# TEST REPORT

| | |
|---|---|
| **Applicant:** | Shen Zhen Broadwell Technology co. ltd |
| **Address:** | 719 Mintai Mansion, Minkang Road, Minzhi, Shenzhen, 518000, China |
| **Equipment Type:** | 2.4G BT WIFI PCB Antenna |
| **Model Name:** | ANT-BT-WIFI-01 |
| **Brand Name:** | N/A |
| **Test Standard:** | IEEE Std 149-2021 |
| **Sample Arrival Date:** | Dec. 11, 2023 |
| **Test Date:** | Dec. 13, 2023 - Dec. 14, 2023 |
| **Date of Issue:** | Dec. 19, 2023 |

**ISSUED BY:**

Shenzhen BALUN Technology Co., Ltd.

**Tested by:** Mai Jintian **Checked by:** Xia Long **Approved by:** Tolan Tu (Testing Director)

**Revision History**

| Version | Issue Date | Revisions |
|---|---|---|
| Rev. 01 | Dec. 19, 2023 | Initial Issue |

# TABLE OF CONTENTS

# 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

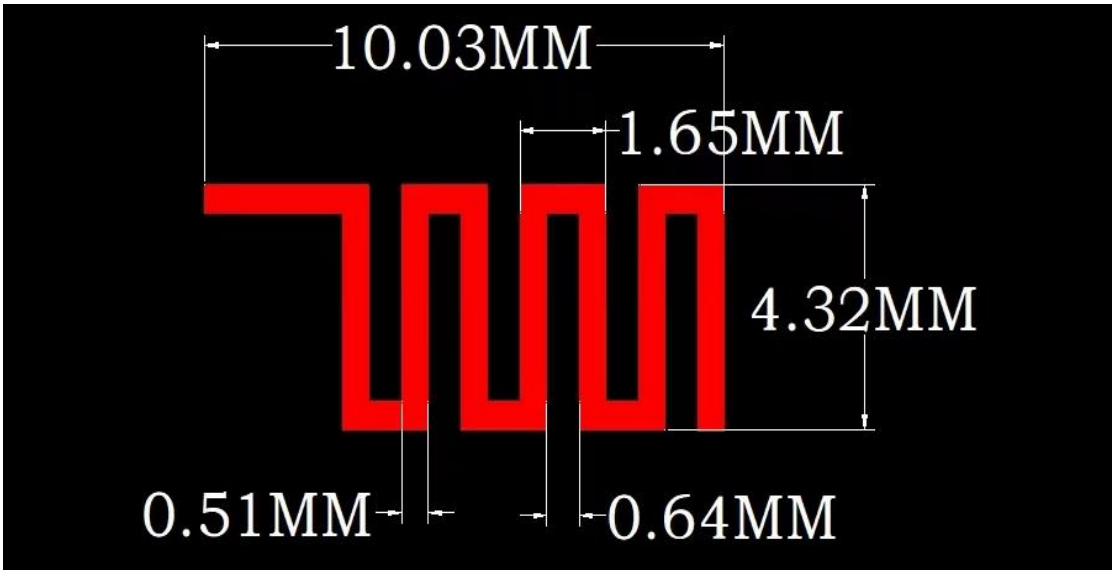
| | |
|---|---|
| Applicant | Shen Zhen Broadwell Technology co. ltd |
| Address | 719 Mintai Mansion, Minkang Road, Minzhi, Shenzhen, 518000, China |

## 2.2 Manufacturer Information

| | |
|---|---|
| Manufacturer | N/A |
| Address | N/A |

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

| | |
|---|---|
| EUT Name | 2.4G BT WIFI PCB Antenna |
| Model Name Under Test | ANT-BT-WIFI-01 |
| Antenna Type | PCB Antenna |
| Dimensions | 10.03*4.32 mm |



## 2.4 Ancillary Equipment

Note: Not applicable.

