TEST REPORT

Applicant:	Guangzhou Yuandong Smart Sports Technology Co, Ltd.
Address:	Room 518, No. 192, Kezhu Road, Huangpu District, Guangzhou (office only)
Equipment Type:	PCB Antenna
Model Name:	SWITCH_RF_Antenna, ESP32WIFI_Antenna, ESP32BT_Antenna
Brand Name:	YD
Test Standard:	ANSI/IEEE Std 149-1979
Test Date:	Aug. 30, 2022
Date of Issue:	Sep. 08, 2022

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Mai Jintian **Checked by:** Tolan Tu **Approved by:** Wei Yanquan (Chief Engineer)

Revision History

Version	Issue Date	Revisions
Rev. 01	Sep. 08, 2022	Initial Issue

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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 Yuandong Smart Sports Technology Co, Ltd.
Address	Room 518, No. 192, Kezhu Road, Huangpu District, Guangzhou (office only)
Contact Person	Dai Wei
Telephone Number	13535804451
E-mail Address	daiwei@gymgest.com.cn

2.2 Manufacturer Information

Manufacturer	N/A
Address	N/A

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

1#

EUT Name	PCB Antenna
Model Name Under Test	SWITCH_RF_Antenna
Antenna Type	PCB Antenna
Dimensions	10.5*5.5 mm

2#

EUT Name	PCB Antenna
Model Name Under Test	ESP32WIFI_Antenna
Antenna Type	PCB Antenna
Dimensions	12.5*7.5 mm

3#

EUT Name	PCB Antenna
Model Name Under Test	ESP32BT_Antenna
Antenna Type	PCB Antenna
Dimensions	11.0*8.5 mm

Note: This report contains test data for three antennas, 1# is SWITCH_RF_Antenna, 2# is ESP32WIFI_Antenna, 3# is ESP32BT_Antenna, in this report, 1#, 2#, 3# are used to represent the corresponding antenna and corresponding test data.

2.5 Ancillary Equipment

Note: Not applicable.

2.6 Technical Information

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

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 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	±1.92dB

4 GENERAL TEST CONFIGURATIONS

4.1 Test Condition

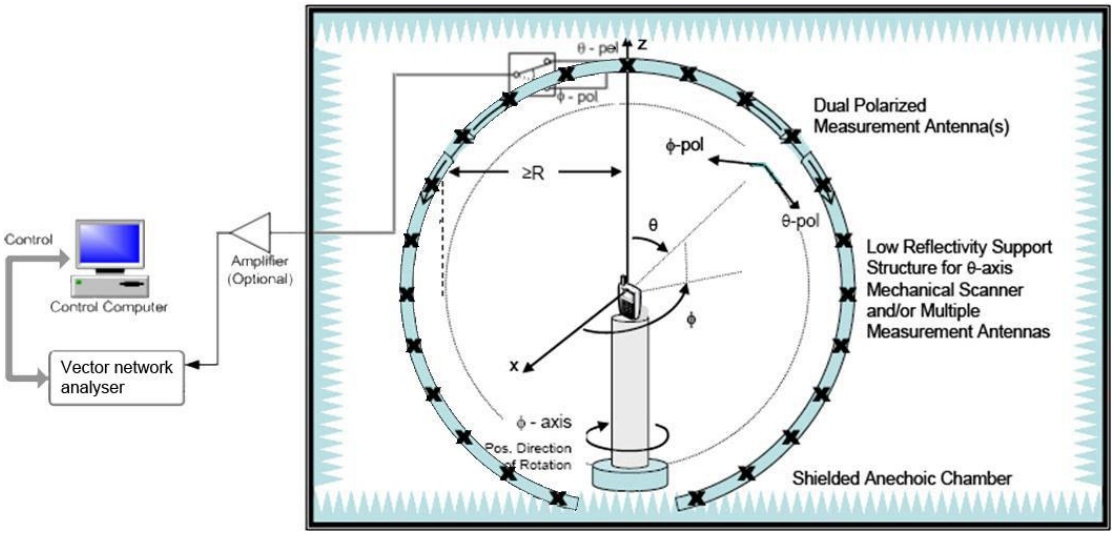
Environment Parameter	Selected Values During Tests			
	Ambient Pressure(KPa)	Temperature(℃)	Voltage	Relative Humidity (%)
Normal Temperature, Normal Voltage (NTNV)	101	25	N/A	50

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
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



ANNEX A TEST RESULTS

A.1 Gain and Efficiency

1#

Frequency	Gain (dBi)	Efficiency (%)
2400MHz	**-3.81**	**17**
2410MHz	-3.73	17
2420MHz	-4.14	17
2430MHz	-4.35	16
2440MHz	-4.49	15
2450MHz	-4.59	15
2460MHz	-4.85	14
2470MHz	-5.09	14
2480MHz	-5.36	13

2#

Frequency	Gain (dBi)	Efficiency (%)
2400MHz	3.76	52
2410MHz	3.97	53
2420MHz	3.92	53
2430MHz	3.99	55
2440MHz	4.10	55
2450MHz	4.03	54
2460MHz	4.23	55
2470MHz	4.49	58
2480MHz	**4.52**	**58**

3#

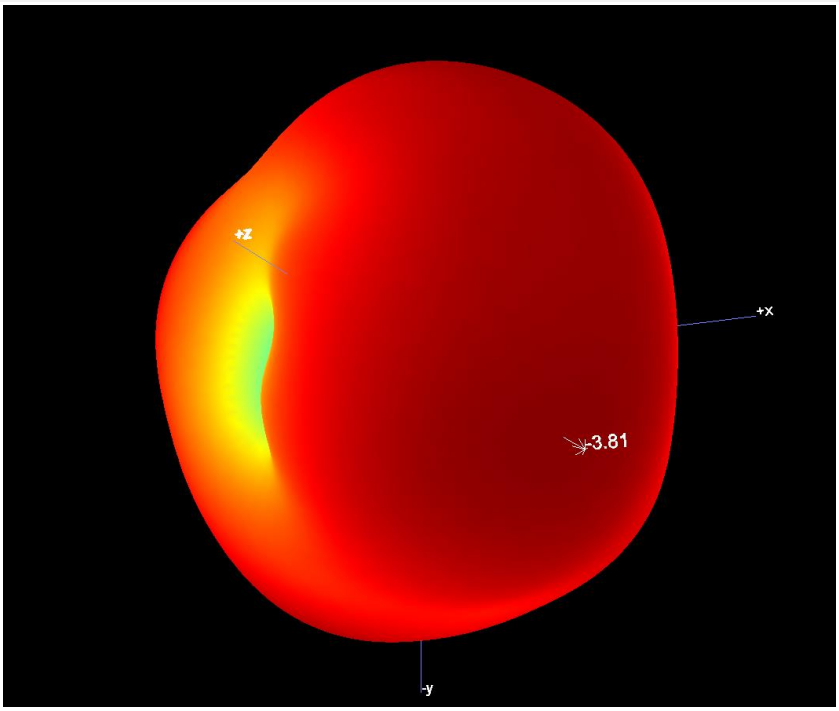
Frequency	Gain (dBi)	Efficiency (%)
2400MHz	2.49	52
2410MHz	**2.66**	**52**
2420MHz	2.56	52
2430MHz	2.38	51
2440MHz	2.14	50
2450MHz	1.93	49
2460MHz	1.89	49
2470MHz	1.94	50
2480MHz	1.87	49

