



中国认可  
国际互认  
检测  
TESTING  
CNAS L3572

REPORT No.: SZ22090079E01A

# TEST REPORT

**APPLICANT** : SHENZHEN HEIMAN TECHNOLOGY CO.,LTD.

**PRODUCT NAME** : Antenna

**MODEL NAME** : N/A

**TRADE NAME** : N/A

**BRAND NAME** : N/A

**STANDARD(S)** : IEEE Std 149-2021

**RECEIPT DATE** : 2022-09-07

**TEST DATE** : 2022-09-08

**ISSUE DATE** : 2022-10-28



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# DIRECTORY

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| Change History |            |                   |
|----------------|------------|-------------------|
| Version        | Date       | Reason for change |
| 1.0            | 2022-10-28 | First edition     |

The original report SZ22090079E01 is replaced by this report SZ22090079E01A.



# 1. Technical Information

**Note:** Provide by manufacturer.

## 1.1. Applicant and Manufacturer Information

|                              |                                                                                                                |
|------------------------------|----------------------------------------------------------------------------------------------------------------|
| <b>Applicant:</b>            | SHENZHEN HEIMAN TECHNOLOGY CO.,LTD.                                                                            |
| <b>Applicant Address:</b>    | 101, NO.4 DAFU INDUSTRIAL PARK, KUKENG COMMUNITY, GUANLAN STREET, LONGHUA DISTRICT, SHENZHEN, GUANGDONG, CHINA |
| <b>Manufacturer:</b>         | SHENZHEN HEIMAN TECHNOLOGY CO.,LTD.                                                                            |
| <b>Manufacturer Address:</b> | 101, NO.4 DAFU INDUSTRIAL PARK, KUKENG COMMUNITY, GUANLAN STREET, LONGHUA DISTRICT, SHENZHEN, GUANGDONG, CHINA |

## 1.2. Equipment Under Test (EUT) Description

|               |                          |
|---------------|--------------------------|
| Wireless Type | Z24@ZigBee/matter 2.4GHz |
| Frequency     | N/A                      |
| IMEI          | N/A                      |
| Sample No.    | 1#                       |

## 2. Test Results

### 2.1. Applied Reference Documents

Leading reference documents for testing:

| No. | Identity          | Document Title                                     |
|-----|-------------------|----------------------------------------------------|
| 1   | IEEE Std 149-2021 | IEEE Recommended Practice for Antenna Measurements |

### 2.2. Test Conditions

Test Environment Conditions:

|                    |                  |
|--------------------|------------------|
| Relative Humidity: | 25 ... 75 %      |
| Temperature:       | +10 °C to +30 °C |

### 2.3. Measurement Uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO. When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% Confidence intervals.

| Item                                                 | Measurement Uncertainty(dB) |
|------------------------------------------------------|-----------------------------|
| Gain                                                 | $\pm 0.5$                   |
| VSWR                                                 | $\pm 0.2$                   |
| Measurement Uncertainty(95% Confidence Interval) K=2 |                             |

## 2.4. Test Results Lists

### 2.4.1. Gain

| Frequency | Gain(dBi) |
|-----------|-----------|
| 2405 MHz  | -2.41     |
| 2410 MHz  | -2.27     |
| 2415 MHz  | -2.35     |
| 2420 MHz  | -2.31     |
| 2425 MHz  | -2.34     |
| 2430 MHz  | -2.41     |
| 2435 MHz  | -2.29     |
| 2440 MHz  | -2.31     |
| 2445 MHz  | -2.24     |
| 2450 MHz  | -2.10     |
| 2455 MHz  | -2.03     |
| 2460 MHz  | -1.92     |
| 2465 MHz  | -1.92     |
| 2470 MHz  | -1.77     |
| 2475 MHz  | -1.61     |
| 2480 MHz  | -1.52     |



## 2.4.2. Efficiency

| Frequency | Efficiency(%) |
|-----------|---------------|
| 2405 MHz  | 31.11         |
| 2410 MHz  | 30.84         |
| 2415 MHz  | 30.28         |
| 2420 MHz  | 30.70         |
| 2425 MHz  | 30.28         |
| 2430 MHz  | 30.60         |
| 2435 MHz  | 31.13         |
| 2440 MHz  | 31.90         |
| 2445 MHz  | 32.57         |
| 2450 MHz  | 33.55         |
| 2455 MHz  | 34.46         |
| 2460 MHz  | 35.16         |
| 2465 MHz  | 35.89         |
| 2470 MHz  | 36.36         |
| 2475 MHz  | 37.04         |
| 2480 MHz  | 37.60         |



### 2.4.3. VSWR

| Frequency | VSWR |
|-----------|------|
| 2405 MHz  | 2.30 |
| 2410 MHz  | 2.22 |
| 2415 MHz  | 2.16 |
| 2420 MHz  | 2.11 |
| 2425 MHz  | 2.05 |
| 2430 MHz  | 1.99 |
| 2435 MHz  | 1.94 |
| 2440 MHz  | 1.90 |
| 2445 MHz  | 1.86 |
| 2450 MHz  | 1.81 |
| 2455 MHz  | 1.77 |
| 2460 MHz  | 1.74 |
| 2465 MHz  | 1.71 |
| 2470 MHz  | 1.69 |
| 2475 MHz  | 1.66 |
| 2480 MHz  | 1.64 |



