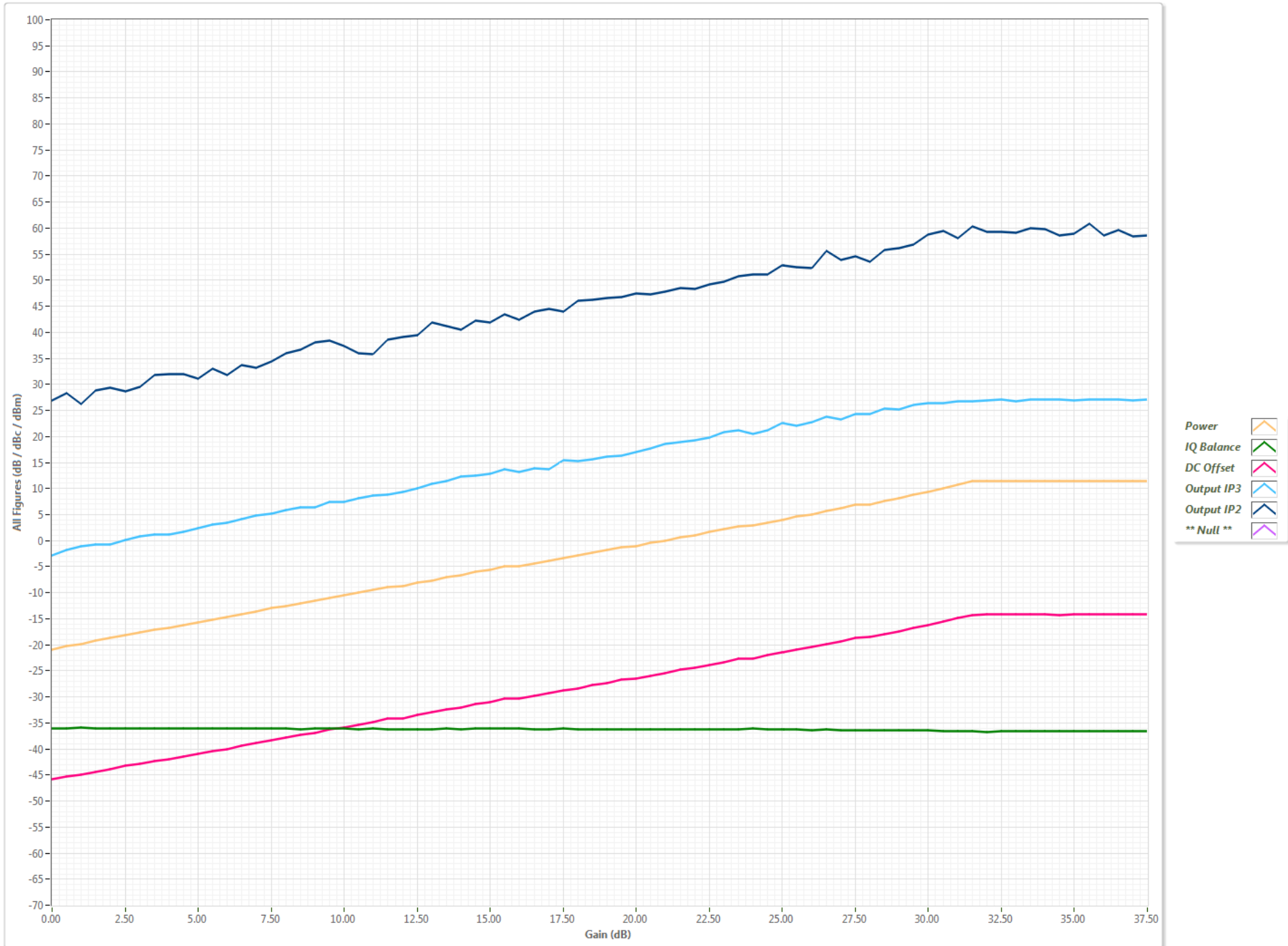
TX Figure vs Gain w/ Frequency=5350.00MHz



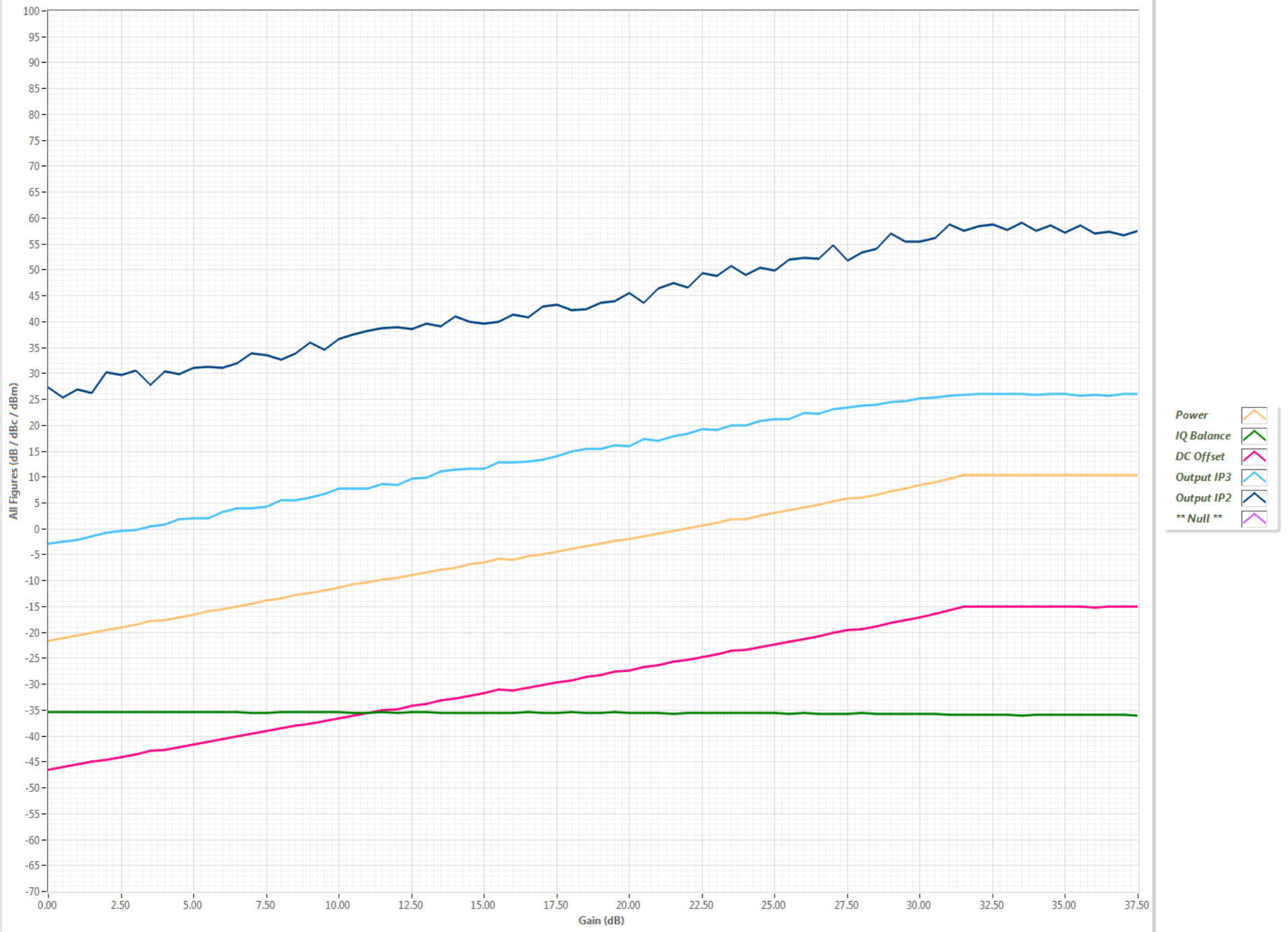
