

# TEST REPORT

**Applicant:** Shenzhen SEI Robotics Co., Ltd  
**Address:** 4th Floor, Productivity Building D, #5 Hi-Tech Middle  
2nd Road, Shenzhen Hi-Tech Industrial Park, N/A  
Nanshan District, Shenzhen, China  
**Equipment Type:** 4K Stick  
**Model Name:** IPA3102HDW  
**Brand Name:** N/A  
**Test Standard:** ANSI/IEEE Std 149-1979  
**Test Date:** Sep. 30, 2022  
**Date of Issue:** Oct. 17, 2022

**ISSUED BY:**

Shenzhen BALUN Technology Co., Ltd.

**Tested by:** Mai Jintian

**Checked by:** Tolan Tu

**Approved by:** Wei Yanquan  
(Chief Engineer)



<b>Revision History</b>		
Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Oct. 17, 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	<input checked="" type="checkbox"/> Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	<input type="checkbox"/> 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 SEI Robotics Co., Ltd
Address	4th Floor, Productivity Building D, #5 Hi-Tech Middle 2nd Road, Shenzhen Hi-Tech Industrial Park, N/A Nanshan District, Shenzhen, China

### 2.2 Manufacturer Information

Manufacturer	Shenzhen SEI Robotics Co., Ltd
Address	4th Floor, Productivity Building D, #5 Hi-Tech Middle 2nd Road, Shenzhen Hi-Tech Industrial Park, N/A Nanshan District, Shenzhen, China

### 2.3 General Description for Equipment under Test (EUT)

EUT Name	4K Stick
Model Name Under Test	IPA3102HDW
Antenna Type	PCB Antenna
Dimensions	1#: 16.5*4.5 mm 2#: 17.0*15.0 mm

Note: This report contains test data for two antennas, 1# is BT+WIFI antenna, 2# is WIFI antenna. In this report, 1#, 2# are used to represent the corresponding antenna and corresponding test data.

### 2.4 Ancillary Equipment

Note: Not applicable.

### 2.5 Technical Information

Test Frequencies	2400MHz, 2410MHz, 2420MHz, 2430MHz, 2440MHz, 2450MHz, 2460MHz, 2470MHz, 2480MHz, 2490MHz, 2500MHz, 5150MHz, 5200MHz, 5250MHz, 5300MHz, 5350MHz, 5400MHz, 5450MHz, 5500MHz, 5550MHz, 5600MHz, 5650MHz, 5700MHz, 5750MHz, 5800MHz, 5850MHz
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### 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
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



## ANNEX A TEST RESULTS

### A.1 Gain and Efficiency

1#

Frequency	Gain (dBi)	Efficiency (%)
2400MHz	5.42	55
2410MHz	5.06	54
2420MHz	5.13	56
2430MHz	5.63	59
2440MHz	5.90	60
2450MHz	6.17	58
2460MHz	6.20	58
2470MHz	6.19	60
2480MHz	6.35	<b>61</b>
2490MHz	<b>6.51</b>	60
2500MHz	6.41	58
5150MHz	4.28	43
5200MHz	3.66	36
5250MHz	3.69	36
5300MHz	4.04	38
5350MHz	4.78	44
5400MHz	5.02	46
5450MHz	4.32	40
5500MHz	3.62	35
5550MHz	3.34	36
5600MHz	3.71	40
5650MHz	4.54	48
5700MHz	4.81	49
5750MHz	4.34	43
5800MHz	3.12	36
5850MHz	2.20	31



