

TEST REPORT

Applicant: Guangzhou ZHIYUAN Electronics Co., Ltd.
Address: ZLG Zhiyuan Electronics Building, No. 43 Sicheng Road, Tianhe District, Guangzhou, Guangdong Province
Equipment Type: Wi-Fi Module
Model Name: ZM602P2S31P
Brand Name: ZLG
Test Standard: GB/T 9410-2008 (refer section 3.1)
Test Date: Jun. 10, 2022
Date of Issue: Aug. 18, 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>Aug. 18, 2022</u>	<u>Initial Issue</u>

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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	Lin Youlian
Telephone Number	13424989034
E-mail Address	zy.emc@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	Wi-Fi Module
Model Name Under Test	ZM602P2S31P
Antenna Type	PCB Antenna
Dimensions	16*7 mm

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	GB/T 9410-2008	General specification for antennas used in the mobile communications
2	ANSI/IEEE Std 149-1979	IEEE Standard Test Procedures for Antennas
3	Enterprise Technology Method	Enterprise Technology Method refer Section 4.3

3.2 Test Verdict

Report Section	Description	Identity	Remark
ANNEX A.1	Gain and Efficiency	GB/T 9410-2008	Note ^{#2}
ANNEX A.2	VSWR	GB/T 9410-2008	Note ^{#2}
ANNEX A.3	Return Loss	Enterprise Technology Method	Note ^{#1} , Note ^{#2}
ANNEX A.4	Input impedance	ANSI/IEEE Std 149-1979	Note ^{#2}
ANNEX B	Radiation Pattern	GB/T 9410-2008	Note ^{#2}

Note^{#1}: The return loss test method is based on Section 4.3.3 of this report.

Note^{#2}: Compared with the EUT of test report(BL-SZ2260417-901), the EUT of this report is the same one.

Therefore, all test datas originate from report(BL-SZ2260417-901), which was issued by Shenzhen BALUN Technology Co., Ltd. on 2022, Jun. 23.

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

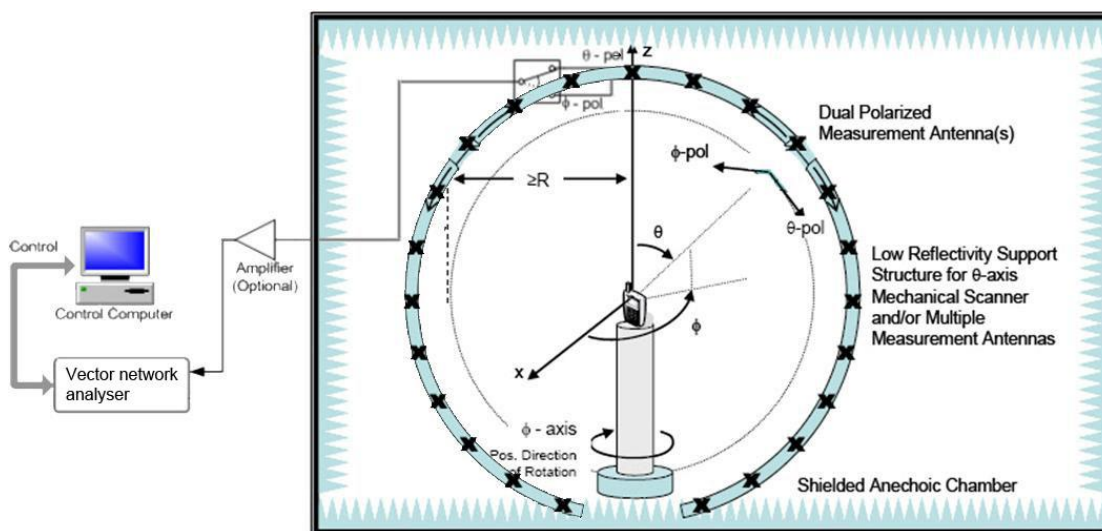
Environment Parameter	Selected Values During Tests			
	Ambient Pressure(KPa)	Temperature(°C)	Voltage	Relative Humidity (%)
Normal Temperature, Normal Voltage (NTNV)	100 to 102	19 to 25	N/A	45 to 55

