CERTIFICATE OF CALIBRATION

Antikernel Labs
PO Box 4665
10355 NE Valley Rd
Rollingbay, WA 98061-0665
https://www.antikernel.net/
sales@antikernel.net

This document certifies that the instrument described has been verified to comply with all published datasheet specifications using traceably calibrated equipment.

Instrument Description	2 GHz Transmission Line Probe
Model	AKL-PT1
Serial Number	0007

Calibration Performed By	A. Zonenberg	Date	2020-07-30 15:50
Test Conditions	21ºC, 46% RH	Cal Due	2021-07-30

Calibration Standards

Type	Manufacturer	Model	Serial	Cal due date
Multimeter	Rohde & Schwarz	HMC8012	36174847	2021-04-15
Vector Network Analyzer	Pico Technology	PicoVNA 106	09335	2021-04-17
Oscilloscope	Teledyne LeCroy	WaveRunner 8404M-MS	LCRY4254N20447	2021-07-16
Pulse Generator	Leo Bodnar	SMA Pulse Generator	N/A	N/A

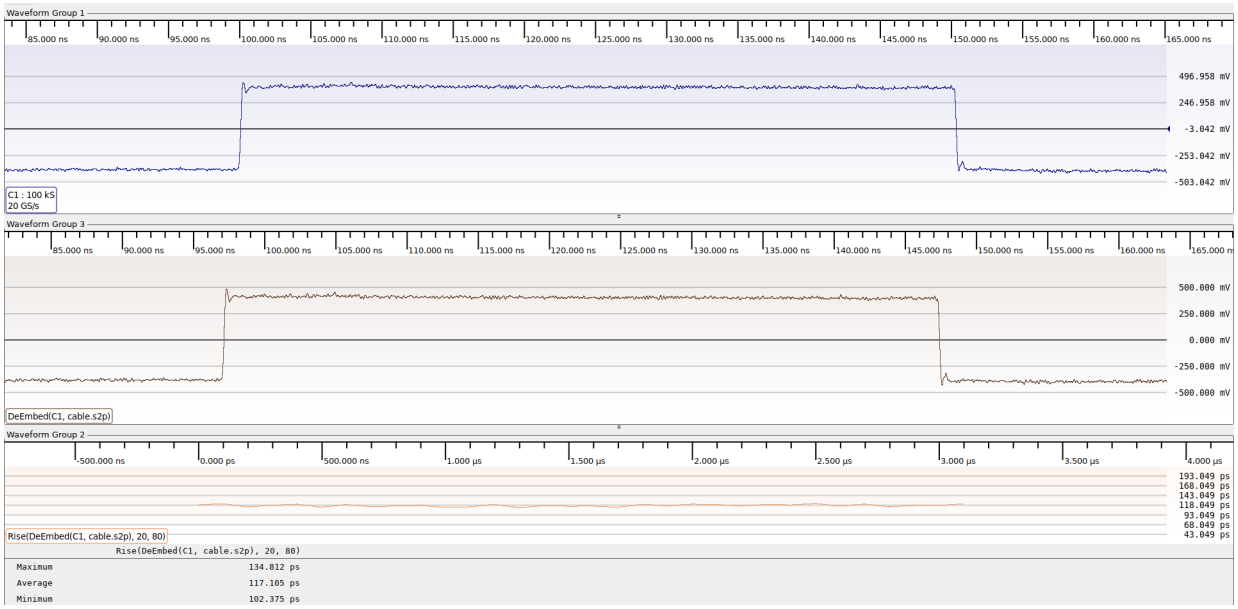
Test Results

All measurements are of probe body only, with cable and fixture de-embedded.

Test	Minimum	Actual	Maximum	Result
DC resistance	448.87 Ω	450.35 Ω	452.25 Ω	PASS
S_{21} (1 MHz)	-23.0 dB	-20.46 dB	-20 dB	PASS
S_{21} (500 MHz)	-23.0 dB	-20.72 dB	-20 dB	PASS
S_{21} (1.0 GHz)	-23.0 dB	-21.25 dB	-20 dB	PASS
S_{21} (1.5 GHz)	-23.0 dB	-21.56 dB	-20 dB	PASS
S_{21} (2.0 GHz)	-23.0 dB	-22.73 dB	-20 dB	PASS
Bandwidth (-23.5 dB)	2.0 GHz	2.23 GHz	N/A	PASS
Rise time (20-80%)	N/A	117 ps	175 ps	PASS

Typical Waveform

Nominal 40 ps risetime pulse. Top waveform includes cable effects, bottom is de-embedded.

