

TEST REPORT

Applicant: Guangzhou ZHIYUAN Electronics Co., Ltd.
Address: ZLG Zhiyuan Electronics Building, No. 43 Sicheng Road, Tianhe District, Guangzhou, Guangdong Province
Equipment Type: ZLG PCB Antenna
Model Name: 4.7mm*11mm, 2.4GHz, PCB ANT
Brand Name: ZLG
Test Standard: ANSI/IEEE Std 149-1979
Test Date: Sep. 08, 2022
Date of Issue: Sep. 19, 2022

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Mai Jintian

Checked by: Tolan Tu

Approved by: Wei Yanquan
(Chief Engineer)

Mai Jintian

Tolan Tu

Wei Yanquan

Revision History

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Sep. 19, 2022</u>	<u>Initial Issue</u>

TABLE OF CONTENTS

1	GENERAL INFORMATION.....	4
1.1	Test Laboratory	4
1.2	Test Location.....	4
2	PRODUCT INFORMATION	5
2.1	Applicant Information.....	5
2.2	Manufacturer Information	5
2.3	Factory Information	5
2.4	General Description for Equipment under Test (EUT)	5
2.5	Ancillary Equipment.....	5
2.6	Technical Information	5
3	SUMMARY OF TEST RESULTS	6
3.1	Test Standards.....	6
3.2	Test Verdict.....	6
3.3	Test Uncertainty	6
4	GENERAL TEST CONFIGURATIONS	7
4.1	Test Condition	7
4.2	Test Equipment List.....	7
4.3	Test Setup.....	8
ANNEX A	TEST RESULTS.....	9
A.1	Gain and Efficiency	9
A.2	VSWR	10
A.3	Input Impedance.....	11
A.4	Return Loss.....	12
ANNEX B	RADIATION PATTERN	13

ANNEX C	TEST SETUP PHOTO	16
ANNEX D	EUT PHOTO	18

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	Guangzhou ZHIYUAN Electronics Co., Ltd.
Address	ZLG Zhiyuan Electronics Building, No. 43 Sicheng Road, Tianhe District, Guangzhou, Guangdong Province
Contact Person	Ruiwen Chen
Telephone Number	15692019234
E-mail Address	chenruiwen@zlg.cn

2.2 Manufacturer Information

Manufacturer	Guangzhou ZHIYUAN Electronics Co., Ltd.
Address	ZLG Zhiyuan Electronics Building, No. 43 Sicheng Road, Tianhe District, Guangzhou, Guangdong Province

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Name	ZLG PCB Antenna
Model Name Under Test	4.7mm*11mm, 2.4GHz, PCB ANT
Antenna Type	PCB Antenna
Dimensions	4.7mm*11mm

2.5 Ancillary Equipment

Note: Not applicable.

2.6 Technical Information

Frequency Range	2400MHz ~ 2500MHz
Test Frequencies	2400MHz, 2410MHz, 2420MHz, 2430MHz, 2440MHz, 2450MHz, 2460MHz, 2470MHz, 2480MHz, 2490MHz, 2500MHz

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	ANSI/IEEE Std 149-1979	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 A.3	Input Impedance	--
ANNEX A.4	Return Loss	--
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

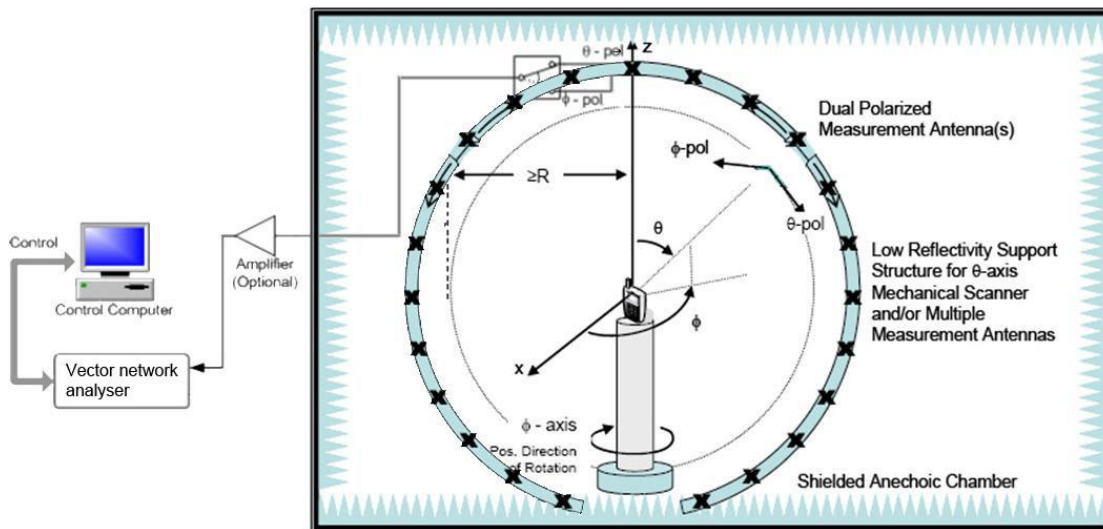
Environment Parameter	Selected Values During Tests			
	Ambient Pressure(KPa)	Temperature(°C)	Voltage	Relative Humidity (%)
Normal Temperature, Normal Voltage (NTNV)	101	25	N/A	50

