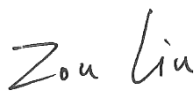


TEST REPORT

Applicant: Shenzhen ChangTaiWei Electronic CO., LTD. 5/F.,6
Block, XinGu Industrial zone, GuShu Village,XiXiang
Address: Town, BaoAn District,Shenzhen City,China
Equipment Type: 15T phosphor copper spring antenna
Model Name: 1.0x5.0x50x15T
Brand Name: N/A
Test Standard: IEEE Std 149-2021
Sample Arrival Date: Jul. 18, 2023
Test Date: Jul. 19, 2023
Date of Issue: Jul. 27, 2023

ISSUED BY:

Shenzhen BALUN Technology Co.,Ltd.

**Tested by:** Mai Jintian**Checked by:** Zou Liu**Approved by:** Tolan Tu
(Testing Director)

Revision History

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Jul. 27, 2023</u>	<u>Initial Issue</u>

TABLE OF CONTENTS

1	GENERAL INFORMATION	3
1.1	Test Laboratory	3
1.2	Test Location.....	3
2	PRODUCT INFORMATION.....	4
2.1	Applicant Information	4
2.2	Manufacturer Information	4
2.3	General Description for Equipment under Test (EUT)	4
2.4	Ancillary Equipment	4
2.5	Technical Information.....	4
3	SUMMARY OF TEST RESULTS.....	5
3.1	Test Standards.....	5
3.2	Test Verdict	5
3.3	Test Uncertainty	5
4	GENERAL TEST CONFIGURATIONS.....	6
4.1	Test Condition	6
4.2	Test Equipment List	6
4.3	Test Setup.....	7
ANNEX A	TEST RESULTS.....	8
A.1	Gain and Efficiency	8
A.2	VSWR	9
ANNEX B	RADIATION PATTERN	10
ANNEX C	TEST SETUP PHOTOS	13
ANNEX D	EUT PHOTO	13

1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	☒ Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	☐ 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Shenzhen ChangTaiWei Electronic CO., LTD.
Address	5/F.,6 Block, XinGu Industrial zone, GuShu Village,XiXiang Town ,BaoAn District,Shenzhen City,China

2.2 Manufacturer Information

Manufacturer	Dongguan Aohe Electronics Co., Ltd
Address	6th Floor, Hengfu Building, Renmin Road, Shajiao Community, Humen Town, Dongguan City, Guangdong Province

2.3 General Description for Equipment under Test (EUT)

EUT Name	15T phosphor copper spring antenna
Model Name Under Test	1.0x5.0x50x15T
Antenna Type	Phosphate copper spring Antenna
Dimensions	52.2mm*16.7mm

2.4 Ancillary Equipment

Note: Not applicable.

2.5 Technical Information

Test Frequencies	462.55MHz, 462.5625MHz, 462.575MHz, 462.5875MHz, 462.6MHz, 462.6125MHz, 462.625MHz, 462.6375MHz, 462.65MHz, 62.6625MHz, 462.675MHz, 462.6875MHz, 462.7MHz, 462.7125MHz, 462.725MHz, 467.5625MHz, 467.5875MHz, 467.6125MHz, 467.6375MHz, 467.6625MHz, 467.6875MHz, 467.7125MHz
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3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	IEEE Std 149-2021	IEEE Standard Test Procedures for Antennas

3.2 Test Verdict

Report Section	Description	Remark
ANNEX A.1	Gain and Efficiency	--
ANNEX A.2	VSWR	--
ANNEX B	Radiation Pattern	--