TX Figure vs Gain w/ Frequency=5400.00MHz



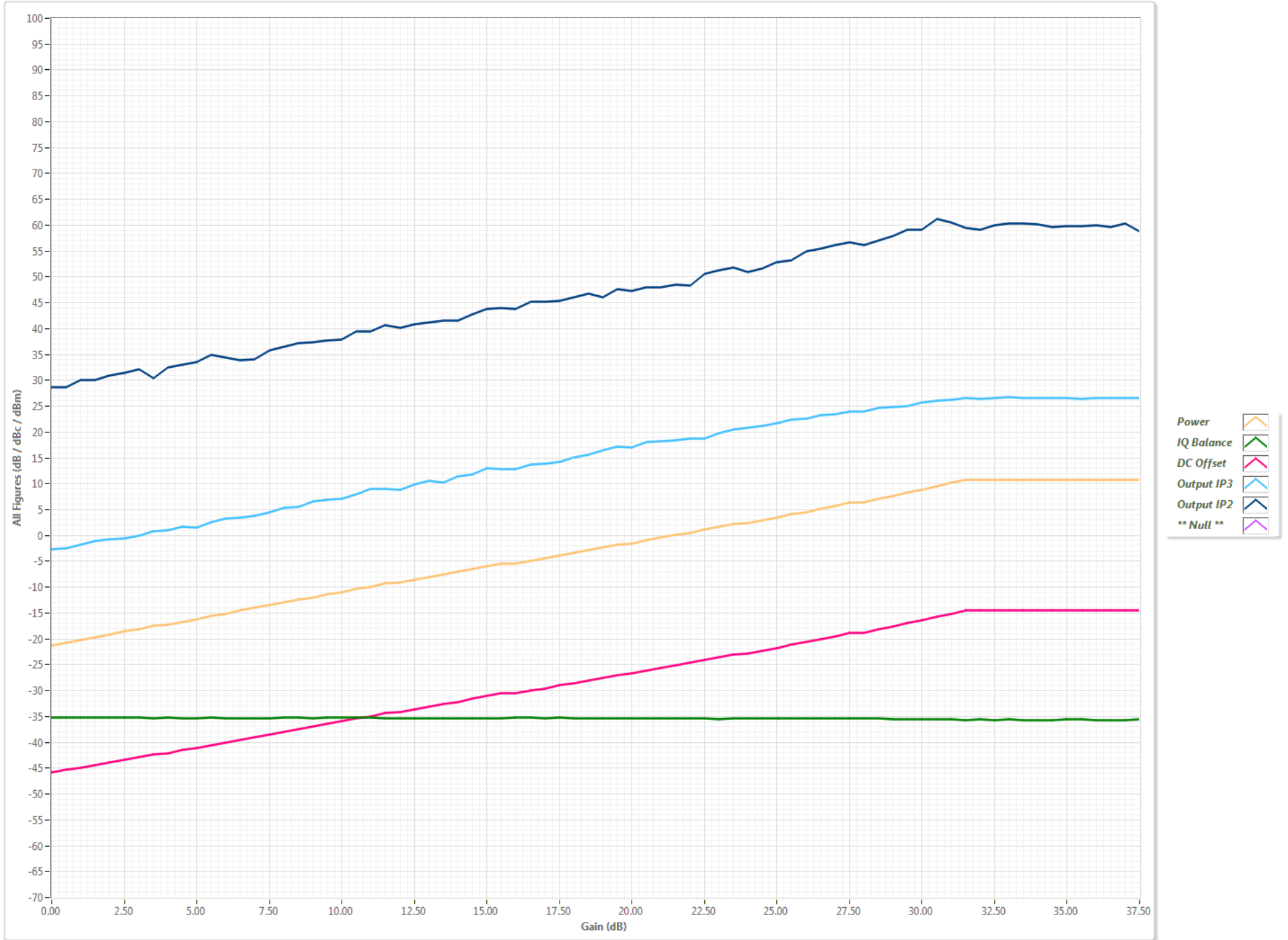
TX Figure vs Gain w/ Frequency=5450.00MHz



