



EXTERNAL 900 MHZ ANTENNA

Measurement Report
01-16-2026 V2

Purpose of Report: Measurement Data Report of the external 900MHz Antenna with Housing

www.fieldtheoryinc.com

Outline:

- Testing Conditions
- DUT Photos
- Summary
- 900 MHz Antenna 1 and 2
 - Passive Efficiency
 - Peak Gain
 - 1D Radiation Patterns
 - 2D Heat Maps and 3D Spherical
- WiFi Antenna
 - Passive Efficiency
 - Peak Gain
 - 1D Radiation Patterns
 - 2D Heat Maps and 3D Spherical



Testing Conditions

Field Theory Setup

Test Conducted	Passive RF measurements of 900 MHz External Antennas with housing.
Equipment Used	3-meter anechoic antenna chamber equipped with a dual-pol quad-ridge horn receiver antenna and an EL-AZ positioner with laser positioner
Notes on DUT	

Equipment	Manufacturer	Model No.	Serial No.	last Cal.	Due Date
Network Analyzer	Anritsu	MS46122B	2135304	7/10/2025	11/10/2025
Quad-Ridge Horn Antenna	ETS-Lindgreen	3164-10	217936	7/10/2025	11/10/2025
3 Meter Anechoic Chamber	Braden Shielding Systems	NA	F70331	NA	NA
RF Cable	ENS Microwave	S160-160-MKS-MKS	3042020	7/10/2025	11/10/2025
RF Cable	ENS Microwave	S160-120-MKS-MKS	12042018	7/10/2025	11/10/2025
RF Cable	ENS Microwave	EMC1-K1K1-72	1GVT4 19002201	7/10/2025	11/10/2025
RF Cable	ENS Microwave	EMC1-K1K1-72	1GVT4 19002202	7/10/2025	11/10/2025
RF Cable	ENS Microwave	EMC1-K1K1-216	1GVT4 19002202 001	7/10/2025	11/10/2025
RF Cable	ENS Microwave	EMC1-K1K1-216	1GVT4 19002202 002	7/10/2025	11/10/2025
DUT Positioner	DE LCC	D6025	NA	NA	NA
RF Switch	Mini-Circuits	RC-1SPDT-A18	1810010005	7/10/2025	11/10/2025

Testing Information

Field Theory Setup

Antenna Type	1. Low Frequency Range (Sub 1GHz-US)-Dipole 2. WiFi Antenna-PCB Antenna-PiFa
Connector	SMA Pigtail
Model Name	Passive model in Free Space
Test Lab Company	Field Theory Consulting Inc.
Address	1029 Butterfield Road, Vernon Hills, IL 60061
Person	Zabed Iqbal
Commercial Test Software	Antenna Measurement System
Polarization	Linear

Test Procedure:

Test Conditions

Results were collected from a passive antenna measurement within a 5-meter fully anechoic antenna chamber equipped with a dual-pol quad-ridged horn receiver antenna and an EL-AZ positioner with laser positioner.

Test Conducted	Passive
DUT SN/PN	Prototype units

Formula & Calculations

Gain: $G_{AUT} = \frac{[S_{21}^2]}{[G_{REF}]} \left(\frac{\lambda}{4\pi d}\right)^{-2}$

Efficiency: $\epsilon = \frac{\pi}{2NM} \sum_n \sum_m \frac{S_{21}^2(\theta_n, \phi_n)}{P_t G_t} \cos(\phi_n)$



FULLY ANECHOIC 3 METER
ANTENNA CHAMBER



External Antenna 900 MHz

Summary

Sub 1GHz Antenna

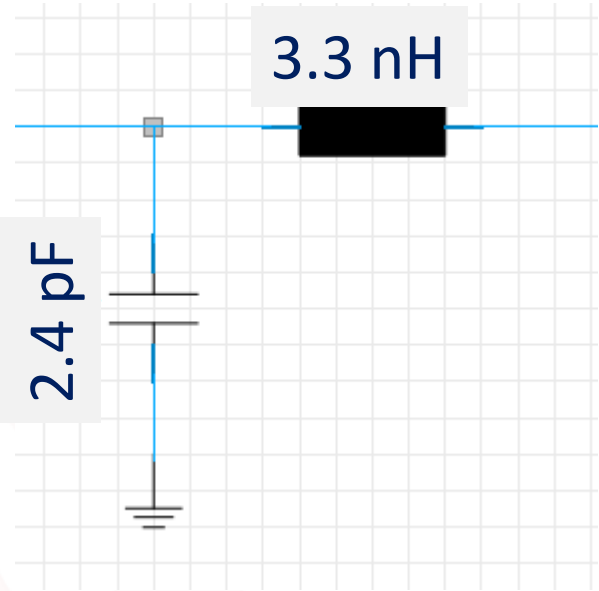
Frequency (MHz)	Efficiency (%)				Peak Gain (dBi)			
	Ant 1 Baseline	Ant 1 (2mm cut +LPF)	Ant 2 Baseline	Ant 2 (2mm cut +LPF)	Ant 1 Baseline	Ant 1 (2mm cut +LPF)	Ant 2 Baseline	Ant 2 (2mm cut +LPF)
902	77.0	82.0	77.0	86.0	2.10	2.20	1.80	2.14
915	78.0	84.0	78.0	86.0	2.20	2.30	1.90	2.15
928	75.0	85.0	76.0	85.0	2.40	2.60	2.05	2.40

WiFi Antenna

Frequency (MHz)	Efficiency (%)	Peak Gain (dBi)
2400	88.79	3.56
2440	92.83	4.69
2480	90.88	5.04

