



SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

Report No.: SZOA2511000221AT01
Rev.: 01
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ANTENNA PASSIVE TEST REPORT

Application No. SZOA2511000221AT
Applicant Sphero, Inc.
Manufacturer Sphero, Inc.
Product Name Controller
Model No. 760-0603
Standards ANSI/IEEE Std 149-2021.
Date Initial Sample(s) Received Dec. 01, 2025
Testing Start Date Dec. 01, 2025
Testing Finish Date Dec. 04, 2025
Report Issue Date Dec. 16, 2025

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

Yuanyu Luo

Prepared by: Yuanyu Luo/ Test
Engineer

Ervin Li

Approved by: Ervin Li/ Technical
Manager



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch Wireless Laboratory

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Revision History

Revision	Issue Date	Description
01	Dec. 16, 2025	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	Sphero, Inc.
Applicant's Address	7121B Shelby Ave, Dock 85, Greenville, TX, 75402
Contact	Edith NG
Tel.	852 65768623
Fax	N/A
E-mail	edith.ng@sphero.com

1.3 Details of Manufacturer

Manufacturer's Name	Sphero, Inc.
Manufacturer's Address	7121B Shelby Ave, Dock 85, Greenville, TX, 75402
Contact	Edith NG
Tel.	852 65768623
Fax	N/A
E-mail	edith.ng@sphero.com



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1.4 General Description of EUT

Device Description:	Controller
Device Manufacturer:	Sphero, Inc.
Device Model:	760-0603
Antenna Type:	PCB antenna
Antenna Dimension:	3.2 x 1.6 x 0.5 mm

1.5 Test Procedure

Testing is performed according to the **ANSI/IEEE Std 149-2021**.



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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	



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2 OTA Measurements System Configuration

