



FIELD THEORY[®]

CUSTOM ANTENNA DESIGN & RF SOLUTIONS

RING
VIREO & JEWELFISH

RF Passive Measurement
7-6-2026

Purpose of Report: Passive measurement report with new three element matching network

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Outline:

- Testing Conditions
- DUT Photos
- Vireo WiFi-5G antenna
 - S-Parameters
 - Passive Efficiency
 - Peak Gain
 - 1D Radiation Patterns
 - 2D Heat Maps and 3D Spherical
- Jewel Fish WiFi-5G antenna
 - S-Parameters
 - Passive Efficiency
 - Peak Gain
 - 1D Radiation Patterns
 - 2D Heat Maps and 3D Spherical



Testing Conditions

Field Theory Setup

Test Conducted	Passive RF measurements of Vireo and Jewelfish Antenna 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	Vireo DSN: GT56140262540MU8 Jewelfish DSN: GT55XB026253REBW

Equipment	Manufacturer	Model No.	Serial No.	last Cal.	Due Date
Network Analyzer	Anritsu	MS46122B	2135304	7/10/2025	11/10/2026
Quad-Ridge Horn Antenna	ETS-Lindgreen	3164-10	217936	7/10/2025	11/10/2026
3 Meter Anechoic Chamber	Braden Shielding Systems	NA	F70331	NA	NA
RF Cable	ENS Microwave	S160-160-MKS-MKS	3042020	7/10/2025	11/10/2026
RF Cable	ENS Microwave	S160-120-MKS-MKS	12042018	7/10/2025	11/10/2026
RF Cable	ENS Microwave	EMC1-K1K1-72	1GVT4 19002201	7/10/2025	11/10/2026
RF Cable	ENS Microwave	EMC1-K1K1-72	1GVT4 19002202	7/10/2025	11/10/2026
RF Cable	ENS Microwave	EMC1-K1K1-216	1GVT4 19002202 001	7/10/2025	11/10/2026
RF Cable	ENS Microwave	EMC1-K1K1-216	1GVT4 19002202 002	7/10/2025	11/10/2026
DUT Positioner	DE LCC	D6025	NA	NA	NA
RF Switch	Mini-Circuits	RC-1SPDT-A18	1810010005	7/10/2025	11/10/2026

Field Theory Setup

Antenna Type	WiFi-5G Antenna[PCB-PiFa]
Connector	SMA Pigtail
Test Date	07/05/2026
Model Name	Passive model in Free Space
Test Lab Company	Field Theory Consulting Inc.
Address	1029 Butterfield Road, Vernon Hills, IL 60061
Person	Paul Gjerde
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:
$$\epsilon = \frac{\pi}{2NM} \sum_n \sum_m \frac{S_{21}^2(\theta_n, \phi_n)}{P_t G_t} \cos(\phi_n)$$

Test Procedure

Field Theory Setup

The antenna was measured in 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.

Formula & Calculations

Gain:

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

Efficiency:

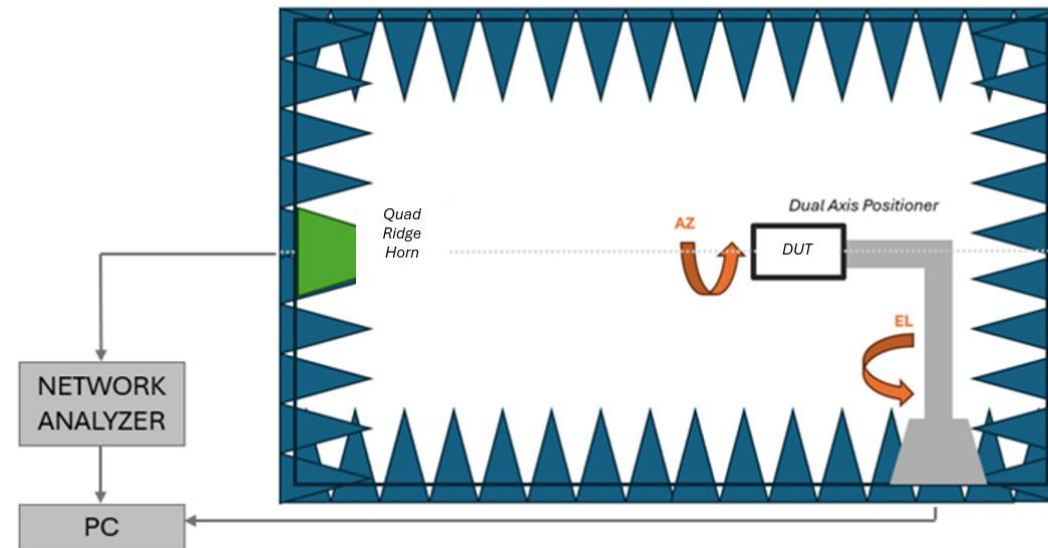
$$\varepsilon = \frac{\pi}{2NM} \sum_N \sum_M \frac{S_{21}^2(\theta_M, \phi_N)}{P_L G_T} \cos(\phi_N)$$