4.2 Test Equipment List

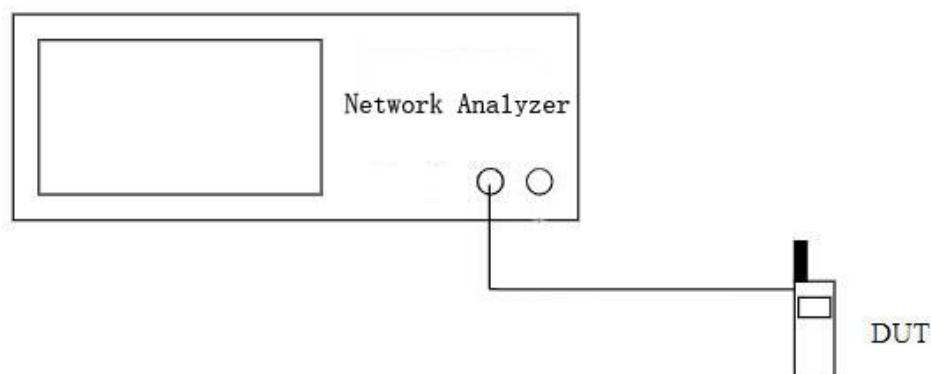
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
SG24 Multi-probe Antenna Measurement System	SATIMO	SG24-L	1101855- 0001	2021.11.12	2024.11.11
Vector Network Analyzer	Agilent	E5071B	MY42404001	2022.04.02	2023.04.01

4.3 Test Setup

4.3.1 Antenna gain, efficiency and radiation pattern test setup



4.3.2 S11 parameter test setup



4.3.3 Return Loss Test Method

- 1) The connection diagram between the antenna under test and the measuring system is shown in Chapter 4.3.2. The nominal impedance of return loss measuring equipment is 50 Ω ;
- 2) Calibration of the measuring system: perform system calibration according to the calibration steps of the test instrument, and the interface of the test end shall match the interface of the antenna under test;
- 3) Connect the measuring system with the antenna under test, and measure the return loss within the working frequency range. The measured loss reading is the return loss of the measured antenna port.

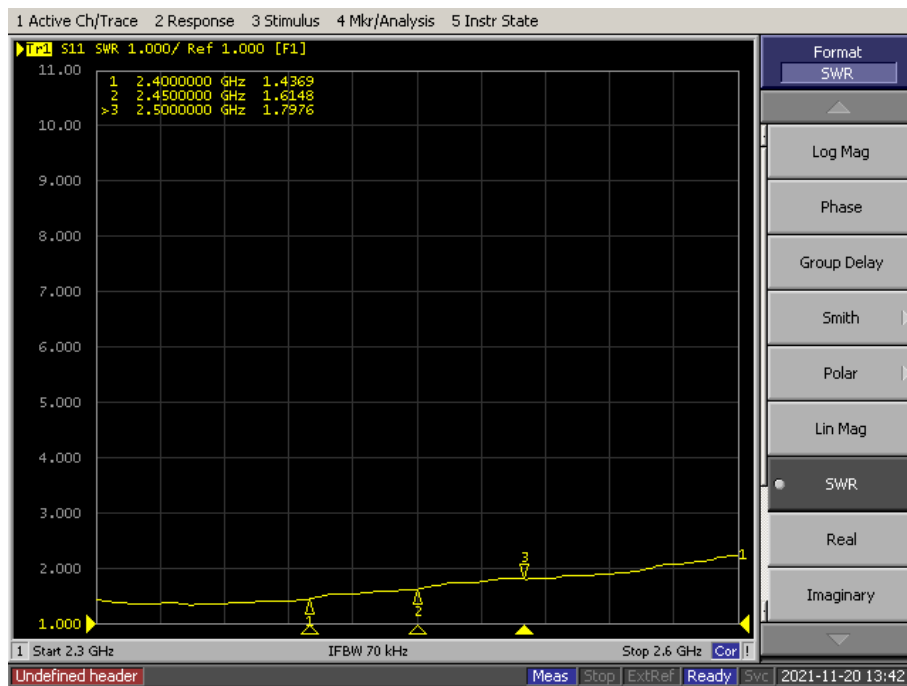
ANNEX A TEST RESULTS

A.1 Gain and Efficiency

Frequency	Gain (dBi)	Efficiency (%)
2400MHz	3.40	81
2410MHz	3.36	80
2420MHz	3.31	79
2430MHz	3.28	80
2440MHz	3.19	80
2450MHz	3.16	78
2460MHz	3.03	77
2470MHz	3.00	77
2480MHz	3.04	78
2490MHz	3.07	76
2500MHz	3.02	75