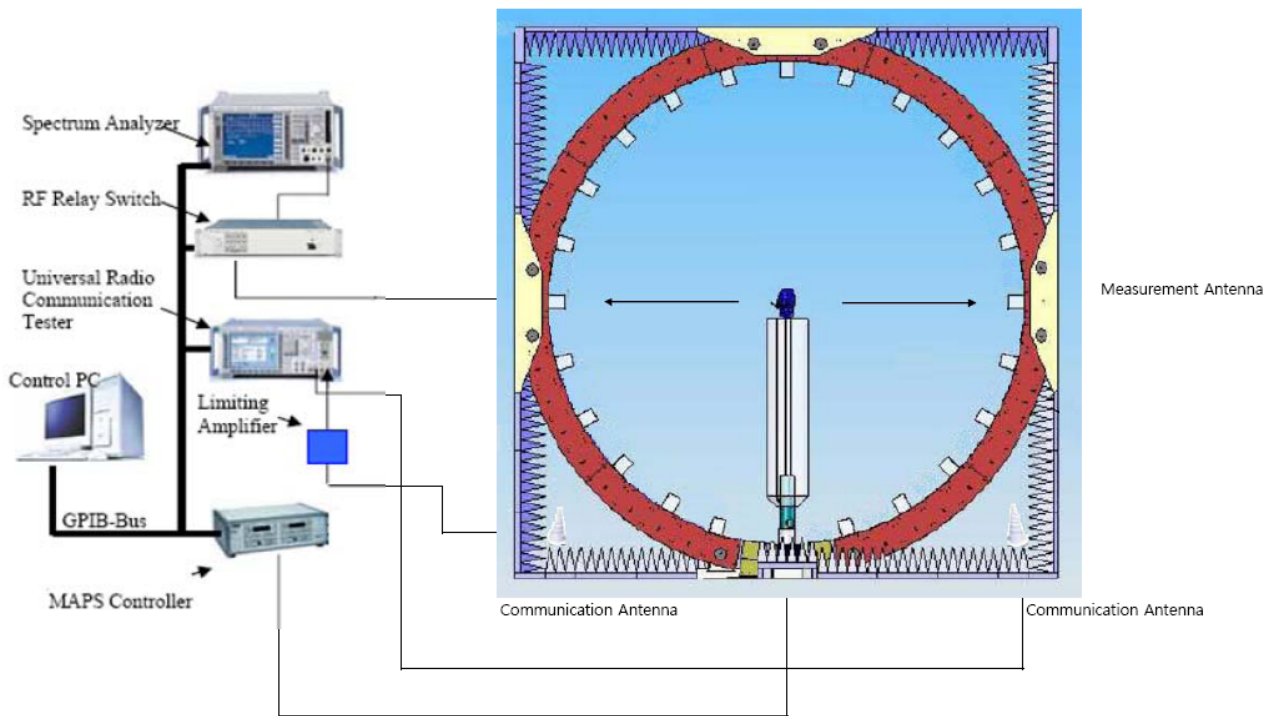
2.1 Test Configuration

Testing Condition:

- Temperature: $22 \pm 3^\circ\text{C}$
- Humidity: $< 80\%$

Measurement Facility:

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 1.95m



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	2024/12/19	2025/12/18
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

Definition of Acronyms:
NCR: No Calibration Requirement.



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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

760-0603			
Frequency (MHz)	Efficiency (dB)	Efficiency (%)	Gain (dBi)
2350	-3.63	43.31	1.42
2355	-3.99	39.90	0.91
2360	-3.90	40.74	1.12
2365	-4.08	39.13	0.85
2370	-4.12	38.75	0.88
2375	-4.14	38.52	1.08
2380	-4.26	37.53	1.08
2385	-4.20	38.02	1.35
2390	-4.35	36.69	1.12
2395	-4.23	37.77	1.38
2400	-4.39	36.41	1.26
2405	-4.48	35.66	1.05
2410	-4.44	35.99	1.10
2415	-4.60	34.70	0.87
2420	-4.57	34.94	0.78
2425	-4.76	33.44	0.80
2430	-4.93	32.11	0.51
2435	-4.91	32.27	0.85
2440	-4.88	32.53	0.74
2445	-4.69	33.97	0.73
2450	-4.76	33.44	0.76
2455	-4.73	33.68	0.73
2460	-4.88	32.49	0.42
2465	-4.88	32.49	0.04
2470	-5.01	31.53	-0.11
2475	-5.10	30.92	-0.41
2480	-5.21	30.15	-0.61
2485	-5.30	29.50	-0.73
2490	-5.25	29.83	-0.84
2495	-5.08	31.05	-0.66
2500	-4.93	32.14	-0.48



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2505	-4.79	33.19	-0.14
2510	-4.83	32.92	-0.15
2515	-5.06	31.21	-0.32
2520	-5.33	29.30	-0.55
2525	-5.60	27.54	-0.85
2530	-5.82	26.19	-0.99
2535	-5.99	25.16	-1.14
2540	-6.07	24.73	-1.10
2545	-6.01	25.07	-1.02
2550	-6.00	25.11	-0.82
2555	-6.01	25.07	-0.79
2560	-6.18	24.09	-0.79
2565	-6.35	23.17	-0.87
2570	-6.50	22.39	-1.06
2575	-6.55	22.11	-1.07
2580	-6.39	22.96	-1.12



