

TEST REPORT

Applicant: Lidarvision Limited
Address: Unit 1, 19/F, Tak Lee Industrial Centre Blk B, 8 Tsing Yeung Circuit, Tuen Mun, New Territories, Hong Kong
Equipment Type: PCB BLE Antenna
Model Name: LV220901_ANT
Brand Name: Lidarvision Limited
Test Standard: ANSI/IEEE Std 149-2021
Sample Arrival Date: Jan. 13, 2023
Test Date: Jan. 13, 2023
Date of Issue: Jan. 18, 2023

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Mai Jintian

Checked by: Zou Liu

Approved by: Tolan Tu
(Testing Director)

Mai Jintian

Zou Liu

Tolan Tu

| Revision History | | |
|-------------------------|----------------------|----------------------|
| Version | Issue Date | Revisions |
| <u>Rev. 01</u> | <u>Jan. 18, 2023</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 | Lidarvision Limited |
| Address | Unit 1, 19/F, Tak Lee Industrial Centre Blk B, 8 Tsing Yeung Circuit, Tuen Mun, New Territories, Hong Kong |

2.2 Manufacturer Information

| | |
|--------------|--|
| Manufacturer | Lidarvision Limited |
| Address | Unit 1, 19/F, Tak Lee Industrial Centre Blk B, 8 Tsing Yeung Circuit, Tuen Mun, New Territories, Hong Kong |

2.3 Factory Information

| | |
|---------|-----|
| Factory | N/A |
| Address | N/A |

2.4 General Description for Equipment under Test (EUT)

| | |
|-----------------------|-----------------|
| EUT Name | PCB BLE Antenna |
| Model Name Under Test | LV220901_ANT |
| Antenna Type | PCB Antenna |
| Dimensions | 17*5 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 | ANSI/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 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

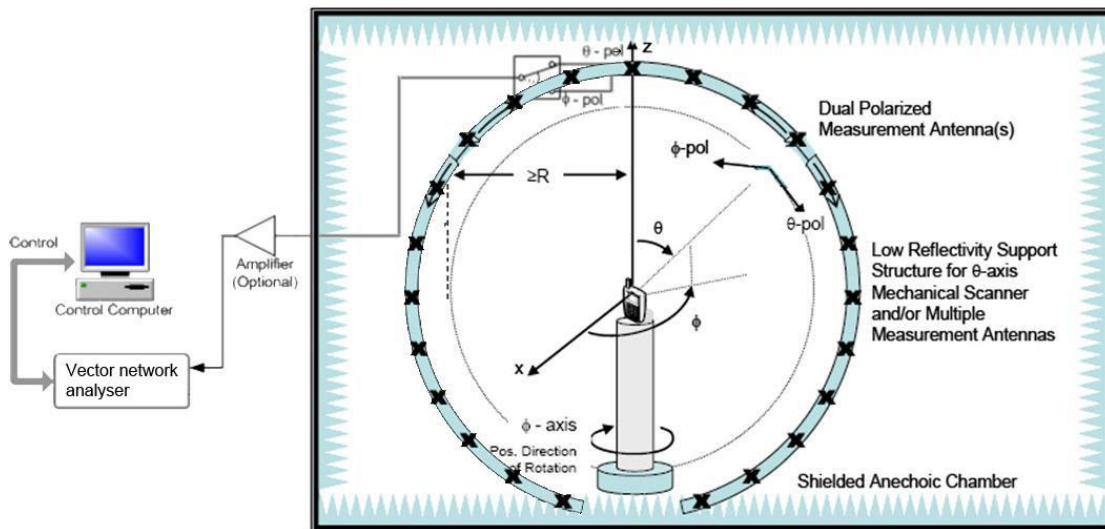
| Environment Parameter | Selected Values During Tests | | | |
|---|------------------------------|-----------------|---------|-----------------------|
| | Ambient Pressure(KPa) | Temperature(°C) | Voltage | Relative Humidity (%) |
| Normal Temperature, Normal Voltage (NTNV) | 101 | 21.5 | N/A | 49 |

