# ANTENNA

# TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.

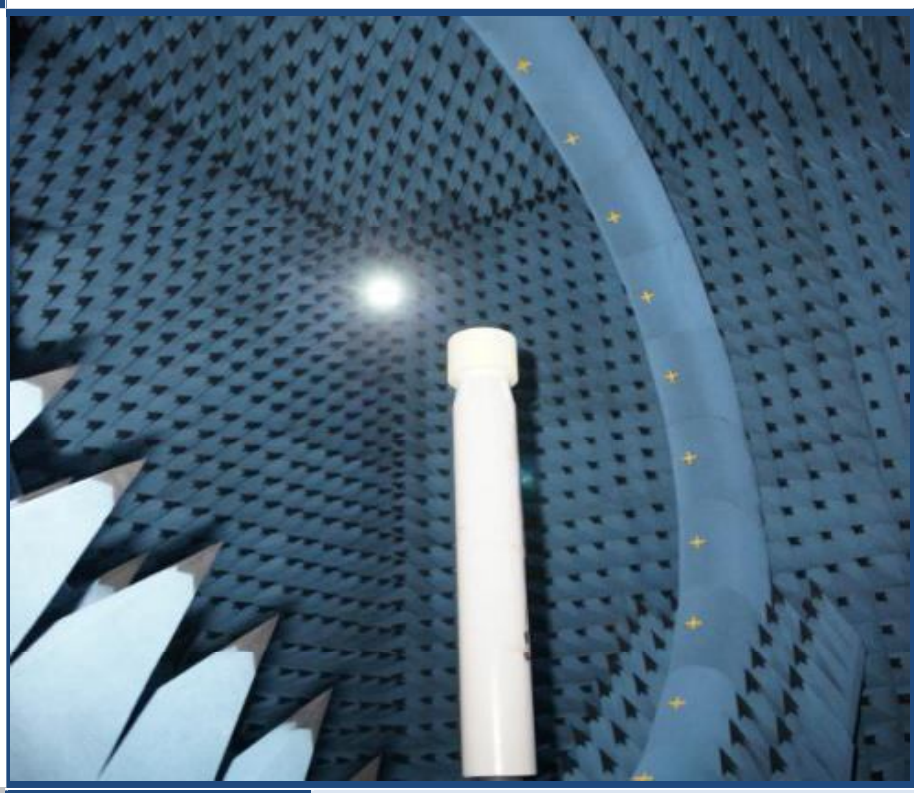
FOR

**PCB Antenna**

ISSUED TO

Guangzhou Super Technology Co., LTD

Address: 1st Floor,No.65 Fengan 3rd Street,Xinexin Road, Haizhu District,Guangzhou (Office only),China



| | |
|---|---|
| Tested by: | Shang Dandan |
| | (Engineer) |
| Date | |
| Approved by: | Wei Yanquan |
| | (Chief Engineer) |
| Date | |

| | |
|---|---|
| Report No: | BL-EC1950331-902 |
| EUT Name: | PCB Antenna |
| Model Name: | ANT-2.4G-2 |
| Brand Name: | HJZ |
| Test Standard: | IEEE149-1979 |
| Maximum: | Gain: 2.63 (dBi) |
| | Efficiency: 70% |
| Test Date: | May 23, 2019 |
| Date of Issue: | May 29, 2019 |



Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong, P. R. China 518055
TEL: +86-755-66850100, FAX: +86-755-61824271
Email: qc@baluntek.com
www.baluntek.com

**Revision History**

| Version | Issue Date | Revisions |
|---|---|---|
| Rev. 01 | May 29, 2019 | Initial Issue |

# TABLE OF CONTENTS

# 1 Administrative Data (GENERAL INFORMATION)

## 1.1 Identification of the Testing Laboratory

| | |
|---|---|
| Company Name | Shenzhen BALUN Technology Co., Ltd. |
| Address | Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China |
| Phone Number | +86 755 6685 0100 |

## 1.2 Identification of the Responsible Testing Location

| | |
|---|---|
| Test Location | Shenzhen BALUN Technology Co., Ltd. |
| Address | Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China |
| Accreditation Certificate | The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.<br>The laboratory is a testing organization accredited by China Metrology Accreditation (CMA). The accreditation certificate number is 2017192290Z. |
| Description | All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055 |

## 1.3 Laboratory Condition

| | |
|---|---|
| Ambient Temperature | 19℃ to 25℃ |
| Ambient Relative Humidity | 45% to 55% |
| Ambient Pressure | 100 kPa to 102 kPa |

## 1.4 Announce

(1) The test report reference to the report template version v2.2.

