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ANTENNA PASSIVE TEST REPORT

Application No. SZOA2408000177AT
Applicant Janus International Group LLC
Manufacturer Huizhou Zecheng Electronic., Ltd.
Product Name KP-2
Model No. NOKĒ Keypad 3x4
Standards ANSI/IEEE Std 149-2021
Date Initial Sample(s) Received August 8, 2024
Testing Start Date August 8, 2024
Testing Finish Date August 16, 2024
Report Issue Date September 20, 2024

* 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



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Revision History

Revision	Issue Date	Description
01	September 20, 2024	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	Janus International Group LLC
Applicant's Address	135 Janus International Blvd. Temple, GA 30179
Contact	Kathrine Cao
Tel.	+86 13592732924
Fax	N/A
E-mail	kathrine.cao@janusintl.com

1.3 Details of Manufacturer

Manufacturer's Name	Huizhou Zecheng Electronic., Ltd.
Manufacturer's Address	No.18, Weigang Rd, Qibu District, Zhonghan Chanye Yuan, Zongkai Gaoxinqu, Huizhou, Guangdong, China
Contact	Ruby Zhang
Tel.	0086 13410786201
Fax	N/A
E-mail	ruby.zhang@flexiblecircuit.cn



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1.4 General Description of EUT

Device Description:	Wire
Device Manufacturer:	Huizhou Zecheng Electronic., Ltd
Device Model:	KP-2
Hardware Version:	N/A
Software Version:	N/A
Antenna Dimensions:	28.0 x 0.6 x 0.6 mm
Antenna Type:	N52832: Wire, N52840: Wire

1.5 Test Procedure

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

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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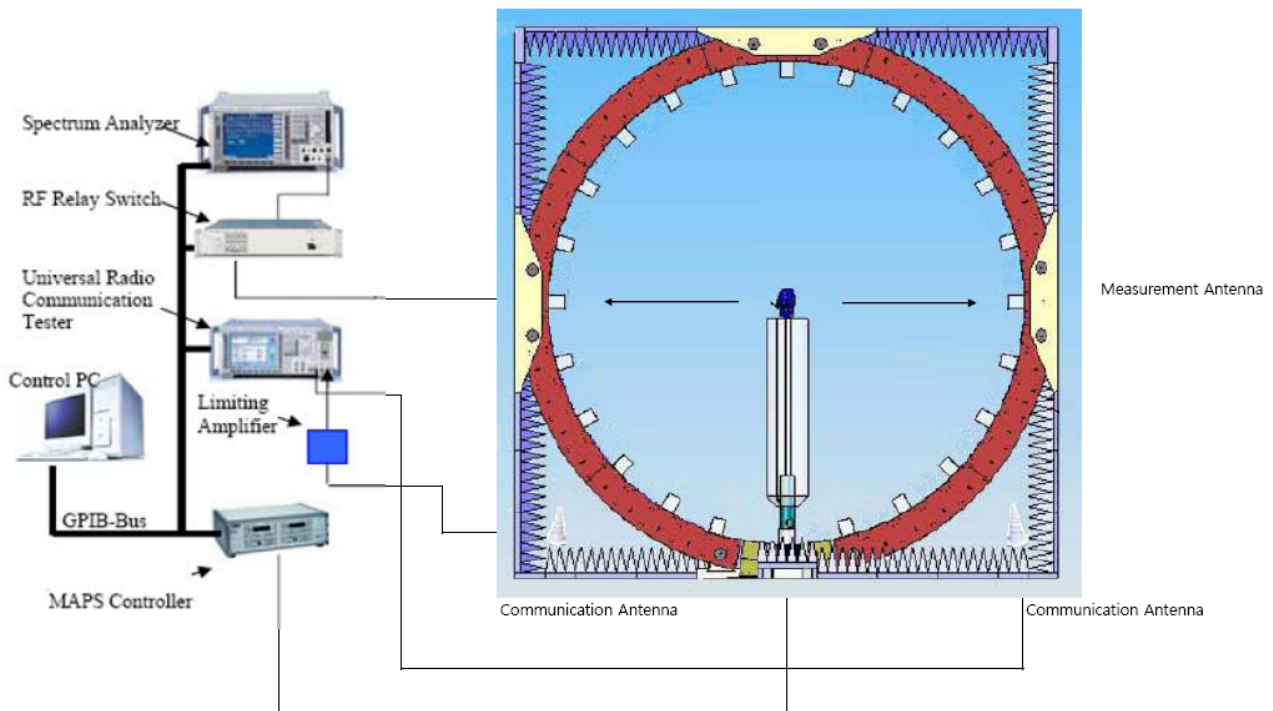
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2 OTA Measurements System Configuration

