

ANTENNA PASSIVE TEST REPORT

Application No. ZEWM2208001008OA
Applicant SKULLCANDY, INC.
Manufacturer SKULLCANDY, INC.
Product Name Rail
Model No. S2RLW
Standards ANSI/IEEE Std 149-2008
Date Initial Sample(s) Received 2022.08.25
Testing Start Date 2022.08.25
Testing Finish Date 2022.11.07
Report Issue Date 2022.11.17

* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

YuanYu Luo

Prepared by

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Reviewed By

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Approved by



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch Testing & Calibration Laboratory

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Revision Version

Report No.	Version	Date	Memo
ZEWM2208001008OA02	00	2022.11.17	Initial creation of report



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1 General Information

1.1 Testing Laboratory

Test Lab	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
Address	No.1 Workshop, M-10, Middle section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China 518057
Contact	Ervin Li
Tel.	+86 18823369694
Fax	+86-755-25328600
E-mail	Ervin.Li@sgs.com

1.2 Details of Applicant

Applicant's Name	SKULLCANDY, INC.
Applicant's Address	6301 N Landmark Dr Park City UT 84098, Utah United States of America
Contact	James Nance
Tel.	1(435) 729-2698
Fax	N/A
E-mail	James.Nance@skullcandy.com

1.3 Details of Manufacturer

Manufacturer's Name	SKULLCANDY, INC.
Manufacturer's Address	6301 N Landmark Dr Park City UT 84098, Utah United States of America
Contact	James Nance
Tel.	1(435) 729-2698
Fax	N/A
E-mail	James.Nance@skullcandy.com



1.4 General Description of EUT

Device Description:	Rail
Device Manufacturer:	SKULLCANDY, INC.
Device Model:	S2RLW
Hardware Version:	N/A
Software Version:	N/A

1.5 Test Procedure

Testing is performed according to the **ANSI/IEEE Std 149-2008**.



1.6 Test Specification

Identity	Document Title
ANSI/IEEE Std 149-2008	IEEE Standard Test Procedures for Antennas

1.7 Laboratory Environment

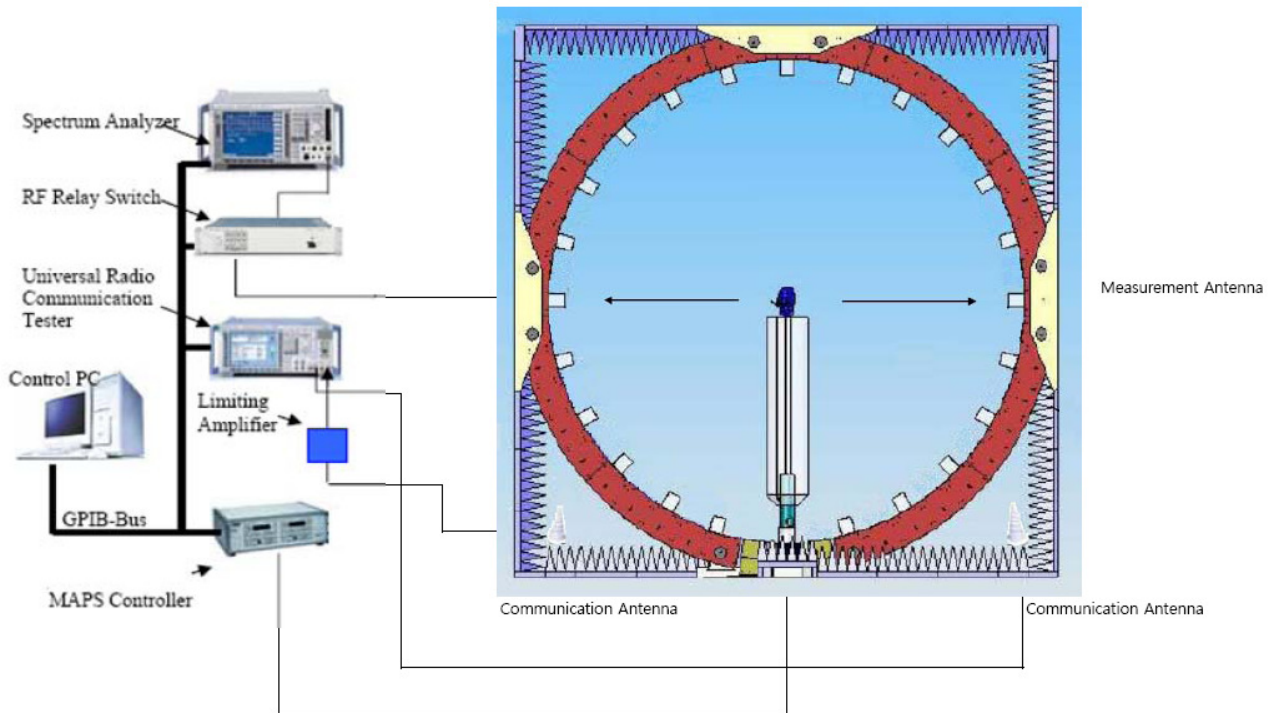
Temperature	Min. =19°C , Max. = 25°C	
Relative humidity	Min. =40% , Max. =72%	
Shield effect	0.7-6GHz	> 100dB
Ground resistance	<0.5Ω	