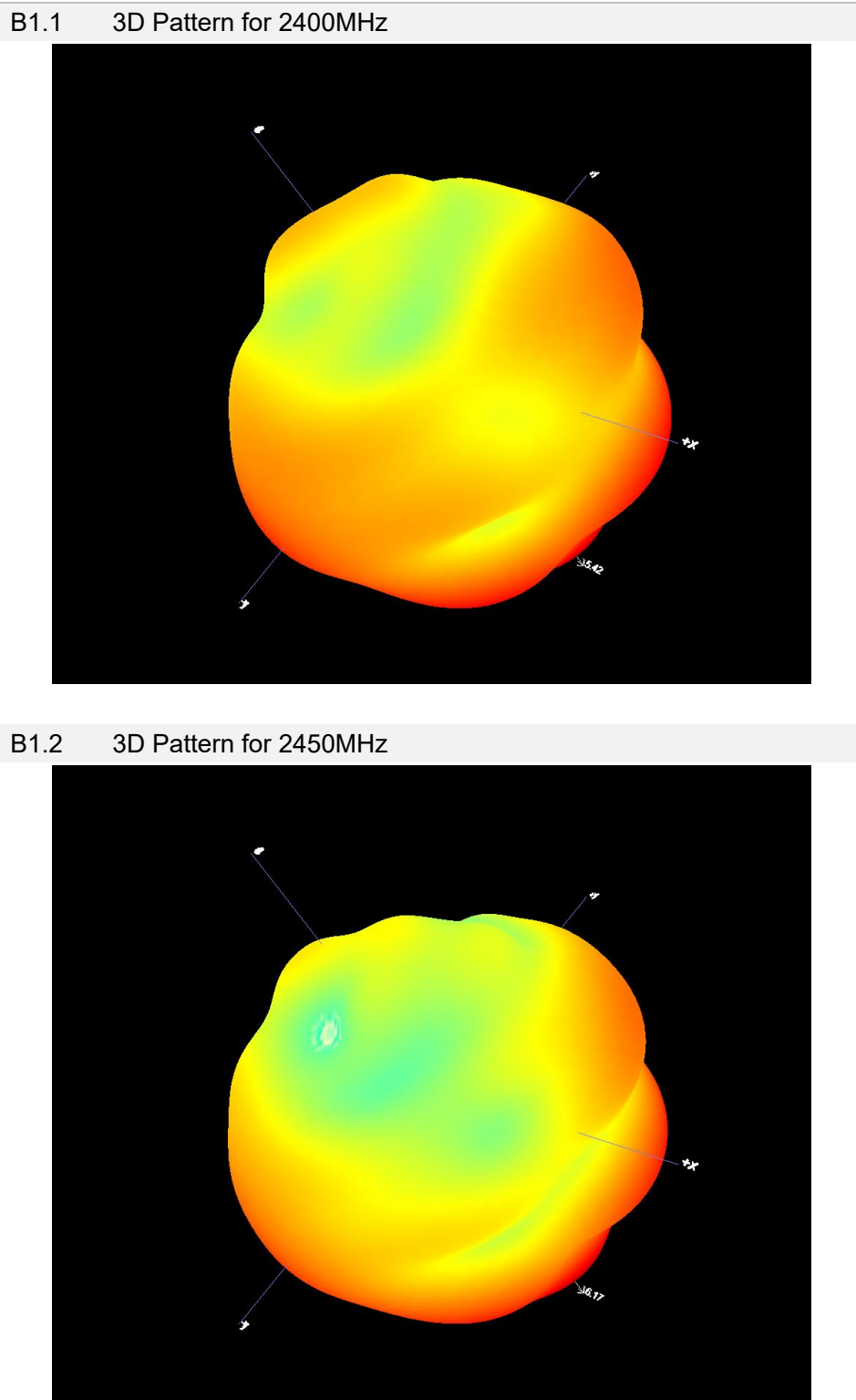
2#

Frequency	Gain (dBi)	Efficiency (%)
2400MHz	3.52	51
2410MHz	3.43	51
2420MHz	3.62	51
2430MHz	3.90	53
2440MHz	4.05	54
2450MHz	4.29	53
2460MHz	4.35	53
2470MHz	4.45	54
2480MHz	4.65	55
2490MHz	4.88	53
2500MHz	4.75	52
5150MHz	7.18	50
5200MHz	7.72	56
5250MHz	<b>8.10</b>	<b>63</b>
5300MHz	8.08	62
5350MHz	7.83	58
5400MHz	7.93	58
5450MHz	7.81	57
5500MHz	7.82	57
5550MHz	7.02	51
5600MHz	6.45	43
5650MHz	6.49	45
5700MHz	6.99	47
5750MHz	7.58	55
5800MHz	7.53	56
5850MHz	7.17	53