•Description of the anechoic chamber:

Length: 5 m

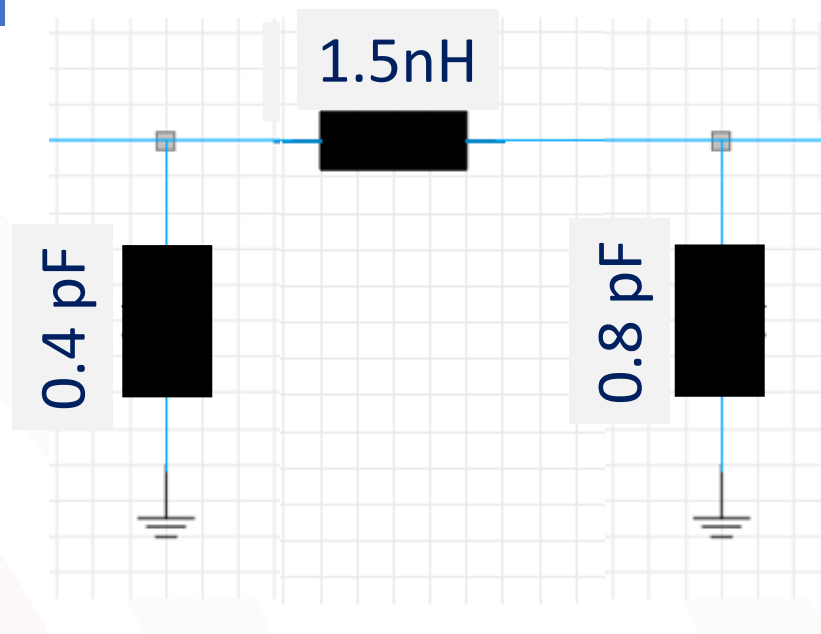
Width: 3 m

Height: 3 m



LPF Matching

Jewelfish WiFi-5G antenna



Antenna side

Name	Value	Part Number
C231	0.4 pF	GJM1555C1HR40WB01
L30	1.5 nH	LQW15AN1N5B00
C232	0.8 pF	GJM1555C1HR80WB01