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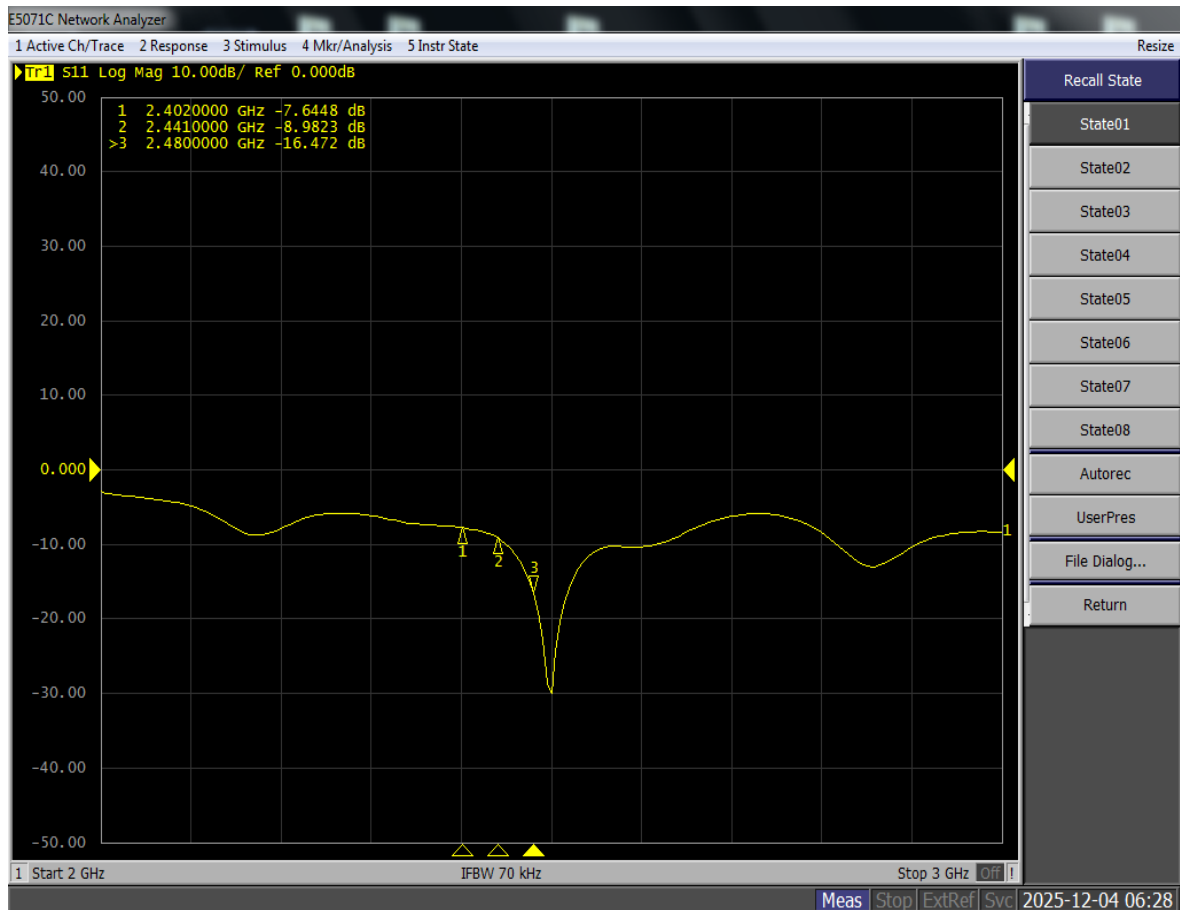
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6 Pattern Plots

