

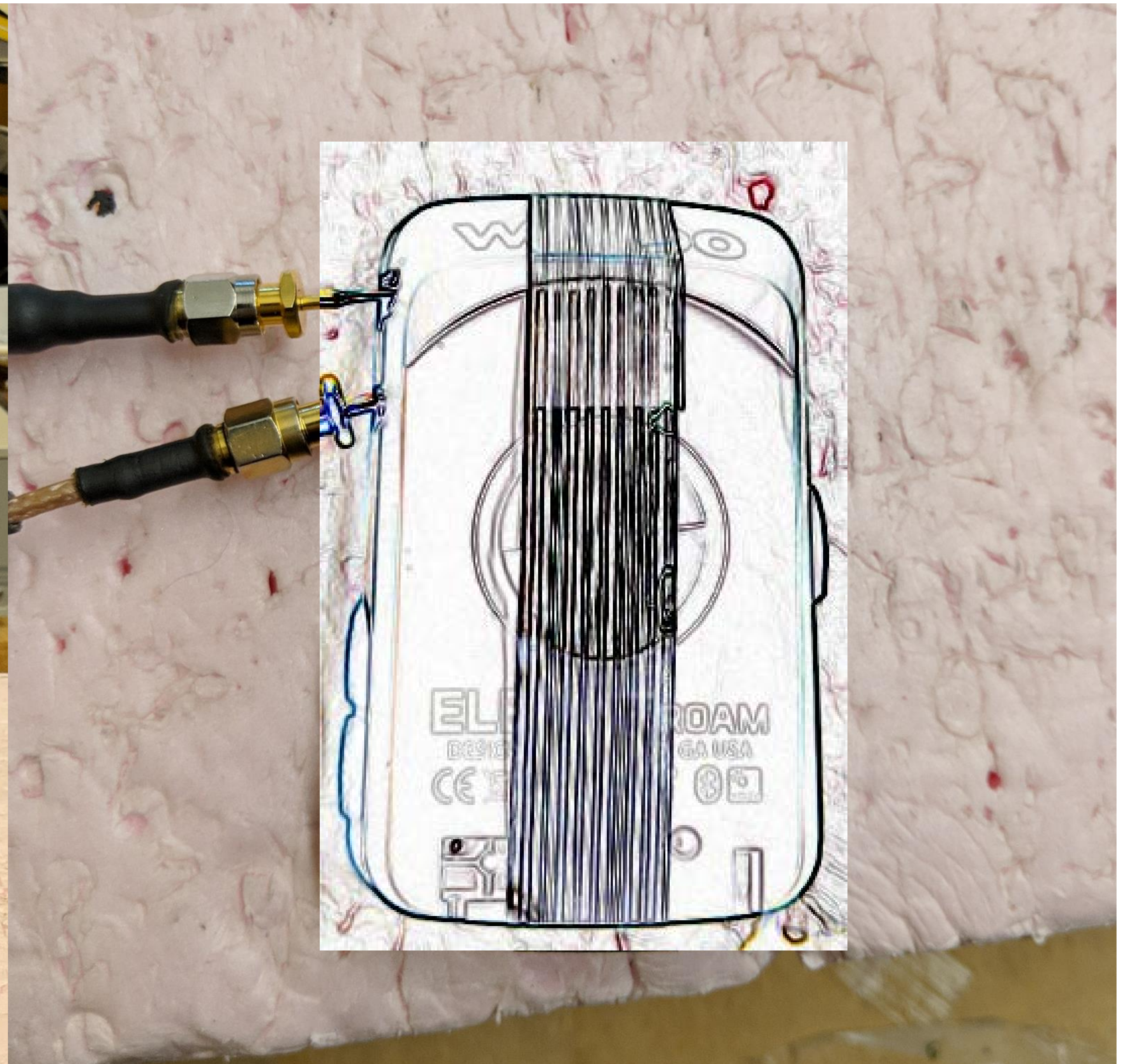
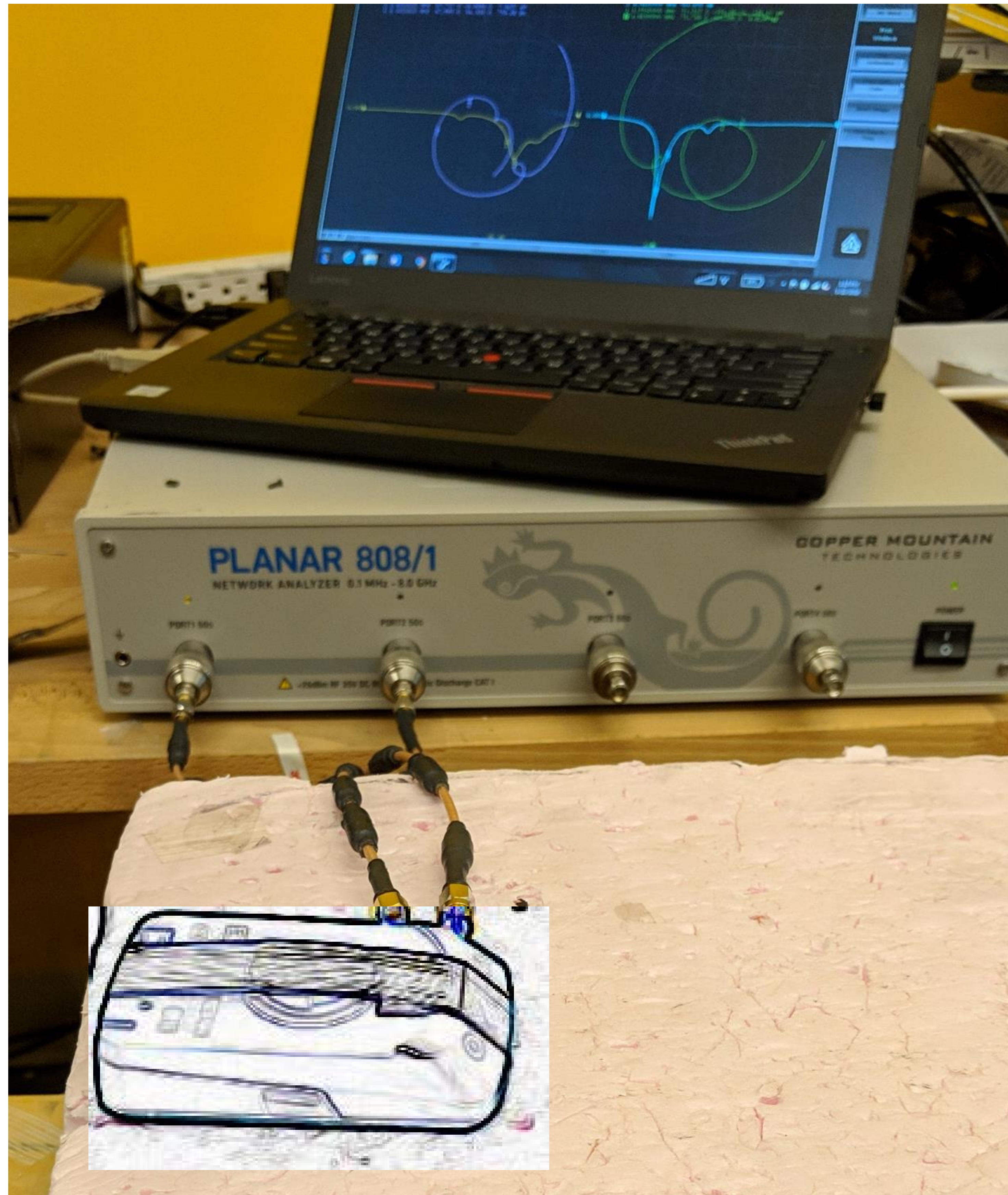
Antenna Report

Antenna model	W3412
Antenna type	Metal Antenna
Working frequency range	2400 - 2500 MHz
Peak gain	1.9 dBi