4.2 Test Equipment List

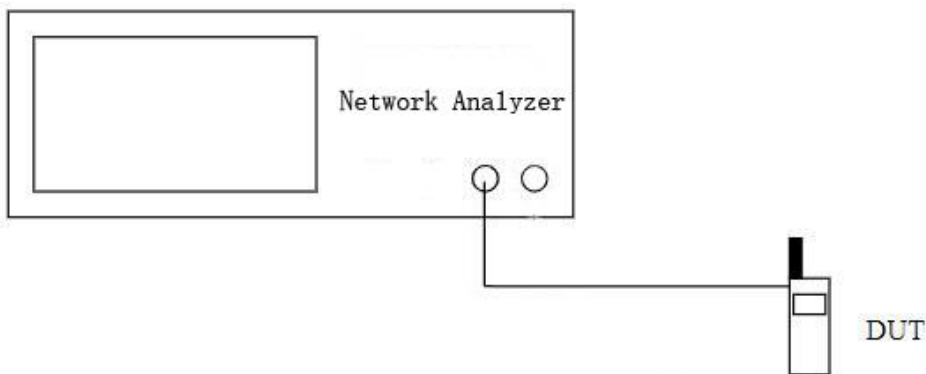
| Description | Manufacturer | Model | Serial No. | Cal. Date | Cal. Due |
|---|--------------|--------|--------------|------------|------------|
| SG24 Multi-probe Antenna Measurement System | SATIMO | SG24-L | 1101855-0001 | 2021.11.12 | 2024.11.11 |
| Vector Network Analyzer | Agilent | E5071B | MY42404001 | 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 | 2.94 | 69 |
| 2410MHz | 2.91 | 67 |
| 2420MHz | 2.58 | 62 |
| 2430MHz | 2.30 | 58 |
| 2440MHz | 2.27 | 55 |
| 2450MHz | 1.99 | 53 |
| 2460MHz | 1.80 | 49 |
| 2470MHz | 1.62 | 46 |
| 2480MHz | 1.42 | 44 |
| 2490MHz | 1.18 | 42 |
| 2500MHz | 1.18 | 40 |

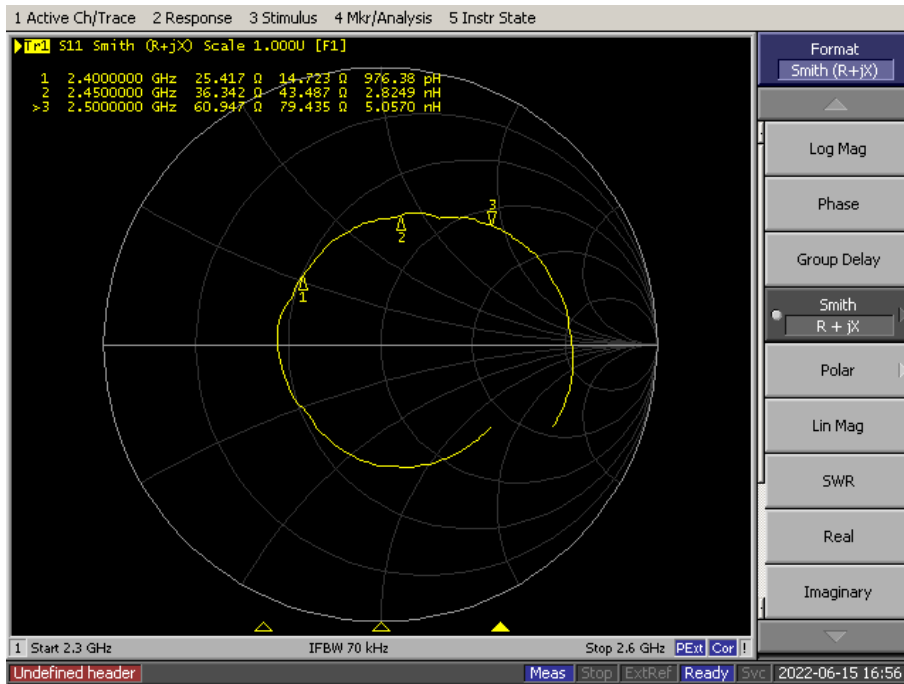
A.2 VSWR

| Frequency | VSWR |
|-----------|------|
| 2400MHz | 2.19 |
| 2450MHz | 2.79 |
| 2500MHz | 3.85 |