6.1 Return Loss



Free Space



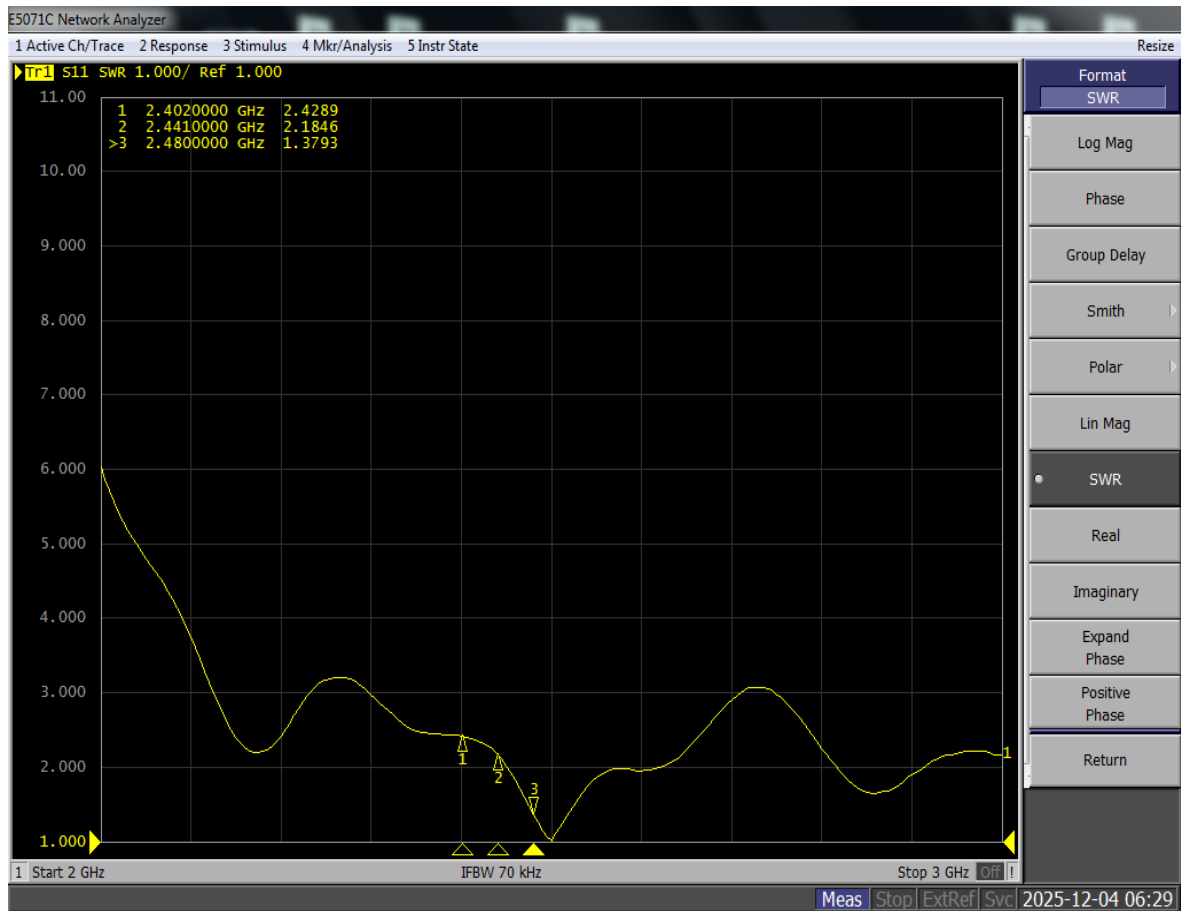
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6.2 VSWR