LPF Matching

900 MHz antenna 1 & 2



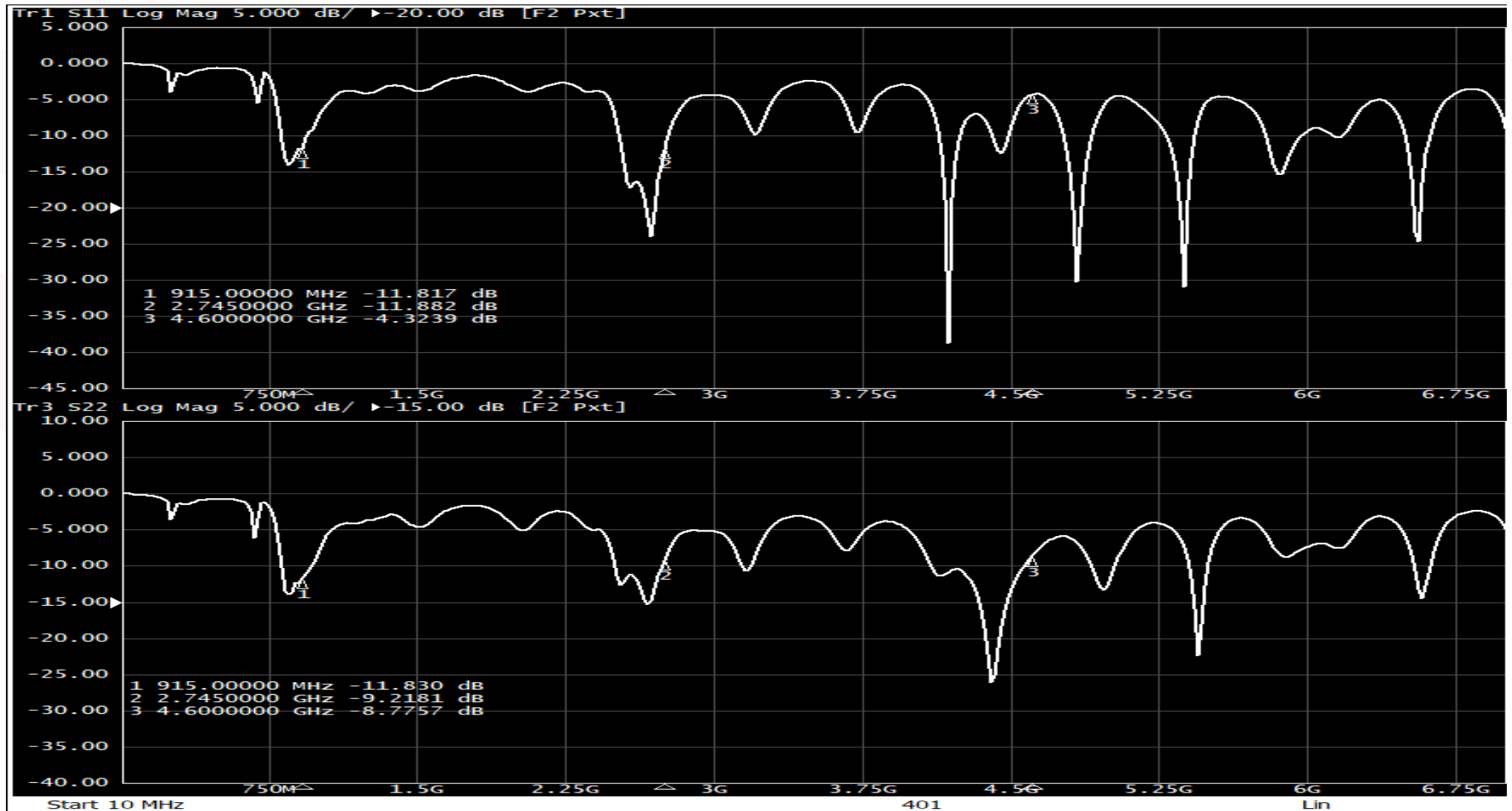
Antenna side

Name	Value	Part Number
C	2.4 pF	GJM0335C1H5R0BB01
L	3.3 nH	LQP03HQ1N0H02D

S-parameter

Baseline-External 900 MHz

Ant 1

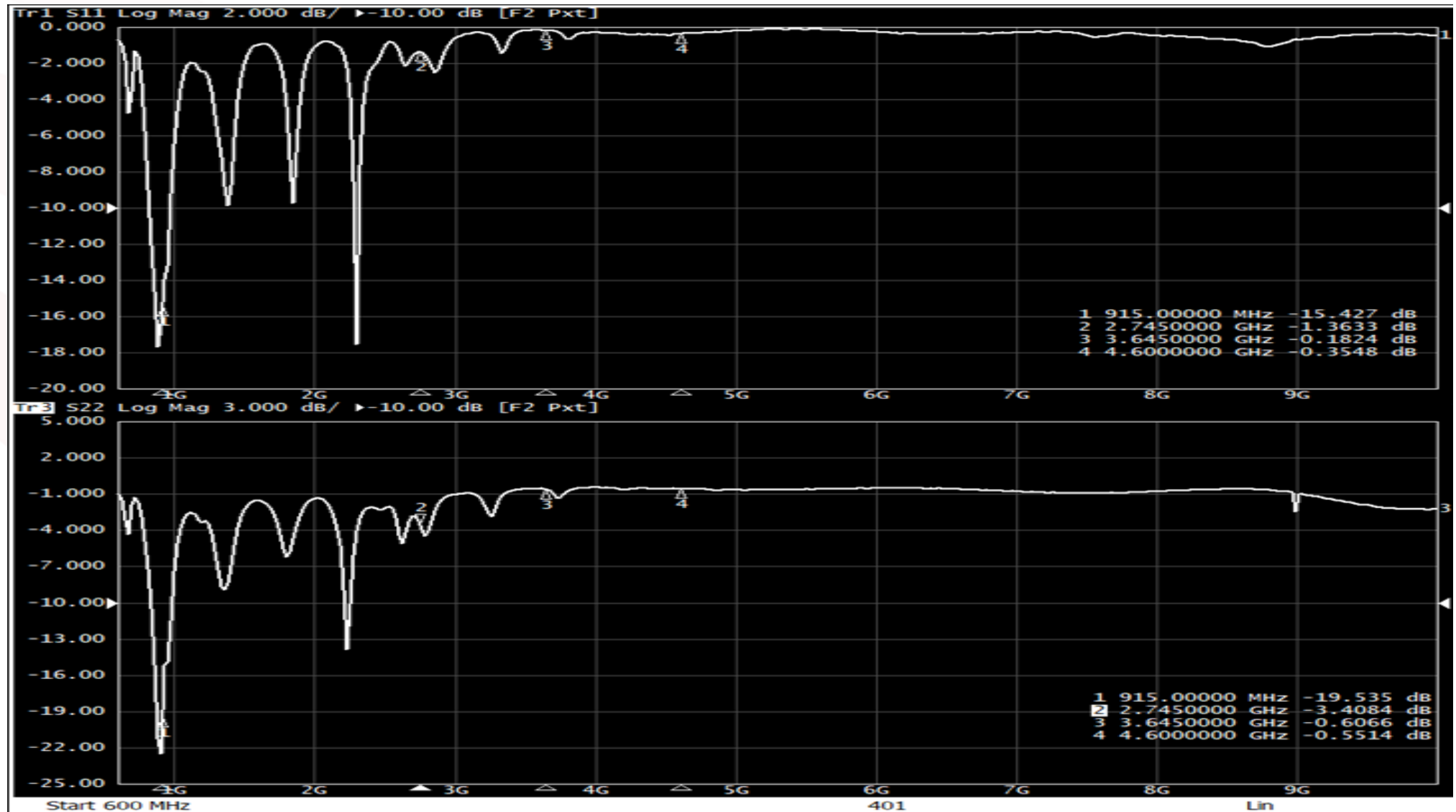


Ant 2

S-parameter

With LPF+2mm cut-External 900 MHz

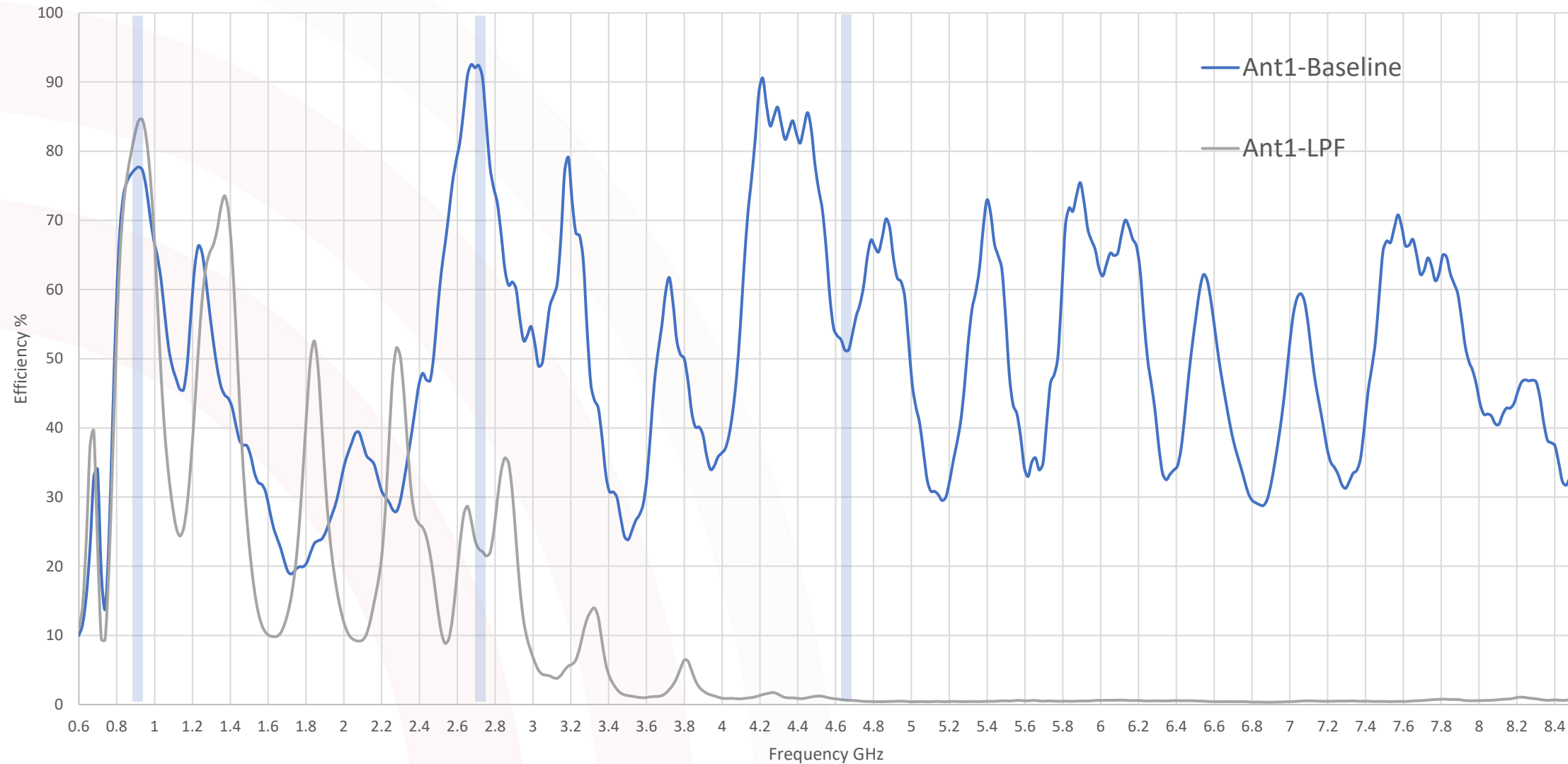
Ant 1



Ant 2

Passive Efficiency