ANNEX B RADIATION PATTERN

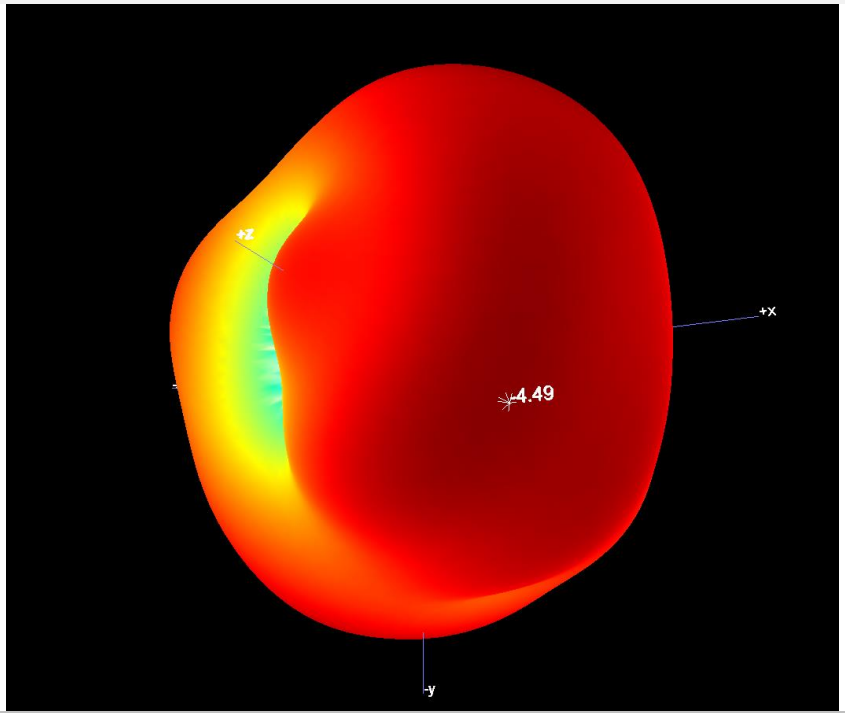
B.1 3D Pattern

1#

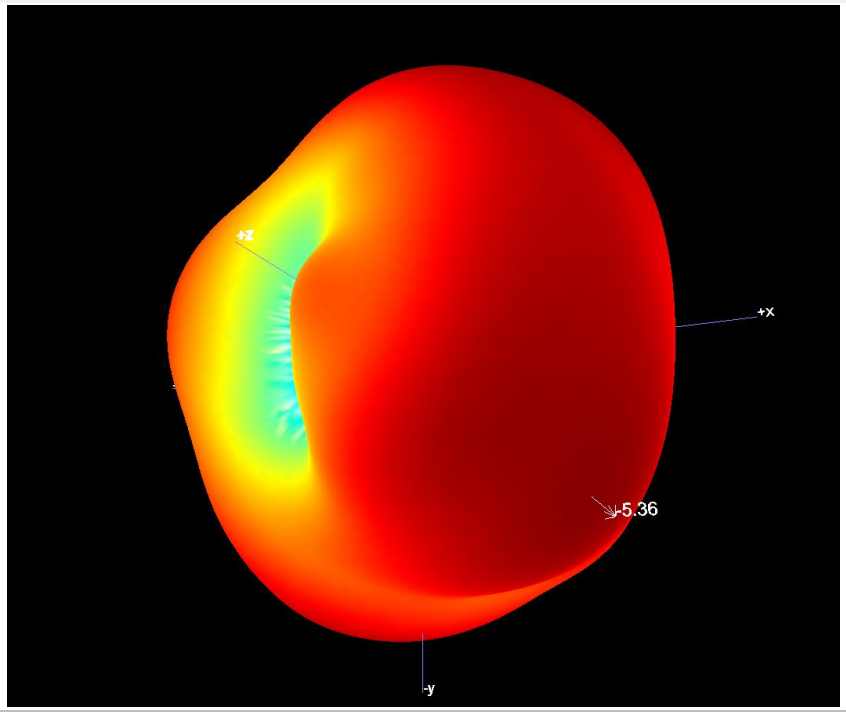
B1.1 3D Pattern for 2400MHz



B1.2 3D Pattern for 2440MHz



B1.3 3D Pattern for 2480MHz



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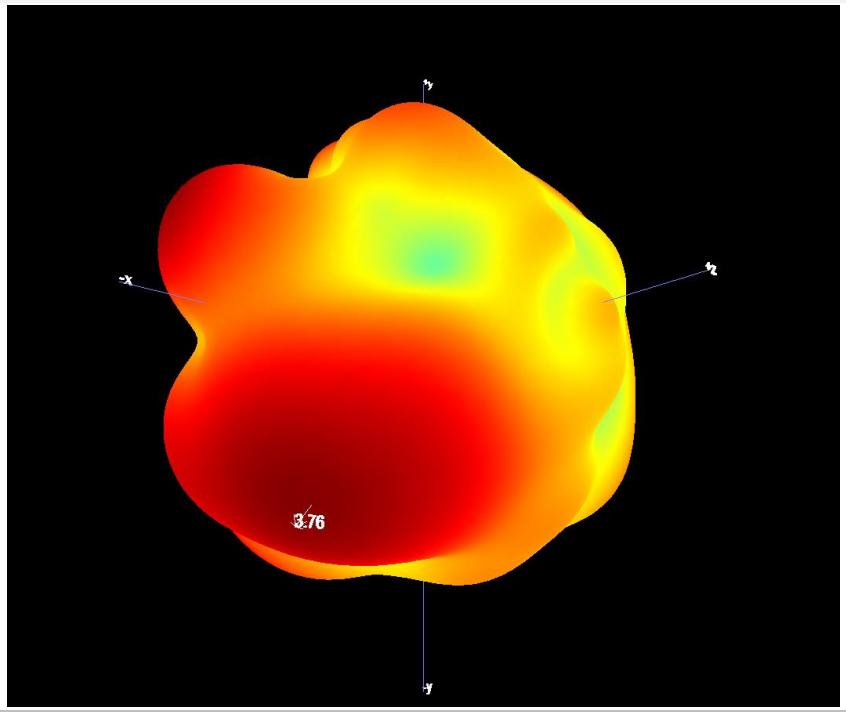
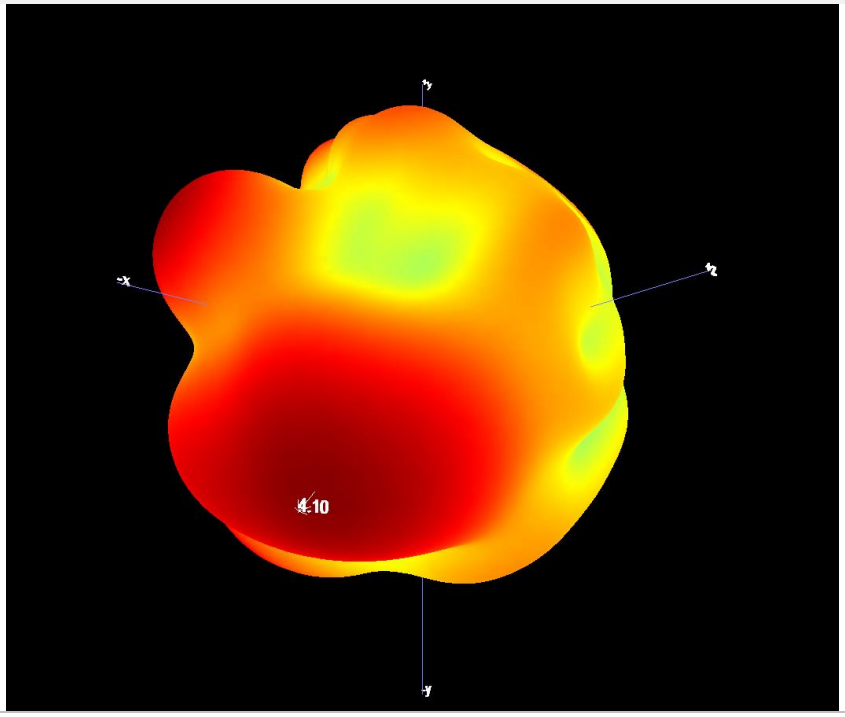
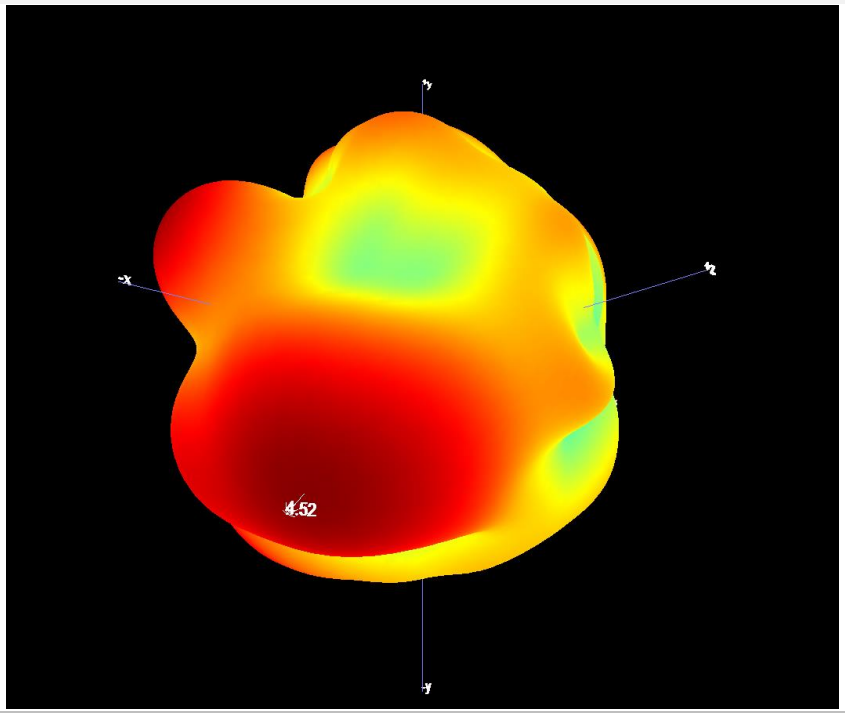
B1.4 3D Pattern for 2400MHz



