

ANTENNA PASSIVE TEST REPORT

Application No.	ZO/2021/C0005
Applicant	SKULLCANDY, INC.
Manufacturer	SKULLCANDY, INC.
Product Name	Crusher ANC 2
Model No.	S6CAW
Standards	ANSI/IEEE Std 149-2008
Date Initial Sample(s) Received	2021.12.03
Testing Start Date	2021.12.07
Testing Finish Date	2022.11.14
Report Issue Date	2022.12.14

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

Yuanyu Luo

Prepared by

Max. Huang

Reviewed By

Ervin Li

Approved by

Revision Version

Report No.	Version	Date	Memo
ZO/2021/C000501	00	2022.12.14	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) 729-2485
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) 729-2485
Fax	N/A
E-mail	James.Nance@skullcandy.com



1.4 General Description of EUT

Device Description:	Crusher ANC 2
Device Manufacturer:	SKULLCANDY, INC.
Device Model:	S6CAW
Hardware Version:	N/A
Software Version:	N/A

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

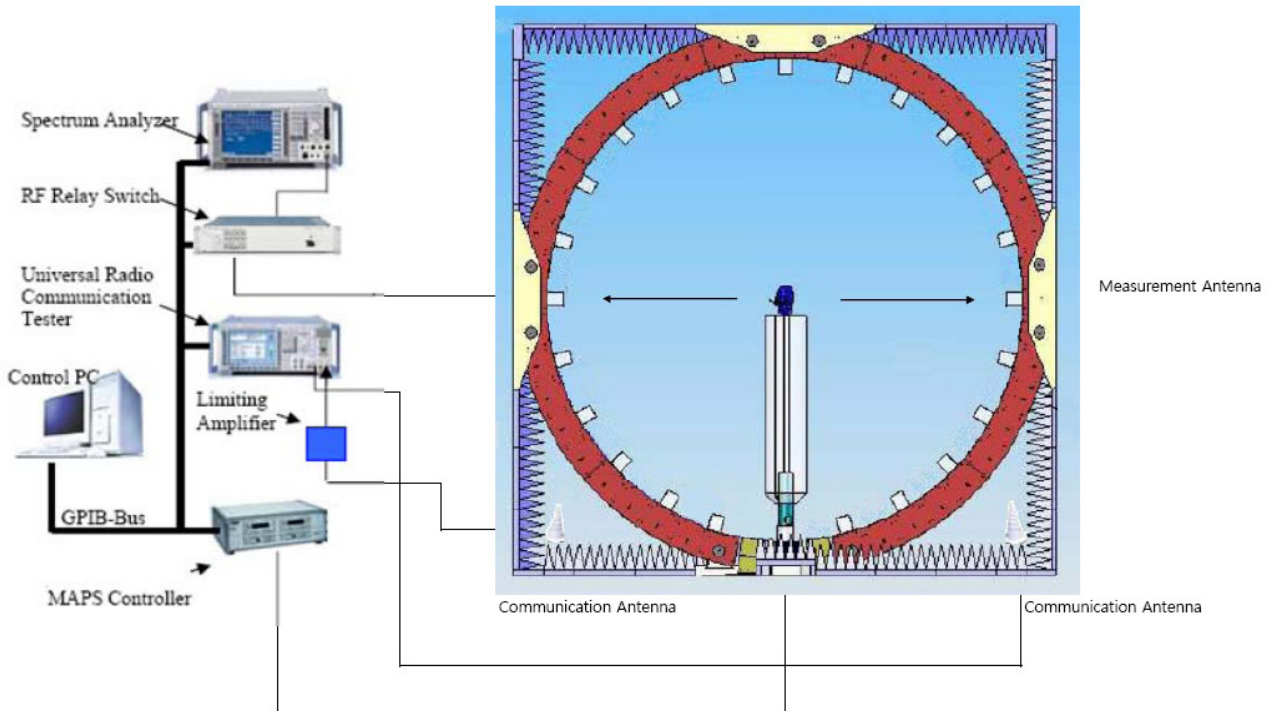
Temperature	Min. =19°C · Max. = 25°C	
Relative humidity	Min. =40% · Max. =72%	
Shield effect	0.7-6GHz	> 100dB
Ground resistance	<0.5Ω	



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



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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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5 Test Results

Free Space #1			
Frequency (MHz)	Efficiency (dB)	Efficiency (%)	Gain (dBi)
2350	-2.68	53.92	3.21
2355	-2.61	54.78	3.16
2360	-2.41	57.45	3.45
2365	-2.45	56.90	3.32
2370	-2.49	56.35	3.31
2375	-2.58	55.16	3.19
2380	-2.55	55.55	3.24
2385	-2.56	55.52	3.30
2390	-2.49	56.41	3.29
2395	-2.35	58.15	3.53
2400	-2.38	57.75	3.43
2402	-2.36	58.10	3.52
2405	-2.33	58.45	3.54
2410	-2.37	57.96	3.47
2415	-2.39	57.66	3.43
2420	-2.49	56.42	3.20
2425	-2.49	56.39	3.18
2430	-2.53	55.88	3.10
2435	-2.51	56.08	3.10
2440	-2.46	56.70	3.16
2441	-2.47	56.60	3.16
2445	-2.48	56.47	3.14
2450	-2.52	55.98	3.06
2455	-2.59	55.05	2.99
2460	-2.67	54.06	2.88

Beside Head #1			
Frequency (MHz)	Efficiency (dB)	Efficiency (%)	Gain (dBi)
2350	-4.08	39.09	2.52
2355	-4.05	39.38	2.60
2360	-3.83	41.37	2.77
2365	-3.89	40.85	2.74
2370	-3.96	40.17	2.64
2375	-4.06	39.23	2.57
2380	-4.08	39.12	2.54
2385	-4.07	39.17	2.58
2390	-4.03	39.49	2.60
2395	-3.84	41.29	2.83
2400	-3.89	40.81	2.73
2402	-3.90	40.70	2.64
2405	-3.83	41.42	2.75
2410	-3.86	41.11	2.77
2415	-3.88	40.92	2.72
2420	-3.93	40.42	2.71
2425	-3.94	40.38	2.66
2430	-3.92	40.53	2.72
2435	-3.93	40.46	2.65
2440	-3.83	41.39	2.77
2441	-3.84	41.30	2.79
2445	-3.86	41.11	2.66
2450	-3.84	41.33	2.73
2455	-3.90	40.78	2.71
2460	-3.99	39.93	2.60



2465	-2.66	54.20	2.96
2470	-2.81	52.39	2.84
2475	-2.77	52.87	2.85
2480	-2.90	51.30	2.70
2482	-2.89	51.45	2.58
2485	-2.82	52.22	2.57
2490	-2.81	52.35	2.61
2495	-2.64	54.49	2.61
2500	-2.59	55.11	2.79
2505	-2.60	54.98	2.68
2510	-2.65	54.32	2.83
2515	-2.88	51.48	2.57
2520	-2.98	50.35	2.46
2525	-3.14	48.47	2.32
2530	-3.17	48.21	2.25
2535	-3.24	47.47	2.36
2540	-3.26	47.19	2.31
2545	-3.19	47.95	2.60
2550	-3.30	46.78	2.47
2555	-3.32	46.52	2.56
2560	-3.50	44.70	2.27
2565	-3.54	44.22	2.20
2570	-3.67	42.95	1.99
2575	-3.75	42.15	1.84
2580	-3.70	42.63	1.93

2465	-3.95	40.31	2.65
2470	-4.11	38.83	2.43
2475	-4.04	39.47	2.48
2480	-4.19	38.07	2.22
2482	-4.15	38.45	2.35
2485	-4.07	39.15	2.30
2490	-4.06	39.24	2.34
2495	-3.86	41.09	2.52
2500	-3.81	41.61	2.66
2505	-3.80	41.69	2.66
2510	-3.81	41.59	2.67
2515	-4.05	39.35	2.27
2520	-4.12	38.77	2.06
2525	-4.23	37.74	1.92
2530	-4.22	37.87	1.89
2535	-4.23	37.75	1.89
2540	-4.21	37.89	1.87
2545	-4.08	39.07	2.10
2550	-4.18	38.21	1.88
2555	-4.15	38.50	1.99
2560	-4.29	37.23	1.76
2565	-4.28	37.32	1.91
2570	-4.35	36.70	1.90
2575	-4.43	36.09	1.85
2580	-4.27	37.39	2.24



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Beside Head #2			
Frequency (MHz)	Efficiency (dB)	Efficiency (%)	Gain (dBi)
2350	-3.43	45.44	3.73
2355	-3.38	45.89	3.86
2360	-3.18	48.11	4.10
2365	-3.21	47.79	4.12
2370	-3.24	47.40	4.01
2375	-3.33	46.40	3.95
2380	-3.34	46.33	3.86
2385	-3.37	46.02	3.84
2390	-3.30	46.83	3.88
2395	-3.15	48.45	4.04
2400	-3.17	48.21	3.95
2402	-3.13	48.62	3.93
2405	-3.10	48.95	3.97
2410	-3.12	48.71	3.88
2415	-3.11	48.88	3.88
2420	-3.16	48.33	3.76
2425	-3.11	48.87	3.81
2430	-3.12	48.71	3.78
2435	-3.07	49.36	3.98
2440	-2.97	50.45	4.07
2441	-2.98	50.39	4.04
2445	-2.93	50.94	4.28
2450	-2.89	51.36	4.29
2455	-2.89	51.44	4.33
2460	-2.90	51.24	4.15
2465	-2.85	51.82	4.13