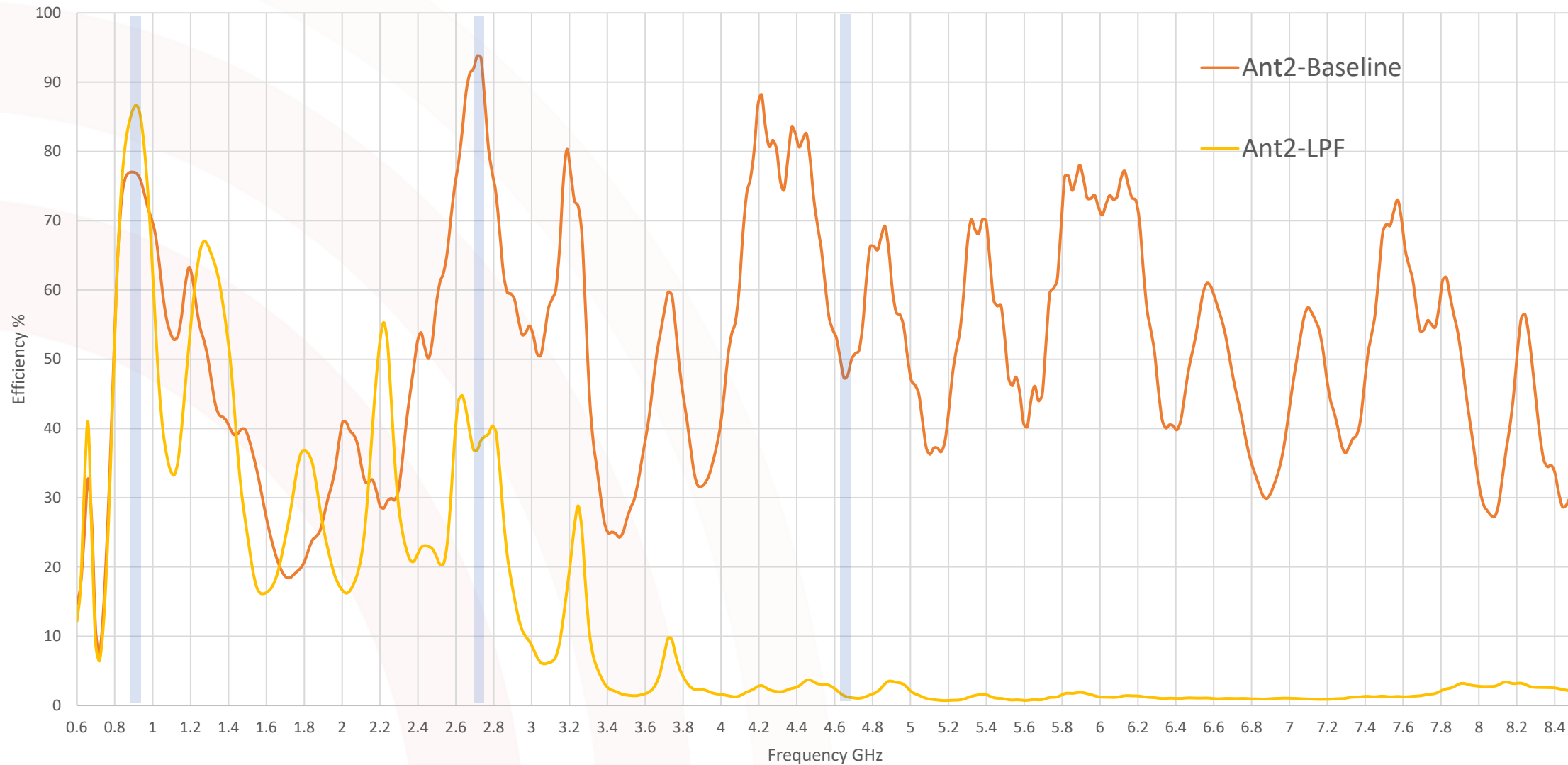
External 900 MHz Antenna 1



CONFIDENTIAL

Passive Efficiency

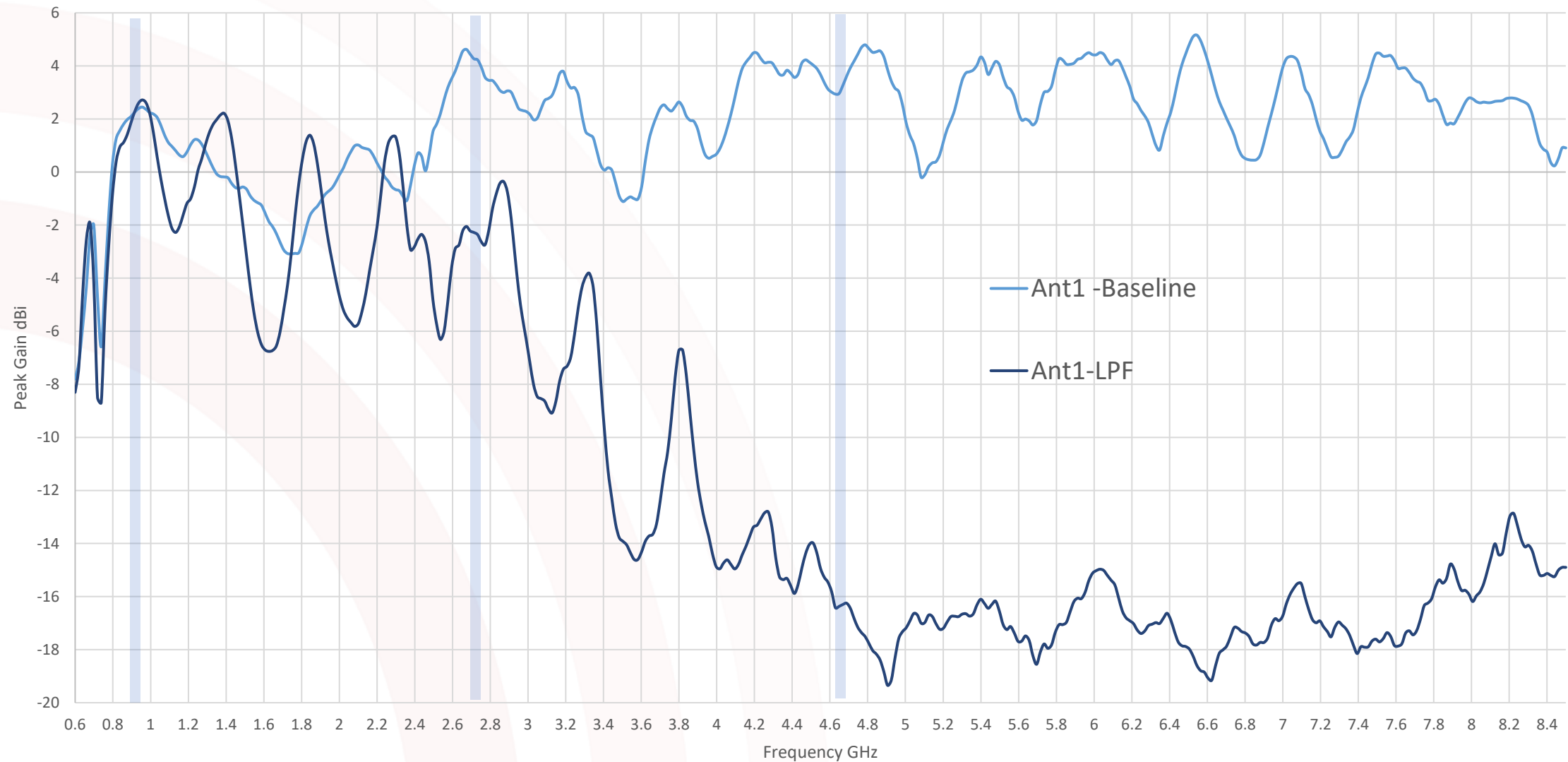
External 900 MHz Antenna 2



CONFIDENTIAL

Peak Gain

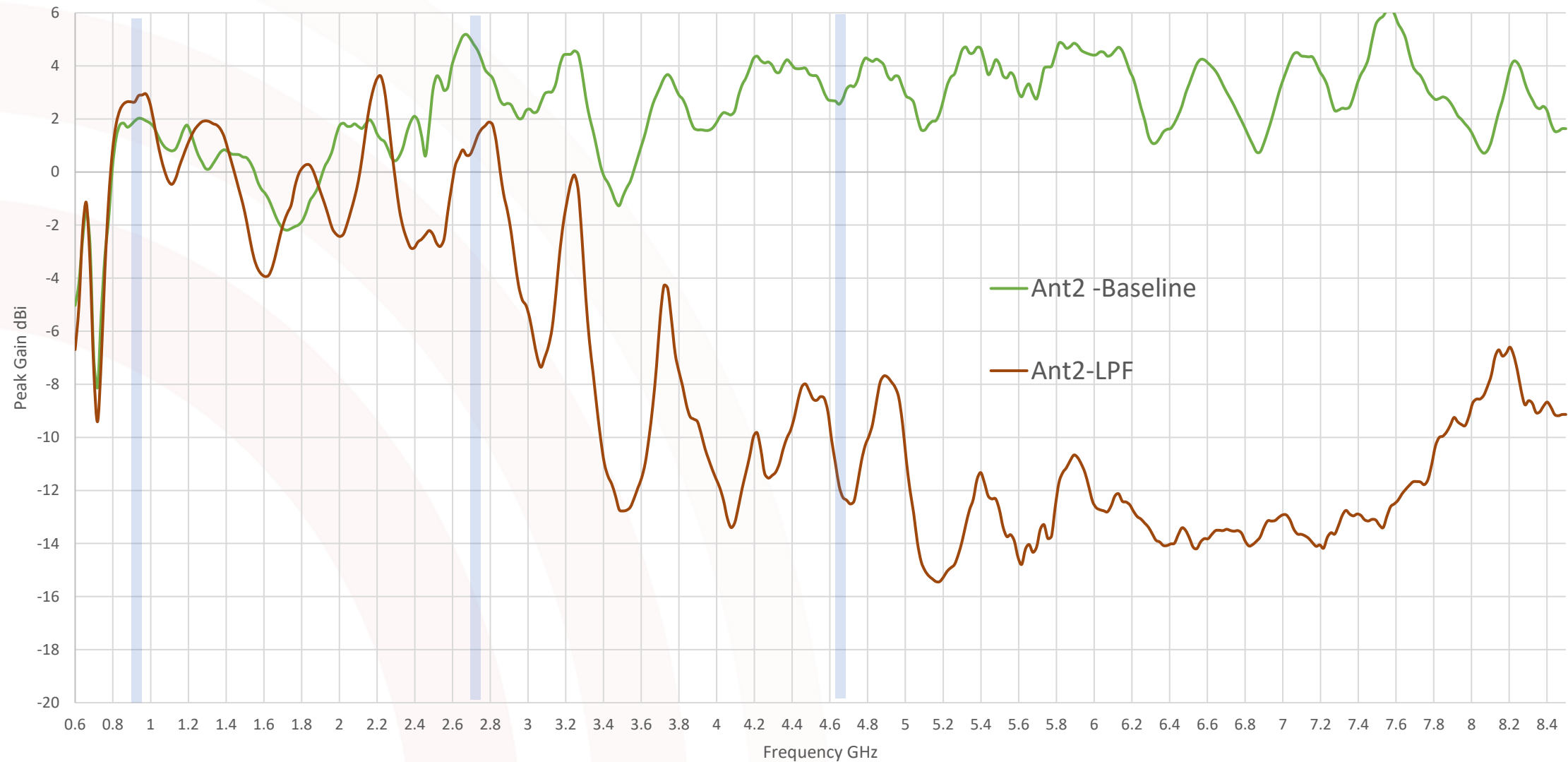
External 900 MHz Antenna 1



CONFIDENTIAL

Peak Gain

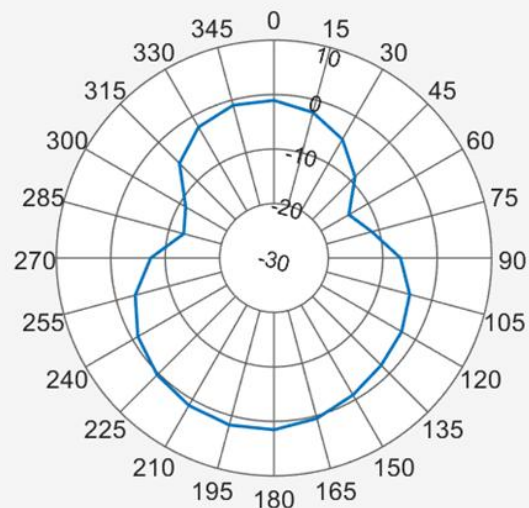
External 900 MHz Antenna 2



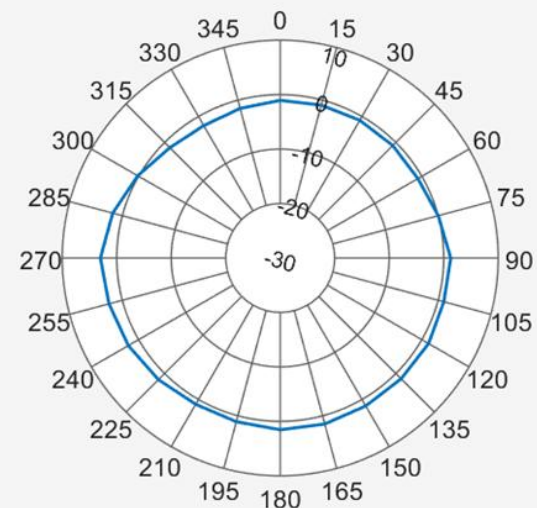
CONFIDENTIAL