B1.5 3D Pattern for 2440MHz



B1.6 3D Pattern for 2480MHz



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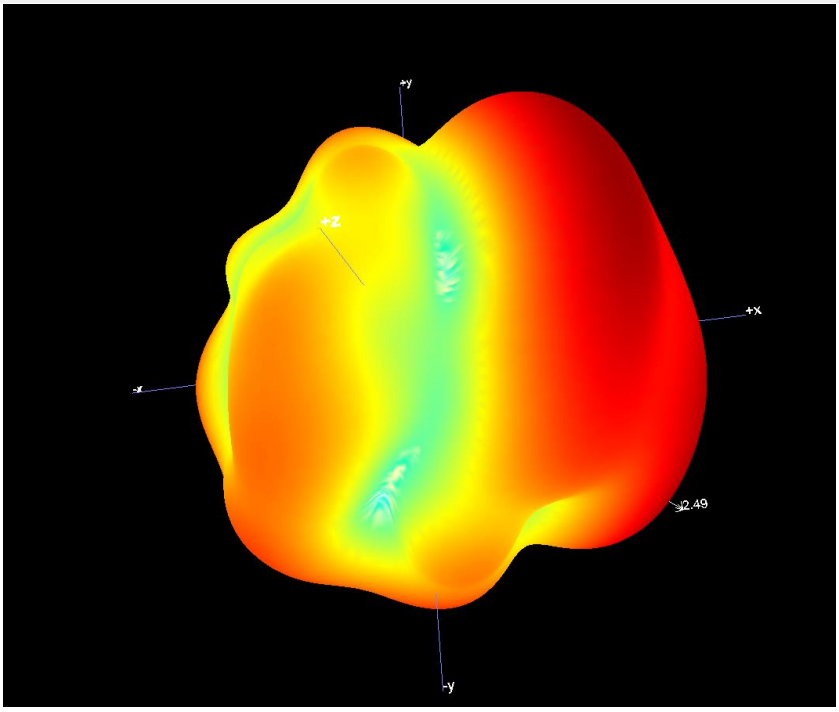
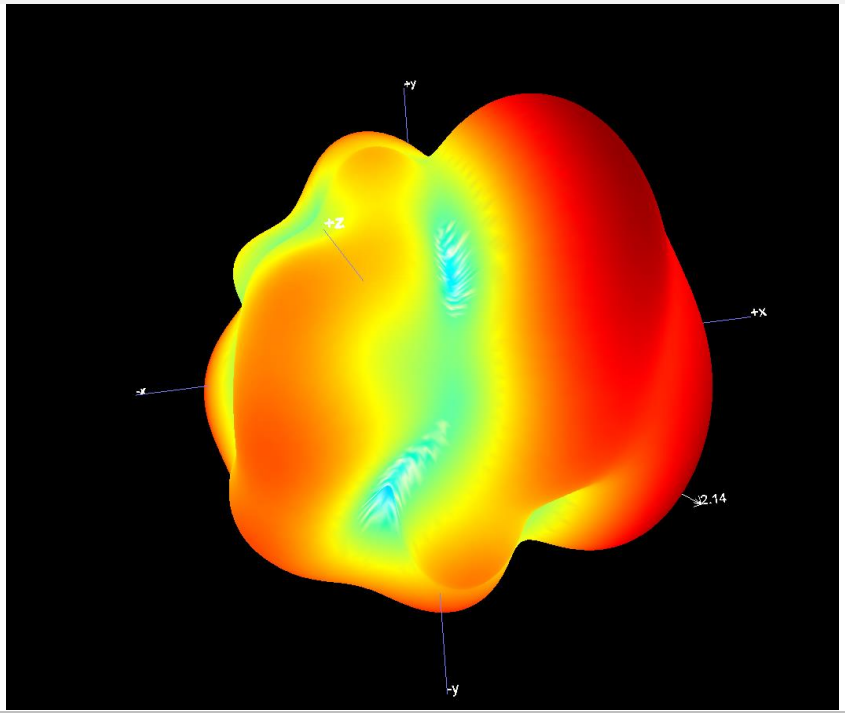
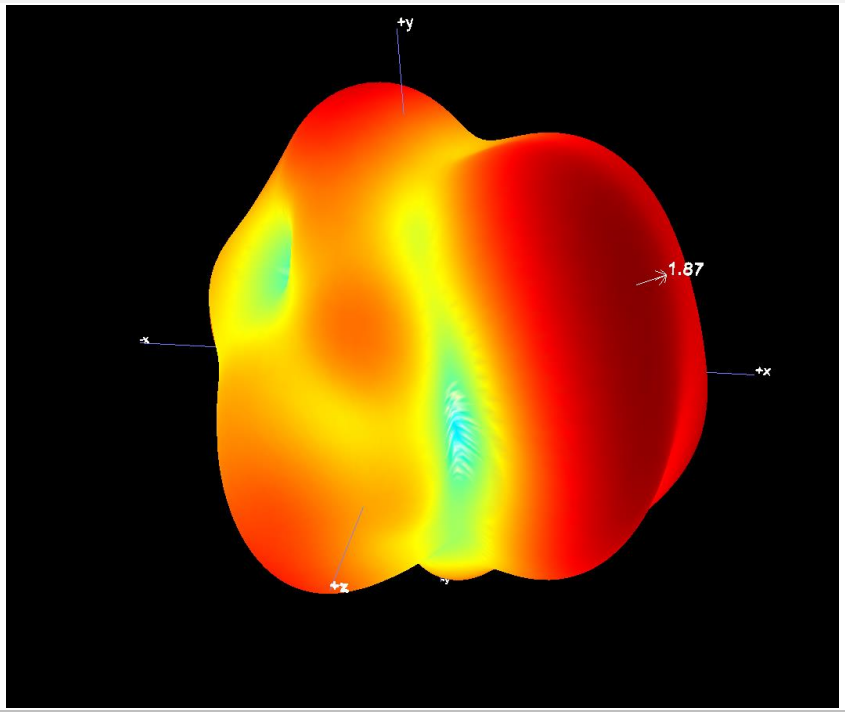
B1.7 3D Pattern for 2400MHz