3.3 Test Uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

Item	Uncertainty
VSWR(S11)	± 0.61
Gain	$\pm 1.92\text{dB}$

4 GENERAL TEST CONFIGURATIONS

4.1 Test Condition

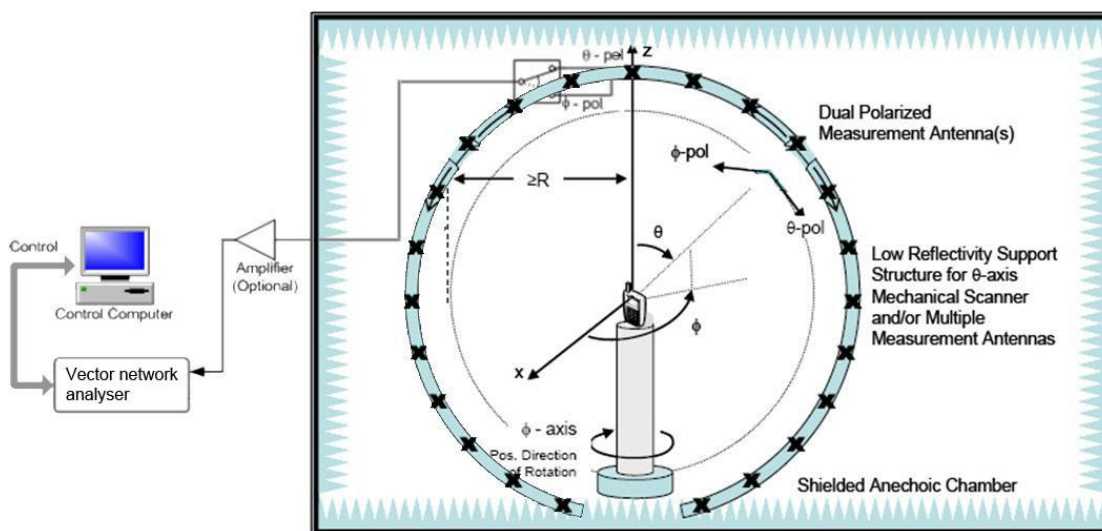
Environment Parameter	Selected Values During Tests			
	Ambient Pressure(KPa)	Temperature(°C)	Voltage	Relative Humidity (%)
Normal Temperature, Normal Voltage (NTNV)	101	21.6	N/A	45

4.2 Test Equipment List

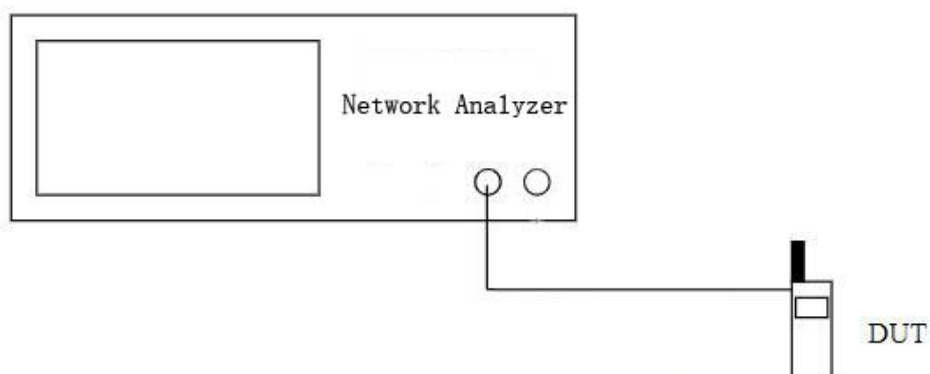
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
SG24 Multi-probe Antenna Measurement System	SATIMO	SG24-L	1101855- 0001	2021.11.12	2024.11.11
Vector Network Analyzer	Agilent	E5071B	MY42404001	2023.03.26	2024.03.25
Description	Manufacturer	Name		Version	
Test Software	MVG	SPM		V 1.8	

