Out[39]: Click to See/ Hide Code.

VSWR Procedure

The VSWR plot for the LPDA was found for the Dipole and the LPDA. Below is the procedure used to find the plots shown further down.

We used the Signal Analyzer (SA) N9000A and the Mini-Circuits Coupler ZFDC-20-4L to measure the VSWR of both the LPDA and Aluminum Dipole. Below is the process followed to measure the Reflection Loss (dB) of both these antennas. That data was put into the following equations to calculate the VSWR values.

a := return loss (dB)

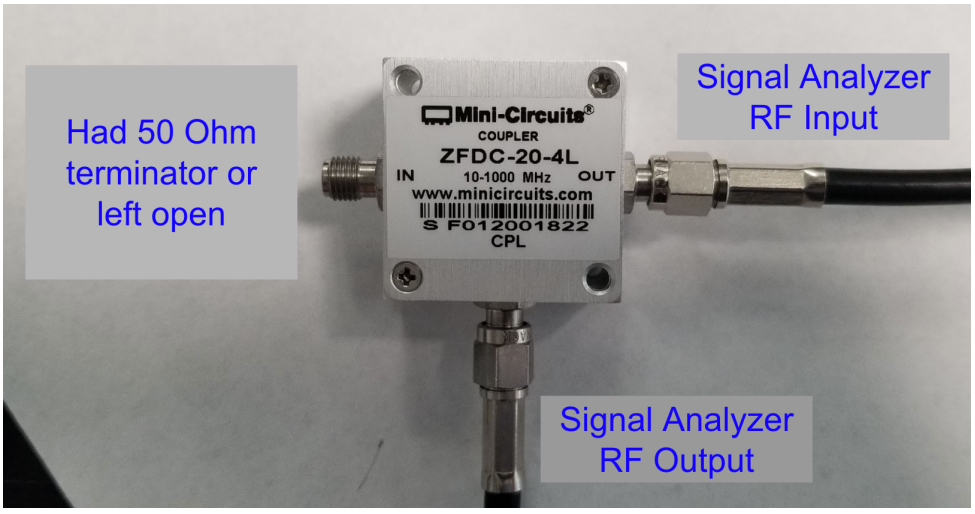
r := Reflection coefficient of DUT

$$r = 10^{0.05a}$$
$$VSWR = \frac{1 + |r|}{1 - |r|}$$

Procedure

1. Turn on the (SA) and hit the green ***MODE preset*** button

2. Connect things up as follows:



3. Hit ***source*** button then find ***RF output*** on the display and switch this on. The screen should no longer be as noisy.

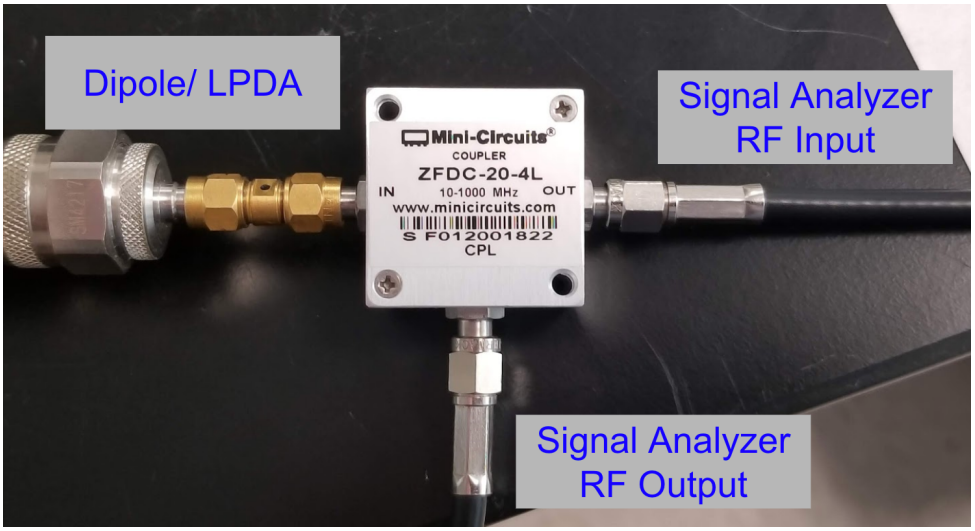
4. Hit the ***FREQ Channel*** button. Change the Start frequency to 0Hz (when the RF Output is on, the start frequency defaults to 9KHz) set the stop frequency to 1GHz.

5. Turn on the Tracking Generator (TG) by: hitting ***source*** ---> ***Select Source...*** ***[internal TG]*** ---> ***Select Highlighted Source*** ---> ***return***

6. Subtract the noise from the system: ***Trace/Detector*** ---> ***More 3 of 3*** (on bottom right of display) ---> ***Normlize*** ---> ***Store Ref 1->3***

What was on the display in yellow should now be purple and the yellow line is now at the top of the graph. The purple is the noise that is being subtracted from the signal which then zeroes out the signal since nothing should be going into the input of the SA until the Input of the coupler is connected to the LPDA or Dipole.