#### 2.4.4. Impedance

| Frequency | Impedance ( $\Omega$ ) |
|-----------|------------------------|
| 2405 MHz  | 115.08                 |
| 2410 MHz  | 109.24                 |
| 2415 MHz  | 101.93                 |
| 2420 MHz  | 93.60                  |
| 2425 MHz  | 84.27                  |
| 2430 MHz  | 75.95                  |
| 2435 MHz  | 68.50                  |
| 2440 MHz  | 61.87                  |
| 2445 MHz  | 55.76                  |
| 2450 MHz  | 50.55                  |
| 2455 MHz  | 46.66                  |
| 2460 MHz  | 43.18                  |
| 2465 MHz  | 40.04                  |
| 2470 MHz  | 37.32                  |
| 2475 MHz  | 35.23                  |
| 2480 MHz  | 33.80                  |

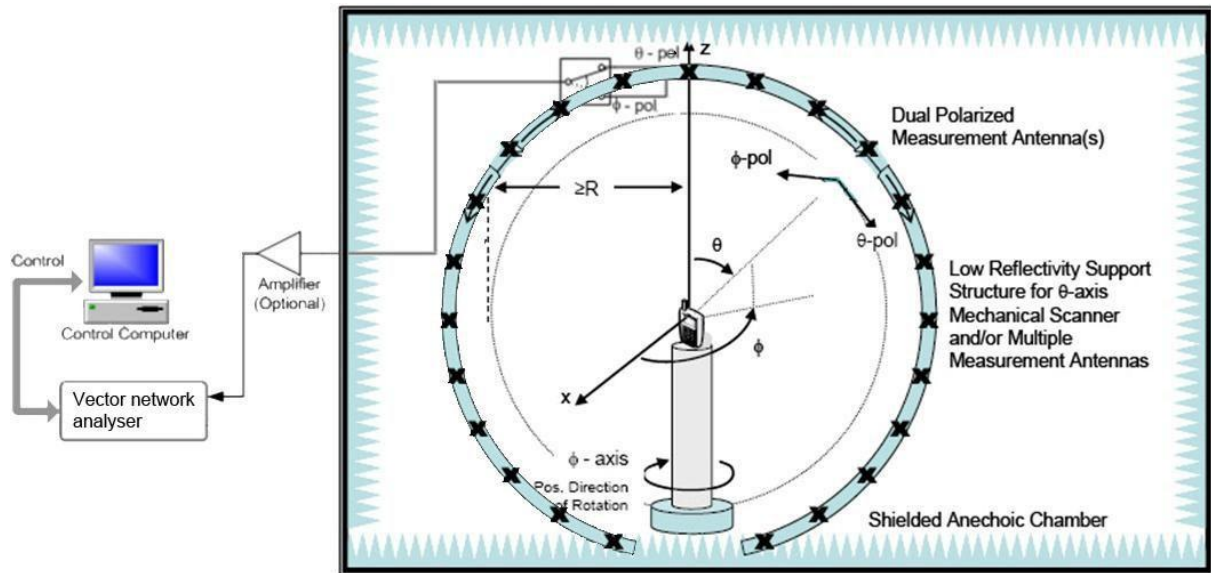


### 2.4.5. Return Loss\*

| Frequency | Return Loss (dB) |
|-----------|------------------|
| 2405 MHz  | -8.08            |
| 2410 MHz  | -8.41            |
| 2415 MHz  | -8.69            |
| 2420 MHz  | -8.93            |
| 2425 MHz  | -9.24            |
| 2430 MHz  | -9.56            |
| 2435 MHz  | -9.87            |
| 2440 MHz  | -10.12           |
| 2445 MHz  | -10.39           |
| 2450 MHz  | -10.74           |
| 2455 MHz  | -11.11           |
| 2460 MHz  | -11.36           |
| 2465 MHz  | -11.57           |
| 2470 MHz  | -11.75           |
| 2475 MHz  | -12.02           |
| 2480 MHz  | -12.29           |

