

# ANTENNA PASSIVE TEST REPORT

Application No. ZEWM2209001119OA  
Applicant SKULLCANDY, INC.  
Manufacturer SKULLCANDY, INC.  
Product Name Rail ANC / Rail ANC XT  
Model No. S2IPW  
Standards ANSI/IEEE Std 149-2008  
Date Initial Sample(s) Received 2022.09.19  
Testing Start Date 2022.09.21  
Testing Finish Date 2023.01.01  
Report Issue Date 2023.03.06

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

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Prepared by

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Reviewed By

Ervin Li

Approved by



## Revision Version

Report No.	Version	Date	Memo
ZEWM2209001119OA02	00	2023.03.06	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	Simon Ling
Tel.	+86 (0) 755 2601 2053
Fax	+86 (0) 755 2671 0594
E-mail	Simon.Ling@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 ANC / Rail ANC XT
Device Manufacturer:	SKULLCANDY, INC.
Device Model:	S2IPW
Hardware Version:	1.0
Software Version:	V028

## 1.5 Test Procedure

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



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## 1.6 Test Specification

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

## 1.7 Laboratory Environment

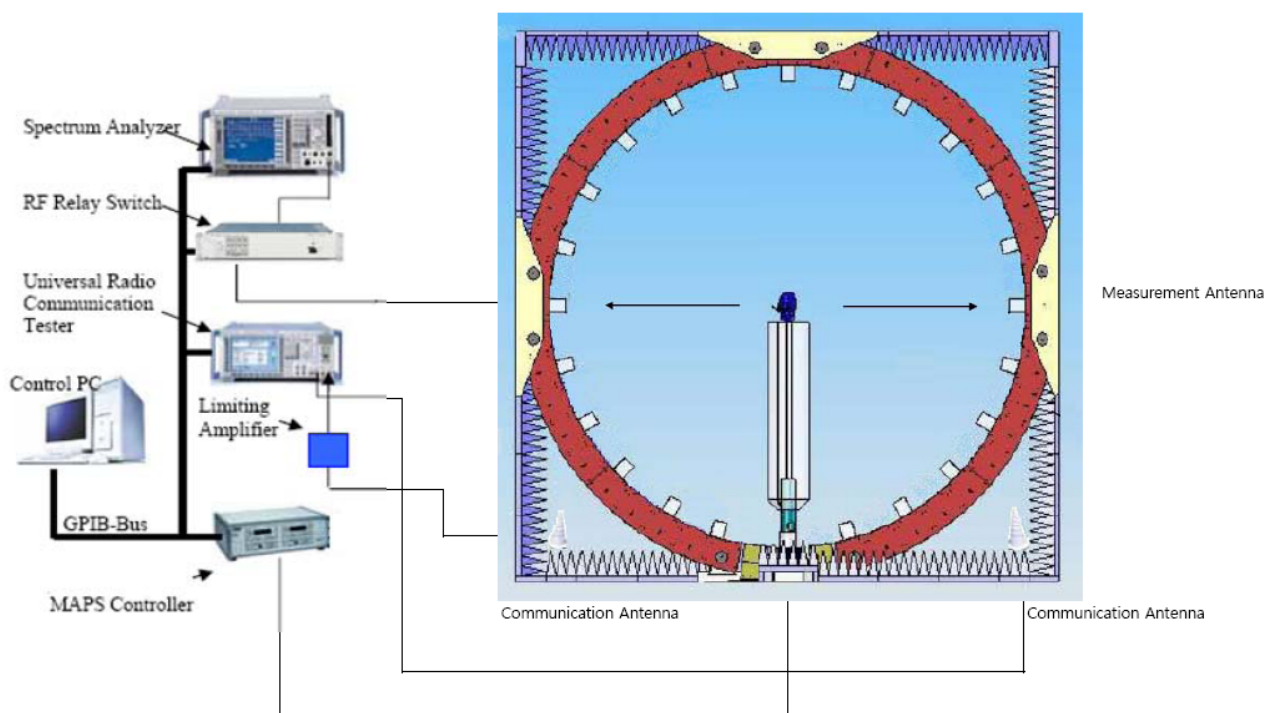
Temperature	Min. =19°C , Max. = 25°C	
Relative humidity	Min. =40% , Max. =72%	
Shield effect	0.7-6GHz	> 100dB
Ground resistance	<0.5Ω	



## 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	2022/4/11	2023/4/10
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





## 4 Measurement Uncertainty

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



## 5 Test Results

Free Space Left #1			
Frequency (MHz)	Efficiency (dB)	Efficiency (%)	Gain (dBi)
2350	-7.50	17.77	-1.04
2355	-7.24	18.89	-0.72
2360	-6.91	20.36	-0.54
2365	-6.76	21.08	-0.28
2370	-6.65	21.62	-0.24
2375	-6.59	21.93	-0.06
2380	-6.37	23.06	0.13
2385	-6.25	23.72	0.28
2390	-6.01	25.08	0.55
2395	-5.83	26.12	0.68
2400	-5.79	26.35	0.74
2402	-5.75	26.59	0.68
2405	-5.69	27.00	0.78
2410	-5.55	27.83	0.91
2415	-5.40	28.82	0.98
2420	-5.29	29.61	1.19
2425	-5.19	30.25	1.18
2430	-5.16	30.46	1.30
2435	-5.09	30.99	1.26
2440	-4.95	32.00	1.49
2441	-4.93	32.12	1.49
2445	-4.91	32.30	1.37
2450	-4.88	32.52	1.49
2455	-4.91	32.28	1.34
2460	-4.97	31.81	1.38