(2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.

(3) The test report is invalid if there is any evidence and/or falsification.

(4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.

(5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.

(6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

# 2 PRODUCT INFORMATION

## 2.1 Applicant Information

| | |
|---|---|
| Applicant | Guangzhou Super Technology Co., LTD |
| Address | 1st Floor,No.65 Fengan 3rd Street,Xinexin Road,Haizhu District, Guangzhou (Office only),China |
| Telephone Number | 13123730073 |
| Fax Number | N/A |
| E-mail Address | thomas186888@gmail.com |

## 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)

| | |
|---|---|
| EUT Name | PCB Antenna |
| Model Name Under Test | ANT-2.4G-2 |
| Antenna Type | PCB Antenna |
| Dimensions | 19mm * 5mm |
| Polarization | Vertical |

## 2.5 Ancillary Equipment

Note: Not applicable.

## 2.6 Technical Information

| | |
|---|---|
| Frequency Range | 2400MHz ~ 2500MHz |
| Test Frequencies | 2400MHz, 2402MHz, 2404MHz, 2406MHz, 2408MHz, 2410MHz, 2412MHz, 2414MHz, 2416MHz, 2418MHz, 2420MHz, 2422MHz, 2424MHz, 2426MHz, 2428MHz, 2430MHz, 2432MHz, 2434MHz, 2436MHz, 2438MHz, 2440MHz, 2441MHz, 2442MHz, 2444MHz, 2446MHz, 2448MHz, 2450MHz, 2452MHz, 2454MHz, 2456MHz, 2458MHz, 2460MHz, 2462MHz, 2464MHz, 2466MHz, 2468MHz, 2470MHz, 2472MHz, 2474MHz, 2476MHz, 2478MHz, 2480MHz, 2482MHz, 2484MHz, 2486MHz, 2488MHz, 2490MHz, 2492MHz, 2494MHz, 2496MHz, 2498MHz, 2500MHz |

# 3 SUMMARY OF TEST RESULTS

## 3.1 Test Standards

| No. | Identity | Document Title |
|---|---|---|
| 1 | IEEE149-1979 | 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 |
|---|---|
| VSWR(S11) | ±0.2 |
| Gain | ±0.5dB |