2D Heat map and 3D Radiation Pattern

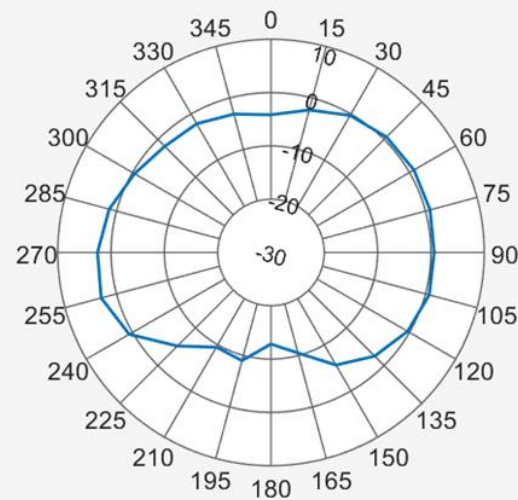
External 900 MHz –Ant 1



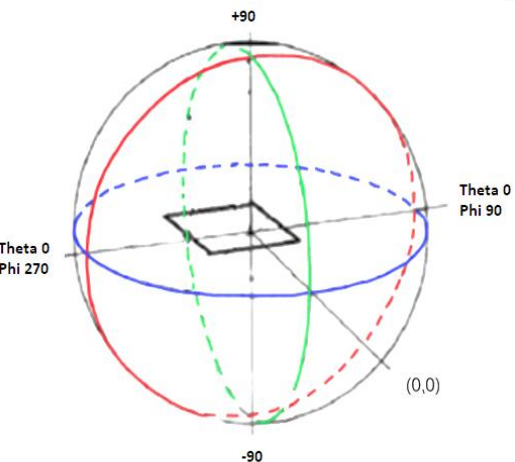
BLUE



GREEN

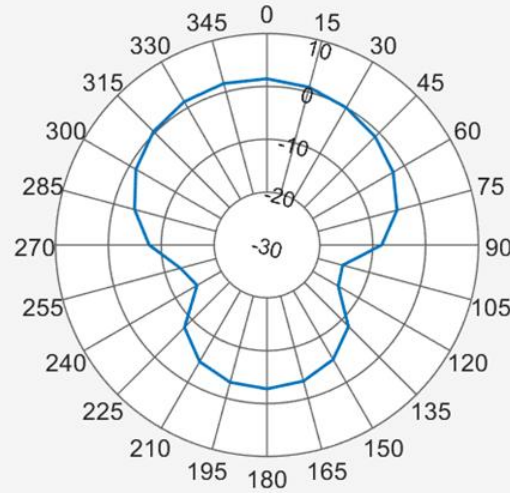


RED

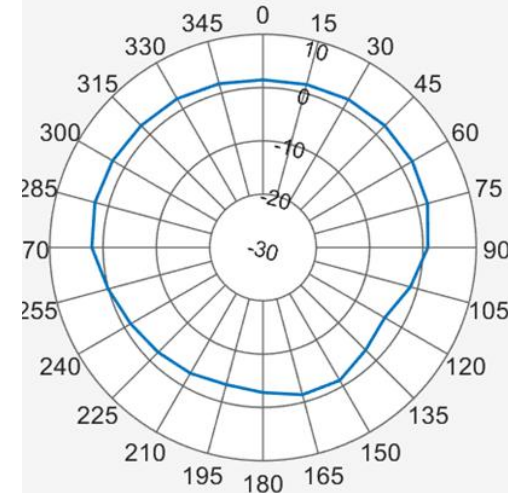


2D Heat map and 3D Radiation Pattern

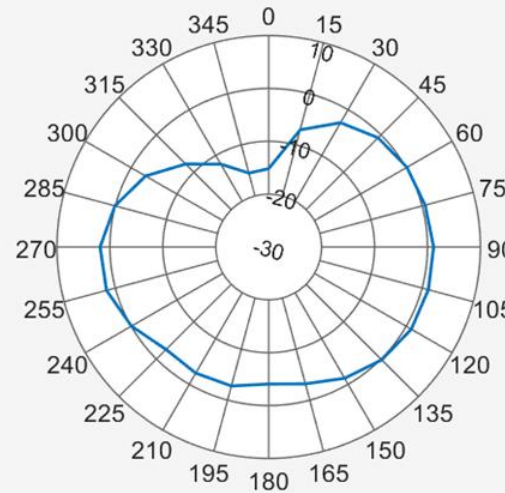
External 900 MHz –Ant 2



BLUE

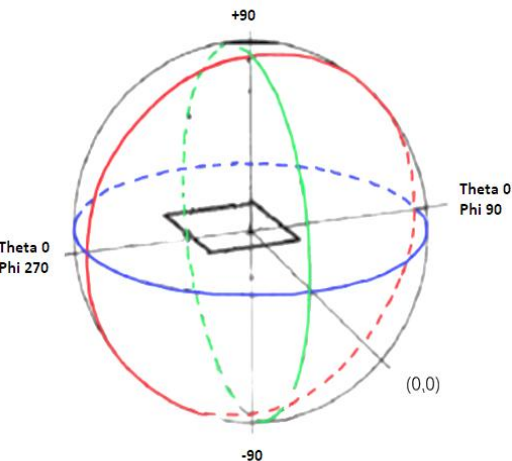