B1.8 3D Pattern for 2440MHz



B1.9 3D Pattern for 2480MHz



B.2 1D Radiation Pattern

1#

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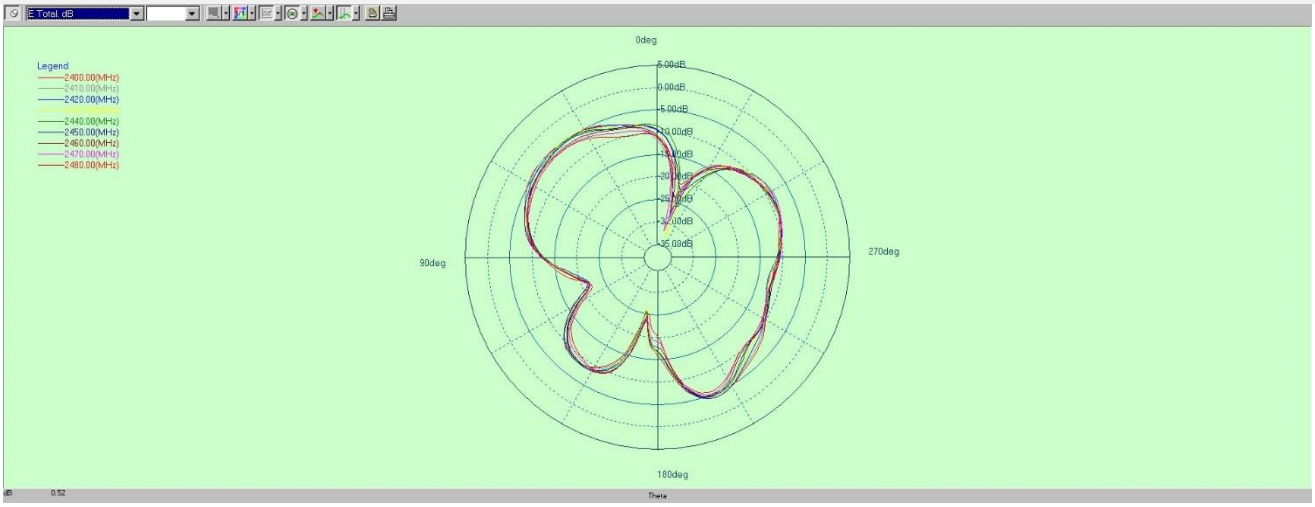

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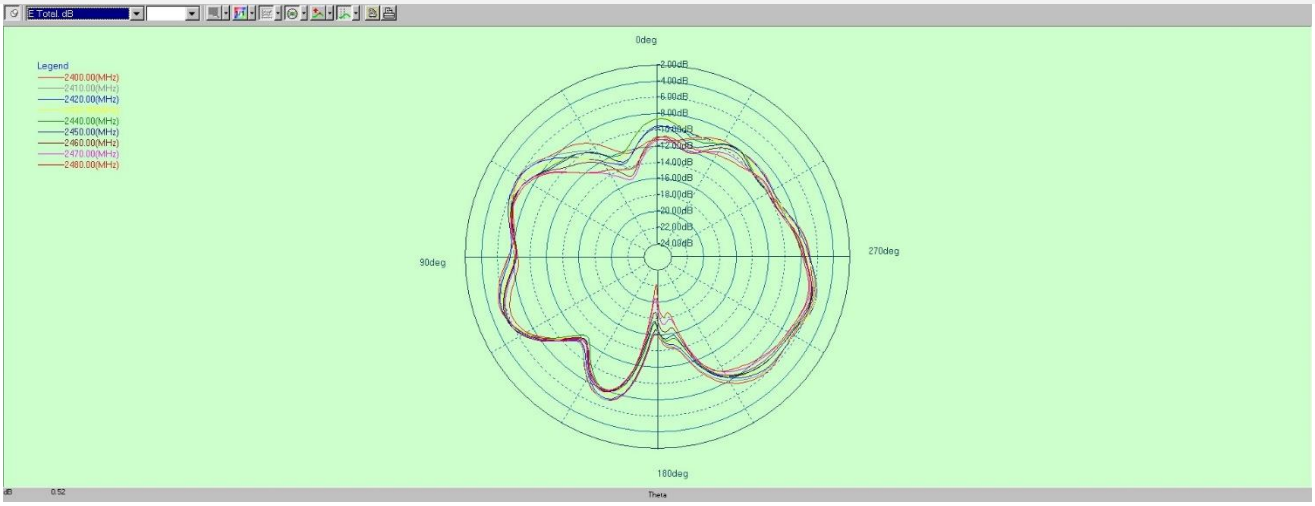
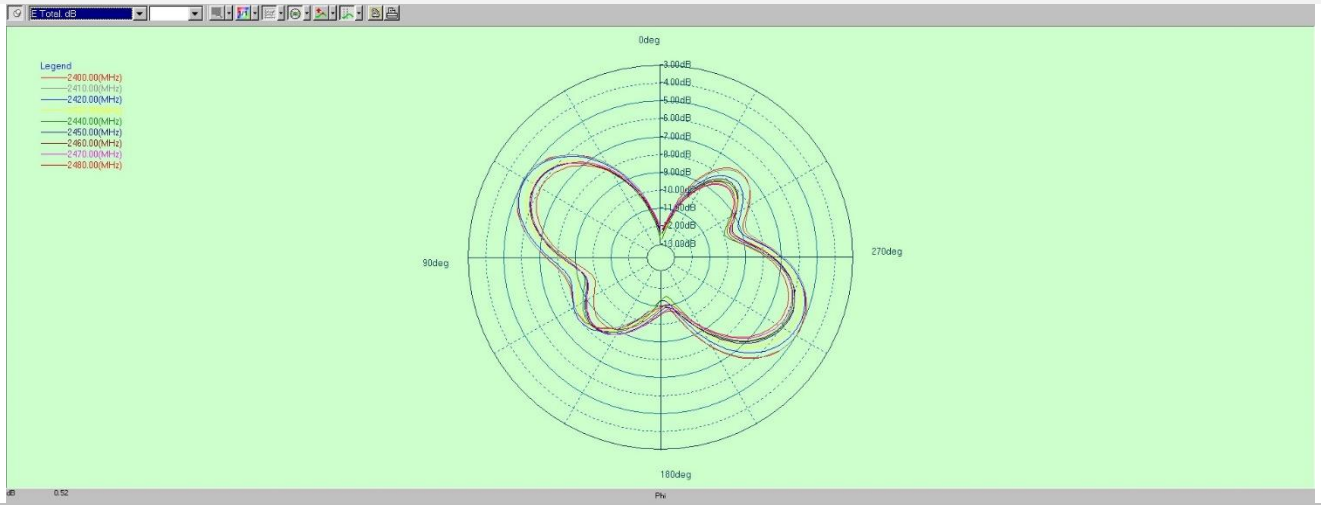