Beside Head #3			
Frequency (MHz)	Efficiency (dB)	Efficiency (%)	Gain (dBi)
2350	-3.80	41.69	3.09
2355	-3.78	41.91	3.11
2360	-3.59	43.74	3.38
2365	-3.64	43.23	3.29
2370	-3.71	42.54	3.20
2375	-3.82	41.51	3.06
2380	-3.85	41.24	3.02
2385	-3.85	41.19	3.03
2390	-3.78	41.92	3.16
2395	-3.57	43.93	3.50
2400	-3.58	43.87	3.53
2402	-3.55	44.11	3.51
2405	-3.50	44.72	3.67
2410	-3.52	44.41	3.64
2415	-3.54	44.31	3.67
2420	-3.62	43.41	3.49
2425	-3.61	43.60	3.50
2430	-3.64	43.25	3.31
2435	-3.60	43.69	3.37
2440	-3.49	44.76	3.43
2441	-3.50	44.69	3.39
2445	-3.43	45.40	3.64
2450	-3.37	46.05	3.87
2455	-3.33	46.46	3.96
2460	-3.35	46.22	4.01
2465	-3.28	46.99	4.04



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2470	-2.96	50.61	4.06
2475	-2.90	51.27	4.05
2480	-2.97	50.42	4.00
2482	-2.95	50.73	4.03
2485	-2.86	51.80	4.11
2490	-2.79	52.65	4.21
2495	-2.59	55.12	4.40
2500	-2.52	55.97	4.41
2505	-2.51	56.15	4.44
2510	-2.50	56.22	4.31
2515	-2.66	54.25	4.10
2520	-2.70	53.67	3.97
2525	-2.83	52.14	3.83
2530	-2.84	51.94	3.78
2535	-2.89	51.41	3.73
2540	-2.89	51.45	3.78
2545	-2.78	52.76	3.99
2550	-2.84	52.01	3.90
2555	-2.81	52.30	3.94
2560	-2.92	51.00	3.79
2565	-2.92	51.01	3.79
2570	-2.99	50.24	3.72
2575	-3.03	49.74	3.67
2580	-2.97	50.50	3.84

2470	-3.37	46.06	4.04
2475	-3.27	47.09	4.09
2480	-3.31	46.66	4.09
2482	-3.26	47.22	4.27
2485	-3.16	48.28	4.23
2490	-3.03	49.80	4.45
2495	-2.80	52.46	4.74
2500	-2.66	54.14	4.91
2505	-2.62	54.64	5.03
2510	-2.60	54.95	4.97
2515	-2.74	53.19	4.83
2520	-2.81	52.36	4.71
2525	-2.91	51.20	4.65
2530	-2.92	51.06	4.62
2535	-2.94	50.86	4.64
2540	-2.93	50.97	4.71
2545	-2.79	52.61	4.86
2550	-2.83	52.16	4.83
2555	-2.77	52.86	4.87
2560	-2.83	52.11	4.82
2565	-2.81	52.32	4.81
2570	-2.82	52.22	4.79
2575	-2.85	51.86	4.79
2580	-2.73	53.33	4.99

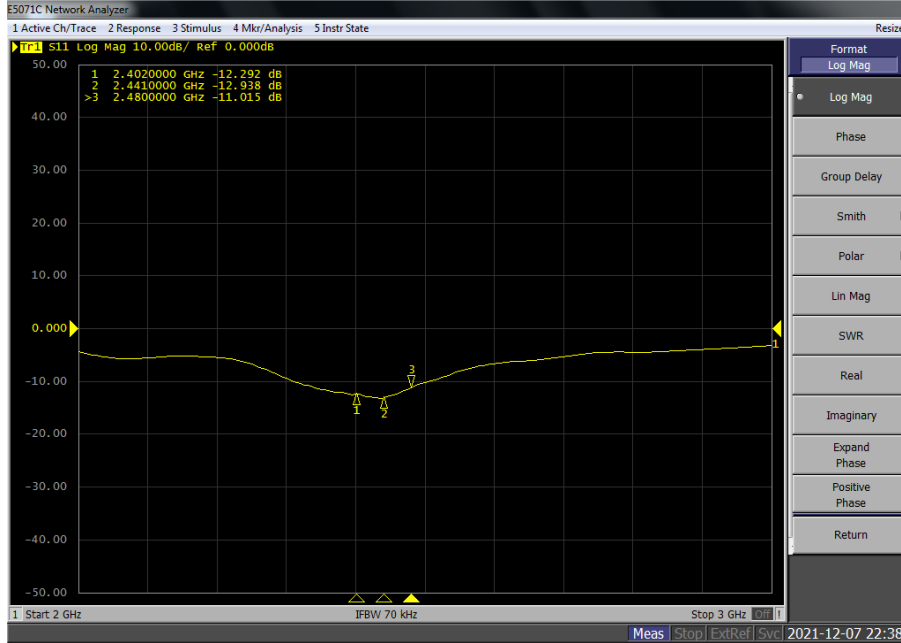


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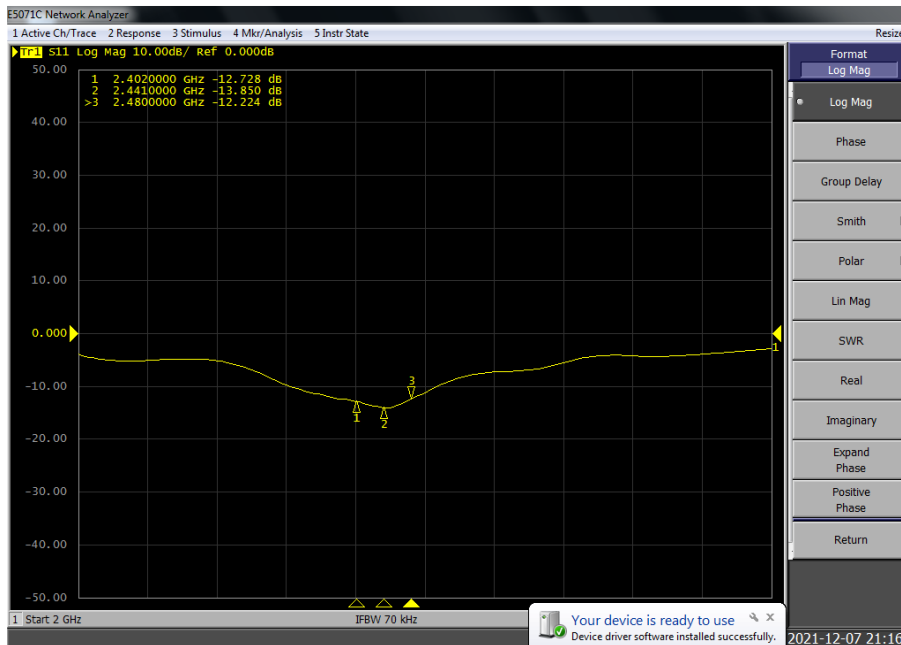
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6 Pattern Plots

