

# ANTENNA PASSIVE TEST REPORT

**Application No.** ZEWM2312001894OA  
**Applicant** Shenzhen RF-star Technology Co., Ltd  
**Manufacturer** Shenzhen RF-star Technology Co., Ltd  
**Product Name** BLE Wireless Module  
**Model No.** RF-BM-2340B1  
**Standards** ANSI/IEEE Std 149-2008  
**Date Initial Sample(s) Received** 2023.12.06  
**Testing Start Date** 2023.12.06  
**Testing Finish Date** 2023.12.06  
**Report Issue Date** 2023.12.12

\* 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



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Shenzhen Branch, Wireless Laboratory

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## Revision Version

Report No.	Version	Date	Memo
ZEWM2312001894OA01	00	2023.12.12	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	Shenzhen RF-star Technology Co., Ltd.
Applicant's Address	Room 502-503, Block12-A5, Shenzhen Bay Science and Technology Ecological Park, Nanshan District, Shenzhen, China
Contact	Shengping Xie
Tel.	+86 13580115040
Fax	N/A
E-mail	aiden@szrfstar.com

### 1.3 Details of Manufacturer

Manufacturer's Name	Shenzhen RF-star Technology Co., Ltd.
Manufacturer's Address	Room 502-503, Block12-A5, Shenzhen Bay Science and Technology Ecological Park, Nanshan District, Shenzhen, China
Contact	Shengping Xie
Tel.	+86 13580115040
Fax	N/A
E-mail	aiden@szrfstar.com



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## 1.4 General Description of EUT

Device Description:	BLE Wireless Module
Device Manufacturer:	Shenzhen RF-star Technology Co., Ltd
Device Model:	RF-BM-2340B1
Hardware Version:	N/A
Software Version:	N/A
Antenna Dimensions:	14.4 x 5.4 x 0.5 mm

## 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	



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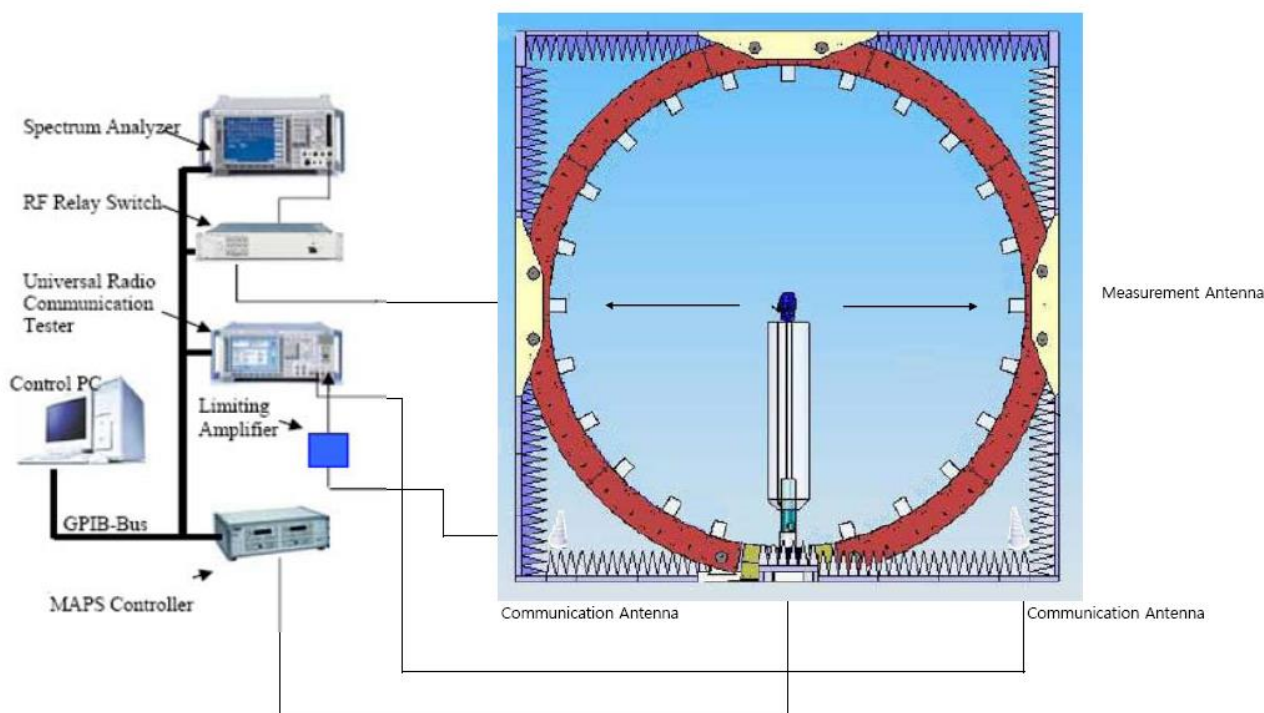
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## 2 OTA Measurements System Configuration