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 MY46523590	Keysight	2024/1/30	2025/1/29
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



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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

N52832			
Frequency (MHz)	Efficiency (dB)	Efficiency (%)	Gain (dBi)
2350	-16.50	2.24	-10.89
2355	-16.58	2.20	-11.26
2360	-16.32	2.34	-11.20
2365	-16.45	2.27	-11.52
2370	-16.54	2.22	-11.00
2375	-16.69	2.14	-11.13
2380	-16.78	2.10	-10.64
2385	-16.76	2.11	-10.63
2390	-16.88	2.05	-10.52
2395	-16.87	2.05	-10.59
2400	-17.39	1.82	-11.30
2402	-17.58	1.75	-11.29
2405	-17.87	1.63	-11.73
2410	-18.29	1.48	-12.37
2415	-18.65	1.37	-12.53
2420	-18.72	1.34	-12.89
2425	-18.93	1.28	-13.02
2430	-19.08	1.24	-13.44
2435	-19.02	1.25	-13.44
2440	-18.83	1.31	-13.16
2441	-18.71	1.34	-12.99
2445	-18.44	1.43	-12.78
2450	-18.12	1.54	-12.14



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2455	-17.78	1.67	-11.54
2460	-17.65	1.72	-11.23
2465	-17.45	1.80	-11.20
2470	-17.52	1.77	-11.10
2475	-17.40	1.82	-11.39
2480	-17.32	1.85	-11.46
2482	-17.27	1.87	-11.34
2485	-17.23	1.89	-11.37
2490	-17.12	1.94	-11.46
2495	-17.04	1.98	-11.37
2500	-17.16	1.92	-11.40
2505	-17.23	1.89	-11.41
2510	-17.49	1.78	-11.59
2515	-17.87	1.63	-11.94
2520	-18.27	1.49	-12.28
2525	-18.72	1.34	-12.82
2530	-19.03	1.25	-13.24
2535	-19.28	1.18	-13.61
2540	-19.41	1.15	-13.47
2545	-19.37	1.16	-13.36
2550	-19.42	1.14	-13.33
2555	-19.37	1.16	-13.27
2560	-19.32	1.17	-13.33
2565	-19.18	1.21	-13.08
2570	-18.94	1.28	-12.35
2575	-18.69	1.35	-11.95
2580	-18.34	1.47	-11.47



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N52840			
Frequency (MHz)	Efficiency (dB)	Efficiency (%)	Gain (dBi)
2350	-12.69	5.39	-6.69
2355	-12.85	5.19	-7.08
2360	-12.62	5.47	-6.68
2365	-12.74	5.32	-6.59
2370	-12.74	5.32	-6.76
2375	-12.80	5.25	-6.68
2380	-12.70	5.37	-6.59
2385	-12.49	5.64	-6.36
2390	-12.41	5.75	-6.24
2395	-12.20	6.02	-5.94
2400	-12.43	5.71	-6.02
2402	-12.52	5.60	-6.34
2405	-12.55	5.56	-6.40
2410	-12.53	5.59	-6.20
2415	-12.49	5.64	-6.32
2420	-12.26	5.94	-6.05
2425	-12.31	5.87	-6.19
2430	-12.41	5.74	-6.26
2435	-12.50	5.62	-6.36
2440	-12.61	5.48	-6.40
2441	-12.60	5.50	-6.37
2445	-12.56	5.55	-6.45
2450	-12.66	5.42	-6.41
2455	-12.66	5.42	-6.61



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2460	-12.94	5.08	-6.90
2465	-13.18	4.81	-7.18
2470	-13.59	4.37	-7.56
2475	-13.85	4.12	-7.64
2480	-14.10	3.89	-7.76
2482	-14.18	3.82	-7.75
2485	-14.28	3.73	-7.76
2490	-14.41	3.62	-7.76
2495	-14.44	3.60	-7.55
2500	-14.55	3.50	-7.56
2505	-14.62	3.46	-7.53
2510	-14.75	3.35	-7.51
2515	-15.02	3.15	-7.63
2520	-15.29	2.96	-7.78
2525	-15.52	2.81	-7.91
2530	-15.64	2.73	-8.05
2535	-15.68	2.70	-8.18
2540	-15.61	2.75	-8.05
2545	-15.42	2.87	-7.56
2550	-15.33	2.93	-7.21
2555	-15.19	3.02	-6.97
2560	-15.14	3.06	-6.98
2565	-14.94	3.20	-6.53
2570	-14.74	3.36	-6.39
2575	-14.46	3.58	-6.22
2580	-14.12	3.88	-5.97