6.1 Return Loss

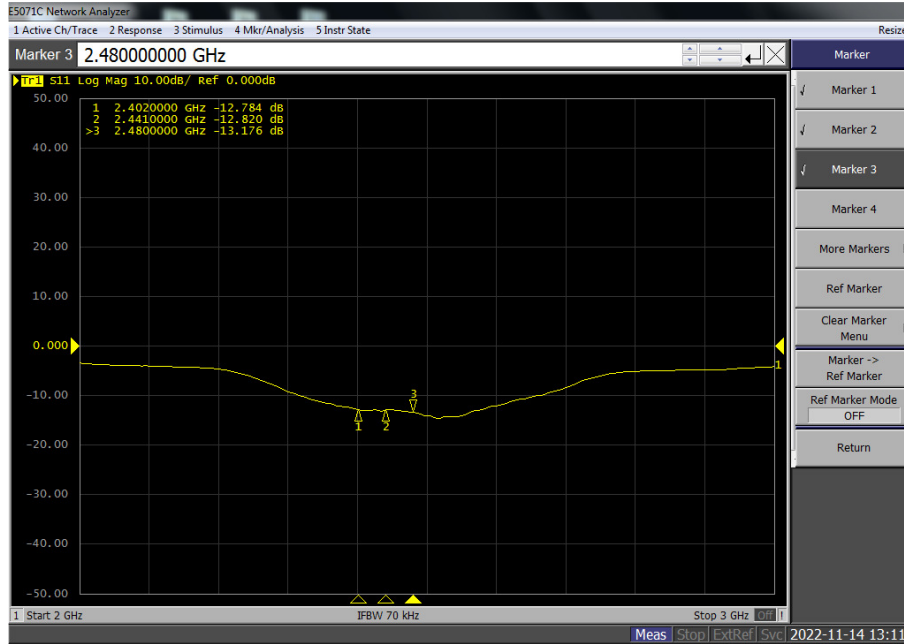


Free Space #1

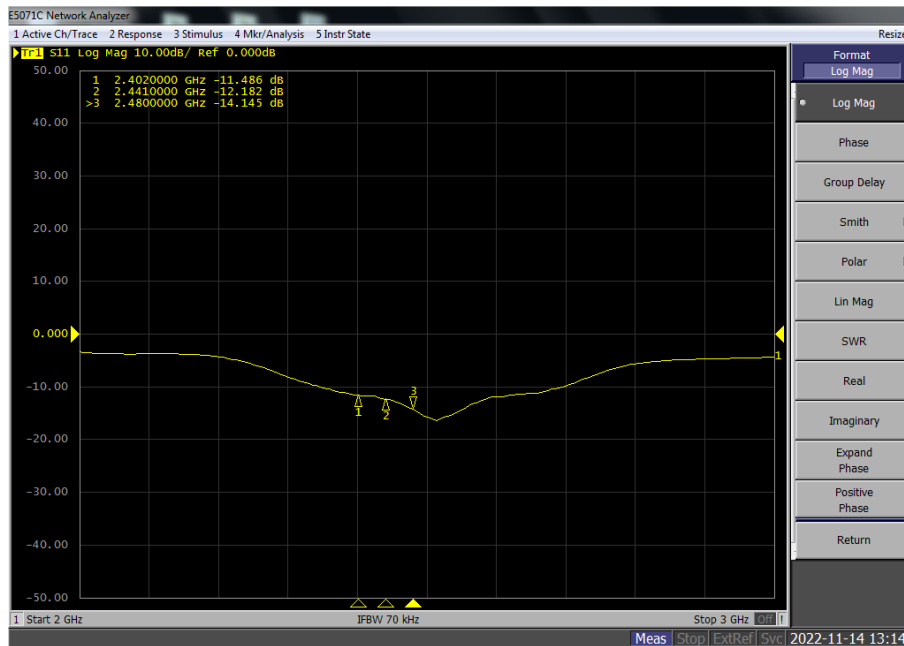


Beside Head #1





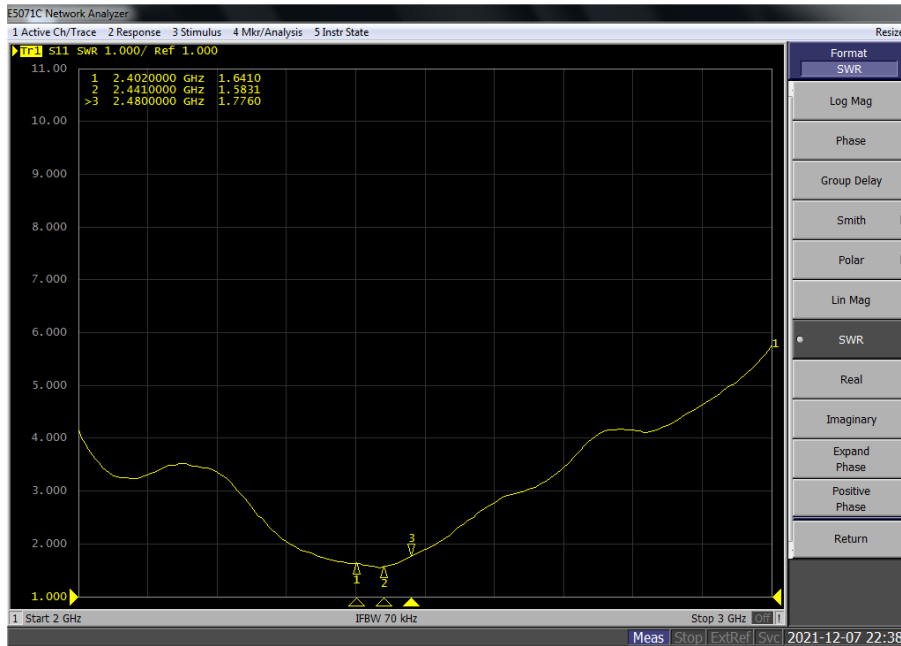
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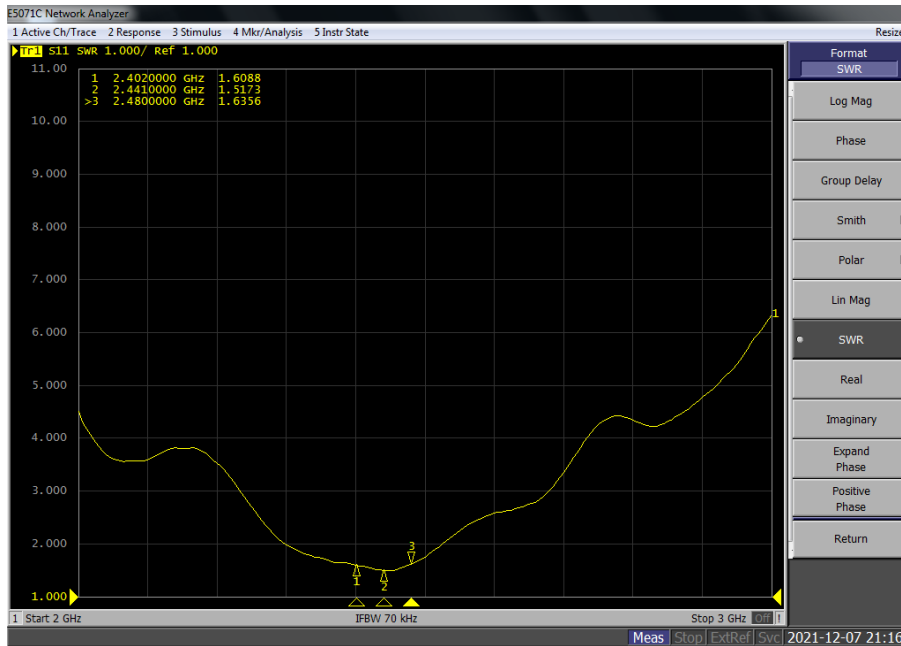
Beside Head #3



6.2 VSWR

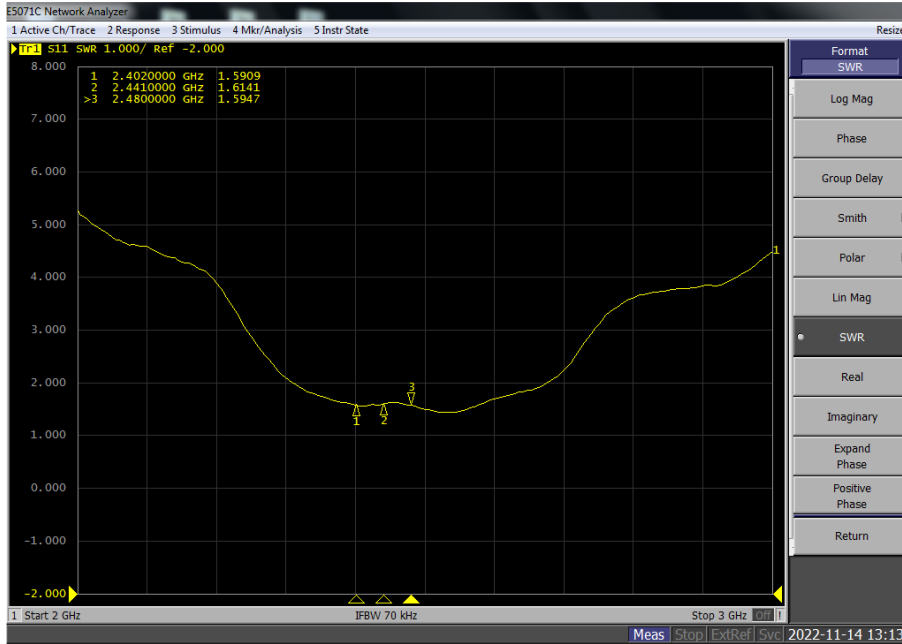


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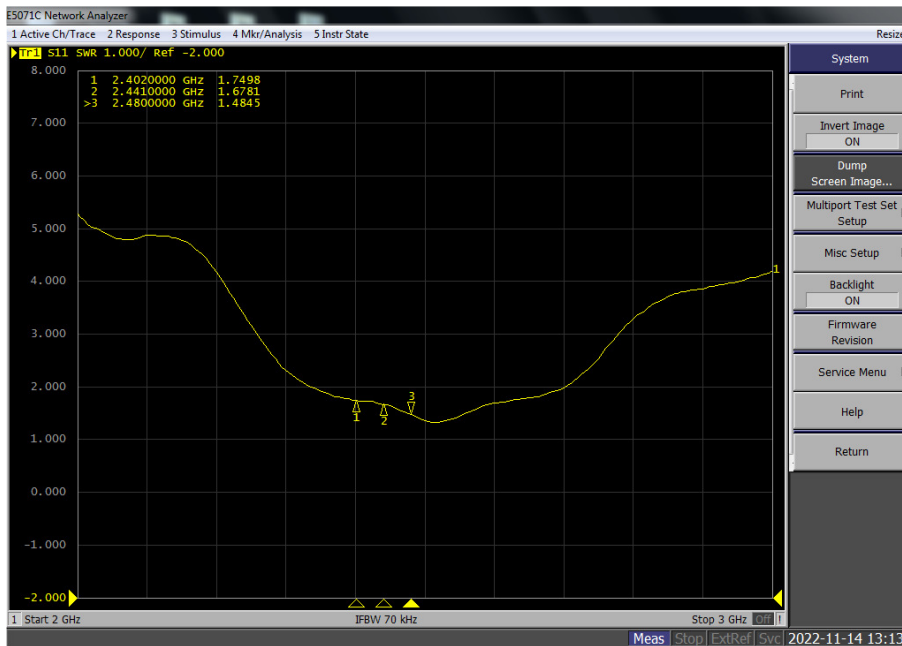


