FRONT-END RECEIVER AND TRANSMITTER FOR S-POL TEST SYSTEM

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OBJECTIVES

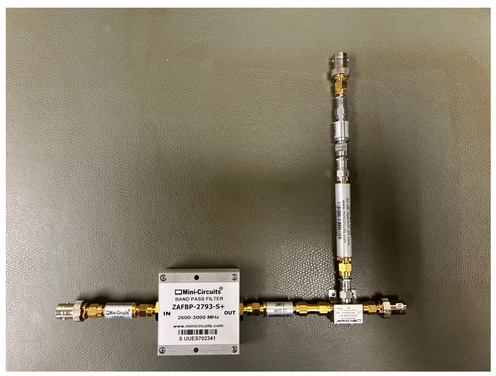
- Develop a receiver and transmitter front end for a S-Pol radar test system
- Account for all mixing terms created during the process of up/down conversion
- Prepare receiver and transmitter to be connected to Pentek 71821 FPGA and S-Band horn antenna

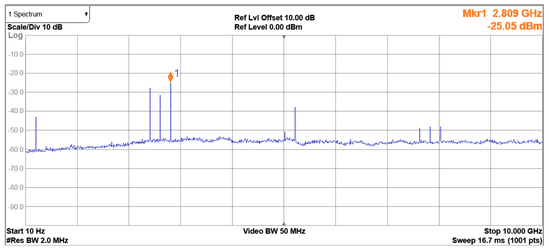
APPLICATIONS

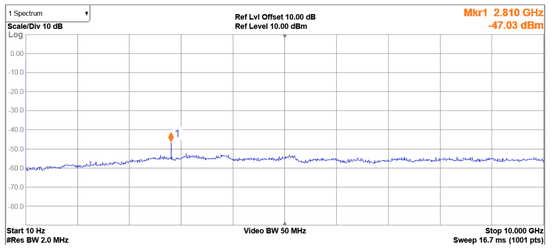
- Use this front end to measure the far-field antenna patterns of the S-Pol radar over the transmission path from the Marshall Field Site to the Mesa Lab
- Apply findings from this project to the potential method for finding antenna patterns of the active electrically steered array antennas for the APAR project

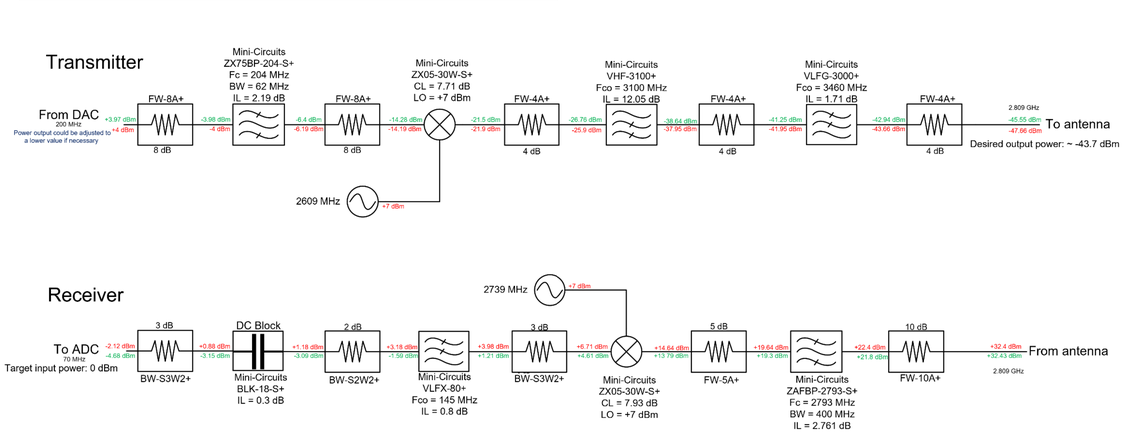
RECEIVER

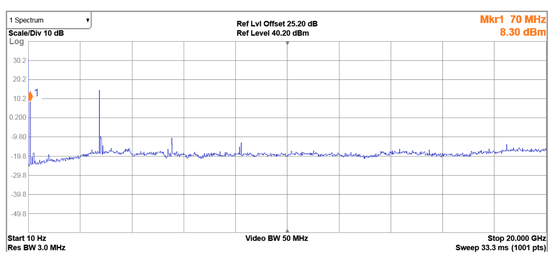
- Designed to receive a signal of approximately 2.809 GHz at 32.4 dBm (peak) and output a 0 dBm (peak) signal at 70 MHz to the ADC through attenuation and down-conversion while accounting for mixing terms
- A link budget was used to find the power at the receiver input based on the known transmit power and antenna gain of the S-Pol system as well as range
- Linear interpolation was used to approximate the insertion loss of each receiver component to estimate the attenuation of the mixing terms

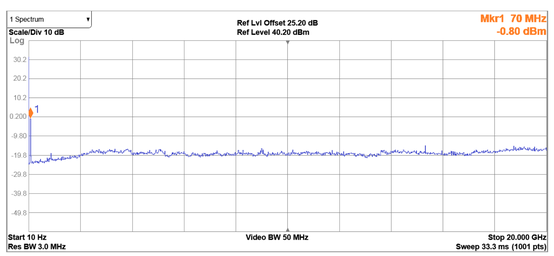






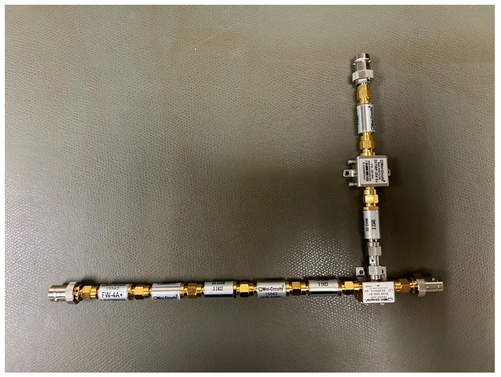






TRANSMITTER

- Designed to transmit a signal of approximately -43.7 dBm at 2.809 GHz converted from a DAC output signal of 4 dBm at 200 MHz by utilizing attenuation and up-conversion while accounting for mixing terms
- A link budget was used to find the power at the transmitter output by working backward from the maximum power possible for S-Pol to safely receive allowing the amount of needed attenuation to be found



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