Pulse Larsen Antenna Solution for Wahoo Rev 5

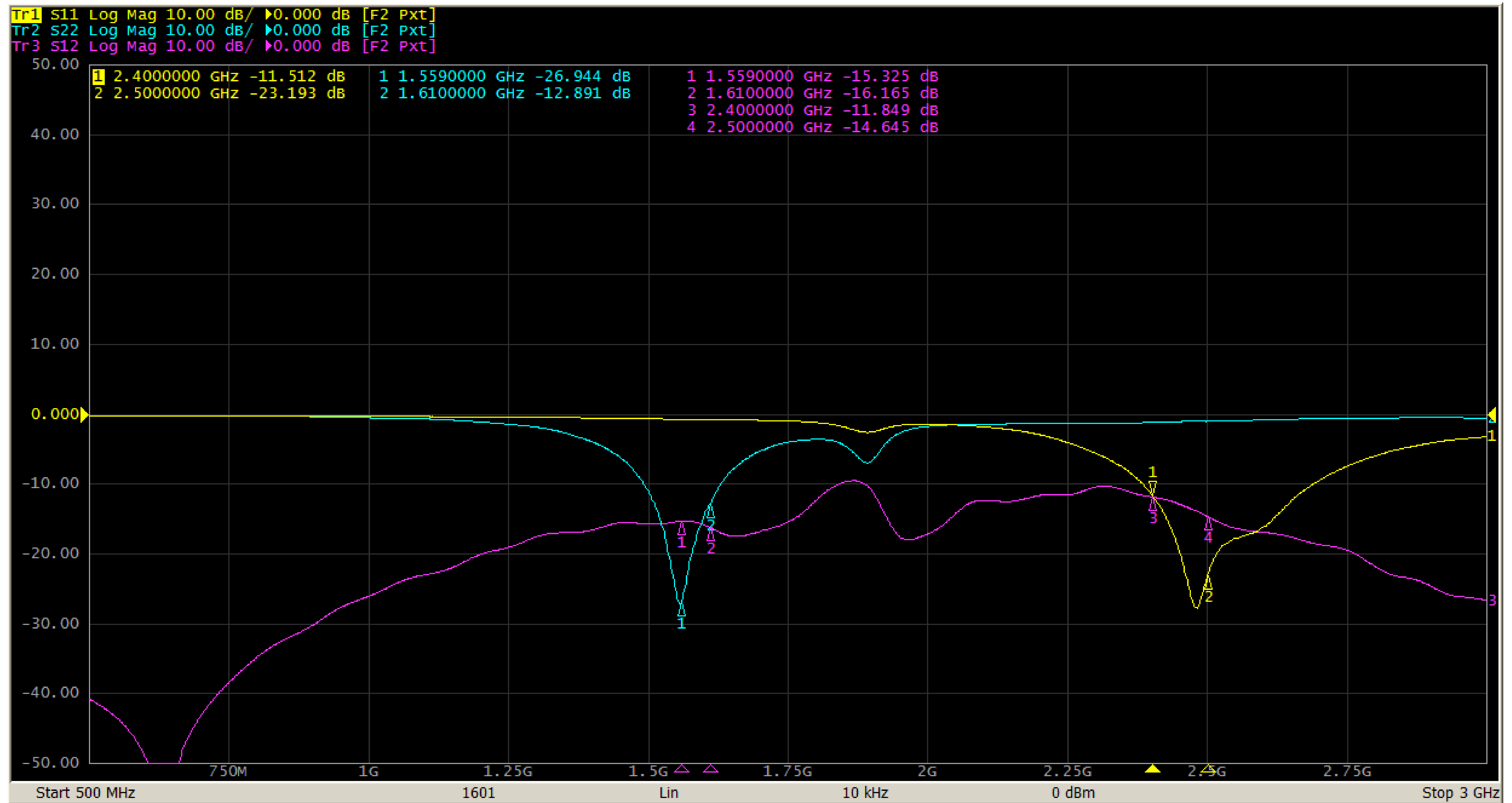
January 22, 2019

Test Setup



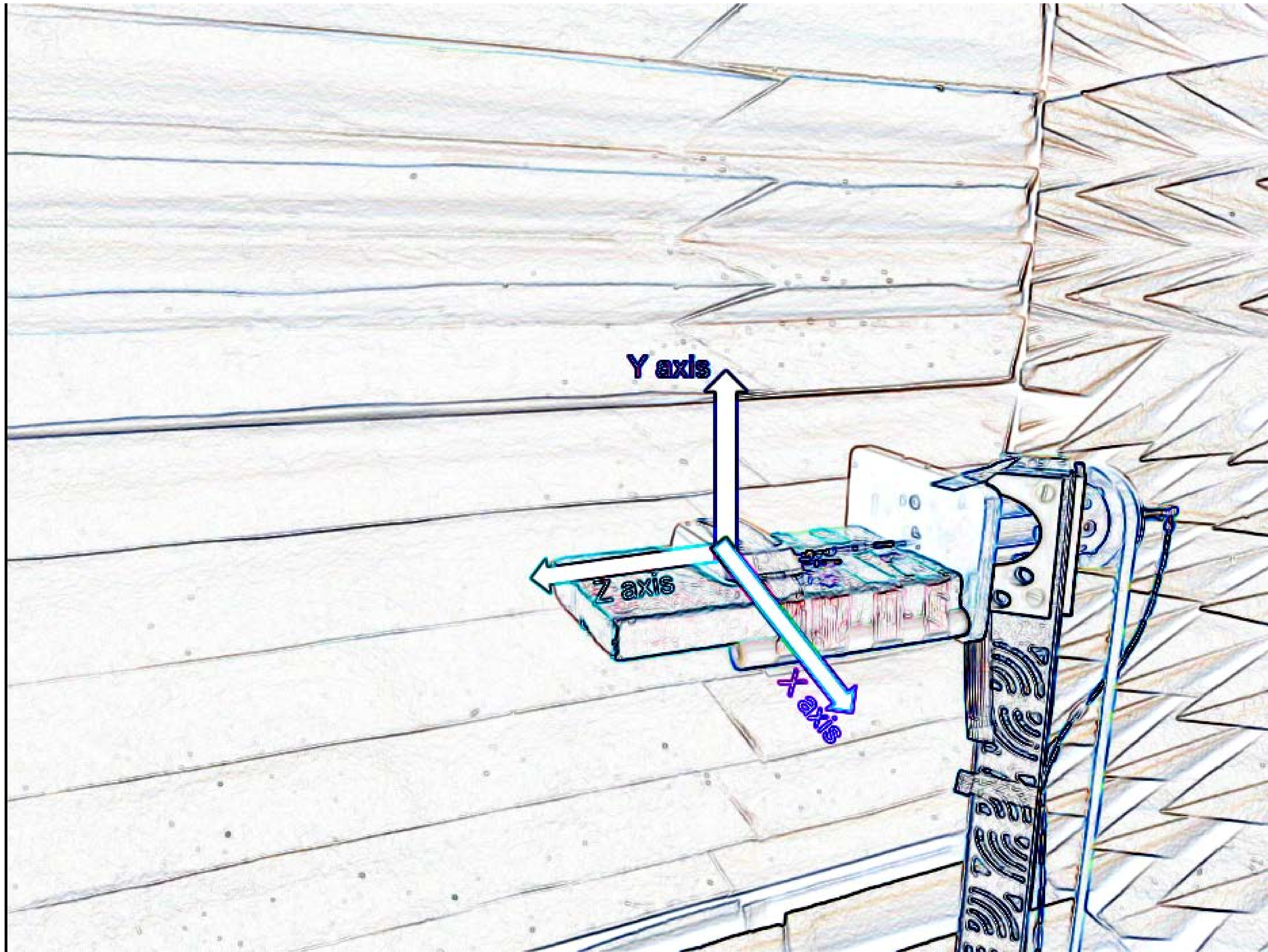
Return Loss

1/22/2019 2:56:02 PM

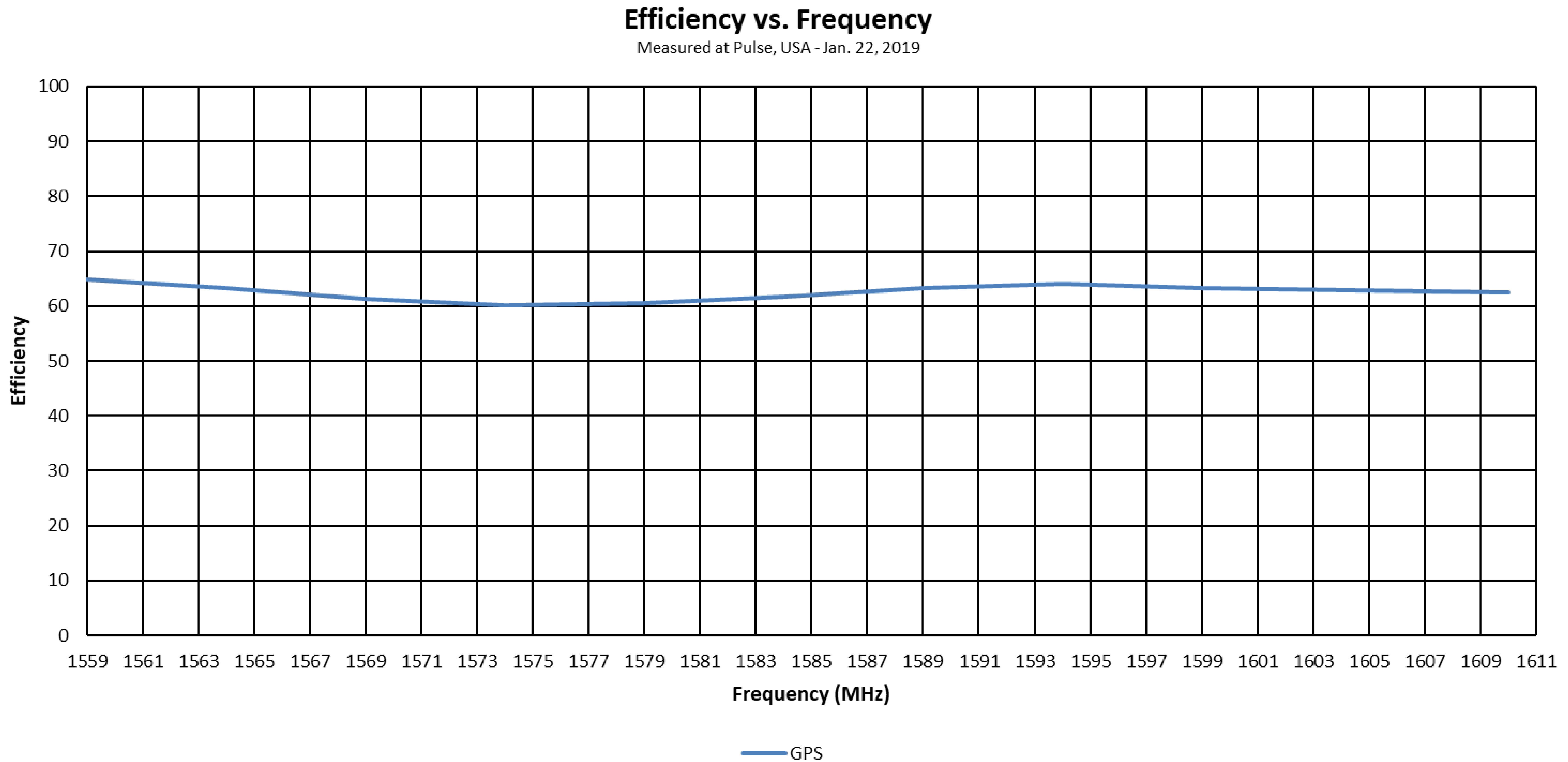


1. As GPS is receive only so the isolation is only significant in the GPS band 1559-1610 MHz. In this band we have -15dB isolation which acceptable.