FULLY ANECHOIC 3 METER
ANTENNA CHAMBER



JewelFish

DSN: GT55XB026253REBW

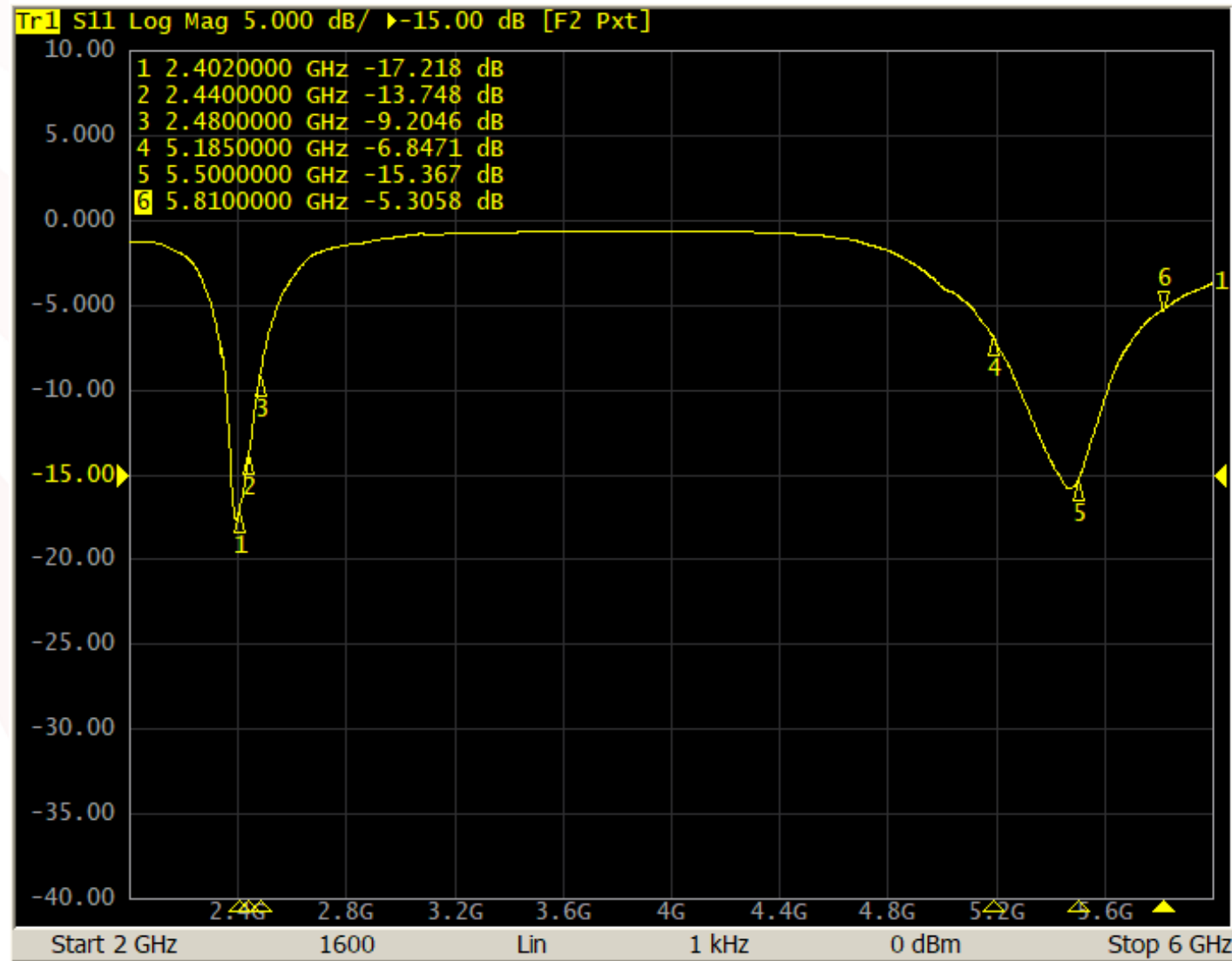
Antenna	Channel	Frequency(GHz)	Efficiency [dB]	Peak Gain [dBi]
WiFi-2.4GHz	1	2.417	-2.39	0.65
	7	2.437	-2.06	1.24
	13	2.476	-2.00	2.06
	36	5.201	-3.44	2.65
WiFi-5G	64	5.32	-2.70	2.44
	100	5.498	-2.42	2.57
	149	5.735	-3.43	2.12
	165	5.834	-3.68	1.69