2 OTA Measurements System Configuration

2.1 Test Configuration

Great-Circle-Cut method is used to measure the antenna 3D GAIN of EUT in OTA qualified anechoic chamber. Equipment Under Test (EUT) geometry centre vertical projection at the centre of platform, the distance from EUT to measurement antenna is 5m



F-1. OTA Measurement System Configuration

3 Test Equipment List

Type of Equipment	Model Number	Manufacture	Calibration Date	Valid Period
Network Analyzer	E5071C S/N MY46523591	Keysight	2022/04/11	2023/04/10
Quad-Ridge Horn Antenna 700 MHz-10 GHz	EMCO 3164-08 S/N 161915	ETS-Lindgren L.P.	N/A	N/A
MAPS Controller	EMCENTER S/N 160485	ETS-Lindgren L.P.	N/A	N/A
SAM V4.5BS Head Phantom	Head Phantom S/N 3609	SPEAG	NCR	NCR



4 Measurement Uncertainty

Item	2400-2500 MHz (dB)
Gain	0.88
Efficiency	0.88
Measurement Uncertainty (95% CONFIDENCE INTERVAL) K=2	



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Shenzhen Branch Testing Center, EMC Laboratory

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5 Test Results

Free Space Right #1			
Frequency (MHz)	Efficiency (dB)	Efficiency (%)	Gain (dBi)
2350	-5.05	31.25	2.43
2355	-4.95	31.96	2.60
2360	-4.79	33.22	2.67
2365	-4.83	32.88	2.69
2370	-4.85	32.71	2.68
2375	-4.92	32.22	2.69
2380	-4.86	32.64	2.74
2385	-4.88	32.49	2.81
2390	-4.80	33.12	2.98
2395	-4.70	33.92	3.04
2400	-4.71	33.80	3.03
2402	-4.65	34.24	3.13
2405	-4.62	34.53	3.05
2410	-4.61	34.62	3.04
2415	-4.59	34.74	2.96
2420	-4.66	34.22	2.90
2425	-4.66	34.21	2.89
2430	-4.68	34.04	2.90
2435	-4.62	34.55	3.00
2440	-4.50	35.51	3.18
2441	-4.49	35.56	3.19
2445	-4.47	35.73	3.15
2450	-4.45	35.87	3.12
2455	-4.49	35.54	2.97
2460	-4.52	35.28	2.89

Free Space Left #1			
Frequency (MHz)	Efficiency (dB)	Efficiency (%)	Gain (dBi)
2350	-5.45	28.48	1.98
2355	-5.33	29.28	2.17
2360	-5.16	30.48	2.21
2365	-5.18	30.34	2.21
2370	-5.19	30.30	2.18
2375	-5.23	29.98	2.17
2380	-5.16	30.50	2.22
2385	-5.16	30.50	2.30
2390	-5.04	31.34	2.50
2395	-4.96	31.95	2.53
2400	-4.95	31.96	2.51
2402	-4.89	32.43	2.60
2405	-4.88	32.54	2.50
2410	-4.85	32.71	2.48
2415	-4.82	32.97	2.42
2420	-4.86	32.64	2.39
2425	-4.85	32.75	2.37
2430	-4.87	32.55	2.37
2435	-4.80	33.12	2.42
2440	-4.70	33.90	2.57
2441	-4.69	33.95	2.57
2445	-4.67	34.11	2.50
2450	-4.69	33.98	2.44
2455	-4.73	33.64	2.28
2460	-4.77	33.37	2.20



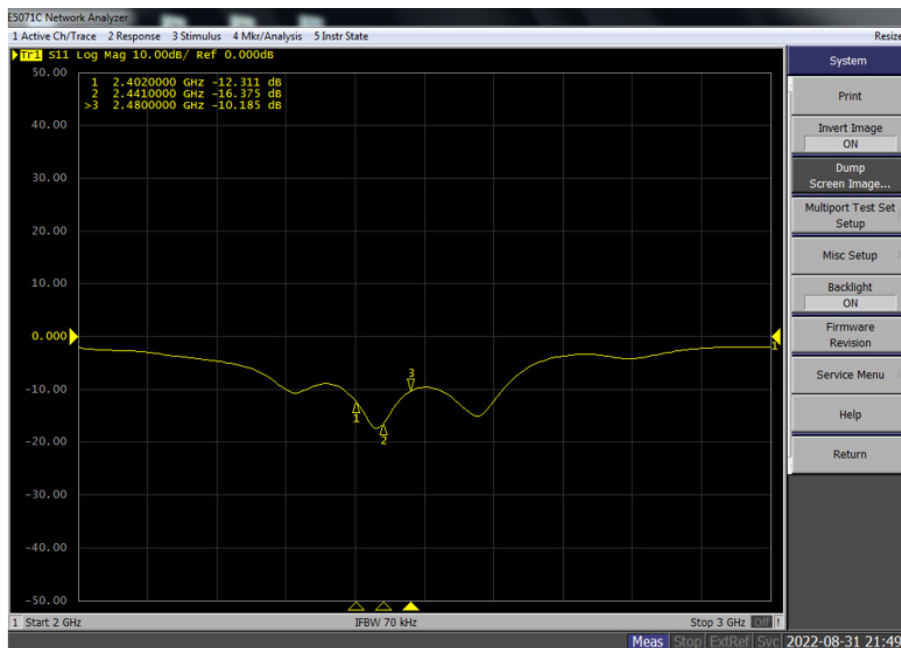
2465	-4.52	35.29	2.93
2470	-4.64	34.36	2.78
2475	-4.59	34.73	2.97
2480	-4.69	33.99	2.82
2482	-4.66	34.24	2.85
2485	-4.57	34.93	3.08
2490	-4.57	34.88	2.89
2495	-4.36	36.63	3.13
2500	-4.37	36.57	2.90
2505	-4.34	36.78	2.98
2510	-4.37	36.59	2.85
2515	-4.51	35.37	2.78
2520	-4.50	35.47	2.86
2525	-4.65	34.30	2.70
2530	-4.62	34.53	2.77
2535	-4.71	33.79	2.54
2540	-4.71	33.83	2.54
2545	-4.65	34.26	2.47
2550	-4.72	33.73	2.41
2555	-4.70	33.87	2.39
2560	-4.84	32.81	2.39
2565	-4.84	32.79	2.37
2570	-4.96	31.90	2.31
2575	-4.99	31.68	2.21
2580	-5.01	31.57	2.06

