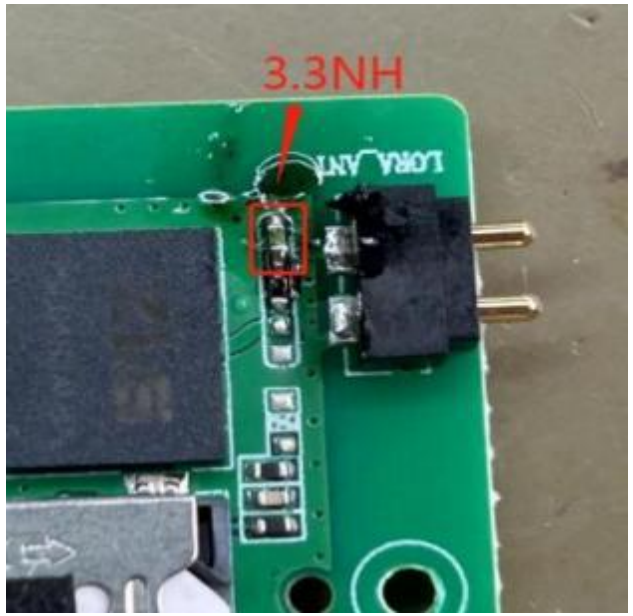
# KG-04-NA Antenna Test Report

# Catalogue

- LORA Antenna Matching and Efficiency
- Main antenna OTA data
- Main antenna matching

# LORA Antenna Matching and Efficiency

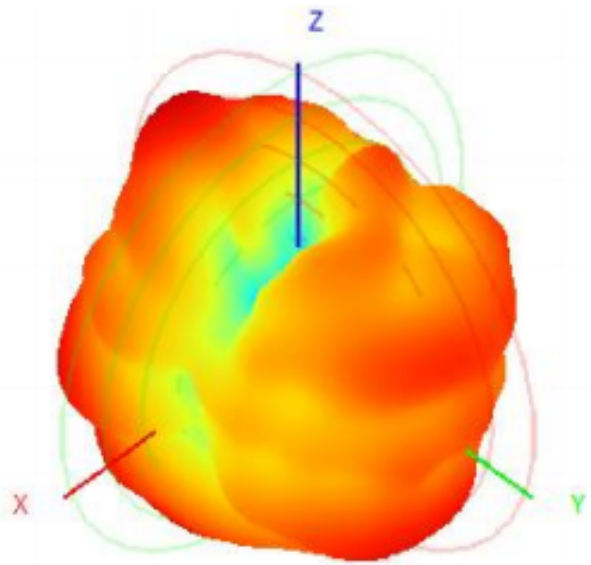



| Frequency | Efficiency | Efficiency. dB | Gain. dB |
|---|---|---|---|
| 922 | 48% | -3.21 | 2.27 |

And 3.3 NH inductor (original motherboard unchanged)