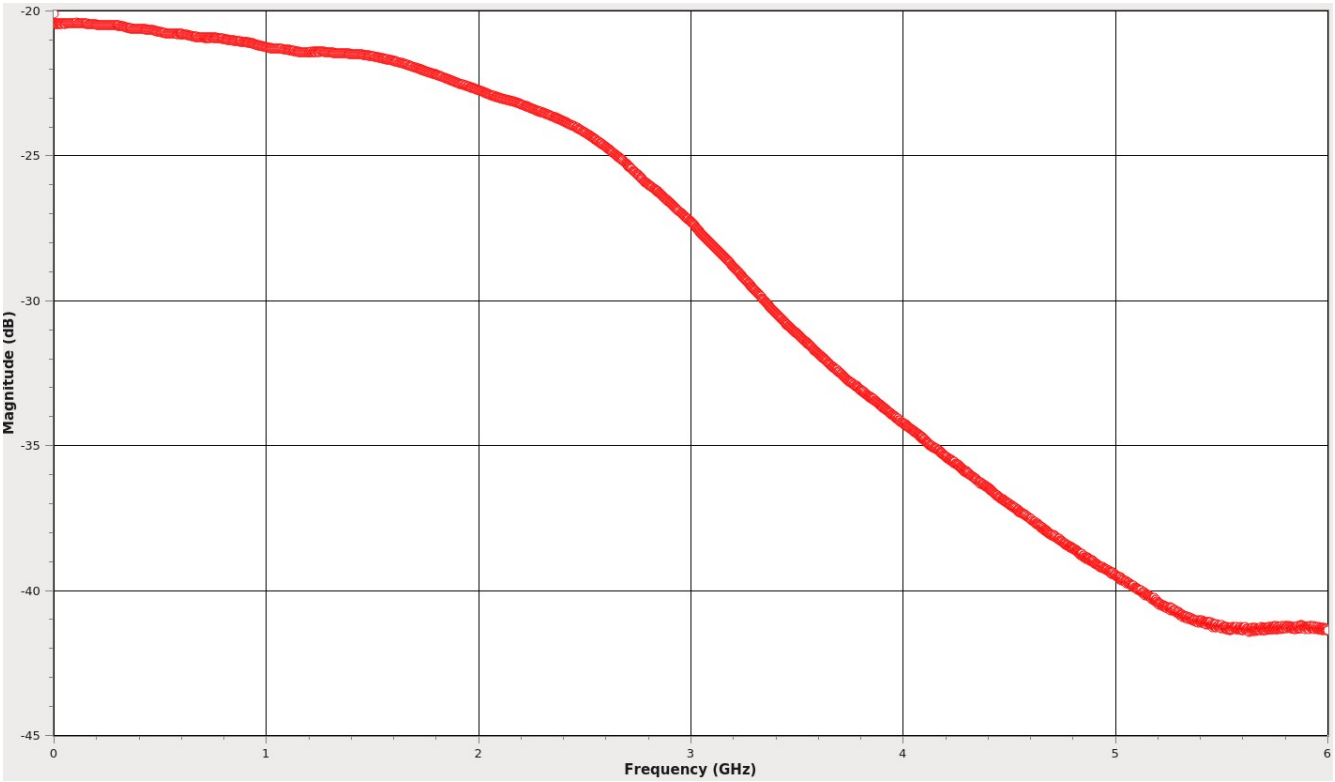


S-Parameter Data

Machine readable S2P files for de-embedding may be downloaded at:
https://github.com/azonenberg/starshipraider-caldata/tree/master/handheld-resistive-probe/007/