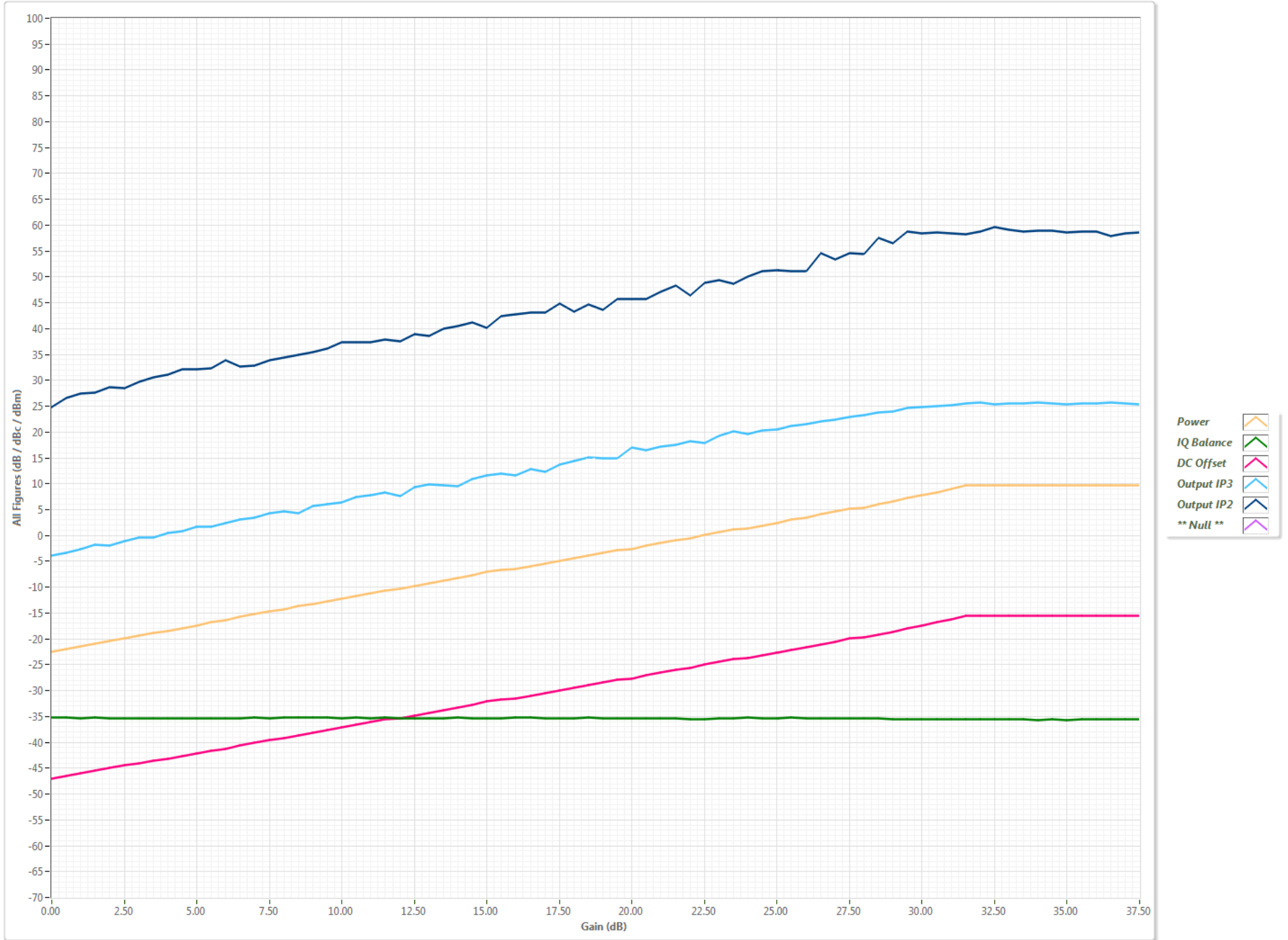
TX Figure vs Gain w/ Frequency=5500.00MHz



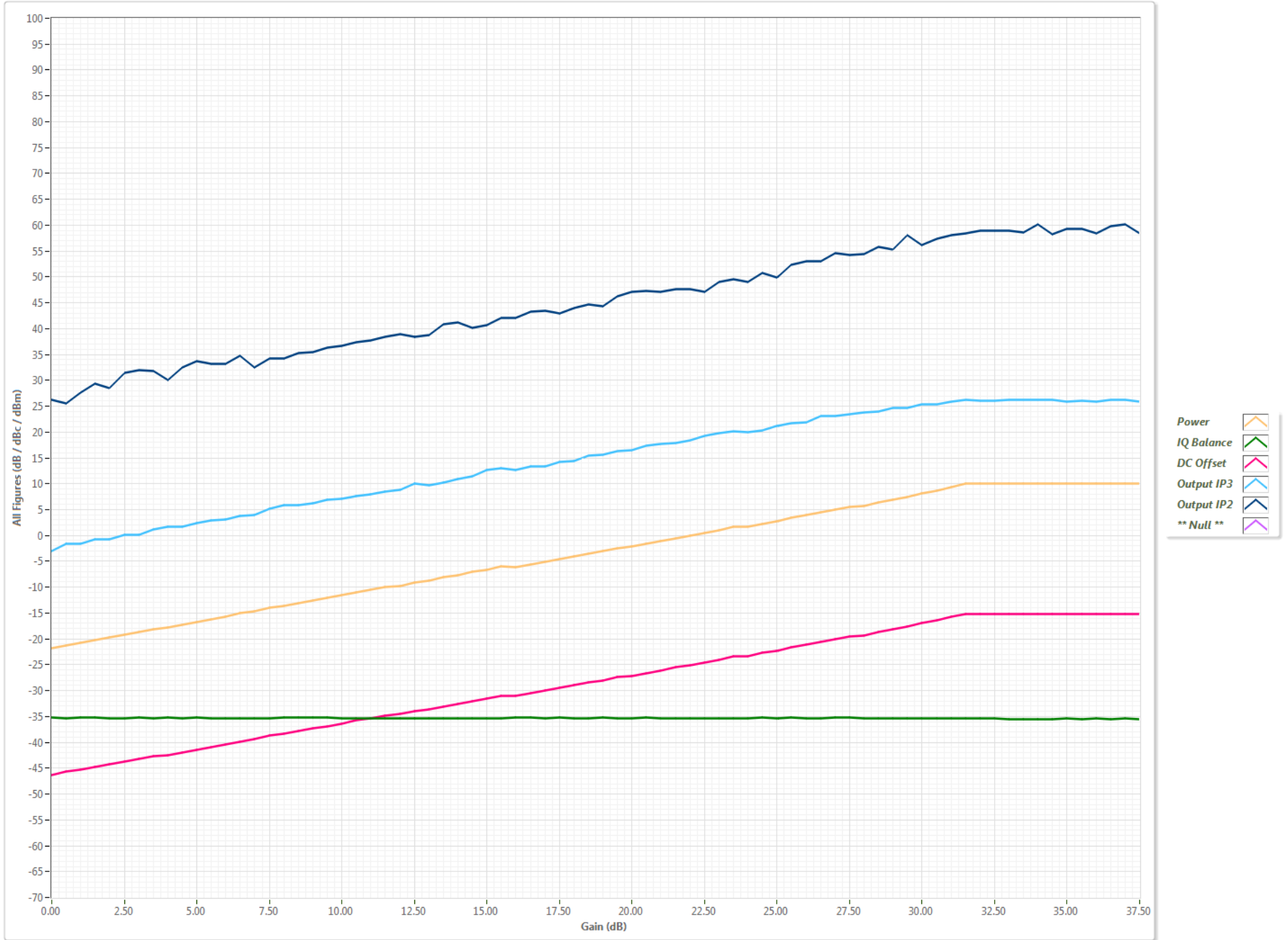