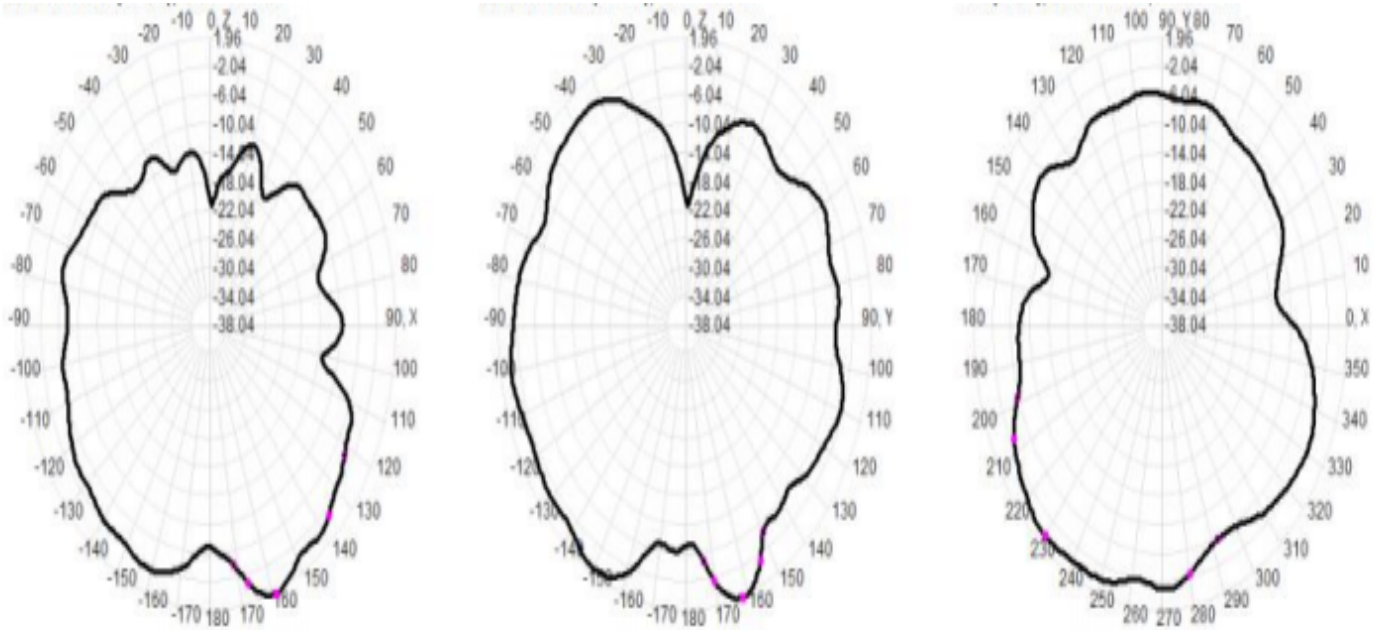
# Radiation Pattern

## Antenna 3D Radiation Pattern

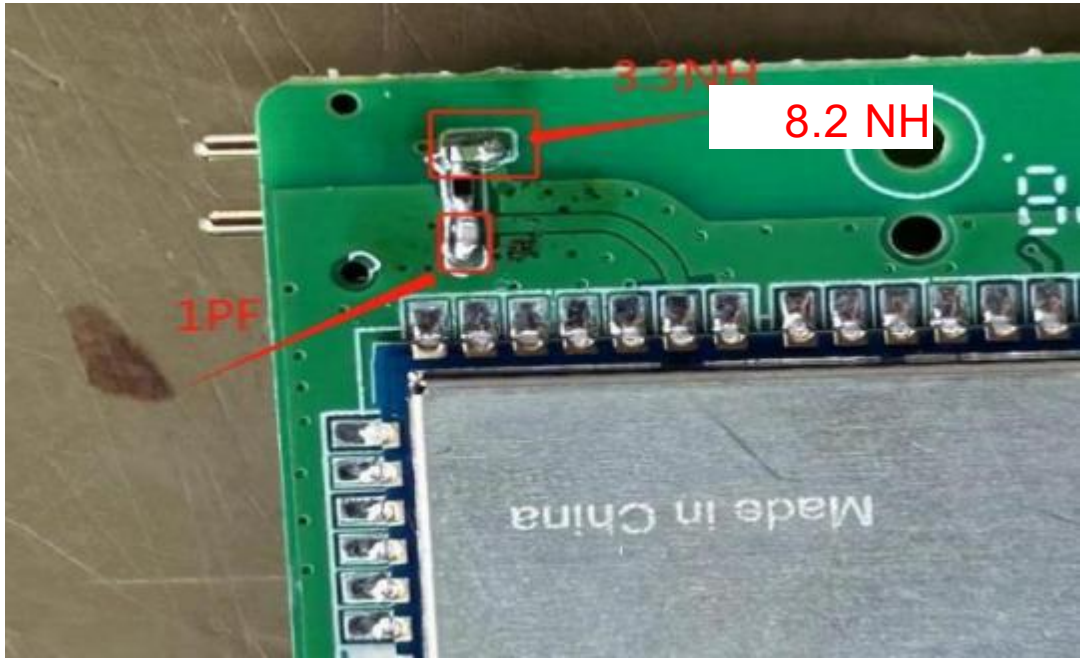



922MHz

# Antenna 2D Radiation Pattern



# Main antenna matching




The main set antenna terminal comes out and first parallel the 8.2 NH inductor and then the 1PF capacitor

# ThankYou

BSJ Huizhou Boshijie Technology Co., Ltd

# Material Recognition Letter

| | |
|---|---|
| Customer Name | Huizhou Boshijie Technology Co., Ltd |
| Project Name | |
| Product Name | GPS built-in antenna/ceramic antenna |
| Product model | Silk screen: KG-04/ Size: 25 * 25 * 2 MM |
| Customer Material Number | 1301-00971 |

## Supplier Information

| | |
|---|---|
| Supplier Name: | Shenzhen Jiakai Electronics Co., Ltd |
| Supplier address: | No. 1204, Floor 12, Building 1, Phase I, Zhuoyue City, Zhongkang North Road, Shangmeilin, Futian District, Shenzhen |
| Contact number: | 0755-83178069 |
| EMAIL: | wangchen@jkelec.com |

## Supplier Signature

RoHS Materials Non-RoHS Materials-

| Division | Make | Engineering Department | Design Department | Quality Department |
|---|---|---|---|---|
| Signed by | Shang Lirong | Hu Shanshan | Shang Lirong | Dai Youjiang |
| Date of Signature | | | | |

Note: 1. RoHS materials, non-RoHS materials must be selected; 2. The engineering department and design department need to participate in the drama to select material types and sign them according to customer needs.

## Shenzhen Boshijie Technology Co., Ltd

| | | |
|---|---|---|
| Recognition status | -Acknowledged | -Refuse to admit |
| | -Conditional recognition must meet the conditions: | |
| | -Temporary Limited Recognition Limited Purchase PCS (need to sign the special procurement process) | |

| Division | Responsible for | -ID section | -Structure | | -Hardware | | -Quality | |
|---|---|---|---|---|---|---|---|---|
| | | | Structure PL | Director of Structure | Hardware PL | Director of Hardware | QPM | SQE |
| Check item | Delivery date | Appearance process | Structural dimensions and specifications | | Electrical properties, specifications | | Appearance, sample testing | |
| Signed by | | | | | | | | |
| Date | | | | | | | | |
| 1. Purchase follow-up material delivery date; 2. Design appearance and craft ID signature; 3. Sign the material structure of the mold and hardware shell; 4. Signature of electronic devices, modules and battery hardware; 5. The PE department cooperates with the quality inspection department to be responsible for signing the qualified appearance and sample testing. | | | | | | | | |

Note: 1. The supplier signatory should pay attention to the customers requirements and material numbers, and send samples for approval according to the requirements. Document No.: B-QR-QC-1709 Document Version: A2

2. The internal signatories of Boshijie should pay attention to the review, and the materials must meet our companys usage requirements.

3. This document is kept by the purchasing department and the quality department each, and the valid storage time is 2 years.

| Approval Sheet | |
|---|---|
| **Customer** | |
| **Supplier P/N** | DAE1568R2520 NBDD2-T |
| **Customer P/N** | |

| Customers Approval Certificate | |
|---|---|
| **Checked & Approval by** | |
| **Date** | |

**Please return this copy as a certi administration of your approval.**

**1 SCOPE**

Add: No.1188, Jiahang Road, Jiaxing, Zhejiang, China (314001)
Tel: +86-755-83178086
E-mail: sales@jkelec.com

This specification shall cover the characteristics of the diel ectric antenna elementwith the type DAE1568R2520NBDD2-T .