## 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	2023/2/16	2024/2/15
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



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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

Free Space			
Frequency (MHz)	Efficiency (dB)	Efficiency (%)	Gain (dBi)
2350	-5.18	30.31	2.73
2355	-5.25	29.88	2.48
2360	-4.90	32.34	2.96
2365	-4.88	32.49	2.90
2370	-4.91	32.27	3.02
2375	-4.93	32.13	2.97
2380	-4.94	32.04	2.95
2385	-4.71	33.79	3.12
2390	-4.72	33.71	3.04
2395	-4.48	35.69	3.25
2400	-4.66	34.19	3.15
2402	-4.77	33.34	3.00
2405	-4.80	33.10	2.91
2410	-4.78	33.25	3.03
2415	-4.88	32.51	2.89
2420	-4.75	33.49	2.98
2425	-4.92	32.19	2.97
2430	-5.12	30.77	2.68
2435	-5.26	29.78	2.70
2440	-5.38	28.99	2.43
2441	-5.35	29.16	2.48
2445	-5.23	30.00	2.66
2450	-5.23	29.98	2.70
2455	-5.21	30.12	2.49
2460	-5.44	28.55	2.55



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2465	-5.62	27.43	2.08
2470	-5.88	25.83	2.20
2475	-6.02	24.99	1.81
2480	-6.17	24.15	1.78
2482	-6.20	24.01	1.91
2485	-6.27	23.61	1.61
2490	-6.30	23.43	1.64
2495	-6.18	24.08	1.82
2500	-6.29	23.52	1.68
2505	-6.33	23.28	1.70
2510	-6.58	21.99	1.27
2515	-6.92	20.35	0.94
2520	-7.35	18.42	0.33
2525	-7.68	17.07	0.20
2530	-7.96	16.01	-0.16
2535	-8.11	15.47	-0.25
2540	-8.20	15.14	-0.37
2545	-8.16	15.29	-0.37
2550	-8.21	15.10	-0.42
2555	-8.26	14.91	-0.50
2560	-8.38	14.52	-0.63
2565	-8.47	14.23	-0.74
2570	-8.50	14.11	-0.74
2575	-8.58	13.87	-0.86
2580	-8.50	14.12	-0.61