Free Space



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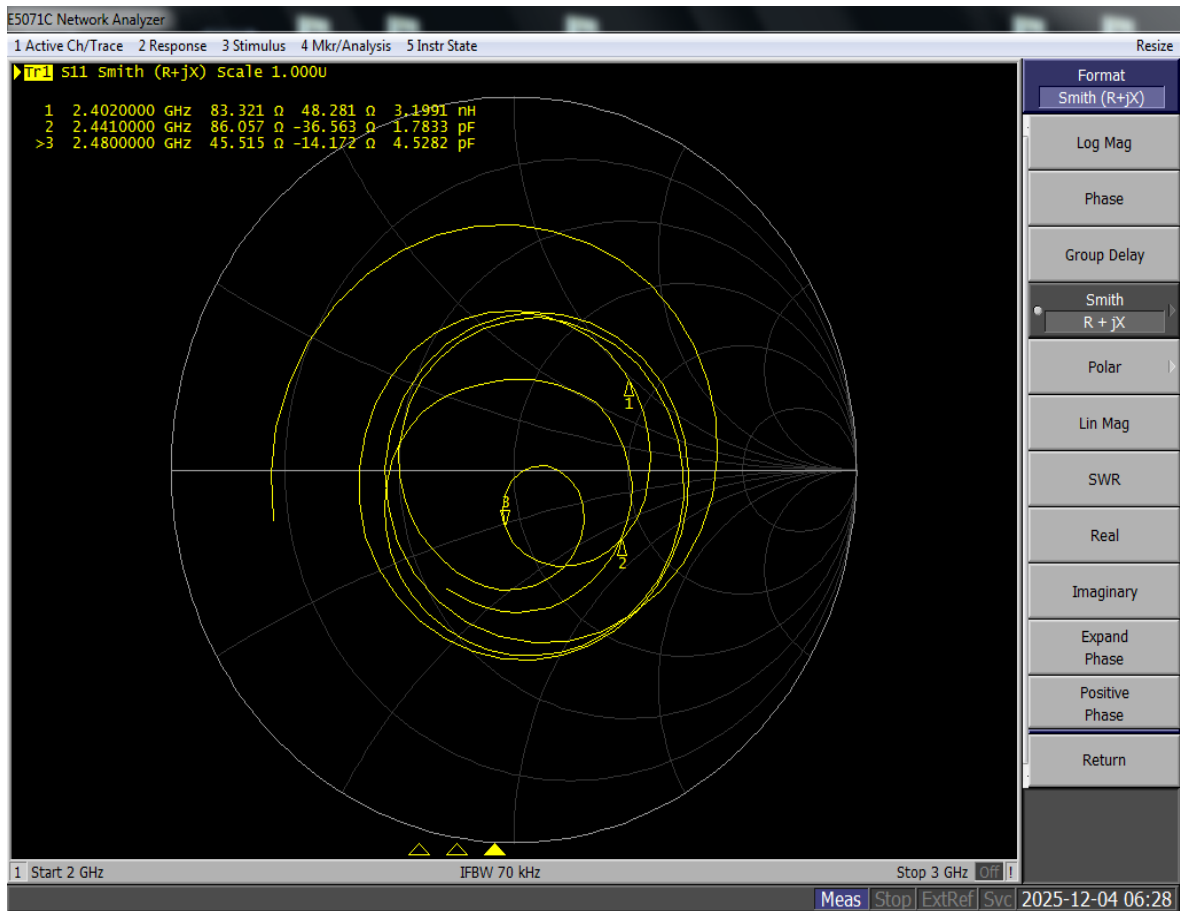
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6.3 Stimulus



Free Space



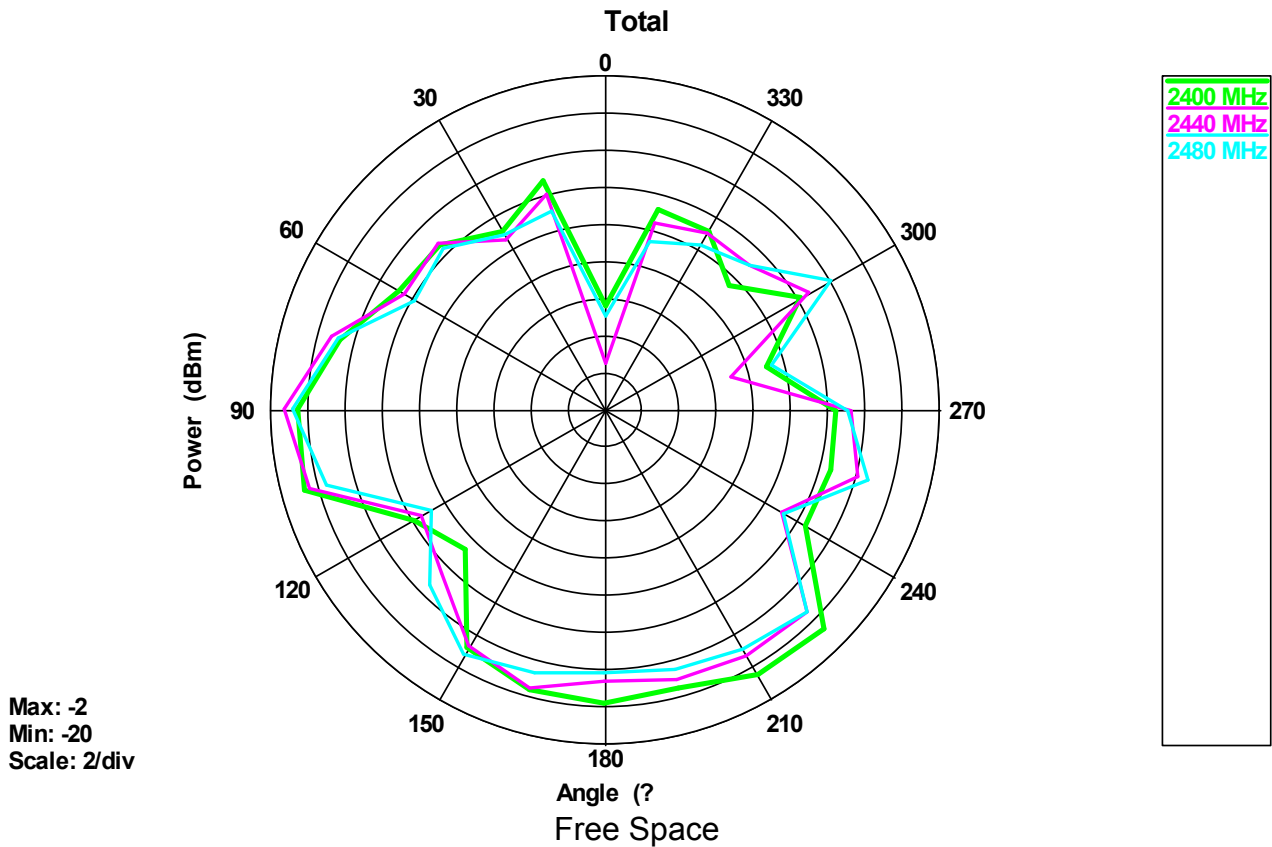
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7 2-D Antenna Pattern(Theta=90°)