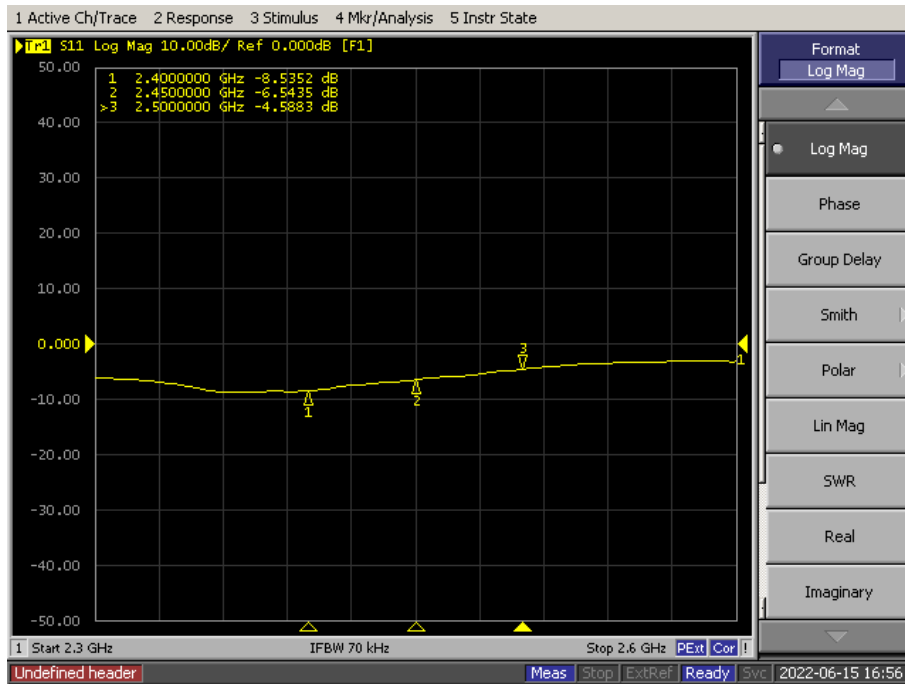
A.3 Input Impedance

| Frequency | Input Impedance (Ω) |
|-----------|------------------------------|
| 2400MHz | 25.42 |
| 2450MHz | 36.34 |
| 2500MHz | 60.95 |