2465	-4.76	33.39	2.25
2470	-4.88	32.49	2.08
2475	-4.85	32.73	2.22
2480	-4.94	32.04	2.02
2482	-4.92	32.22	2.04
2485	-4.83	32.85	2.25
2490	-4.84	32.78	2.03
2495	-4.65	34.24	2.26
2500	-4.68	34.02	1.98
2505	-4.67	34.16	2.07
2510	-4.71	33.77	1.90
2515	-4.86	32.69	1.82
2520	-4.86	32.62	1.89
2525	-5.02	31.47	1.67
2530	-5.02	31.48	1.75
2535	-5.16	30.51	1.47
2540	-5.19	30.30	1.46
2545	-5.18	30.36	1.30
2550	-5.26	29.78	1.30
2555	-5.29	29.57	1.24
2560	-5.44	28.58	1.19
2565	-5.48	28.29	1.12
2570	-5.63	27.36	0.95
2575	-5.69	26.97	0.82
2580	-5.76	26.55	0.60

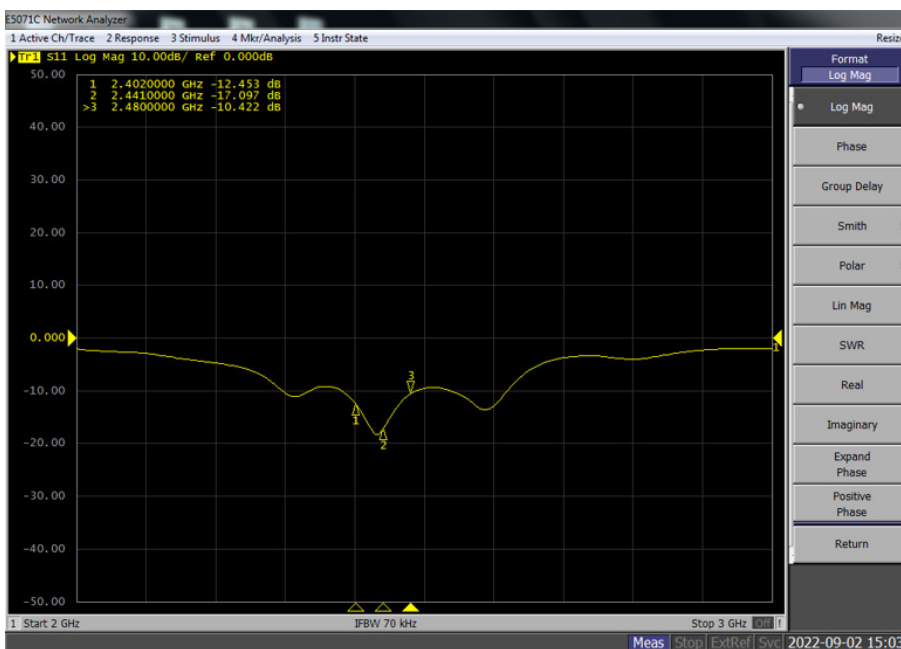


6 Pattern Plots

6.1 Return Loss



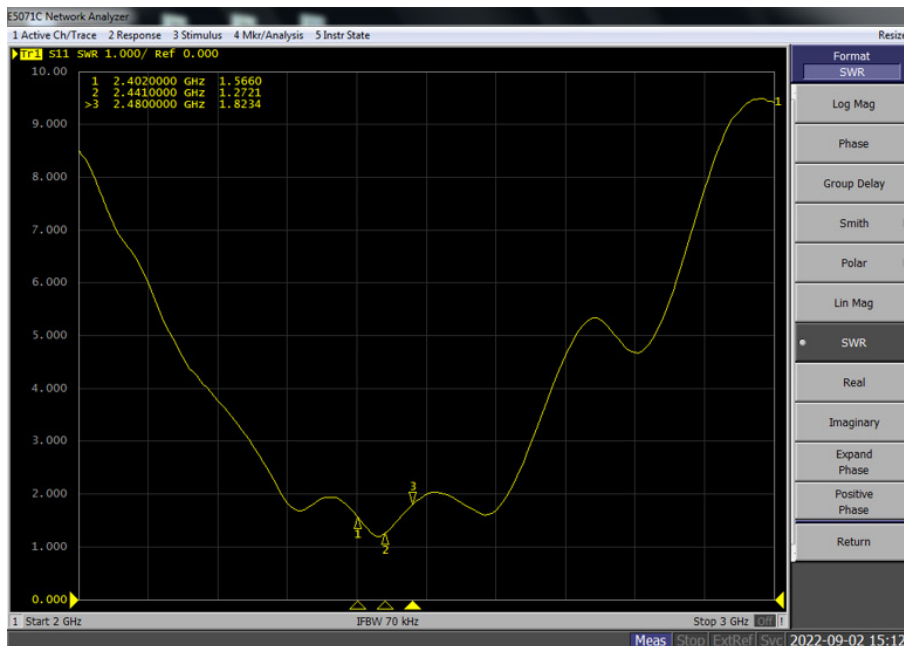
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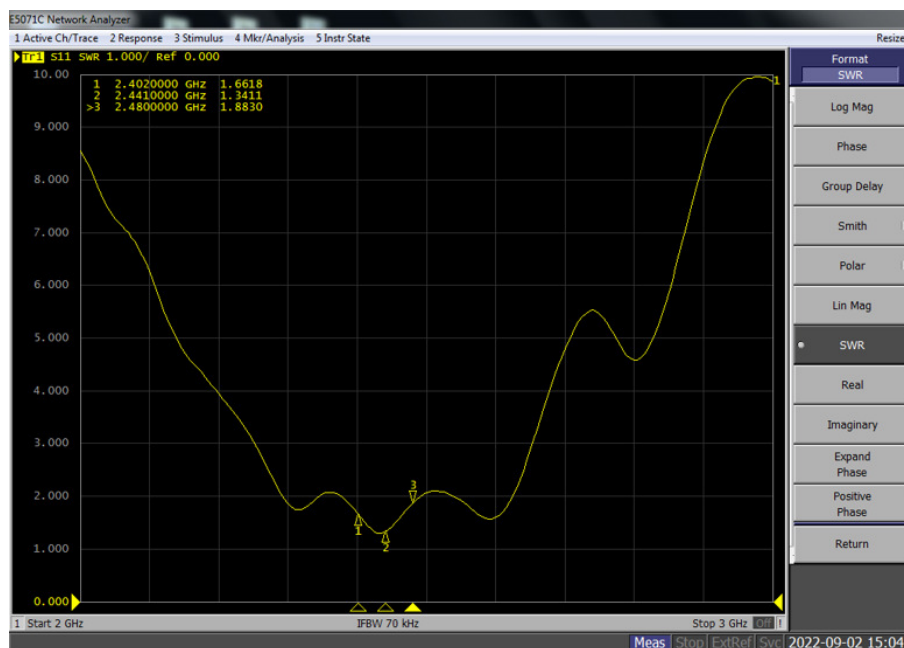
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6.2 VSWR



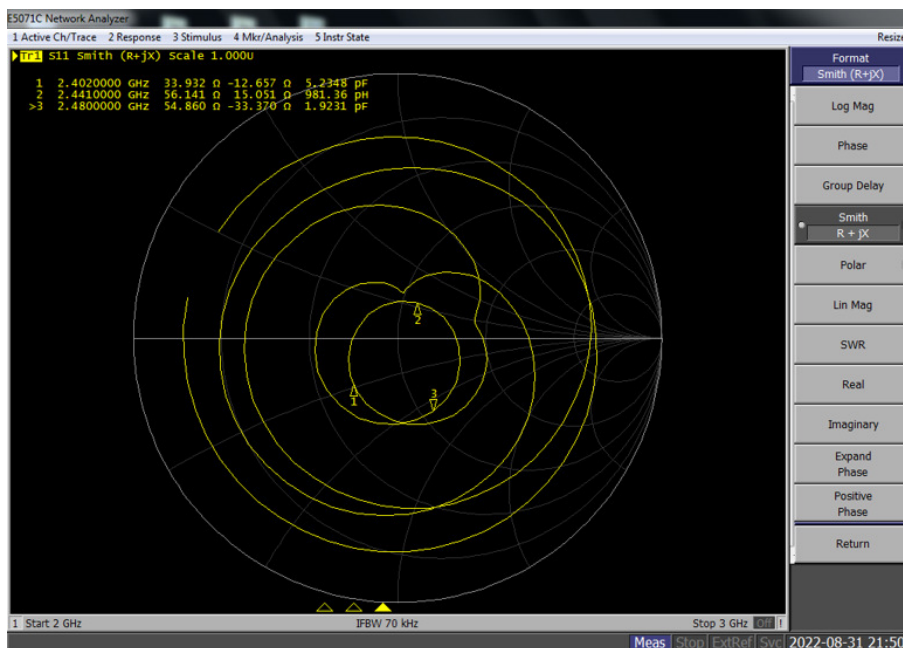
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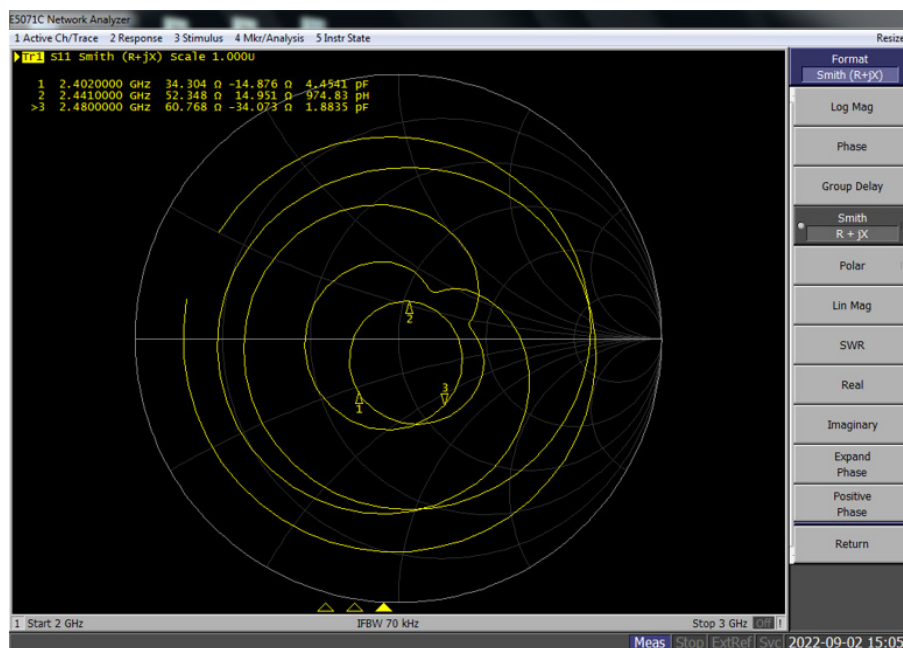
Free Space Right #1