Beside Head #1





Beside Head #2

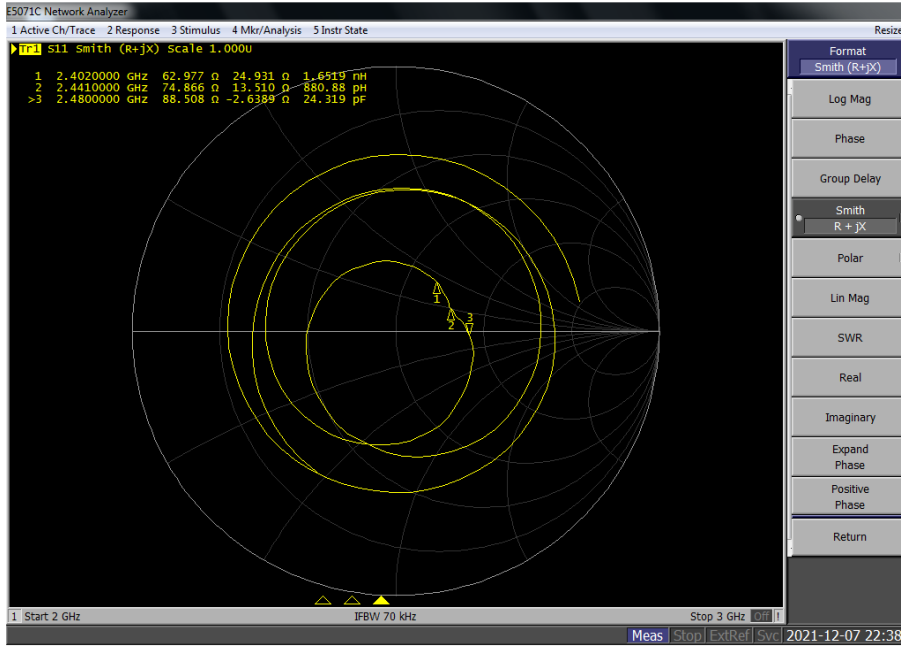


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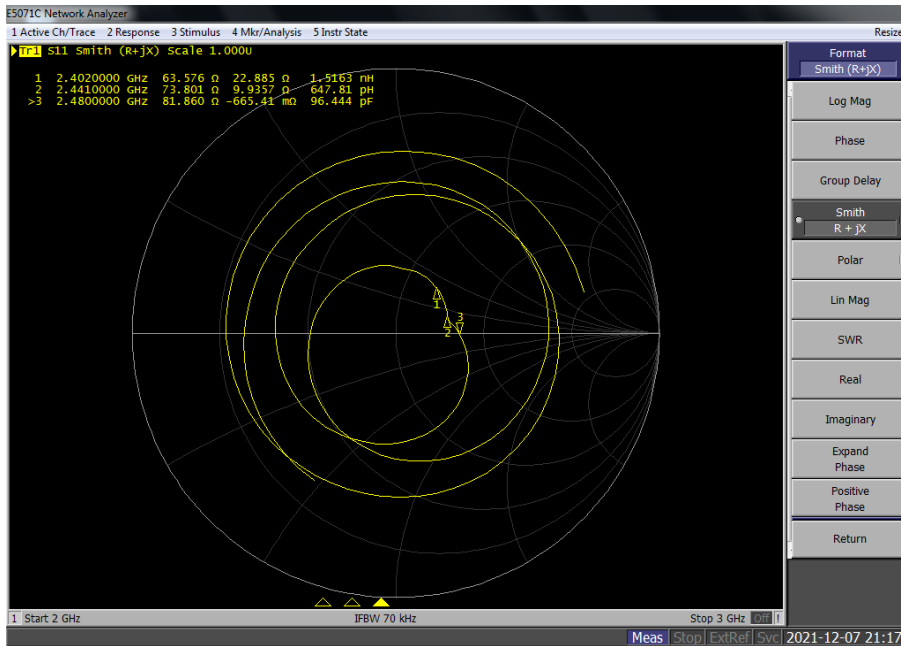


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6.3 Stimulus

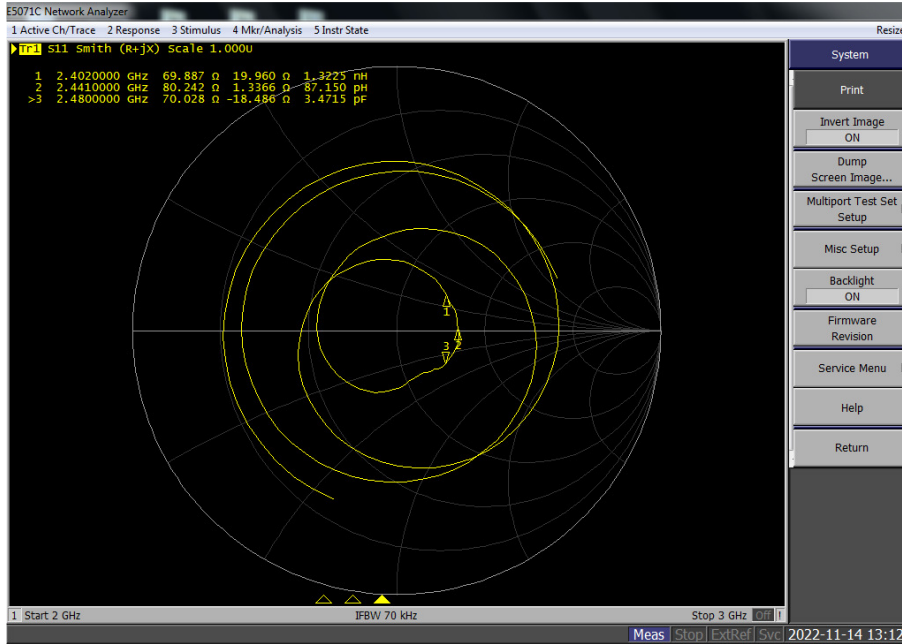


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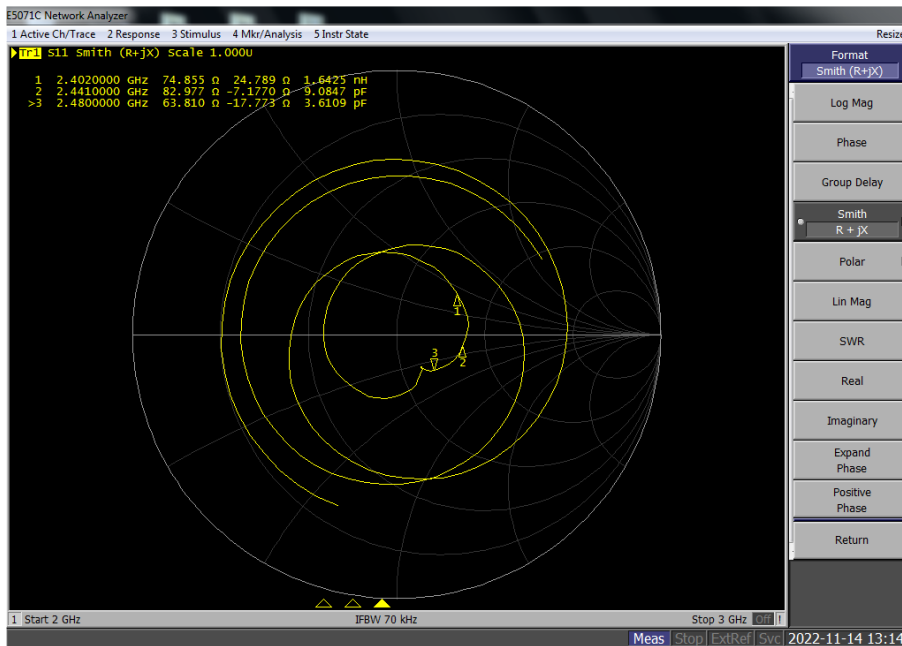