## 2.5 Technical Information

| | |
|---|---|
| Test Frequencies | 2402MHz, 2404MHz, 2406MHz, 2408MHz, 2410MHz, 2412MHz, 2414MHz, 2416MHz, 2418MHz, 2420MHz, 2422MHz, 2424MHz, 2426MHz, 2428MHz, 2430MHz, 2432MHz, 2434MHz, 2436MHz, 2438MHz, 2440MHz, 2442MHz, 2444MHz, 2446MHz, 2448MHz, 2450MHz, 2452MHz, 2454MHz, 2456MHz, 2458MHz, 2460MHz, 2462MHz, 2464MHz, 2466MHz, 2468MHz, 2470MHz, 2472MHz, 2474MHz, 2476MHz, 2478MHz, 2480MHz, 2482MHz, 2483MHz |

# 3 SUMMARY OF TEST RESULTS

## 3.1 Test Standards

| No. | Identity | Document Title |
|---|---|---|
| 1 | 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 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 | ±1.92dB |
| VSWR(S11) | ±0.61 |

# 4 GENERAL TEST CONFIGURATIONS

## 4.1 Test Condition

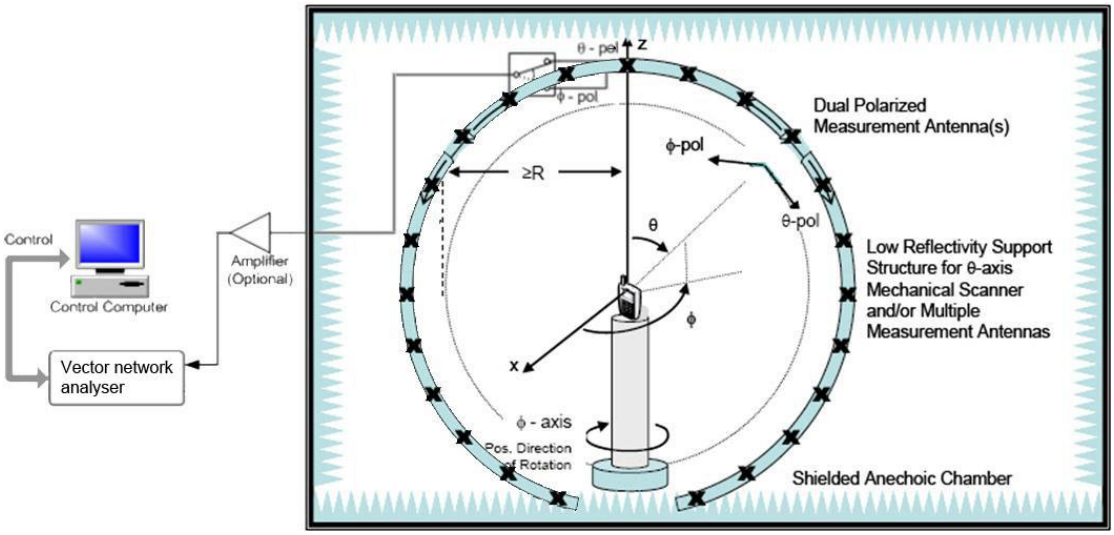
| Environment Parameter | Selected Values During Tests | | | |
|---|---|---|---|---|
| | Ambient Pressure (KPa) | Temperature (℃) | Voltage | Relative Humidity (%) |
| Normal Temperature, Normal Voltage (NTNV) | 101 | 21.6 | N/A | 44 |

## 4.2 Test Equipment List

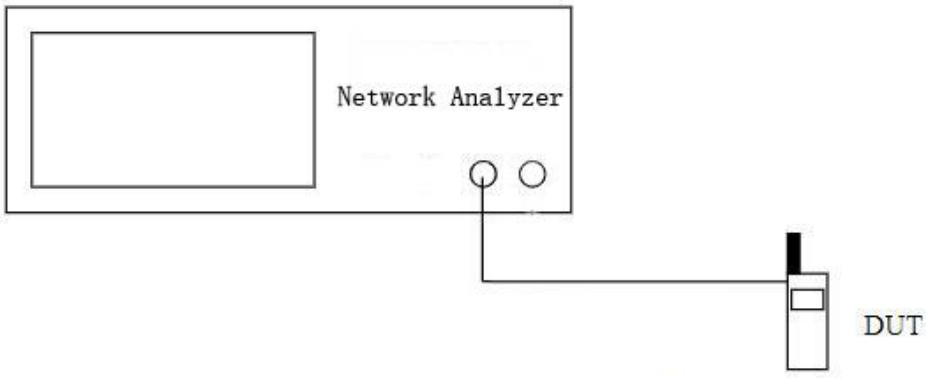
| Description | Manufacturer | Model | Serial No. | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| SG24 Multi-probe Antenna Measurement System | SATIMO | SG24-L | 1101855-0001 | 2021.11.12 | 2024.11.11 |
| Vector Network Analyzer | Agilent | E5071B | MY42404001 | 2023.03.26 | 2024.03.25 |
| Description | 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