6.3 Stimulus



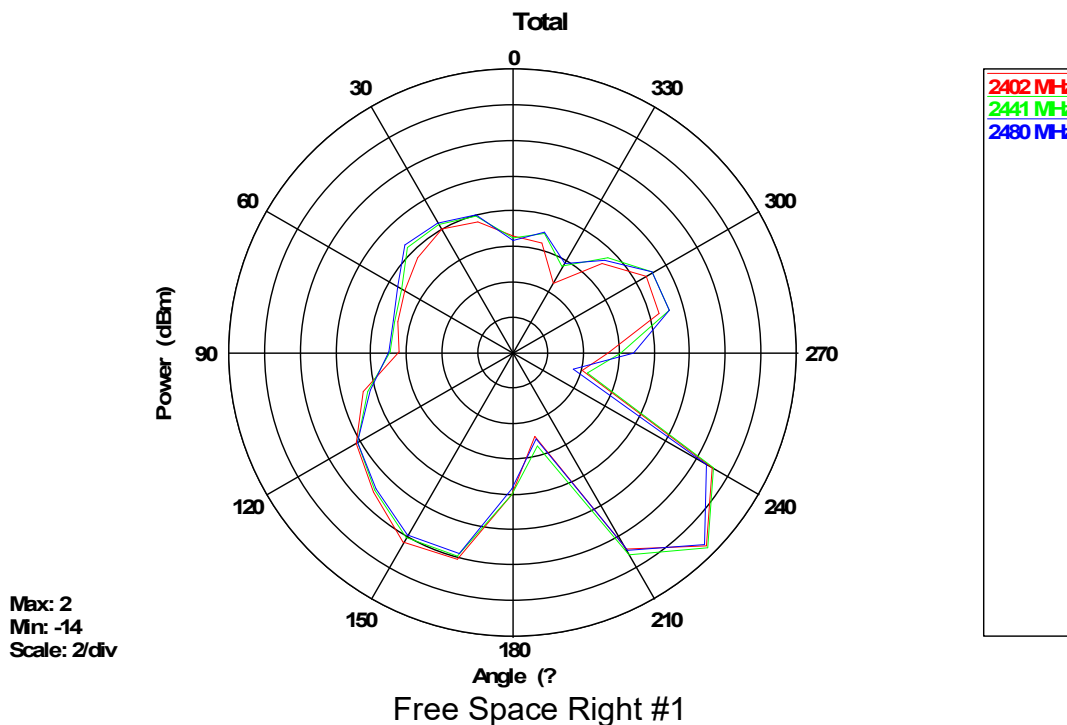
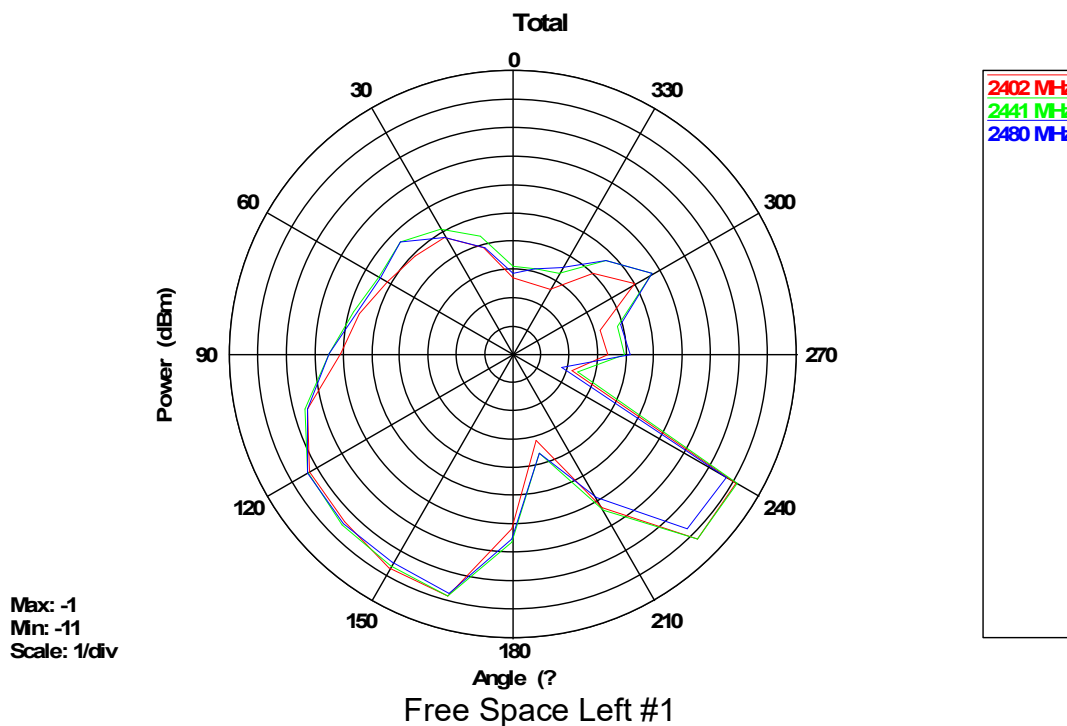