TX Figure vs Gain w/ Frequency=5550.00MHz



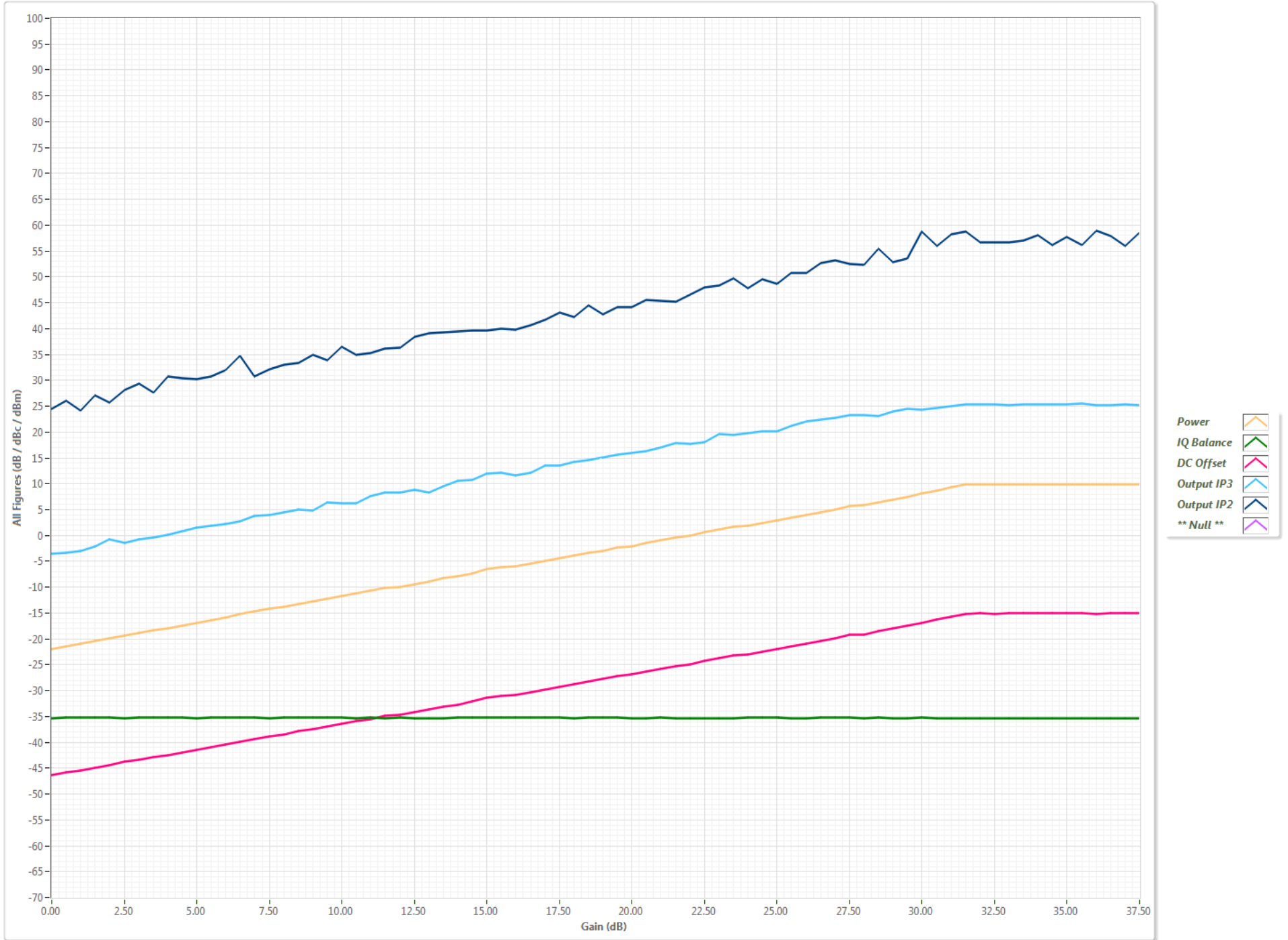
TX Figure vs Gain w/ Frequency=5600.00MHz



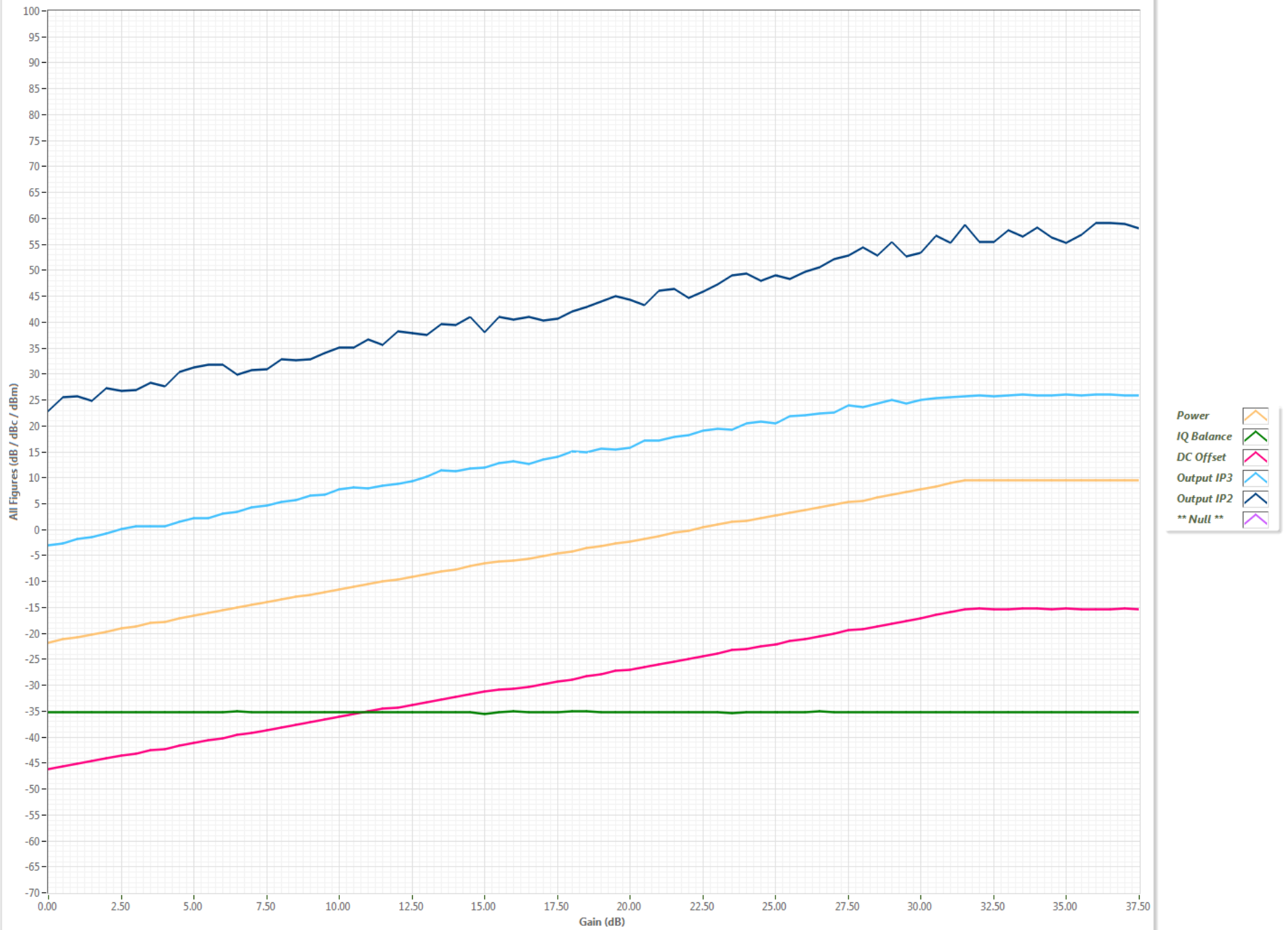
