

# Shenzhen Hetuo Technology Co., Ltd

Building 1202B, Building C 6, Hengfeng industrial city, Hezhou, xixiang, Baoan District, Shenzhen City

## Sample Approved Sheet

Antenna Type: FPC Antenna

Hetuo (R1328-L) Acknowledgment

Customer Name Dongguan Shui Wo Electronic Technology Co. , Ltd.

Client Type R1328

Brand HT-R1328-L

### Hetuo Judgment Audit Team

| Formulate | Check    | Ratify      | Acknowledge the book completion time |
|-----------|----------|-------------|--------------------------------------|
| Liyaona   | Huxuewen | Daitingting | 2024.9.14                            |

### (Ruihe) Judgment Audit Team

Acknowledgement Number \_\_\_\_\_

Proving time

| acknowledge | check | ratify | Acknowledge the book completion time |
|-------------|-------|--------|--------------------------------------|
|             |       |        |                                      |

Project Review  Three acknowledgements  Specifications/drawings

examining report  Specimen PCS  Safety standard  HSF

Appraisal report  Accept

Conditional acceptance

Refuse





Antenna picture & assembly picture

## 2. Antenna Test Equipment Introduction

Test of antenna input characteristics using Agilent E5071C and Agilent 5062A vector network analyzer; The radiation pattern of the antenna are tested using the Satimo starlab 3D near field Anechoic Chamber , and the instrument is used to agilent8960 E5515 and Agilent E4438C. The test coordinates of the darkroom are as follows:

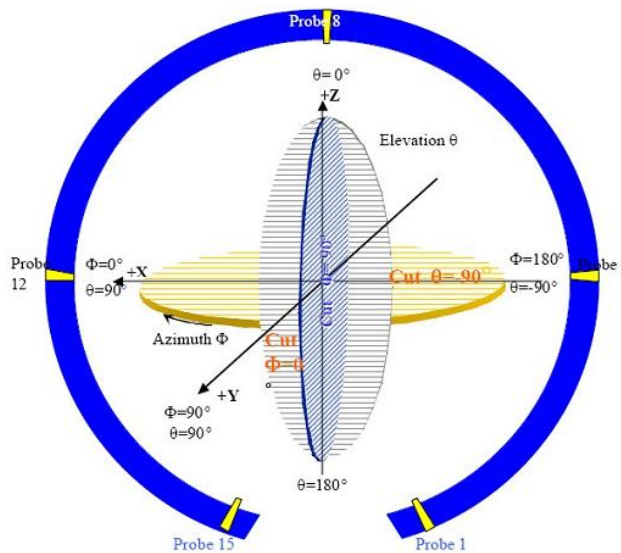


图 4 3D 微波暗室测试坐标系 (back view)

Coordinate system for 3D microwave darkroom testing

## 3. Electrical Specification

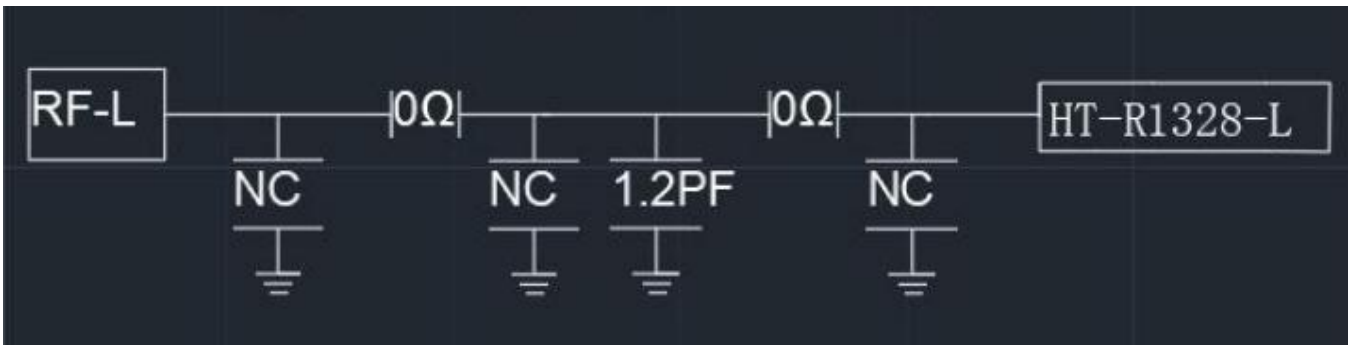
### 3-2 Passive S11 parameter

Measuring Method is a 50Ω coaxial cable is connected to the antenna. Then this cable is connected to a network analyzer to measure the S11 parameter, Keeping this fixture away from metal at least 20cm.