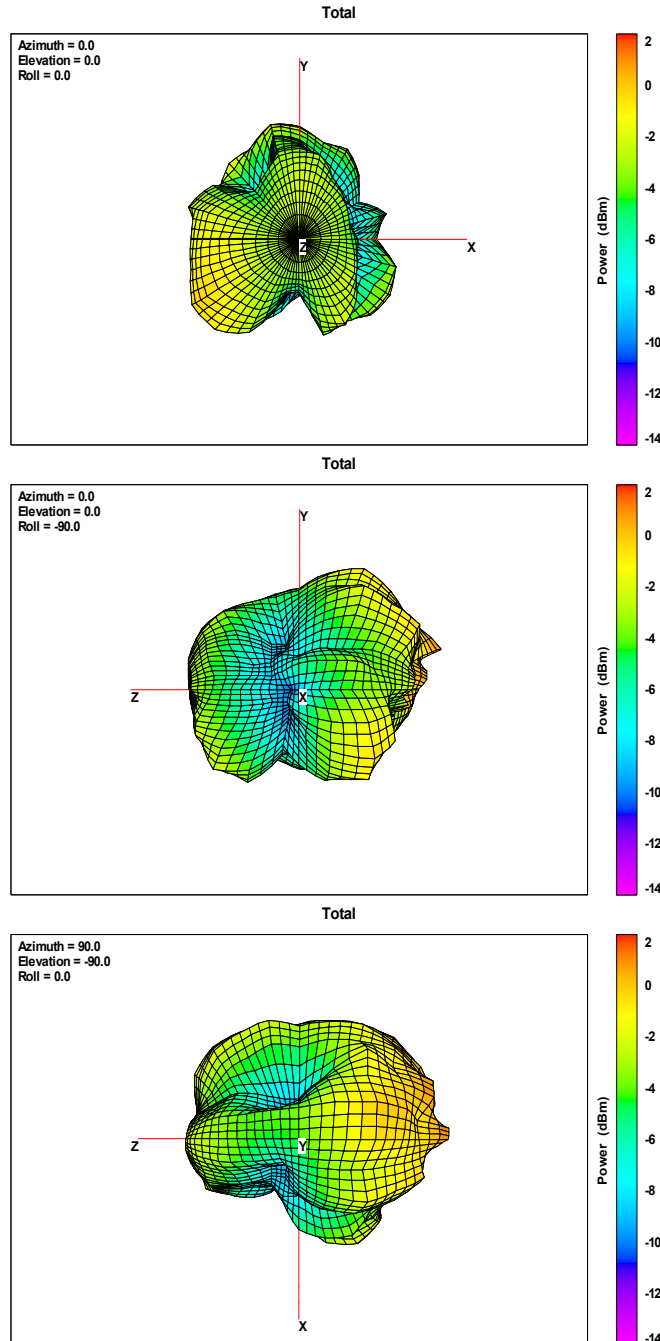
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8 3-D Antenna Pattern