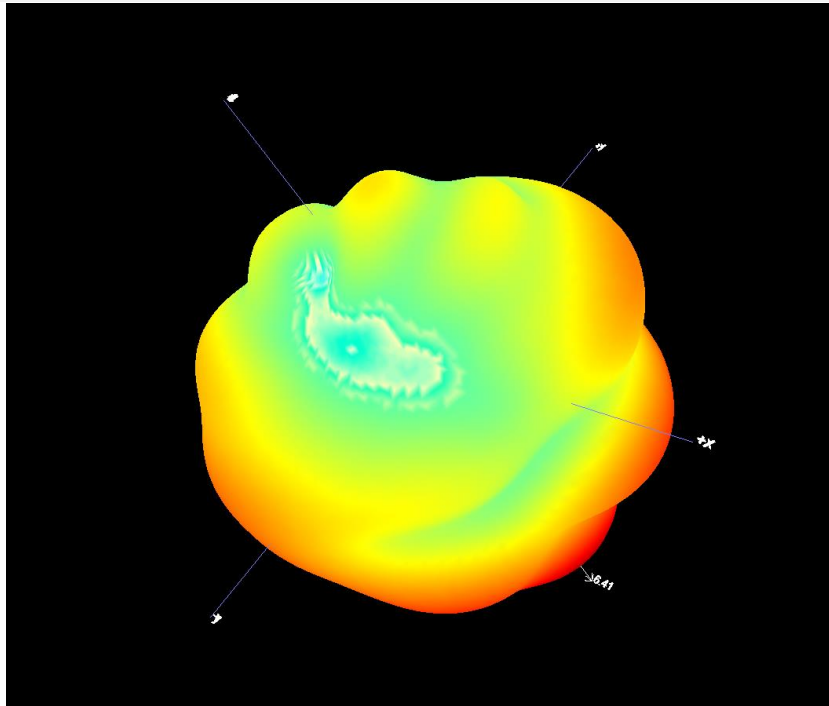
## ANNEX B RADIATION PATTERN

### B.1 3D Pattern

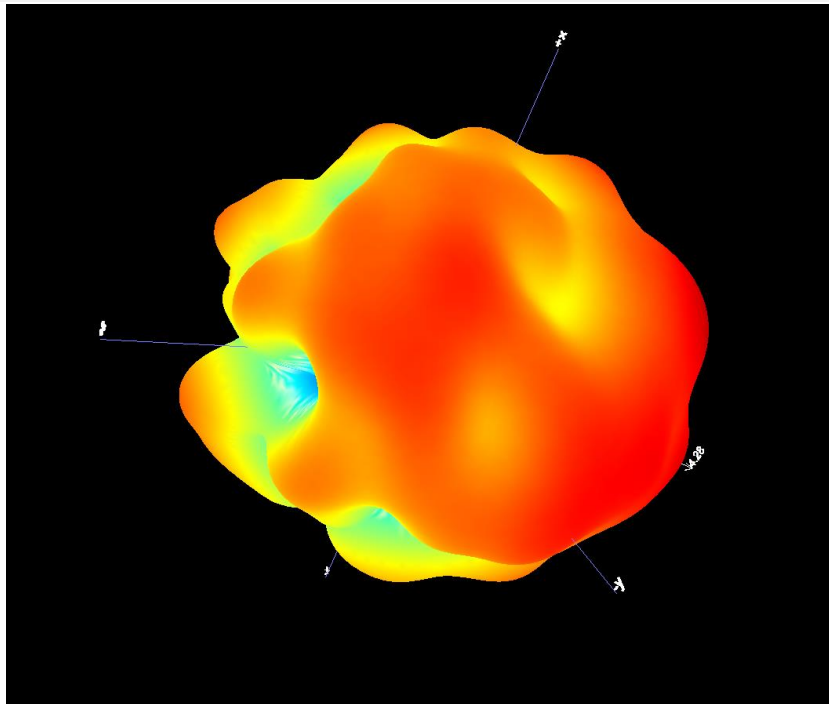
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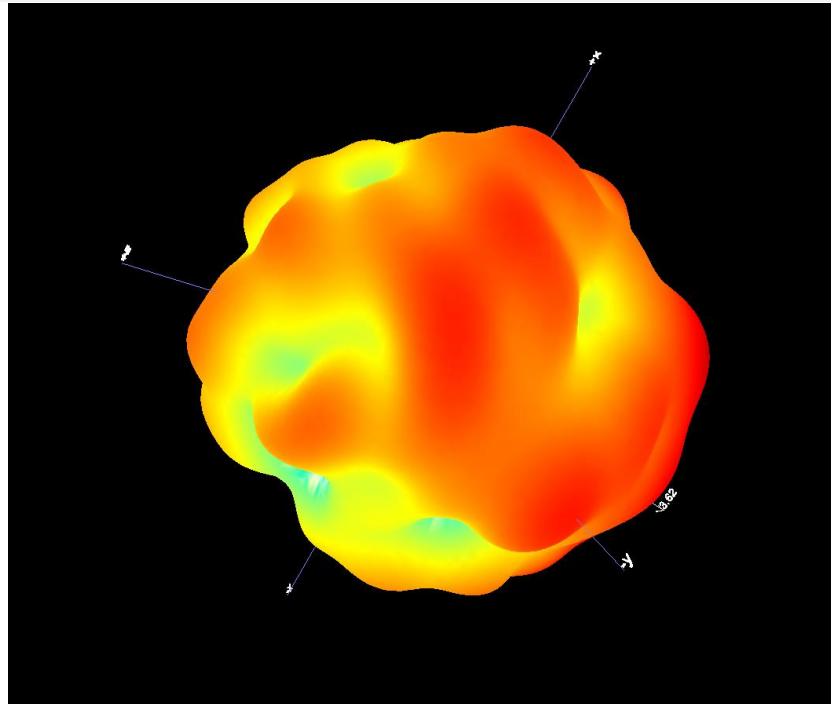
B1.3 3D Pattern for 2500MHz