4.2 Test Equipment List

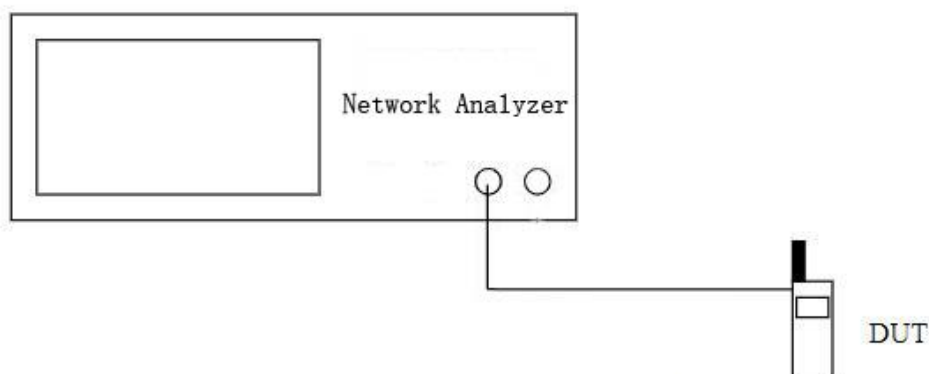
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
SG24 Multi-probe Antenna Measurement System	SATIMO	SG24-L	1101855- 0001	2021.11.12	2024.11.11
Vector Network Analyzer	Agilent	E5071B	MY42404001	2022.04.02	2023.04.01
Description	Manufacturer	Name		Version	
Test Software	MVG	SPM		V 1.8	