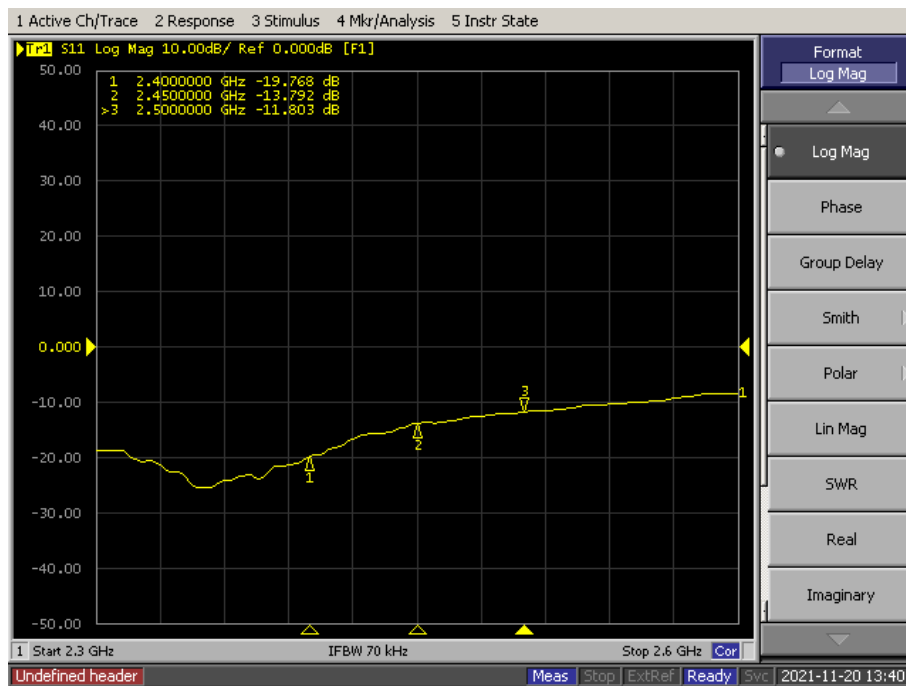
A.2 VSWR

Frequency	VSWR
2400MHz	1.44
2450MHz	1.61
2500MHz	1.80



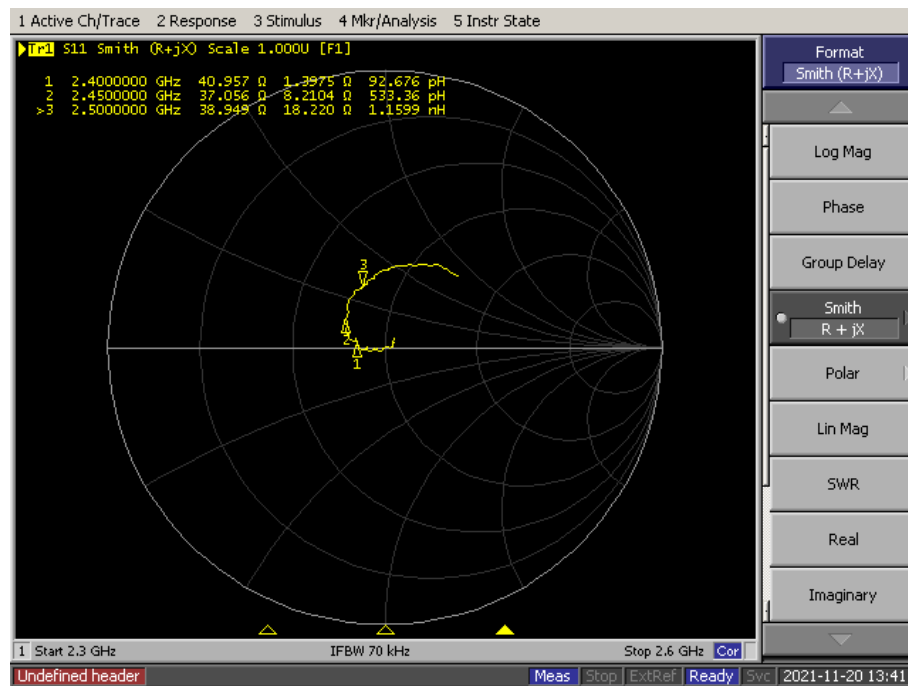
A.3 Return Loss

Frequency	Return Loss (dB)
2400MHz	-19.77
2450MHz	-13.79
2500MHz	-11.80



A.4 Input Impedance

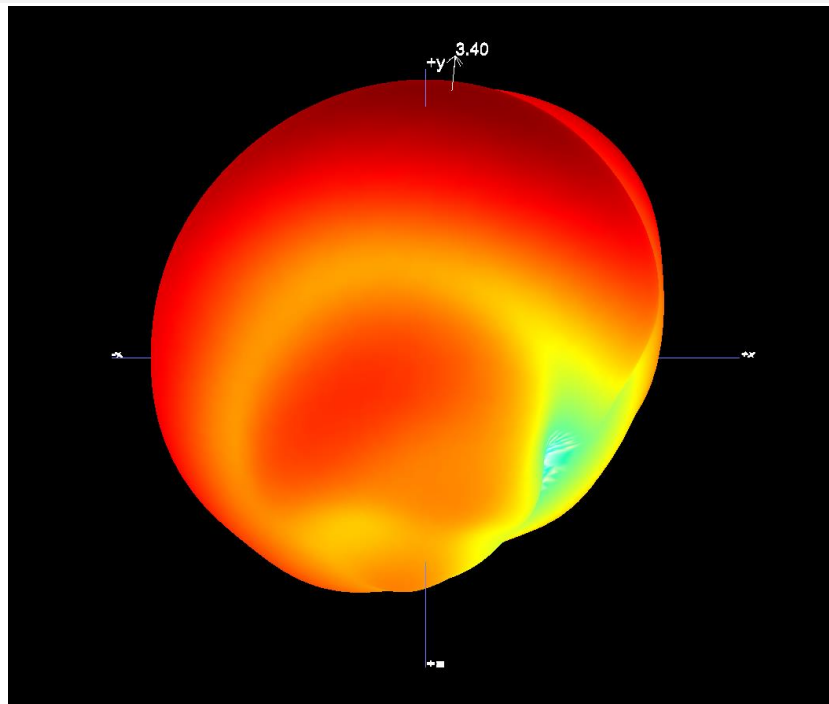
Frequency	Input impedance (Ω)
2400MHz	40.96
2450MHz	37.06
2500MHz	38.95