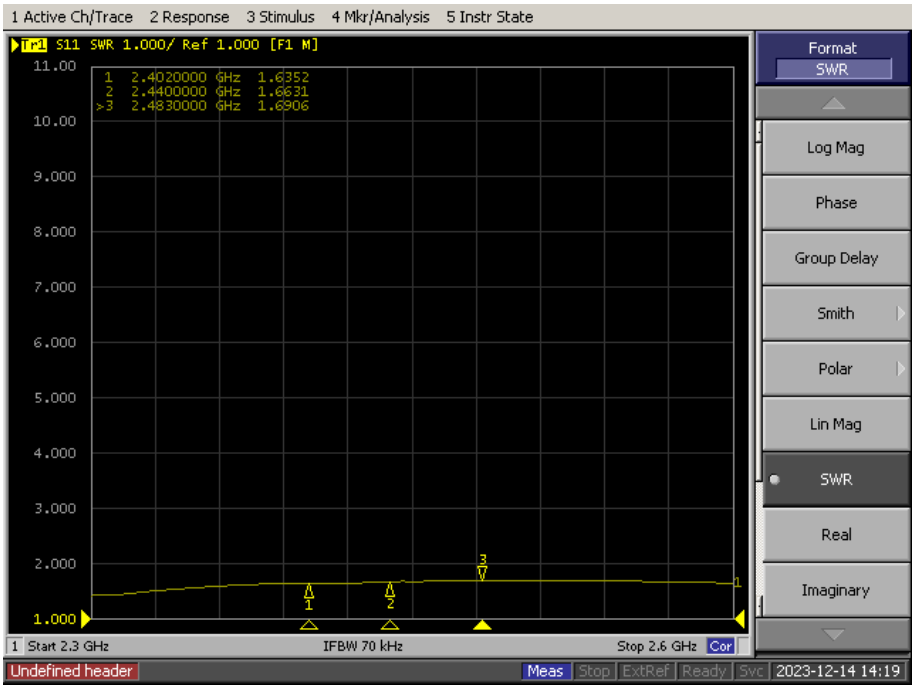
## A.1 Gain and Efficiency

| Frequency | Gain (dBi) | Efficiency (%) |
|---|---|---|
| 2402MHz | **3.73** | **60** |
| 2404MHz | 3.64 | 59 |
| 2406MHz | 3.50 | 57 |
| 2408MHz | 3.47 | 57 |
| 2410MHz | 3.43 | 56 |
| 2412MHz | 3.39 | 55 |
| 2414MHz | 3.36 | 55 |
| 2416MHz | 3.40 | 55 |
| 2418MHz | 3.38 | 55 |
| 2420MHz | 3.36 | 55 |
| 2422MHz | 3.41 | 55 |
| 2424MHz | 3.47 | 56 |
| 2426MHz | 3.50 | 57 |
| 2428MHz | 3.55 | 57 |
| 2430MHz | 3.58 | 58 |
| 2432MHz | 3.60 | 58 |
| 2434MHz | 3.60 | 59 |
| 2436MHz | 3.59 | 59 |
| 2438MHz | 3.55 | 59 |
| 2440MHz | 3.54 | 59 |
| 2442MHz | 3.52 | 59 |
| 2444MHz | 3.47 | 59 |
| 2446MHz | 3.25 | 57 |
| 2448MHz | 3.25 | 57 |
| 2450MHz | 3.25 | 58 |
| 2452MHz | 3.24 | 58 |
| 2454MHz | 3.24 | 58 |
| 2456MHz | 3.22 | 58 |
| 2458MHz | 3.24 | 58 |
| 2460MHz | 3.24 | 58 |
| 2462MHz | 3.27 | 58 |
| 2464MHz | 3.31 | 58 |
| 2466MHz | 3.45 | 59 |
| 2468MHz | 3.50 | 59 |
| 2470MHz | 3.53 | 59 |
| 2472MHz | 3.56 | 59 |
| 2474MHz | 3.60 | 59 |
| 2476MHz | 3.56 | 59 |

| | | |
|---|---|---|
| 2478MHz | 3.56 | 59 |
| 2480MHz | 3.59 | 59 |
| 2482MHz | 3.59 | 59 |
| 2483MHz | 3.59 | 59 |

