



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

Report No.: SZOA2410000203AT01

Rev.: 01

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ANTENNA PASSIVE TEST REPORT

Application No. SZOA2501000003AT01
Applicant Dongguan Tunno Electronics Technology Co., Ltd
Manufacturer Dongguan Tunno Electronics Technology Co., Ltd
Product Name Smart Tag Finder
Model No. HG12823,SF06
Standards ANSI/IEEE Std 149-2021
Date Initial Sample(s) Received Jan.17, 2024
Testing Start Date Jan.22, 2024
Testing Finish Date Jan.22, 2024
Report Issue Date Jan.23, 2024

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

Turner He

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	Jan.23, 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	Dongguan Tunno Electronics Technology Co., Ltd
Applicant's Address	Building 2.No.1Zhiquan High-tech Park Road, Dongkeng Town 523034 Dongguan City,Guangdong Province,PEOPLE'S REPUBLIC OF CHINA
Contact	N/A
Tel.	N/A
Fax	N/A
E-mail	N/A

1.3 Details of Manufacturer

Manufacturer's Name	Dongguan Tunno Electronics Technology Co., Ltd
Manufacturer's Address	Building 2.No.1Zhiquan High-tech Park Road, Dongkeng Town 523034 Dongguan City,Guangdong Province,PEOPLE'S REPUBLIC OF CHINA
Contact	N/A
Tel.	N/A
Fax	N/A
E-mail	N/A



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1.4 General Description of EUT

Device Description:	Smart Tag Finder
Device Manufacturer:	Dongguan Tunno Electronics Technology Co., Ltd
Device Model:	HG12823,SF06
Hardware Version:	N/A
Software Version:	N/A
Air Interface Supported	2.4GHz
Air Interface Supported	2.4GHz

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℃ , Max. = 25℃	
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

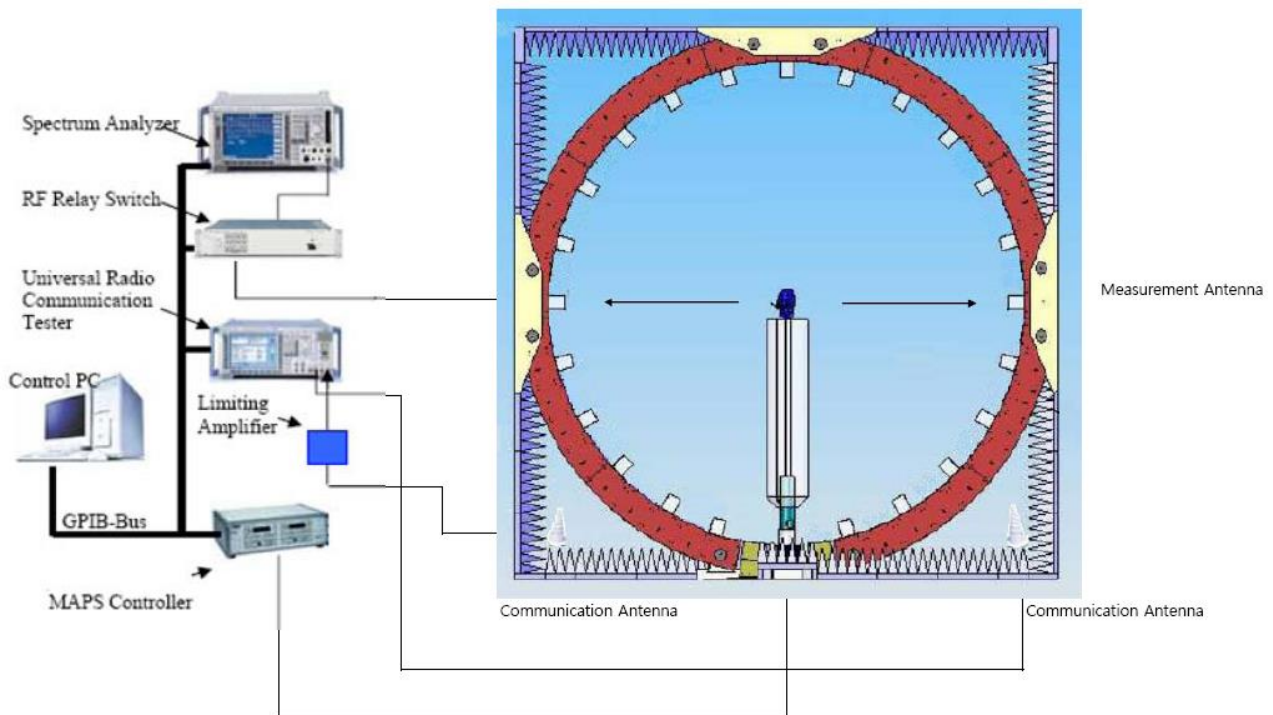
2.1 Test Configuration

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 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	2024/01/30	2025/01/29
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
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