## Annex A Photographs

### 1. Test Setup

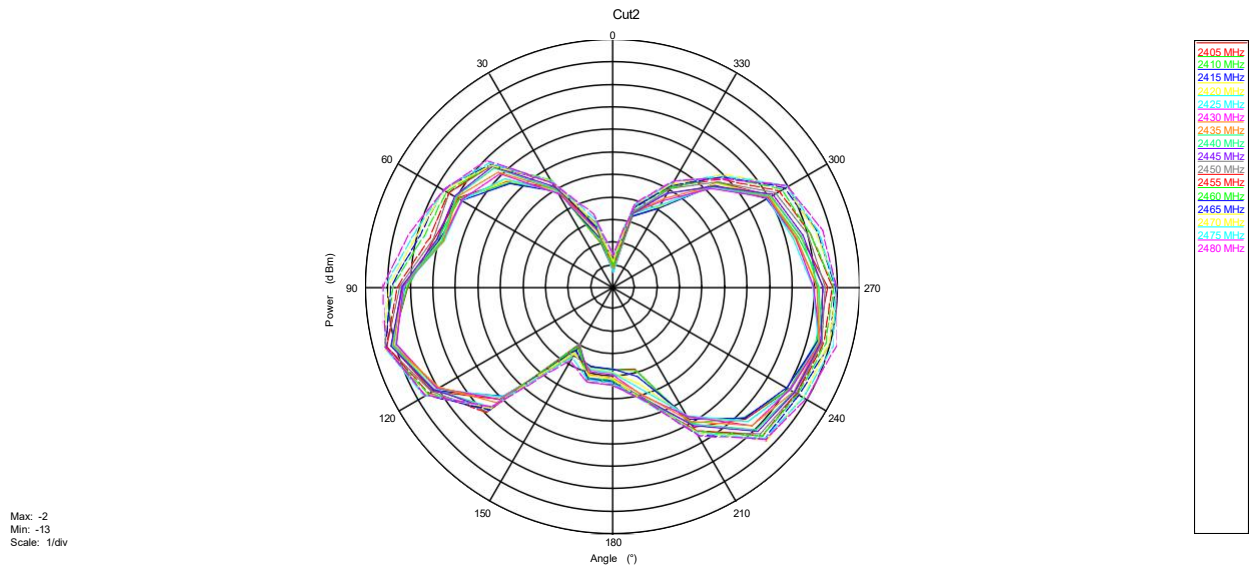




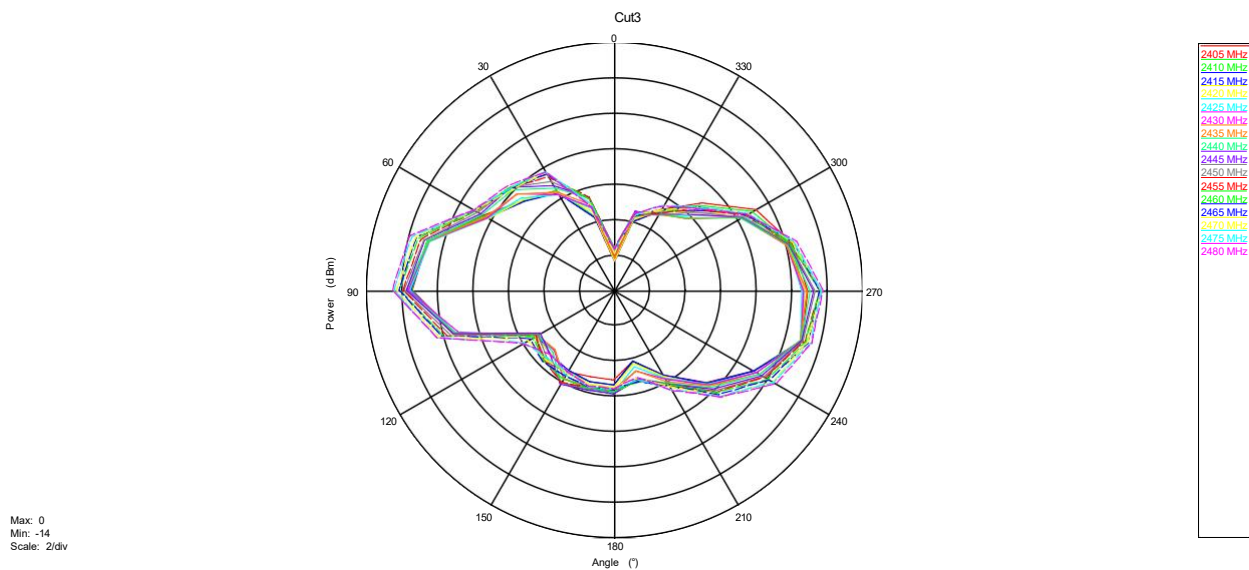