## A.2 VSWR

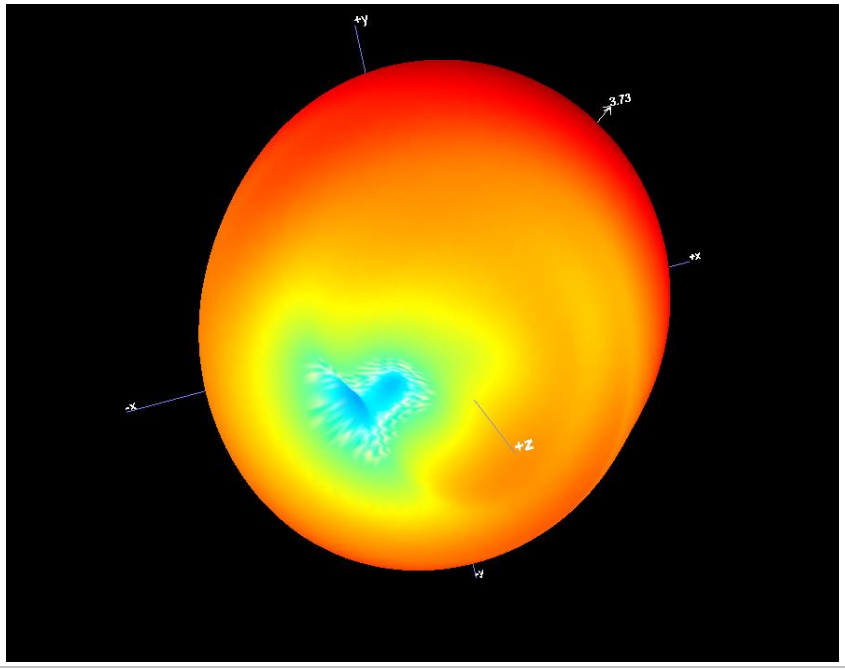
| Frequency | SWR |
|---|---|
| 2402MHz | 1.64 |
| 2440MHz | 1.66 |
| 2483MHz | 1.69 |