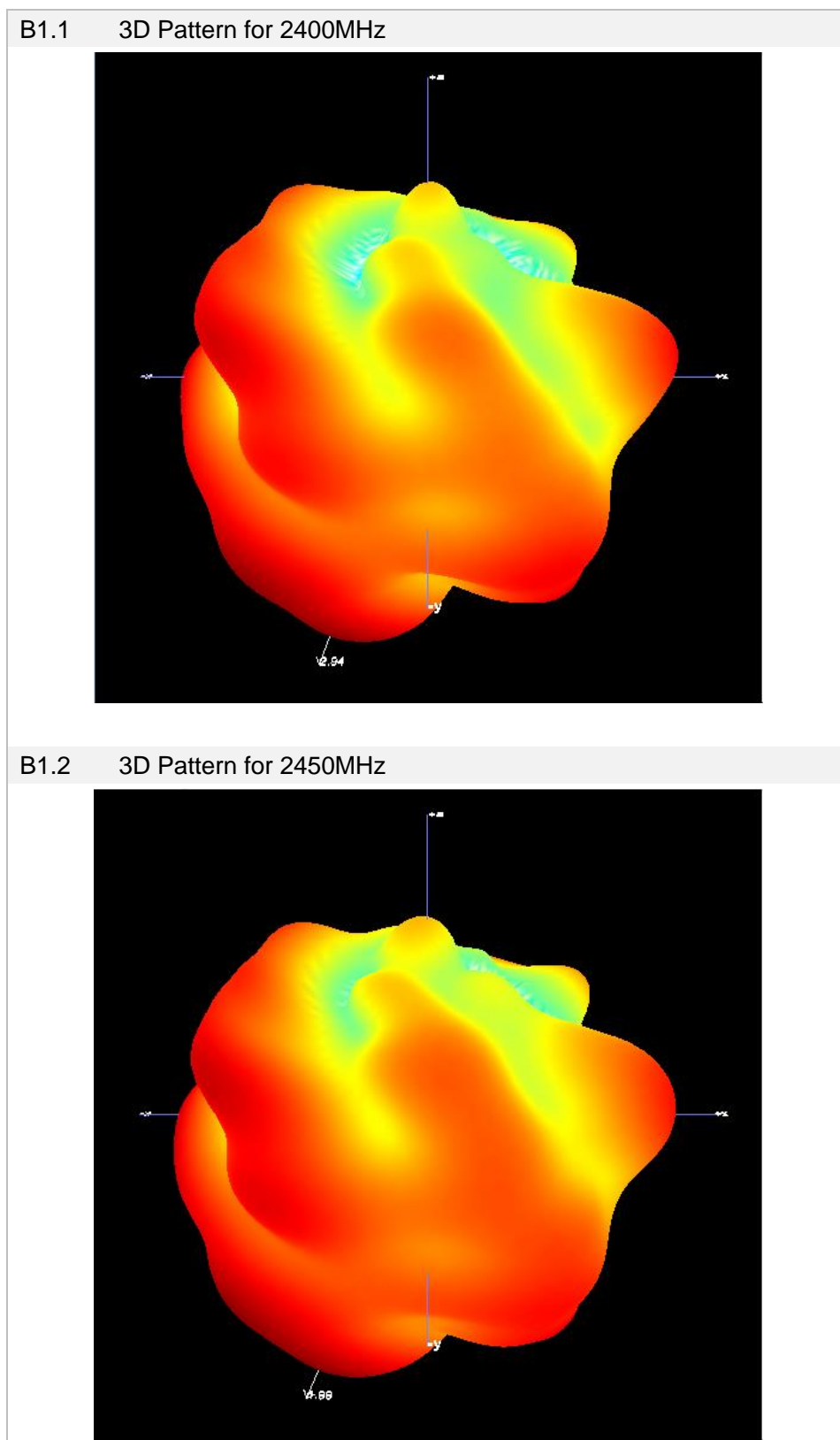
A.4 Return Loss

| Frequency | Return Loss (dB) |
|-----------|------------------|
| 2400MHz | -8.54 |
| 2450MHz | -6.54 |
| 2500MHz | -4.59 |