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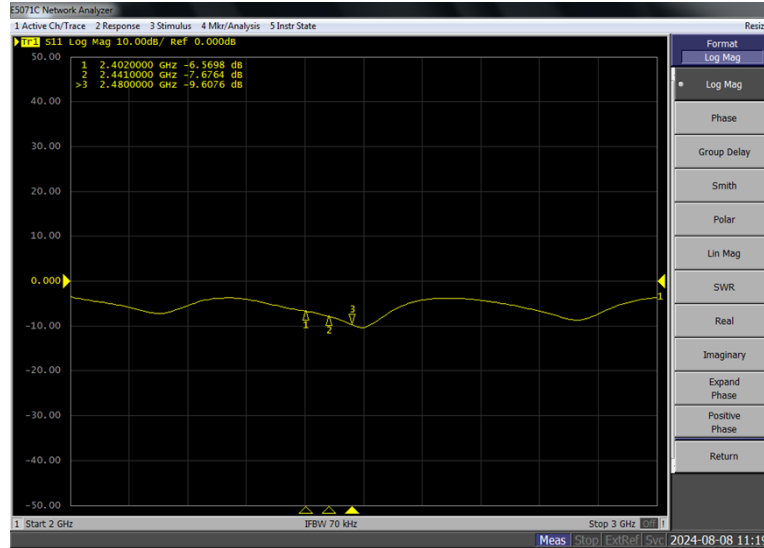
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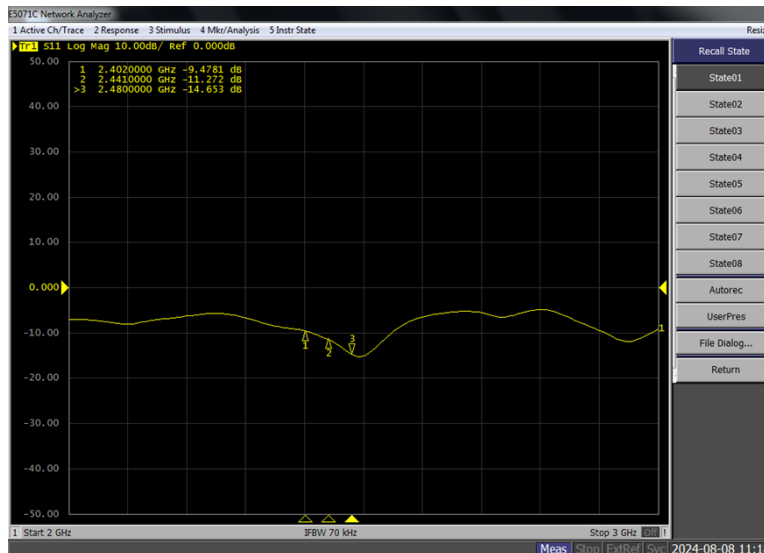
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6 Pattern Plots

6.1 Return Loss



N52832



N52840



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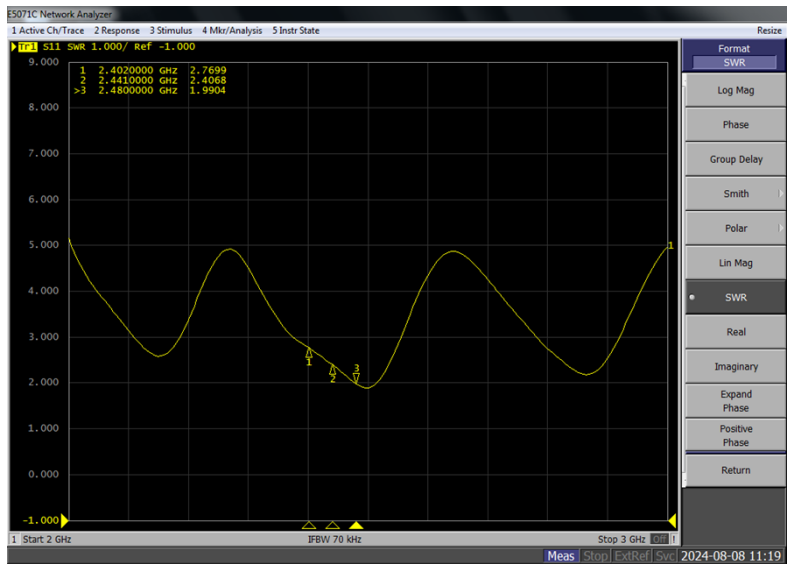
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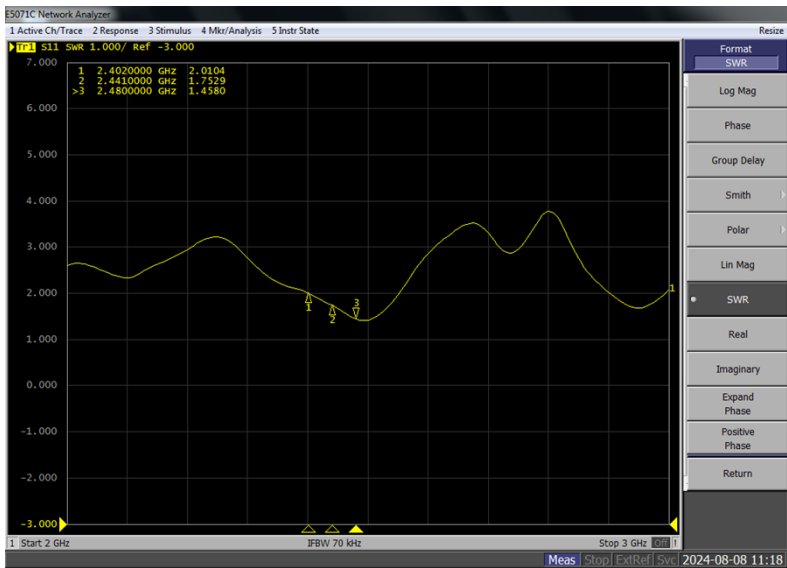
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6.2 VSWR