TX Figure vs Gain w/ Frequency=5650.00MHz



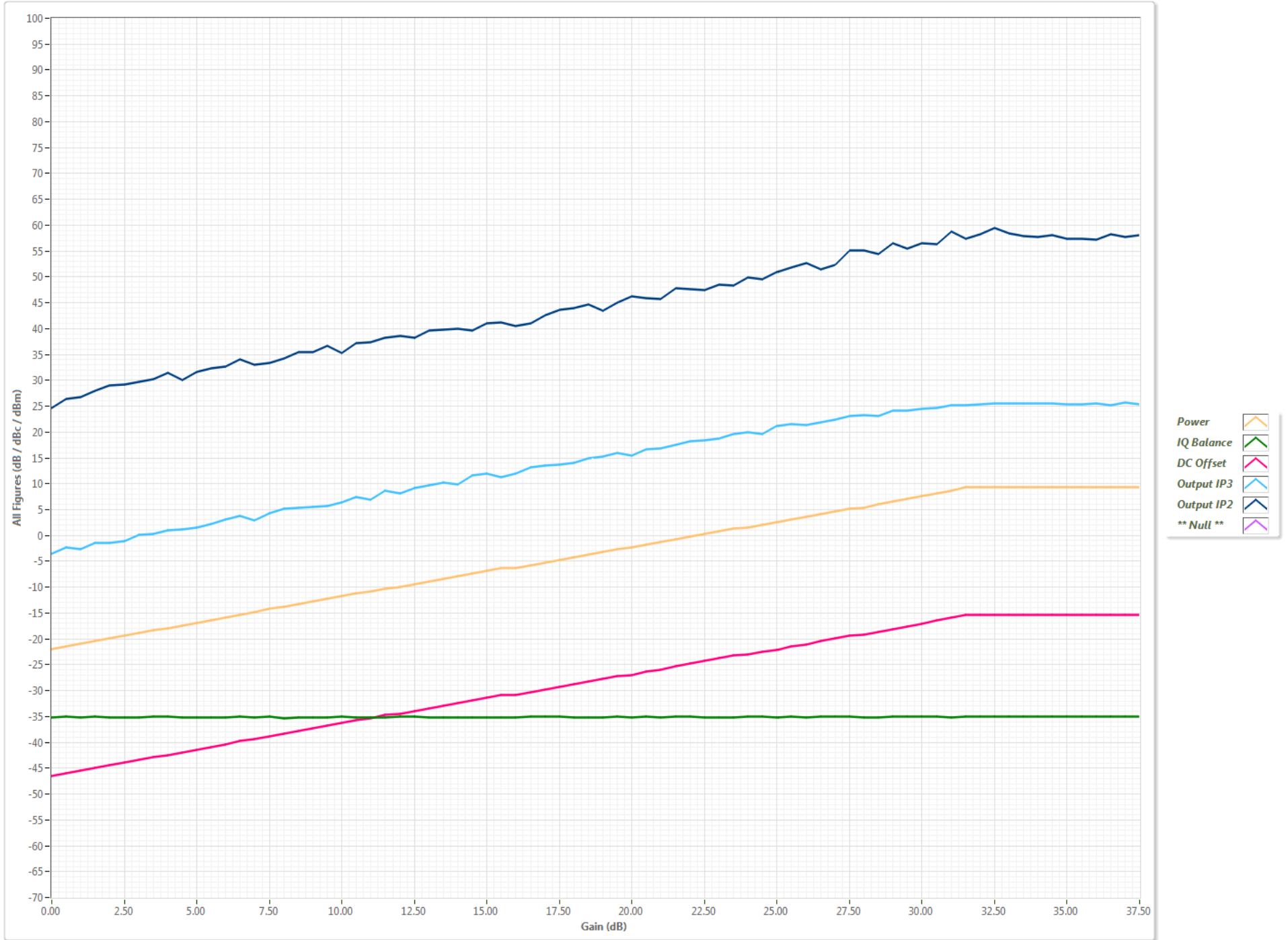
TX Figure vs Gain w/ Frequency=5700.00MHz