## Annex B Figures

### 1. 2D Radiation Pattern

Phi=0°

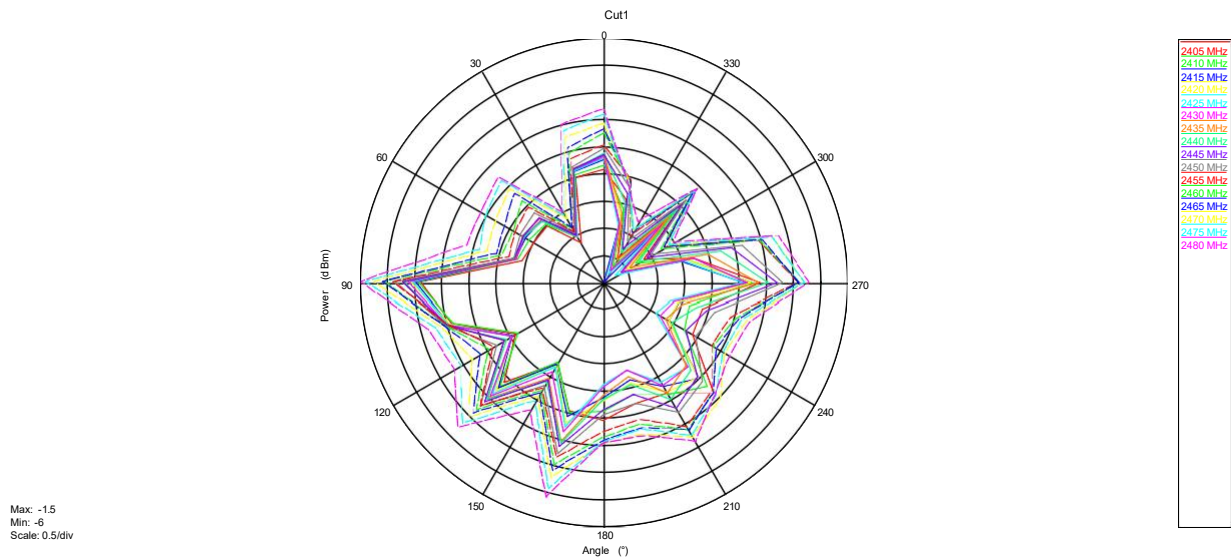


Phi=90°