Beside Head #1





Beside Head #2



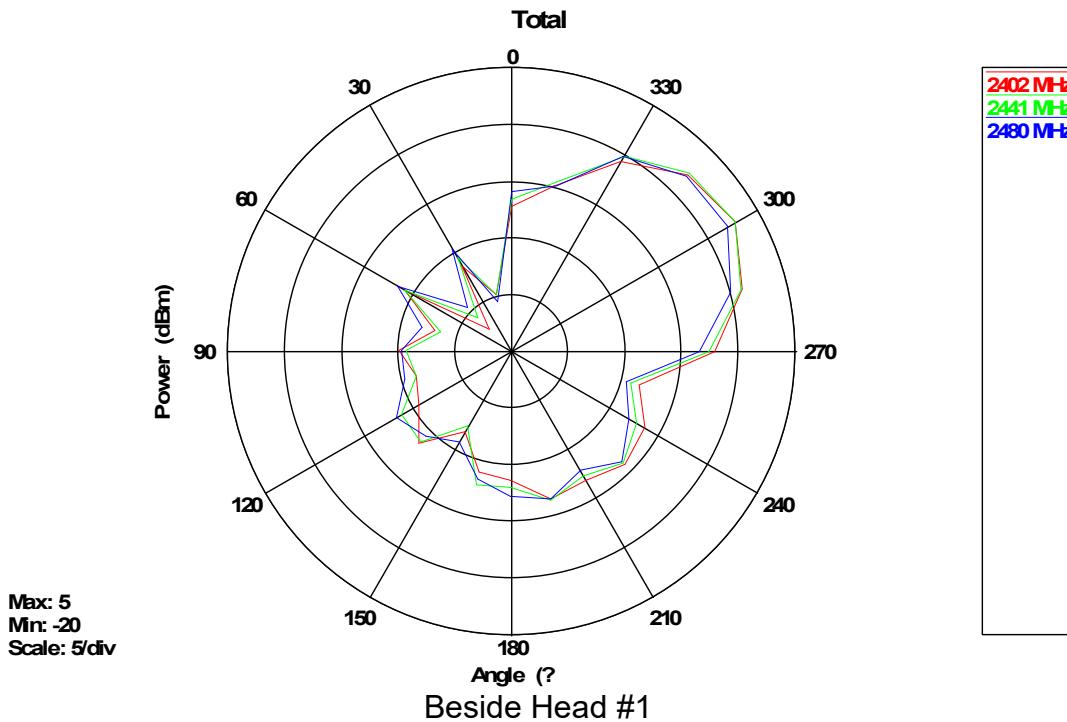
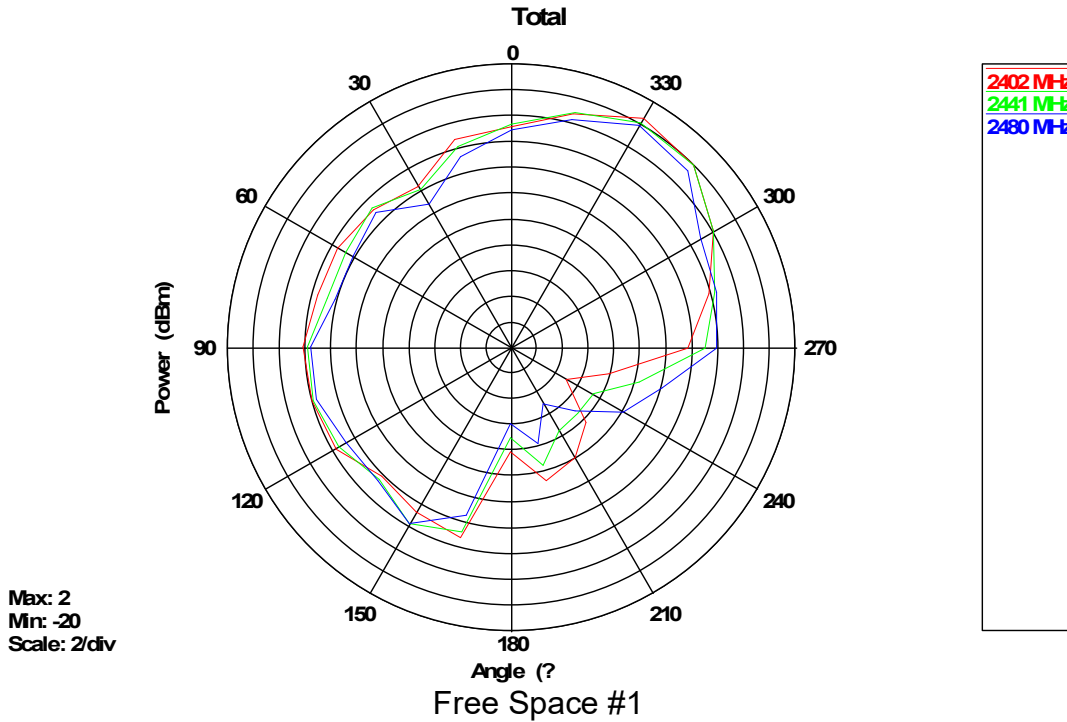
Beside Head #3



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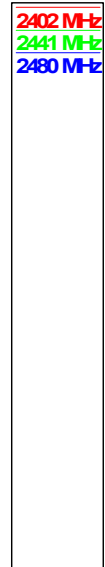
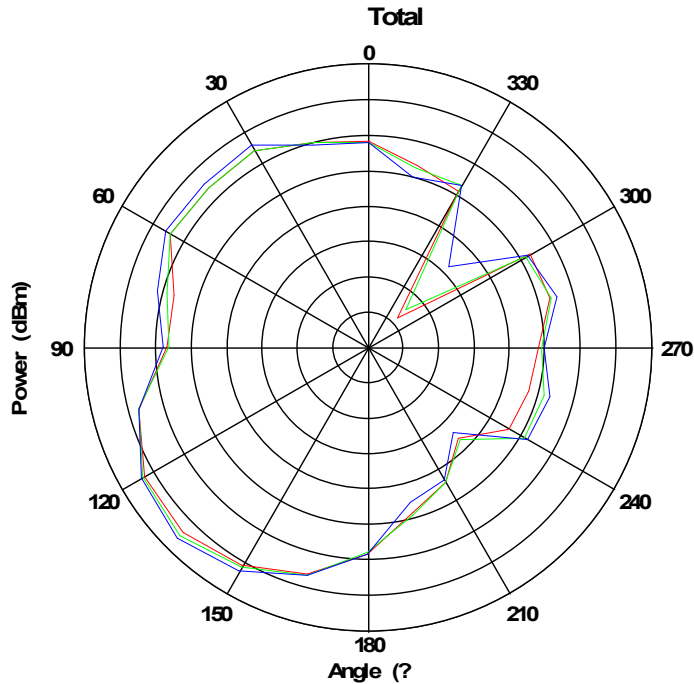
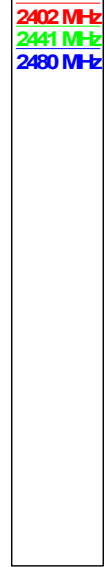
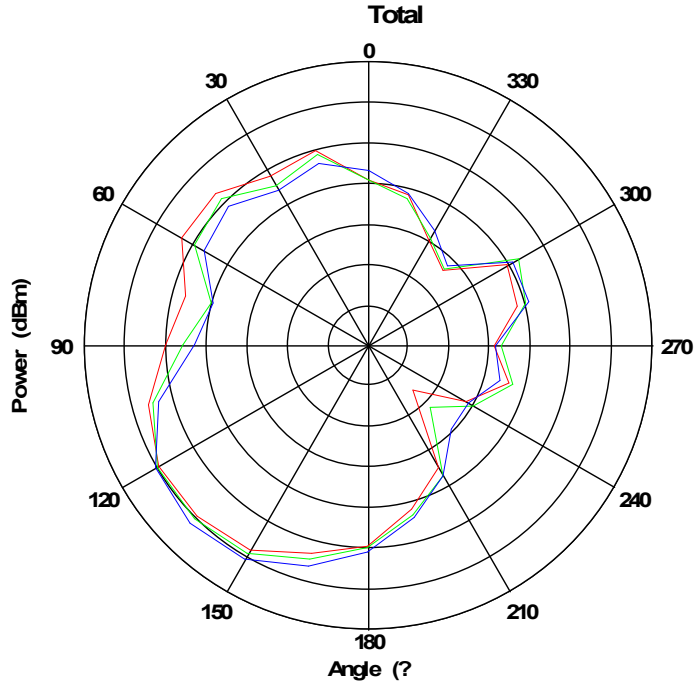
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7 2-D Antenna Pattern(Theta=90°)