**2PART NO.**

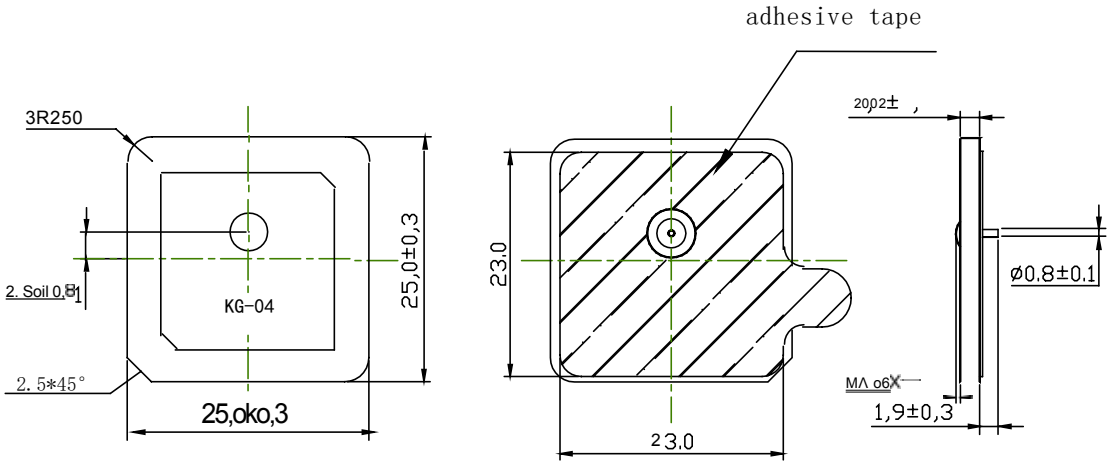
| PART NUMBER | CUSTOMER PART NO | SPECIFICATION NO |
|---|---|---|
| DAE1568R2520NBDD2-T | | |

## 3 OUTLINE DRAWINGAND DIMENSIONS

3.1 Appearance: No visible damage and dirt.

3.2 The products conformto the RoHS directiveand national envi ronment protectionlaw.

3.3 Dimensions




## 4 ELECTRICAL SPE CIFICATIONS

4.1 Performance Characteri stics

| Items | Content |
|---|---|
| Nominal frequency MHz | 1561～1575 |
| Center frequency MHz (without adhesive tape on 30*40mm ground plane) | 1569±3.0 |
| real partat CF | 27±10Ω |
| imaginary partat CF | 1±10 Ω |
| Polarization Model | RHCP |
| Frequency Temperature Coefficient | 20ppm/deg.℃ max |

4.2 RATING

Add: No.1188,Jiahang Road,Jiaxing, Zhejiang, China (314001)
Tel：+86-755-83178086
E-mail：sales@jkelec.com

| Items | Requirement |
|---|---|
| Operating temperature | -40℃~+85℃ |
| Storage temperature | -40℃~+105℃ |

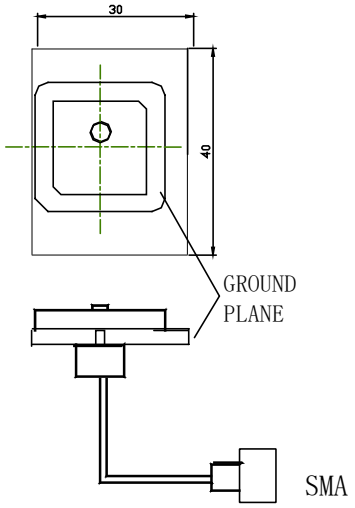
4.3 Impedance Charact eristic


**5 TEST**

5.1 Test Conditions

Partsshall be measured under condition (Temp.: 20 ℃ ± 15 ℃, Humidity: 65% ± 20% R.H.).

5.2 Test Jig




**6 ENVIRONMENTAL TEST**

| No. | Item | Test Condition | Remark |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 6.1 | Humidity Test | The device is subjected to 90% ~ 95% relative humidity60 ℃ ± 3 ℃ for96h, then dry out at25 ℃ ± 5 ℃ and less than65% relative humidity for2h ~ 4h. After dry out the de vice shall satisfythe specification in t able1. | It shall fulfill the Specification sTable1. |
| 6.2 | High Temperature Exposure | The device shall satisfy the specification in table 1 after leaving at105 ℃ for 96h, provided it would be measured after 2h ~ 4 hleaving in25 ℃ ± 5 ℃ andless than65% relativehumidity. | It shall fulfill the Specification sTable1. |
| 6.3 | Low Temperature | The device shall satisfy the specification in table 1 after leaving at-40 ℃ for96h, provided it would be measured after 2h ~ 4 hleaving in25 ℃ ± 5 ℃ andless than65% relativehumidity. | It shall fulfill the Specification sTable1. |
| 6.4 | Temperature Cycle | Subject the device to-40 ℃ for30min. followed by a high temper nature of105 ℃ for30 mincycling shall berepeated 5 times. At theroom temperature for 1h prior to themeasurement. | It shall fulfill the Specification sTable1. |
| 6.5 | Vibration | Subject the device to vibration for2h each in x, y and z axis with the amplitudeof 1.5 mm, the frequencyshall be varied uniformly between t helimits of 10Hz ~ 55Hz. | It shall fulfill the Specification sTable1. |
| 6.6 | Soldering Test | Lead terminals are heated up to350 ℃ ± 10 ℃ for5s ± 0.5 s withbrandiron and thenelement shall be measured after being placed in naturalconditions for 1 h. No visible damageand itshall fulfill the specificationsin Table1 | It shall fulfill the Specification sTable1. |
| 6.7 | Solder ability | Lead terminals are immersed in solding bathof 260 ℃ ~ 290 ℃ for 3 s ± 0. 5 s. More than95% of theterminal surface ofthe device sha ll becovered with freshsolder. | The terminalsshall be at least95% covered bysolder. |
| 6.8 | Terminal Pressure Strength | Force of20N is applied to each l ead in axial direction for 10s ± 1 s (seedrawing). No visible damage and it shall fulfill the specifications in Fig1 | Mechanical damage such as breaks shall notoccur. |