4.3 Test Setup

4.3.1 Antenna gain, efficiency and radiation pattern test setup



4.3.2 S11 parameter test setup



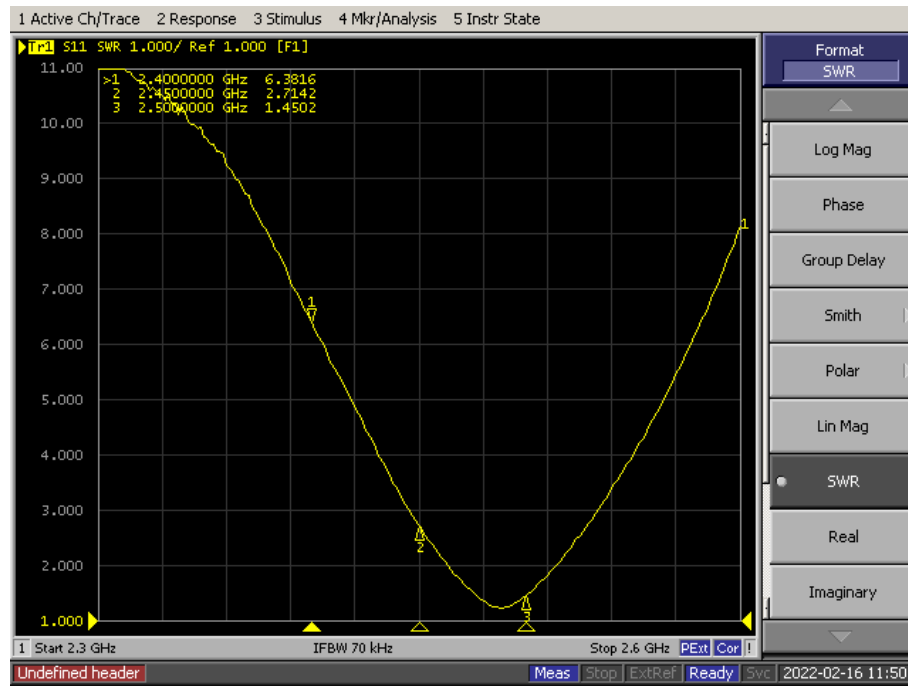
ANNEX A TEST RESULTS

A.1 Gain and Efficiency

Frequency	Gain (dBi)	Efficiency (%)
2400MHz	-4.81	12
2410MHz	-4.23	13
2420MHz	-3.53	15
2430MHz	-2.86	17
2440MHz	-2.23	19
2450MHz	-1.93	21
2460MHz	-1.28	24
2470MHz	-1.15	26
2480MHz	-1.51	26
2490MHz	-1.94	25
2500MHz	-1.83	24