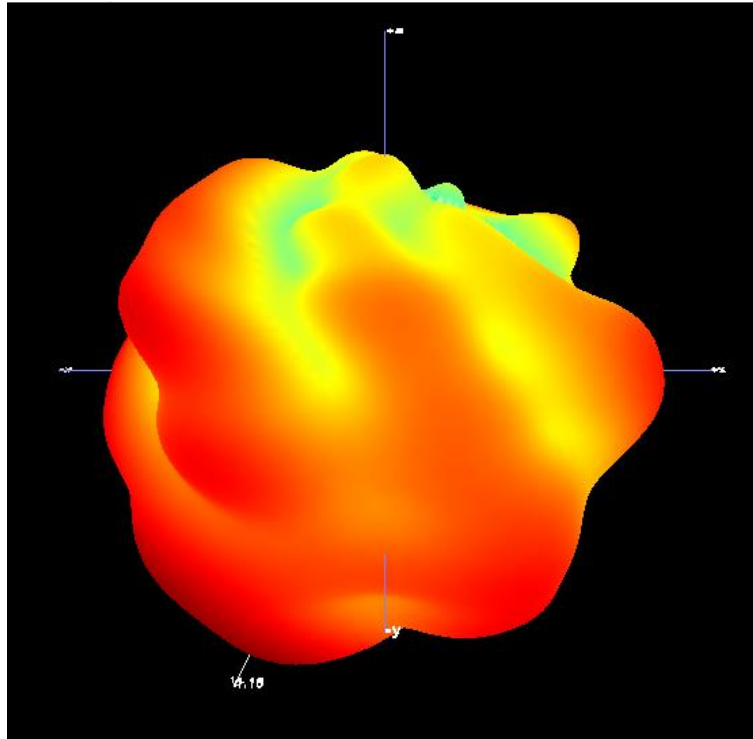


ANNEX B RADIATION PATTERN

B.1 3D Pattern

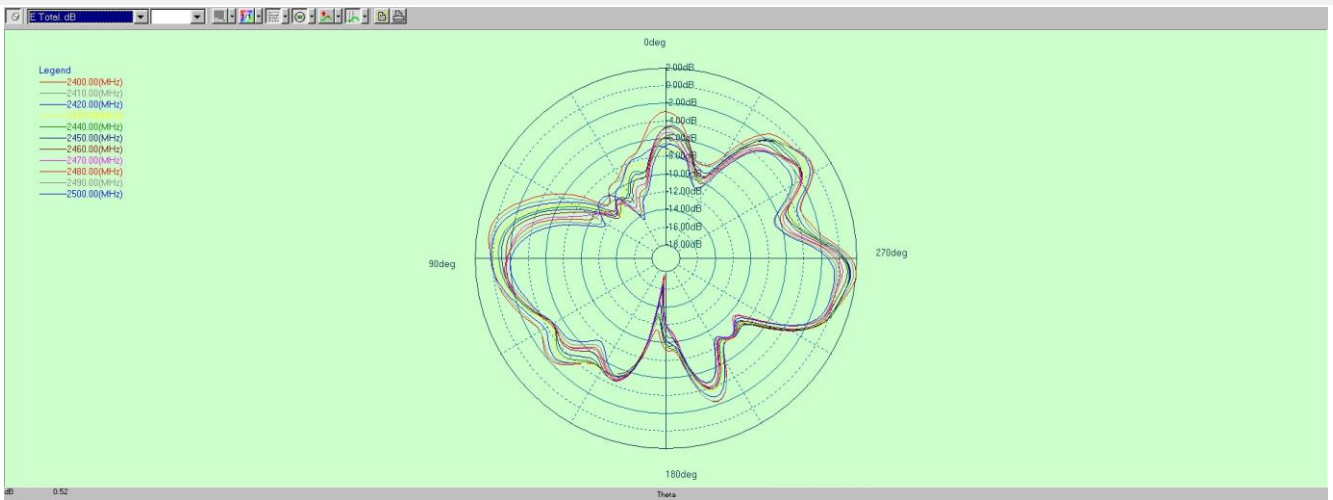