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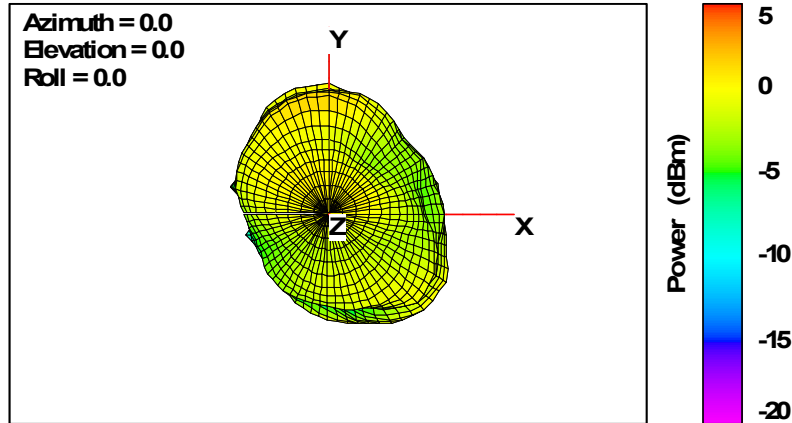


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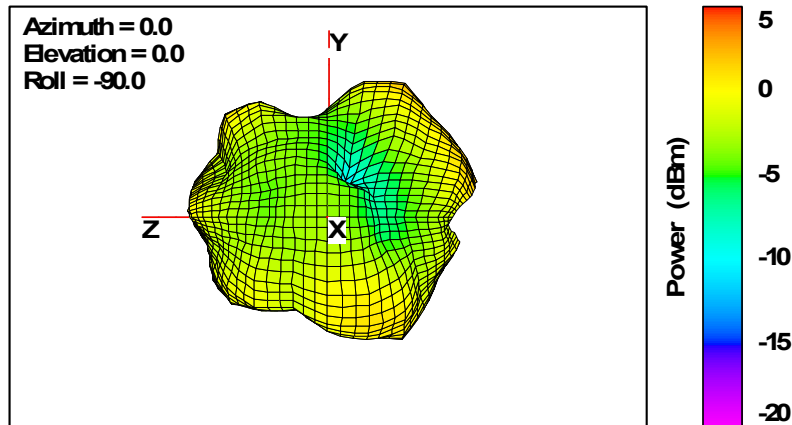
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8 3-D Antenna Pattern

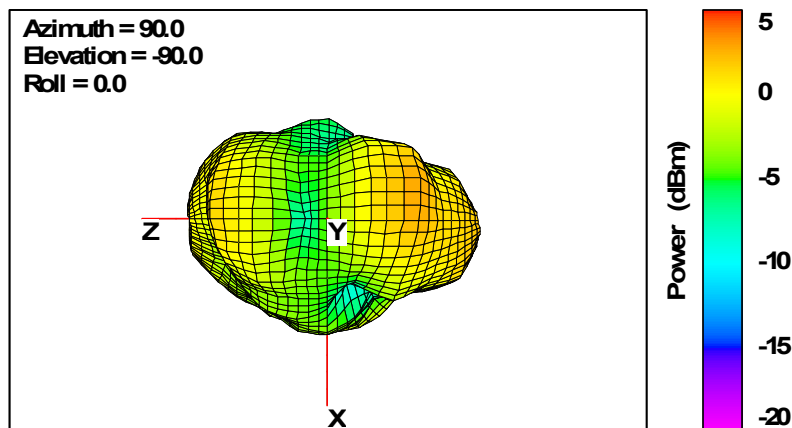
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Total



Total



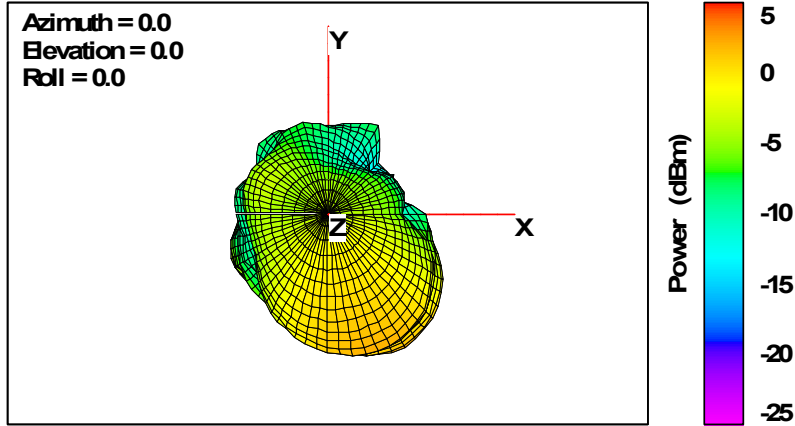
Free Space #1



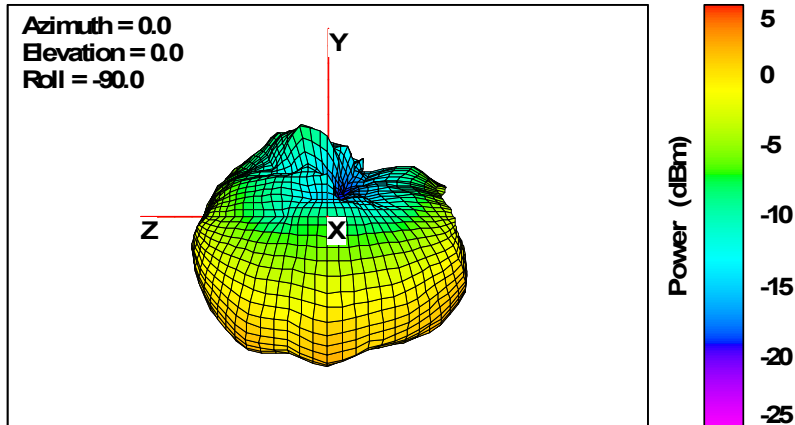
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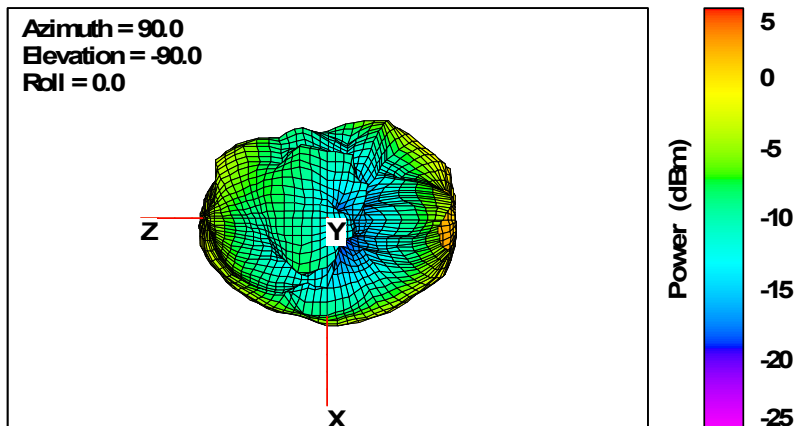
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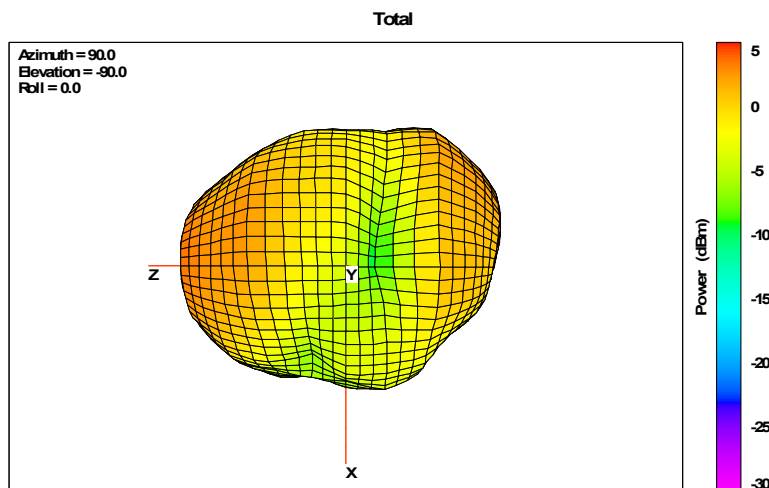
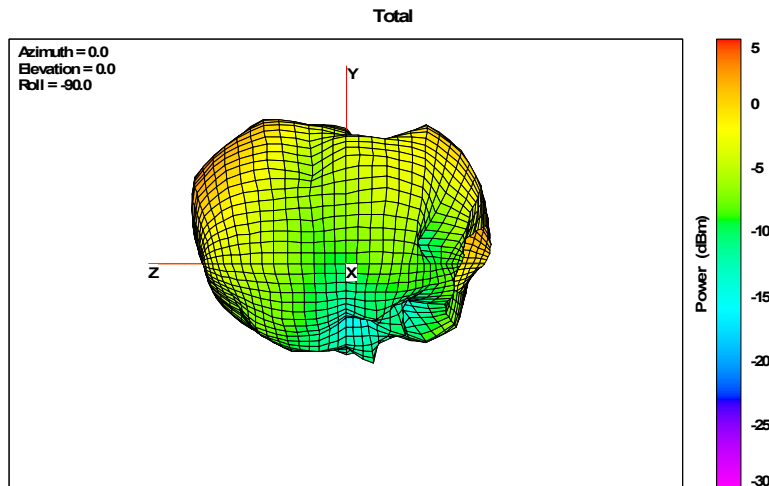
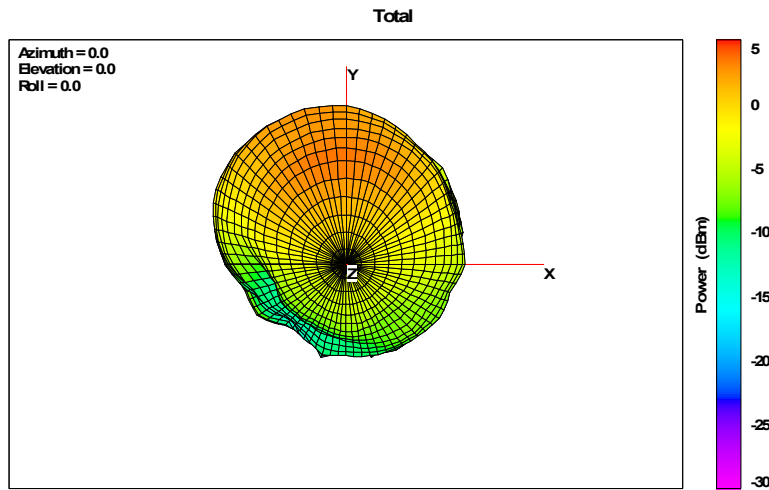