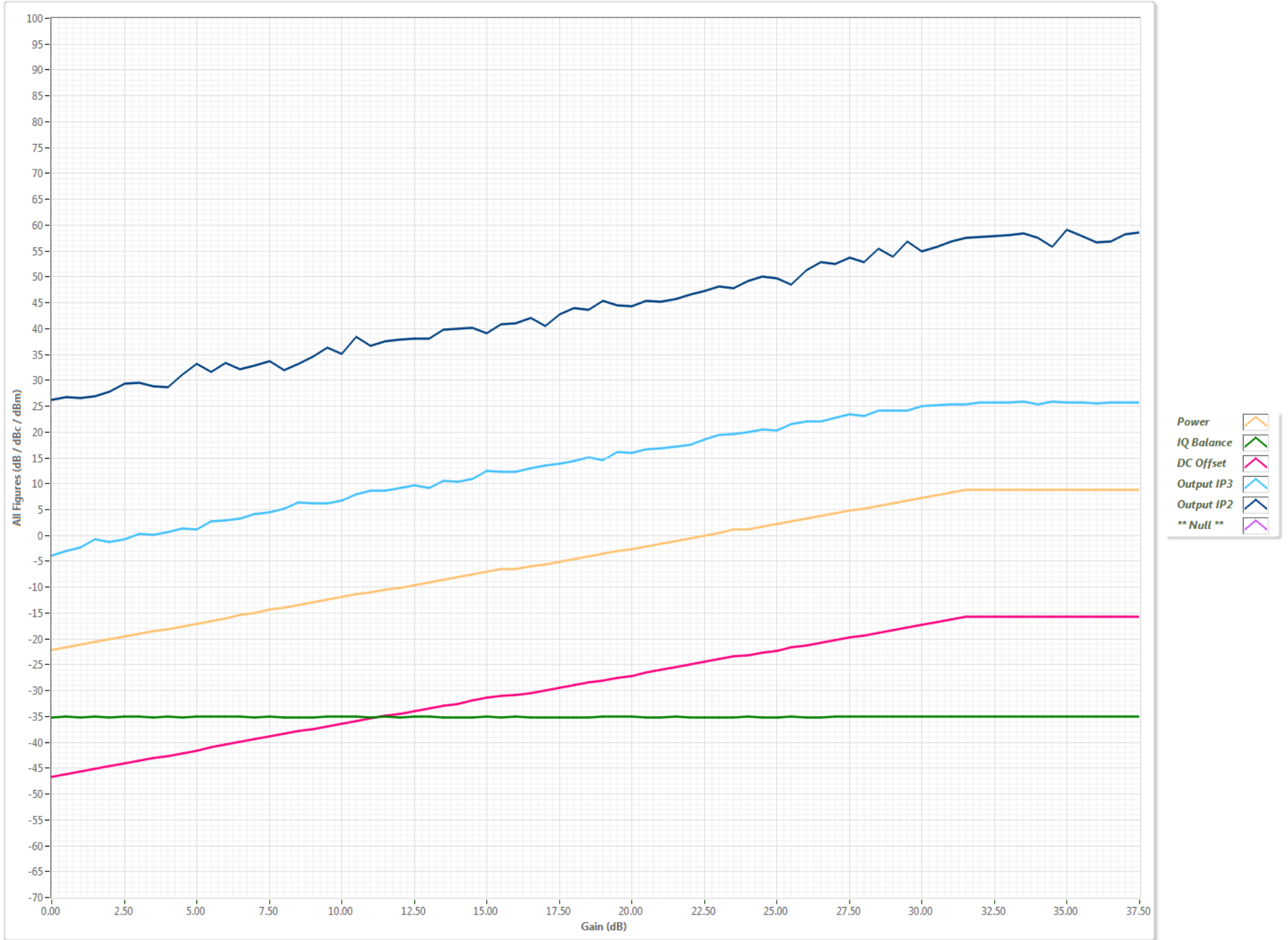
TX Figure vs Gain w/ Frequency=5750.00MHz



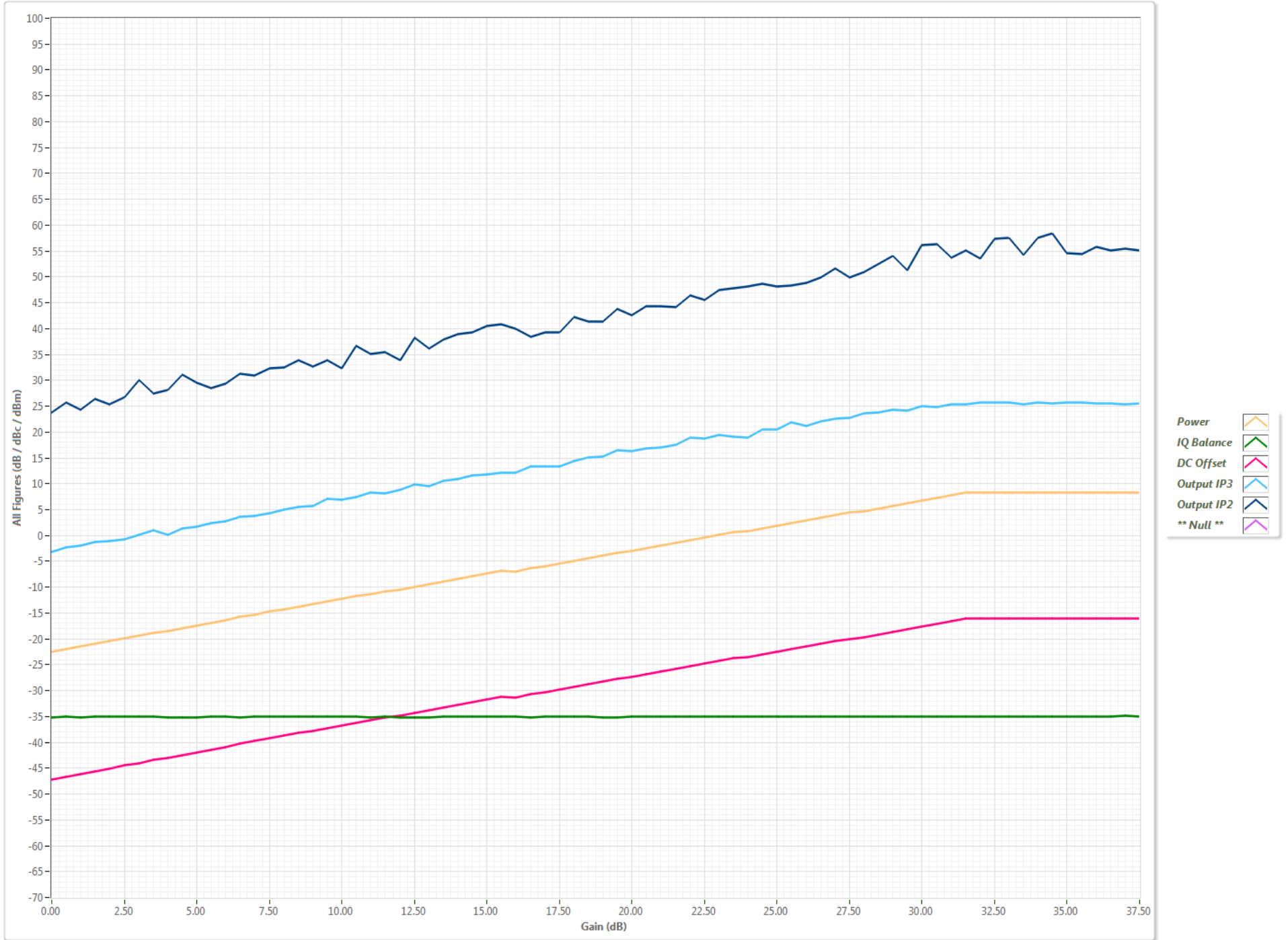