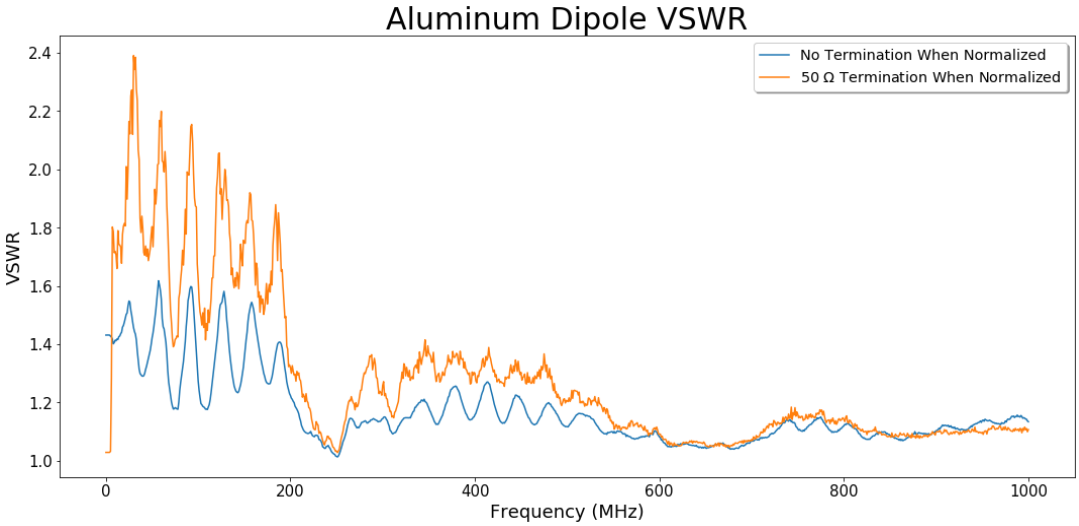
7. Connect the LPDA or Dipole as follows.

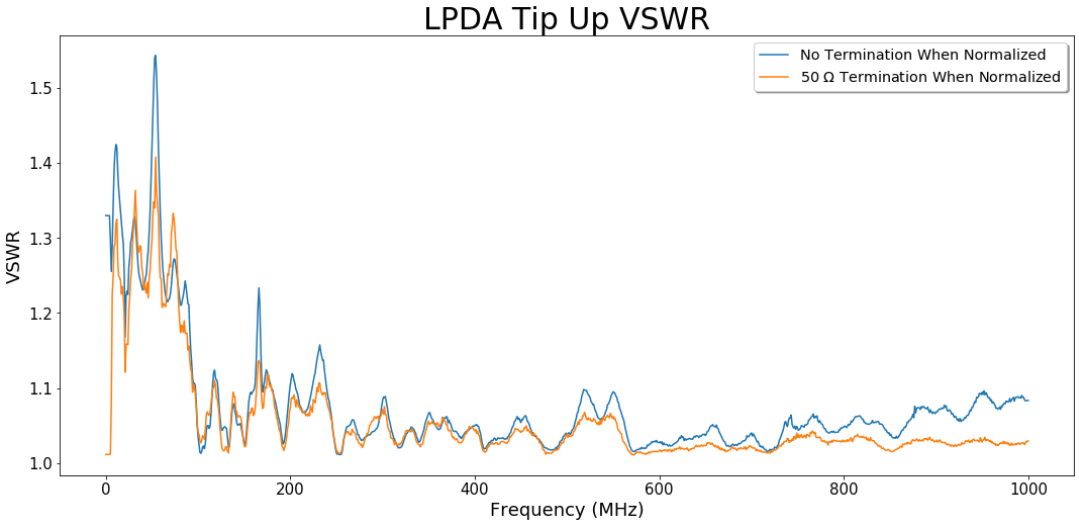


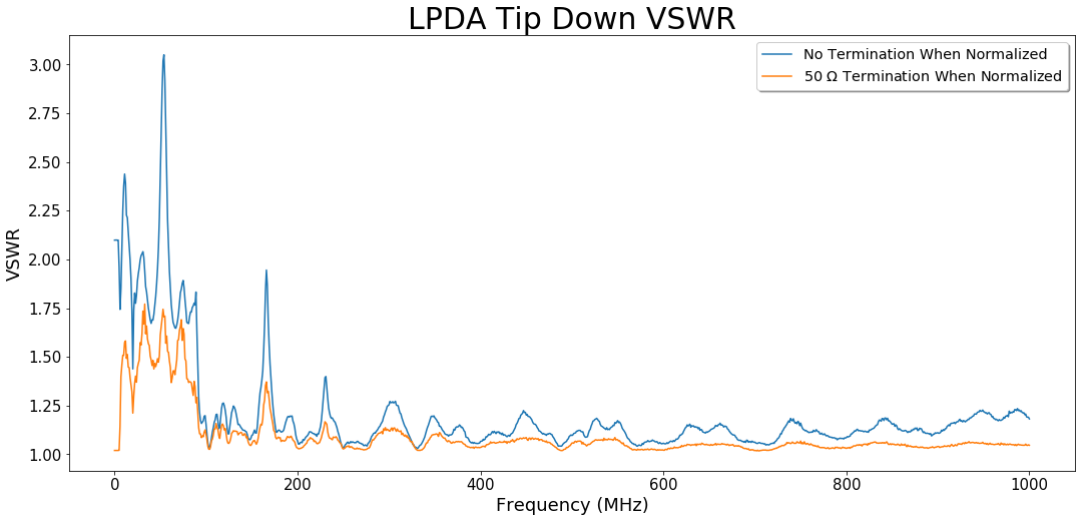
In case the signal is out of the display you can do the following to adjust the offset:

Hit ***AMPTD Y Scale*** ---> ***More*** ---> ***Ref Lvl Offset***

Results




LPDA Tip Up VSWR
No Termination When Normalized
50 Ω Termination When Normalized
VSWR
1.0
1.1
1.2
1.3
1.4
1.5
0
200
400
600
800
1000
Frequency (MHz)


LPDA Tip Down VSWR
No Termination When Normalized
50 Ω Termination When Normalized
VSWR
1.00
1.25
1.50
1.75
2.00
2.25
2.50
2.75
3.00
0
200
400
600
800
1000
Frequency (MHz)