B2.3 THETA=90



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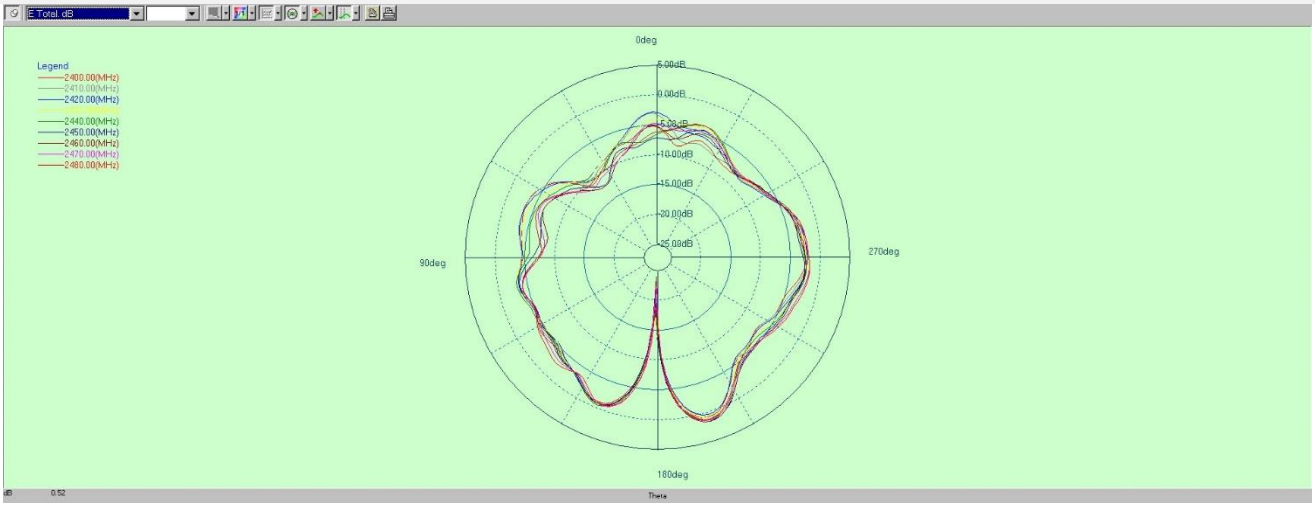

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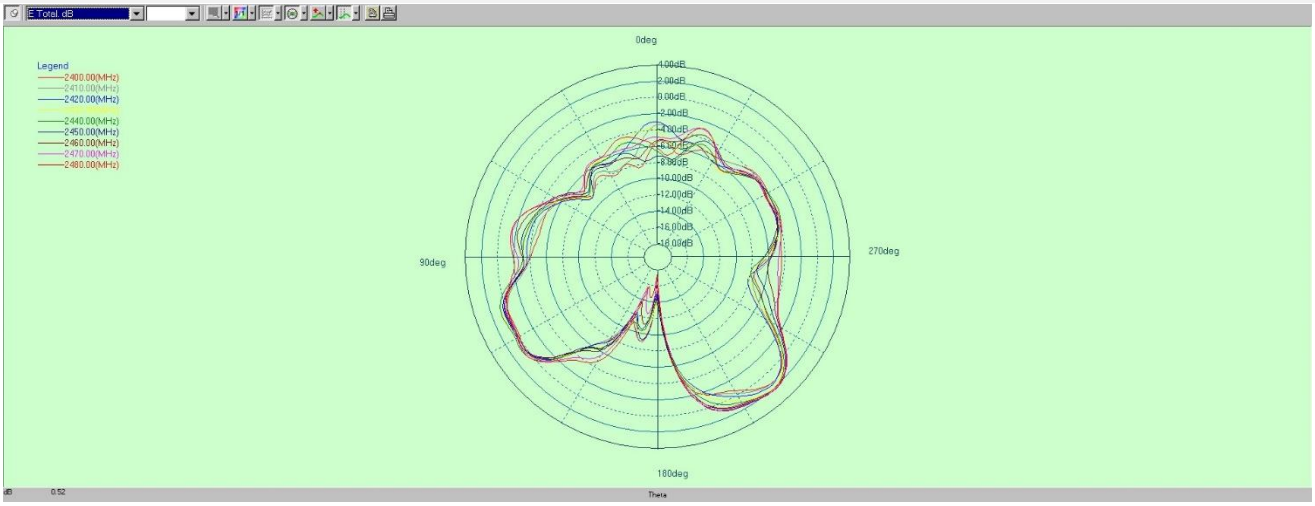

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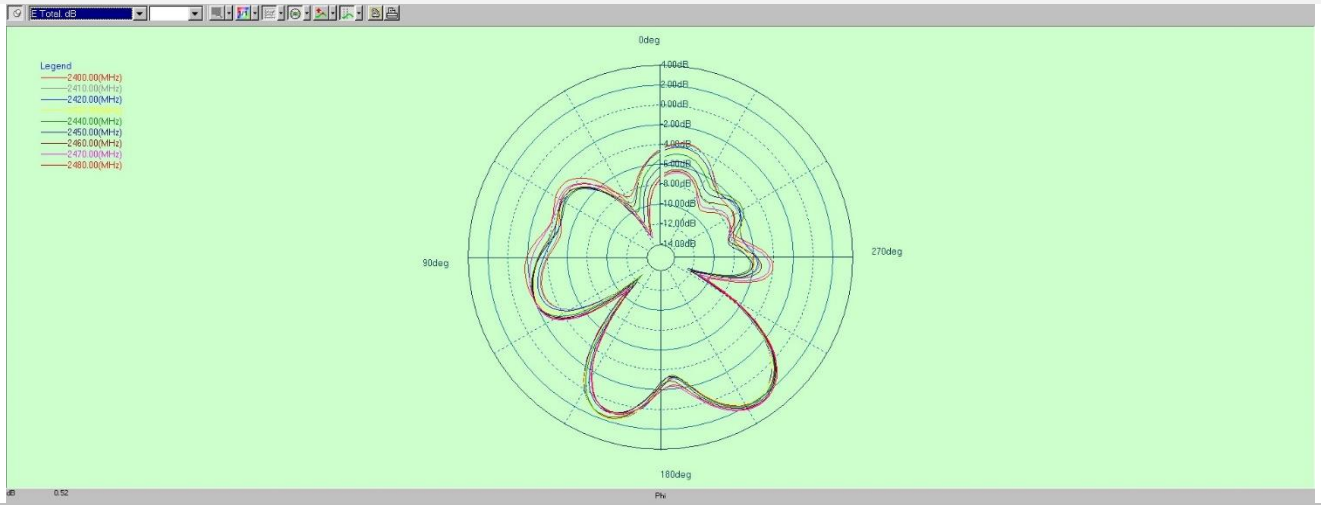

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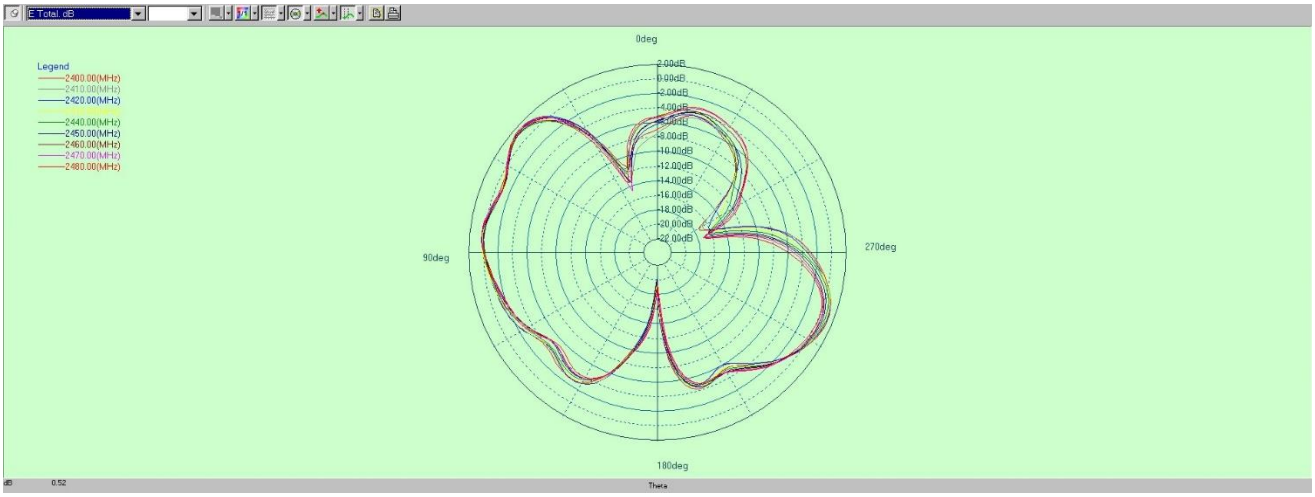