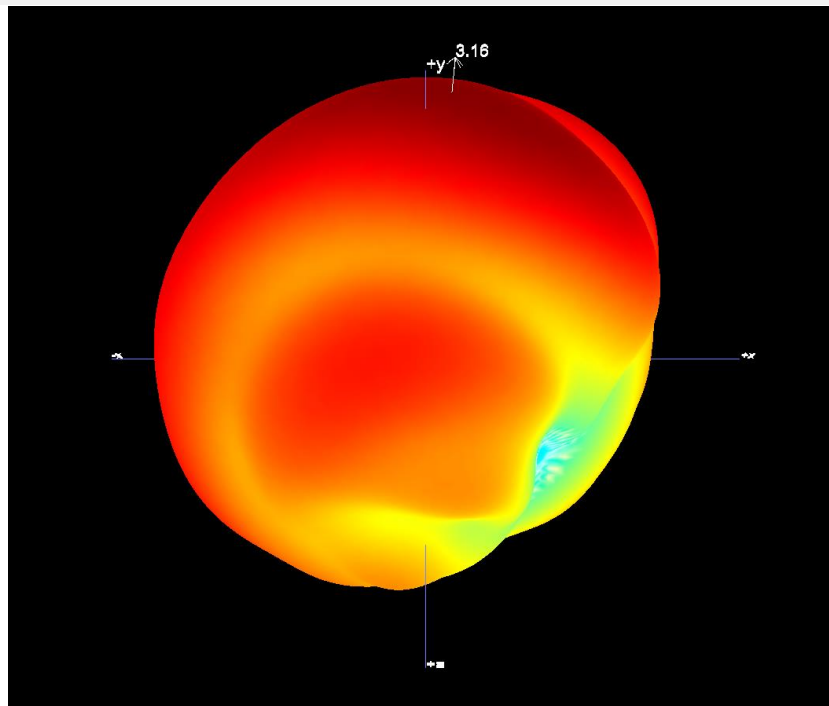
ANNEX B RADIATION PATTERN

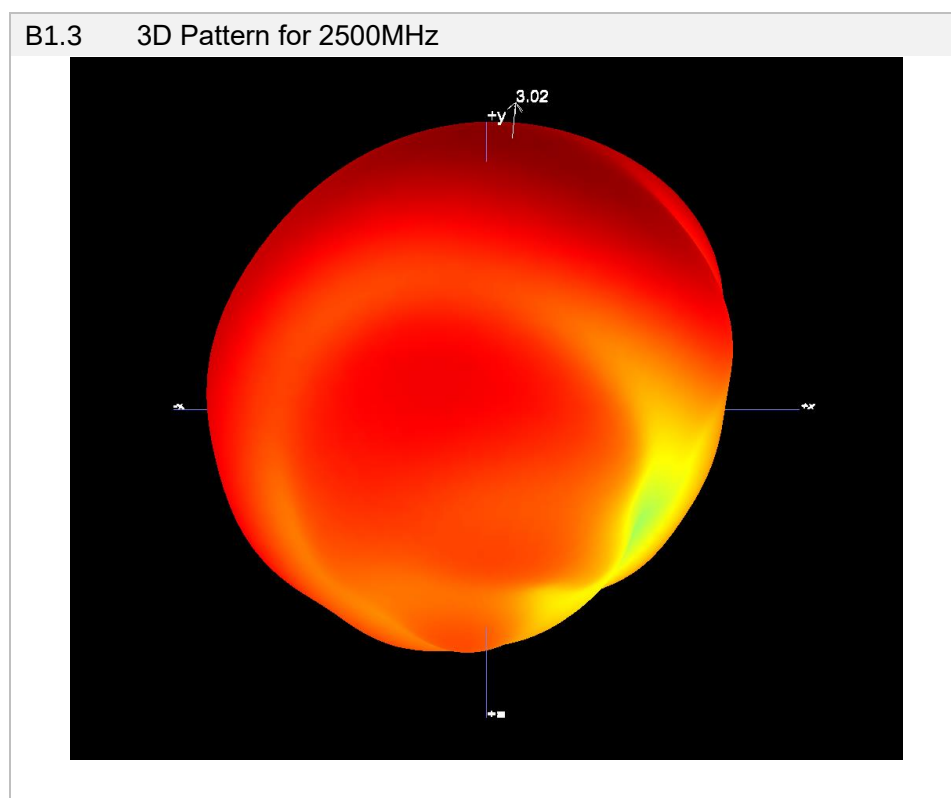
B.1 3D Pattern