GREEN



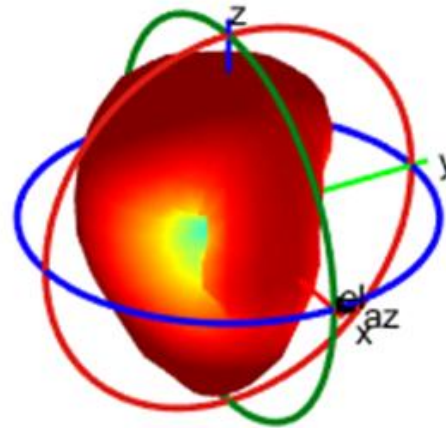
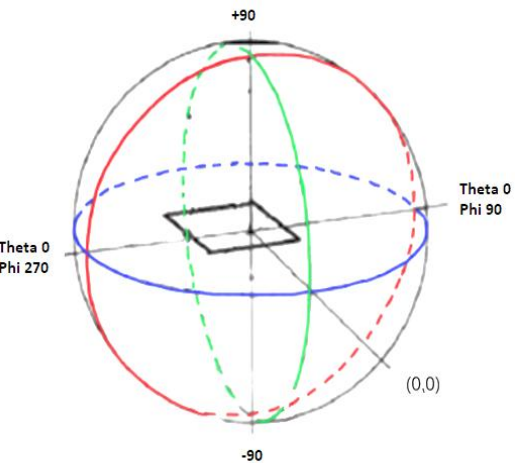
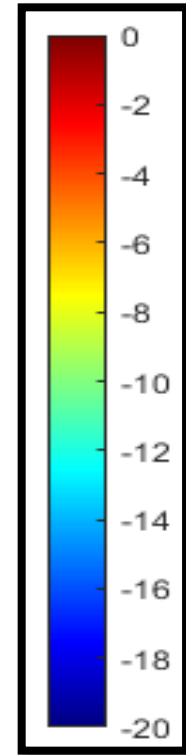
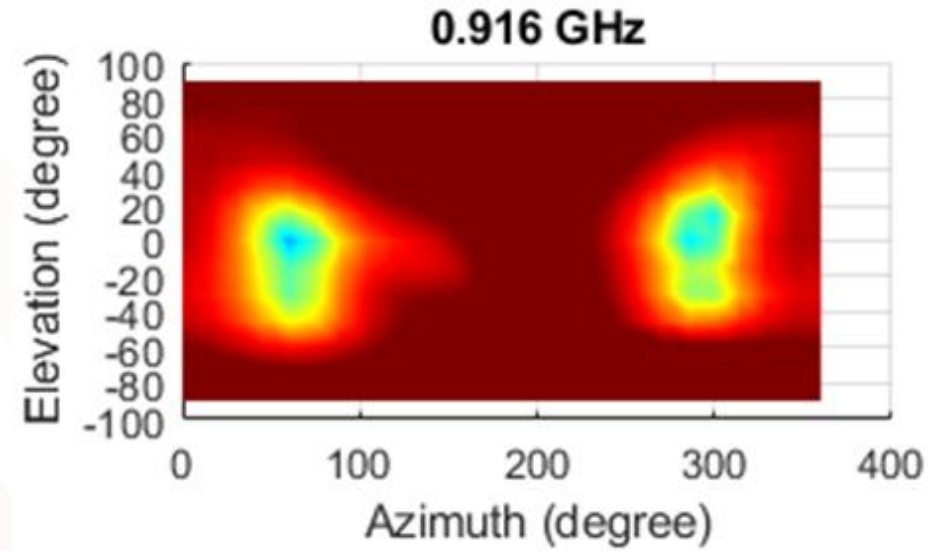
RED

CONFIDENTIAL



2D Heat map and 3D Radiation Pattern

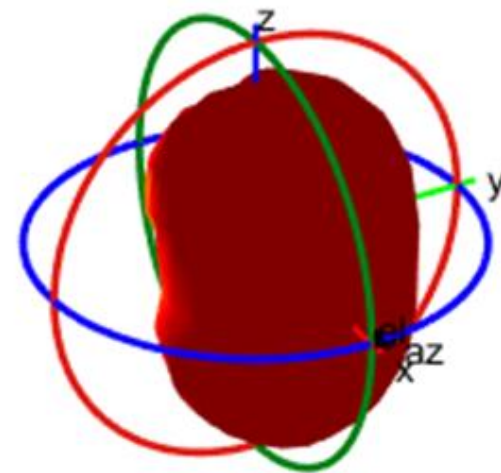
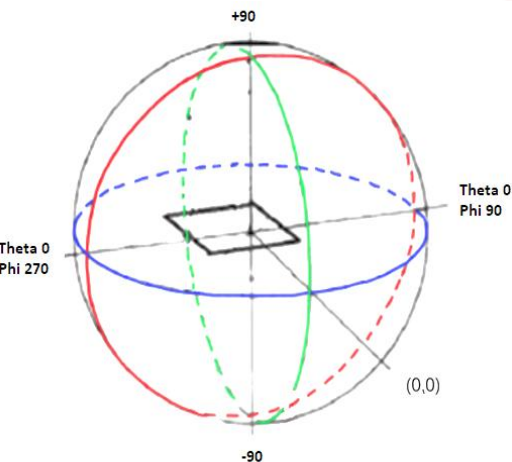
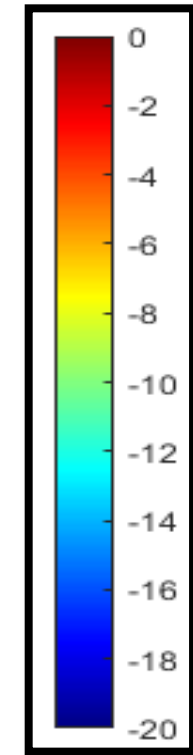
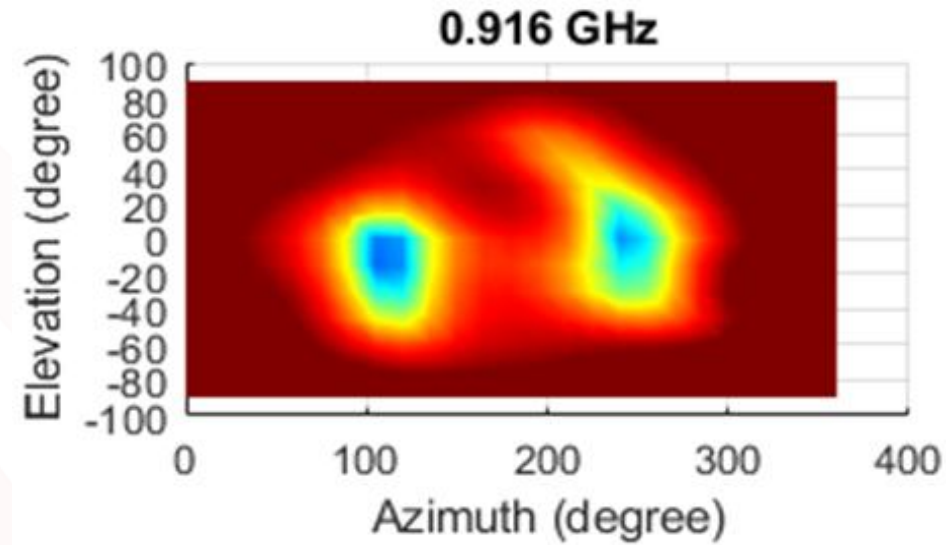
915 MHz-Ant 1