FIG1

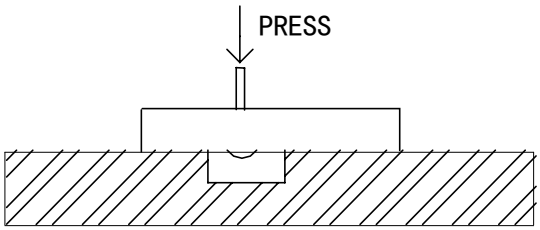



TABLE1

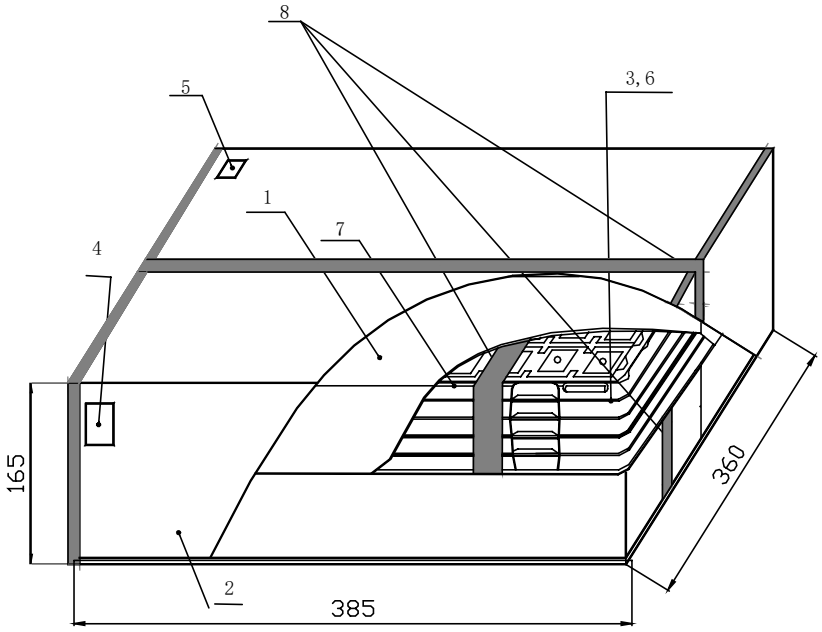
| Item | SpecificationAfter Test (MHz) |
|---|---|
| Center Frequency change | ±2.0 |

7. PACKAGE

To protect the products in storage and transportation, it is necessary to pack them (outer and inner pa ckage). On paper pack, the following requirements are requested.

7.1 Dimensions and Mark

At the endof package, the warning (moisture proof, upward put) should bestick to it.Dimensions and Mark (see below)




unit: mm

| NO. | Name | Quantity |
|---|---|---|
| 1 | Inner Box | 4 |
| 2 | Package | 1 |
| 3 | Vacuum Bag | 4 |
| 4 | Certificate of approval | 1 |
| 5 | Label | 5 |
| 6 | Cushion | 20 |
| 7 | Package Base | 24 |
| 8 | Adhesive tape | 3.5 m |

7.2 Section ofpackage

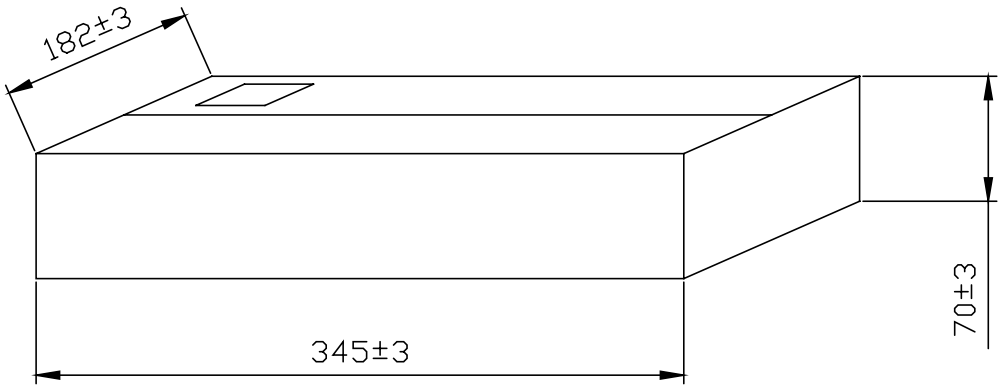
Add: No.1188, Jiahang Road, Jiaxing, Zhejiang, China (314001)
Tel: +86-755-83178086
E-mail: sales@jkelec.com

Package is made of corrugated paper with thickness of 0.8 cm. Package has4inner boxes, each box has1 vacuum bag.

7.3 Quantity ofpackage

| | |
|---|---|
| Per package base | 50 elements |
| Per vacuum bag | 5 package bases |
| Per inner box | 1 vacuum bag |
| Per package (1000 pieces of | 4 inner boxes elements) |

7.4 Inner box Dimensions




unit: mm

8. OTHER

Add: No.1188, Jiahang Road, Jiaxing, Zhejiang, China (314001)
Tel: +86-755-83178086
E-mail: sales@jkelec.com

8.1 Caution of use

8.1. 1 Pleasedont apply excess mechanical st ress to the component and terminals atsoldering.

8.1. 2 The component may be damaged when an excessstress will beapplied.

8.1. 3 Thisspecification mentions the quality of the co mponent as a singleunit. Pleaseinsure the component is thoroughly evaluated in your application circuit.

8.2 Notice

8.2. 1 Please return one of this specification after yoursignature ofacceptance.

8.2. 2 When something gets doubtful with thisspecification, weshall jointly work together anagreement.

BSJ Huizhou Boshijie Technology Co., Ltd

# Material Recognition Letter

| | |
|---|---|
| Customer Name | Huizhou Boshijie Technology Co., Ltd |
| Project Name | KG04 |
| Product Name | 4G built-in antenna/FPC antenna |
| Product model | Silk screen: 20U0760 AX2/Size: 45.6 * 30 * 0.2 |
| Customer Material Number | |

## Supplier Information

| | |
|---|---|
| Supplier Name: | Dongguan Youbi Electronics Co., Ltd |
| Supplier address: | Building 79, New Sun Industrial City, No. 9 Xinfa Road, Lincun, Tangxia Town, Dongguan City |
| Contact number: | 13686295193 |
| EMAIL: | hhp @ ub-rf. com |

## Supplier Signature

RoHS Materials ☑ Non RoHS Material-

| Division | Make | Engineering Department | Design Department | Quality Department |
|---|---|---|---|---|
| Signed by | Lu Yongxin | Loess release | Zhu Zhijun | Li Shufei |
| Date of Signature | 2023/7/26 | 2023/7/26 | 2023/7/26 | 2023/7/26 |

Note: 1. RoHS materials, non-RoHS materials must be selected; 2. The engineering department and design department need to participate in the drama to select material types and sign them according to customer needs.