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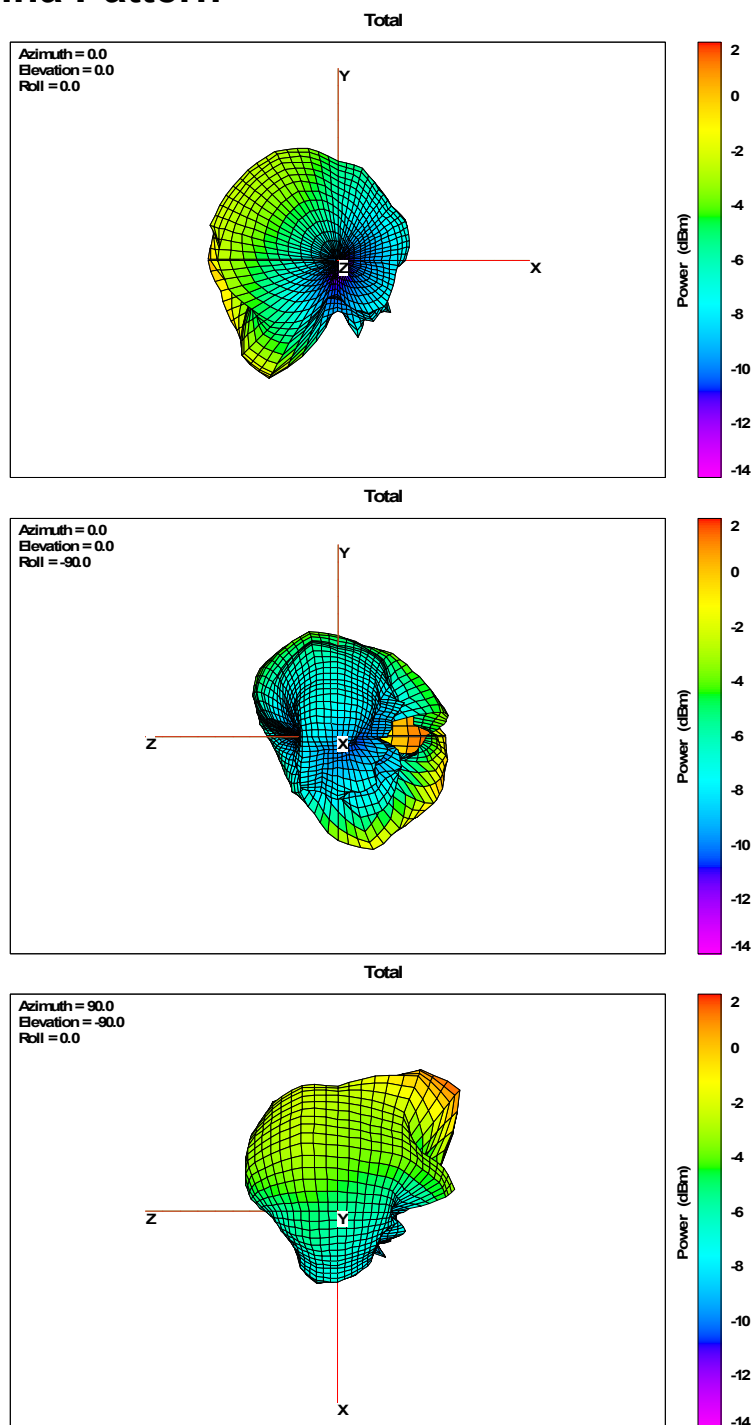
Free Space Right #1



7 2-D Antenna Pattern(Theta=90°)