Anechoic Chamber Setup



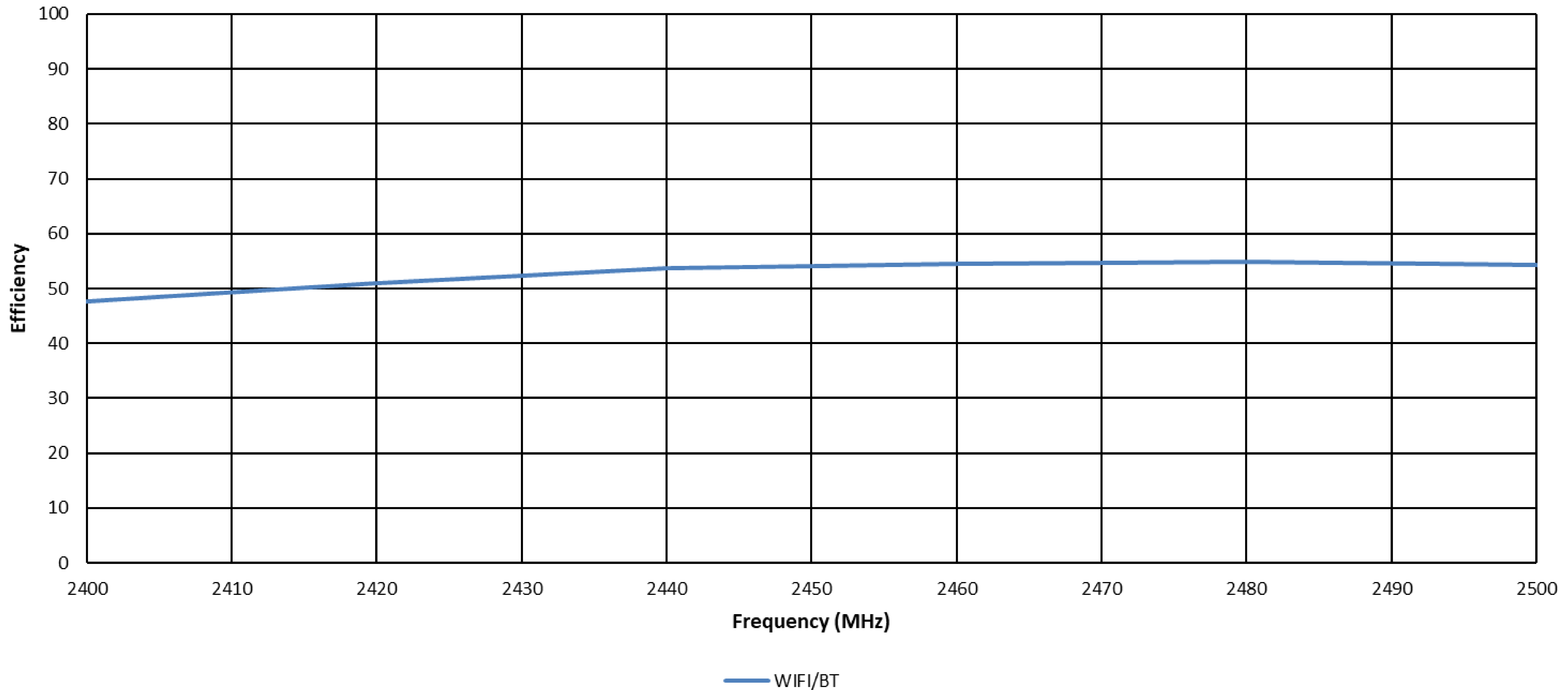
Efficiency- GPS



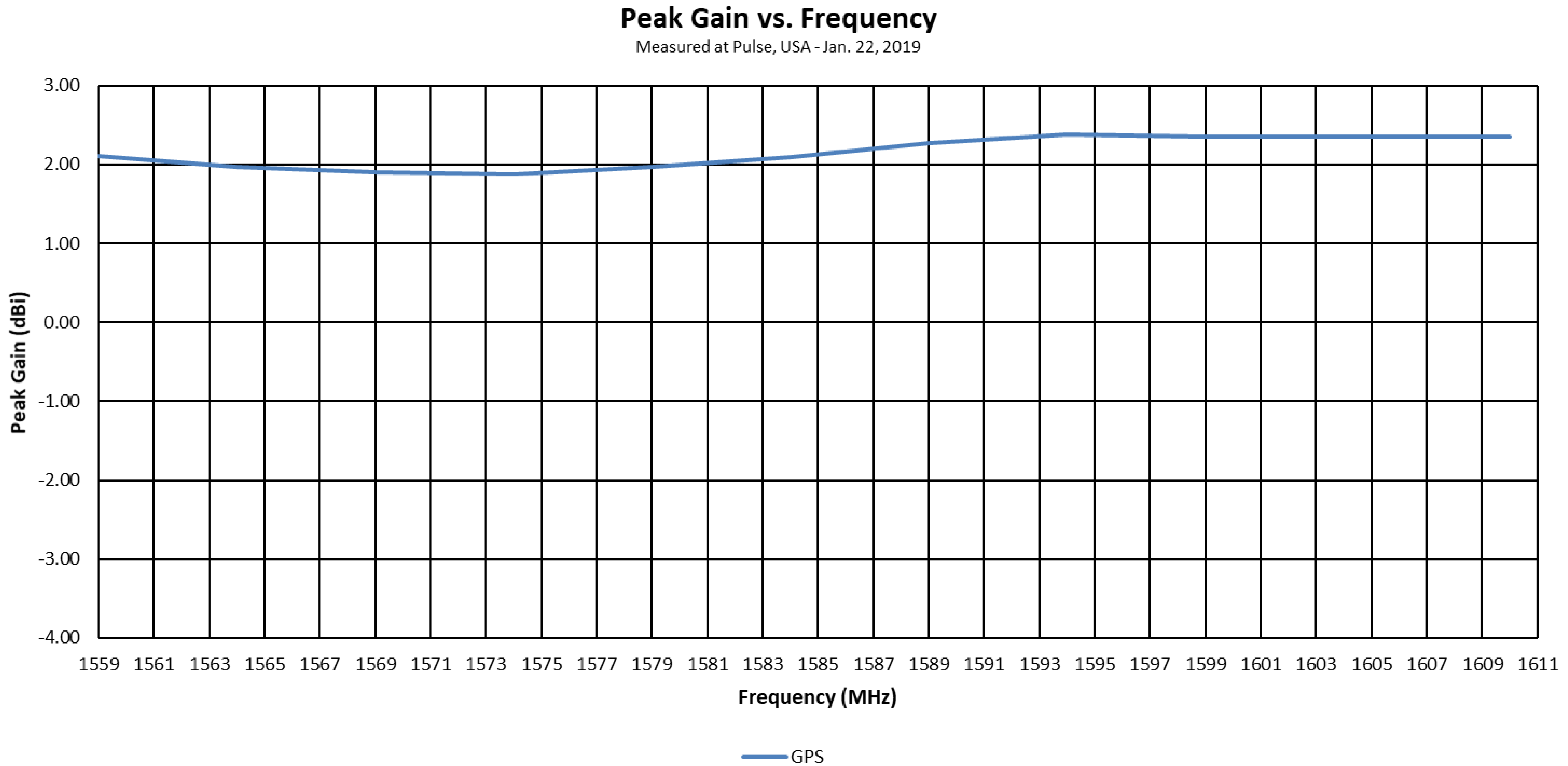
Efficiency – BT