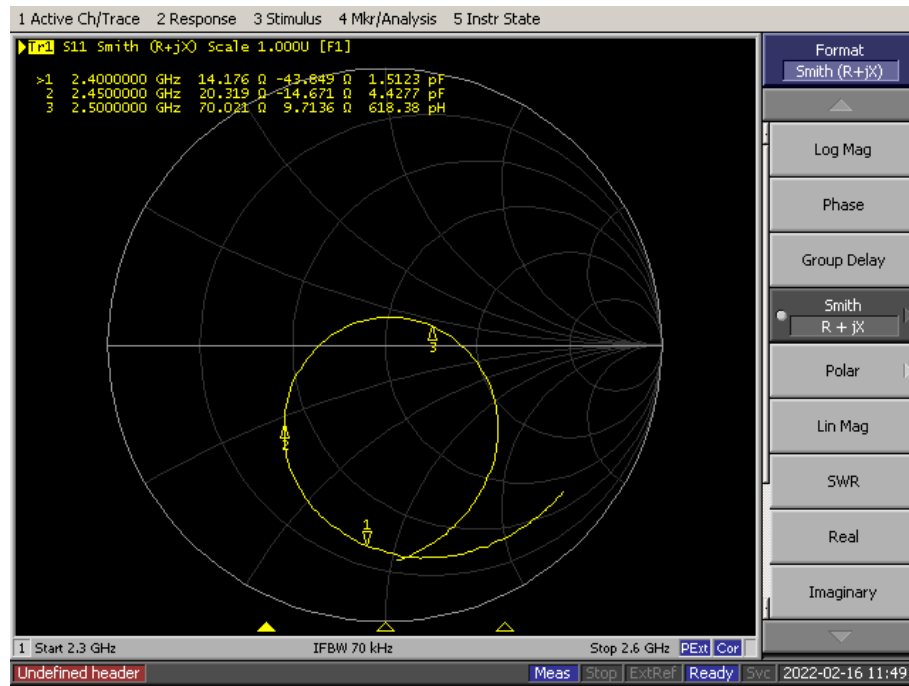
A.2 VSWR

Frequency	VSWR
2400MHz	6.38
2450MHz	2.71
2500MHz	1.45



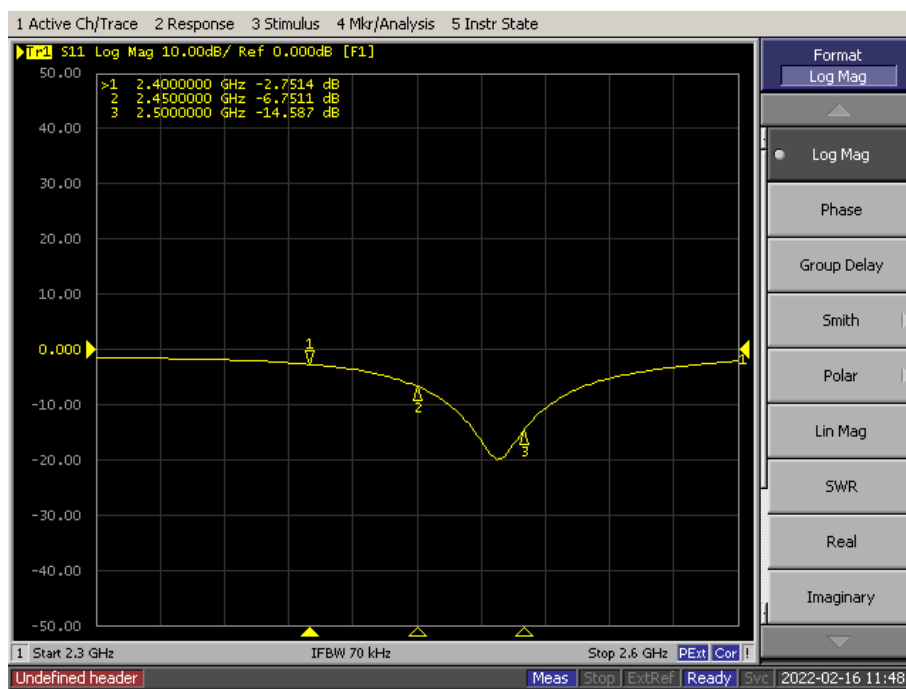
A.3 Input Impedance

Frequency	Input impedance (Ω)
2400MHz	14.18
2450MHz	20.32
2500MHz	70.02



A.4 Return Loss

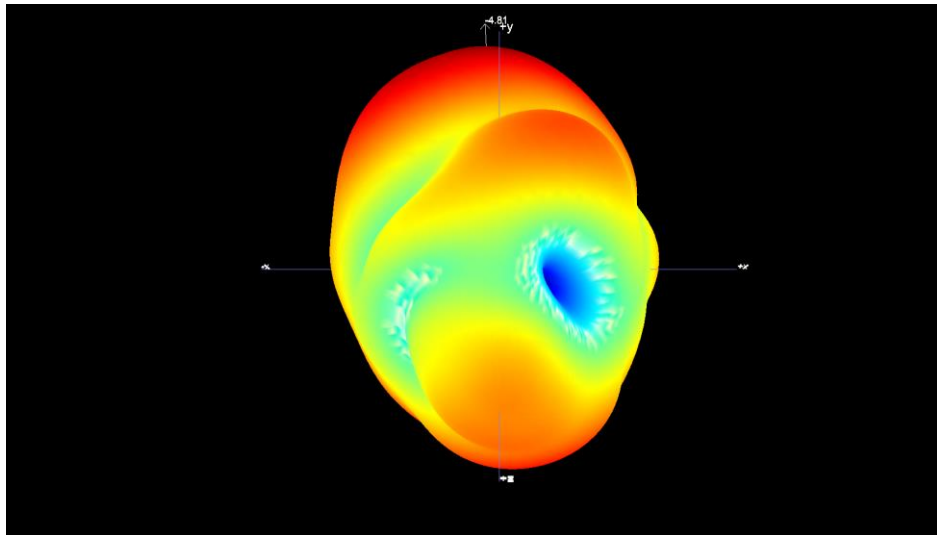
Frequency	Return Loss(dB)
2400MHz	-2.75
2450MHz	-6.75
2500MHz	-14.59