TX Figure vs Gain w/ Frequency=5800.00MHz



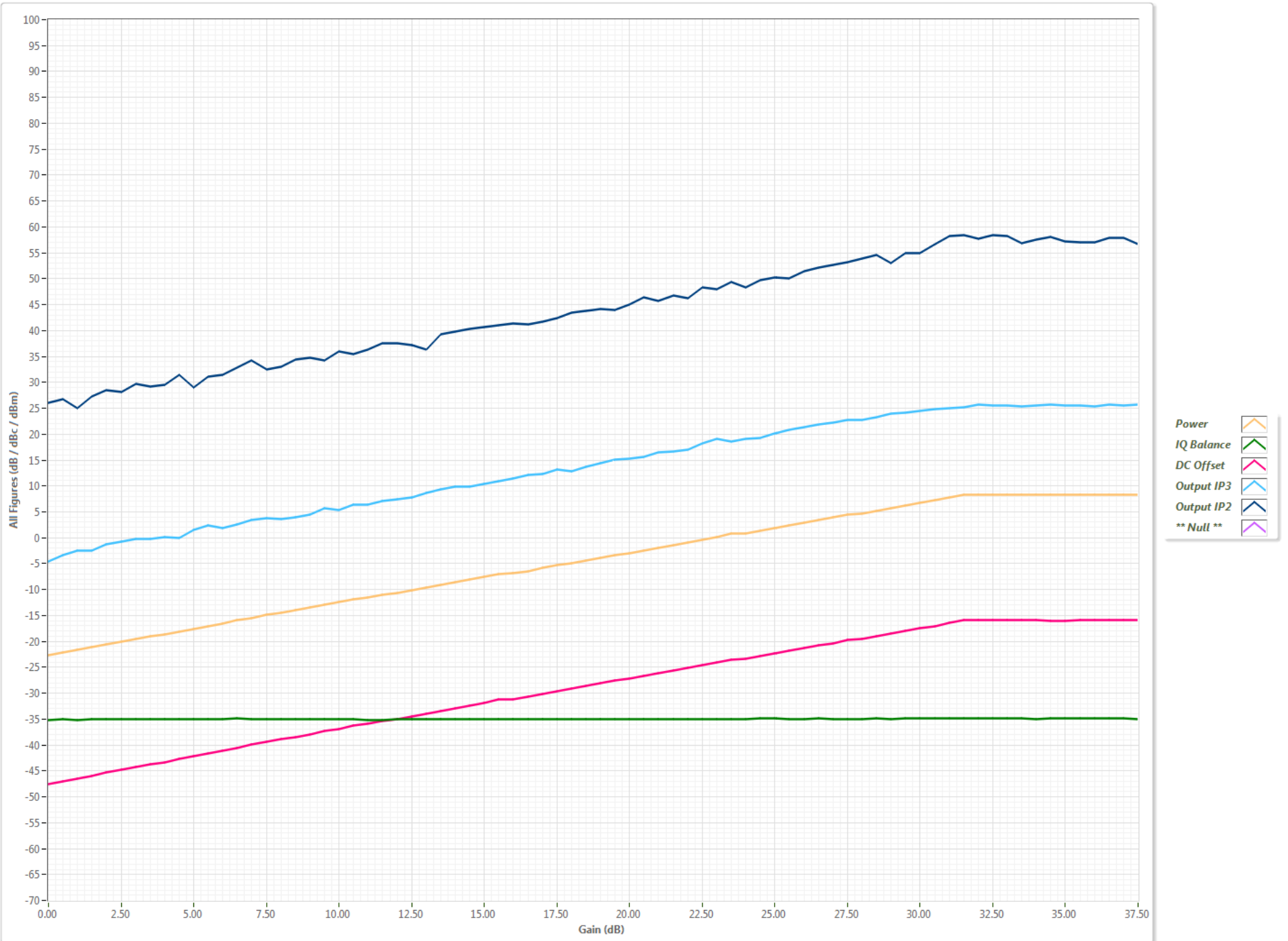
TX Figure vs Gain w/ Frequency=5850.00MHz



TX Figure vs Gain w/ Frequency=5900.00MHz



TX Figure vs Gain w/ Frequency=5950.00MHz



TX Figure vs Gain w/ Frequency=6000.00MHz