Free Space Right #1			
Frequency (MHz)	Efficiency (dB)	Efficiency (%)	Gain (dBi)
2350	-6.68	21.46	-0.12
2355	-6.41	22.88	0.19
2360	-6.15	24.25	0.34
2365	-6.11	24.51	0.44
2370	-6.04	24.89	0.38
2375	-6.03	24.93	0.45
2380	-5.86	25.93	0.55
2385	-5.83	26.12	0.62
2390	-5.66	27.18	0.77
2395	-5.56	27.78	0.89
2400	-5.51	28.12	0.93
2402	-5.45	28.53	0.90
2405	-5.41	28.75	1.02
2410	-5.30	29.54	1.13
2415	-5.25	29.82	1.11
2420	-5.26	29.76	1.17
2425	-5.27	29.74	1.16
2430	-5.29	29.59	1.16
2435	-5.22	30.05	1.28
2440	-5.10	30.92	1.38
2441	-5.08	31.04	1.42
2445	-5.09	30.99	1.45
2450	-5.09	30.94	1.43
2455	-5.18	30.36	1.41
2460	-5.26	29.78	1.35



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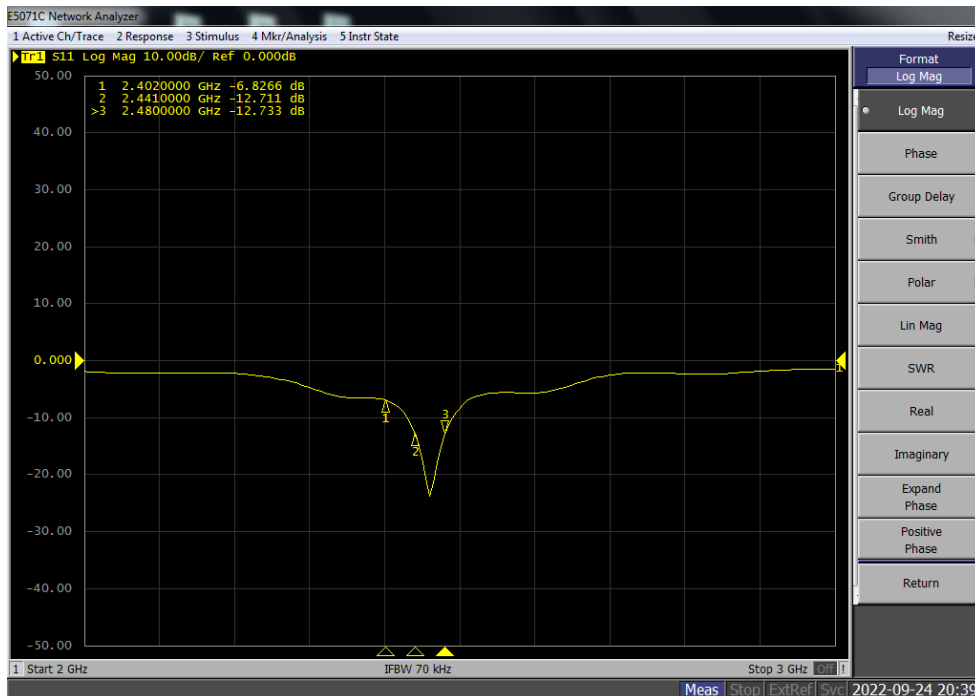
2465	-4.99	31.67	1.24
2470	-5.20	30.17	1.10
2475	-5.21	30.15	1.07
2480	-5.42	28.69	0.88
2482	-5.40	28.82	0.99
2485	-5.36	29.14	1.00
2490	-5.41	28.78	0.86
2495	-5.20	30.22	1.15
2500	-5.24	29.94	0.94
2505	-5.30	29.53	0.92
2510	-5.46	28.45	0.61
2515	-5.77	26.51	0.33
2520	-5.92	25.57	0.12
2525	-6.15	24.24	-0.08
2530	-6.20	23.98	-0.14
2535	-6.32	23.32	-0.24
2540	-6.31	23.38	-0.23
2545	-6.25	23.69	-0.21
2550	-6.34	23.23	-0.30
2555	-6.42	22.80	-0.43
2560	-6.69	21.41	-0.71
2565	-6.86	20.60	-0.96
2570	-7.13	19.36	-1.29
2575	-7.27	18.74	-1.47
2580	-7.32	18.52	-1.55