# 4 GENERAL TEST CONFIGURATIONS

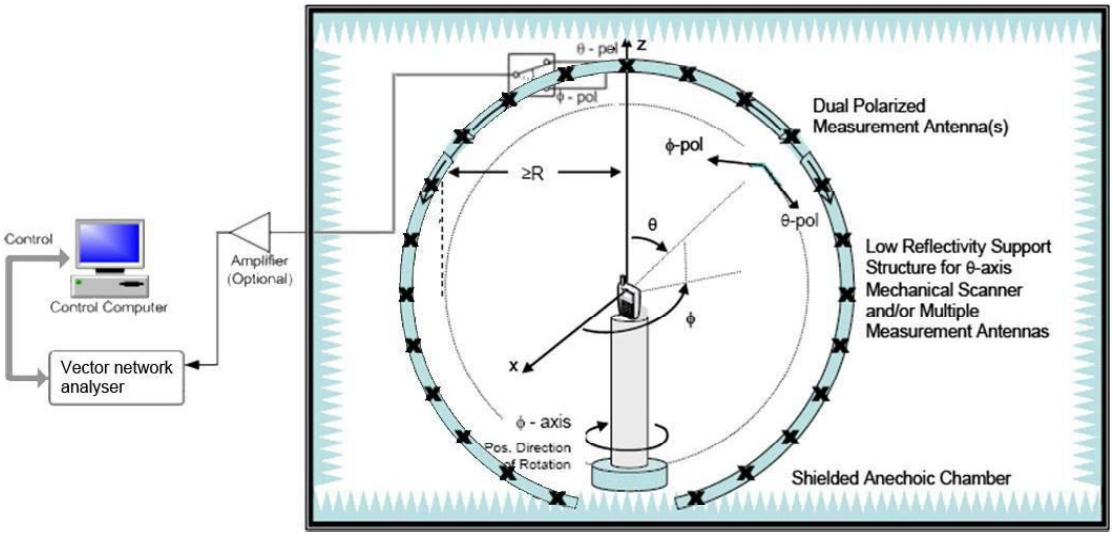
## 4.1 Test Condition

| Environment Parameter | Selected Values During Tests | | | |
|---|---|---|---|---|
| | Ambient Pressure (KPa) | Temperature (℃) | Voltage | Relative Humidity (%) |
| Normal Temperature, Normal Voltage (NTNV) | 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 |
|---|---|---|---|---|---|
| Vector Network Analyzer | Agilent | E5071C | MY46103472 | 2019.02.28 | 2020.02.27 |
| SG24 Multi-probe Antenna Measurement System | SATIMO | SG24-L | 1101855-0001 | 2018.06.22 | 2020.06.21 |