## Huizhou Boshijie Technology Co., Ltd

| | | |
|---|---|---|
| Recognition status | -Acknowledged | -Refuse to admit |
| | -Conditional recognition must meet the conditions: | |
| | -Temporary Limited Recognition Limited Purchase PCS (need to sign the special procurement process) | |

| Divisi | Responsib | -ID | -Structure | | -Hardware | | -Quality | |
|---|---|---|---|---|---|---|---|---|
| | | | Structu | Director | Hardware | Director | QPM | SQE |

| on | le for | section | re PL | of Structure | PL | of Hardware | | |
|---|---|---|---|---|---|---|---|---|
| Check item | Delivery date | Appearance process | Structural dimensions and specifications | | Electrical properties, specifications | | Appearance, sample testing | |
| Signed by | | | | | | | | |
| Date | | | | | | | | |
| | 1. Purchase follow-up material delivery date; 2. Design appearance and craft ID signature; 3. Sign the material structure of the mold and hardware shell;<br>4. Signature of electronic devices, modules and battery hardware; 5. The PE department cooperates with the quality inspection department to be responsible for signing the qualified appearance and sample testing. | | | | | | | |

Form No.: FORM-RD (H)-051-B3

# Modification History

| Version | Content Revision | Issued by | Date |
|---|---|---|---|
| A | Original version | Eddy | 2023-7-26 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

# *Content*

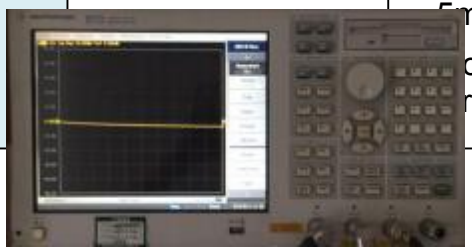
## *Item Description*

## 1. Electrical Specification:

| Characteristics | Specifications | Unit |
|---|---|---|
| Outline Dimensions | 45.6 x30 | mm |
| Frequency | 820-960 /1710-2700 | MHz |
| Impedance | 50 | Ω |
| VSWR | <5 | |
| Polarization | Linear Polarization | |
| Gain | 2 REF | d Bi |
| Efficiency | <60 | % |
| Connector Type | / | |
| Operating temperature | -20℃~+85℃ | |
| Storage Temp | -20℃~+50℃ | |

## 2. TestItems and Equipment

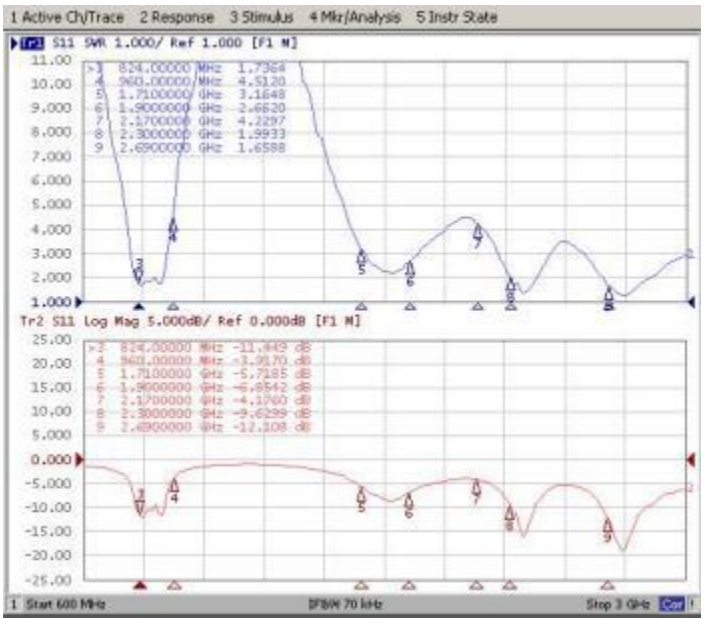
| | Test items | Test equipment |
|---|---|---|
| S Parameter | 1. Return Loss2. VSWR | Network analyzer (AgilentE5071B) |
| The whole machine of Passive parameters | 1. Frequency<br>2. Gain<br>3. Radiation Pattern | 1.3 D microwave darkroom (5m * 5m * 5m)<br>2. Network analyzer (AgilentE5071B) |
| The whole machine | 1. | 1.3 D microwave darkroom (5m * 5m * 5m)<br>omprehensive test in rument (CMW500) |


Room101, Building 2, No.9, Room106, Building 3, Leton gScience Park, Room106, BuildingA, Xinzheng Industrial Park,
Xinfa Road, Lin Village, Tangxia Town No.500 Qiuyi Road, Binjiang District 57 LiuxianRoad, BaoanDistrict, Shenzhen
Tel: +86-769-81777126 Website: www.ubuant.com

## 3. S Parameter

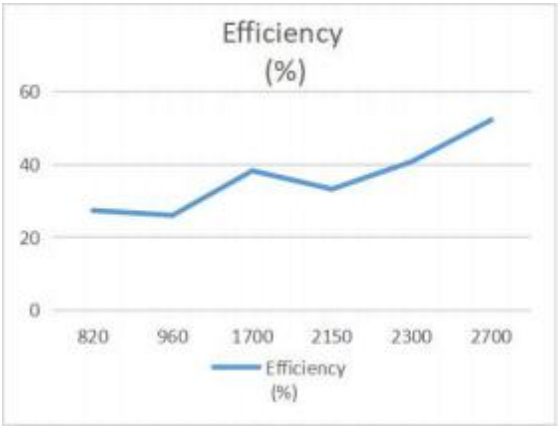
| Frequency (MHz) | ReturnLoss (dB) | VSWR |
|---|---|---|
| 824 | -11.44 | 1.73 |
| 960 | -3.91 | 4.51 |
| 1710 | -5.71 | 3.16 |
| 1900 | -6.85 | 2.66 |
| 2170 | -4.17 | 4.22 |
| 2300 | -9.62 | 1.99 |
| 2690 | -12.10 | 1.65 |