2465	-5.30	29.48	1.34
2470	-5.52	28.05	1.14
2475	-5.52	28.06	1.15
2480	-5.73	26.74	0.96
2482	-5.70	26.90	0.94
2485	-5.62	27.39	1.07
2490	-5.70	26.89	1.01
2495	-5.49	28.24	1.17
2500	-5.63	27.34	1.11
2505	-5.73	26.76	0.98
2510	-5.92	25.58	0.89
2515	-6.15	24.26	0.57
2520	-6.21	23.94	0.58
2525	-6.41	22.87	0.32
2530	-6.39	22.96	0.33
2535	-6.55	22.14	0.13
2540	-6.52	22.28	0.12
2545	-6.56	22.05	0.07
2550	-6.69	21.42	-0.11
2555	-6.84	20.69	-0.21
2560	-7.14	19.30	-0.52
2565	-7.30	18.63	-0.57
2570	-7.57	17.51	-0.83
2575	-7.65	17.19	-0.83
2580	-7.74	16.82	-0.94

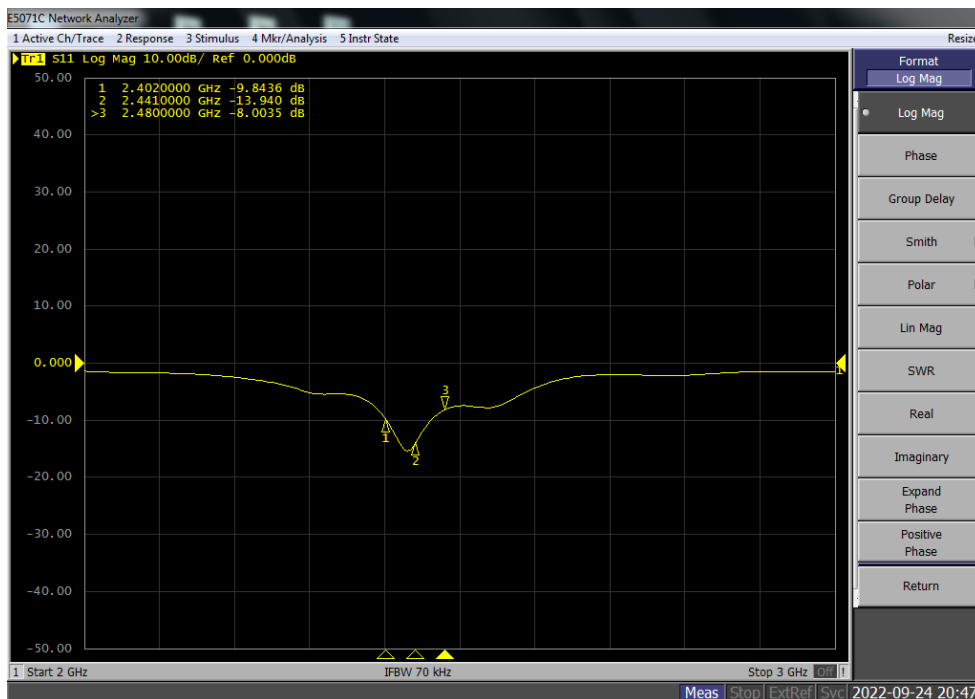


