VNA experiment

What do I want to know?

- Given the IIP3 spec of the SDR, power output of the whole system is important. Accurate gain measurements need to be made to plan further ahead.
    - Since the VNA gives S-parameters over a frequency domain, I download the csv file onto a usb drive and process it with matlab. (I need to learn what to do with s-parameters)
    - LNA: power connectors may be an issue; I am not sure how they work. It looks like they are external and will eliminate the need for a bias-T.
        - I have designed a voltage divider for the 6V lead acid battery:
            - Uses 47kO and 150kO resistors.
            - Produces 4.8V and 138mA, slightly below design requirements of 5V and 150mA.
        - This will need to be CAREFULLY connected via alligator clips with electrical tape in between. For a more permanent solution, soldering will need to be done on what is called a *turret terminal pin*.
    - With the gain figured out, we can get an estimate for how much signal power can be received.
- Noise figure is not what the VNA was designed for, a separate device may be needed.

Calibration:

- Connect cable to port 1, go to Cal -> Calibrate.
- For open calibration, use the “open” screw on cap and then click connect open.
- This is repeated for the “short” cap.
- Then use the double-sided adapter to do the “through” calibration.

Parameters for VNA:

- LNA test parameters:
  - 300kHz to 1.2GHz
  - What input power is the VNA delivering?
  - Get S21, S22 parameters.
- LNA expected parameters:
  - 400 to 1100 MHz
  - P1dB = 16.5 dB
  - OIP3 = 30 dB
  - 27dB gain
  - Max 20dBm input power

MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-40°C to 85°C Case
Storage Temperature	-55°C to 100°C
DC Voltage	+7V
Input RF Power (no damage)	+20 dBm
Power Dissipation	1.3W

Permanent damage may occur if any of these limits are exceeded.

- BPF:
  - 300kHz to 1.2GHz
  - To test for strong reflections between the LNA and BPF, we need to look at S11 and S12.