B1.1 3D Pattern for 2400MHz



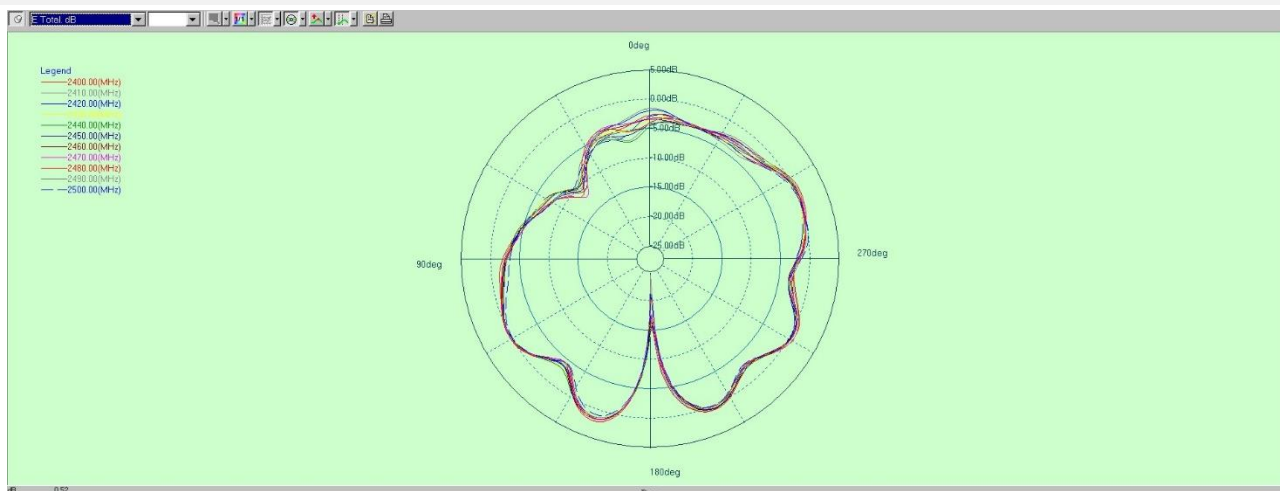
B1.2 3D Pattern for 2450MHz



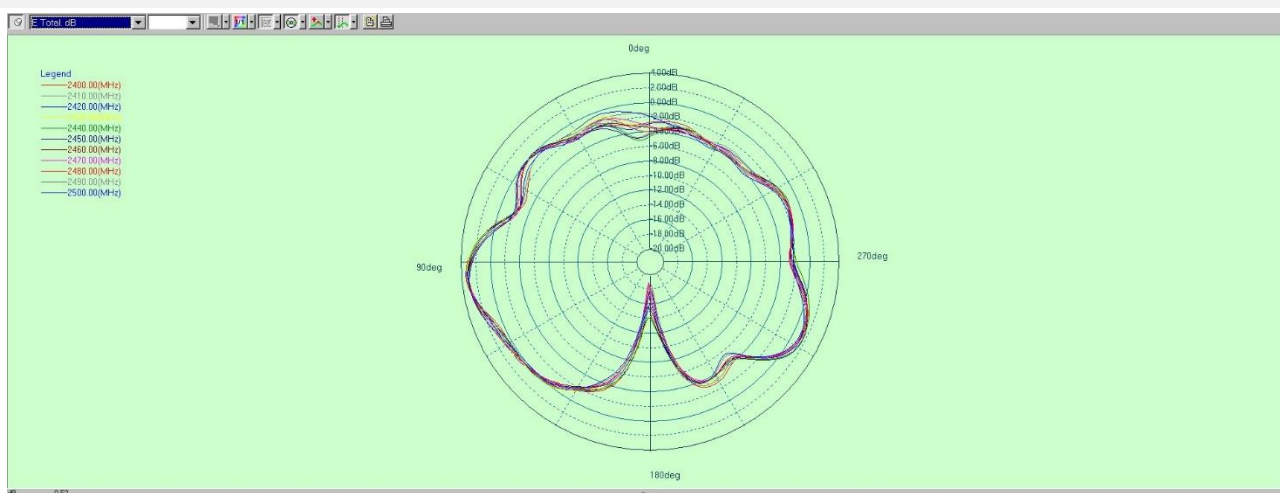