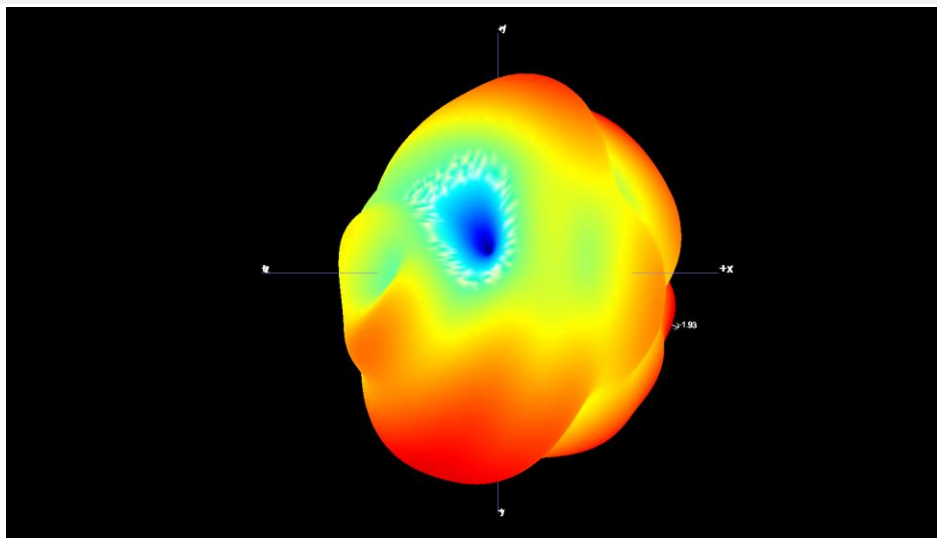
ANNEX B RADIATION PATTERN

B.1 3D Pattern

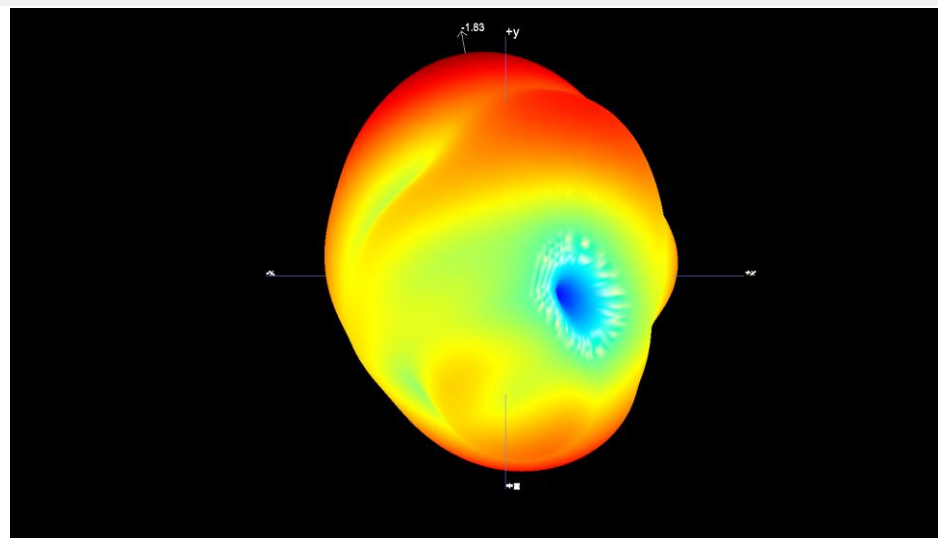
B1.1 3D Pattern for 2400MHz