## 4.3 Test Setup



# ANNEX A TEST RESULTS

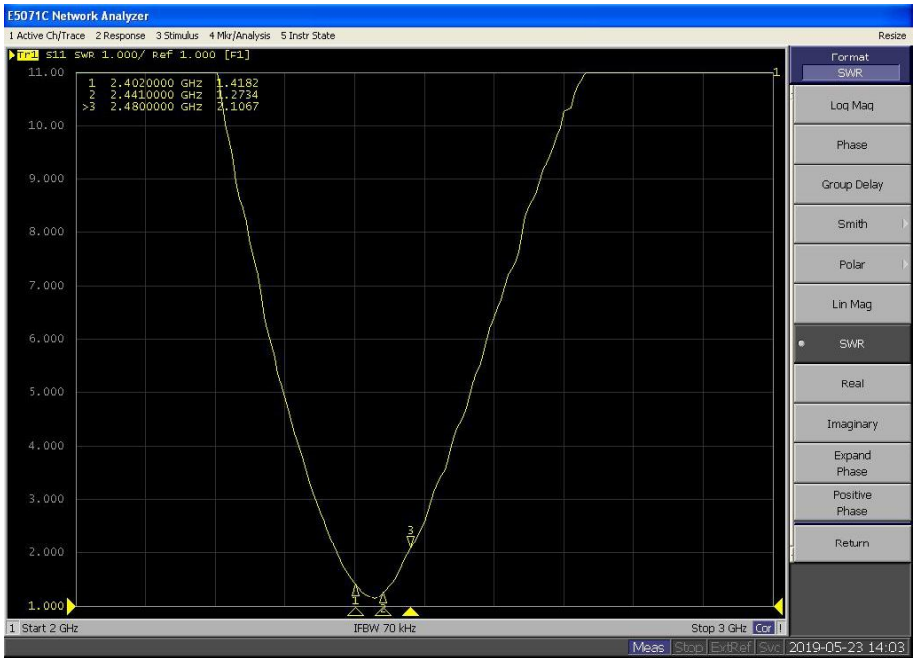
## A.1 Gain and Efficiency

| Frequency | Gain (dBi) | Efficiency (%) |
|---|---|---|
| 2400MHz | 2.11 | 67 |
| 2402MHz | 2.25 | 67 |
| 2404MHz | 2.37 | 67 |
| 2406MHz | 2.49 | 67 |
| 2408MHz | 2.58 | 67 |
| 2410MHz | 2.63 | 68 |
| 2412MHz | 2.62 | 68 |
| 2414MHz | 2.60 | 68 |
| 2416MHz | 2.57 | 68 |
| 2418MHz | 2.51 | 69 |
| 2420MHz | 2.43 | 69 |
| 2422MHz | 2.35 | 69 |
| 2424MHz | 2.37 | 69 |
| 2426MHz | 2.28 | 70 |
| 2428MHz | 2.27 | 70 |
| 2430MHz | 2.27 | 69 |
| 2432MHz | 2.28 | 69 |
| 2434MHz | 2.25 | 69 |
| 2436MHz | 2.20 | 69 |
| 2438MHz | 2.15 | 68 |
| 2440MHz | 2.10 | 68 |
| 2442MHz | 2.07 | 68 |
| 2444MHz | 2.03 | 68 |
| 2446MHz | 1.99 | 67 |
| 2448MHz | 1.98 | 68 |
| 2450MHz | 2.00 | 68 |
| 2452MHz | 2.00 | 68 |
| 2454MHz | 2.01 | 68 |
| 2456MHz | 2.00 | 67 |
| 2458MHz | 2.05 | 68 |
| 2460MHz | 2.09 | 67 |
| 2462MHz | 2.11 | 67 |
| 2464MHz | 2.15 | 66 |
| 2466MHz | 2.14 | 66 |
| 2468MHz | 2.15 | 65 |
| 2470MHz | 2.15 | 65 |
| 2472MHz | 2.14 | 64 |
| 2474MHz | 2.12 | 64 |
| 2476MHz | 2.10 | 63 |

| | | |
|---|---|---|
| 2478MHz | 2.02 | 63 |
| 2480MHz | 1.94 | 62 |
| 2482MHz | 1.88 | 61 |
| 2484MHz | 1.79 | 61 |
| 2486MHz | 1.65 | 60 |
| 2488MHz | 1.53 | 59 |
| 2490MHz | 1.45 | 59 |
| 2492MHz | 1.36 | 58 |
| 2494MHz | 1.25 | 58 |
| 2496MHz | 1.19 | 57 |
| 2498MHz | 1.17 | 57 |
| 2500MHz | 1.14 | 57 |

## A.2 VSWR

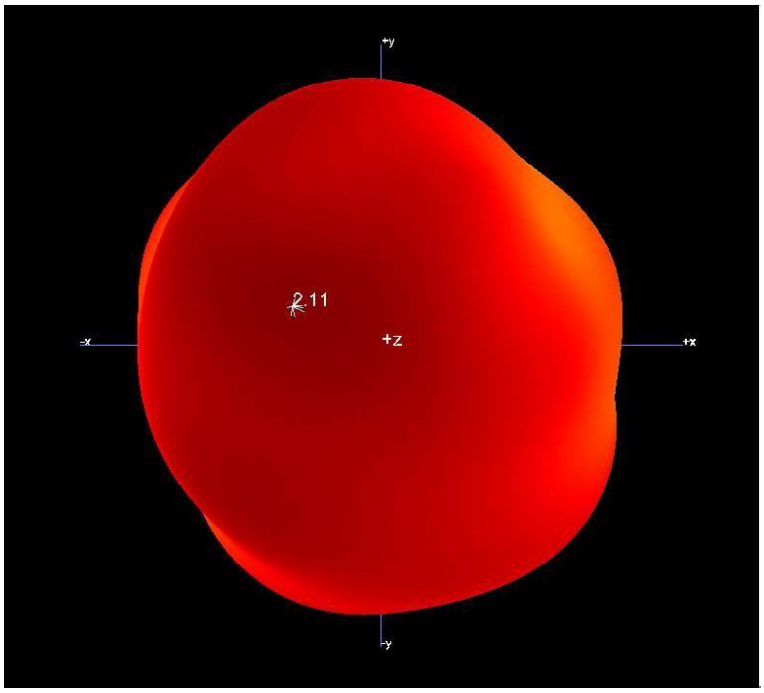
| Frequency | VSWR |
|---|---|
| 2402MHz | 1.42 |
| 2441MHz | 1.27 |
| 2480MHz | 2.11 |