Efficiency vs. Frequency

Measured at Pulse, USA - Jan. 22, 2019



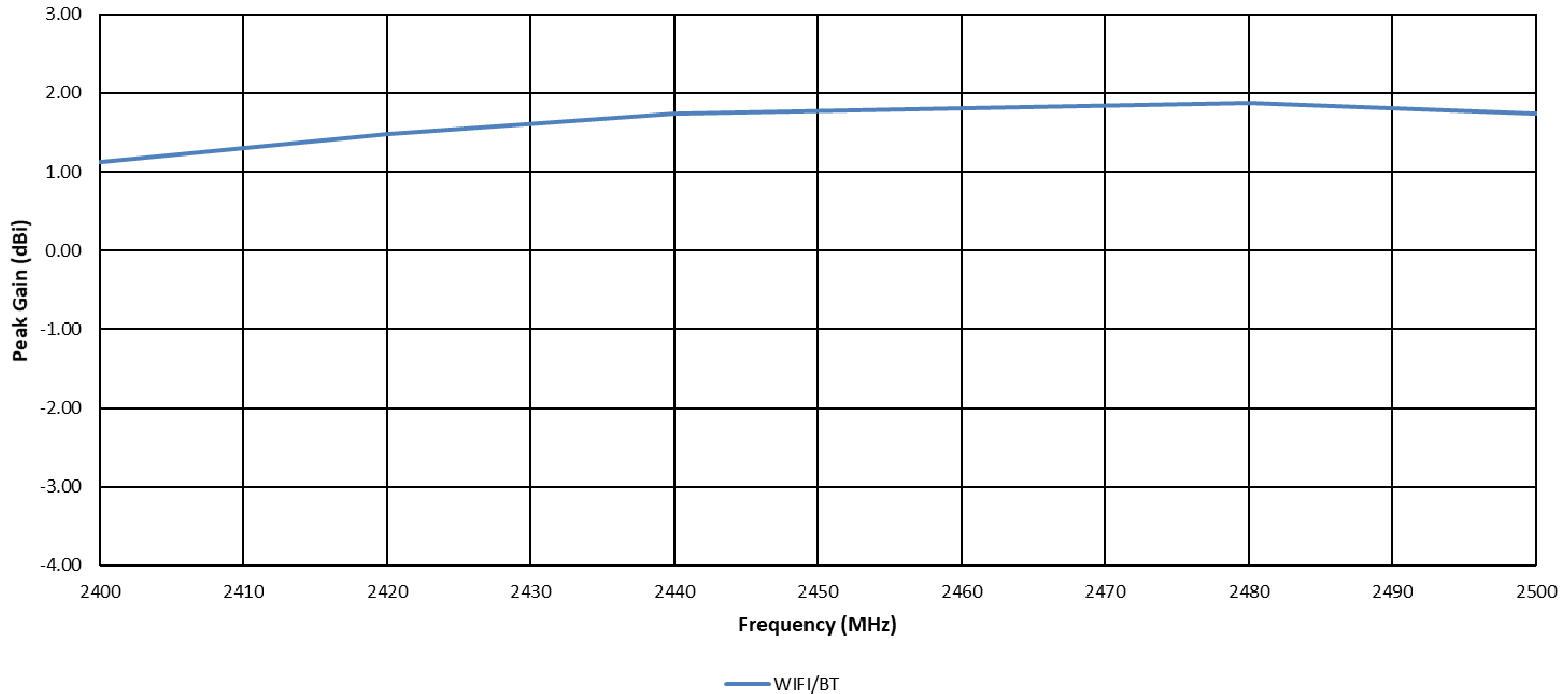
Peak Gain - GPS



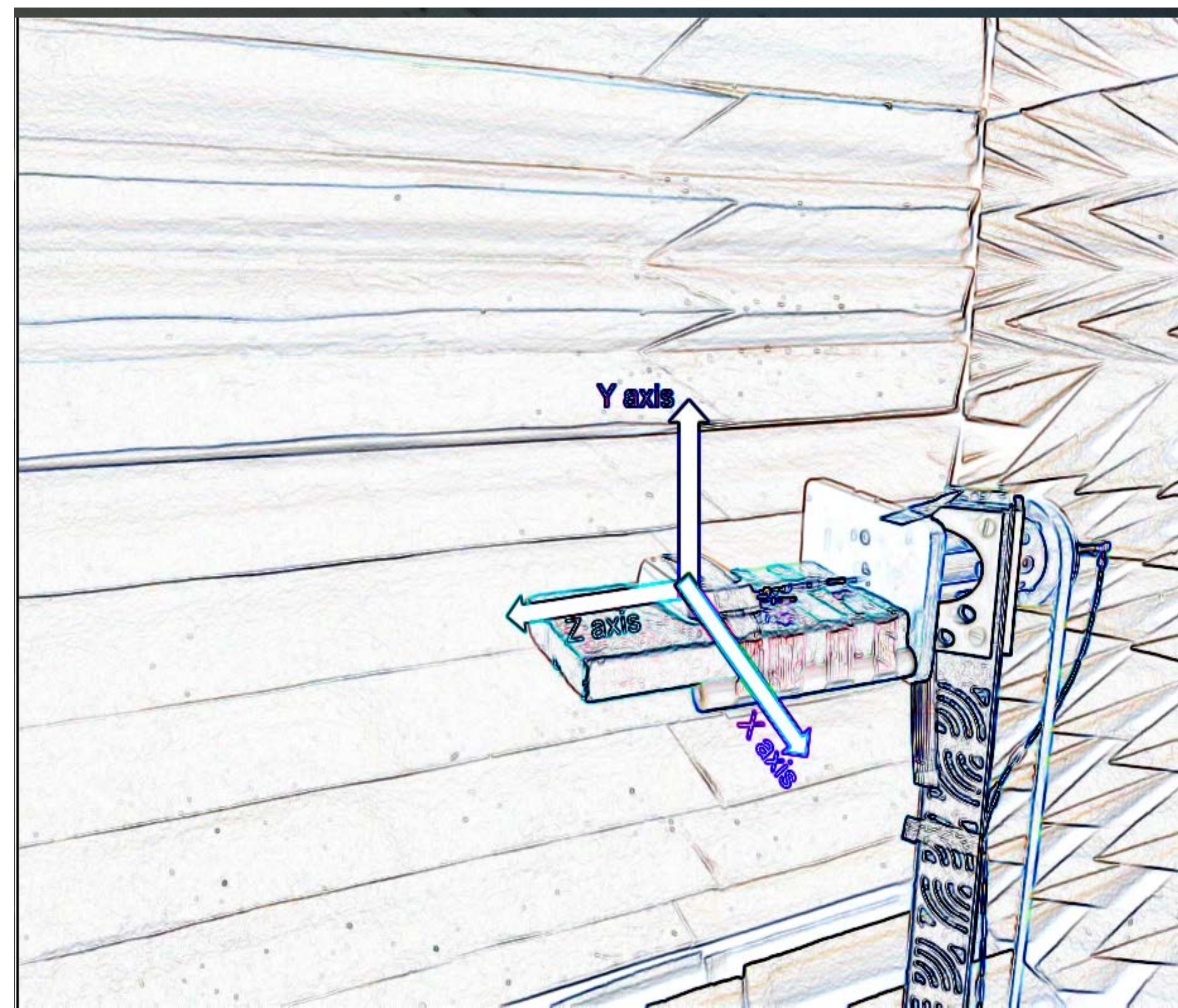