B.2 1D Radiation Pattern

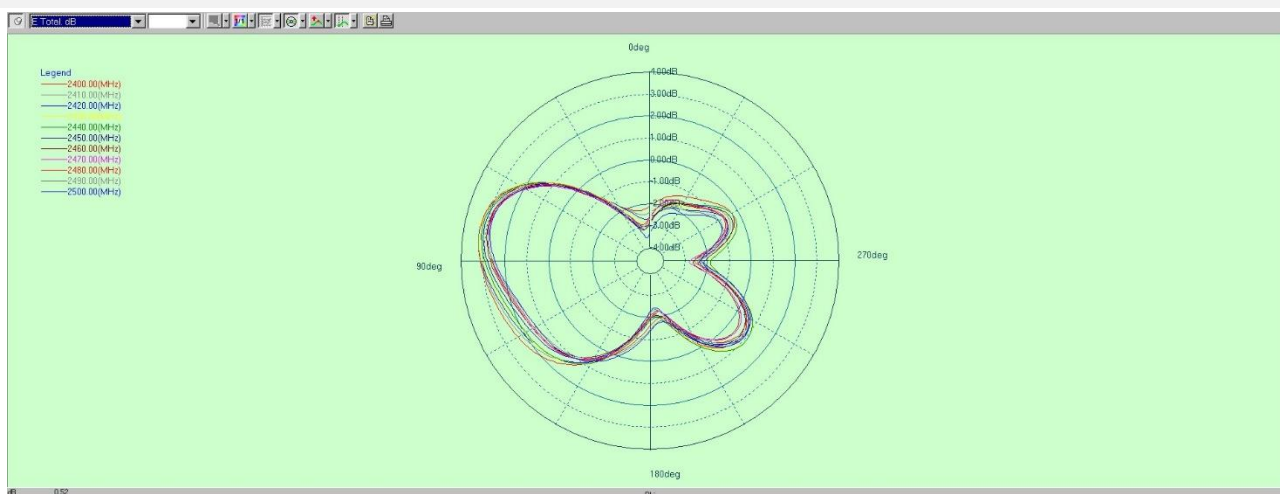
B2.1 PHI=0



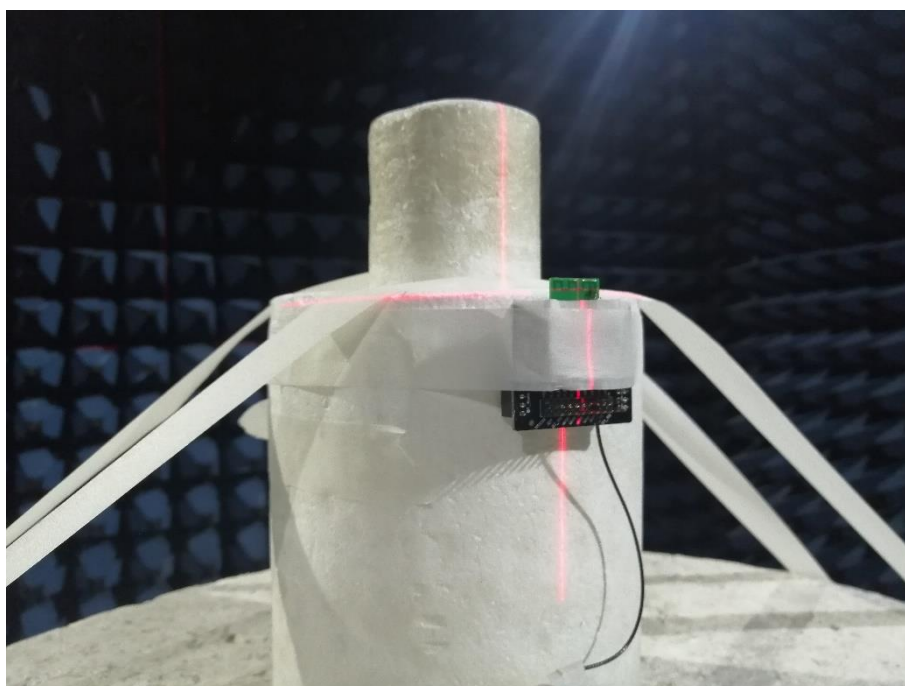