CONFIDENTIAL

2D Heat map and 3D Radiation Pattern

915 MHz-Ant 2



CONFIDENTIAL



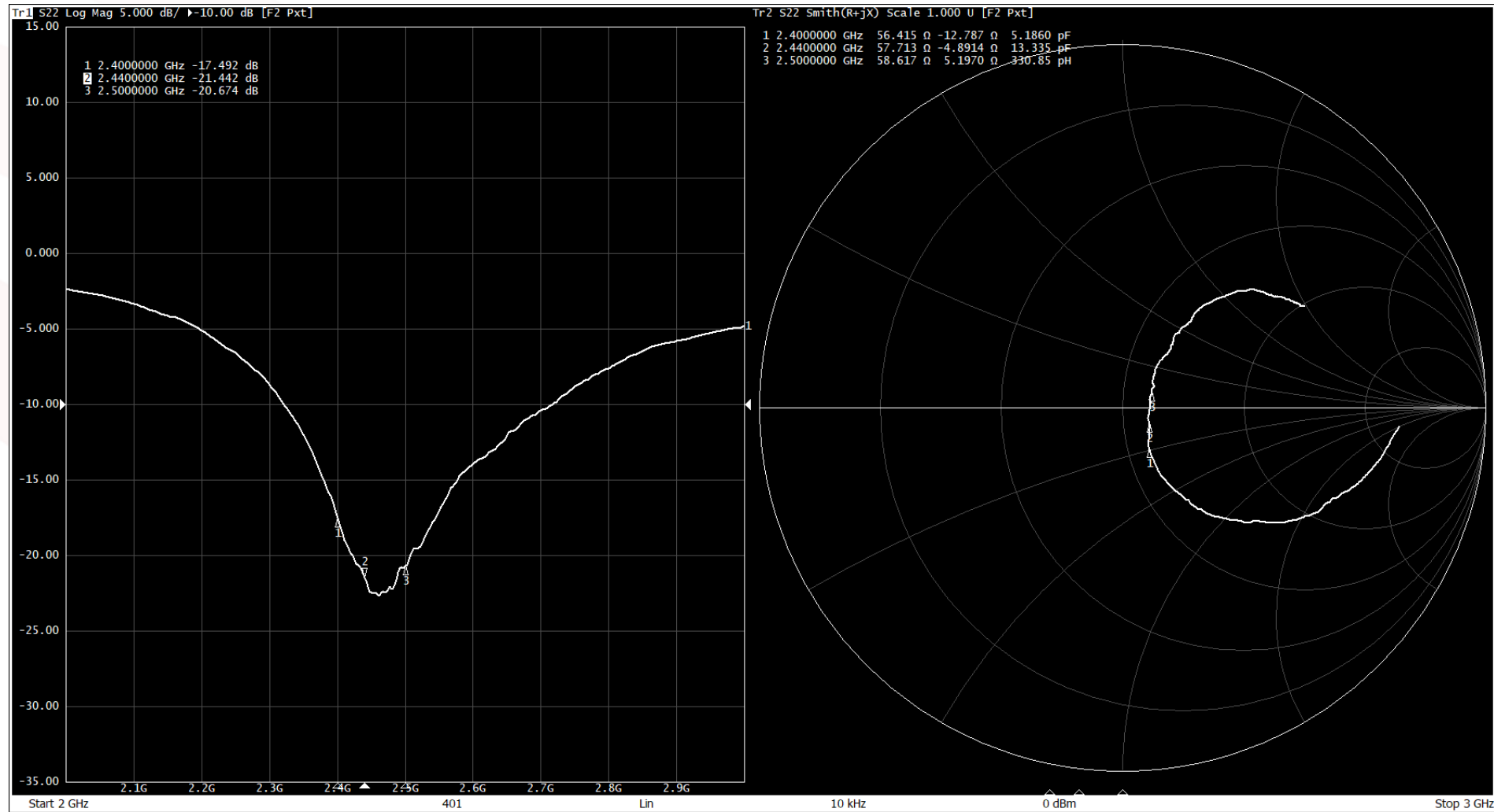
FULLY ANECHOIC 3 METER
ANTENNA CHAMBER



WiFi Antenna

S-parameter

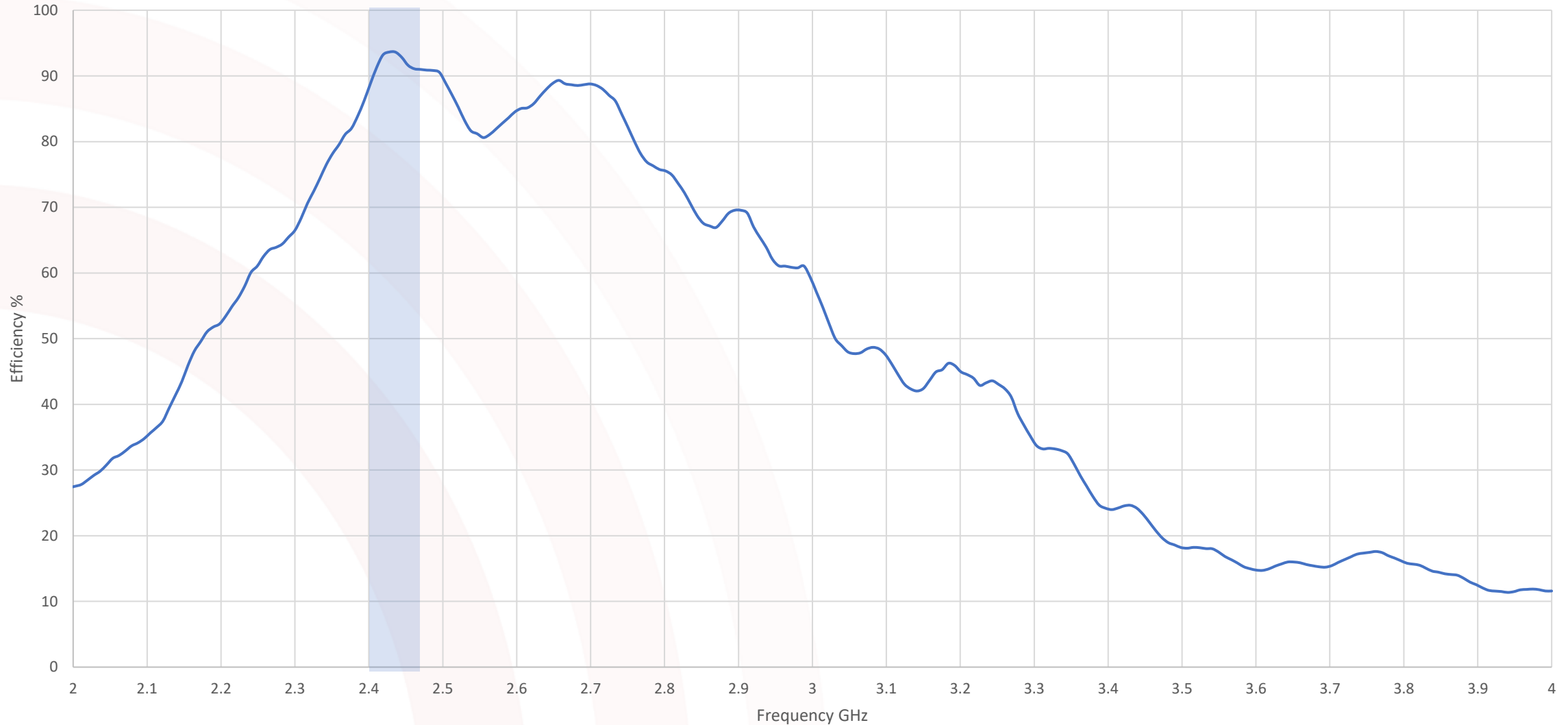
WiFi



CONFIDENTIAL

Passive Efficiency

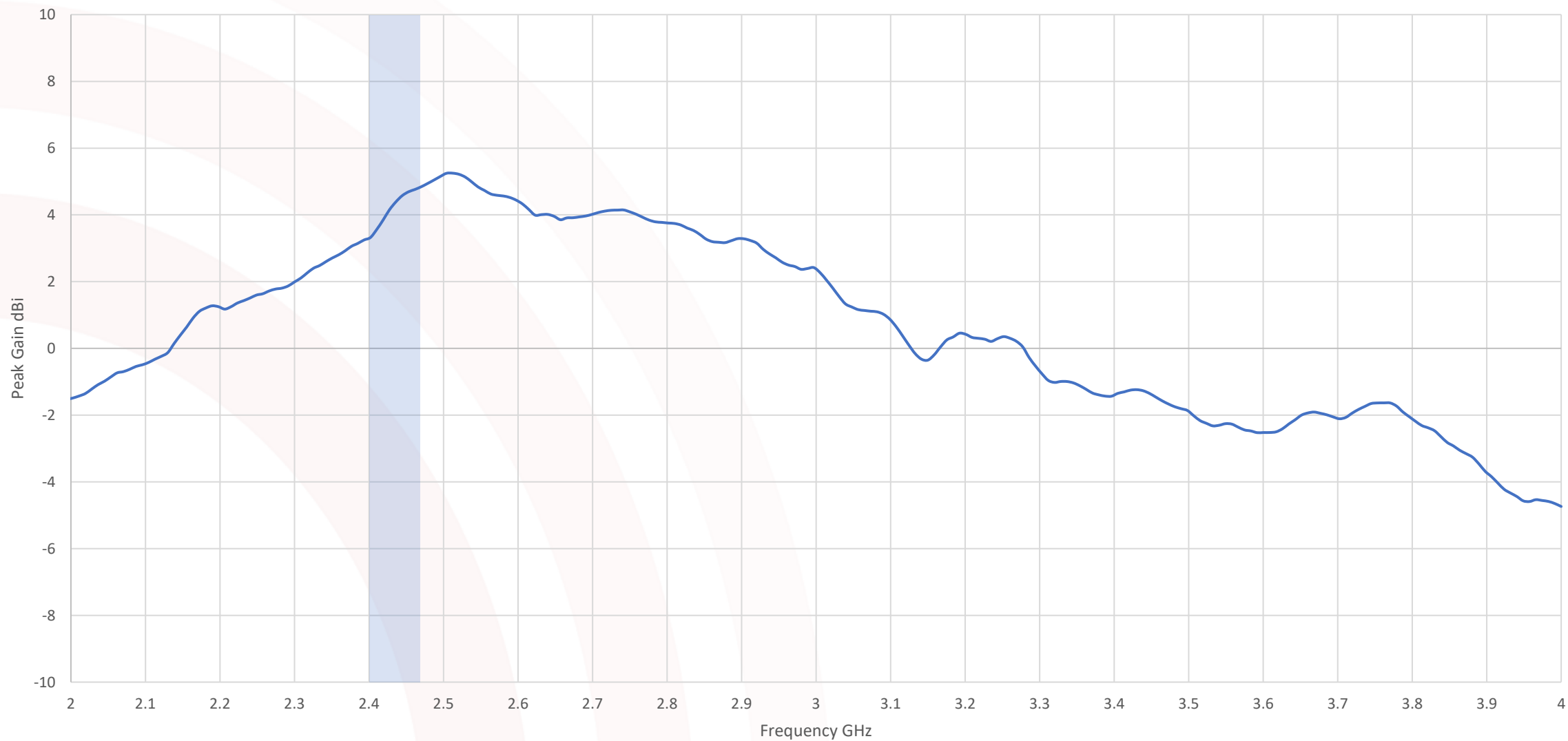
WiFi Antenna



CONFIDENTIAL

Peak Gain

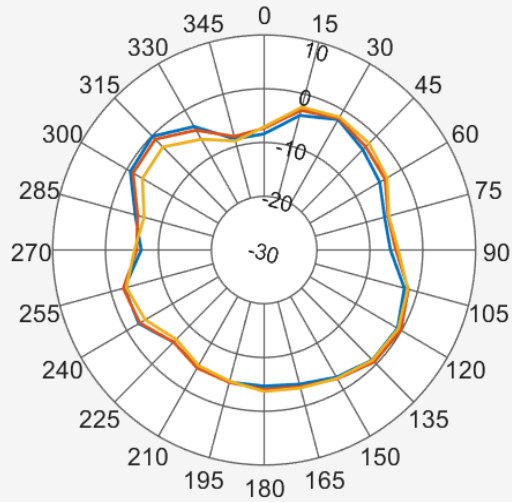