## 6 Pattern Plots

### 6.1 Return Loss



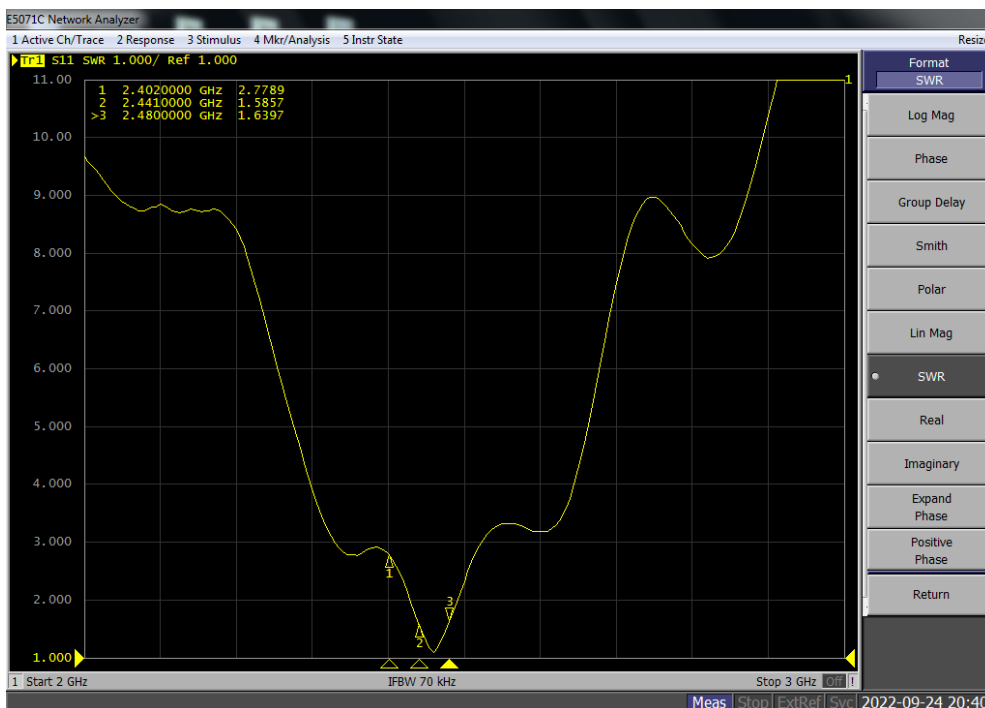
Free Space Left #1



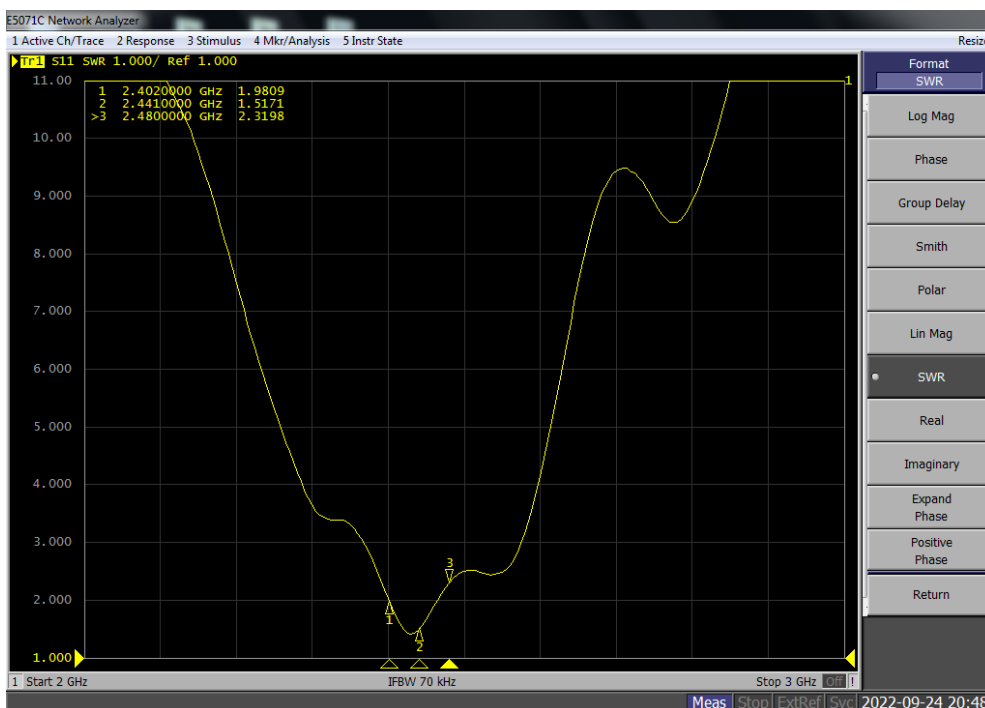
Free Space Right #1



## 6.2 VSWR



Free Space Left #1

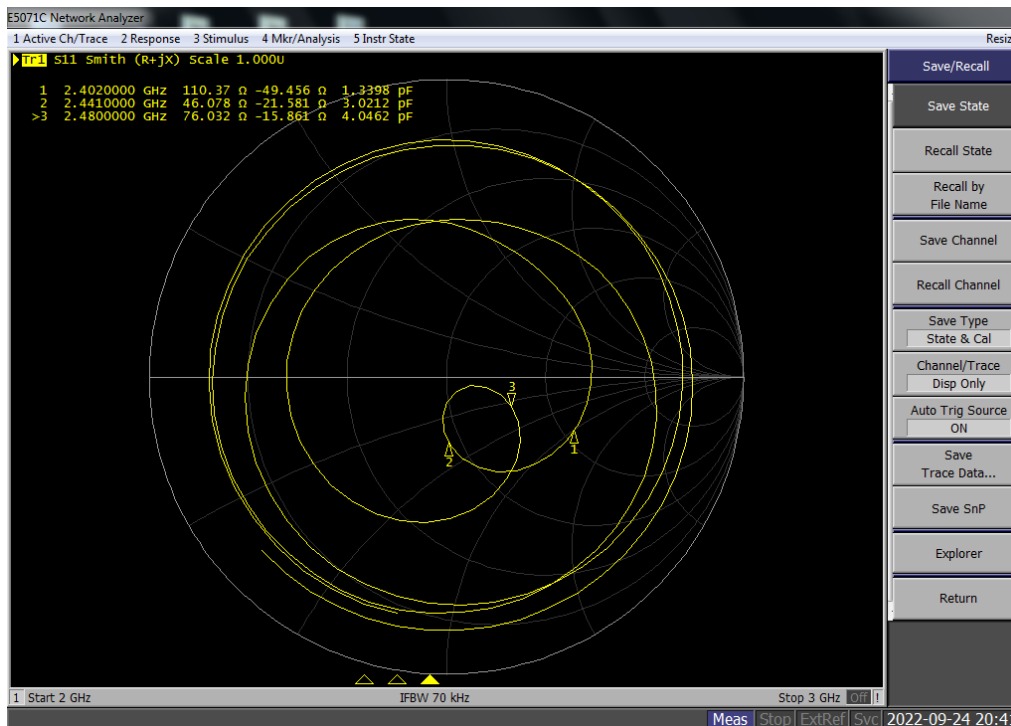


Free Space Right #1

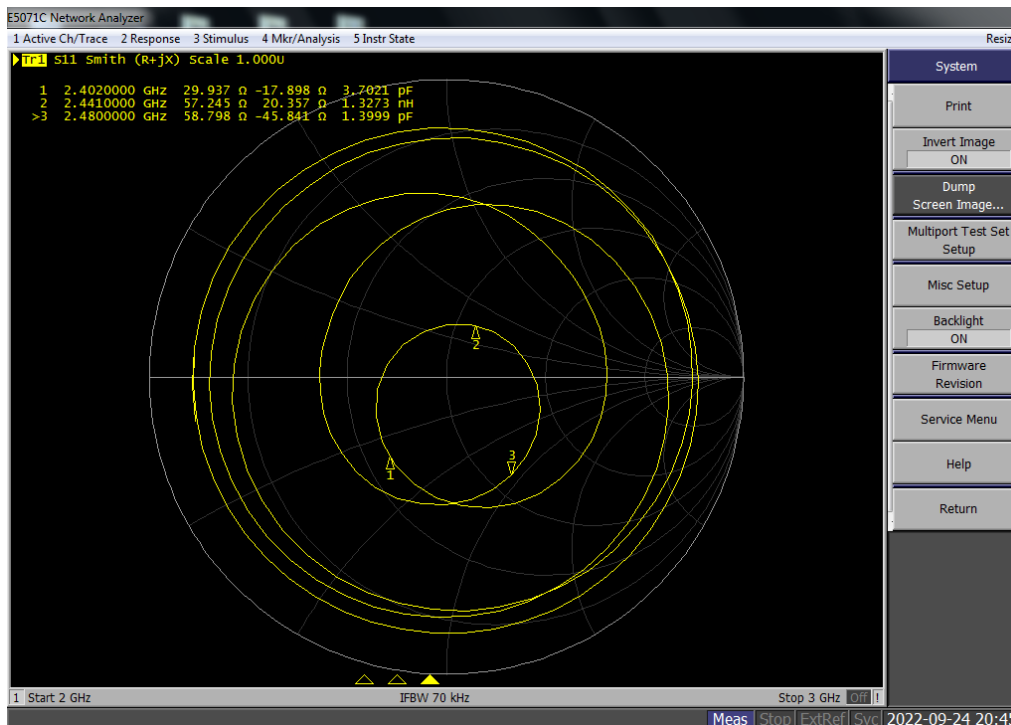