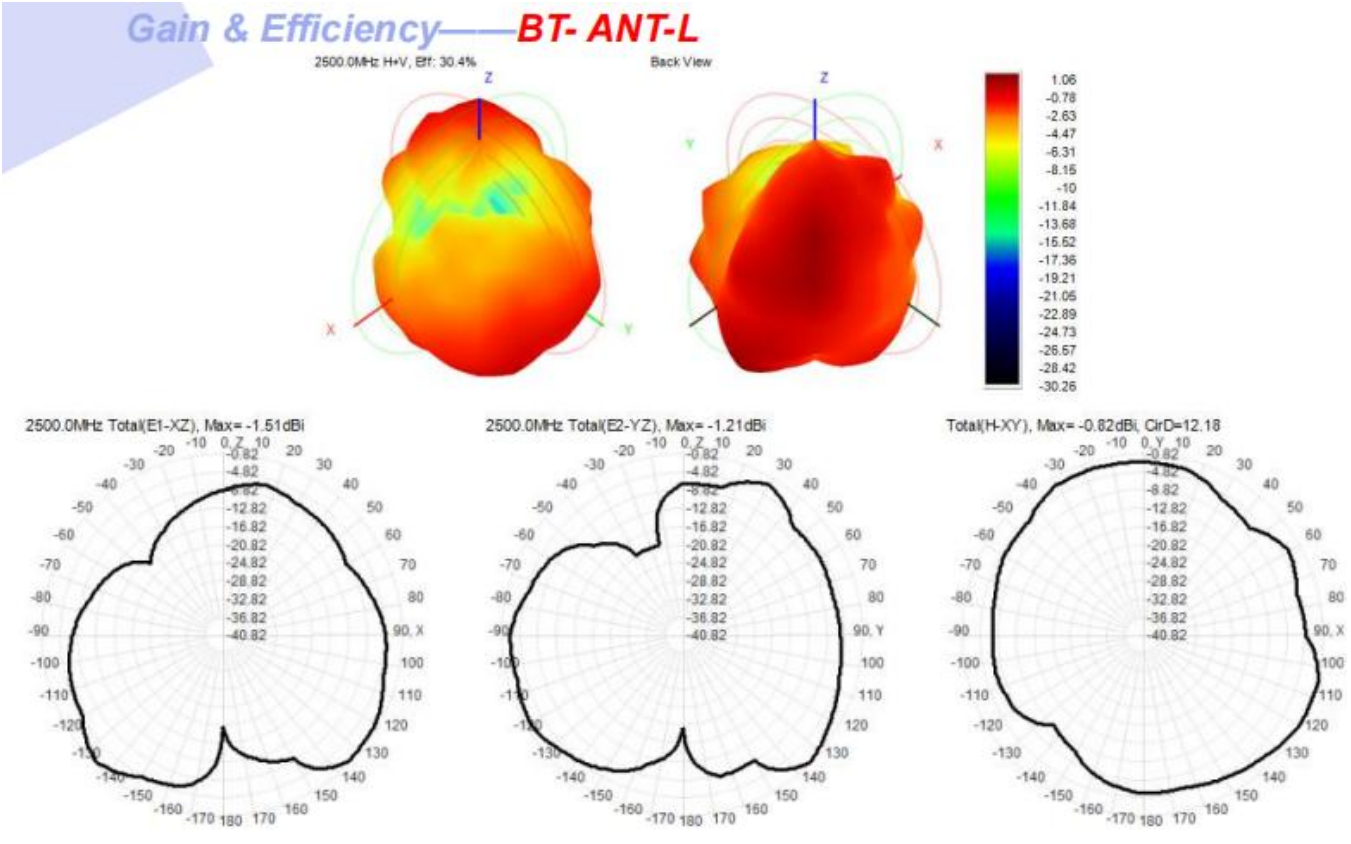