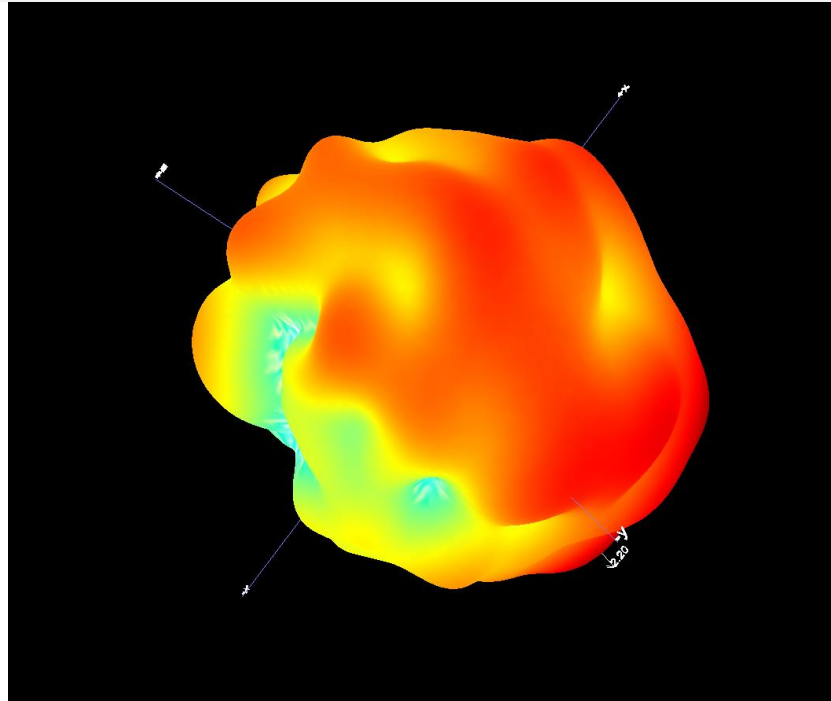
B1.4 3D Pattern for 5150MHz



B1.5 3D Pattern for 5500MHz

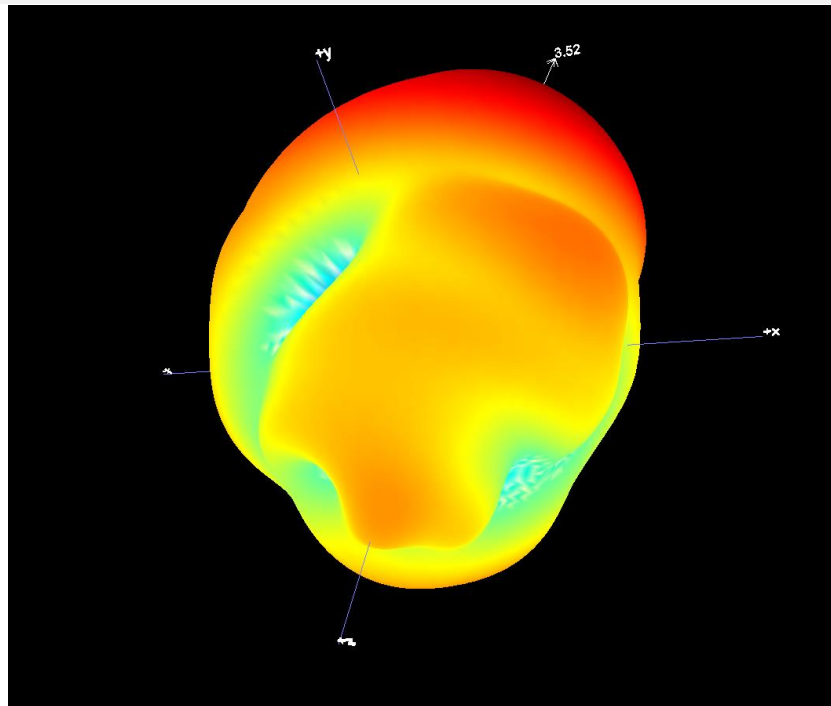


B1.6 3D Pattern for 5850MHz

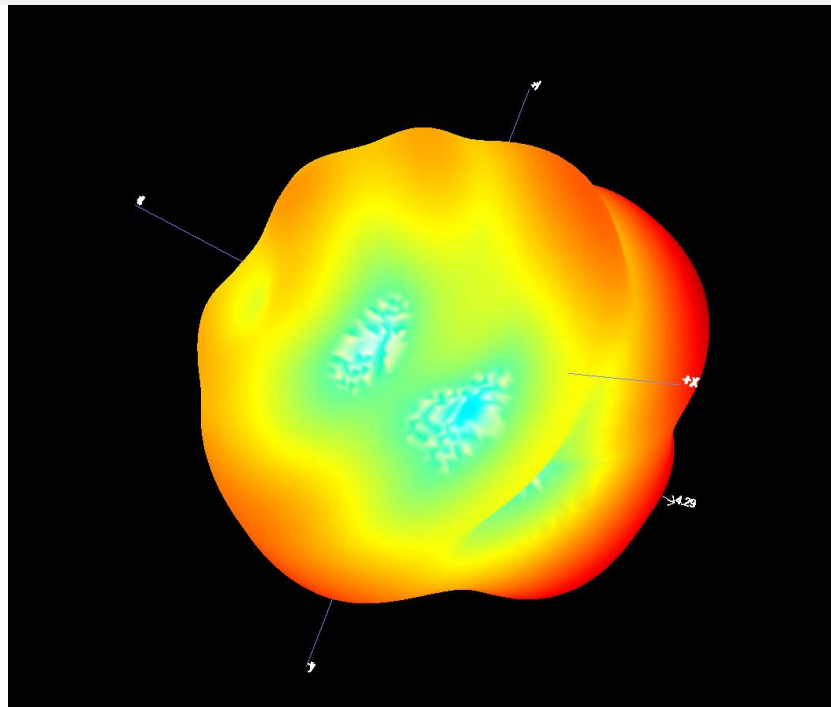


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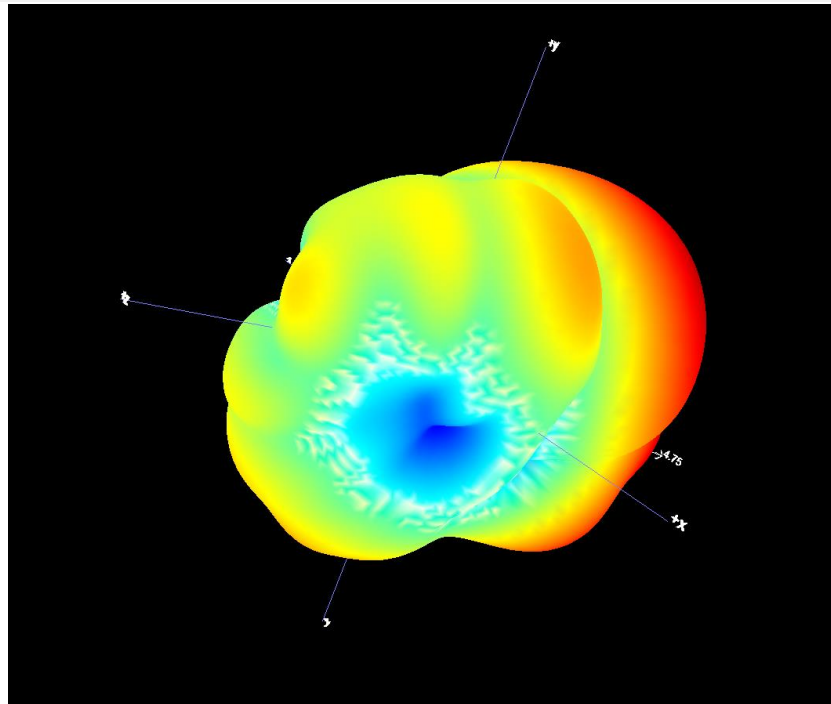
B1.7 3D Pattern for 2400MHz