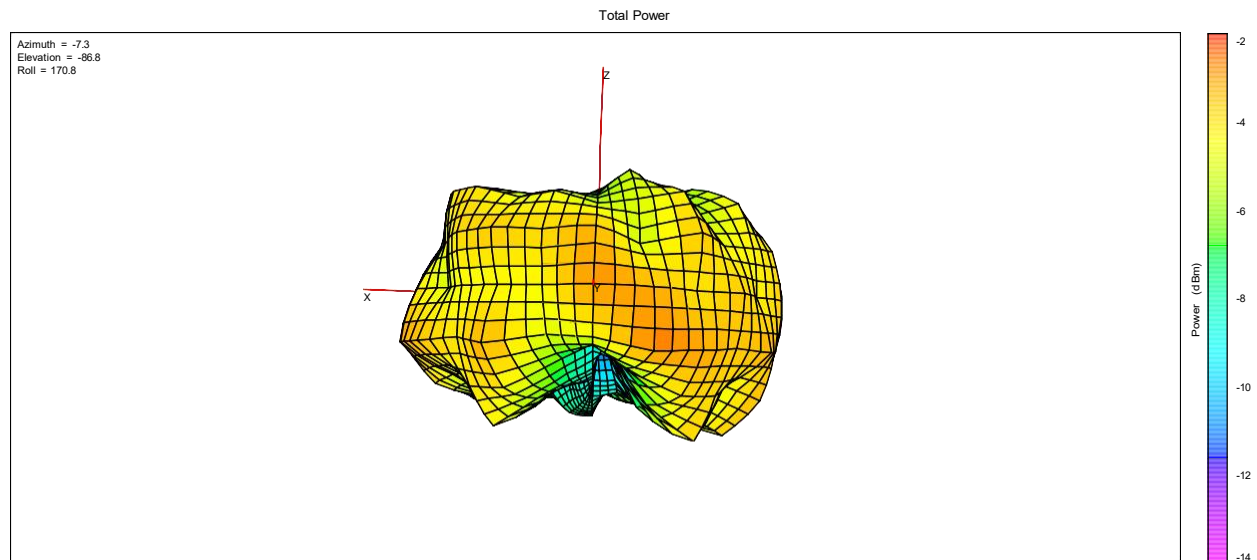




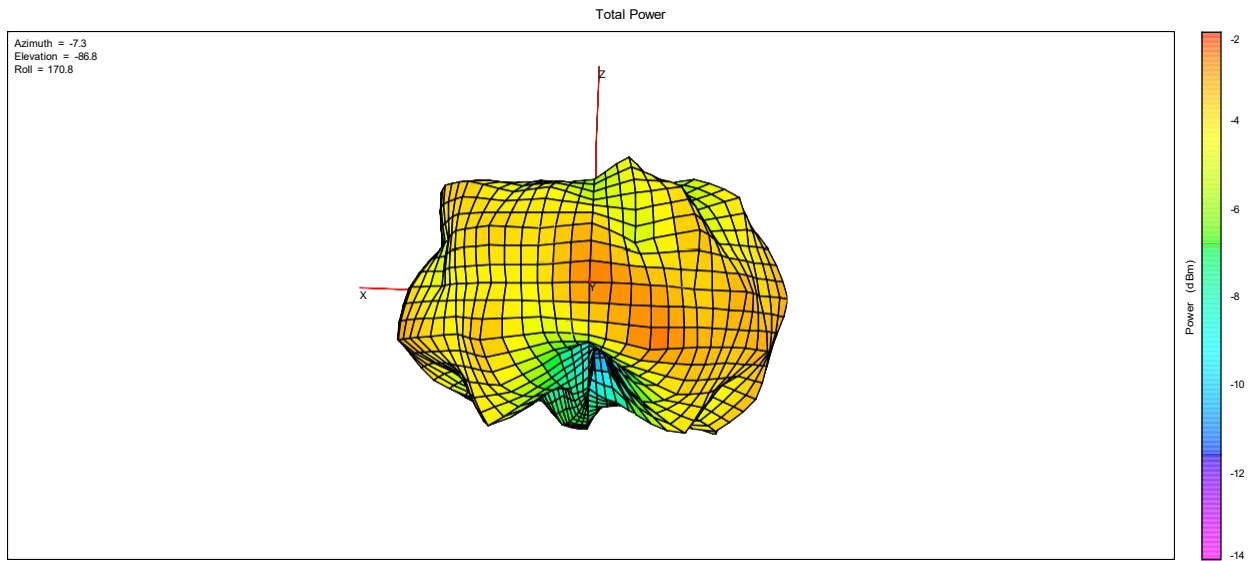
Theta=90°



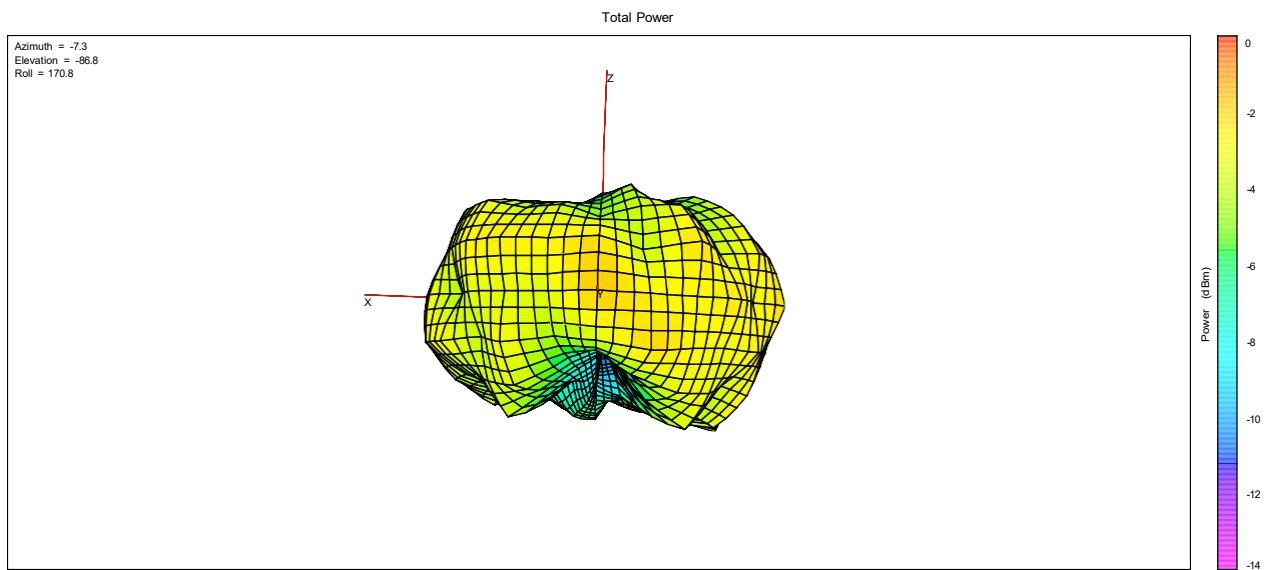