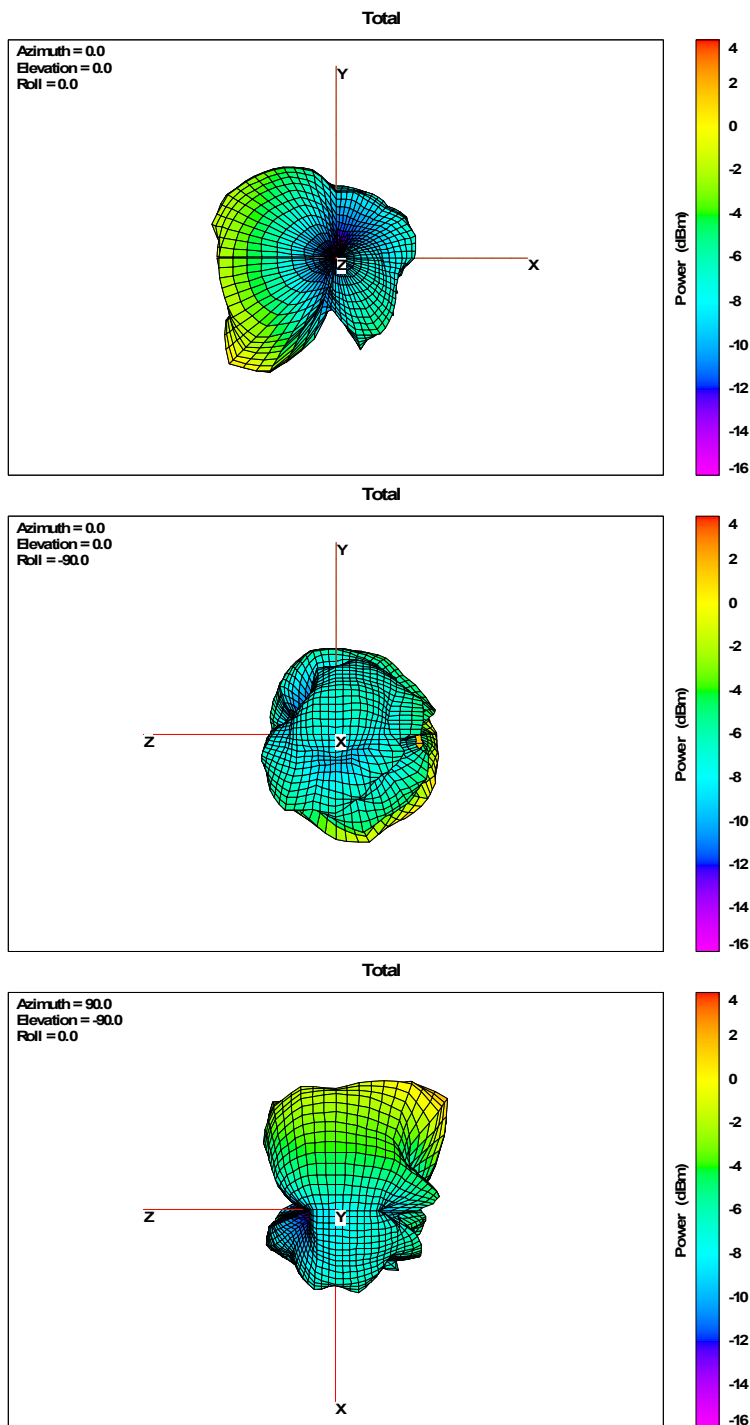


8 3-D Antenna Pattern



Free Space Left #1





Free Space Right #1

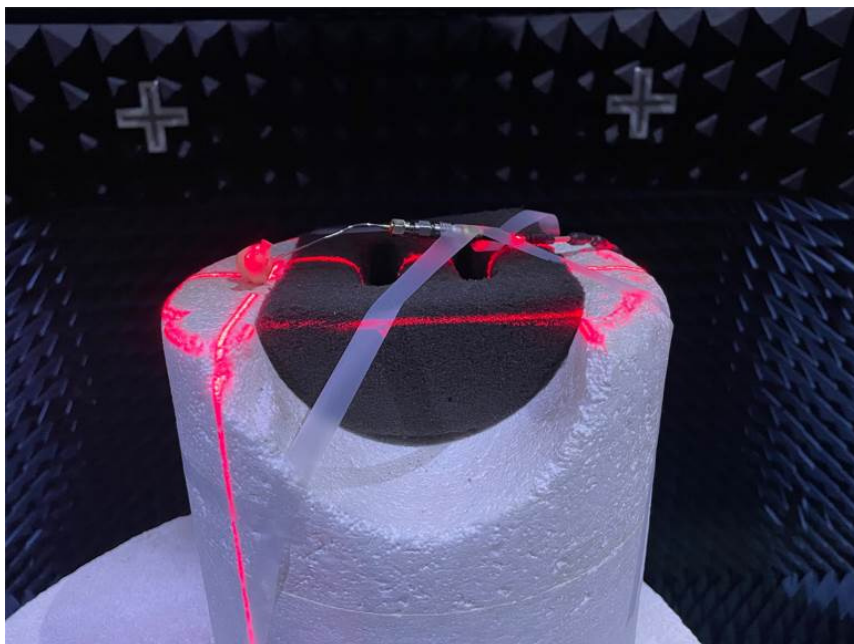


9 The EUT and Test Configuration

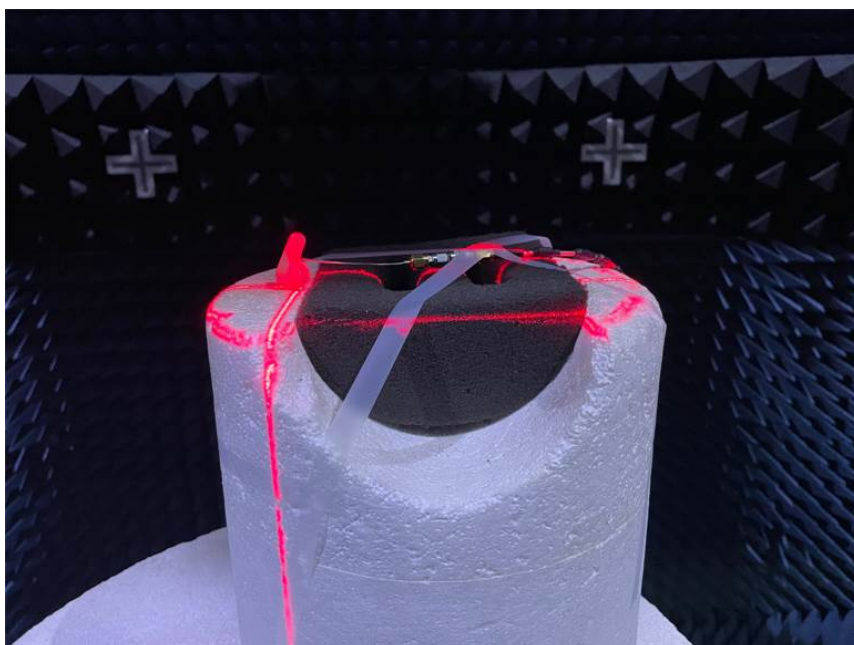