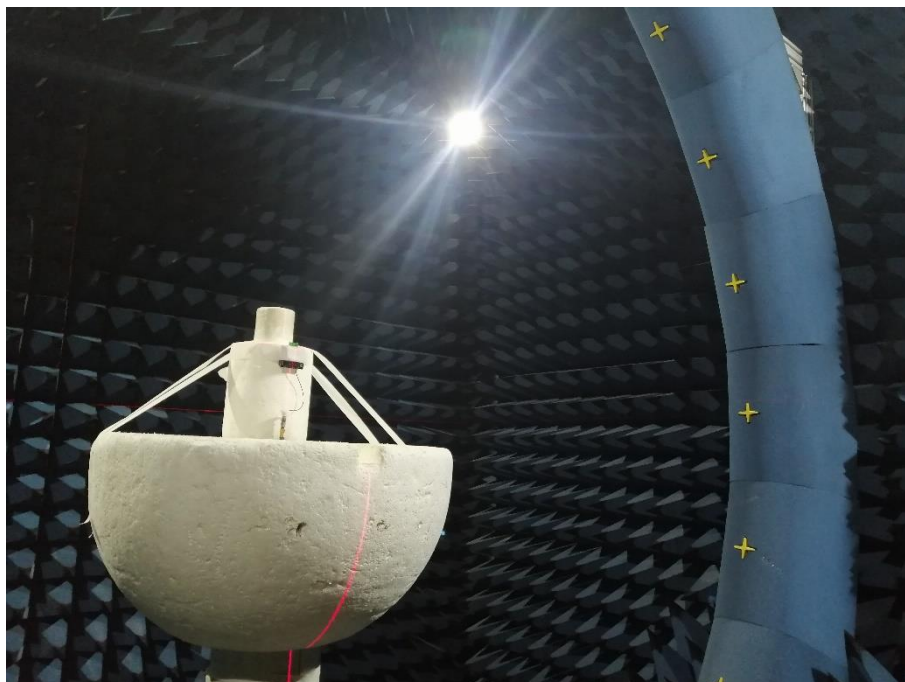
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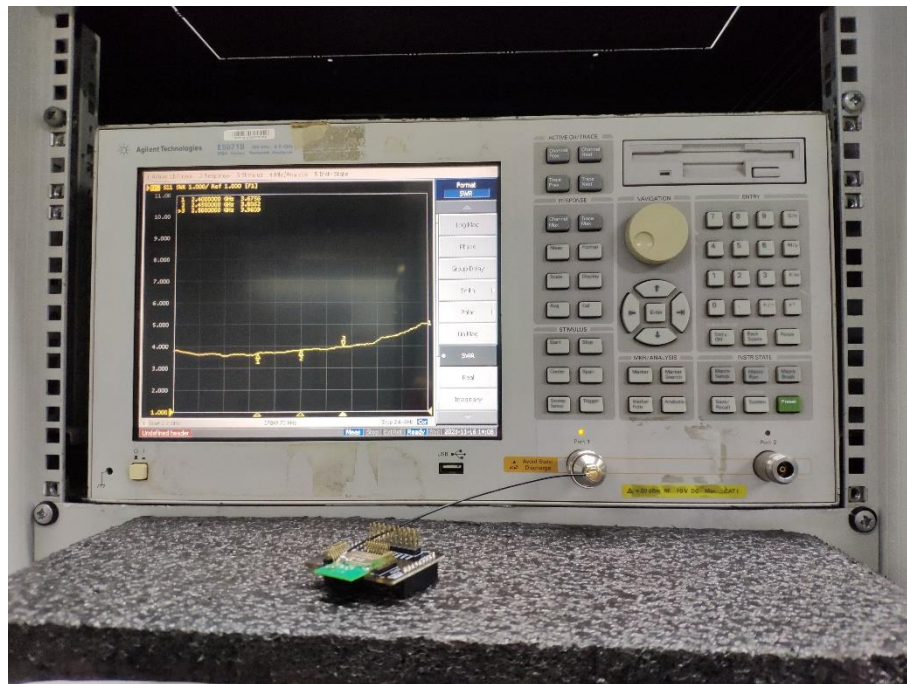