N52832



N52840

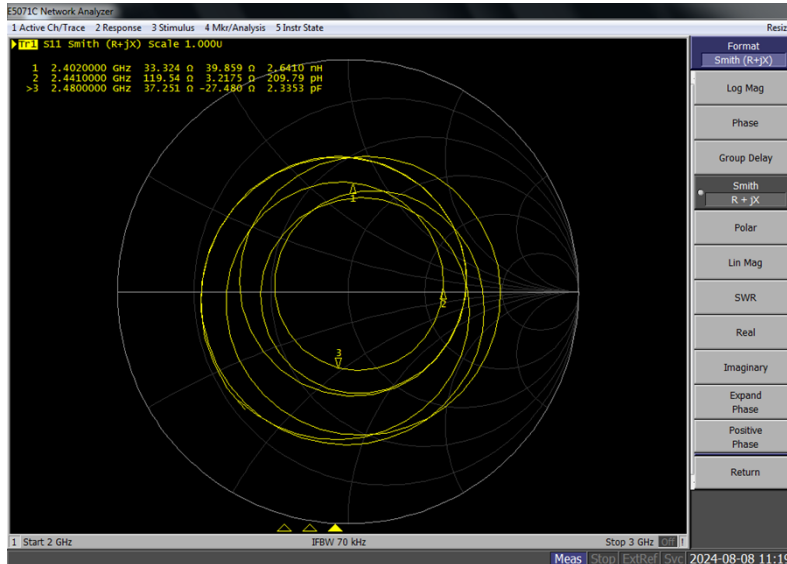


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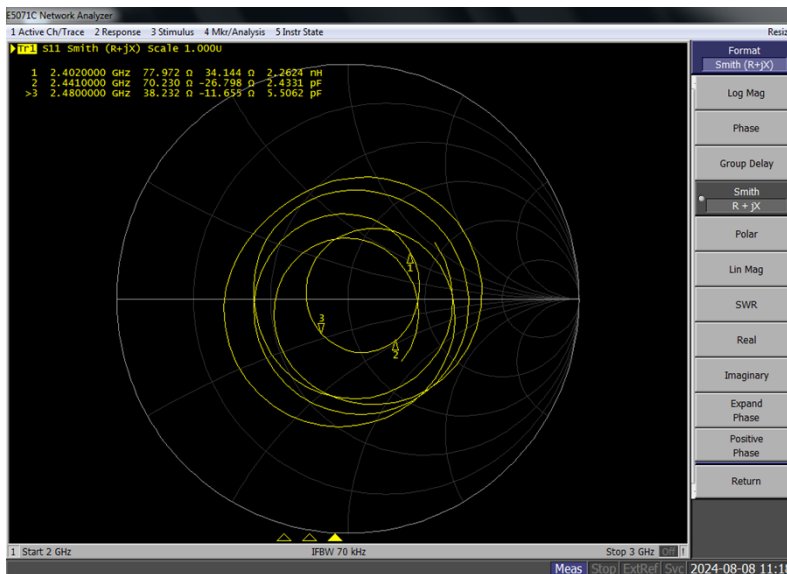
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6.3 Stimulus