WiFi Antenna



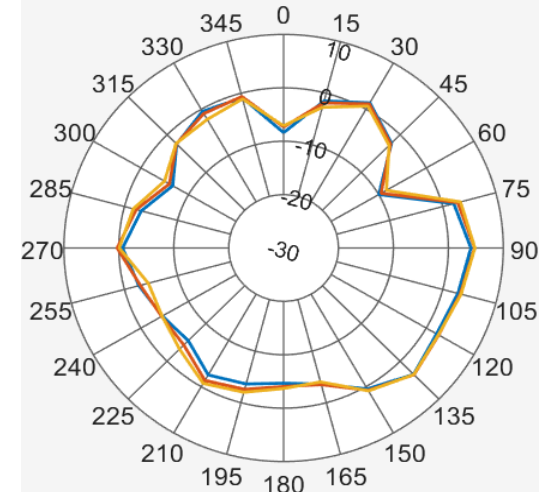
CONFIDENTIAL

2D Heat map and 3D Radiation Pattern

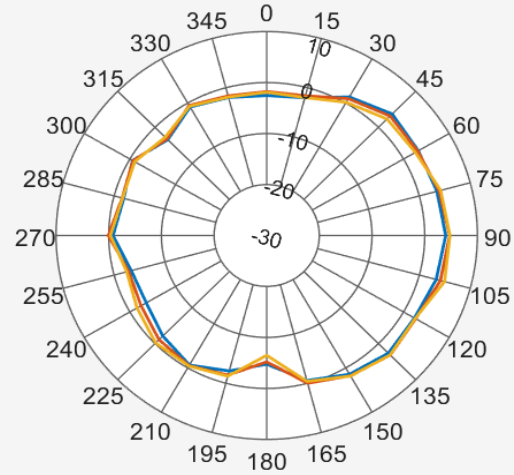
WiFi Antenna



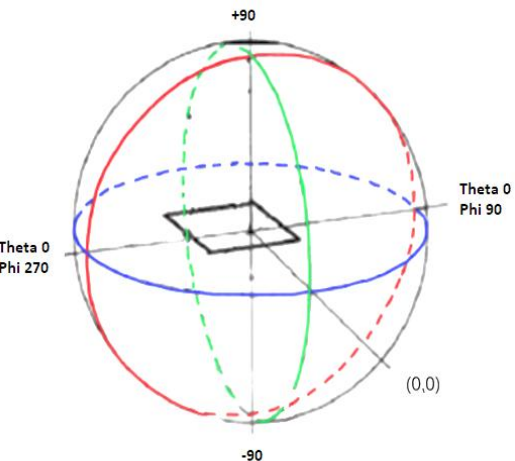
BLUE



GREEN

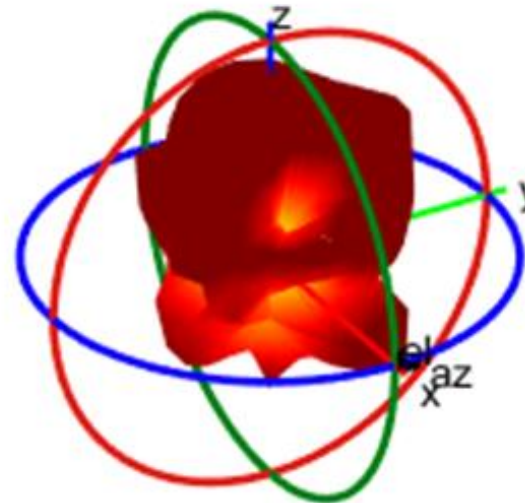
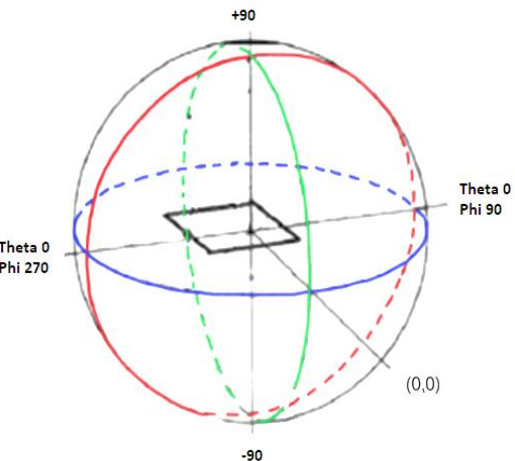
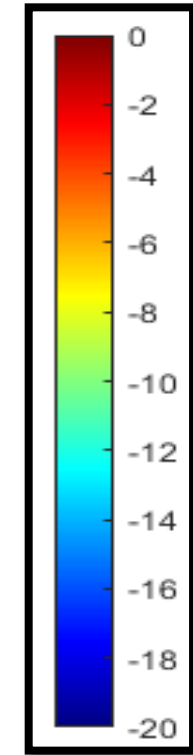
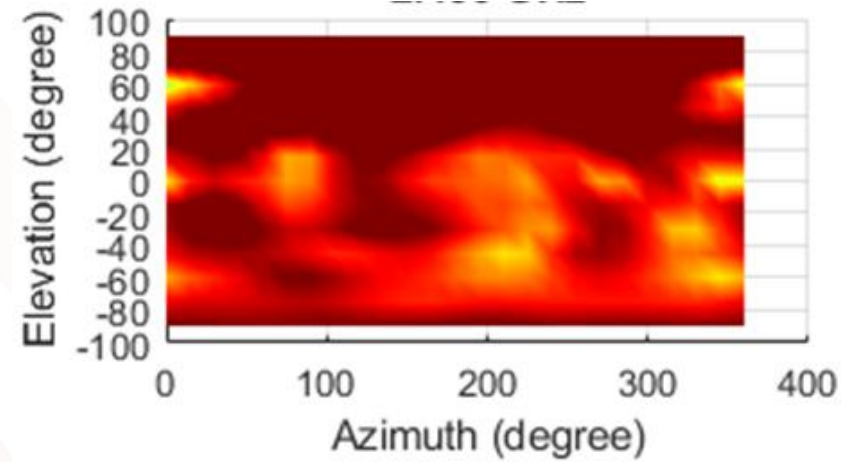