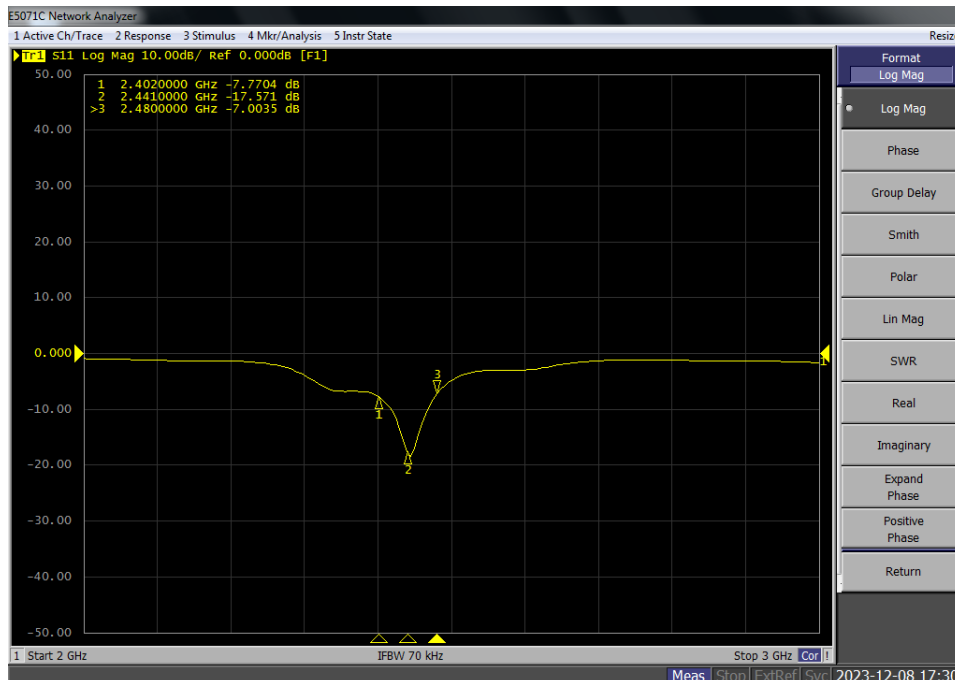
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## 6 Pattern Plots

### 6.1 Return Loss



Free Space



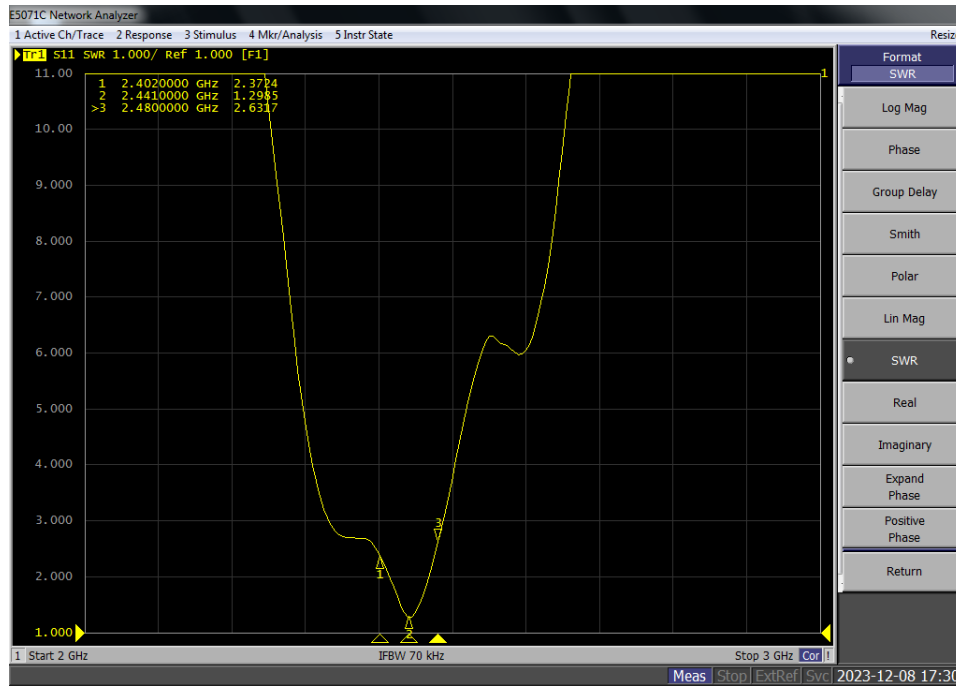
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## 6.2 VSWR