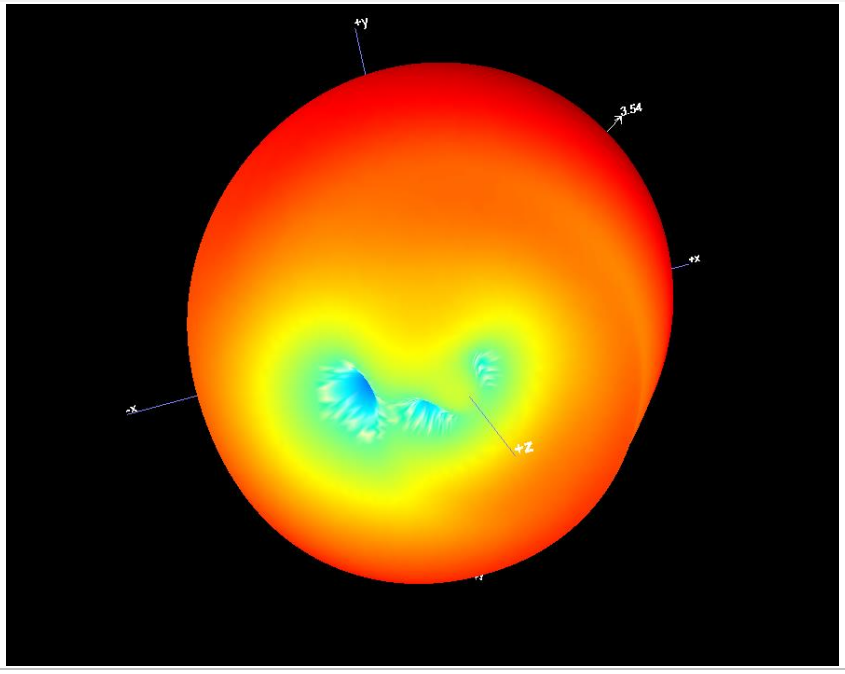
# ANNEX B RADIATION PATTERN

## B.1 3D Pattern

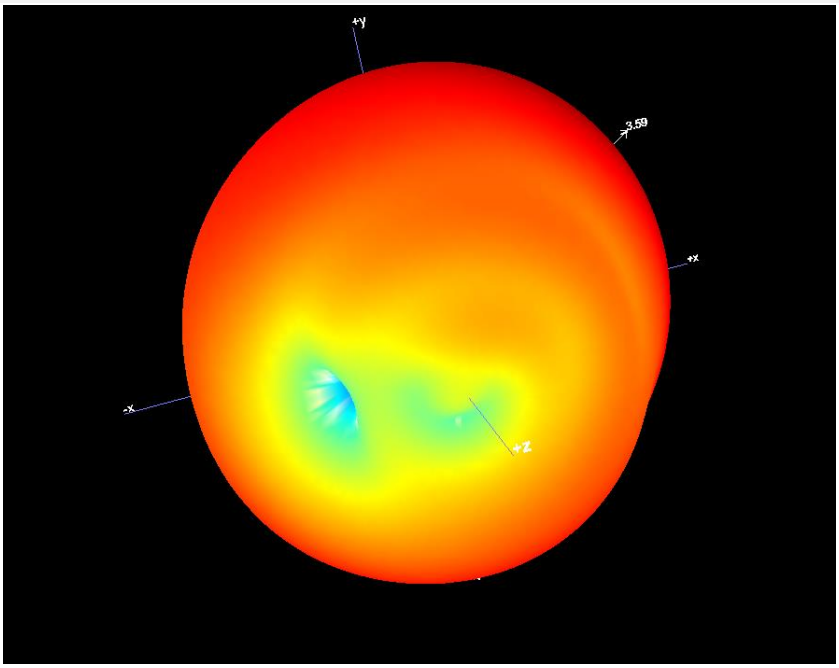
B1.1 3D Pattern for 2402MHz




B1.2 3D Pattern for 2440MHz

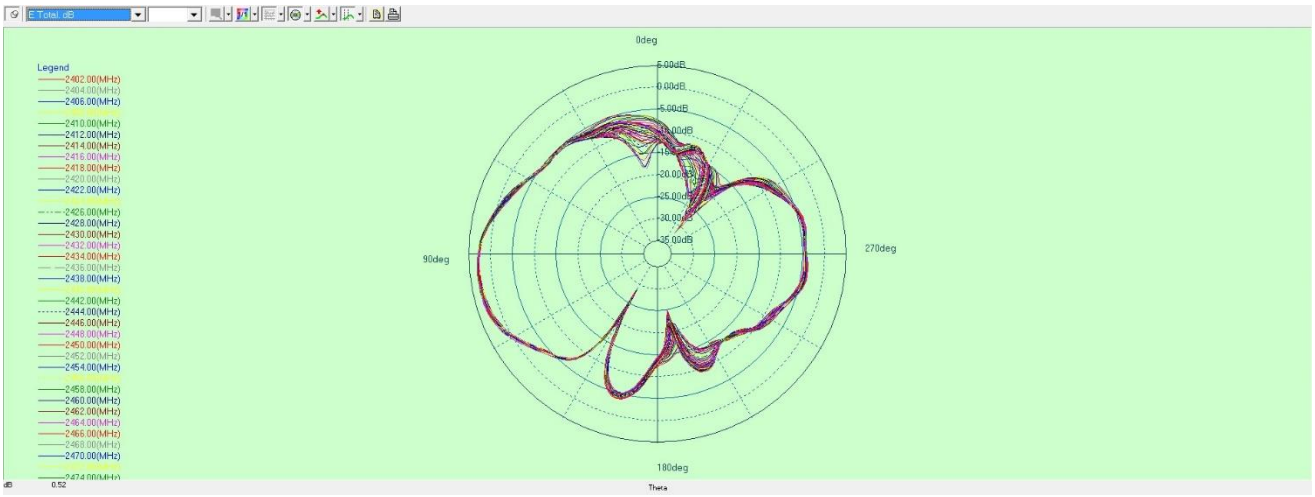


## B1.3 3D Pattern for 2483MHz

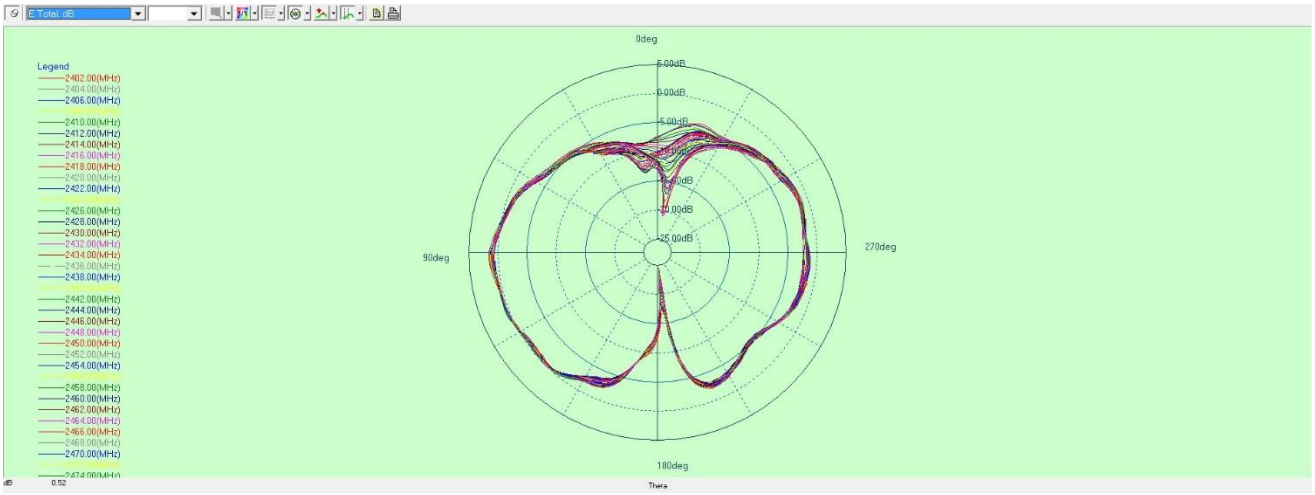