B1.2 3D Pattern for 2450MHz

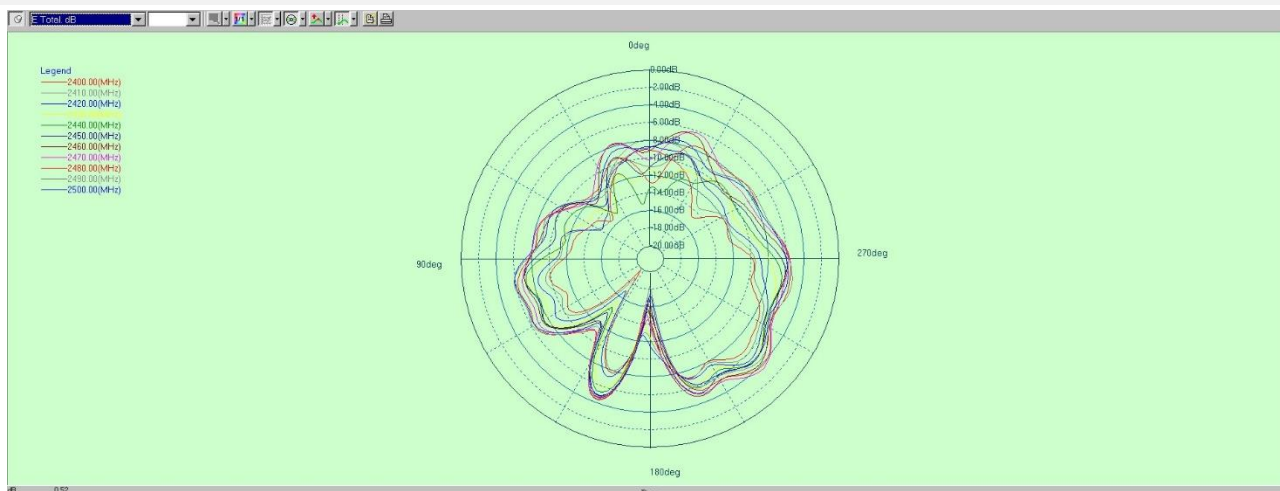


B1.3 3D Pattern for 2500MHz

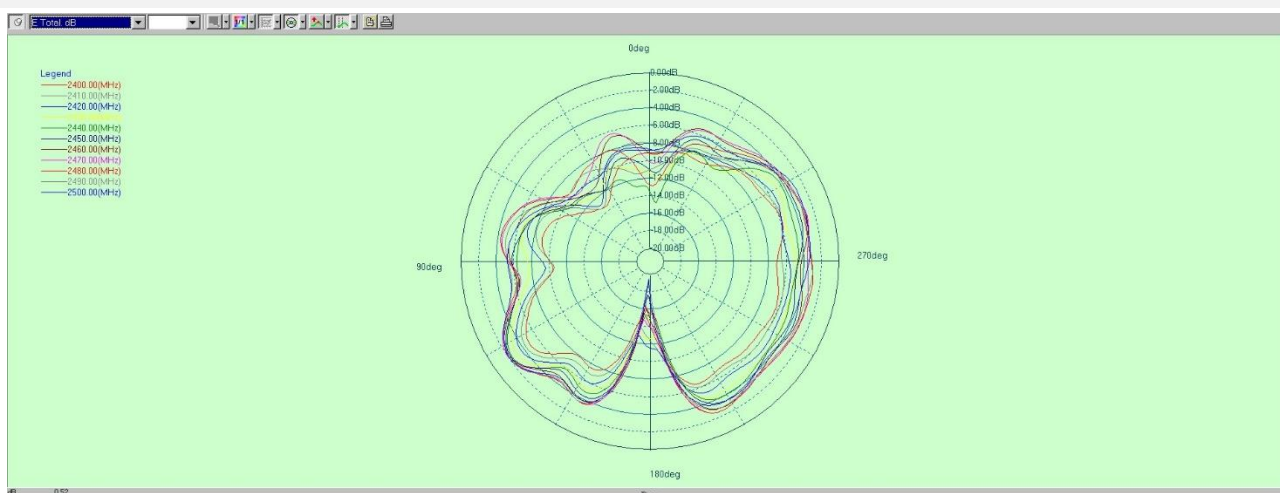


B.2 1D Radiation Pattern