Free Space #1			
Frequenc y (MHz)	Efficienc y (dB)	Efficienc y (%)	Gain (dBi)
2350	-10.14	9.69	-1.00
2355	-9.98	10.05	-0.71
2360	-9.80	10.48	-0.69
2365	-9.80	10.47	-0.56
2370	-9.66	10.82	-0.58
2375	-9.48	11.26	-0.78
2380	-9.22	11.97	-0.54
2385	-9.14	12.19	-0.63
2390	-9.09	12.34	-0.91
2395	-9.00	12.59	-0.78
2400	-9.15	12.16	-0.89
2402	-9.21	12.00	-1.03
2405	-9.24	11.93	-0.85
2410	-9.56	11.08	-1.18
2415	-10.00	10.00	-1.59
2420	-10.59	8.74	-2.23
2425	-11.12	7.73	-2.63
2430	-11.79	6.63	-3.17
2435	-12.50	5.62	-3.74
2440	-13.25	4.74	-4.35
2441	-13.41	4.56	-4.55
2445	-13.99	3.99	-4.86



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2450	-14.63	3.45	-5.24
2455	-15.11	3.09	-5.67
2460	-15.61	2.75	-6.25
2465	-16.07	2.47	-6.95
2470	-16.67	2.15	-7.75
2475	-17.13	1.94	-8.67
2480	-17.52	1.77	-9.39
2485	-17.61	1.73	-9.40
2490	-17.54	1.76	-9.26
2495	-17.45	1.80	-9.14
2500	-17.48	1.79	-9.08
2505	-17.49	1.78	-9.23
2510	-17.48	1.79	-9.31
2515	-17.53	1.76	-9.53
2520	-17.39	1.82	-9.38
2525	-17.51	1.78	-9.43
2530	-17.60	1.74	-9.50
2535	-17.64	1.72	-9.36
2540	-17.73	1.69	-9.47
2545	-17.81	1.66	-9.45
2550	-18.08	1.55	-9.94
2555	-18.26	1.49	-10.21
2560	-18.53	1.40	-10.62
2565	-18.59	1.38	-10.55
2570	-18.58	1.39	-10.14
2575	-18.58	1.39	-9.81
2580	-18.45	1.43	-9.32



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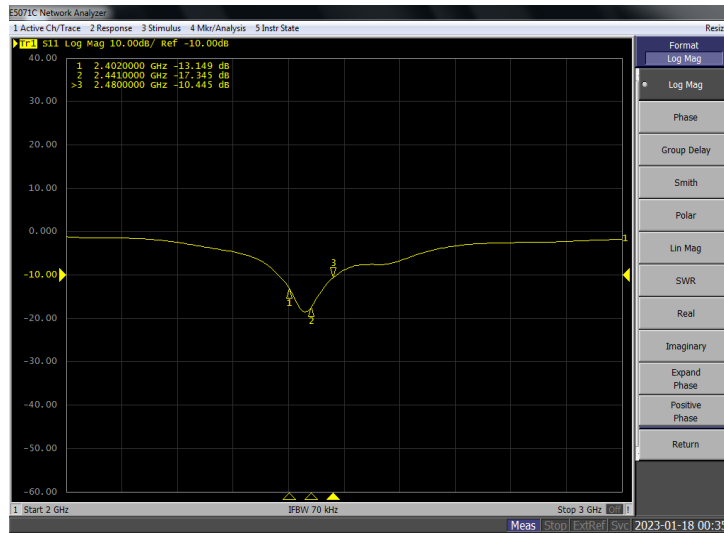
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6 Pattern Plots