DSN: GT55XB026253REBW

S-Parameters

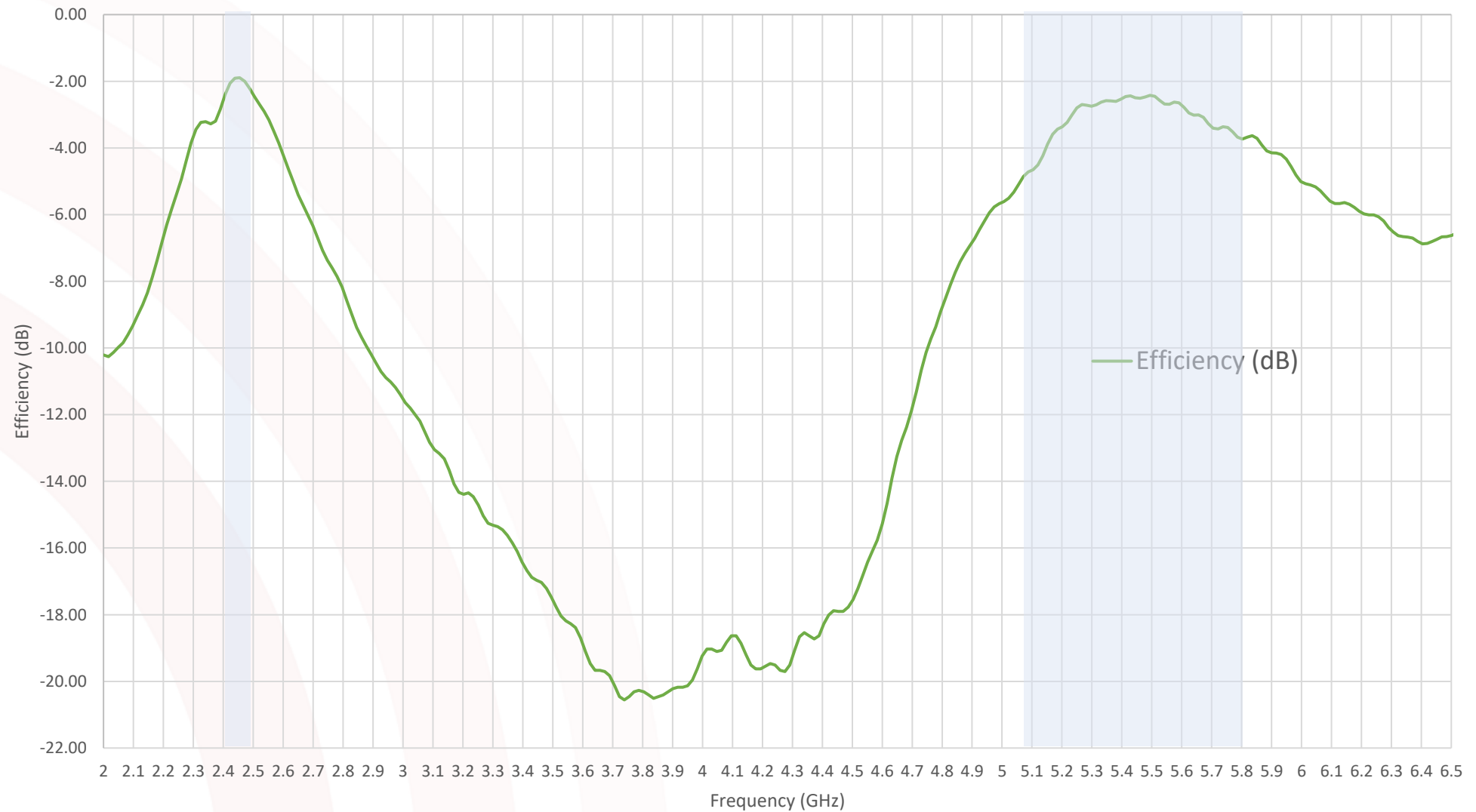
Jewelfish

7/6/2026 4:35:39 PM