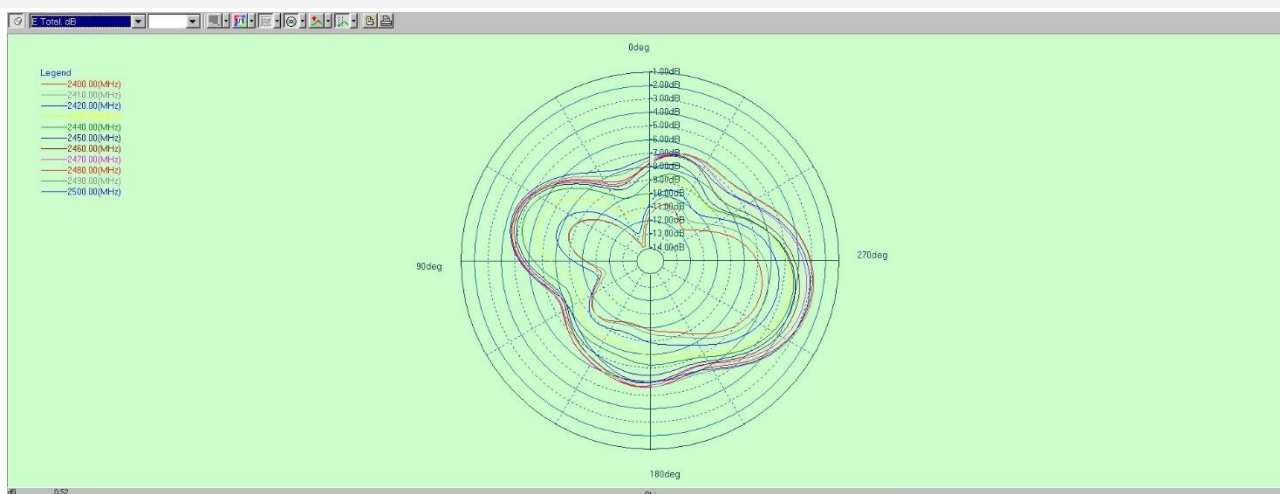
B2.1 PHI=0



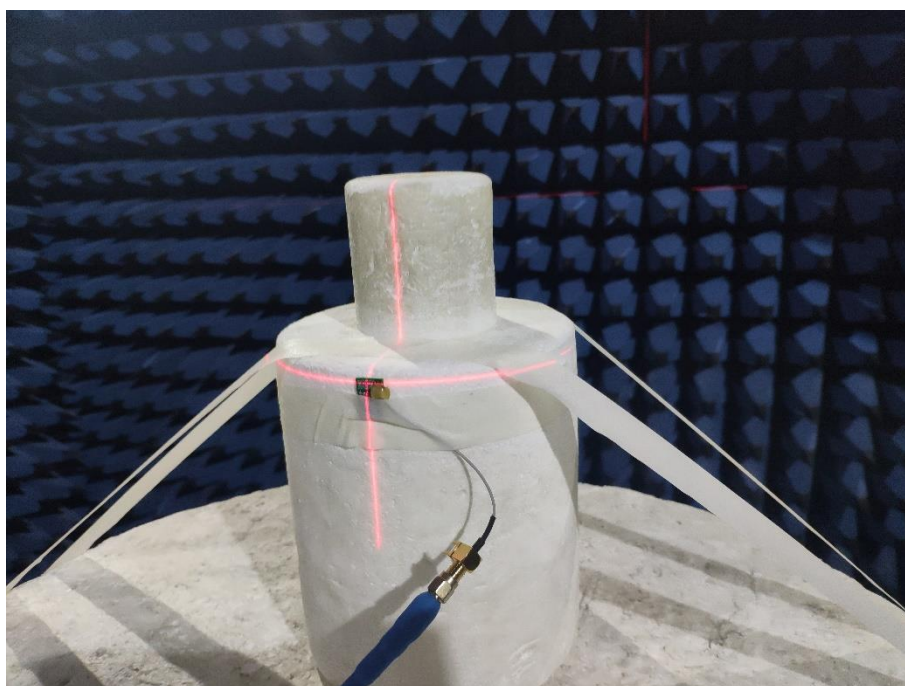
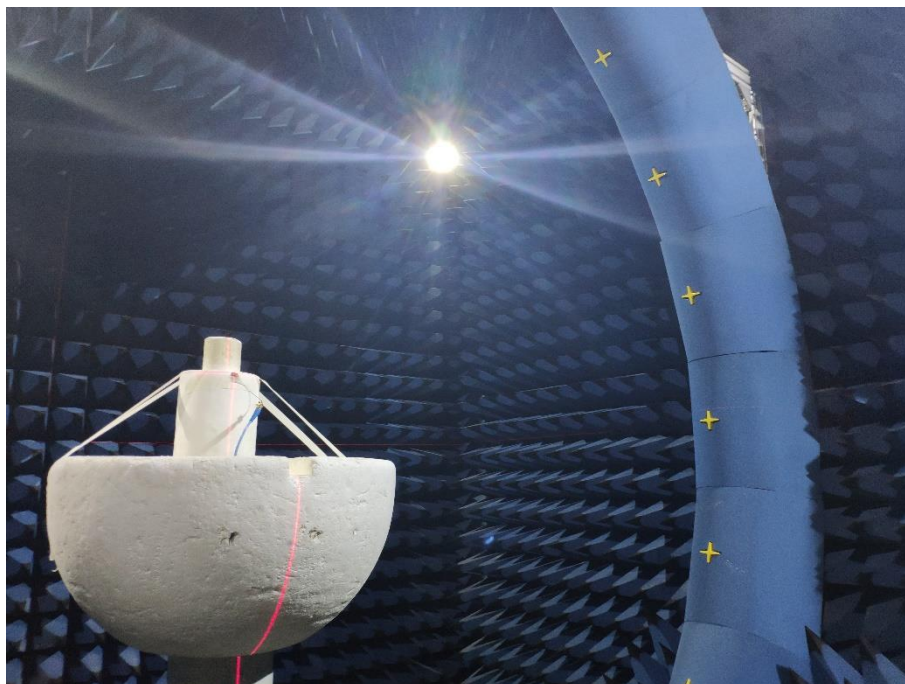
B2.2 PHI=90