6.1 Return Loss



Free Space #1

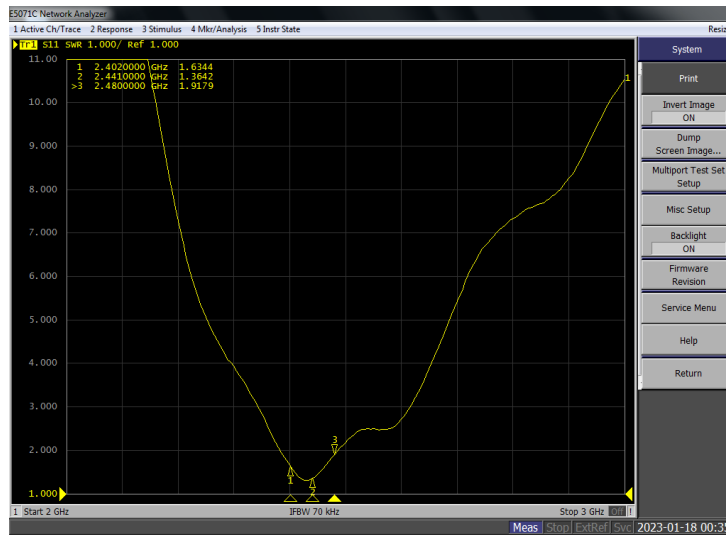


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6.2 VSWR

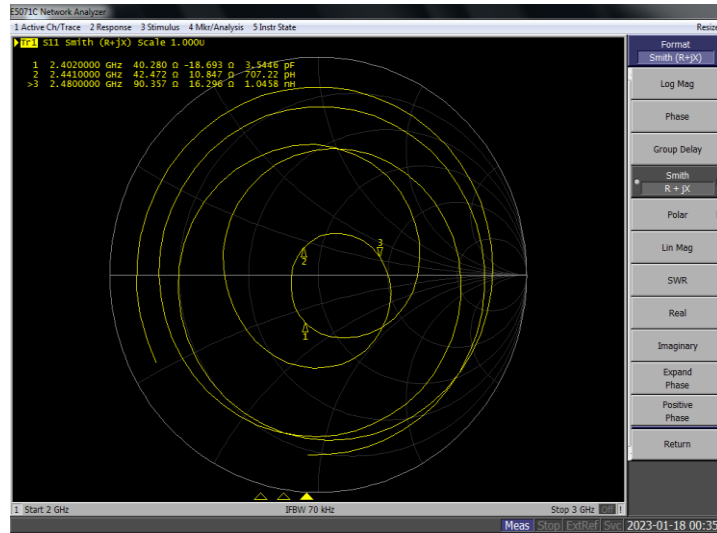


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6.3 Stimulus



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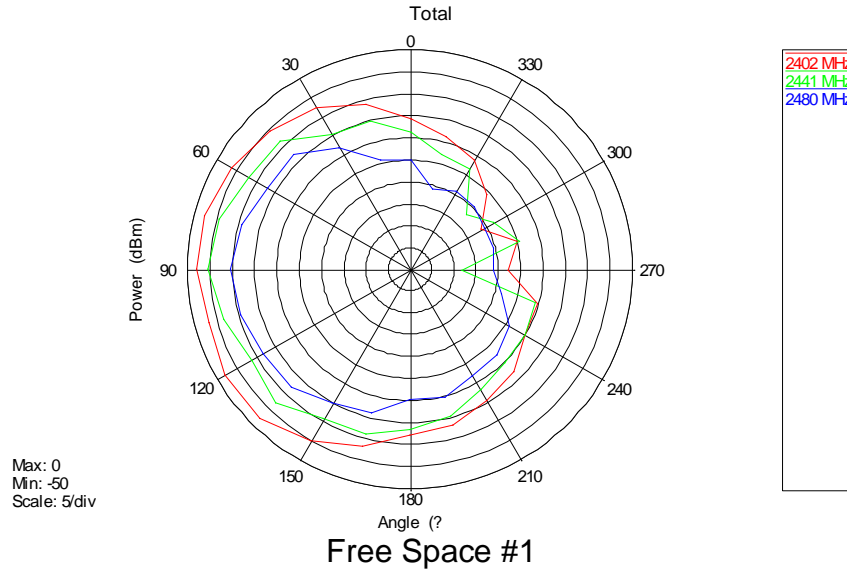
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7 2-D Antenna Pattern(Theta=90°)