## 2. 3D Radiation Pattern



2405MHz



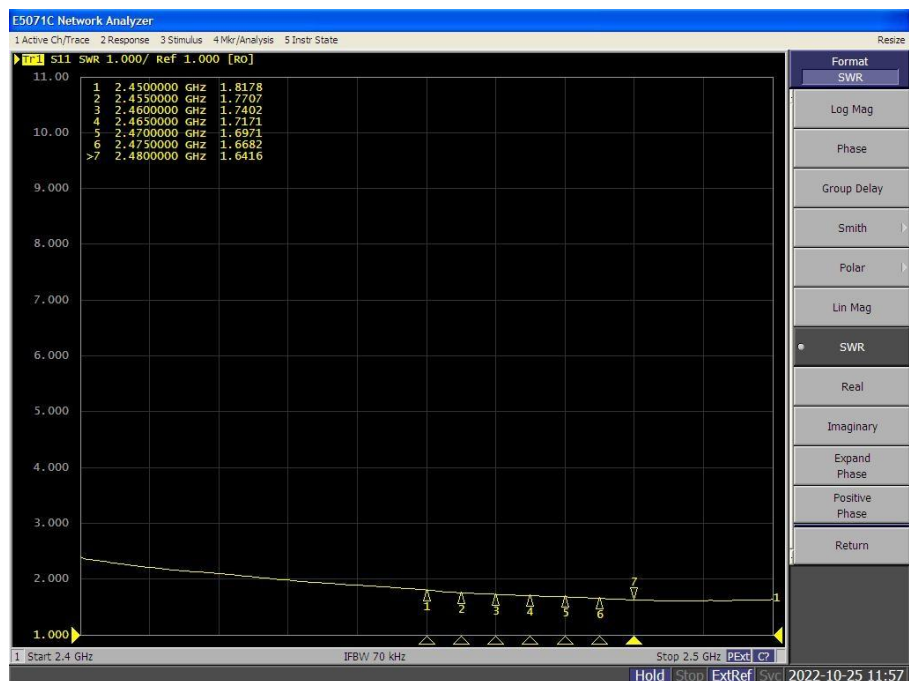
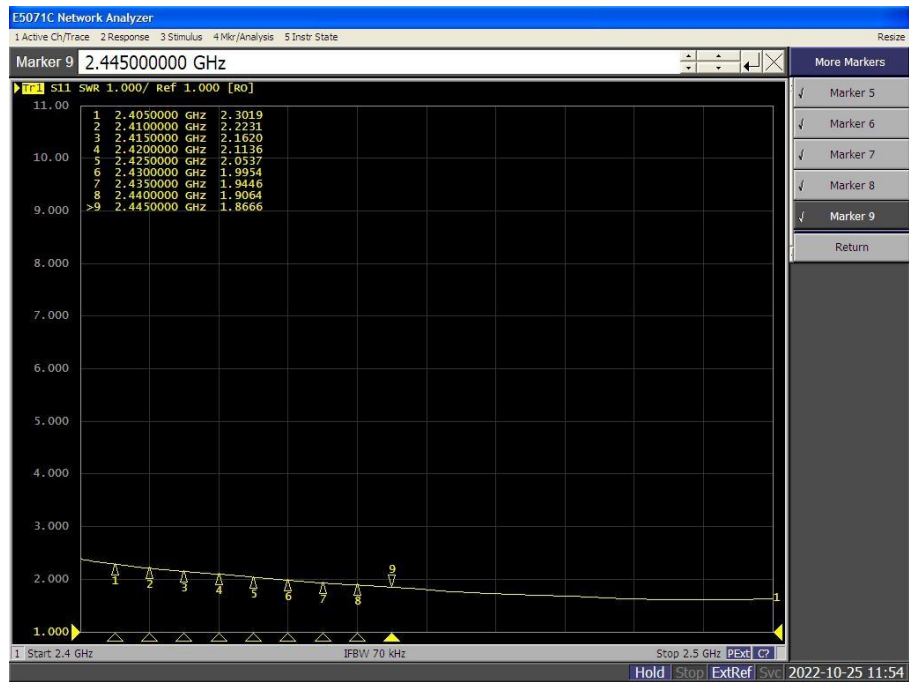
2440MHz