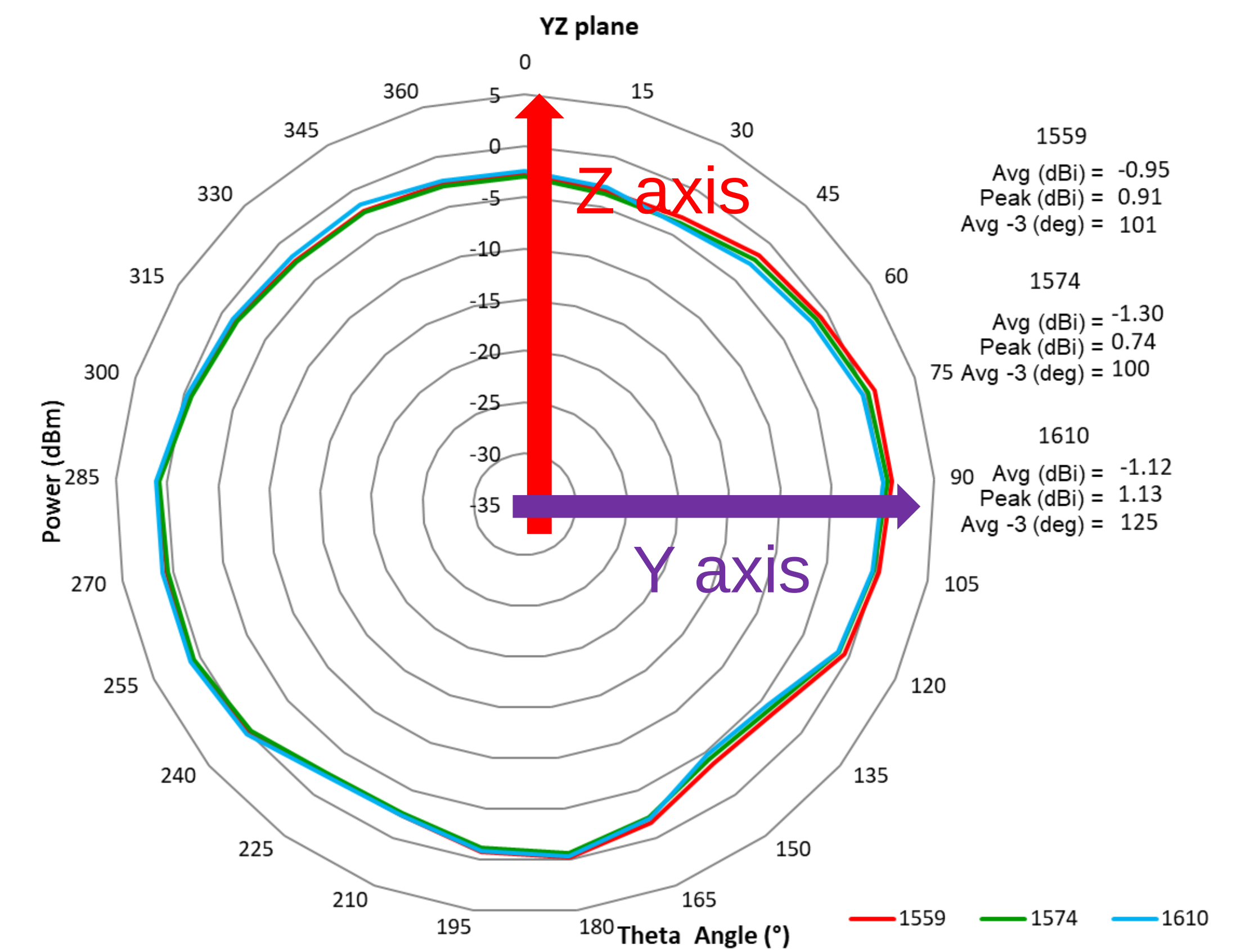
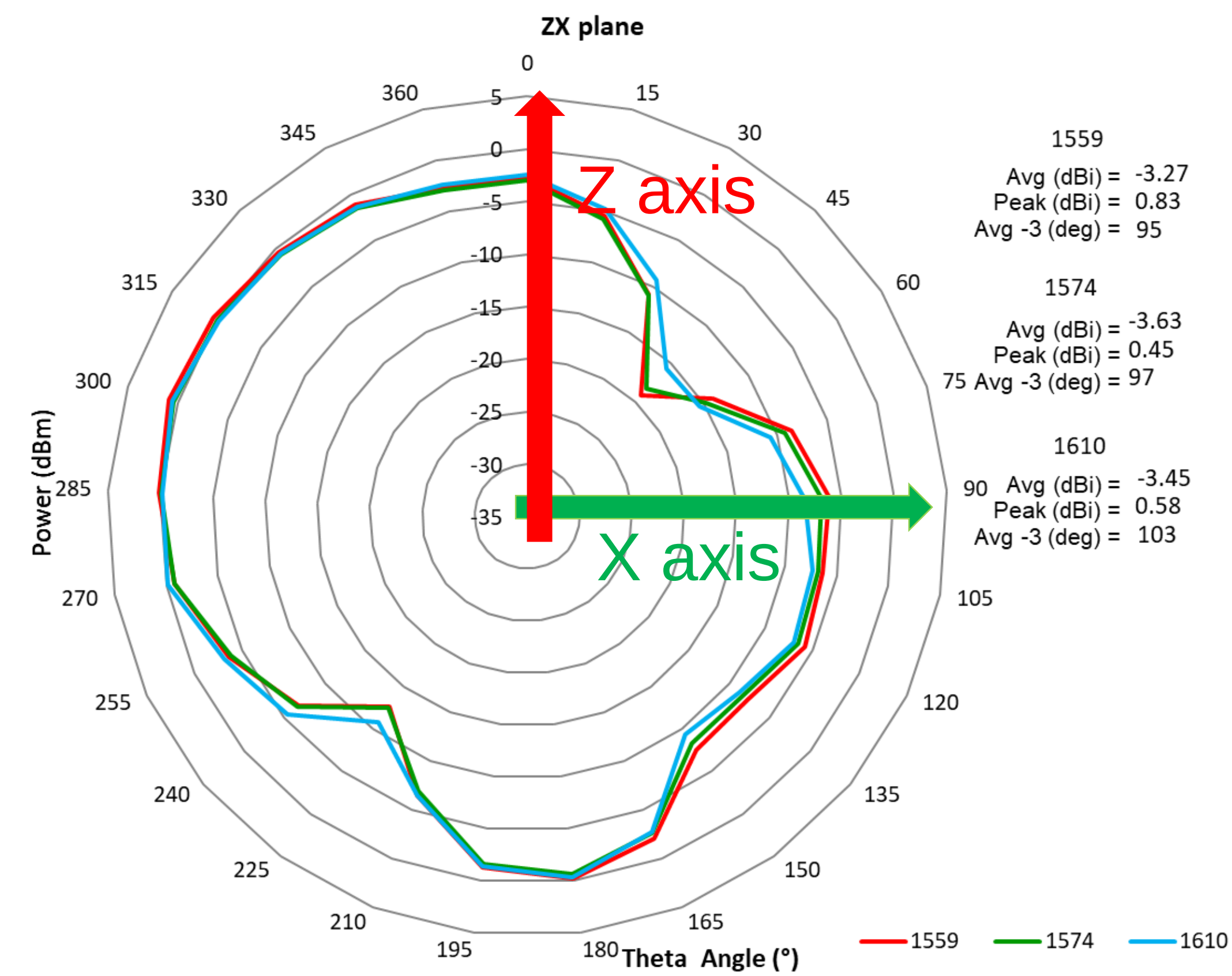
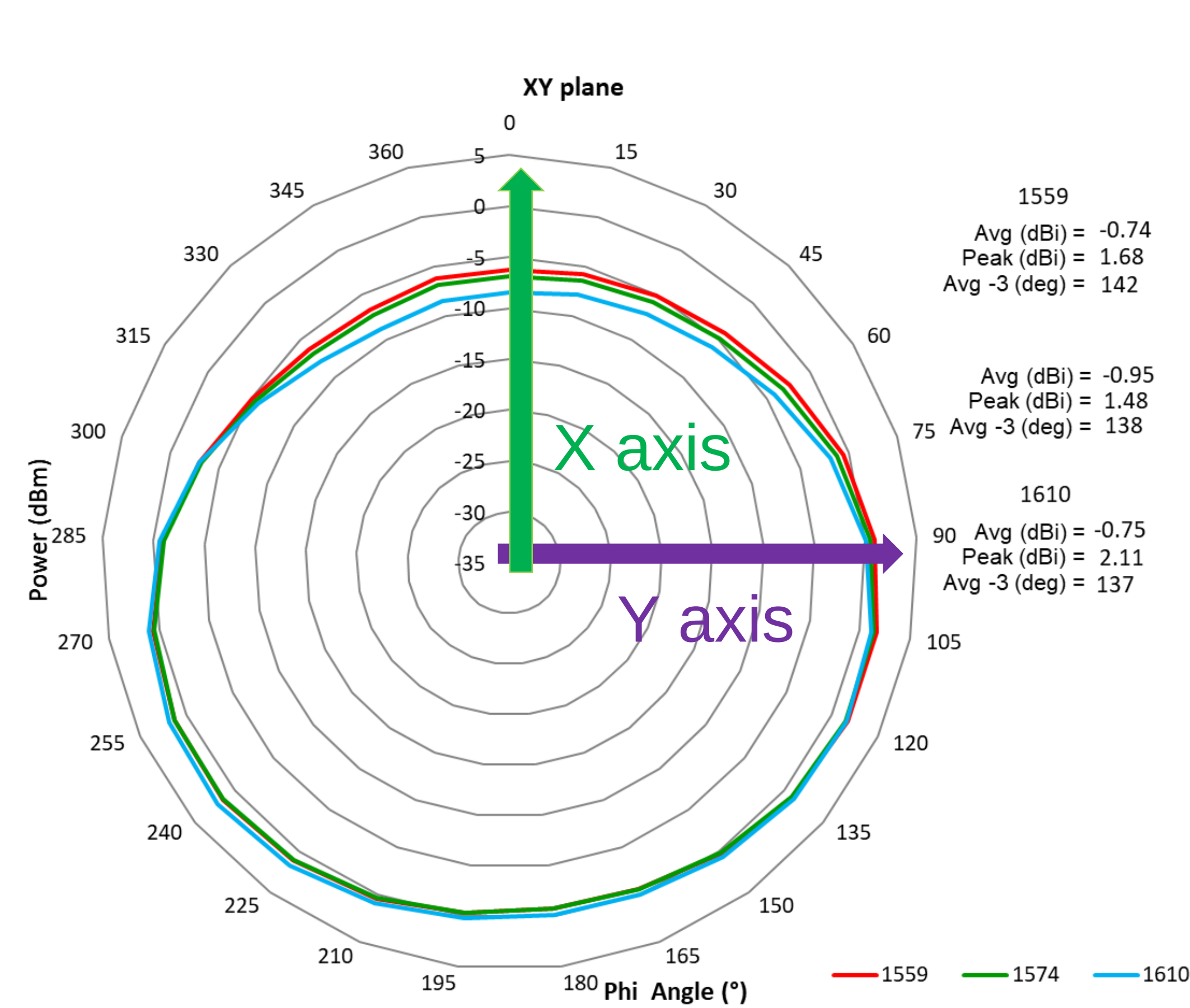
Peak Gain – BT