B1.3 3D Pattern for 2500MHz

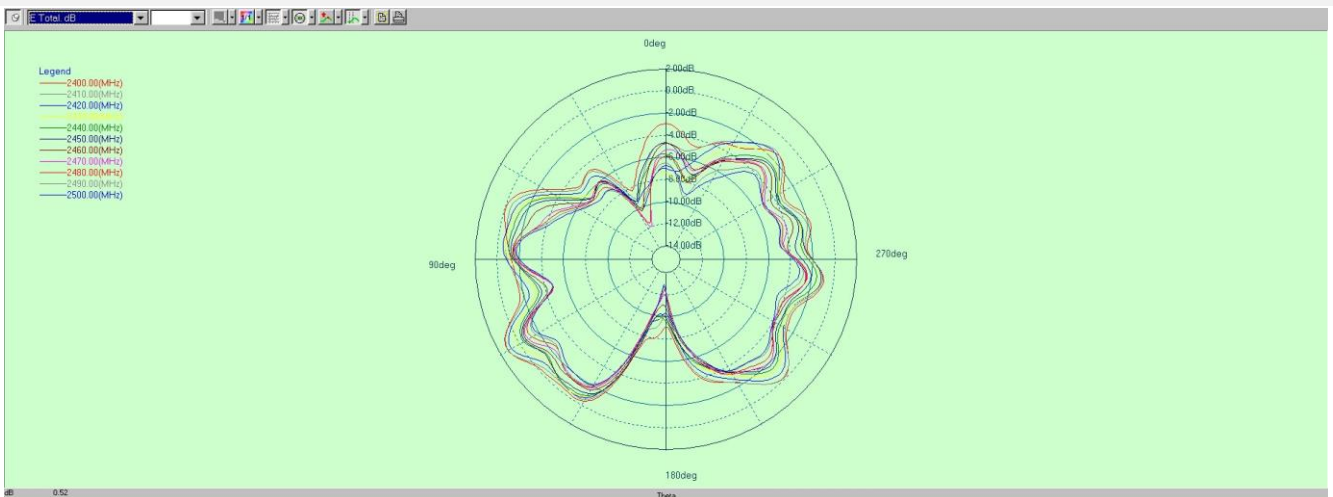


B.2 1D Radiation Pattern

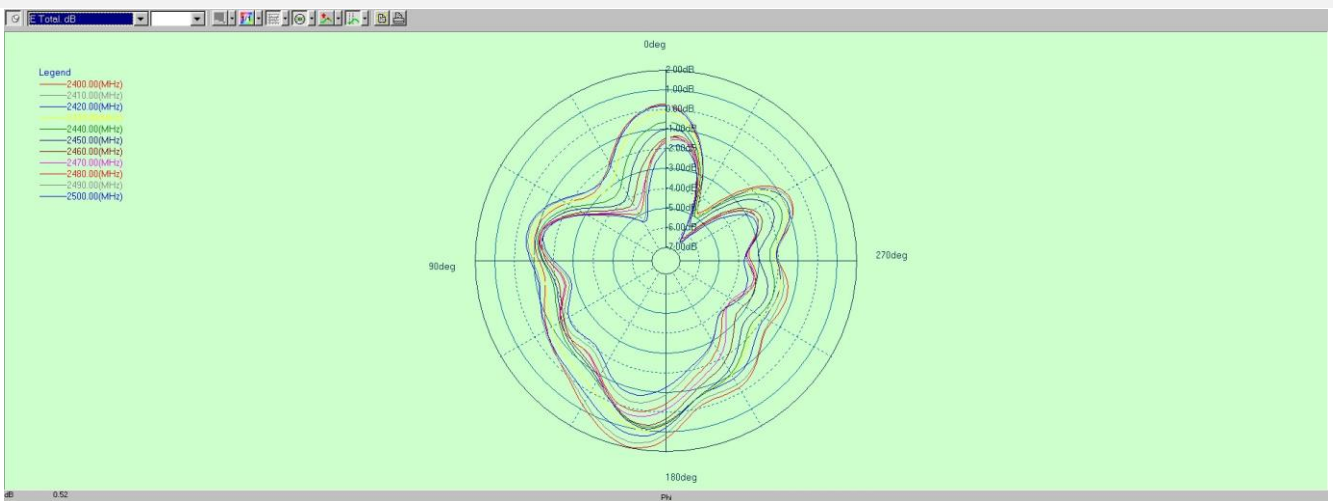