N52832



N52840

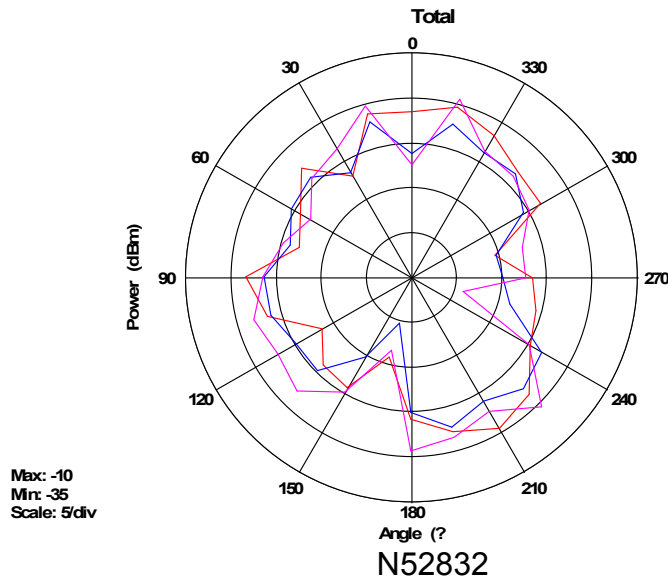


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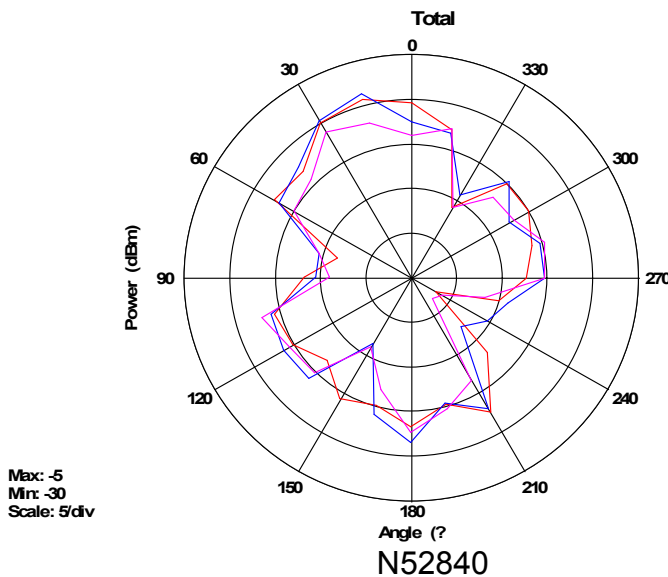
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7 2-D Antenna Pattern(Theta=90°)