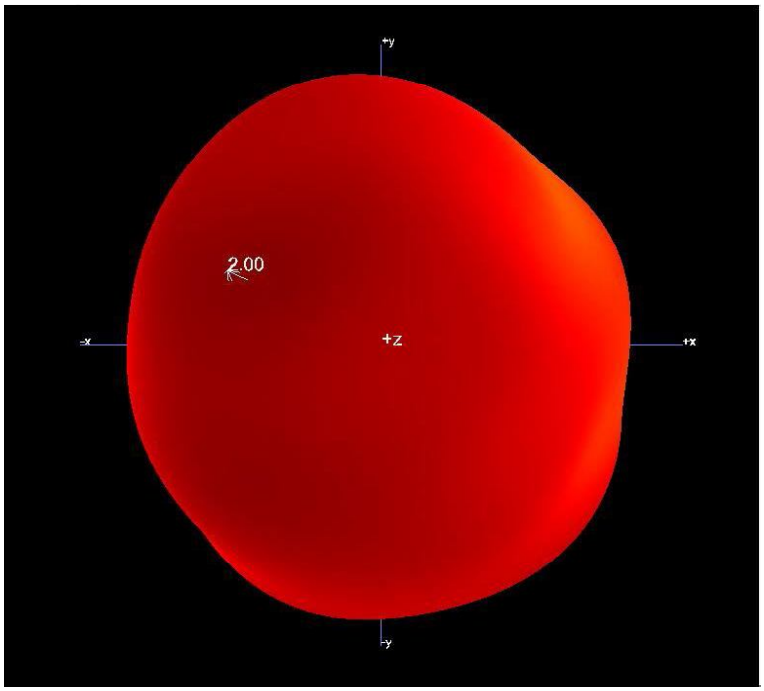
# ANNEX B RADIATION PATTERN

## B.1 3D Pattern

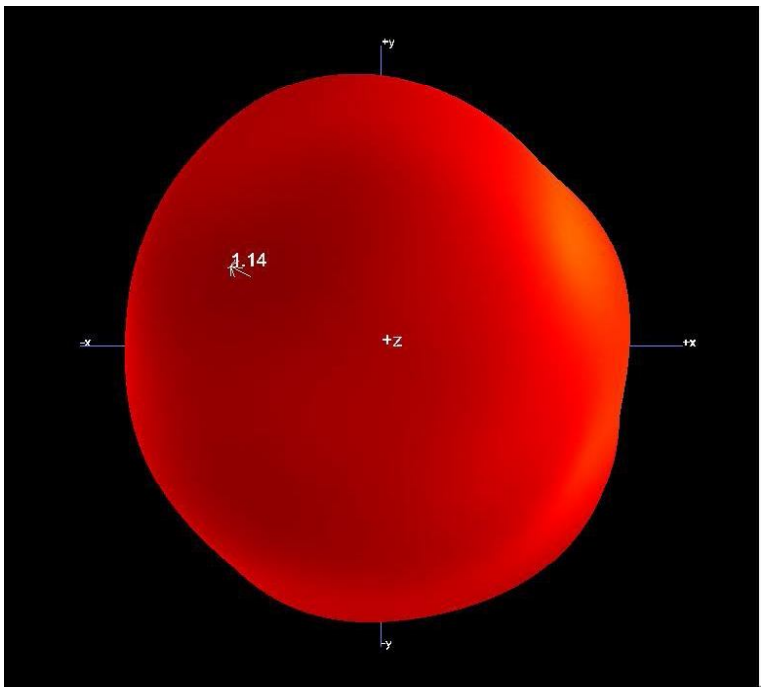
B1.1 3D Pattern for 2400MHz