4.3 Test Setup

4.3.1 Antenna gain, efficiency and radiation pattern test setup



4.3.2 S11 parameter test setup



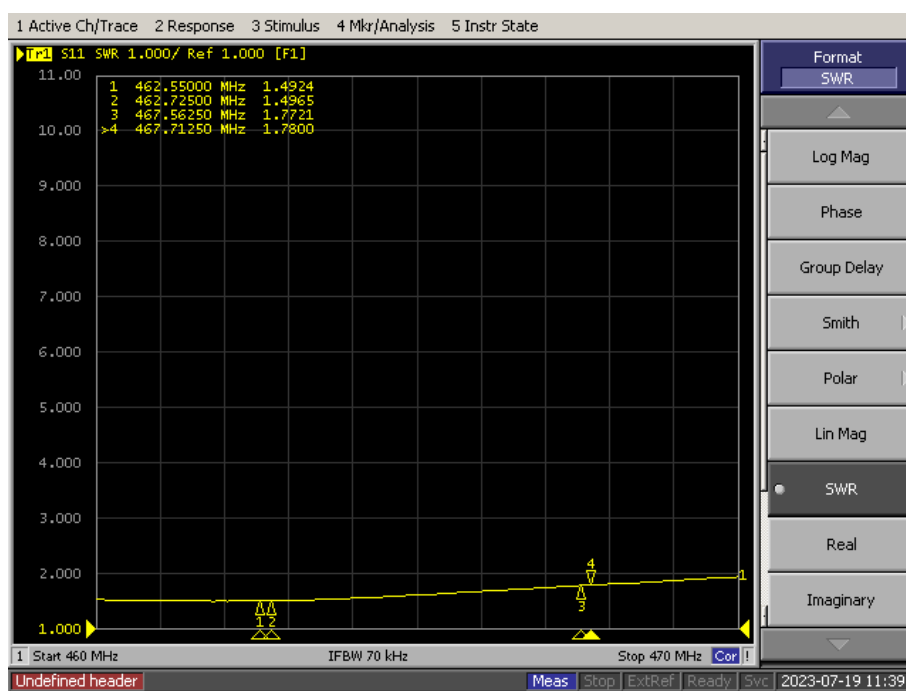
ANNEX A TEST RESULTS

A.1 Gain and Efficiency

Frequency	Gain (dBi)	Efficiency (%)
462.55MHz	-2.97	14
462.5625MHz	-2.97	14
462.575MHz	-2.97	14
462.5875MHz	-2.97	14
462.6MHz	-2.97	14
462.6125MHz	-2.97	14
462.625MHz	-2.97	14
462.6375MHz	-2.97	14
462.65MHz	-2.97	14
462.6625MHz	-2.98	14
462.675MHz	-2.97	14
462.6875MHz	-2.98	14
462.7MHz	-2.98	14
462.7125MHz	-2.98	14
462.725MHz	-2.98	14
467.5625MHz	-3.75	12
467.5875MHz	-3.75	11
467.6125MHz	-3.76	11
467.6375MHz	-3.76	11
467.6625MHz	-3.77	11
467.6875MHz	-3.77	11
467.7125MHz	-3.78	11

A.2 VSWR

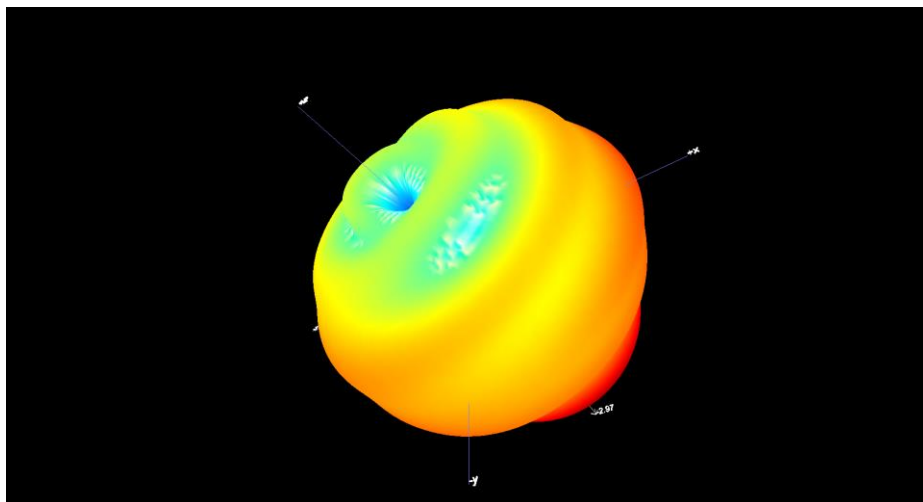
Frequency	VSWR
462.55MHz	1.49
462.725MHz	1.50
467.5625MHz	1.77
467.7125MHz	1.78