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9 The EUT and Test Configuration



Photo of EUT

Mechanical Specifications			
	In	mm	
L	0.126 ± 0.008	3.20 ± 0.20	
W	0.063 ± 0.008	1.60 ± 0.20	
T	0.047 ± 0.008	1.20 ± 0.20	
a	0.012 ± .004/-0.008	0.30 ± 0.1/-0.2	
b	0.020 ± 0.008	0.50 ± 0.20	

Antenna Dimensions

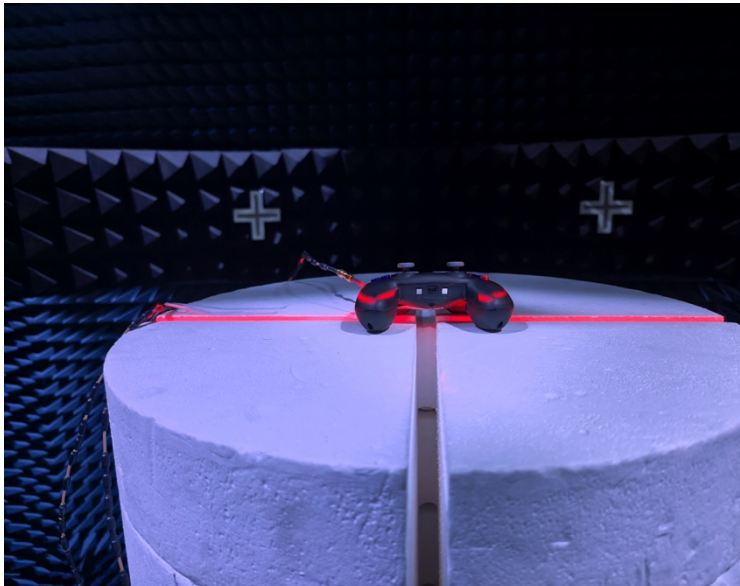


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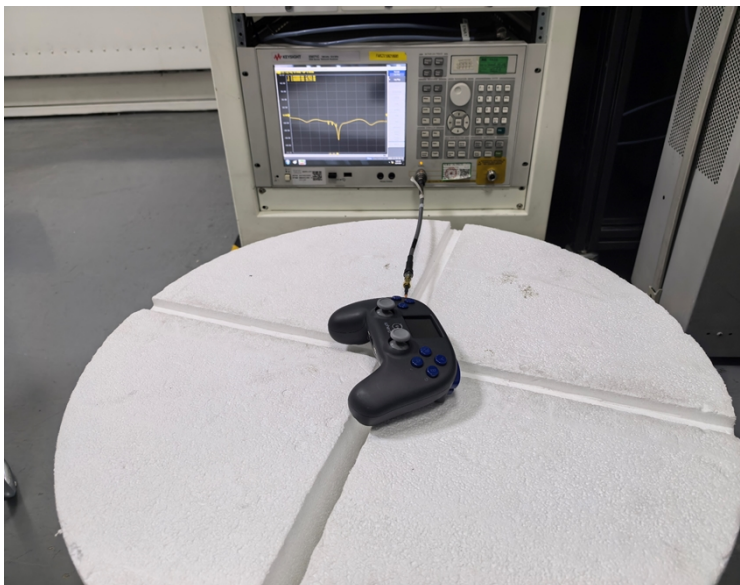
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Free Space View



Free Space Impedance Setup

---END---



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