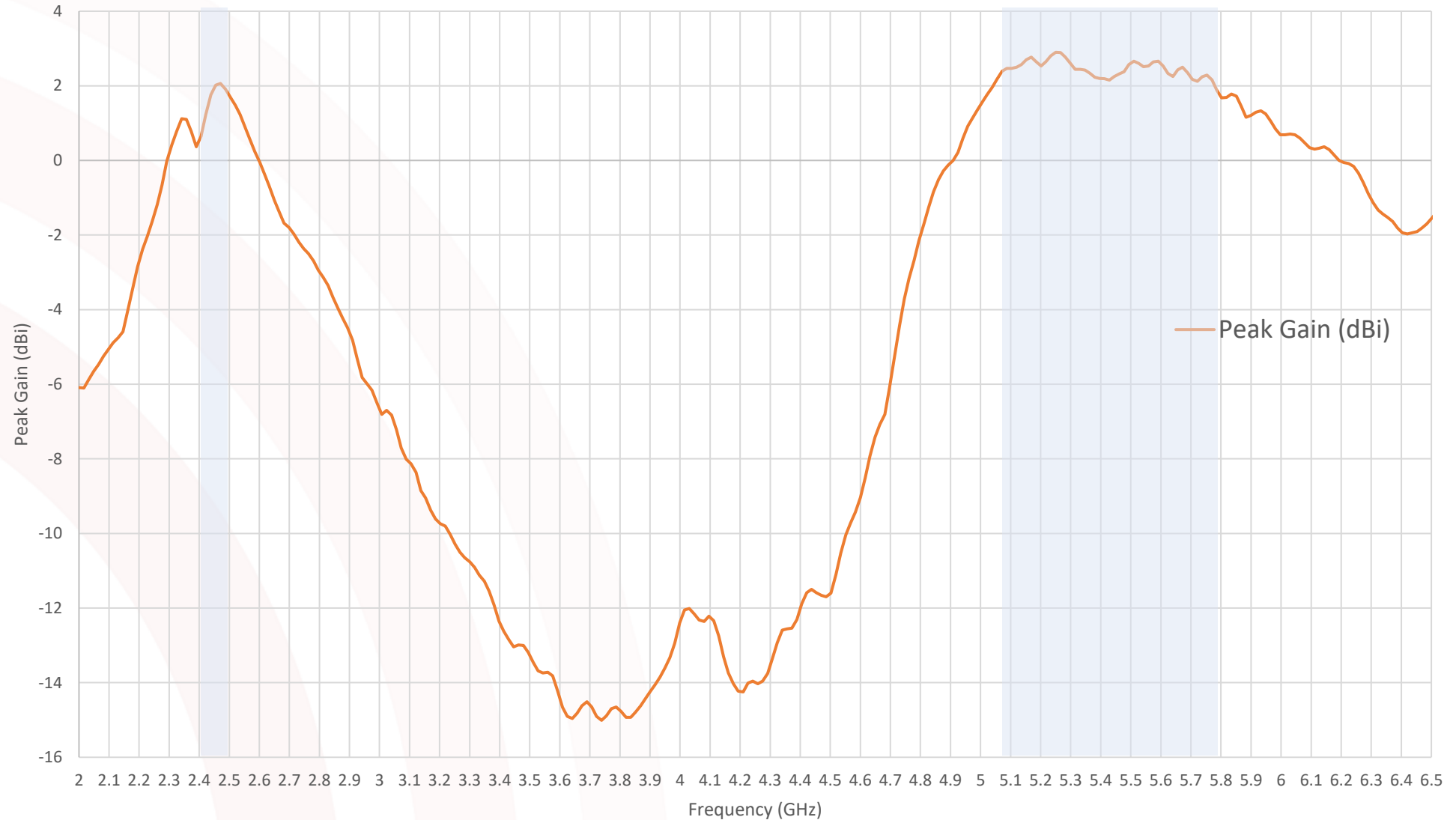
Passive Efficiency

Jewelfish



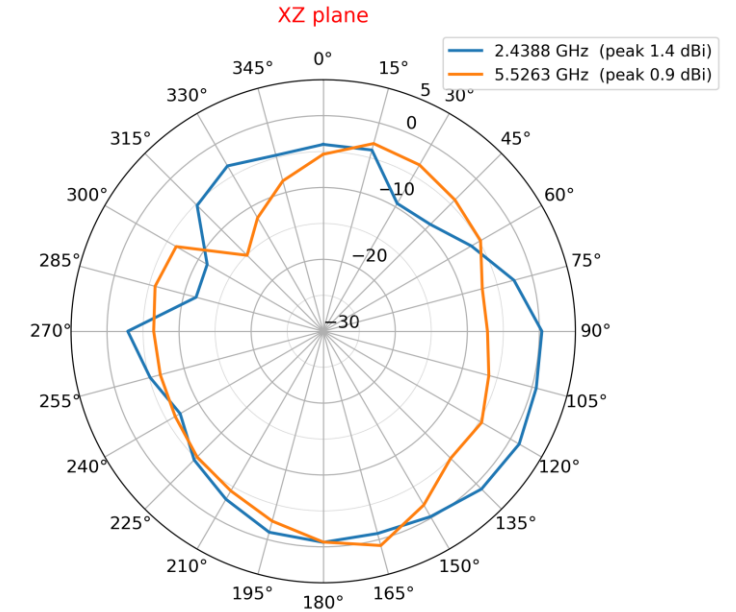