B1.2 3D Pattern for 2450MHz

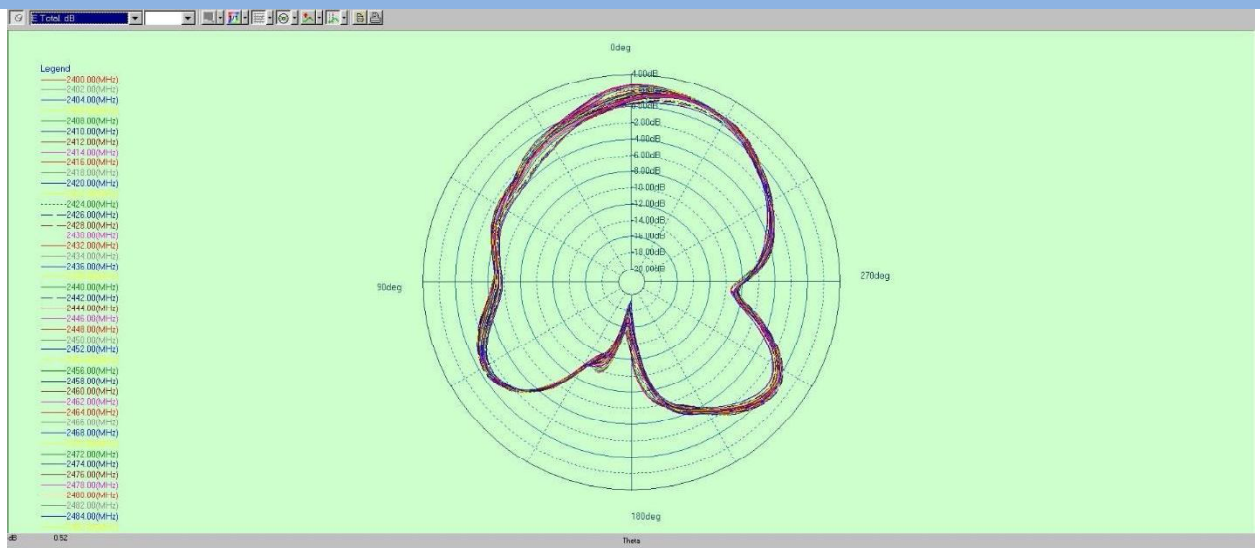


## B1.3 3D Pattern for 2500MHz

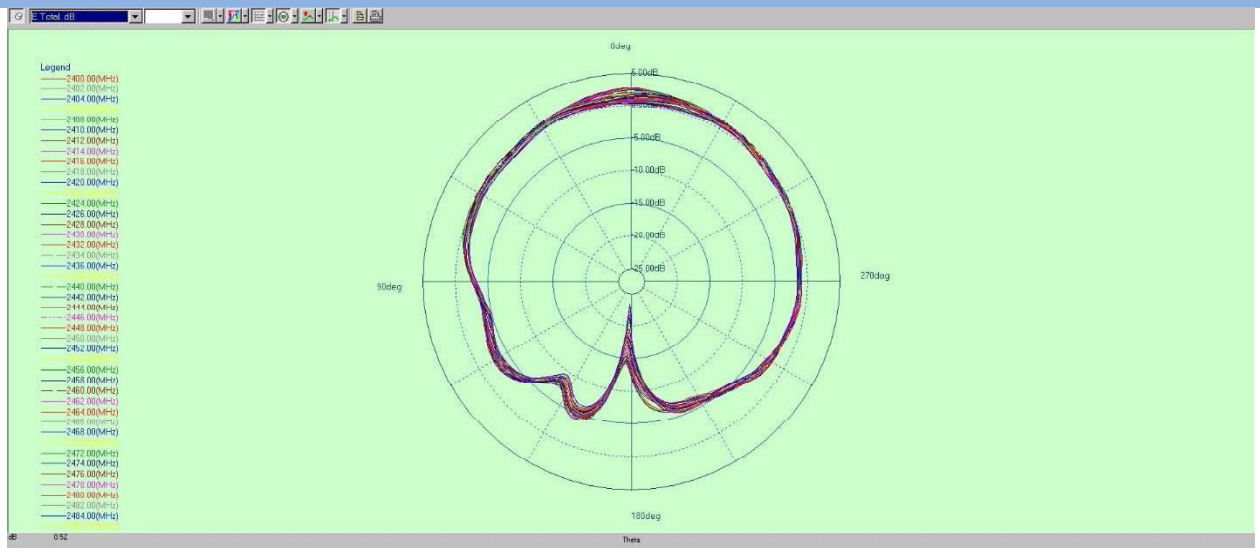


## B.2 1D Radiation Pattern