Free Space

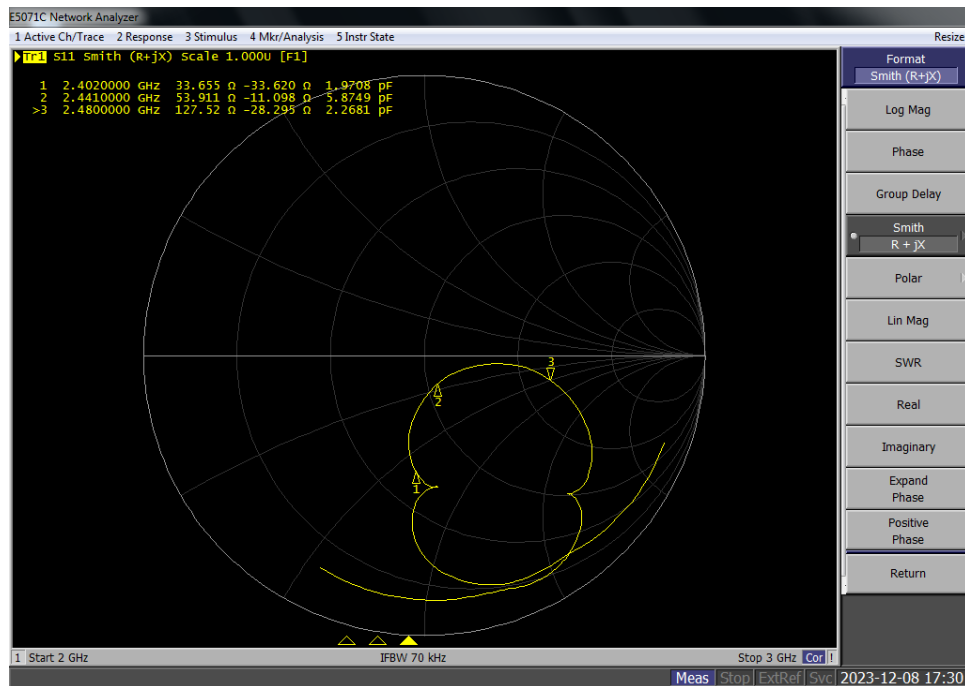


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## 6.3 Stimulus



Free Space



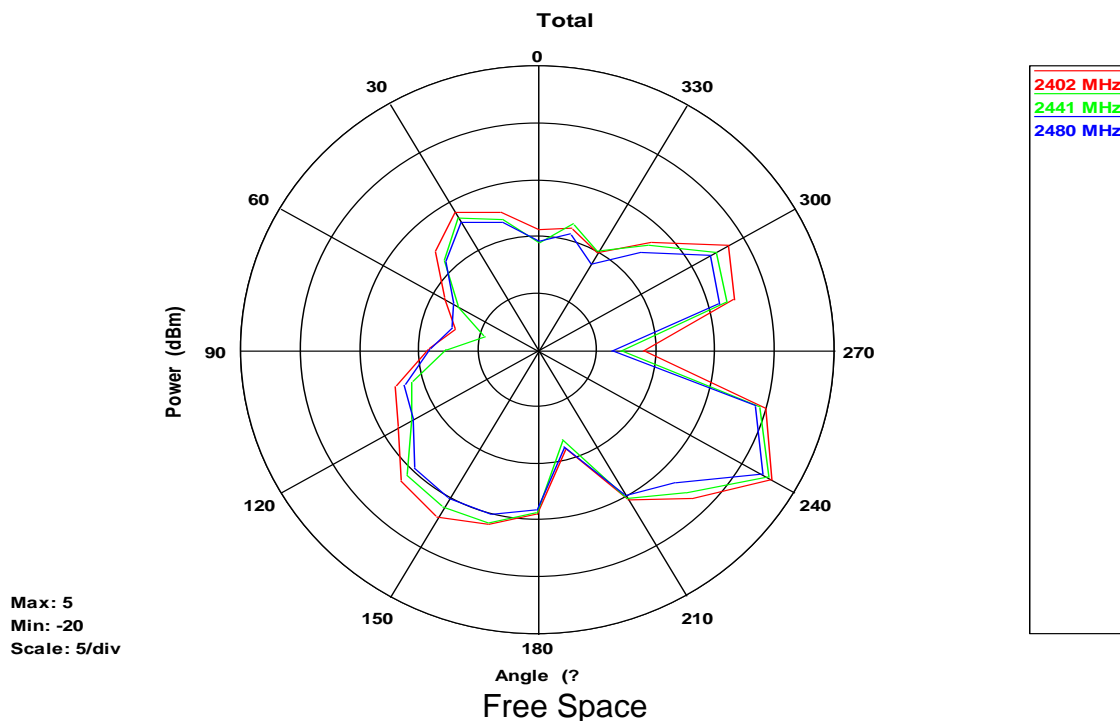
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## 7 2-D Antenna Pattern(Theta=90°)