2402 MHz
2441 MHz
2480 MHz



2402 MHz
2441 MHz
2480 MHz



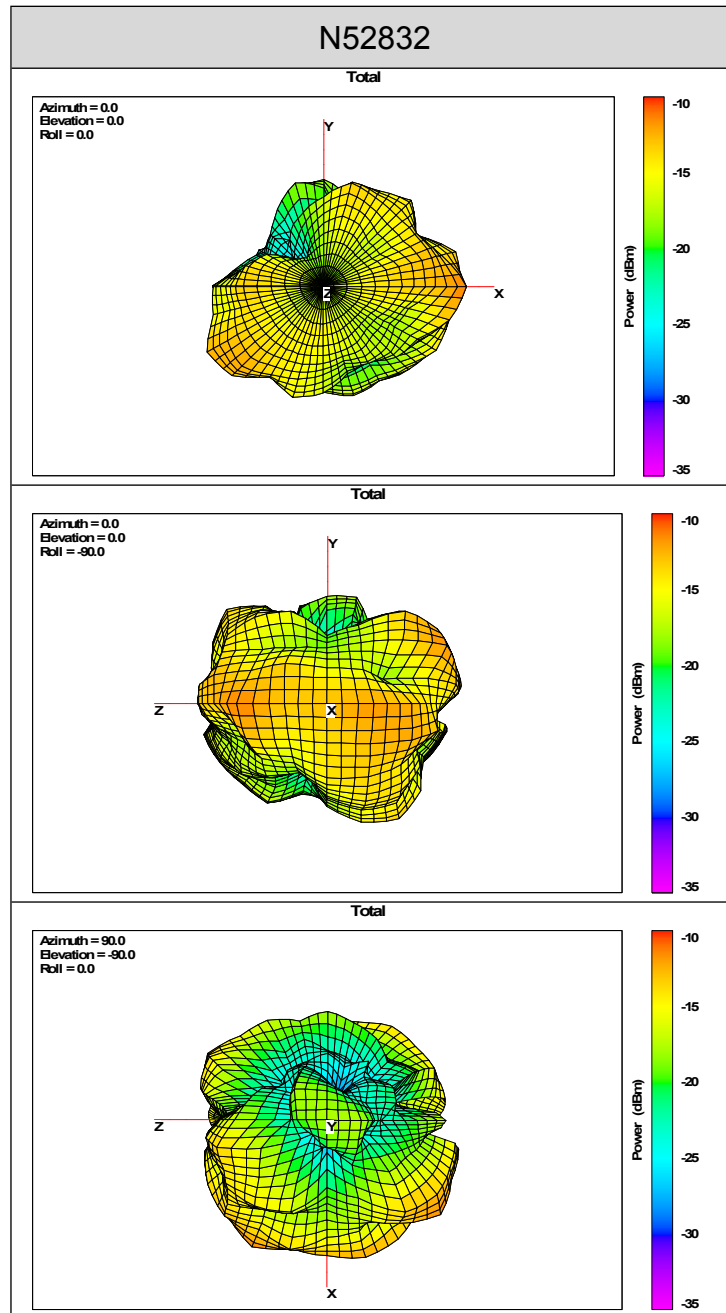
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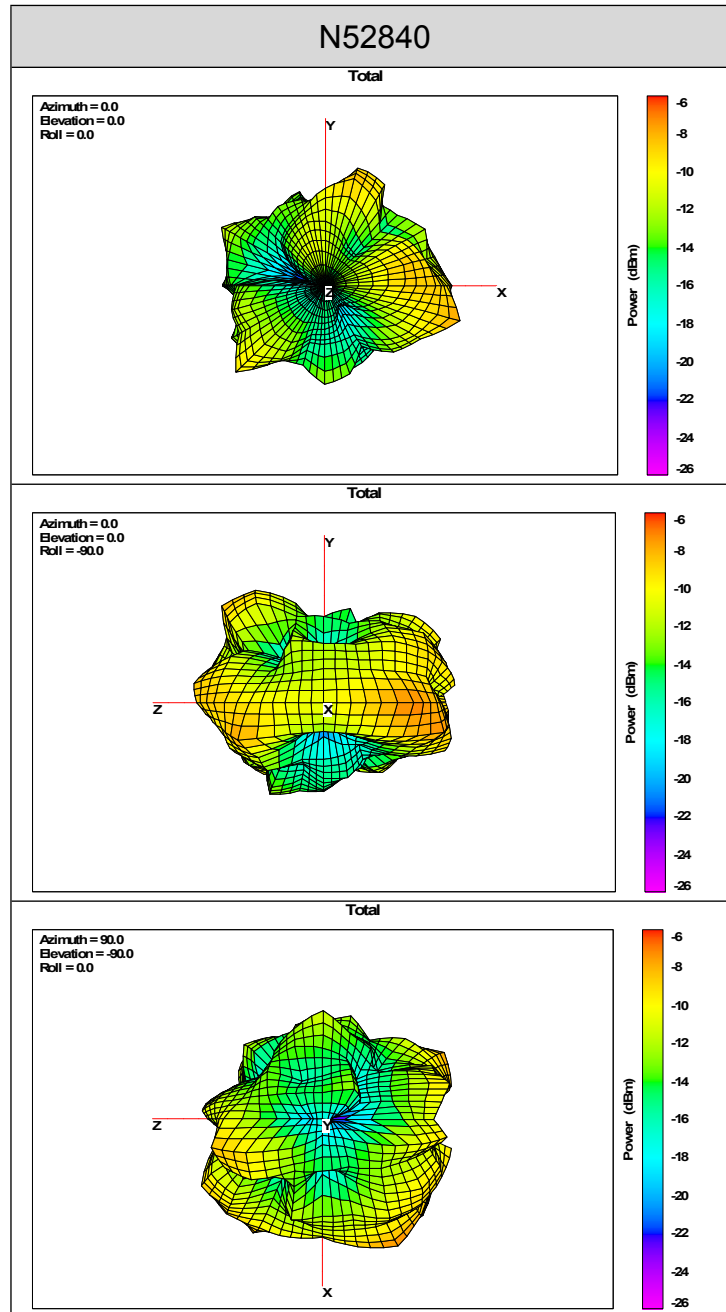
8 3-D Antenna Pattern



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9 The EUT and Test Configuration