B2.1 PHI=0



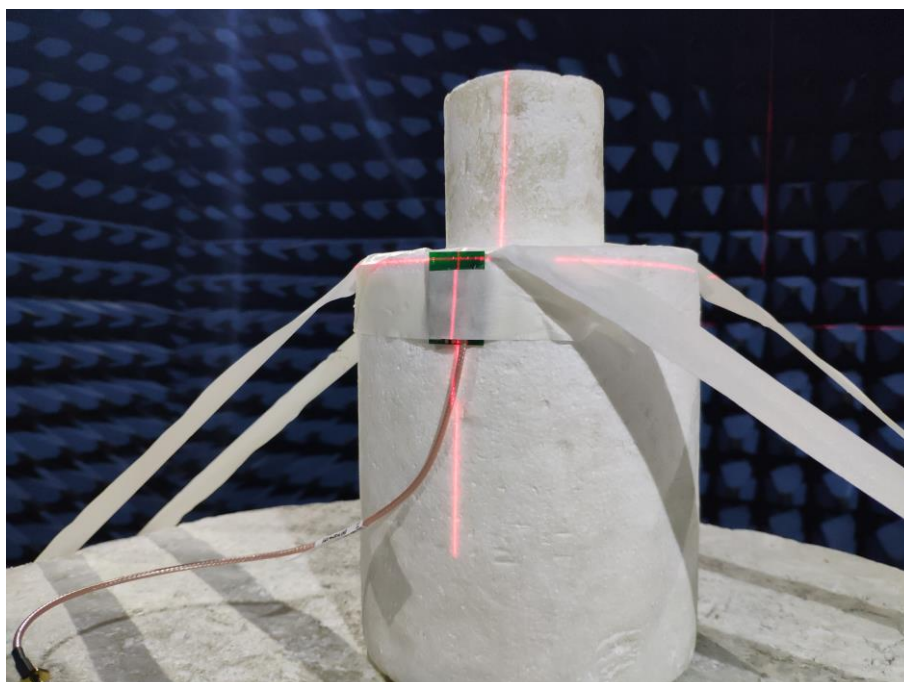
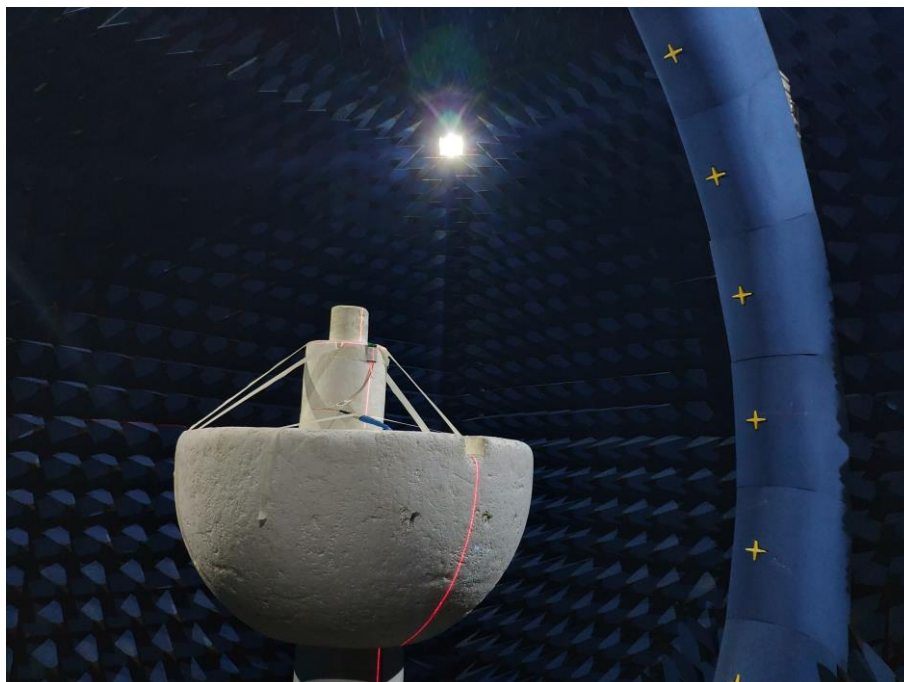
B2.2 PHI=90