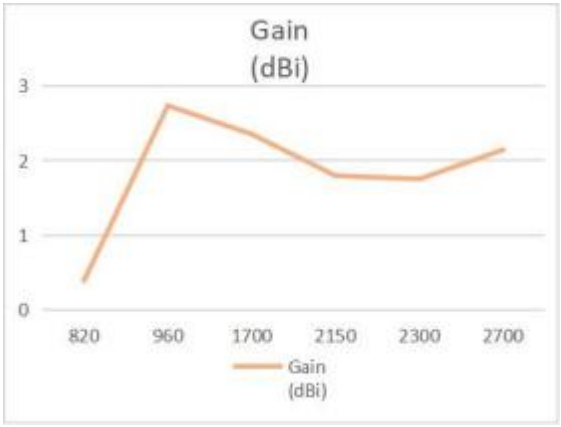



* Voltage Standing Wave Ratio (VSWR) Return Loss (RL)
RL = 20 * log10 [(VSWR+1)/(VSWR-1)

## 4. Efficiency and Gain

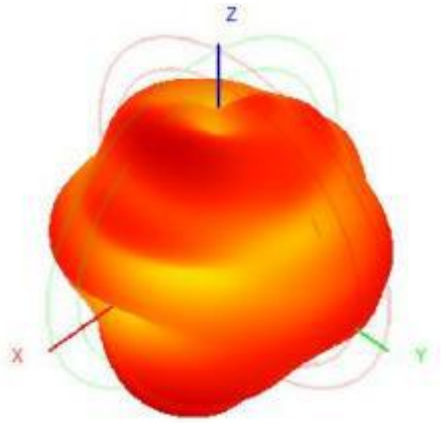
| Frequency (MHz) | 820 | 960 | 1700 | 2150 | 2300 | 2700 |
|---|---|---|---|---|---|---|
| Efficiency (%) | 27.39 | 26.07 | 38.28 | 33.25 | 40.77 | 52.24 |
| Gain (dBi) | 0.39 | 2.73 | 2.35 | 1.80 | 1.75 | 2.14 |