B2.3 THETA=90

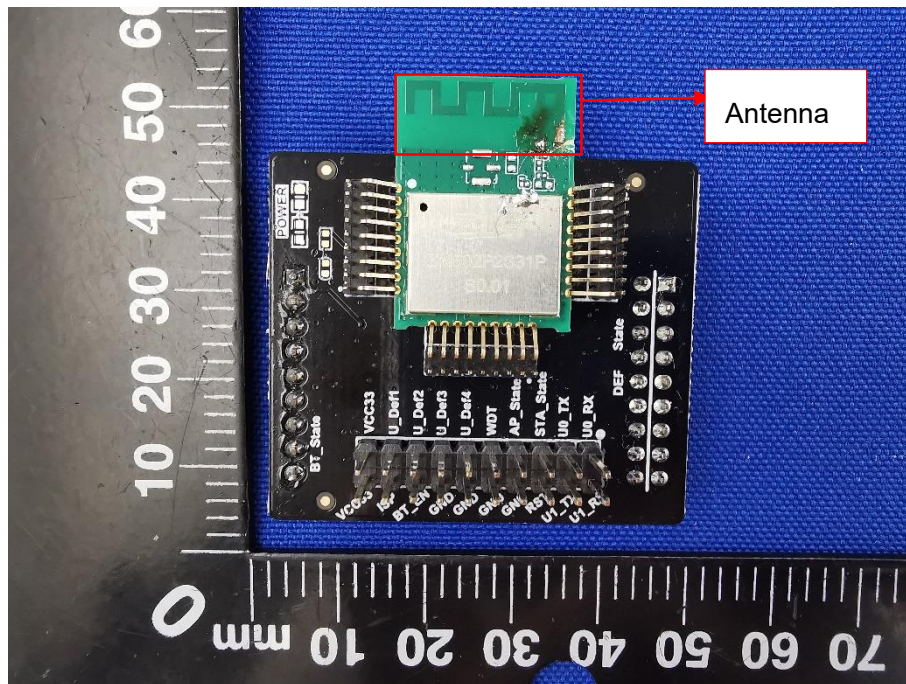


ANNEX C TEST SETUP PHOTO





ANNEX D EUT PHOTO



Statement

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