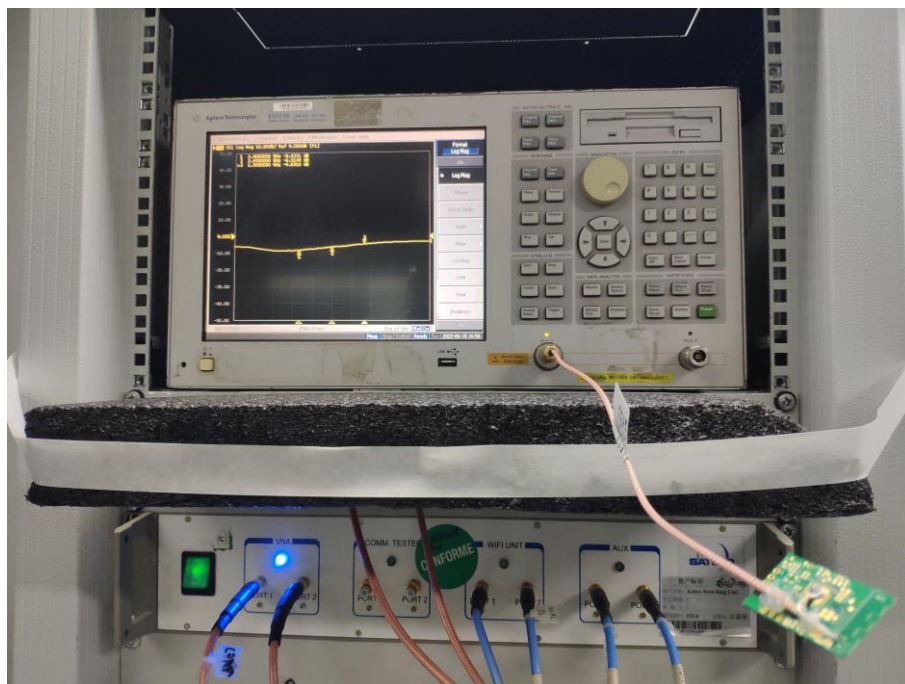


B2.3 THETA=90

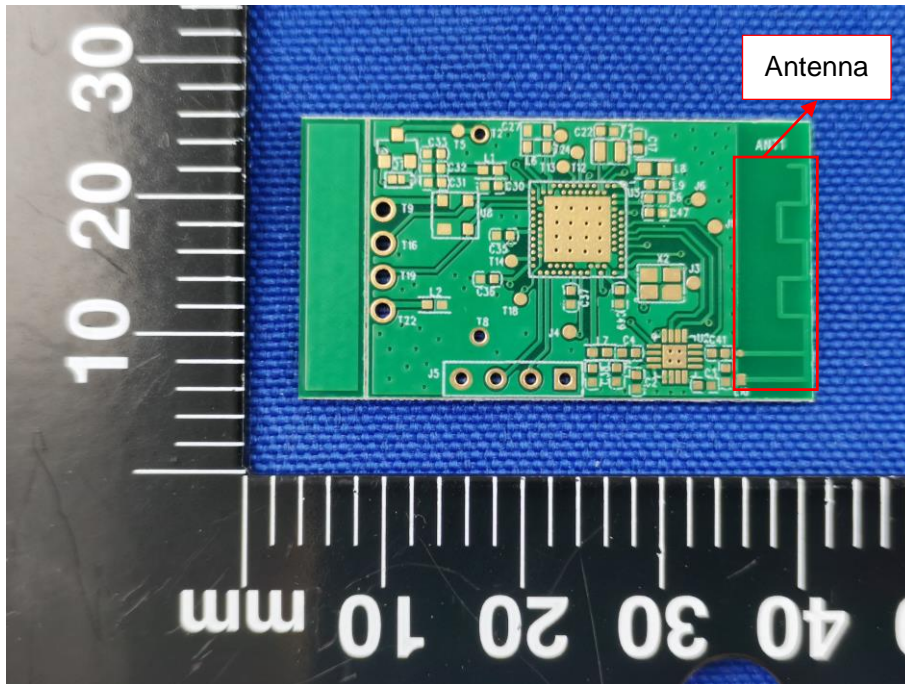


ANNEX C TEST SETUP PHOTO

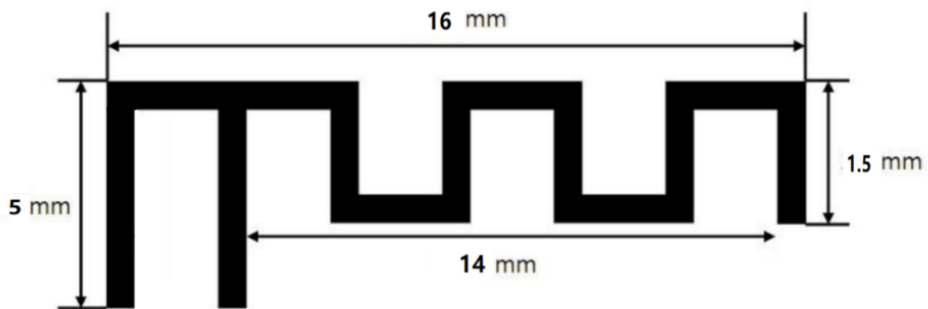




ANNEX D EUT PHOTO



Antenna Photo & Length (mm)



Statement

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--END OF REPORT--