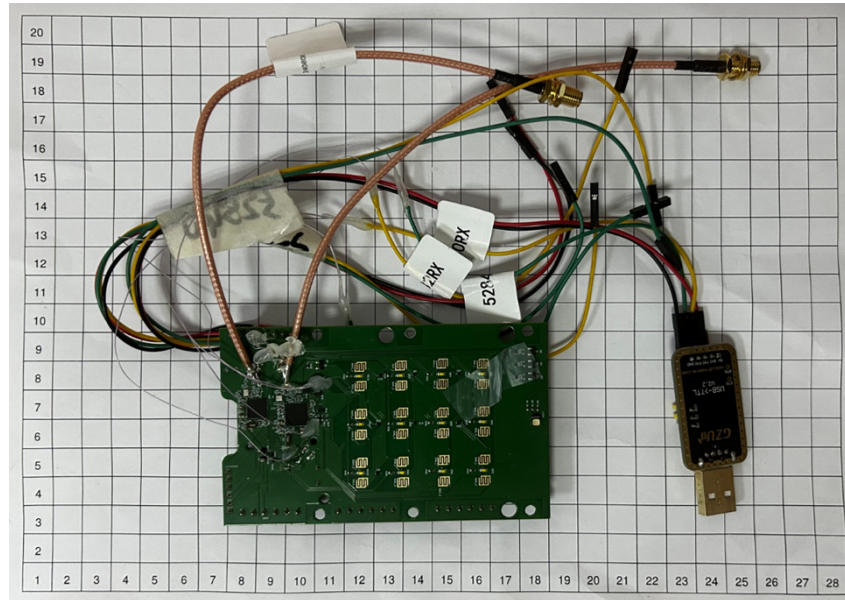
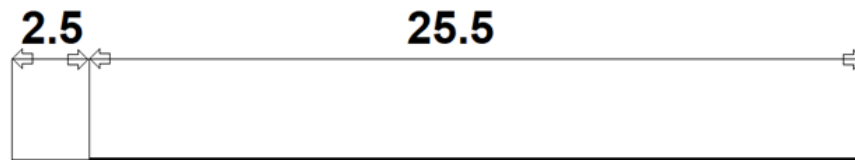


Photo of EUT



0.6mm solid core wire
1.5mm insulation
28mm total length

Antenna Dimensions (N52832& N52840)



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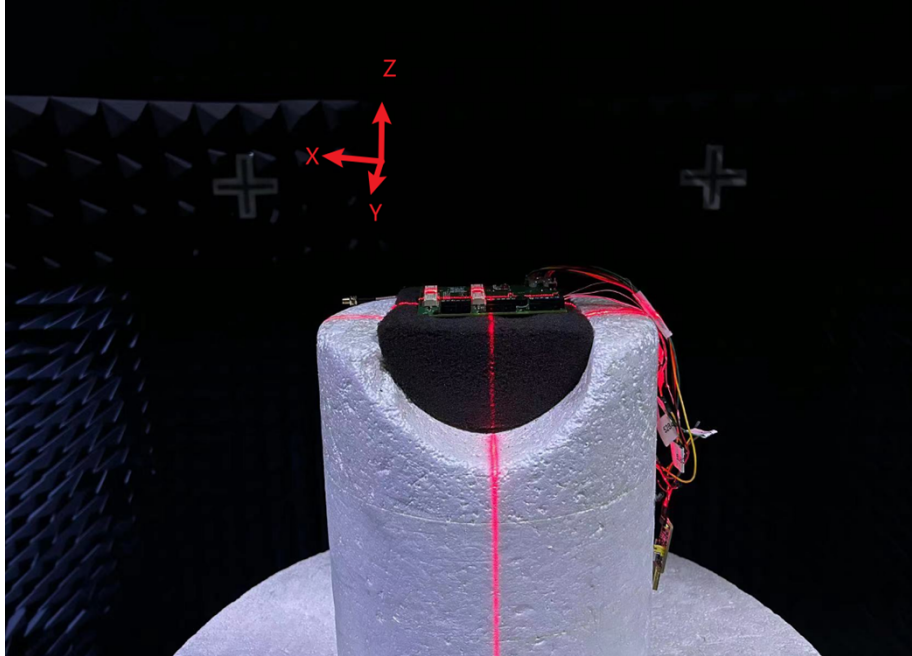