2480MHz

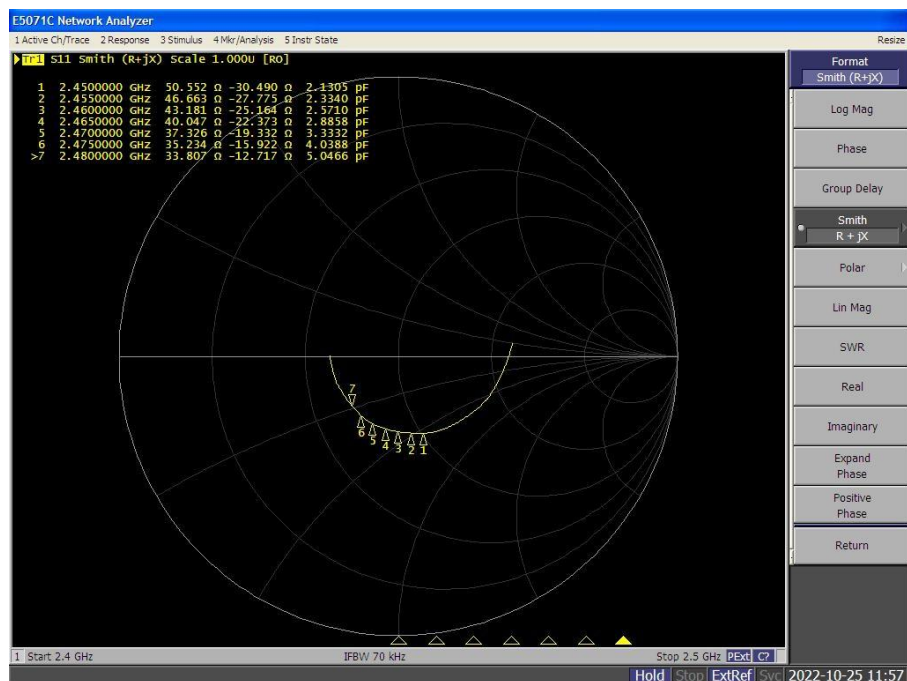
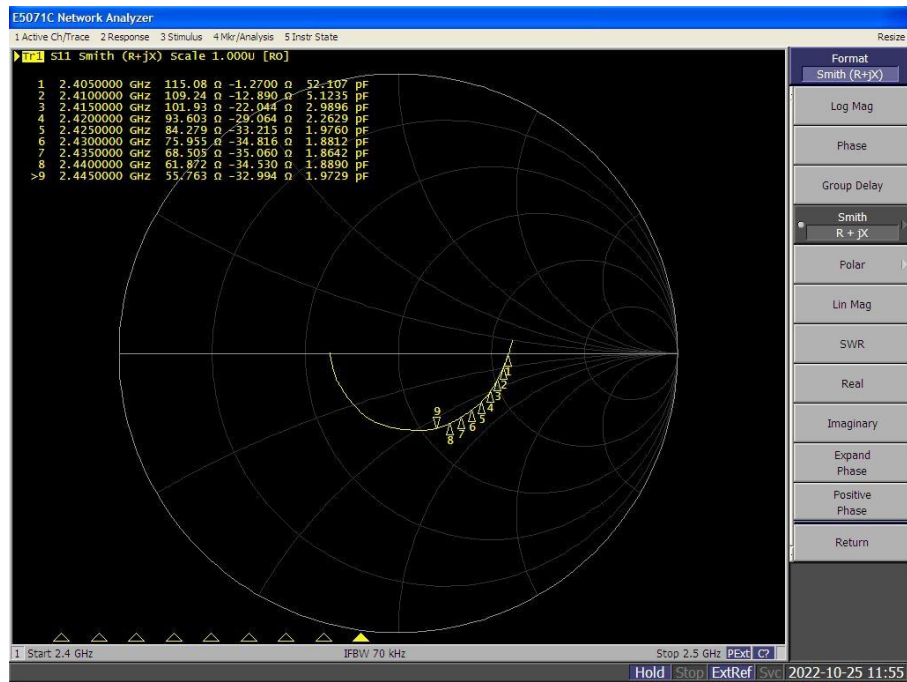