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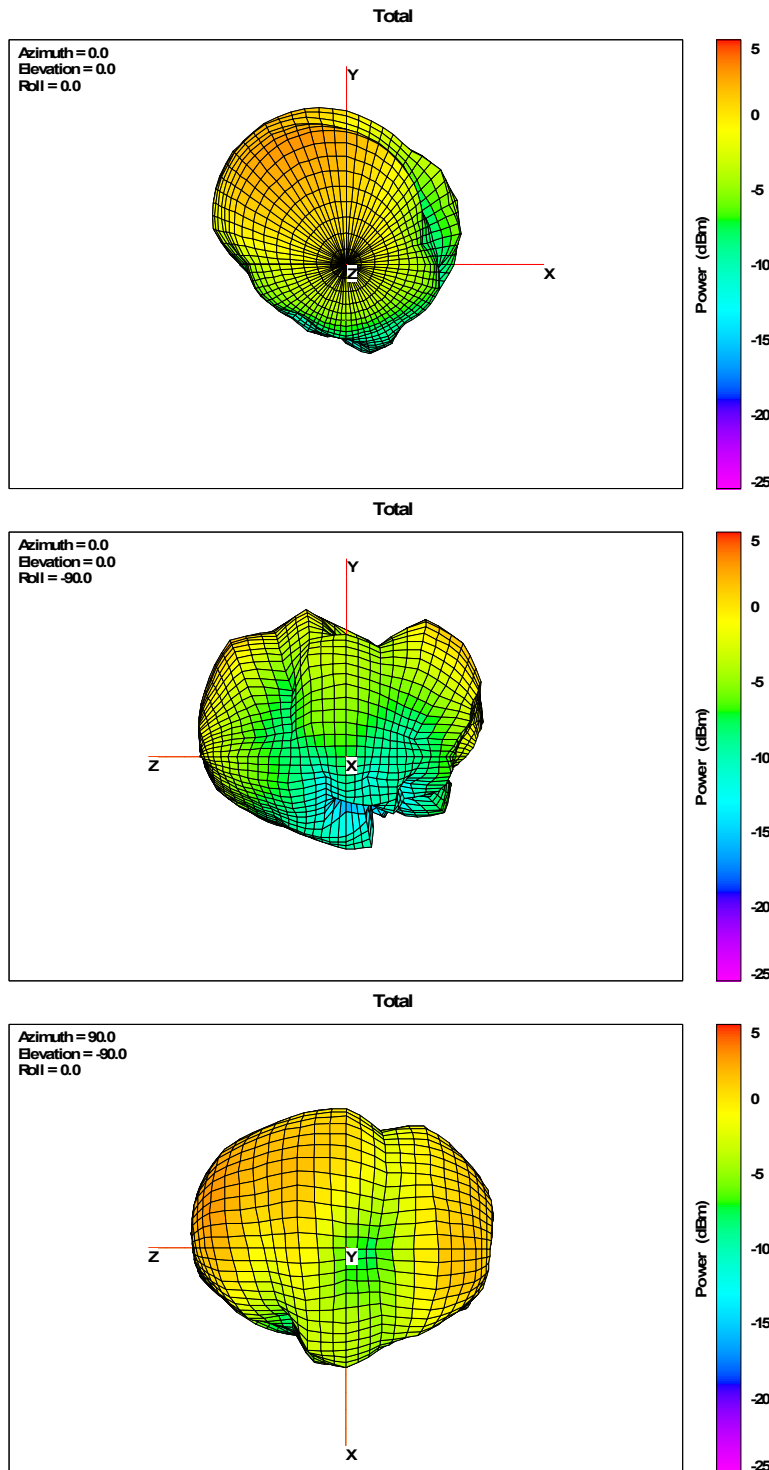


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9 The EUT and Test Configuration



Photo of EUT #1



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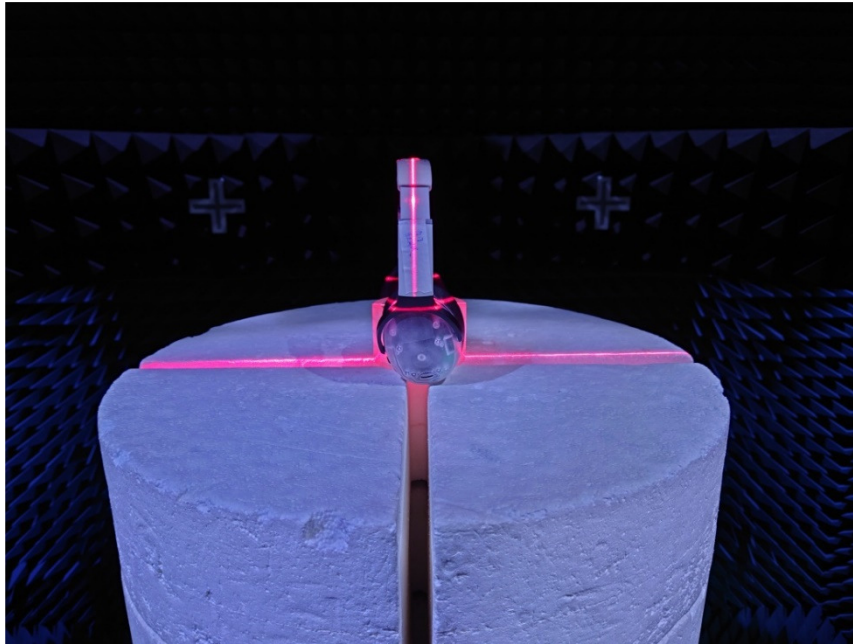