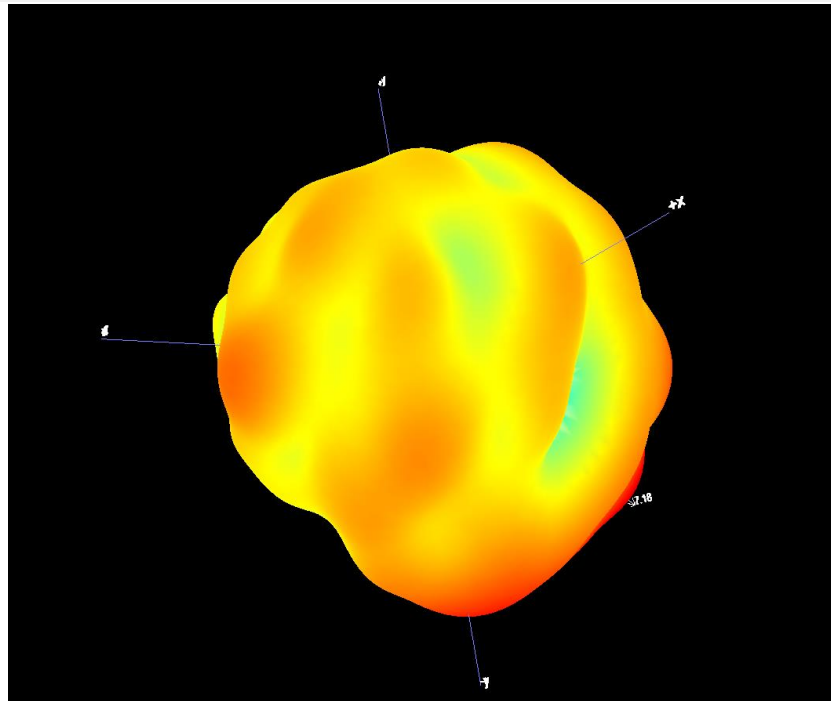
B1.8 3D Pattern for 2450MHz



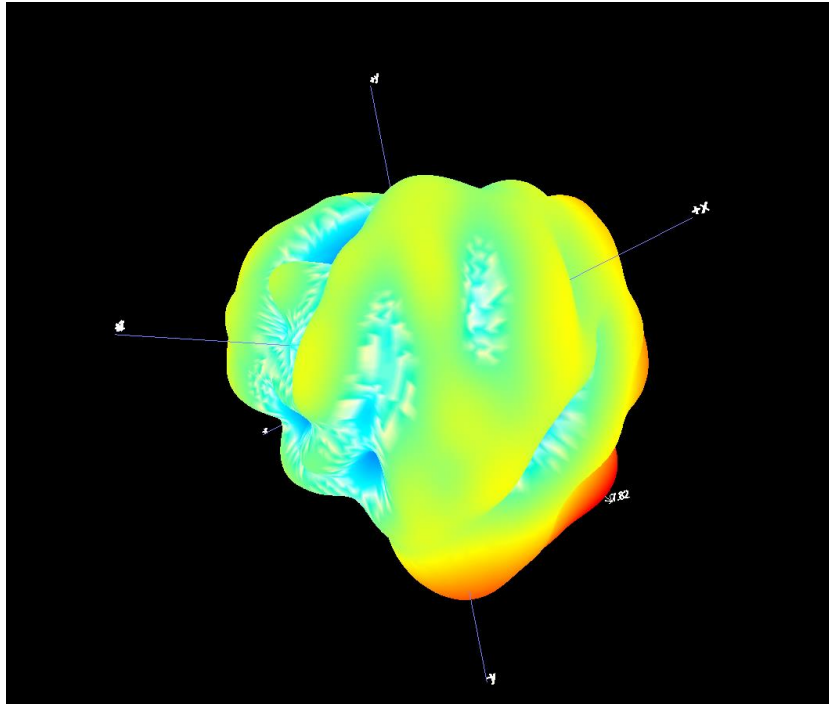
B1.9 3D Pattern for 2500MHz



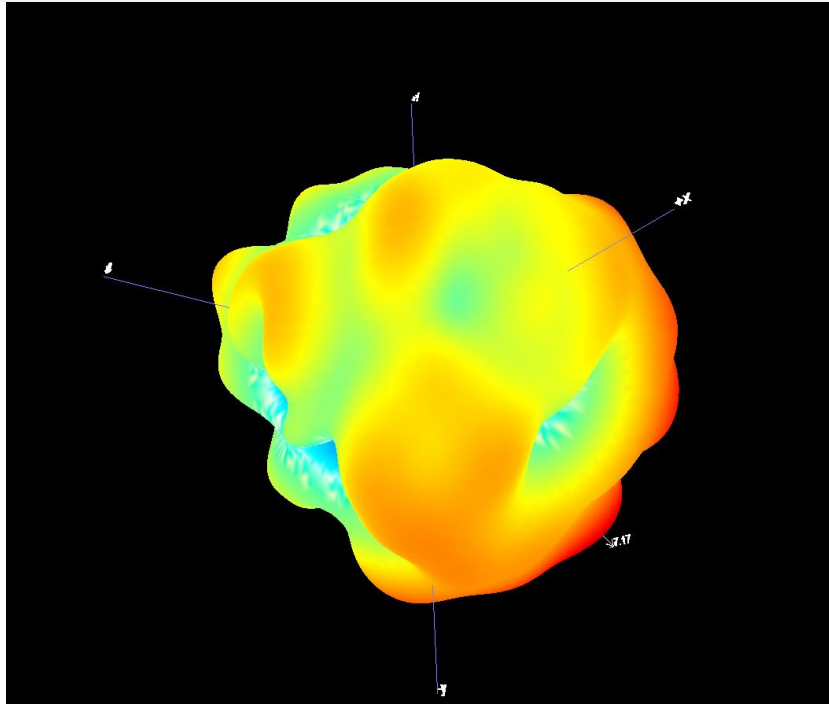
B1.10 3D Pattern for 5150MHz



B1.11 3D Pattern for 5500MHz