Photo of EUT N52832

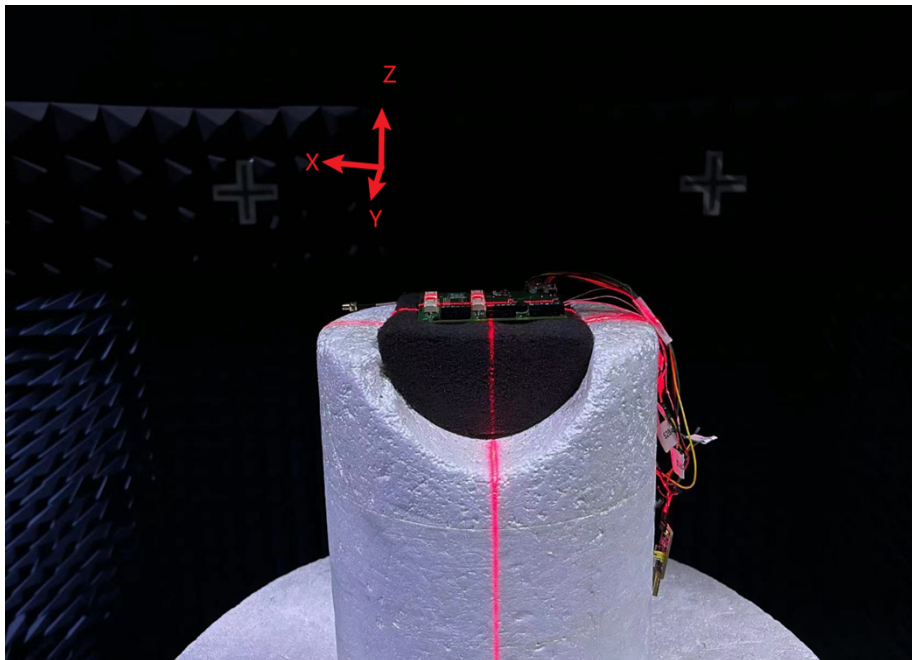


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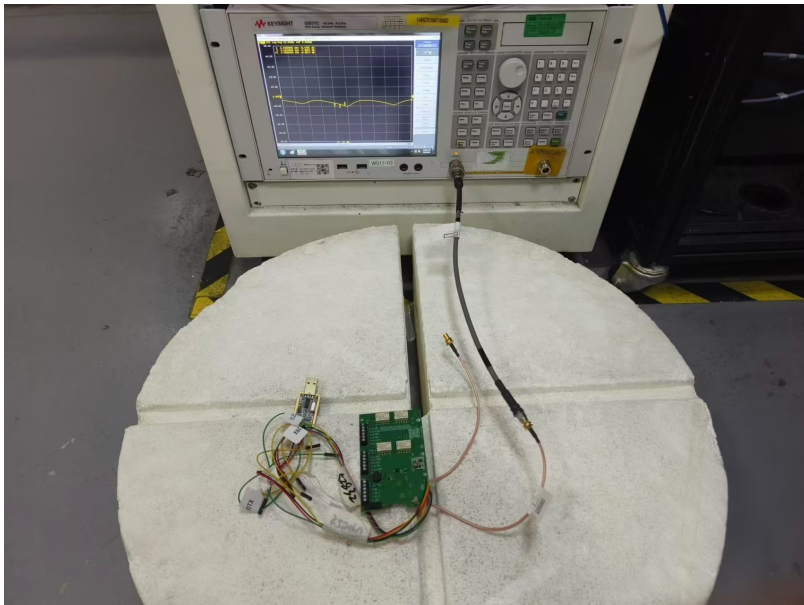


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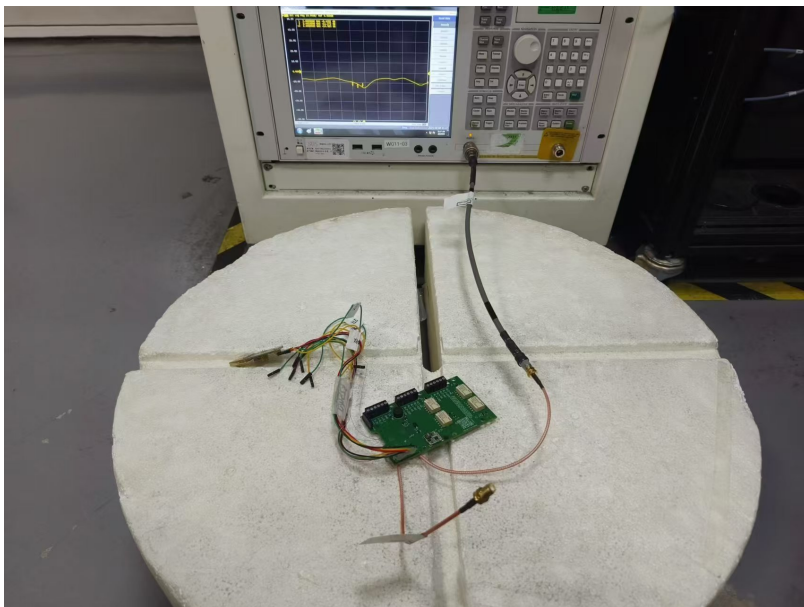
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N52832 Impedance Setup



N52840 Impedance Setup

---END---



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