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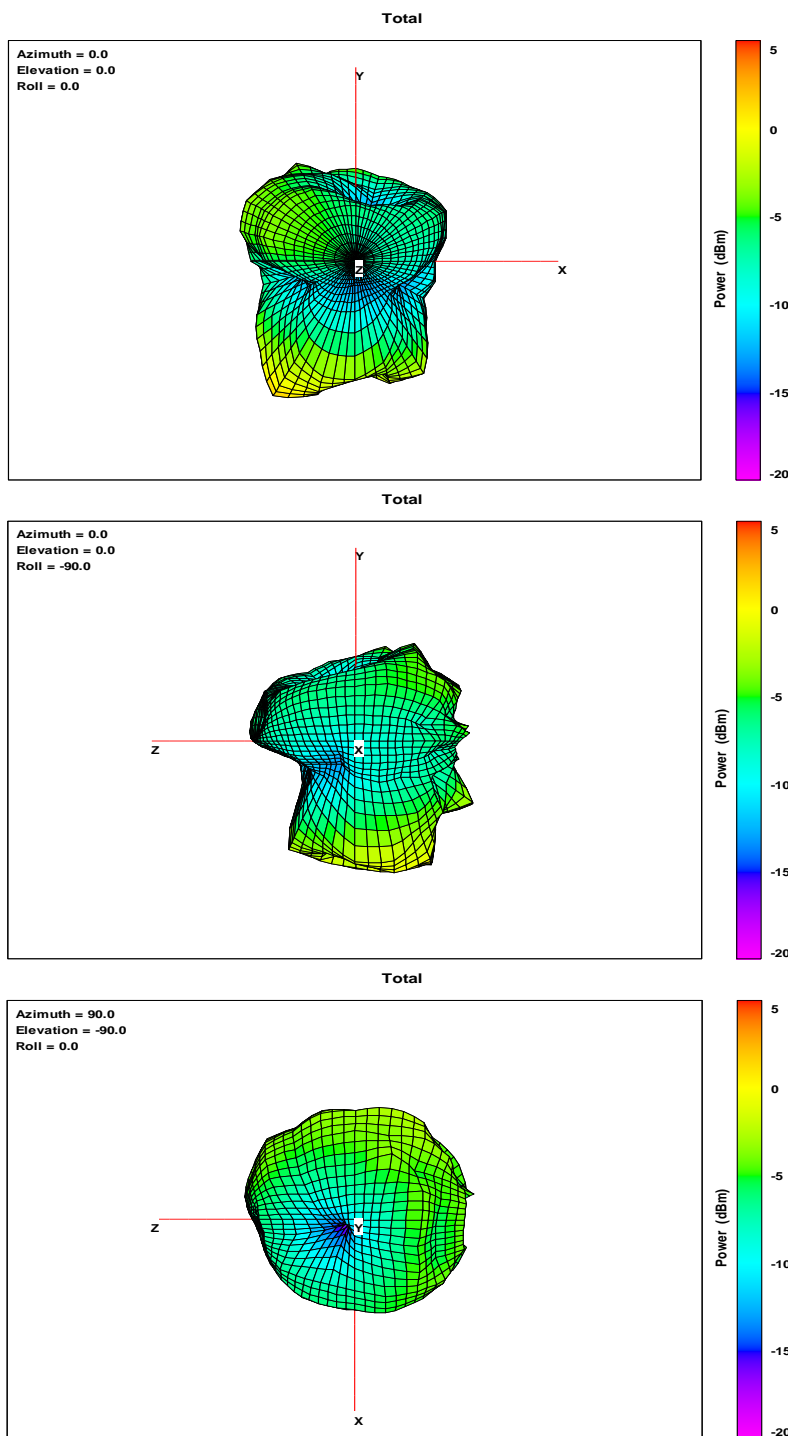
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## 8 3-D Antenna Pattern