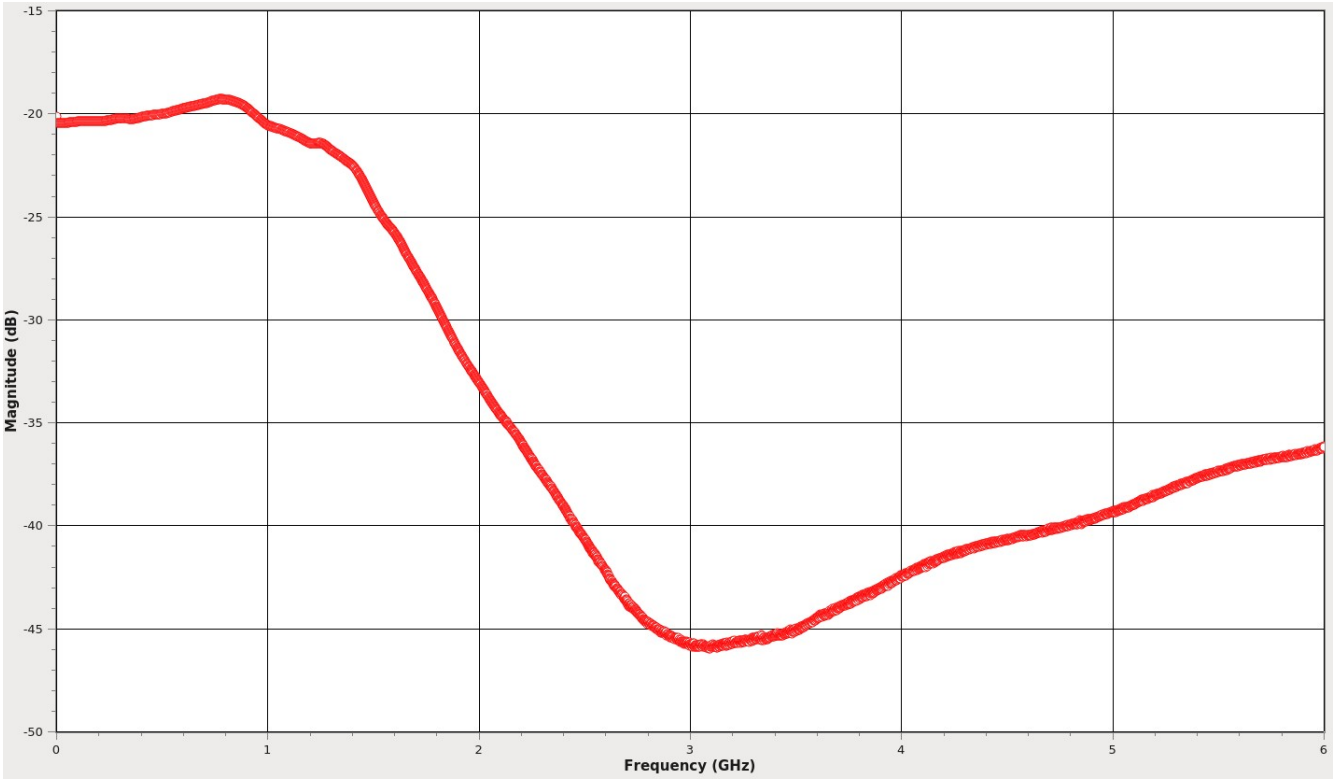
Insertion Loss (tip ground, across 50Ω termination)

tipground.s2p S_{21}



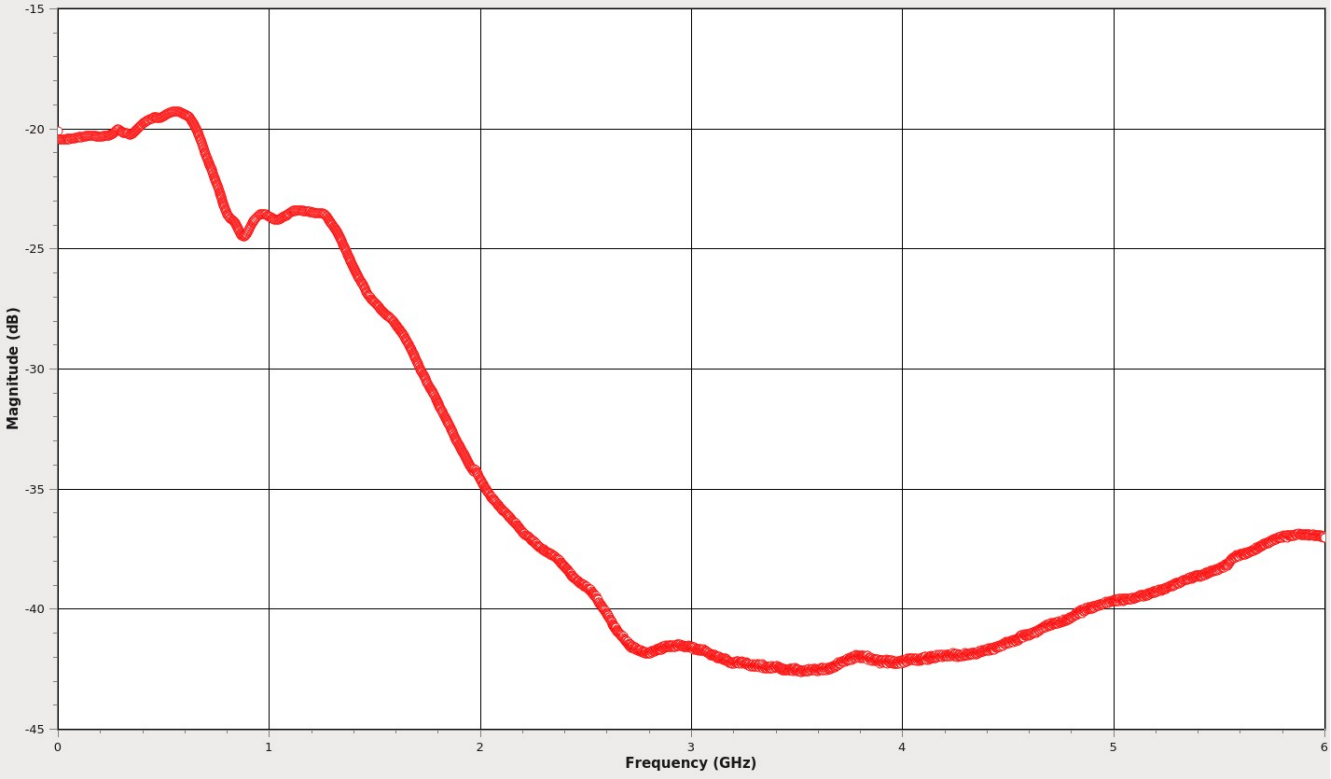
Insertion Loss (leaf ground, across 50Ω termination)