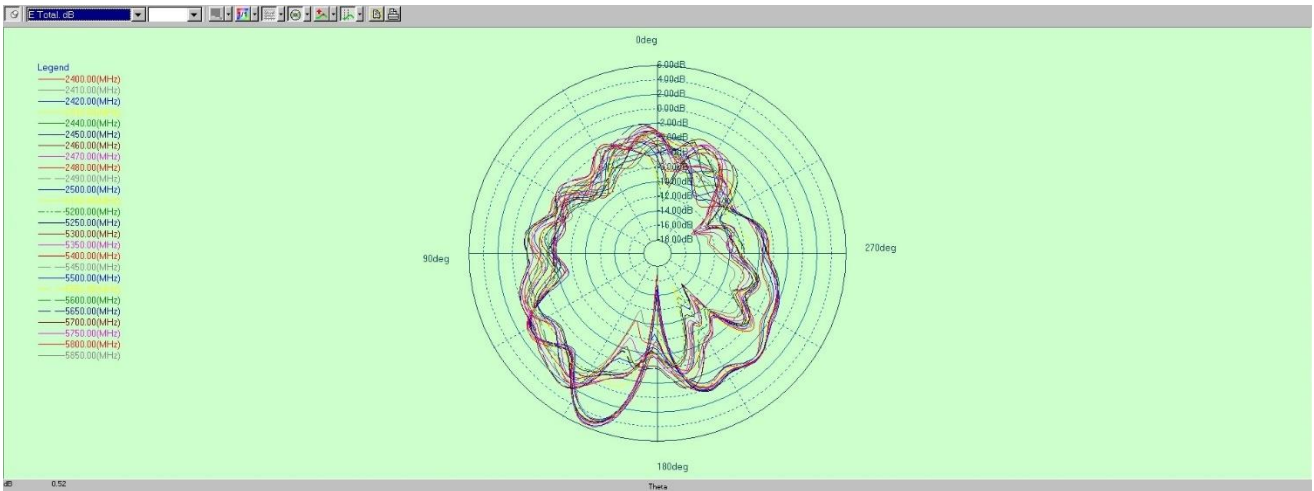
B1.12 3D Pattern for 5850MHz



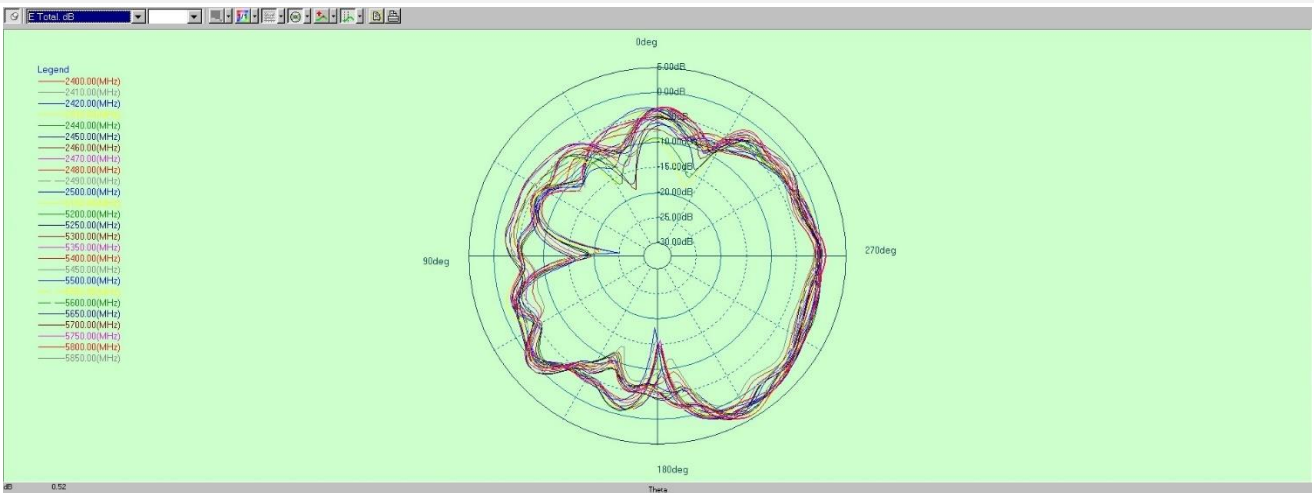
## B.2 1D Radiation Pattern

1#

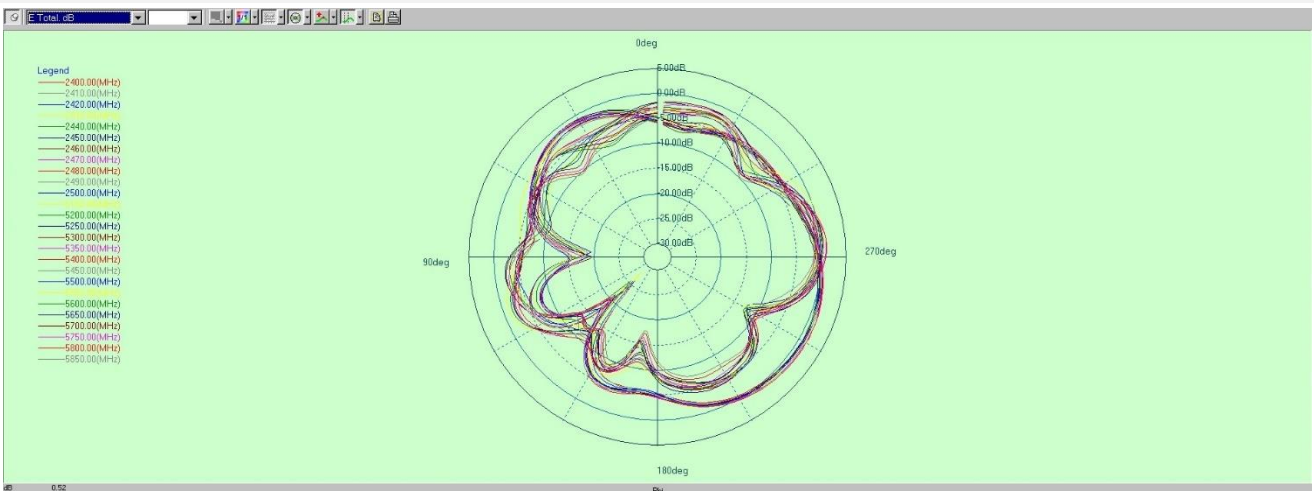
### B2.1 PHI=0



### B2.2 PHI=90