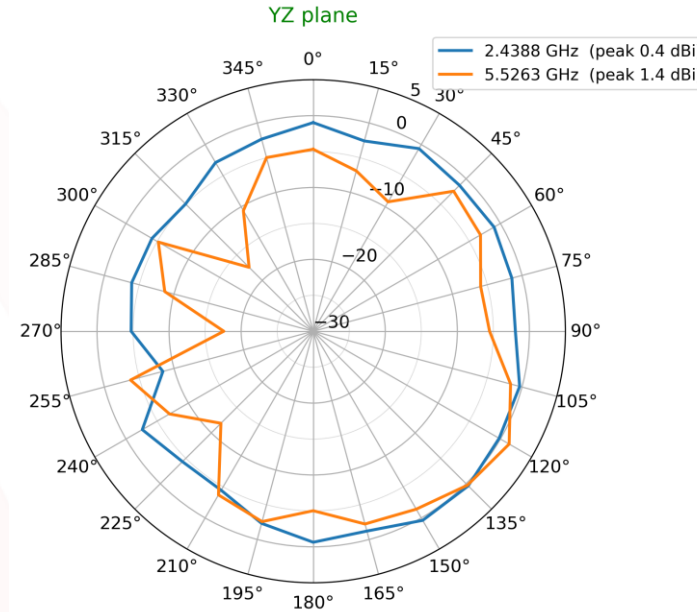
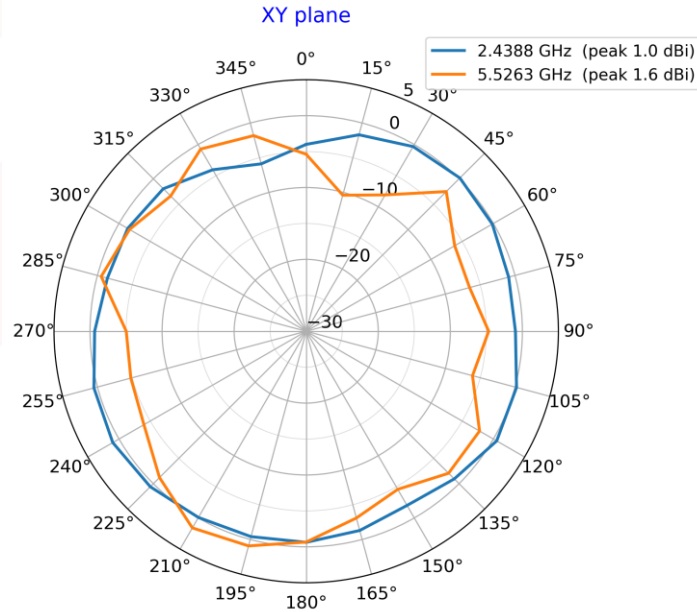
Peak Gain