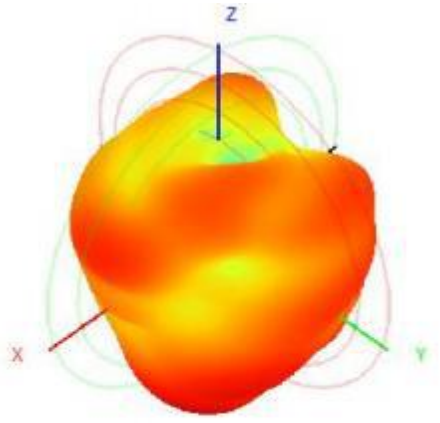



## 5. Radiation Pattern

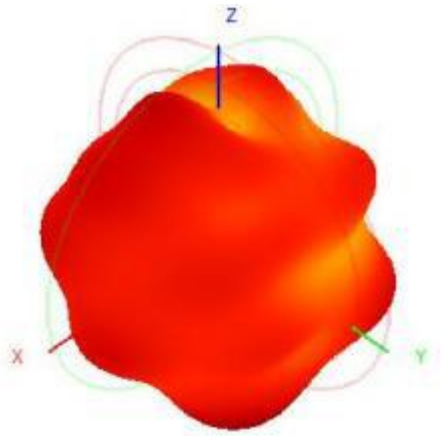
### 5-1 Antenna 3D Radiation Pattern



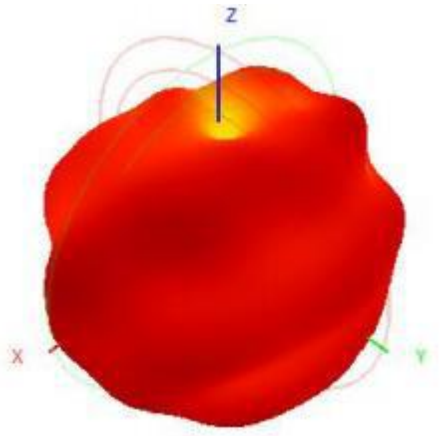

820MHz



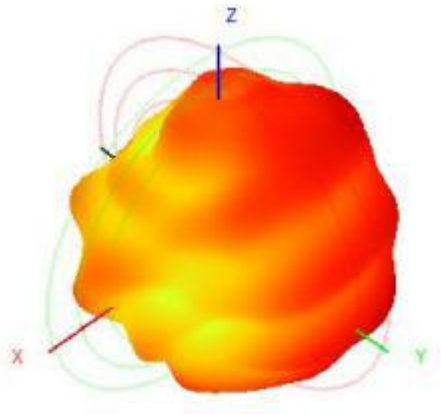

960MHz



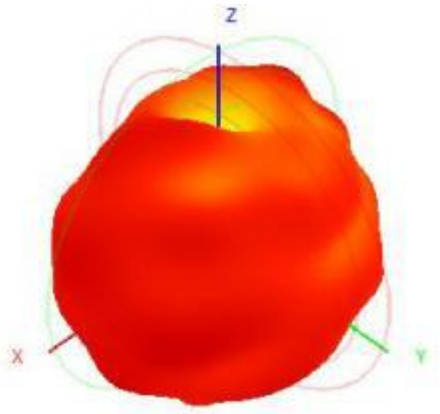

1700MHz




2150MHz

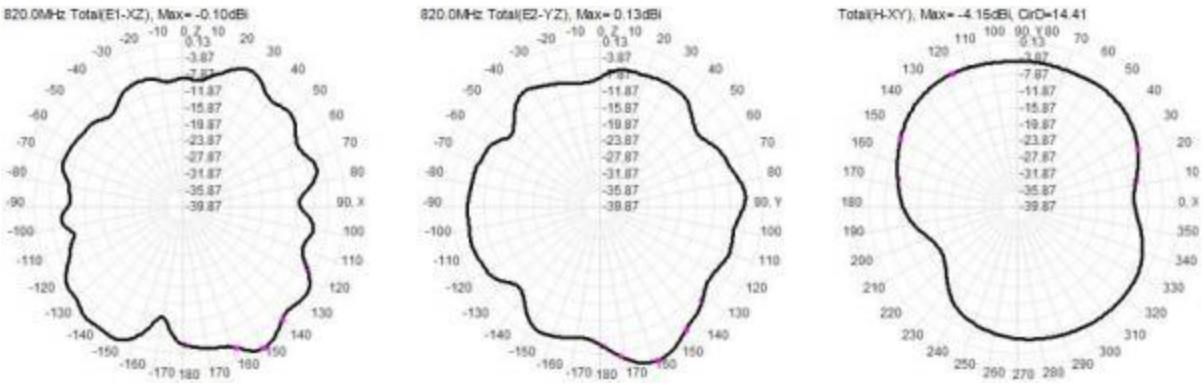



2300MHz

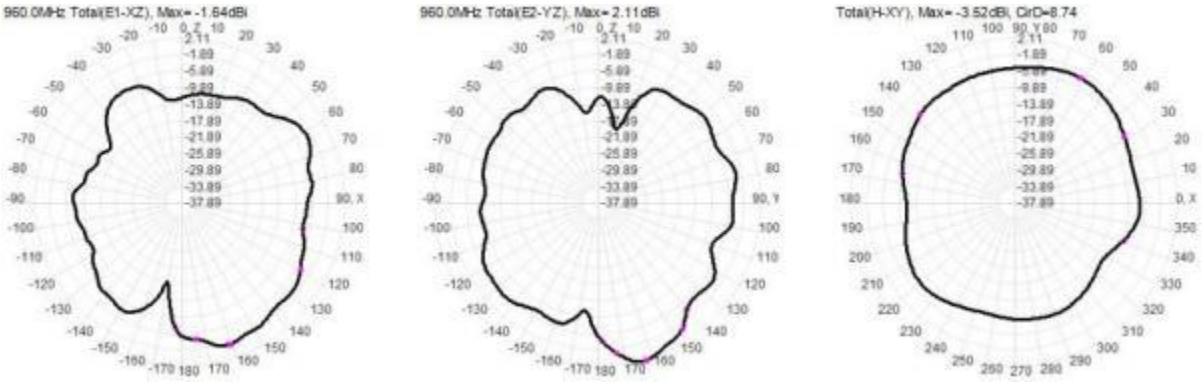



2700MHz

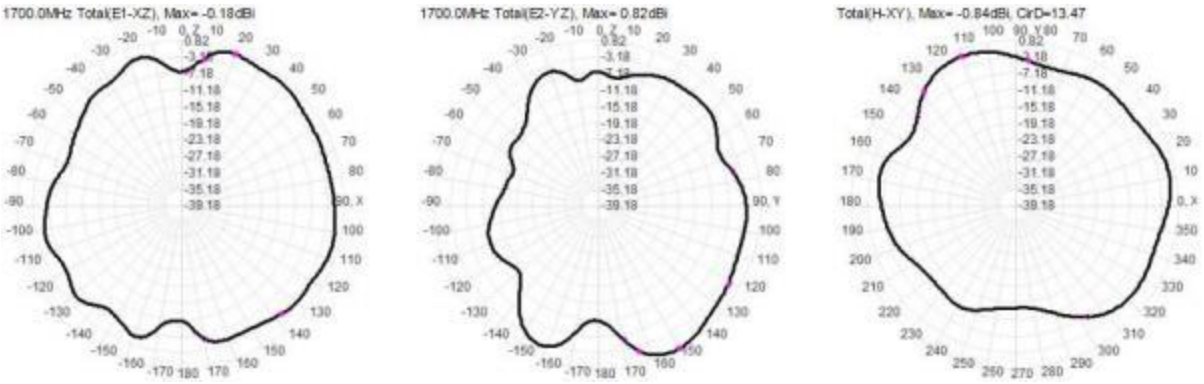
## 5-2 Antenna 2D Radiation Pattern



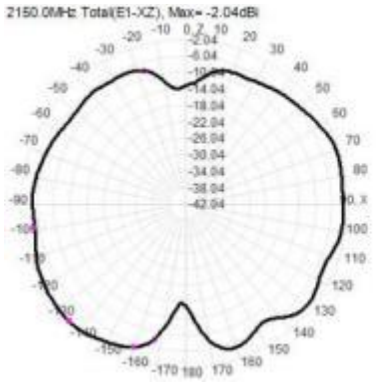

820MHz

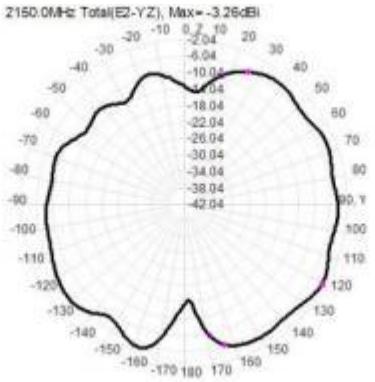


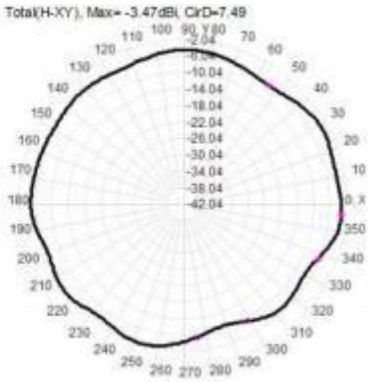

960MHz



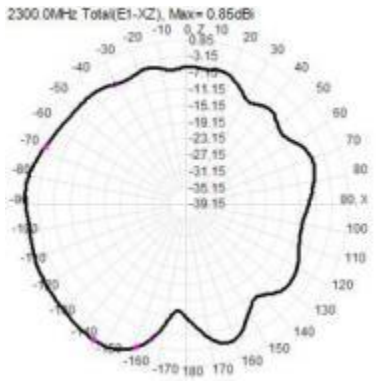

1700MHz

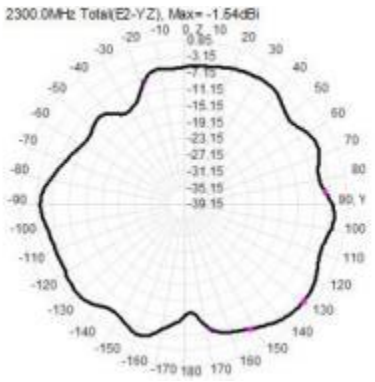


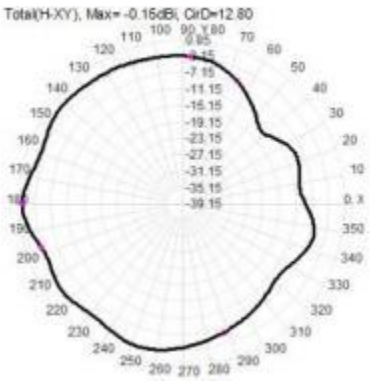



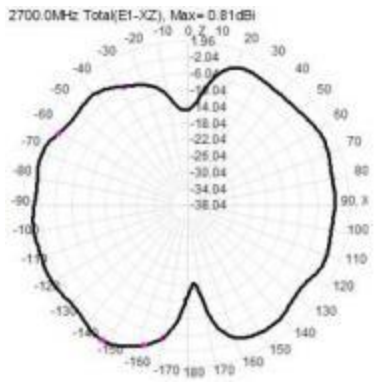

2150MHz

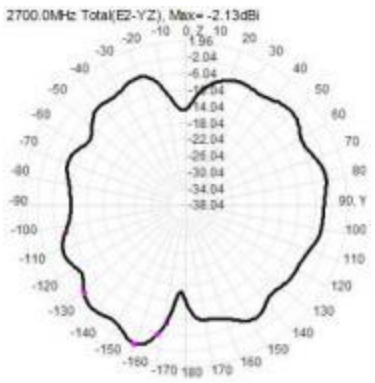


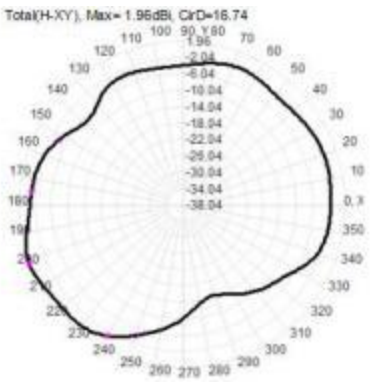




2300MHz



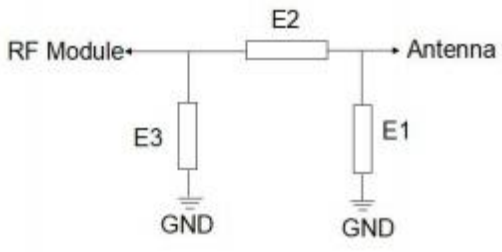

2700MHz

## 6. Active test data

| Band | Channel | TRP | TIS |
|---|---|---|---|
| GSM 850 | L | 25.1 | |
| | M | 25.3 | |