## 6.3 Stimulus



Free Space Left #1



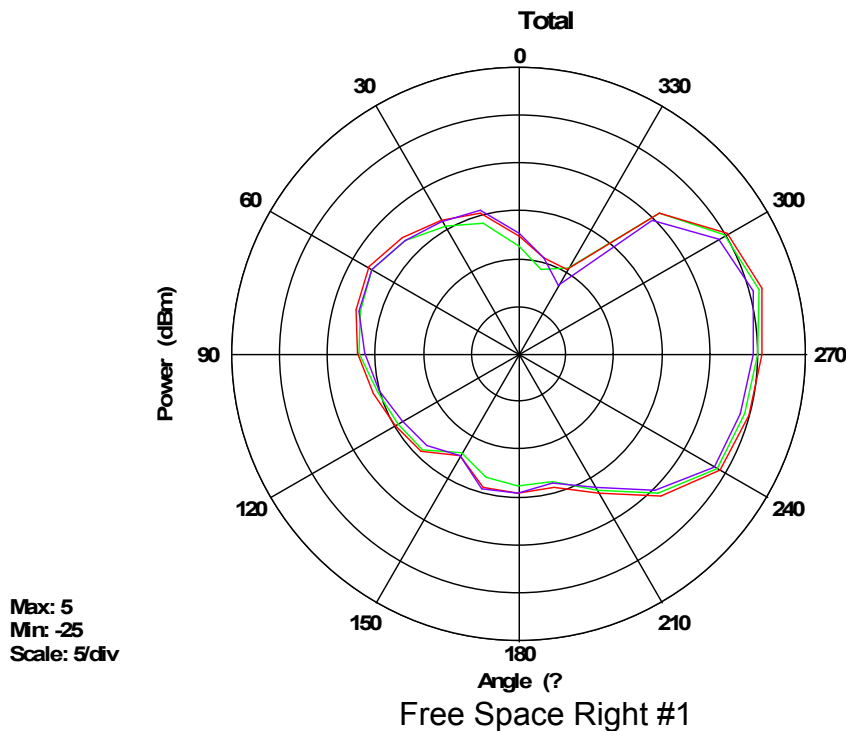
Free Space Right #1



## 7 2-D Antenna Pattern(Theta=90°)



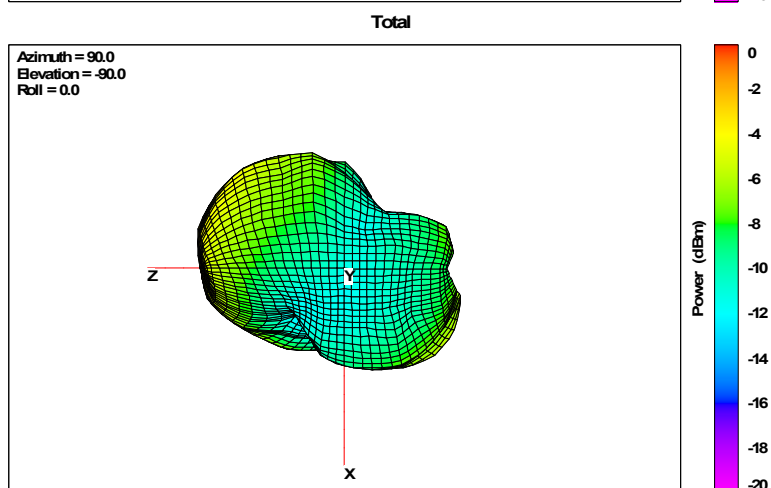
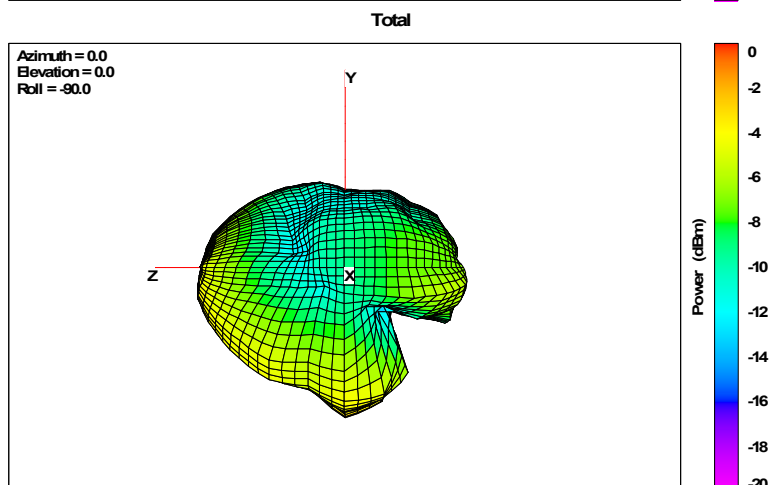
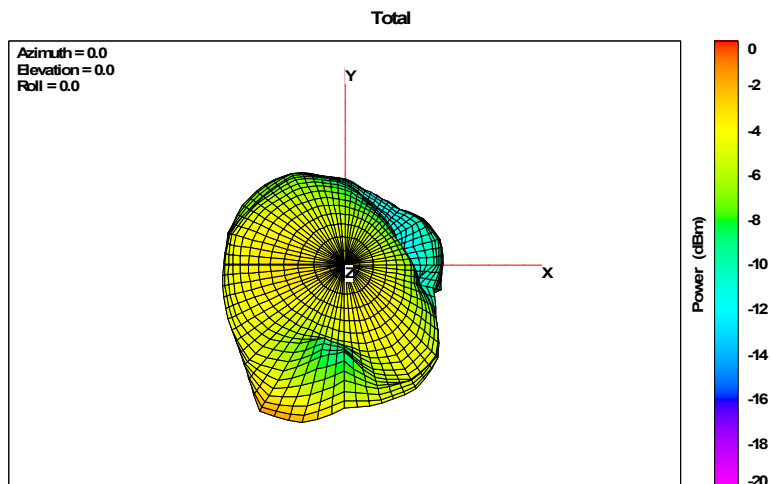
2402 MHz  
2441 MHz  
2480 MHz