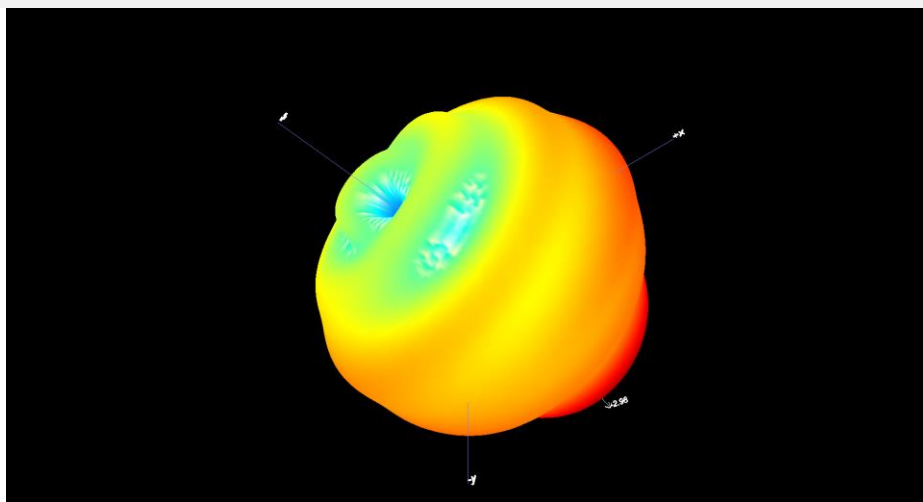
ANNEX B RADIATION PATTERN

B.1 3D Pattern

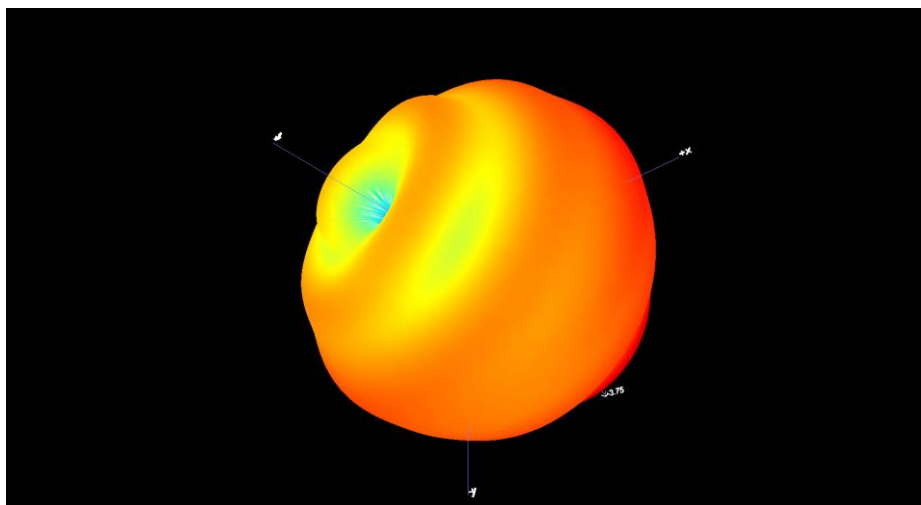
B1.1 3D Pattern for 462.55MHz



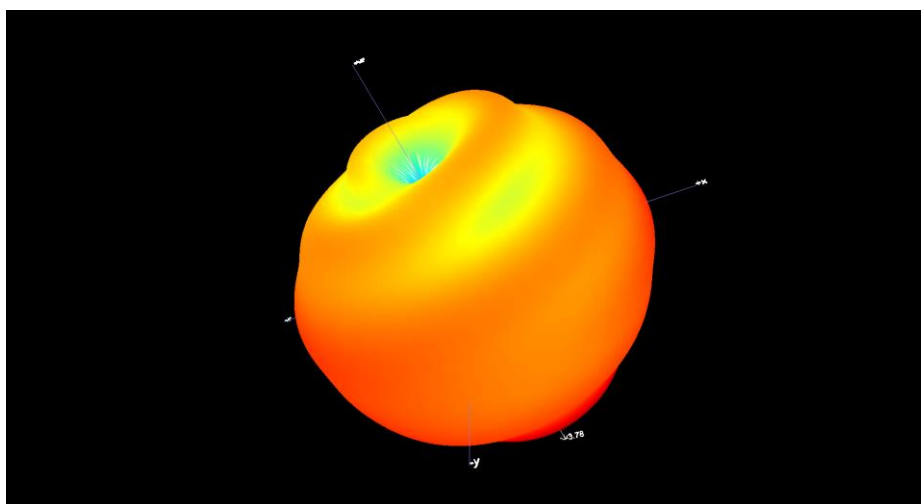
B1.2 3D Pattern for 462.725MHz



B1.3 3D Pattern for 467.5625MHz

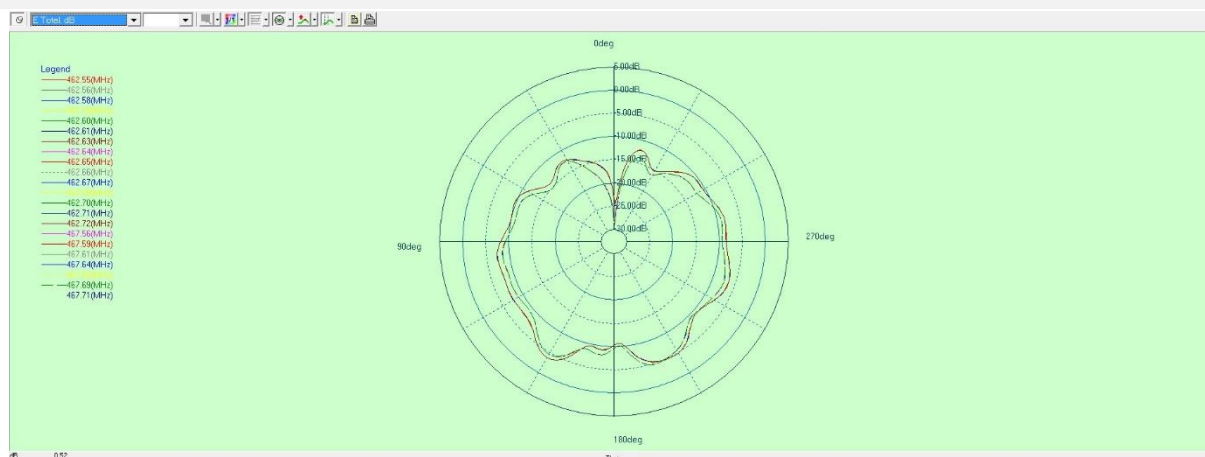


B1.4 3D Pattern for 467.7125MHz

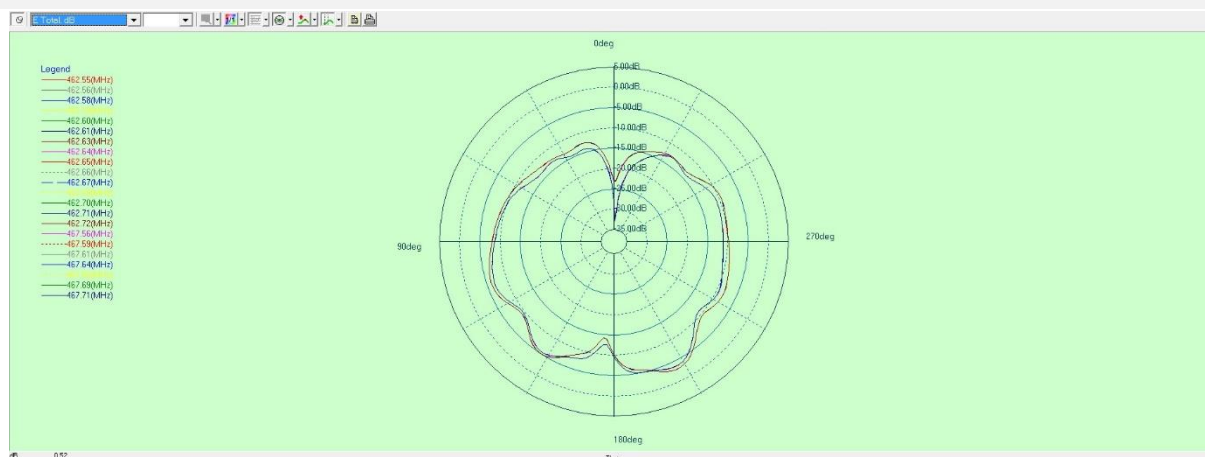


B.2 1D Radiation Pattern

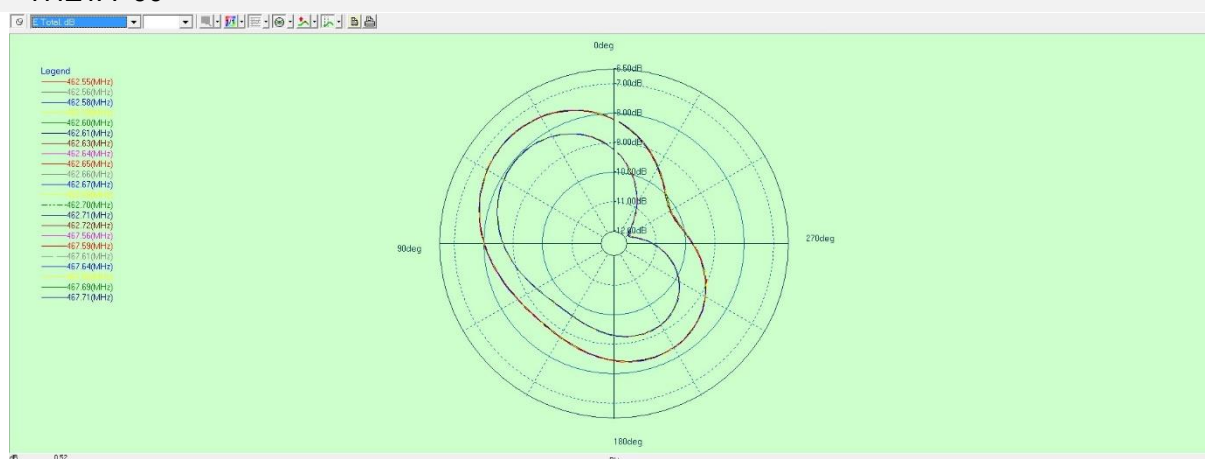
B2.1 PHI=0



B2.2 PHI=90



B2.3 THETA=90



ANNEX C TEST SETUP PHOTOS

Please refer the document “BL-SZ2370769-AO.PDF”.

ANNEX D EUT PHOTO

Please refer the document “BL-SZ2370769-AA.PDF”.

Statement

1. The laboratory guarantees the scientificity, accuracy and impartiality of the test, and is responsible for all the information in the report, except the information provided by the customer. The customer is responsible for the impact of the information provided on the validity of the results.
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3. For the report with CNAS mark or A2LA mark, the items marked with "☆" are not within the accredited scope.
4. This report is invalid if it is altered, without the signature of the testing and approval personnel, or without the "inspection and testing dedicated stamp" or test report stamp.
5. The test data and results are only valid for the tested samples provided by the customer.
6. This report shall not be partially reproduced without the written permission of the laboratory.
7. Any objection shall be raised to the laboratory within 30 days after receiving the report.

--END OF REPORT--