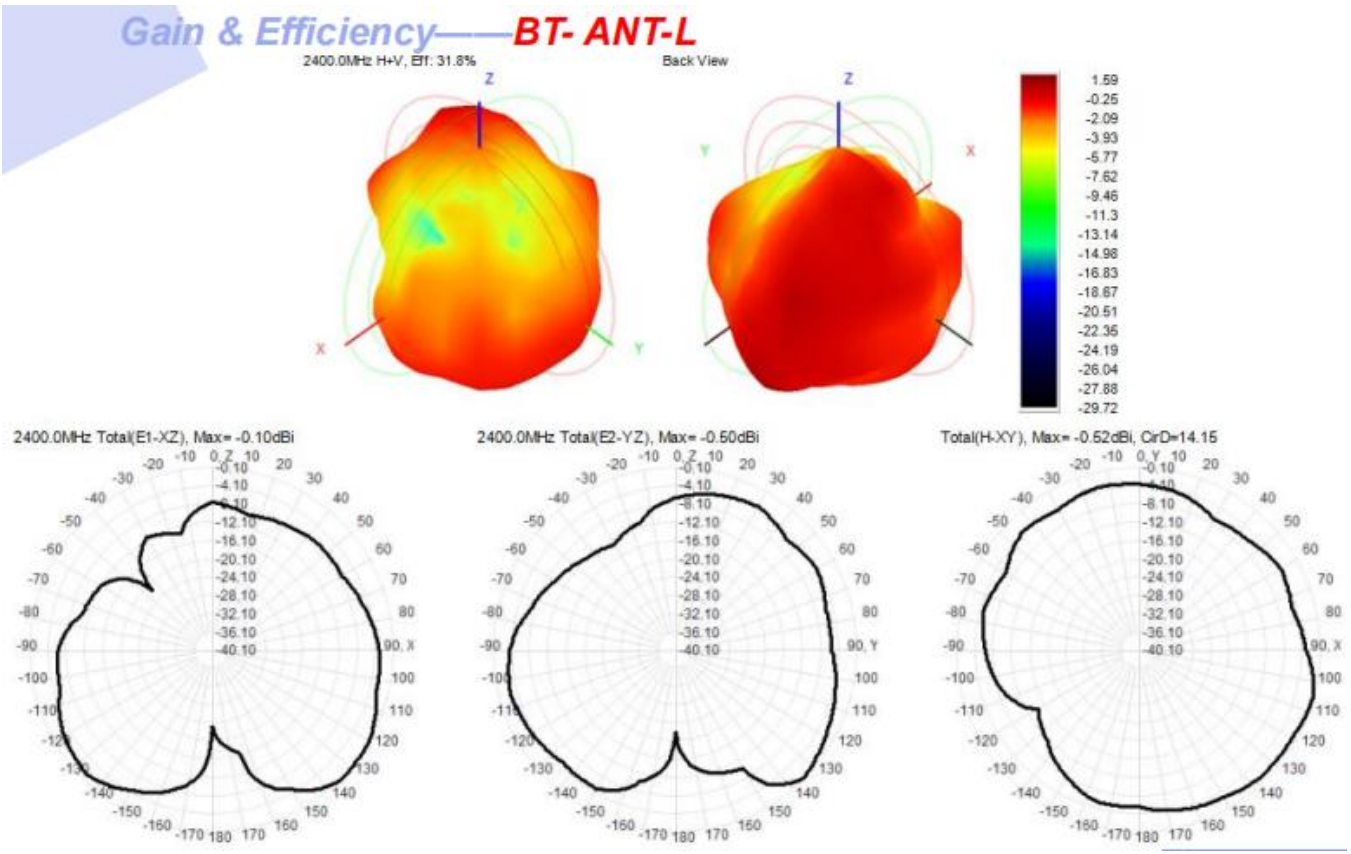
VSWR