Free Space



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## 9 The EUT and Test Configuration

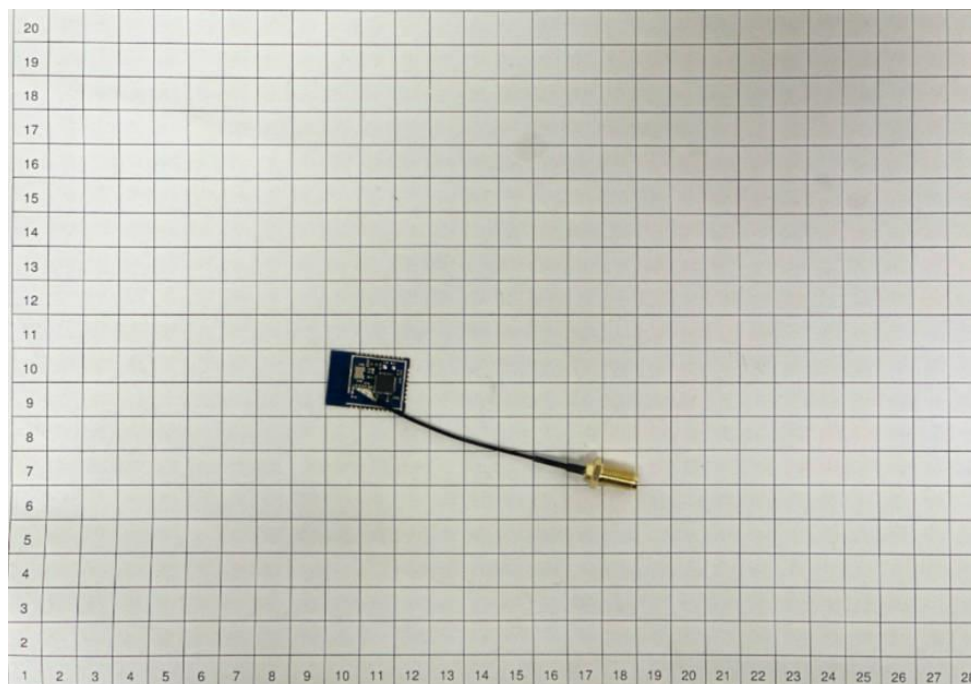
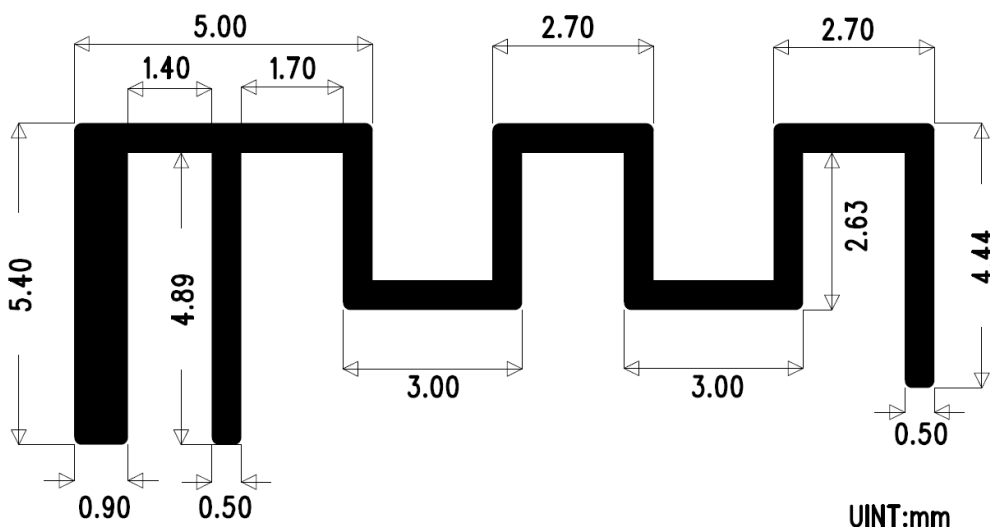