Peak Gain vs. Frequency

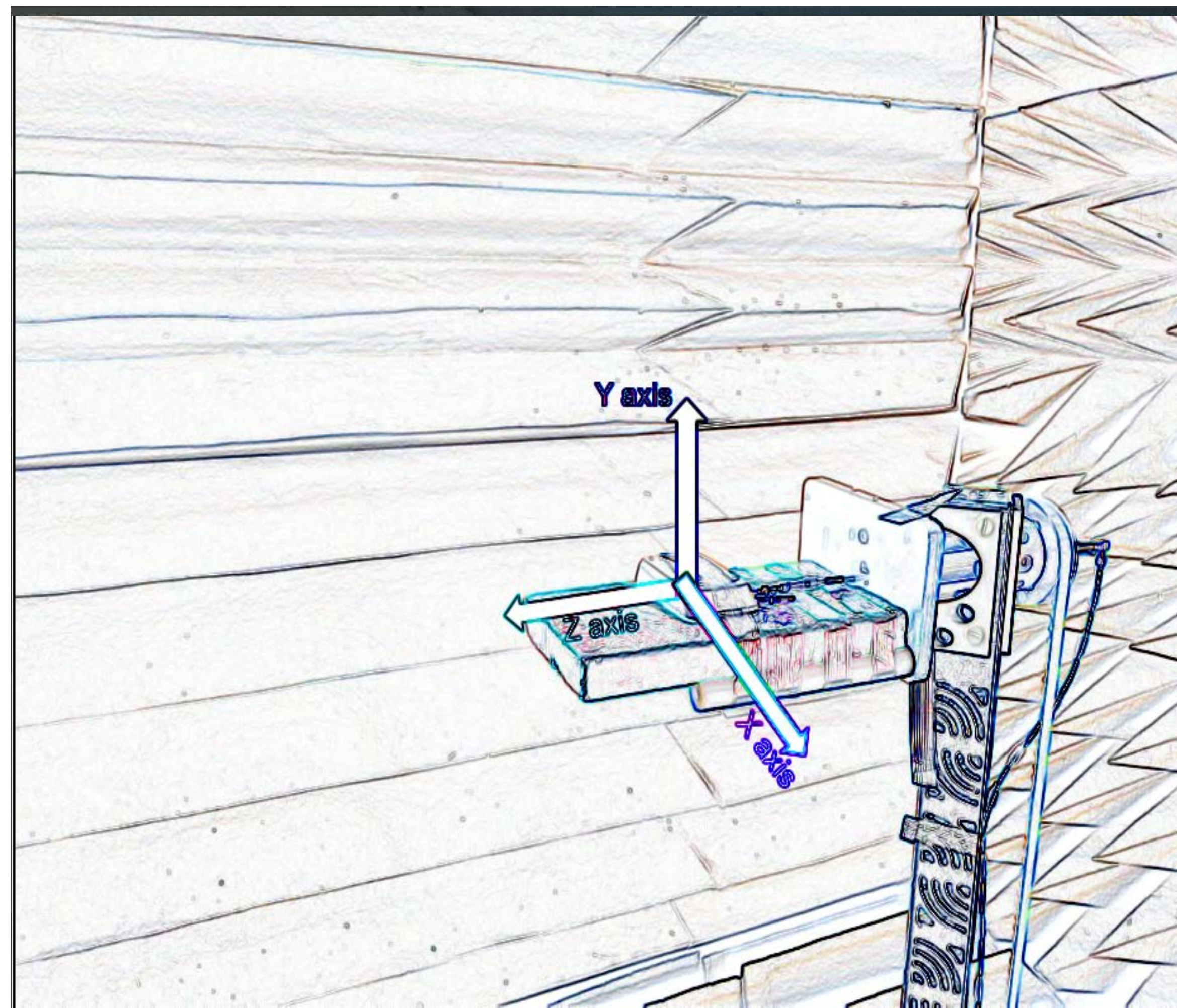
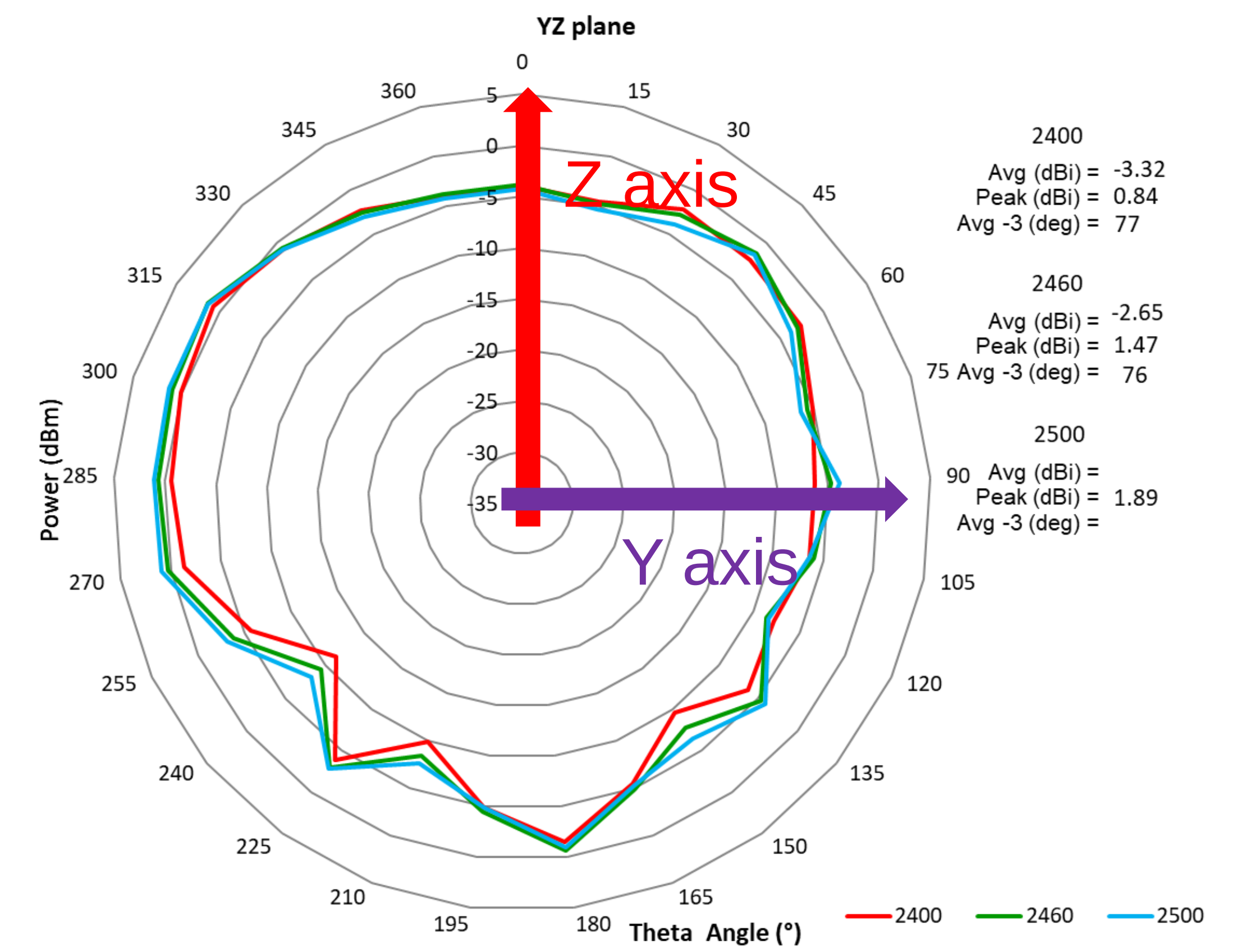