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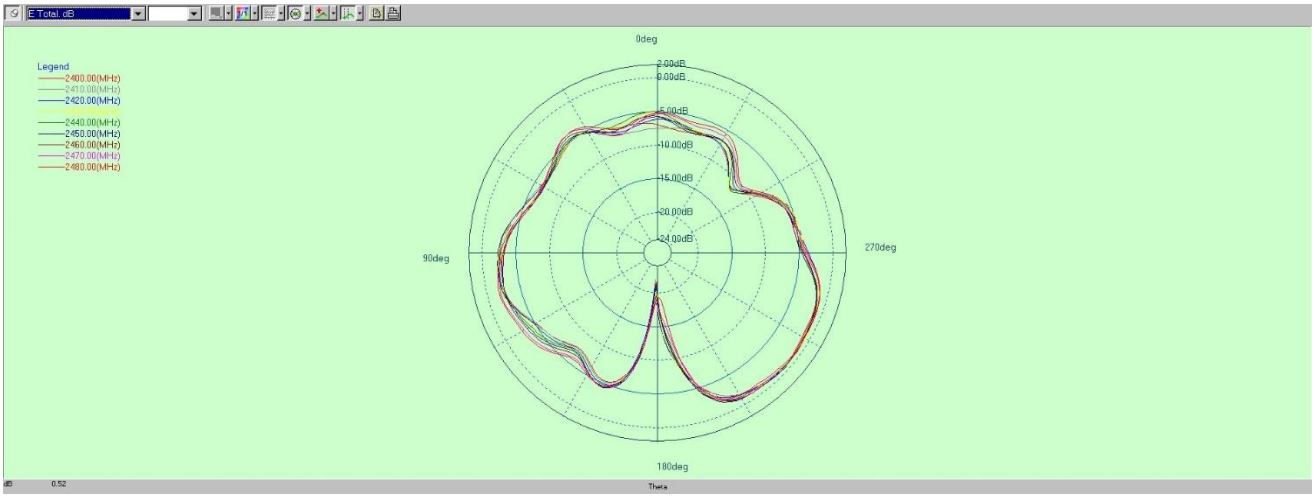

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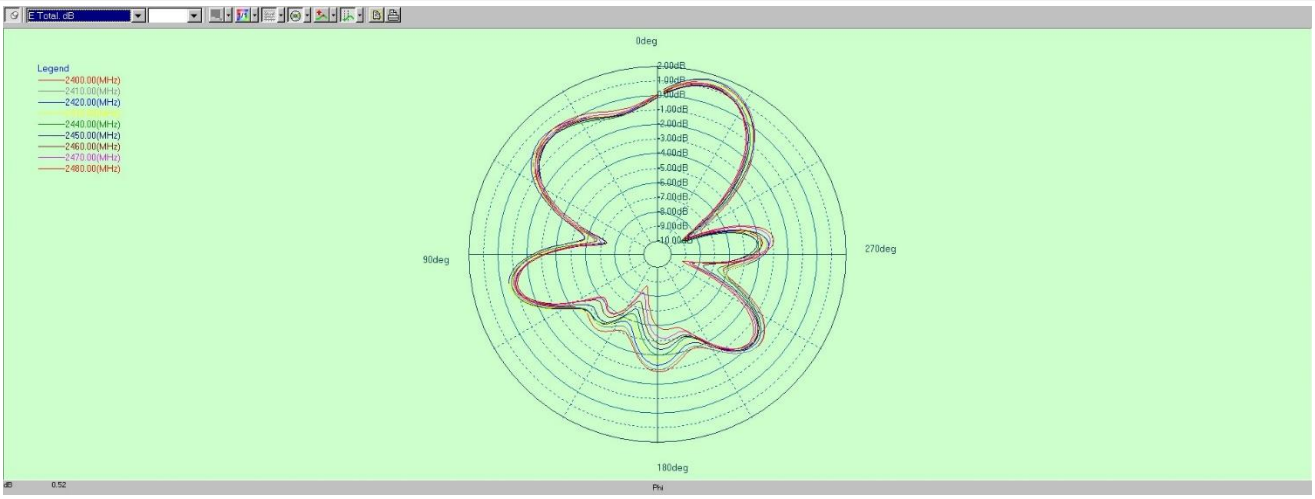
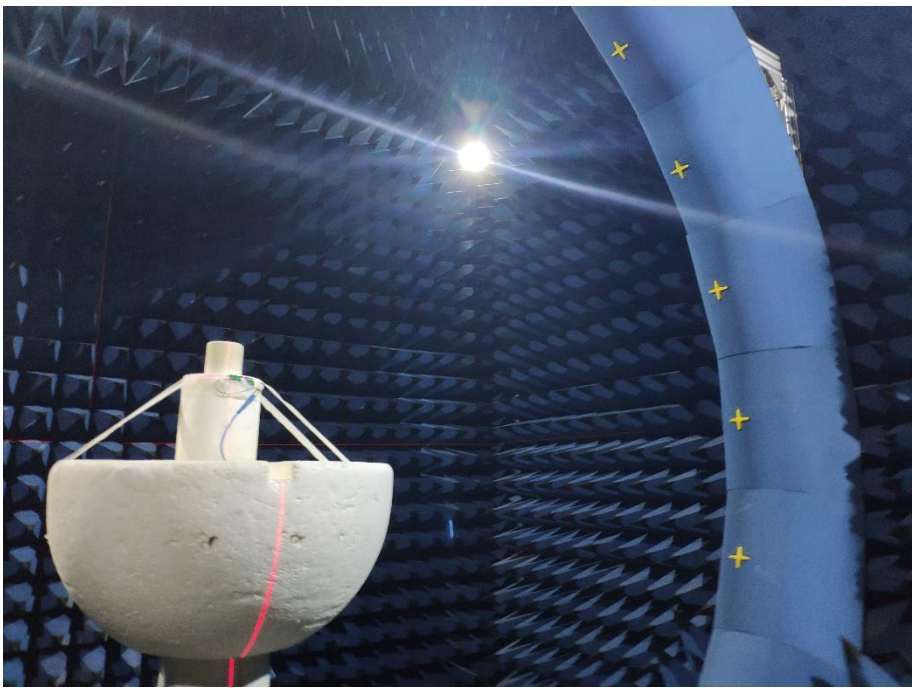
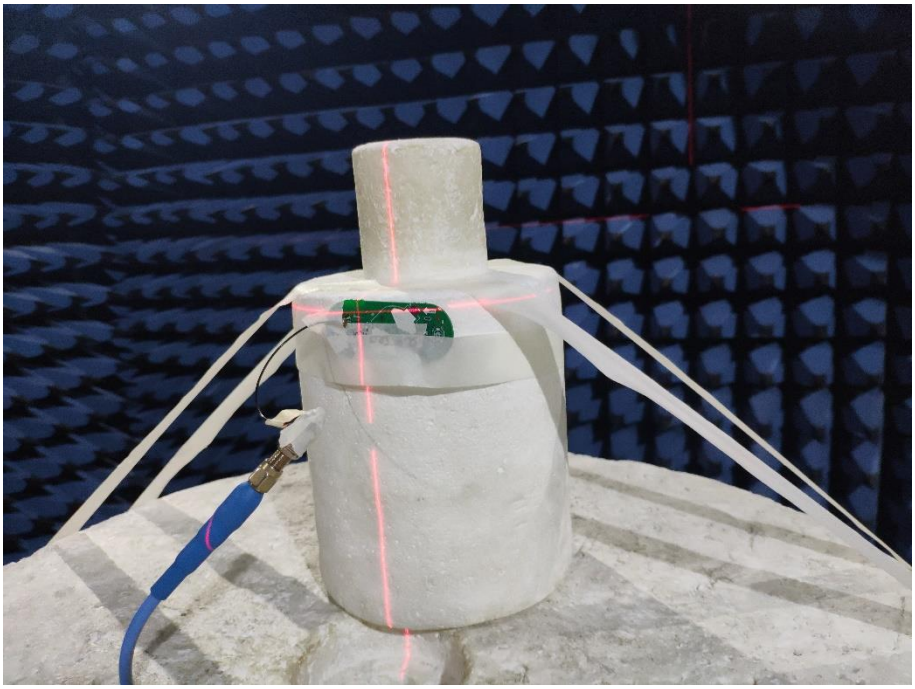