Photo of EUT



Antenna Dimensions



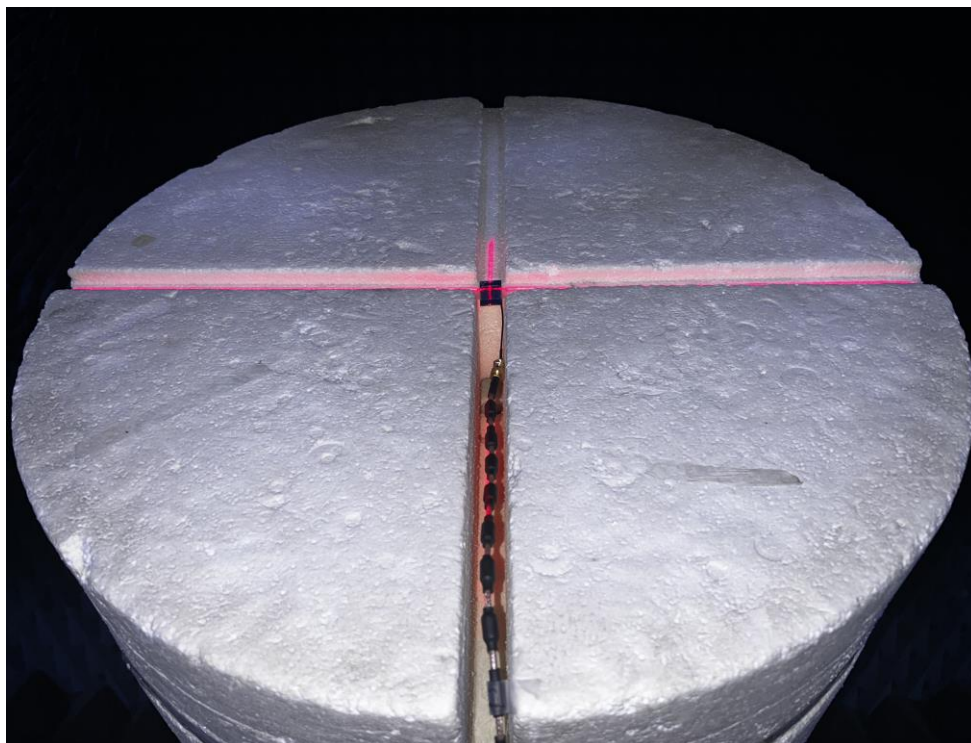
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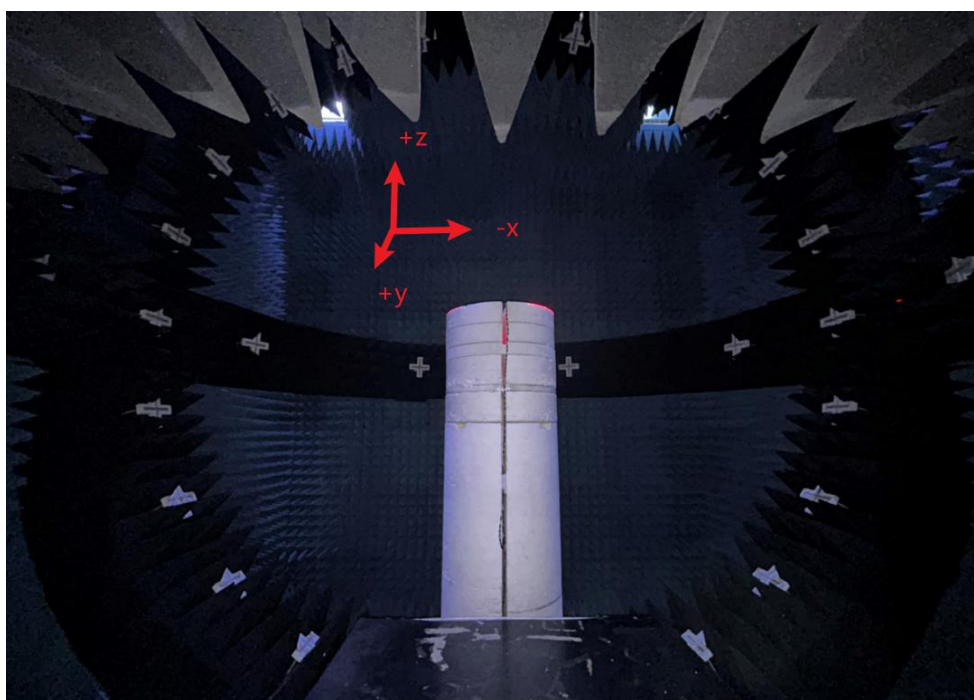
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Free Space View 1