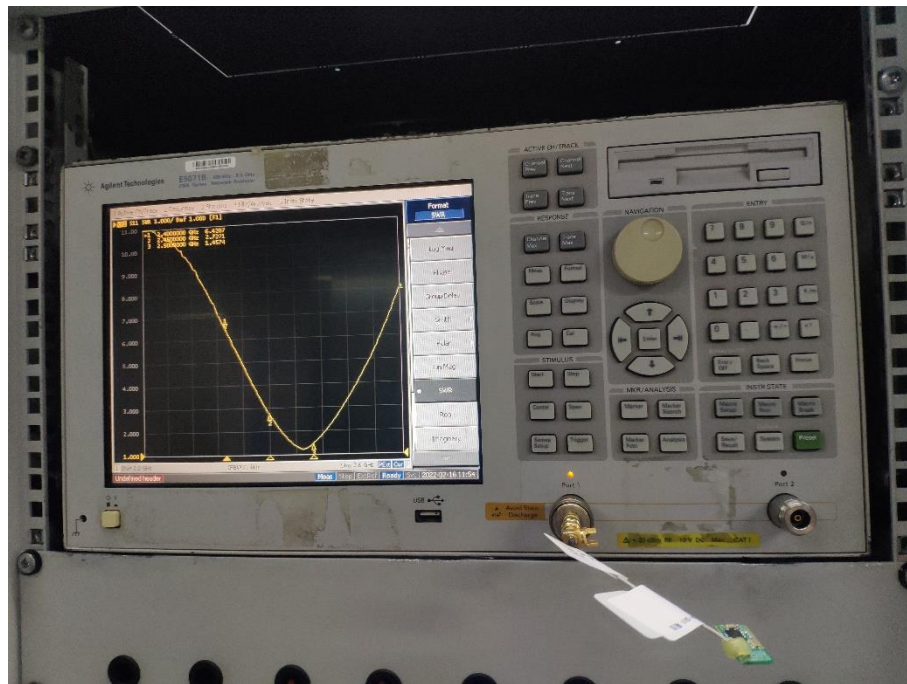


B2.3 THETA=90

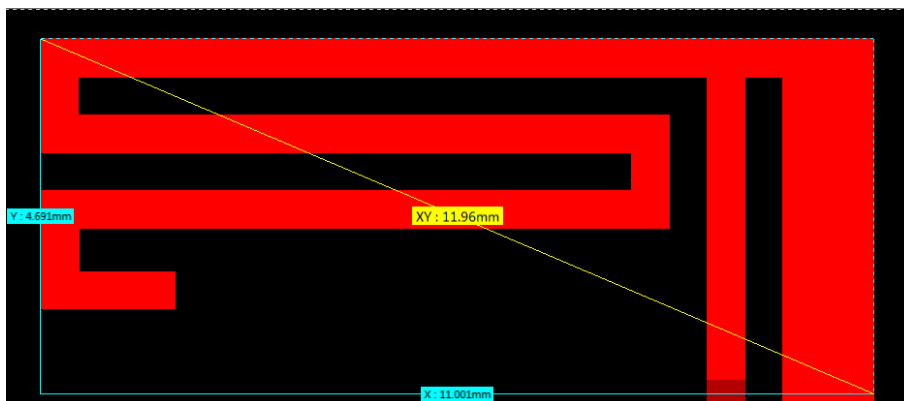
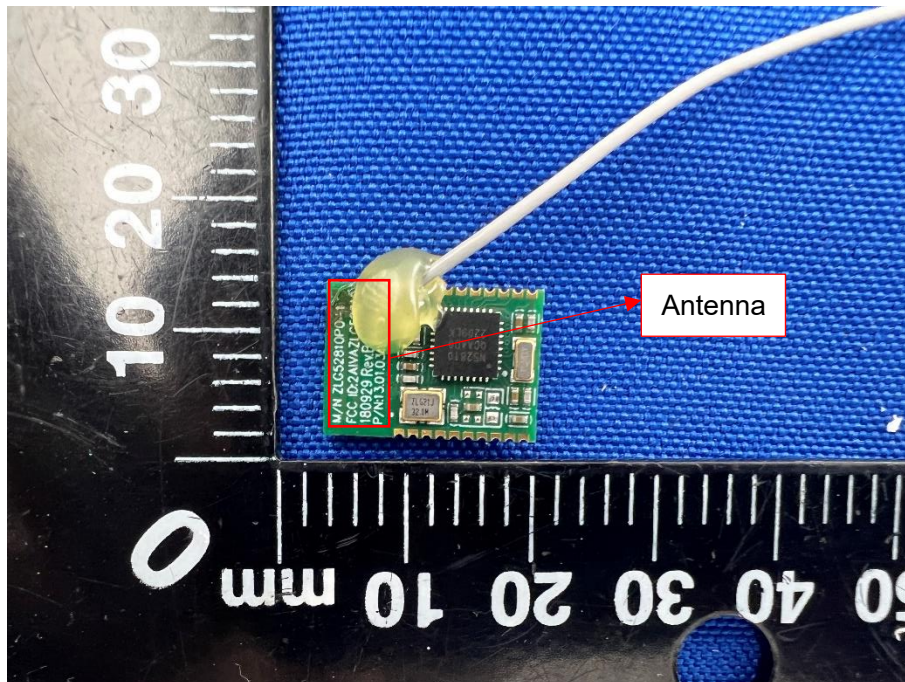


ANNEX C TEST SETUP PHOTO





ANNEX D EUT PHOTO



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.
2. The report without China inspection body and laboratory Mandatory Approval (CMA) mark has no effect of proving to the society.
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--