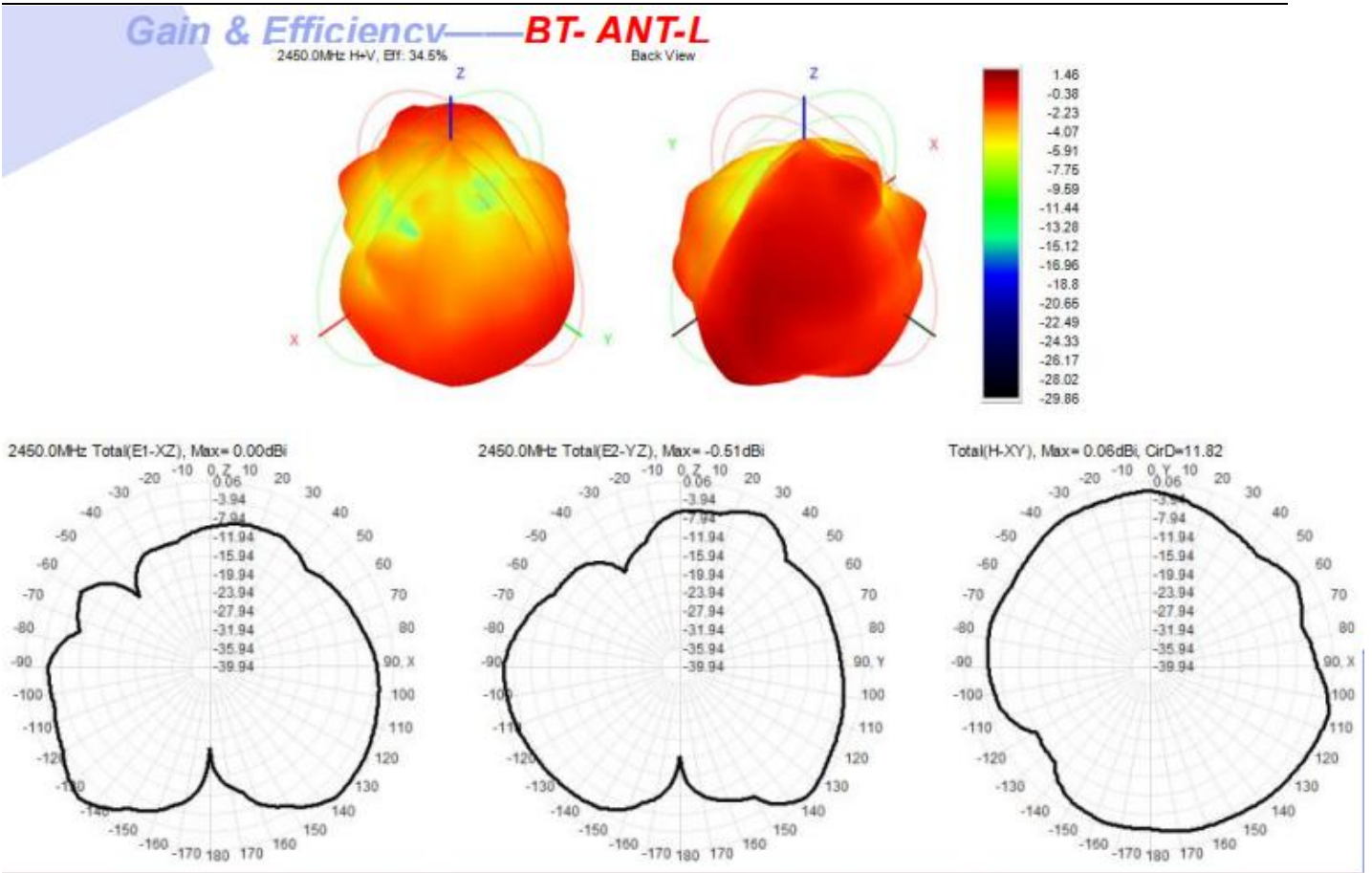


3-3 Antenna Matching Network



| Frequency ID               | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | 11     |
|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Frequency (MHz)            | 2400.0 | 2410.0 | 2420.0 | 2430.0 | 2440.0 | 2450.0 | 2460.0 | 2470.0 | 2480.0 | 2490.0 | 2500.0 |
| Efficiency (dBi)           | -4.98  | -4.82  | -4.82  | -4.73  | -4.62  | -4.63  | -4.74  | -4.77  | -4.99  | -5.11  | -5.17  |
| Gain (dBi)                 | 1.59   | 1.68   | 1.49   | 1.65   | 1.29   | 1.46   | 1.12   | 1.12   | 0.92   | 0.85   | 1.06   |
| Efficiency (%)             | 31.78  | 32.94  | 32.95  | 33.69  | 34.52  | 34.47  | 33.56  | 33.33  | 31.69  | 30.82  | 30.42  |
| Directivity (dB)           | 6.57   | 6.50   | 6.31   | 6.37   | 5.91   | 6.08   | 5.86   | 5.89   | 5.91   | 5.96   | 6.23   |
| Peak Gain Position (Theta) | 135.00 | 135.00 | 135.00 | 135.00 | 135.00 | 135.00 | 135.00 | 135.00 | 120.00 | 120.00 | 120.00 |
| Peak Gain Position (Phi)   | 195.00 | 195.00 | 195.00 | 195.00 | 195.00 | 195.00 | 195.00 | 195.00 | 195.00 | 195.00 | 195.00 |
| Efficiency ThetaPol (%)    | 19.60  | 19.92  | 19.72  | 19.79  | 20.05  | 20.08  | 19.57  | 19.73  | 19.04  | 18.54  | 18.37  |
| Efficiency PhiPol (%)      | 12.18  | 13.01  | 13.24  | 13.90  | 14.48  | 14.39  | 13.99  | 13.59  | 12.66  | 12.29  | 12.04  |
| Upper Hem. Efficiency (%)  | 12.60  | 13.12  | 13.11  | 13.19  | 13.27  | 12.88  | 12.57  | 12.30  | 11.95  | 11.61  | 11.37  |
| Lower Hem. Efficiency (%)  | 19.18  | 19.82  | 19.84  | 20.49  | 21.25  | 21.59  | 20.99  | 21.03  | 19.74  | 19.22  | 19.05  |