2402 MHz  
2441 MHz  
2480 MHz

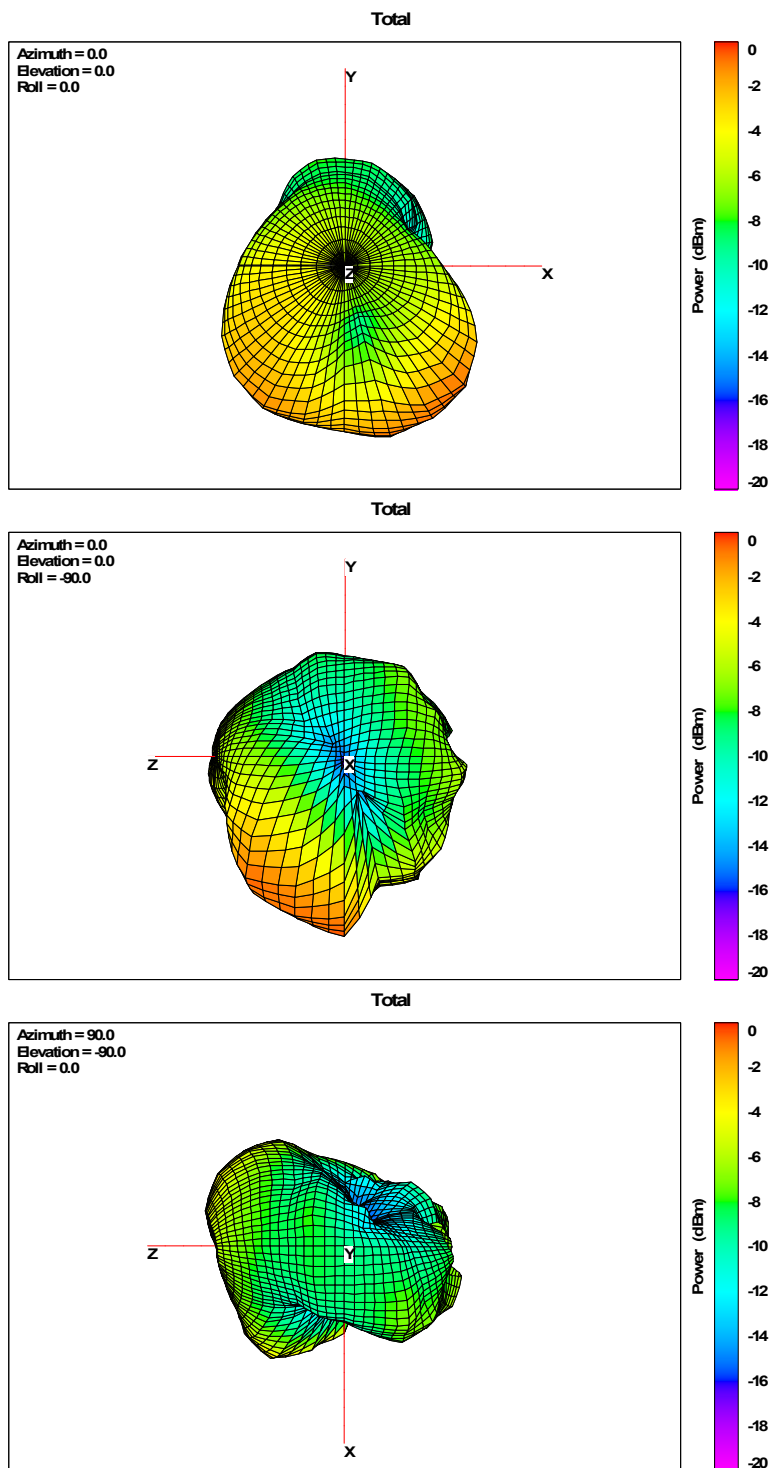


## 8 3-D Antenna Pattern



Free Space Left #1





Free Space Right #1





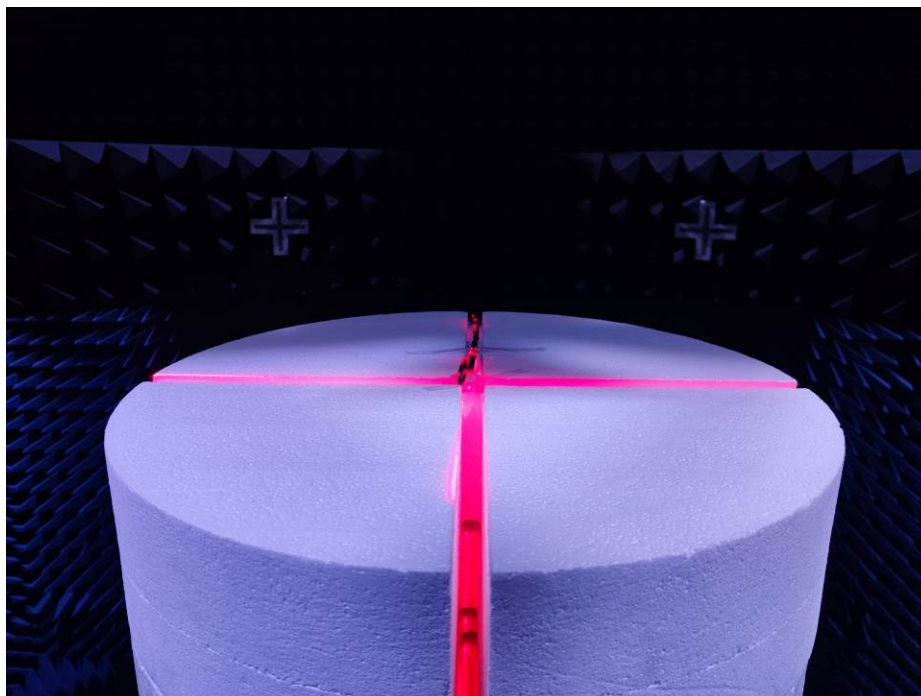
## 9 The EUT and Test Configuration



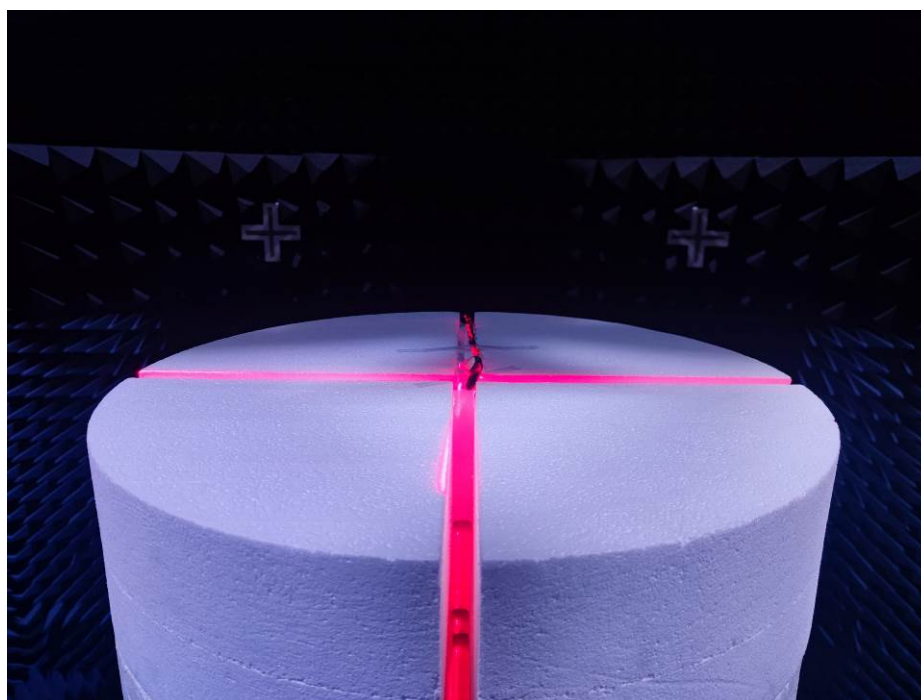