ANNEX C TEST SETUP PHOTO

1#





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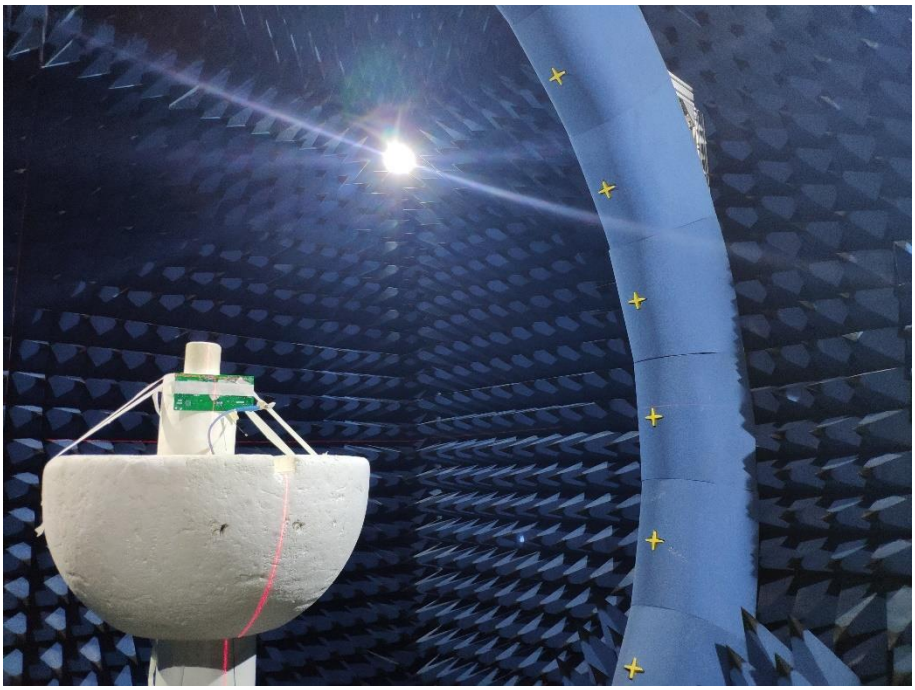

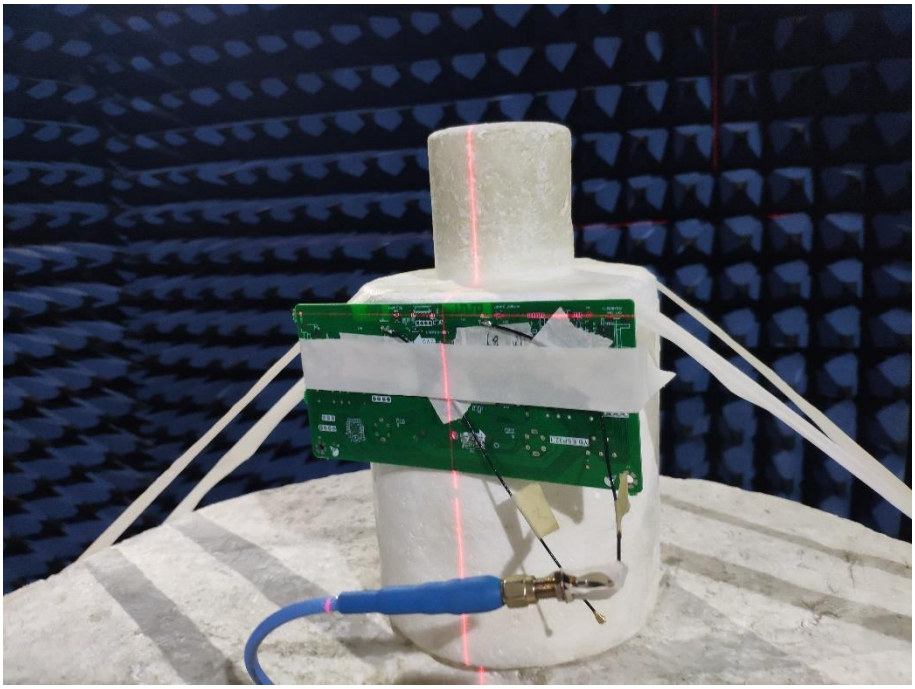

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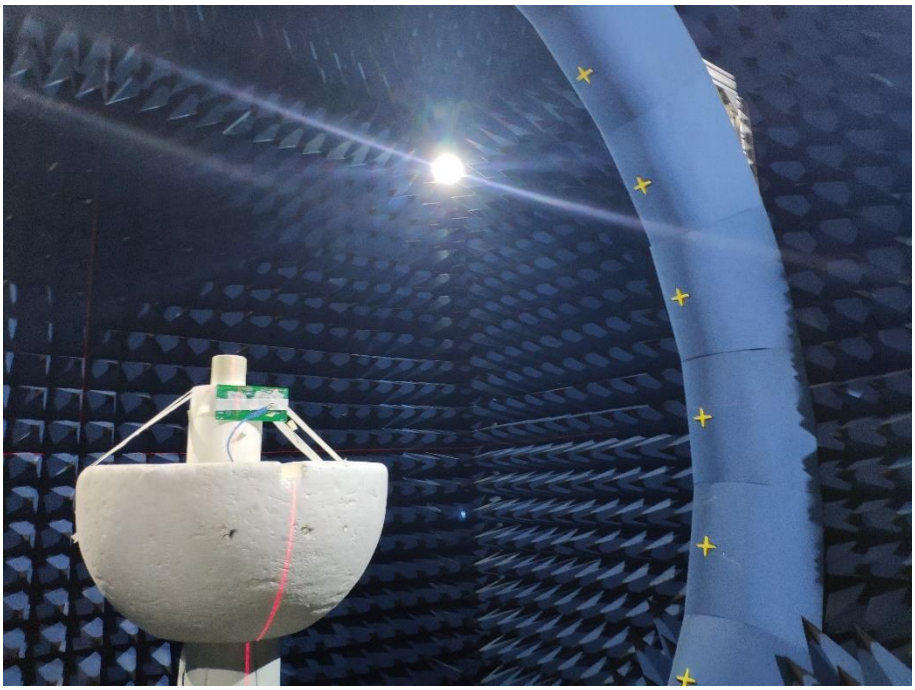
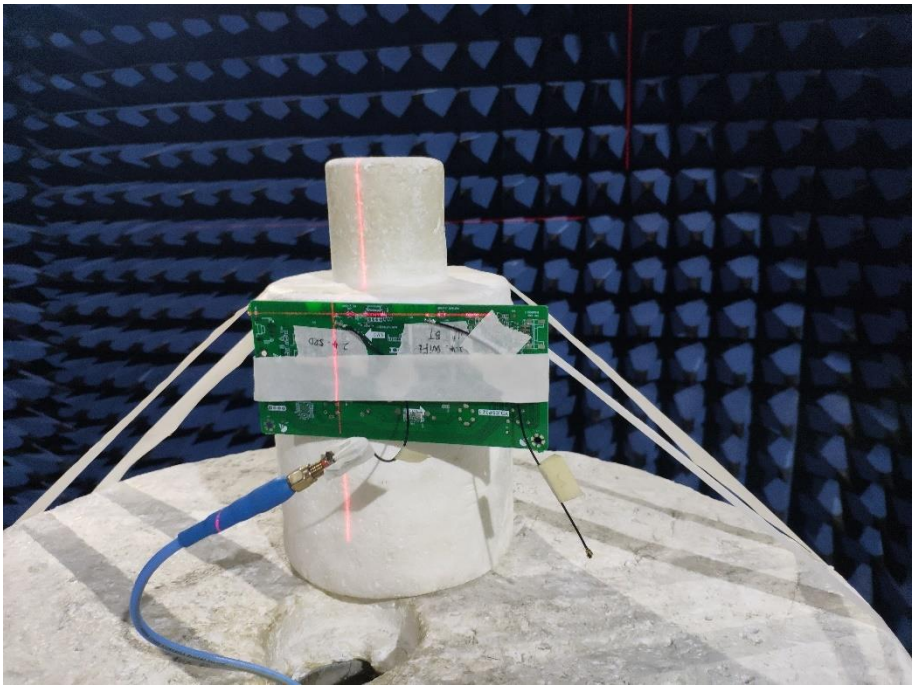
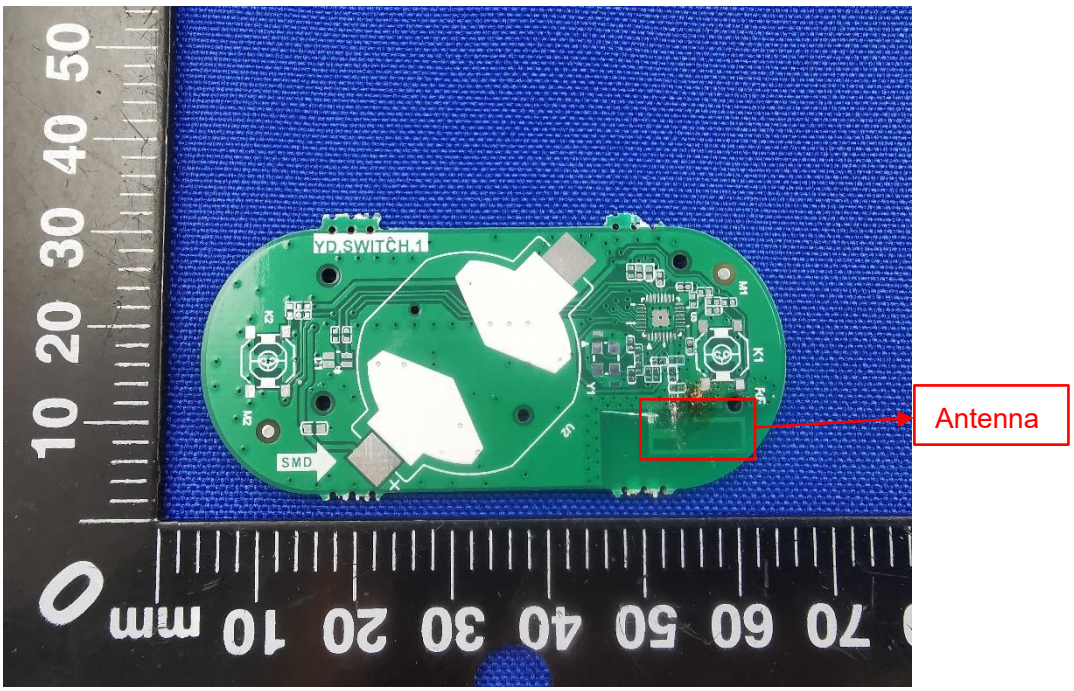