|                 |                   |         |          |          |
|-----------------|-------------------|---------|----------|----------|
| Test Equipment: | R&S CMW500        |         |          |          |
| Test Condition: |                   |         |          |          |
| Band            | Wireless Protocol | Channel | TRP(dBm) | TIS(dBm) |
| BT              |                   | 0       | 3.25     | -87.85   |
|                 |                   | 39      | 3.64     | -87.64   |
|                 |                   | 78      | 3.46     | -86.98   |

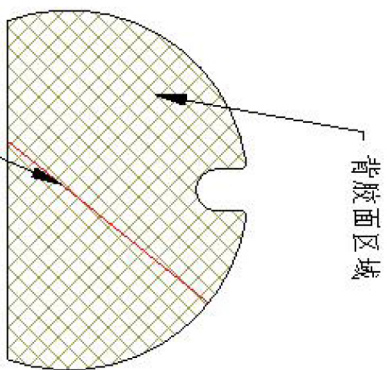
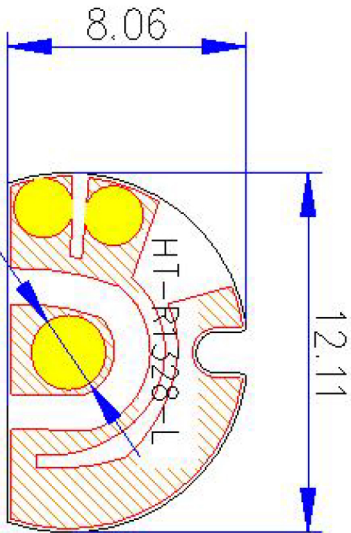
|                 |                   |         |          |          |
|-----------------|-------------------|---------|----------|----------|
| Test Equipment: | R&S CMW500        |         |          |          |
| Test Condition: |                   |         |          |          |
| Band            | Wireless Protocol | Channel | TRP(dBm) | TIS(dBm) |
| BT              |                   | 0       | 1.36     | -84.32   |
|                 |                   | 39      | 1.59     | -84.47   |
|                 |                   | 78      | 1.13     | -84.36   |

#### 4. Mechanical Specification:

Mechanical Configuration (Unit: mm)

The appearance of the antenna is according to drawing Figure 8

|      |           |
|------|-----------|
| 料號   | DR NUMBER |
| 出廠   | DATE      |
| 參將   | DESIGNER  |
| APPV | DATE      |



Adhesive backing area

Cutting line position of adhesive paper

|     |              |         |        |
|-----|--------------|---------|--------|
| REV | MODIFICATION | DATE    | REASON |
| 1   | INITIAL      | 2023.08 |        |

|                                                                                                                                                                                                                                                                                                                           |                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
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| MATERIAL: HI<br>DIMENSIONS: 8.06 x 12.11 x 0.5<br>FINISH: 0.05<br>TOLERANCE: ±0.05<br>SURFACE: 1.0<br>SCALING: 1:1                                                                                                                                                                                                        | MODEL: HI-R1328-L<br>PART NAME: HI-R1328-L<br>DATE: 2023.08.10 |
| DRAWN BY: [Name]<br>CHECKED BY: [Name]<br>DATE: 2023.08.10                                                                                                                                                                                                                                                                | DESIGNED BY: [Name]<br>DATE: 2023.08.10                        |