Jewelfish



2D Heat Map & 3D Spherical

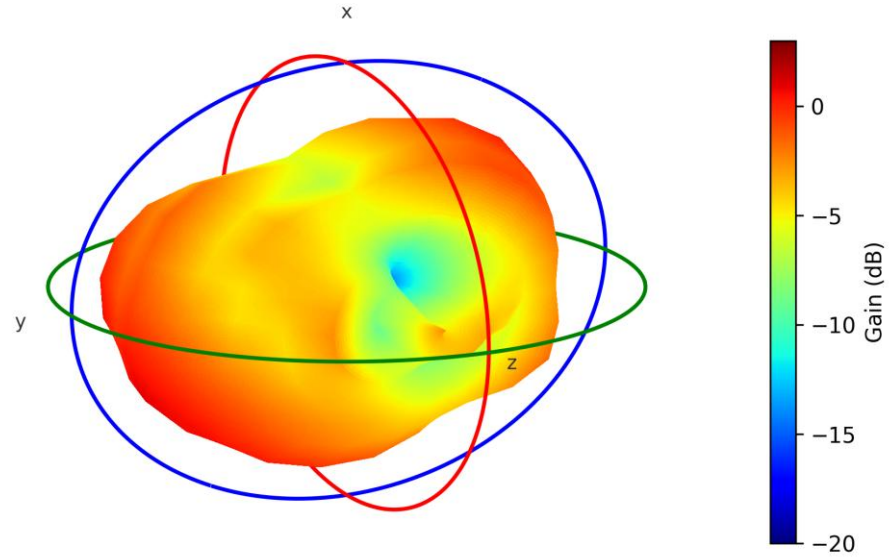
Jewelfish



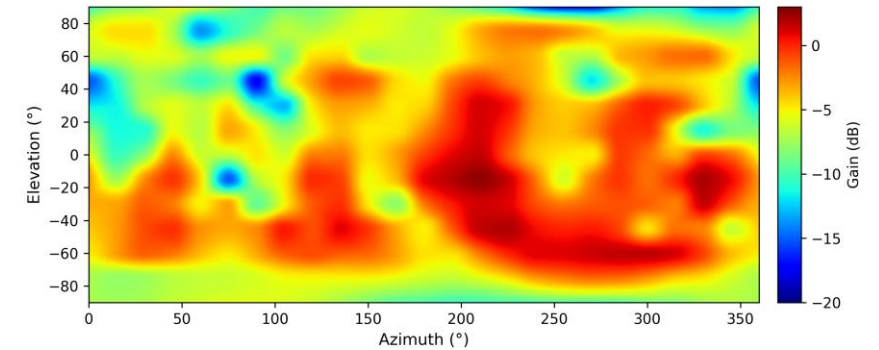
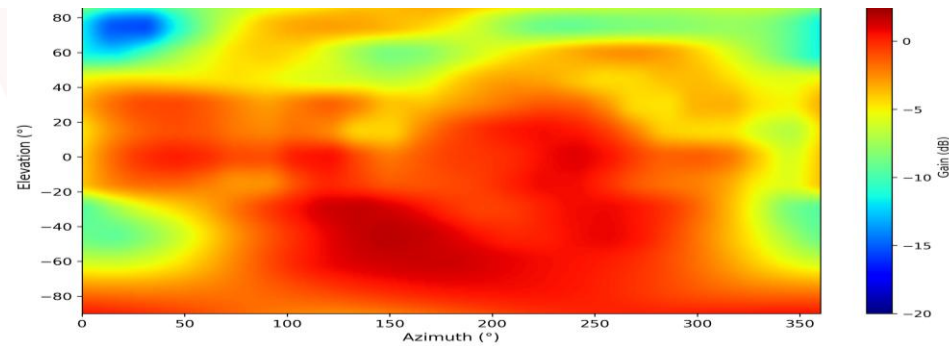
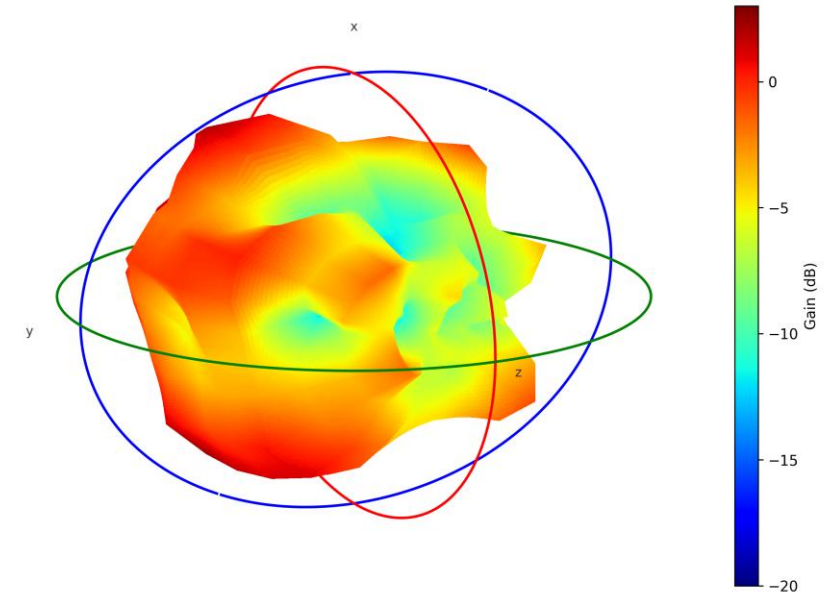
2D Heat Map & 3D Spherical

Jewelfish

2.4388 GHz — peak 1.8 dBi



5.5263 GHz — peak 2.6 dBi



CONFIDENTIAL



FULLY ANECHOIC 3 METER
ANTENNA CHAMBER



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Questions?

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