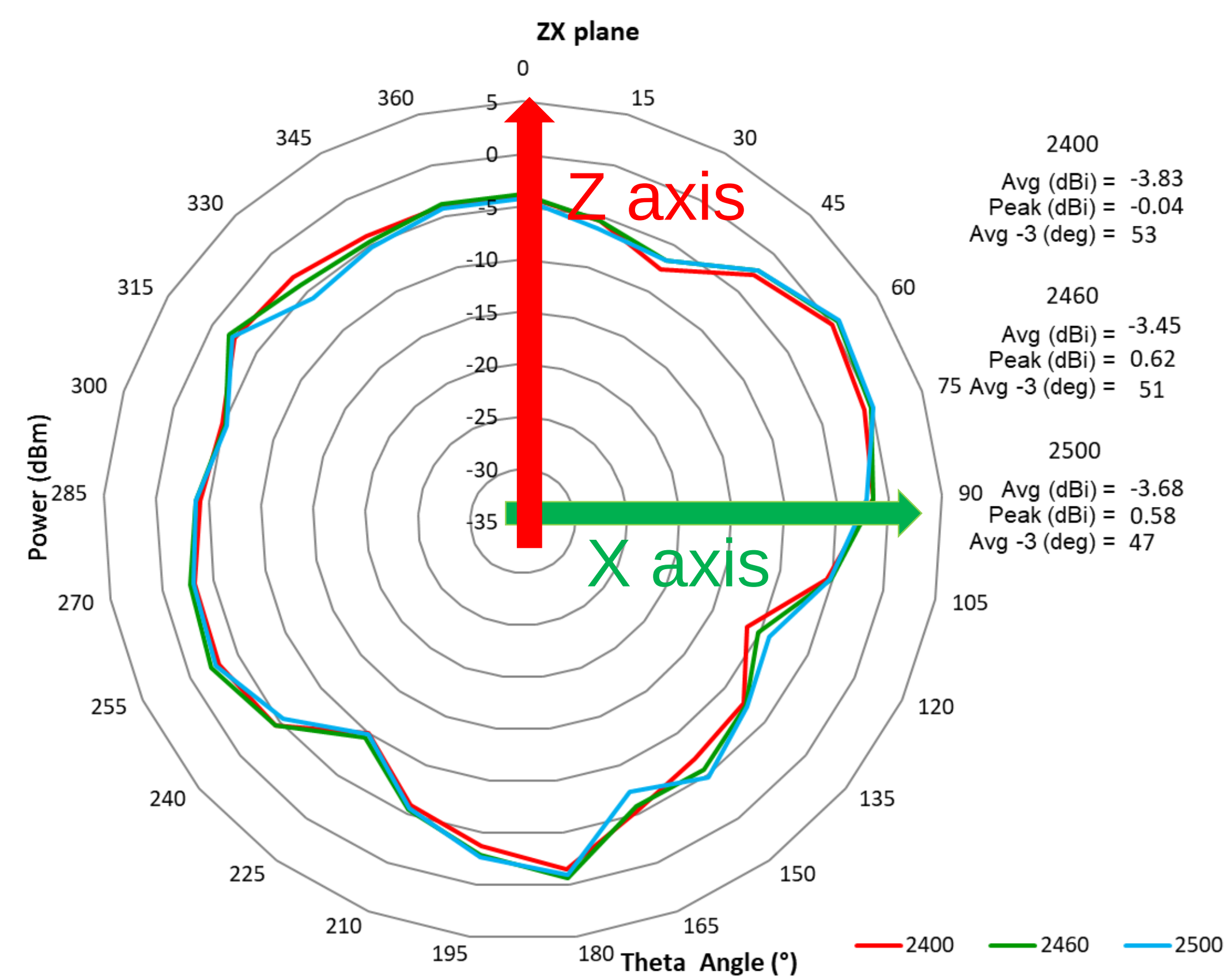
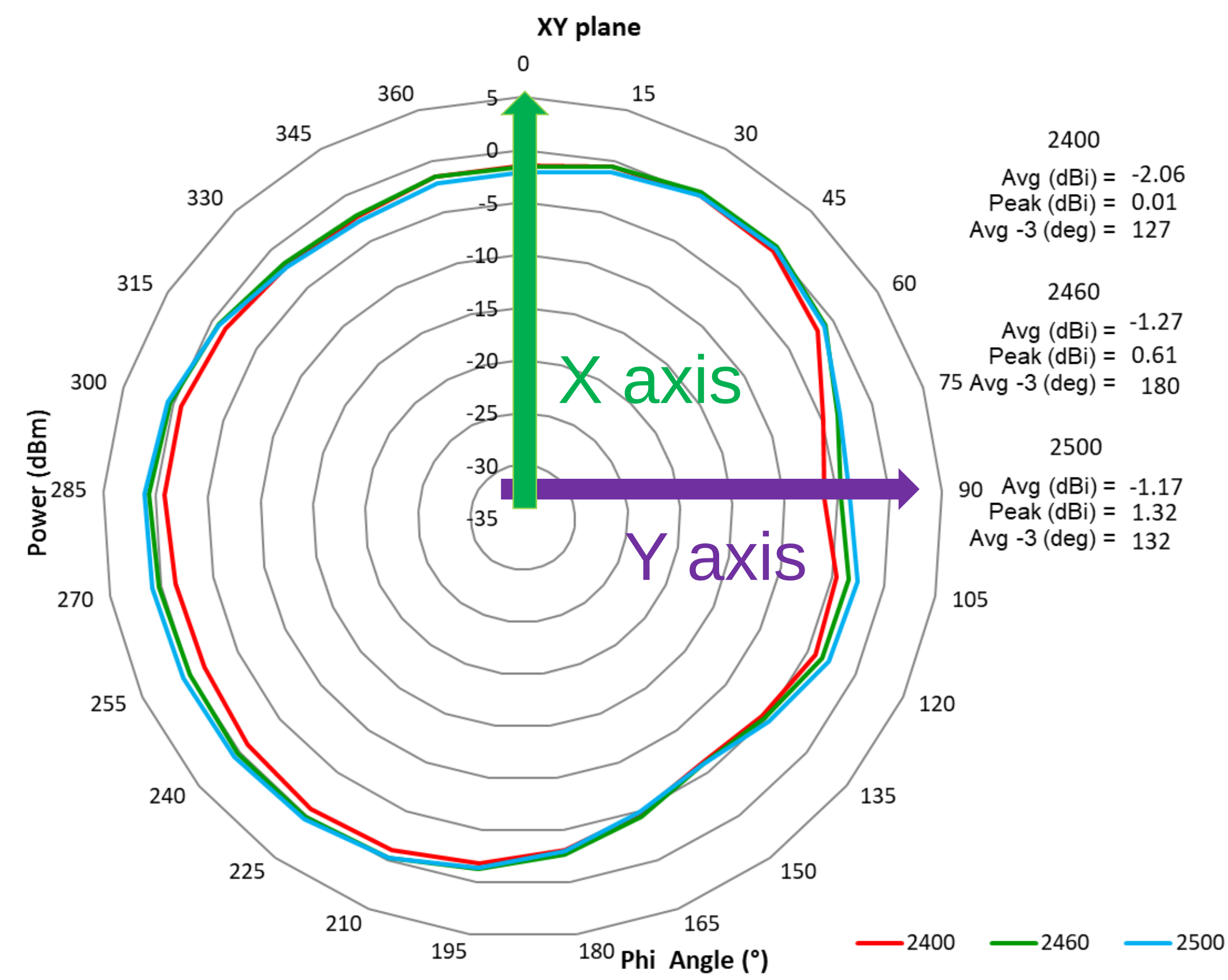
Measured at Pulse, USA - Jan. 22, 2019