ANNEX D EUT PHOTO

1#



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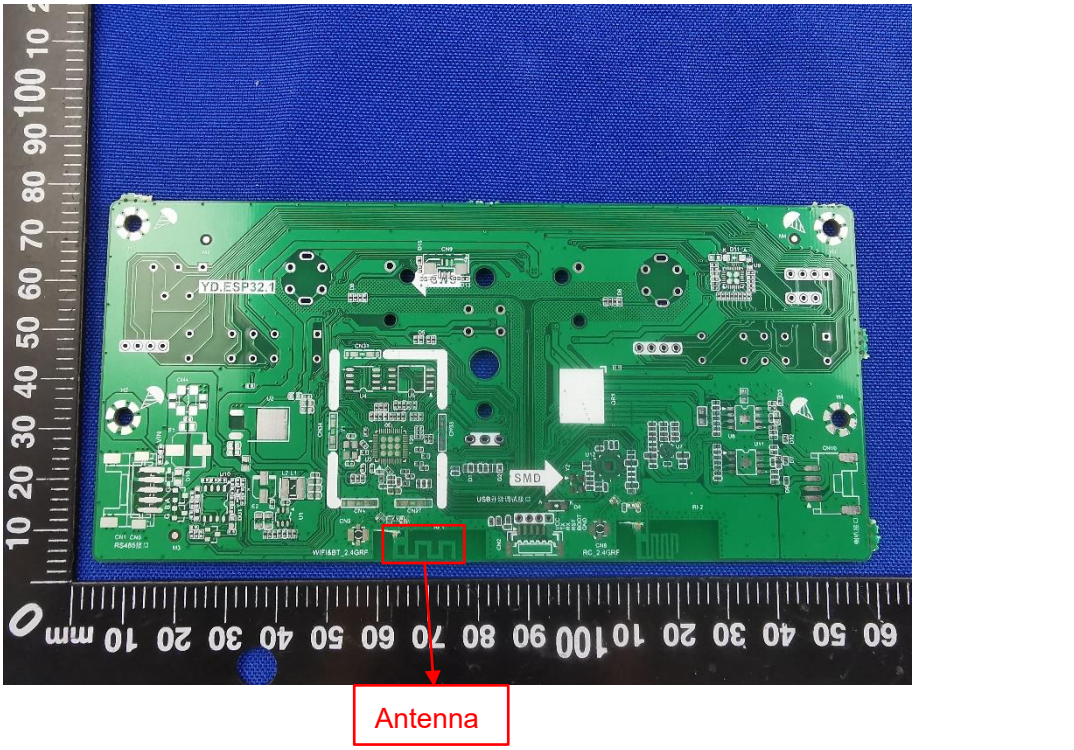

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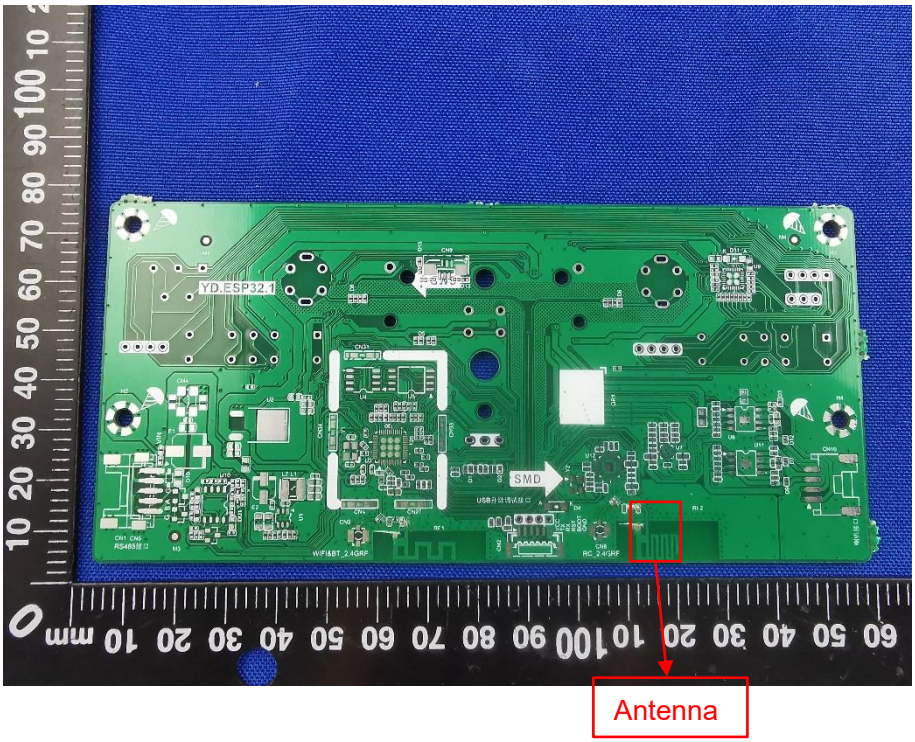

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