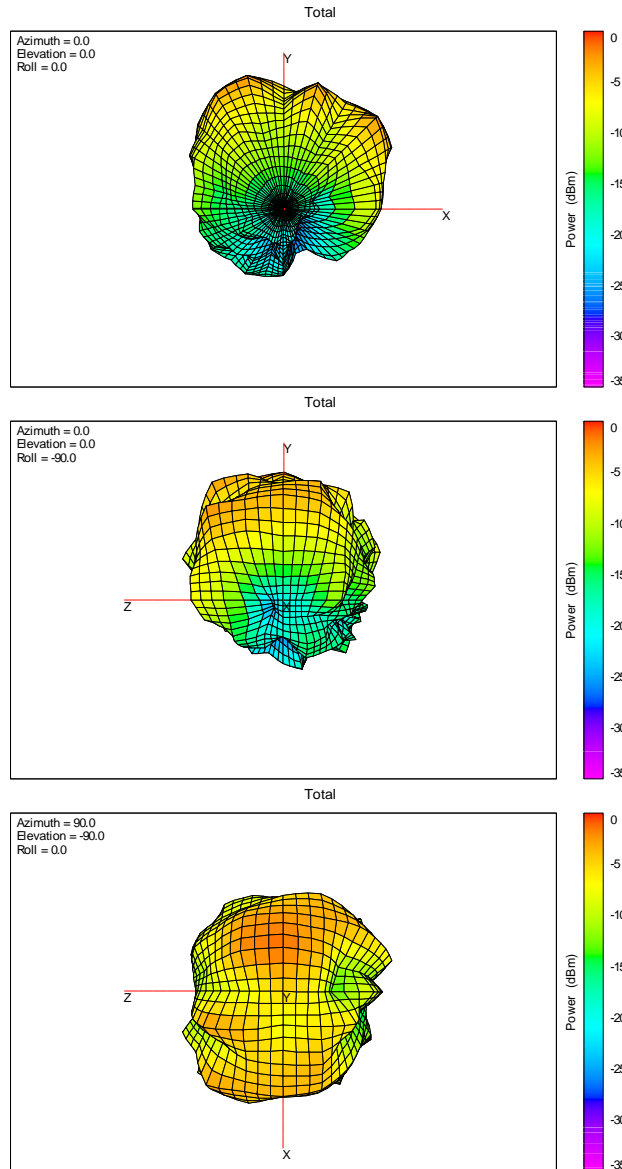
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8 3-D Antenna Pattern



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9 The EUT and Test Configuration

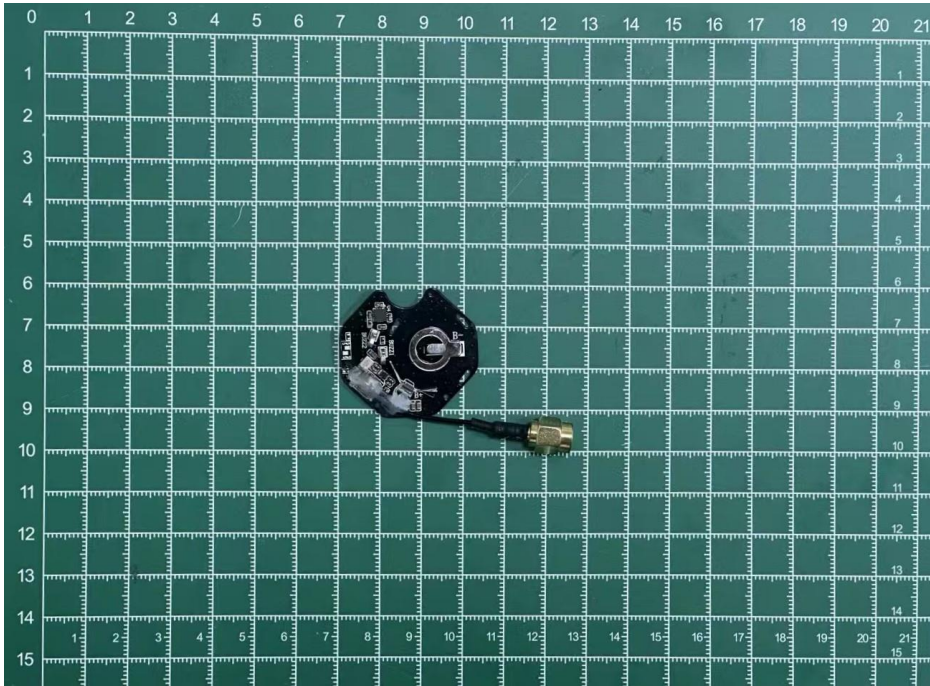


Photo of EUT



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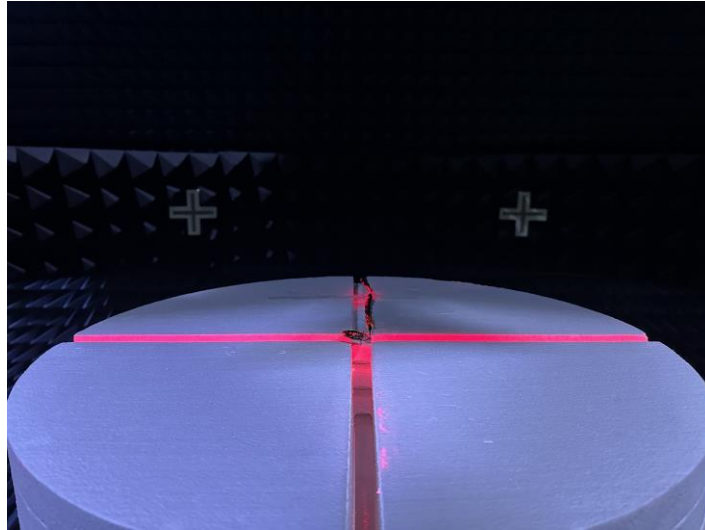
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