Radiation Pattern - GPS



Radiation Pattern – BT



BT Antenna			
Frequency 频率(MHz)	Gain 增益(dBi)	Efficiency 效率(dBi)	Efficiency 效率(%)
2400	0.84	-4.15	51.44
2460	1.47	-4.10	49.90
2500	1.89	-3.77	53.00

Summary

- ❑ DVT2 device antenna performance looks good.
- ❑ The S-parameter is shifted little lower. However it falls within the bandwidth.
- ❑ No more antenna or matching circuit modification is needed.
- ❑ The GPS antenna has around 60-65% efficiency and 1.9-2.4 dBi peak gain.
- ❑ BT antenna has around 49-54% efficiency and 1.1-1.9 dBi peak gain.

Thanks



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MOD	Description	Reliability Test Spec according to WHS7.5.33 (Reliability Test Working Instruction) Default test standard is Test Standard A if no definition
P1	First Release	

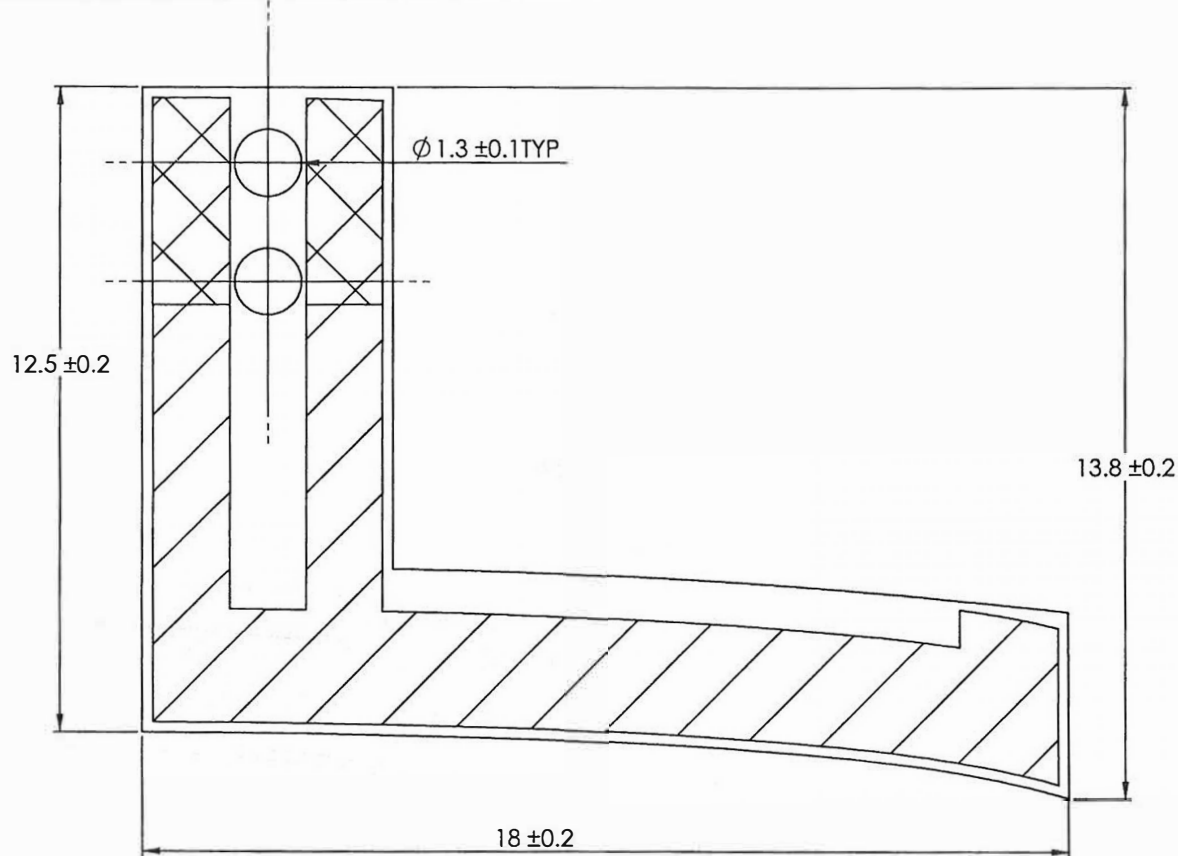
RoHS REQUEST						
ITEM	Cd	Hg	Pb	Cr6+	PBB	PBDE
PPM<	100	1000	1000	1000	1000	1000
OTHERS						

NOTES:

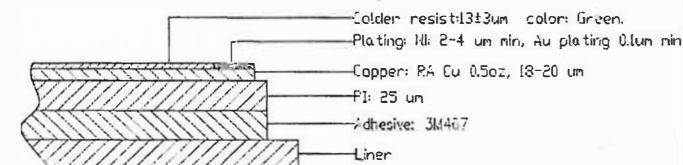
- ALL DIMENSIONS ARE IN MM.
- RoHS COMPLIANT
- RF TEST METHOD SHOULD BE APPROVED BY PULSE
- VISUAL QUALITY ACCORDING TO PULSE VISUAL STANDARD DOCUMENT GAP-Infra.-QA-002 CLASS III.
- ON PCB OUTLINE THE MAXIMUM BURR IS 0.2MM.
- ADHESIVE ON BACKSIDE OF THE ANTENNA. 3M467.

NOTES: UNLESS OTHERWISE SPECIFIED

1. INTERPRET THIS SPECIFICATION PER PULSE PQ: 7.004.000 AND STANDARDS REFERENCED THEREIN.
2. VISUAL QUALITY PER PULSE PQ 5.030.000 CLASS III
3. PRODUCT IS FREE FROM FINGERPRINTS, DUST, GREASE OR SIMILAR EXTERNAL AGENTS
4. ONLY DIMENSIONS WITH DIMENSION NUMBER NEED TO BE MEASURED



Material Stack up



PulseLarsen Antennas Vancouver, Washington	THIRD ANGLE PROJECTION	SHEET NUMBER	SHEET 1 OF 1		
	SCALE	GENERAL TOLERANCE			
	10:1	CUSTOMER NUMBER			
		DESIGN	E.Johnson	102218	
PRODUCT(S)	W3412	CHECKED			
ITEM	FPC, BLUETOOTH, ROAM	APPROVED			
		DOCUMENT NUMBER	W3412	PART VERSION	V02
		DOCUMENT VERSION	P1	MOD	11/26/18
				DATE	JOHNSON
				NAME	

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Functional Characteristics Key (Cpk requirement: 1.33+)

- Process Capability Studies required (total pcs)
- Ongoing Statistical Process Control Required (total pcs)
- Critical dimension need to be measured, no CPK requirement (total pcs)