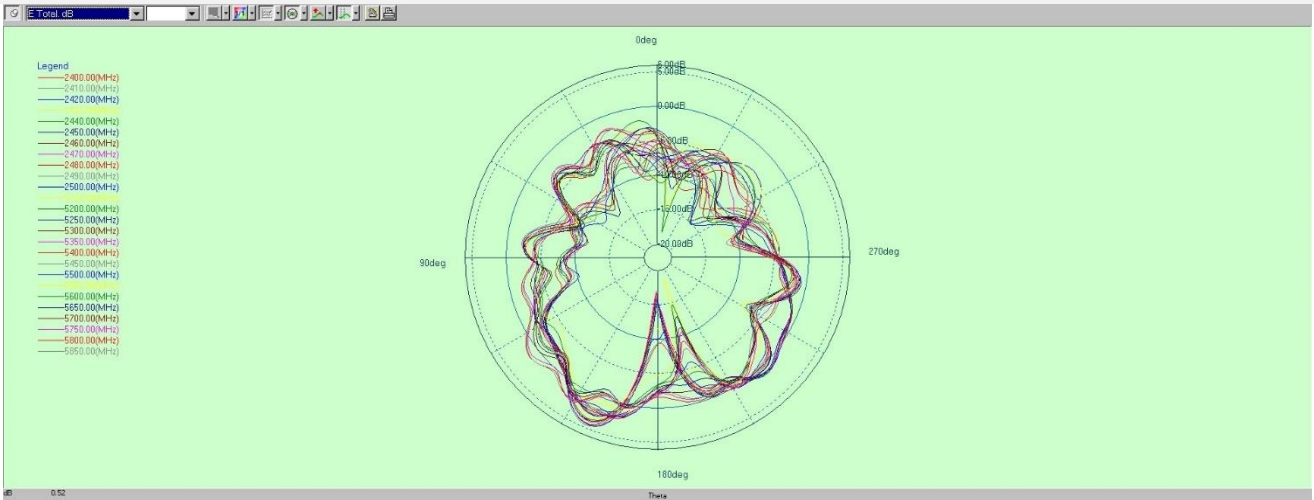
### B2.3 THETA=90



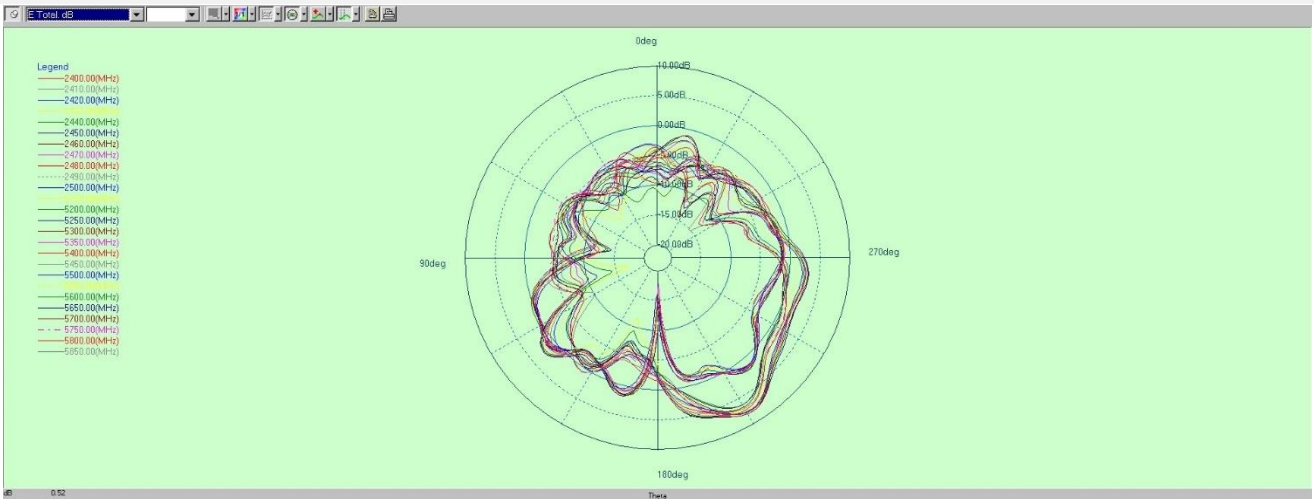


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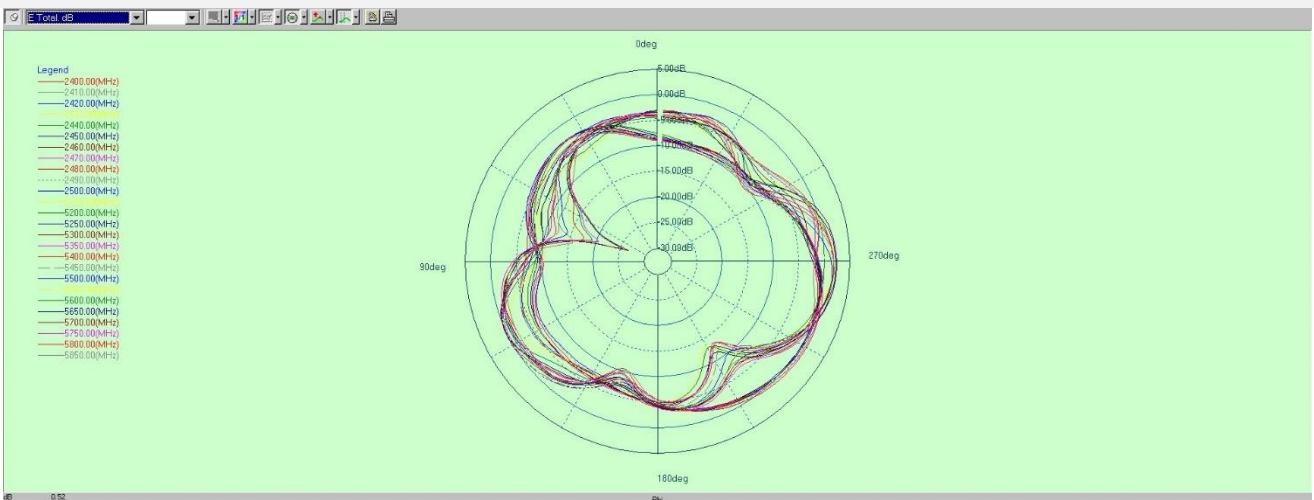
B2.4 PHI=0



B2.5 PHI=90



B2.6 THETA=90



## **ANNEX C TEST SETUP PHOTOS**

Please refer the document “BL-SZ2290469-AO.PDF”.

## **ANNEX D EUT PHOTO**

Please refer the document “BL-SZ2290469-AA.PDF”.

## Statement

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