leafground.s2p S_{21}



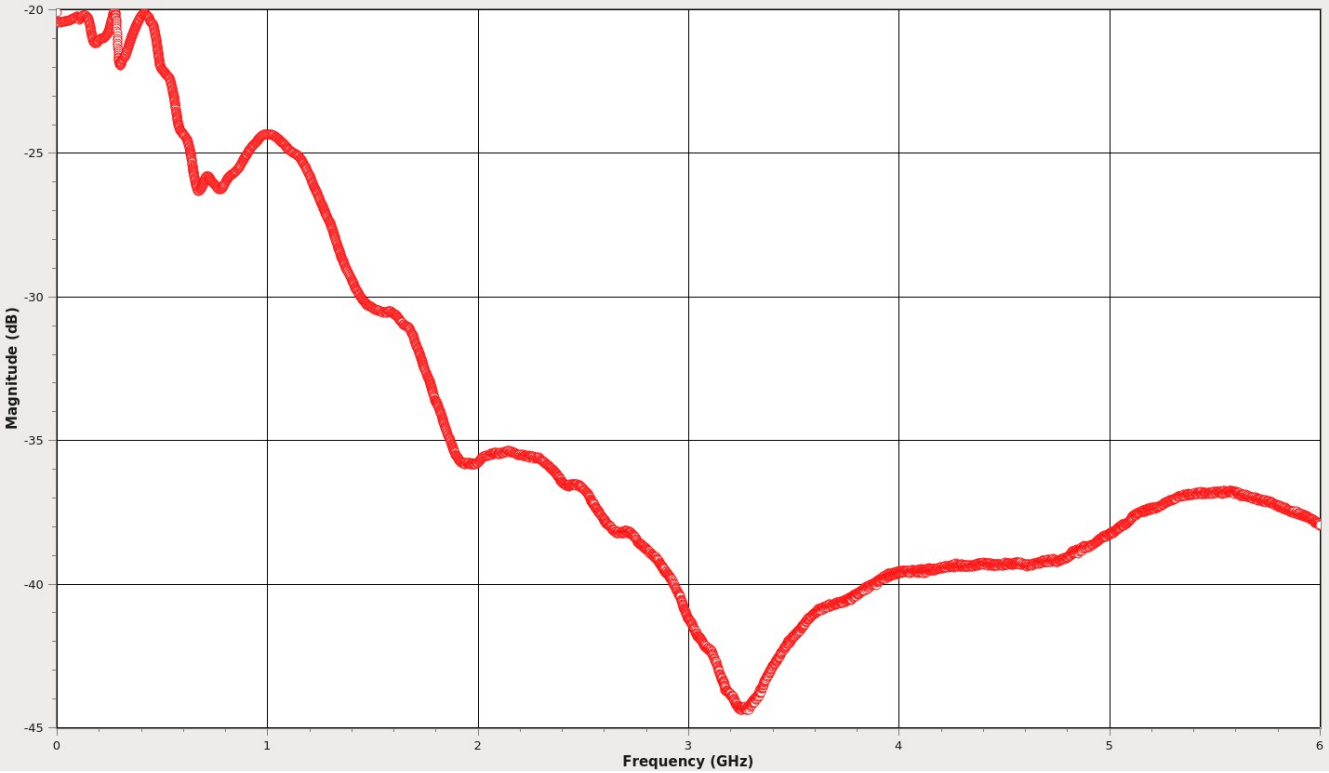
Insertion Loss (Z-ground, across 50Ω termination)

zground.s2p S_{21}



Insertion Loss (flex ground, across 50Ω termination)

flexground.s2p S_{21}



Return Loss (tip ground, across open circuit)

zin.s2p S_{11}