Free Space View 2



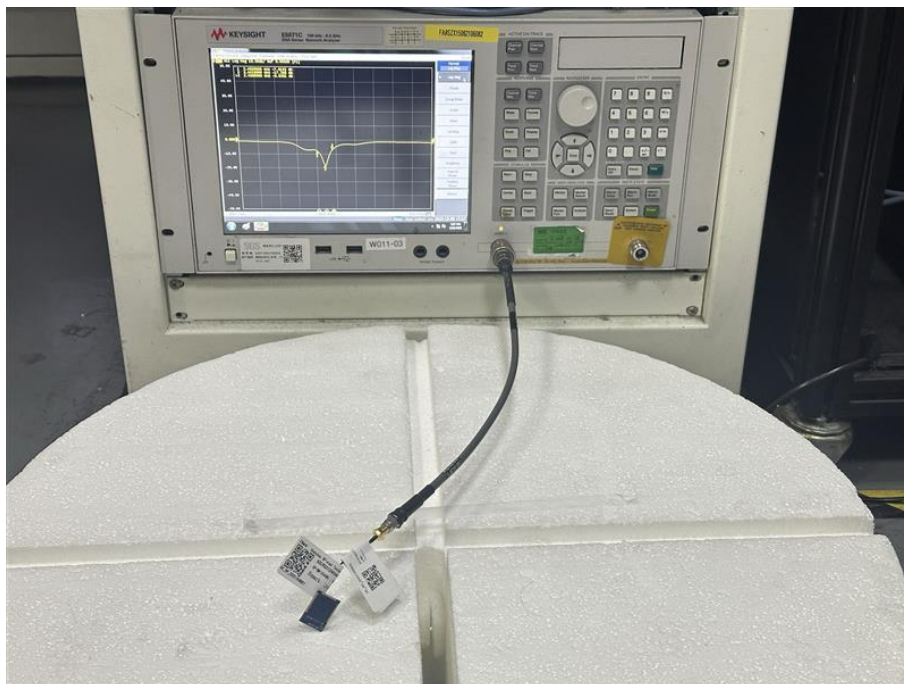
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Free Space Impedance Setup

---END---



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