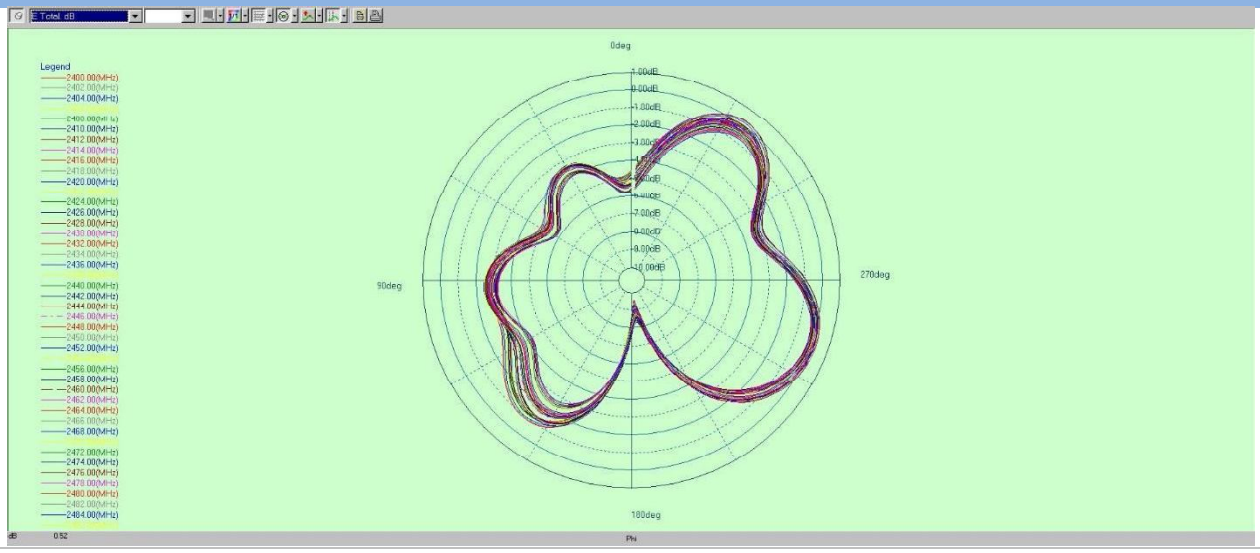
### B2.1 PHI=0



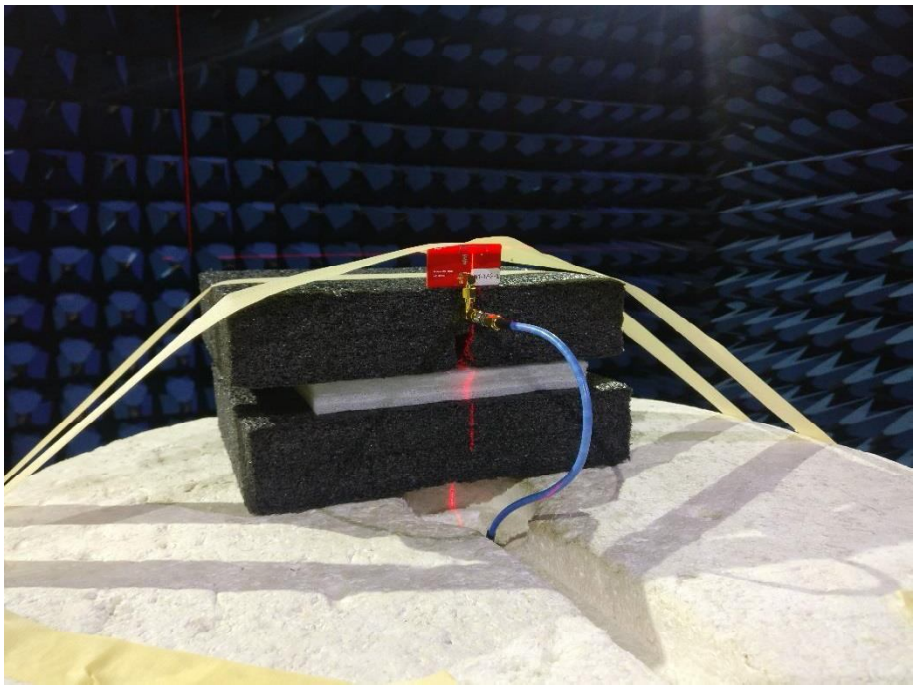

### B2.2 PHI=90

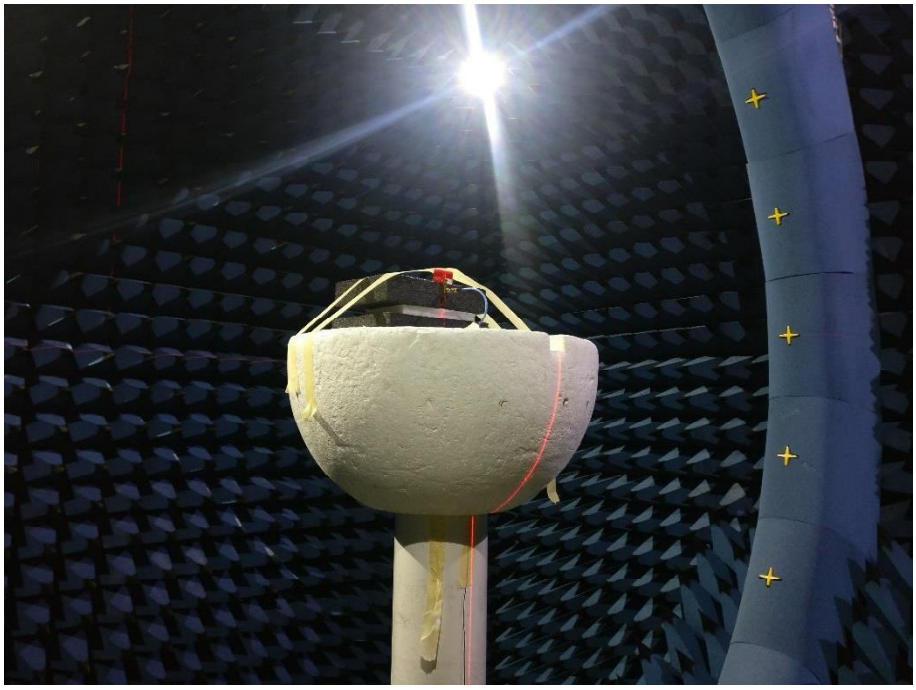