## B.2 1D Radiation Pattern

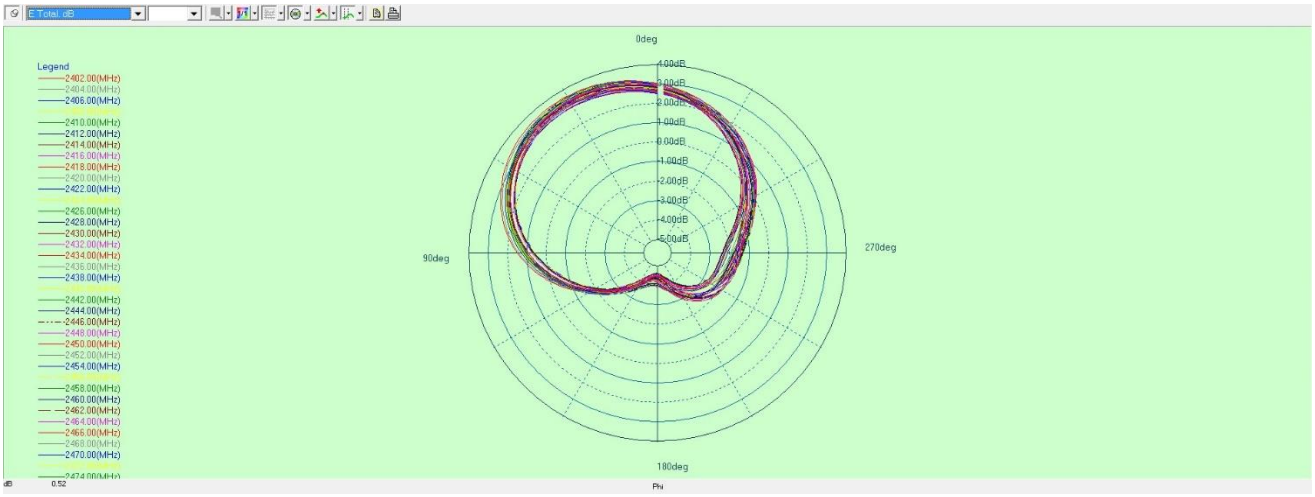
### B2.1 PHI=0




### B2.2 PHI=90




### B2.3 THETA=90



# ANNEX C TEST SETUP PHOTOS

Please refer the document “BL-SZ23C0625-AO-5.PDF”.

# ANNEX D EUT PHOTO

Please refer the document “BL-SZ23C0625-AA-5.PDF”.

# Statement

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--END OF REPORT--