Photo of EUT #1



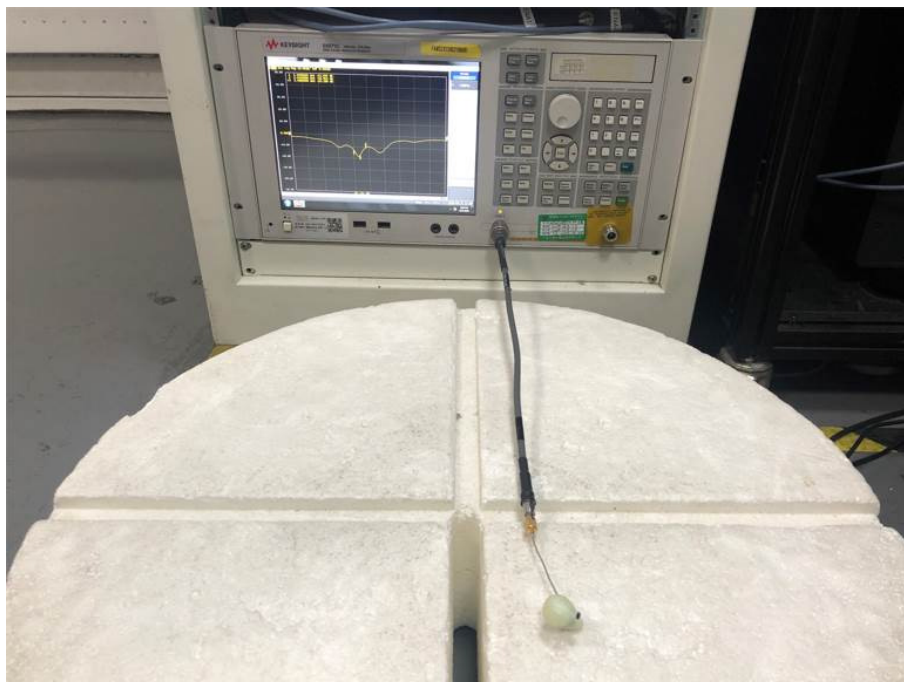


Free Space Left #1 View

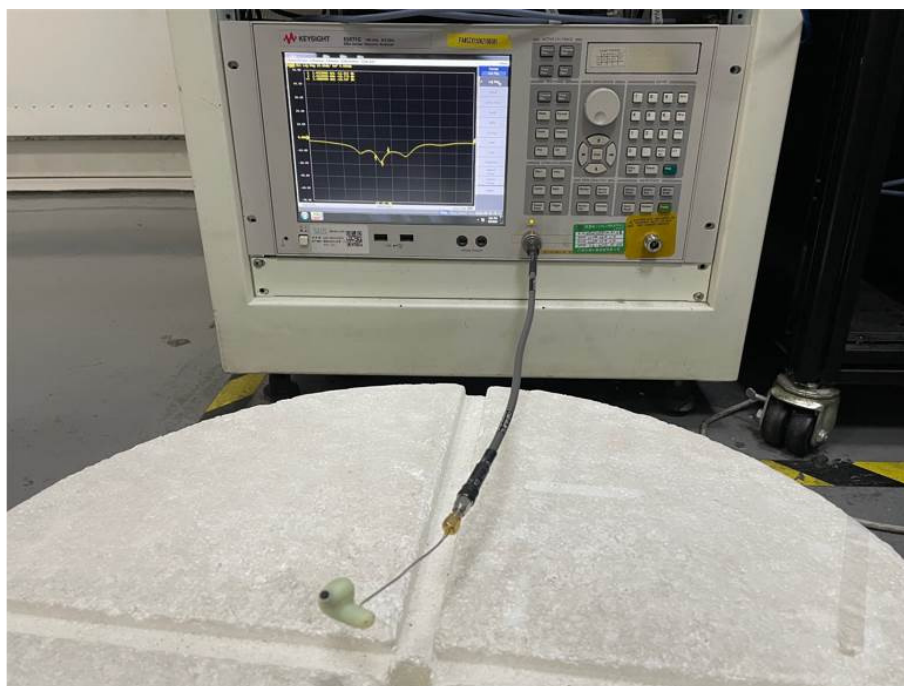


Free Space Right #1 View





Free Space Left #1 Impedance Setup



Free Space Right #1 Impedance Setup

---END---