Photo of EUT #1





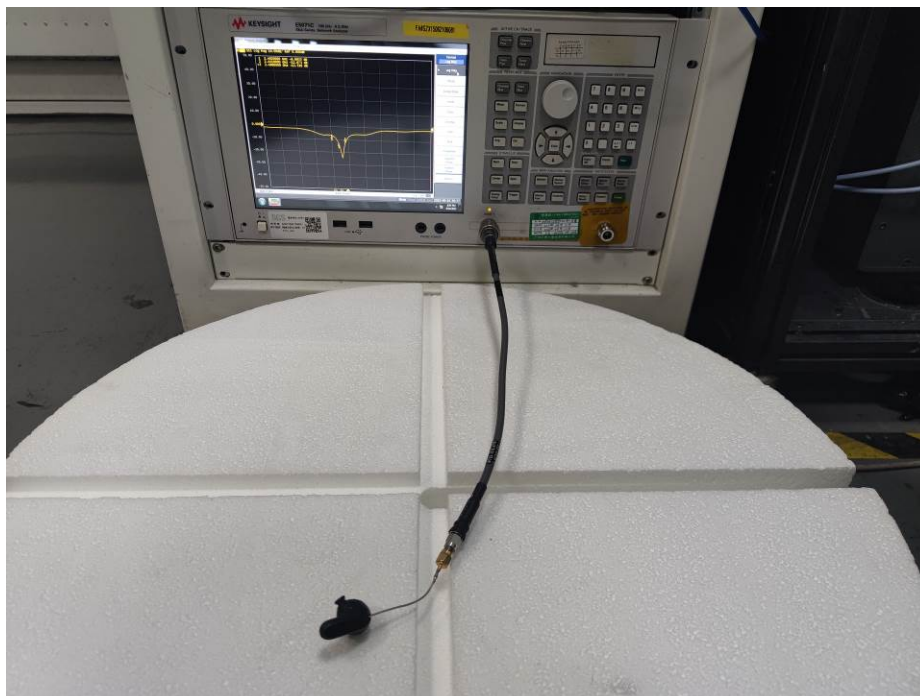


Free Space Left View #1

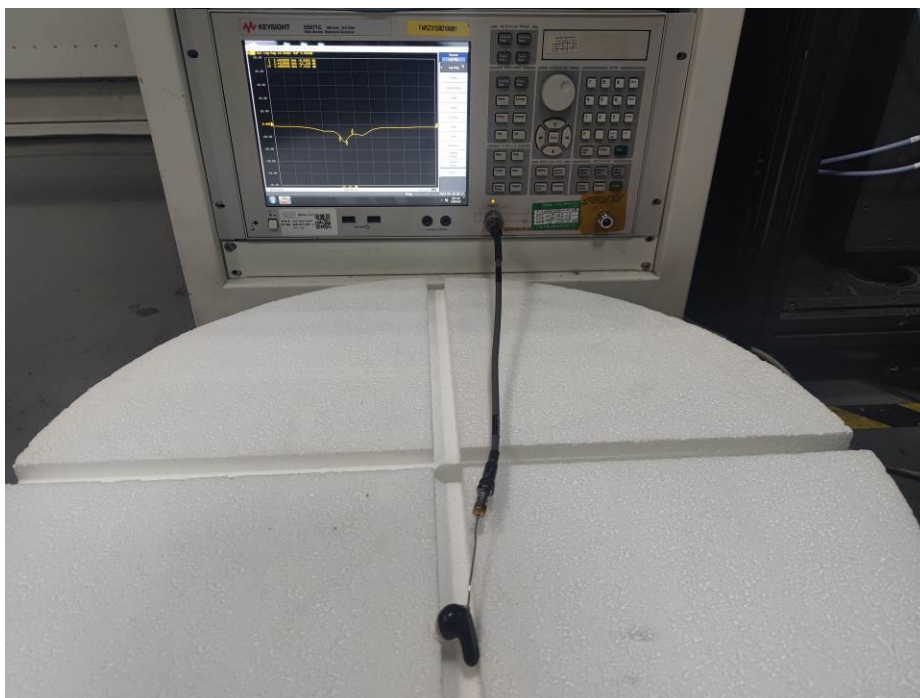


Free Space Right View #1





Free Space Left Impedance Setup #1



Free Space Right Impedance Setup #1

---END---