| | H | 25.7 | -94 |
| GSM 900 | L | 27.6 | |
| | M | 27 | |
| | H | 25.7 | -94.9 |
| DCS 1800 | L | 26.6 | |
| | M | 25.8 | |
| | H | 26.9 | -106.4 |
| PCS 1900 | L | 26.8 | |
| | M | 26.1 | |
| | H | 26.5 | -107 |
| B1(10M) | L | 20.1 | |
| | M | 20.2 | |
| | H | 19.9 | -95.2 |

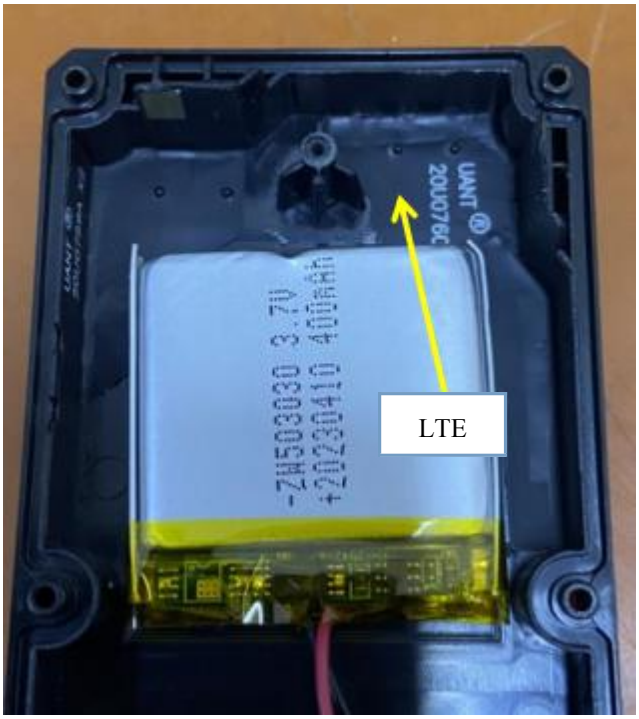
| Band | Channel | TRP | TIS | Band | Channel | TRP | TIS |
|---|---|---|---|---|---|---|---|
| B3(10M) | L | 20.3 | | B38(10M) | L | 19.6 | |
| | M | 20.2 | | | M | 18.6 | |
| | H | 20.5 | -92.5 | | H | 18.4 | -95.1 |
| B5(10M) | L | 16.3 | | B39(10M) | L | 20.1 | |
| | M | 15.8 | | | M | 19.7 | |
| | H | 16.6 | -83.4 | | H | 19.1 | -94.6 |
| B8(10M) | L | 17.7 | | B40(10M) | L | 20.3 | |
| | M | 17.6 | | | M | 20.6 | |
| | H | 17.8 | -85.3 | | H | 20.2 | -94.2 |
| B34(10M) | L | 20.3 | | B41(10M) | L | 19.6 | |
| | M | 20.4 | | | M | 18.5 | |
| | H | 20.2 | -94 | | H | 18.1 | -94.6 |

## 7. Antenna Matching Net work




| Element | Value |
|---|---|
| E1 | 并6.8nH |
| E2 | 0Ω |
| E3 | N/C |

## 8. Antenna installation diagram



# 9. Mechanical Specifica tion