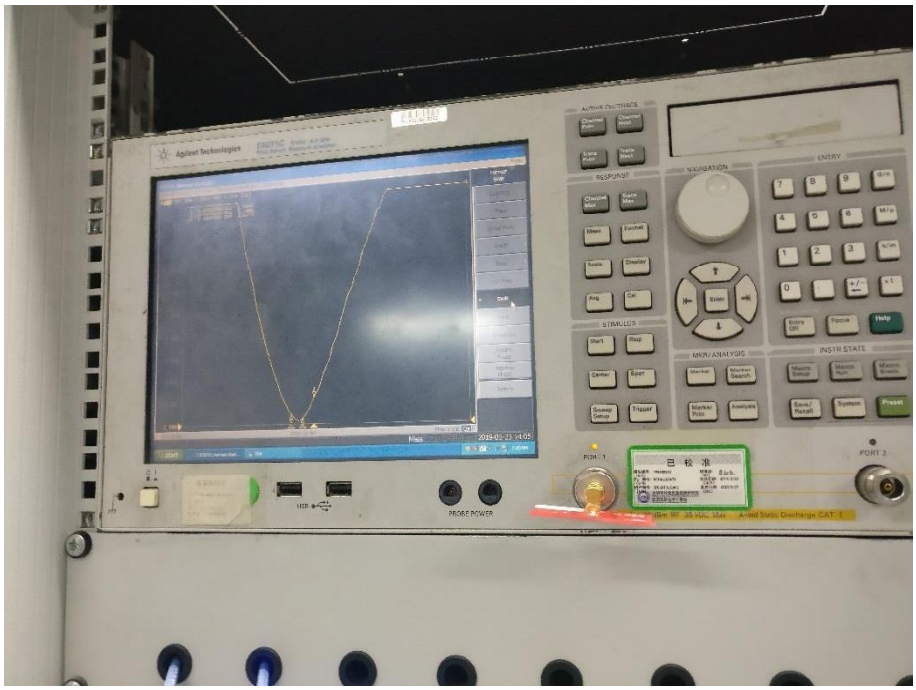

### B2.3 THETA=90



# ANNEX C TEST SETUP PHOTO






Agilent Technologies
PROBE POWER
PORT 2

# ANNEX D EUT PHOTO

Antenna Photo & Length (mm)