RED
CONFIDENTIAL



2D Heat map and 3D Radiation Pattern

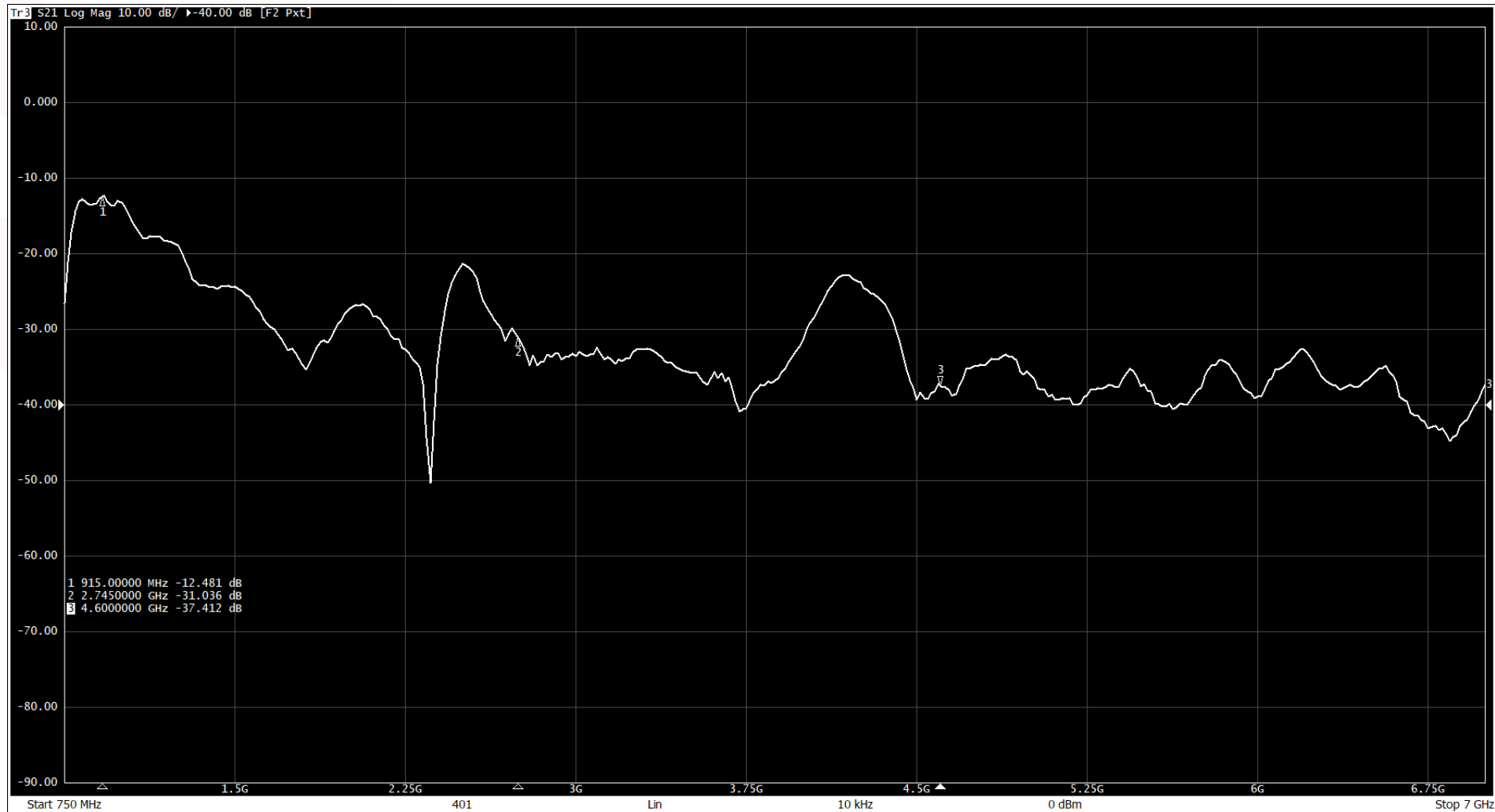
WiFi Antenna



CONFIDENTIAL

Isolation

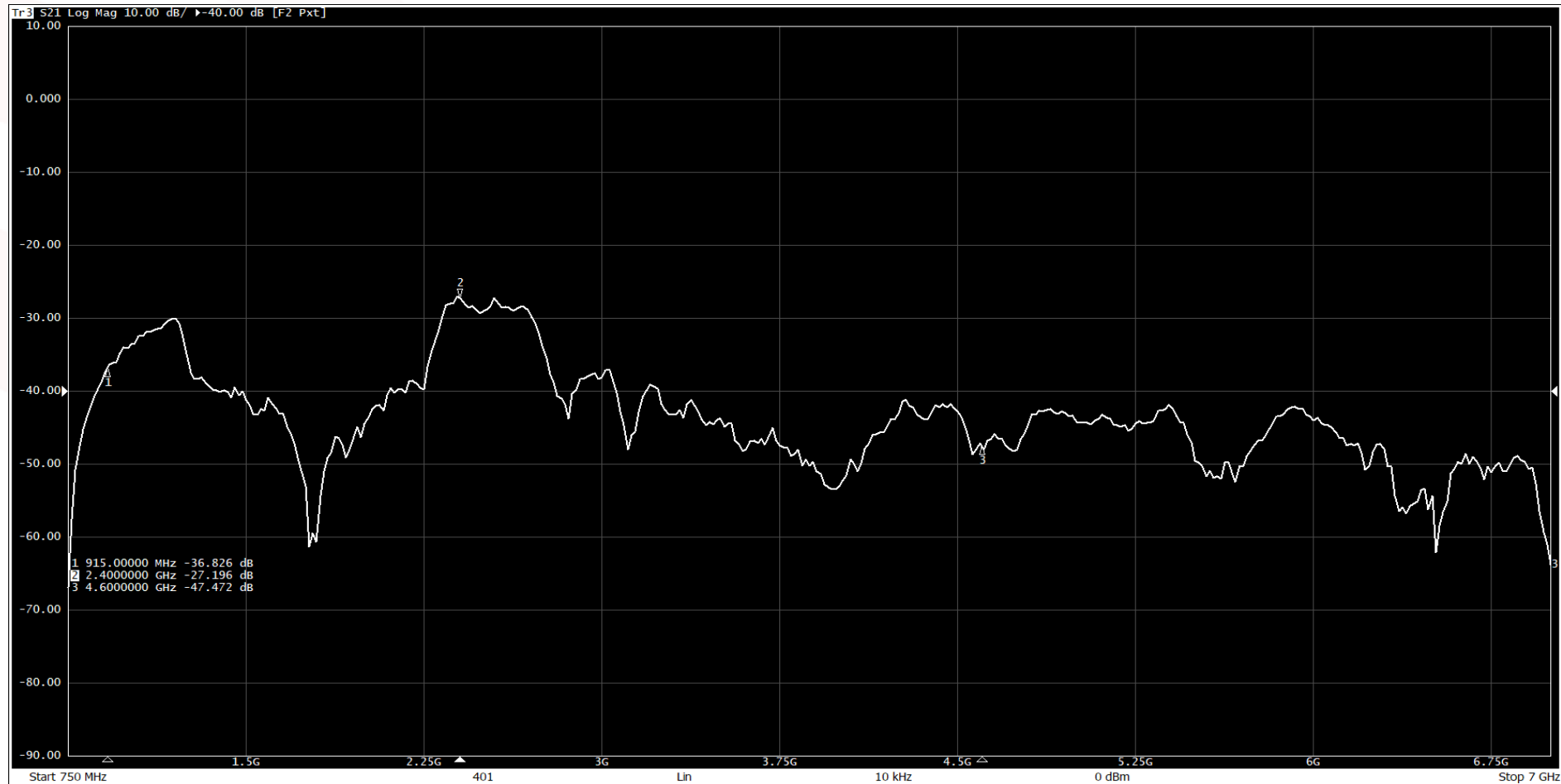
Between Sub 1GHz Ant 2 & Sub 1GHz



CONFIDENTIAL

Isolation

Between WiFi and Sub1GHz Antennas



CONFIDENTIAL



FULLY ANECHOIC 3 METER
ANTENNA CHAMBER



FIELDTHEORY[®]
CUSTOM ANTENNA DESIGN & RF SOLUTIONS

Questions?

www.fieldtheoryinc.com