## 3. VSWR



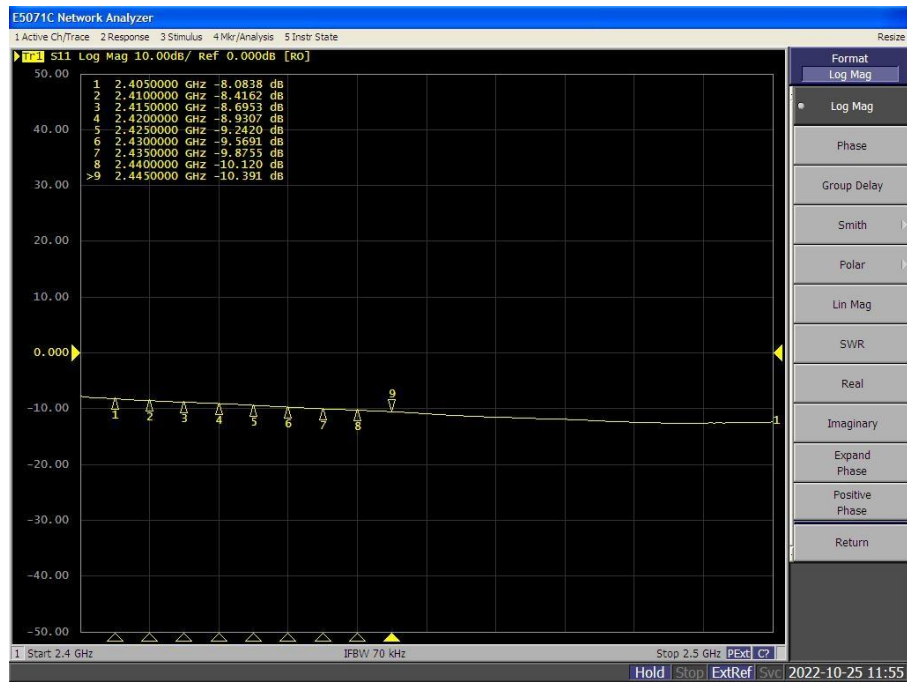


## 4. Impedance



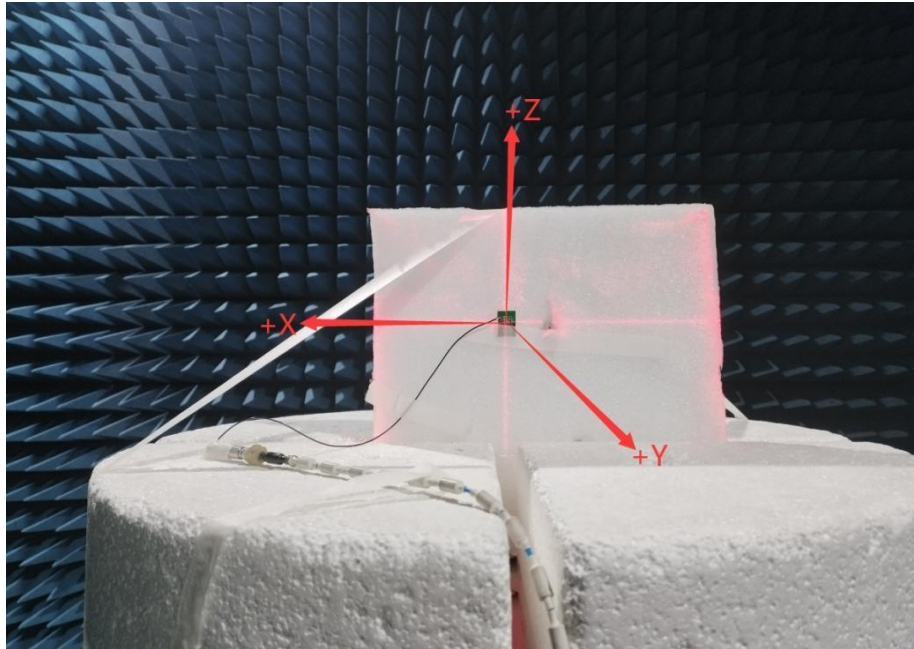


## 5. Return Loss\*

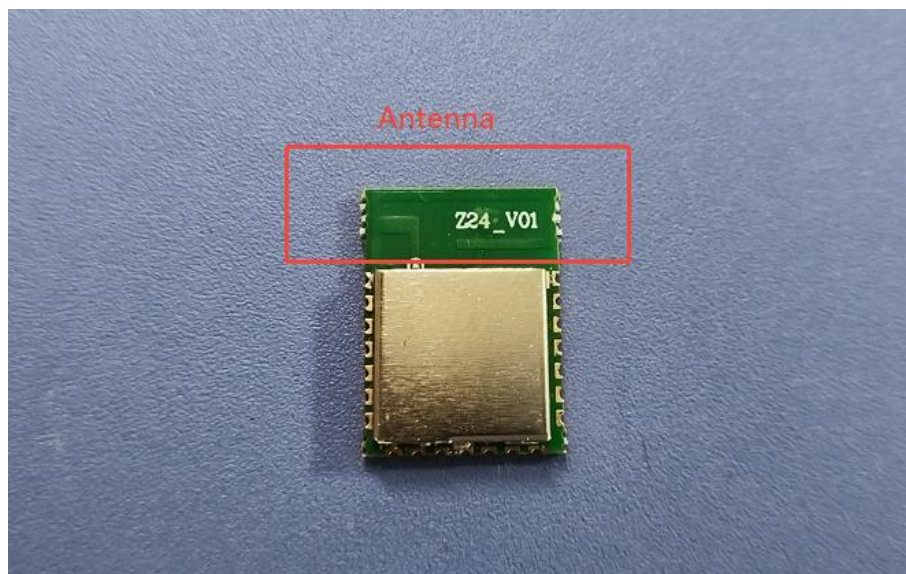


## Annex C Photographs

### Test environment



### EUT





## Annex D General Information

### 1.1 Considerations

"\*" indicates that the project is not recognized by CNAS.

### 1.2 Identification of the Responsible Testing Laboratory

|                     |                                                                                                                                        |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Laboratory Name:    | Shenzhen Morlab Communications Technology Co., Ltd.                                                                                    |
| Laboratory Address: | FL1-3, Building A, FeiYang Science Park, No.8<br>LongChang Road, Block67, BaoAn District, ShenZhen,<br>GuangDong Province, P. R. China |
| Telephone:          | +86 755 36698555                                                                                                                       |
| Facsimile:          | +86 755 36698525                                                                                                                       |

### 1.3 Identification of the Responsible Testing Location

|          |                                                                                                                                        |
|----------|----------------------------------------------------------------------------------------------------------------------------------------|
| Name:    | Shenzhen Morlab Communications Technology Co., Ltd.                                                                                    |
| Address: | FL1-3, Building A, FeiYang Science Park, No.8<br>LongChang Road, Block67, BaoAn District, ShenZhen,<br>GuangDong Province, P. R. China |

### 1.4 Test Equipments Utilized

| No. | Equipment Name             | Serial No.       | Type                                        | Manufacturer | Cal.Date   | Cal.Due Date |
|-----|----------------------------|------------------|---------------------------------------------|--------------|------------|--------------|
| 1   | Network Analyzer           | MY46110140       | E5071C                                      | Agilent      | 2022.07.04 | 2023.07.03   |
| 2   | OTA Chamber                | TJ2235-Q17<br>93 | AMS-8923-1<br>50                            | ETS          | 2020.01.06 | 2023.01.05   |
| 3   | Antenna Measurement System | 1685             | EMQuest<br>EMQ-100<br>V 1.13 Build<br>21267 | ETS          | N/A        | N/A          |

————— END OF REPORT —————