Photo of EUT #2

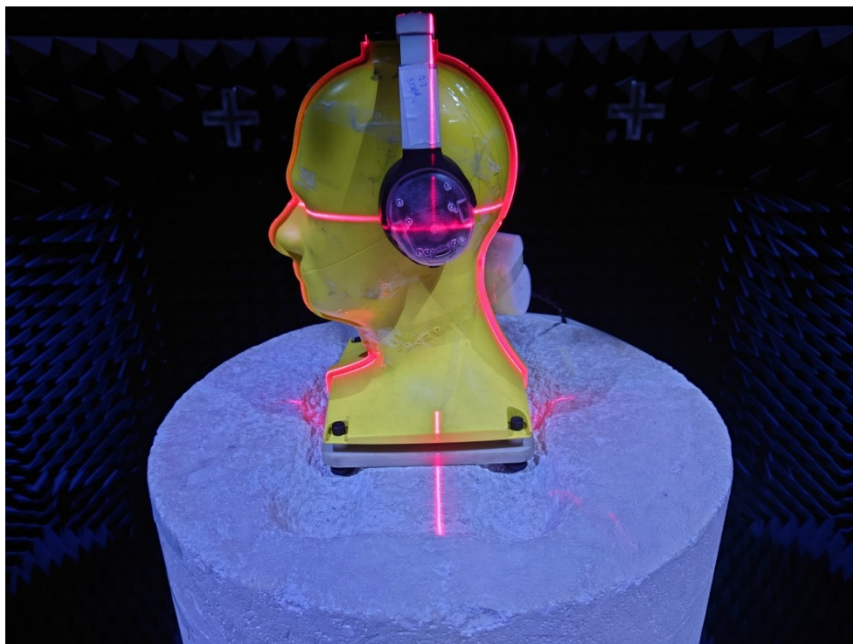


Photo of EUT #3



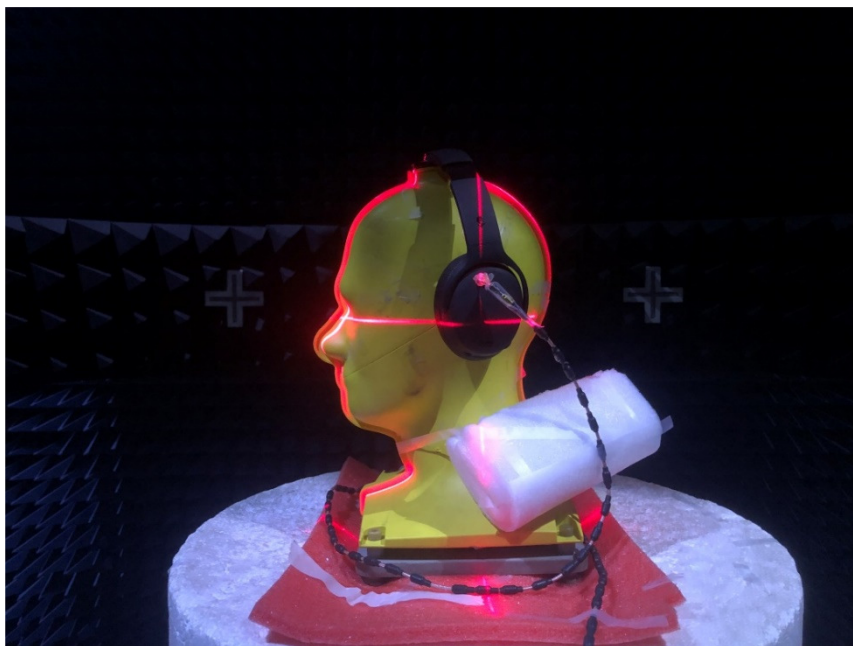


Free Space #1 View

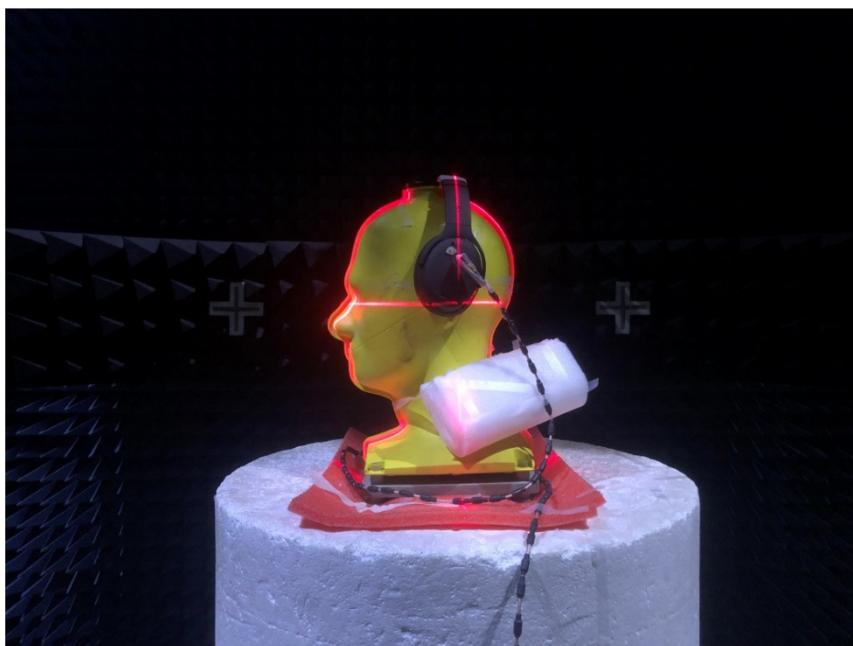


Beside Head #1 View



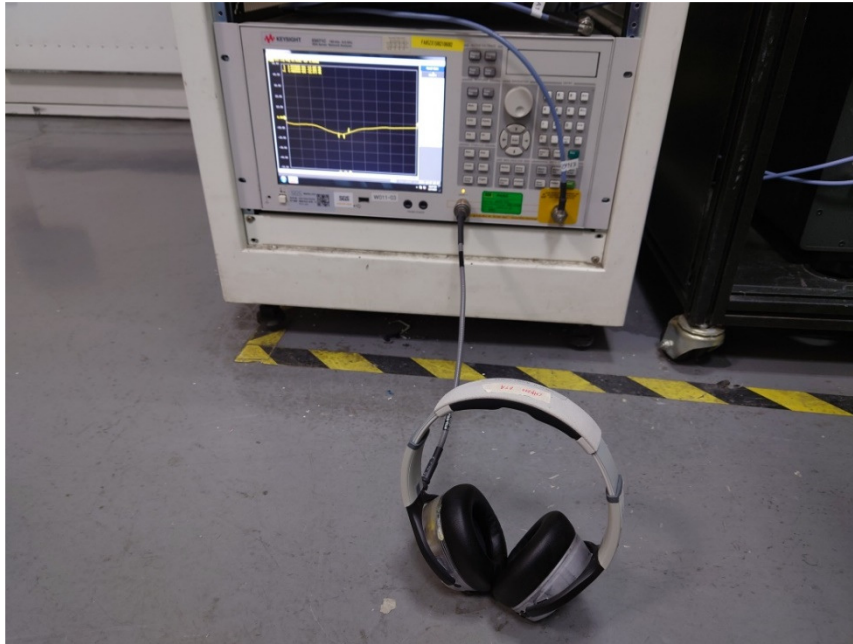


Beside Head #2 View



Beside Head #3 View



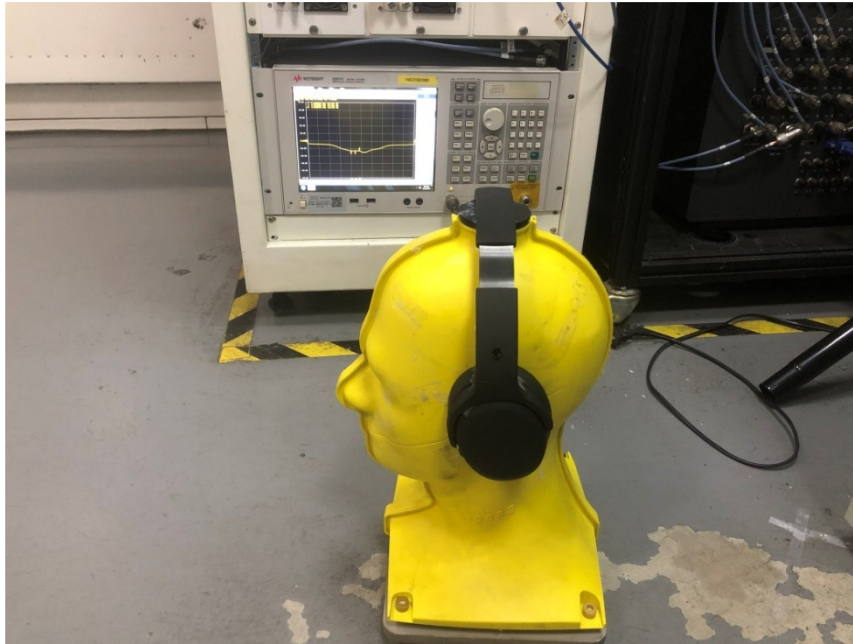


Free Space #1 Impedance Setup

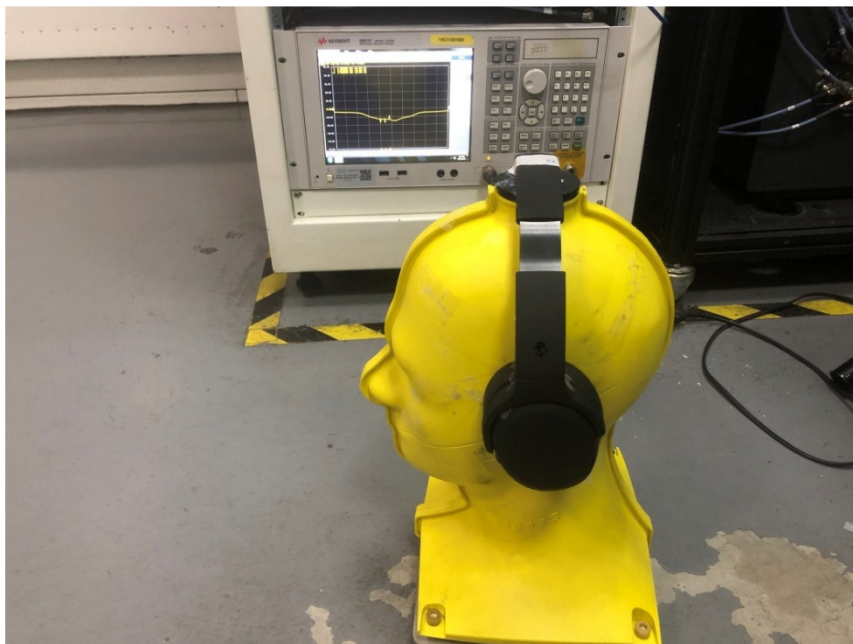


Beside Head #1 Impedance Setup





Beside Head #2 Impedance Setup



Beside Head #3 Impedance Setup

---END---

