DONGGUAN HUANGJIE COMMUNICATION TECHNOLOGY CO., LTD.

# SPECFICATION FOR APPROVAL

| | |
|---|---|
| CUSTOMER | |
| CUS. CODE | |
| CUS. MODEL | |
| HJ-Tech CODE | 3N0101BK-022 |
| PRO. NAME | RF ANTENNA COMPONENT |
| SPECIFICATION DESCRIPTION | Built in antenna OD1.13 Cable, P1 copper tube, P2 MHF-1-PLUG, product length L=730mm |
| DATE | 2026/8/18 |

| SUPPLIER | | |
|---|---|---|
| PREPARER | CHECKER | APPROVER |
| S.He | XIU HE | LFY |

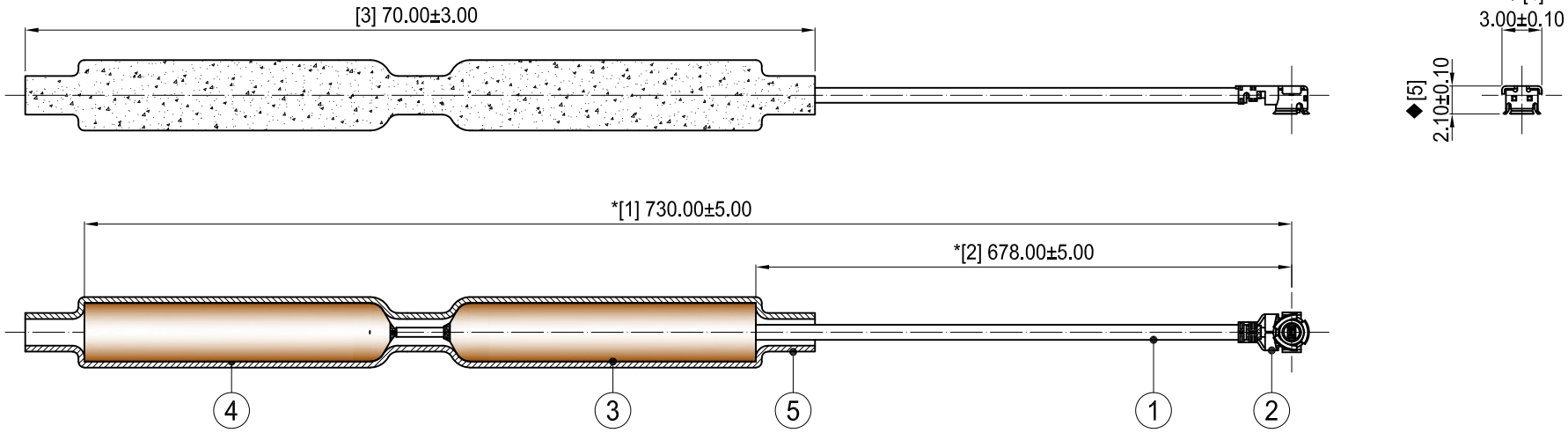
| CUSTOMER | | |
|---|---|---|
| TRANSCTOR | CHECKER | APPROVER |
| | | |

DONGGUAN HUANGJIE COMMUNICATION TECHNOLOGY CO.,LTD.
Address: Daqiandi Industrial Zone, Quantang, Liaobu Town, Dongguan City, Guangdong Province, China
Tel:86-769-83328111 Fax:86-769-83327688
email:info@iphone-line.com
website:www.iphone-line.com

# CONTENTS


| S/N | SYNOPSIS | PAGE |
|---|---|---|
| 1 | COVER | 1 |
| 2 | CONTENTS | 2 |
| 3 | PRODUCT DRAWING | 3 |
| 4 | PRODUCT SPECIFICATION | 4~5 |
| 5 | PACKAGE DRAWING | 6 |
| 6 | ANTENNA ELECTRICAL CHARACTERISTIC TEST REPORT | 7~11 |

| REV. | RELEASE AND CHANGE SUMMARY | DATE |
|---|---|---|
| A | First Release | 2023.02.22 |
| | | |
| | | |




Technical Requirements:

1. Electrical Characteristics:
   Characteristic Impedance: 50Ω.
   Operating Frequency: 2.4GHz-2.5GHz; 5.15GHz-5.85GHz.
   Inspection Method: 100% waveform comparison against the Golden Sample using a Network Analyzer over the 2-6GHz range.
2. Cable Retention Force:
   Pull-out Force (Cable-to-Connector): Minimum 1.30 kgf.
   Test Method: Pull vertically along the central axis of the cable at a rate of 253 mm/min. The part passes the test if it can sustain a 1.30 kg weight lifted off the desktop.
3. Dimensional Inspection:
   [ *] First Article Inspection (FAI) items
   Quality Inspection Plan (QIP) key inspection itemsCritical Process Control (CPK) items
4. Visual Inspection:
   100% visual inspection. The product surface must be free from scratches, damage, and dirt. The plating shall be bright and uniform in color, with no signs of oxidation.
5. Packaging Specification:
   50 pcs/tie, 10 ties/pack (i.e., 500 pcs/pack).
6. Environmental Compliance:
   All materials used in the product and its manufacturing process must comply with the EU RoHS Directive.

| No. | PART NUMBER | PART NAME AND DESCRIPTION | Q'TY |
|---|---|---|---|
| 5 | 2TA055BK1-070 | Heat Shrink Tubing: Ø5.50*L70.00, Halogen-free Flame Retardant, 125H2 Standard Type, Unprinted, Black | 1 |
| 4 | 2YG144 | Copper Tube: Ø5.20 * L24.00 * Ø0.60, Tin-plated | 1 |
| 3 | 2YG128 | Copper Tube: Ø5.20L24.00Ø1.05, Tin-plated | 1 |
| 2 | 2LM10P113210 | RF Connector: MHF-1 PLUG for OD1.13 Cable | 1 |
| 1 | 2C5M11311BK1 | Micro Coaxial Cable: OD1.13, 50Ω, Silver-tinned Wire, Black | 1 |

BOM

GENERAL TOLERANCE:
UNLESS OTHERWISE SPECIFIED
LINEAR:
0.5 < L ≤ 6 ± 0.05
6 < L ≤ 30 ± 0.10
30 < L ≤ 120 ± 0.20
ANGULAR:
0 < L ≤ 10 ± 1°30'
10 < L ≤ 50 ± 1°00'
50 < L ≤ 120 ± 0°30'

FILE TYPE: Product Drawing
DRA./DATE: S.He 23.02.22
CHE./DATE:
APP./DATE:
FILE FORM: HJ-QR-E-03 22.09.01

Dongguan HUANGJIE Communication Technology Co., Ltd.
东莞市皇捷通讯科技有限公司

TITLE: Product Description
Built-in antenna, OD 1.13mm silver-tinned wire, black. P1 end: soldered copper tube + copper tube. P2 end: crimped MHF-1-PLUG. Overall length (L) = 730mm.

CODE: 3N0101BK-022

| SIZE: | UNIT: | PRO.: | SCALE: | PAGE: |
|---|---|---|---|---|
| A4 | mm | 3rd | 2:1 | 1/1 |

THIS DRAWING CONTAINS INFORMATION THAT IS PROPRIETARY TO HUANGJIE AND SHOULDN'T BE USED WITHOUT WRITTEN PERMISSION.

0 10 20

# WIFI 2.4G&5.8G FLEX CABLE BUILT-IN ANTENNA

## 1 SCOPE

### 1.1 CONTENTS

This Product Specification covers the mechanical, electrical and environmental performances specification for wifi 2.4g&5.8g flex cable built-in antenna.

### 1.2 QUALIFICATION

When tests are performed the specification shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

## 2 APPLICABLE DOCUMENTS AND FORMS

The associated product documents and forms constitute a part of this specification to the extent specified herein. Unless otherwise indicated, the latest edition of the document applies. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of the specification and the reference documents, this specification shall take precedence.

## 3 TEST AND ACCEPTANCE REQUIREMENTS

### 3.1 GENERAL

#### 3.1.1 Dimensional Characteristics

Part construction shall conform to the dimensions, shape, and detail attributes specified on the latest revision of the applicable part drawing(s).

#### 3.1.2 Material Characteristics

All material used in each test sample shall conform to the material specifications shown on the latest revision of the applicable part drawing(s).

### 3.2 RATING

| Frequency Range | Nominal Impedance | Return Loss | Peak Gain | Operating Temperature |
|---|---|---|---|---|
| 2.4~2.5G,5.15~5.85G | 50Ω | < -10 dB | 3dBi | -40℃ ~ +85℃ |

### 3.3 TEST CONDITION

Unless otherwise specified, all tests and measurements shall be performed under the following conditions.

| Temperature | Atmospheric Pressure | Relative Humidity |
|---|---|---|
| +15℃ ~ +35℃ | 866hPa ~ 1066hPa | 45% ~ 75% |

### 3.4 Electrical Performance

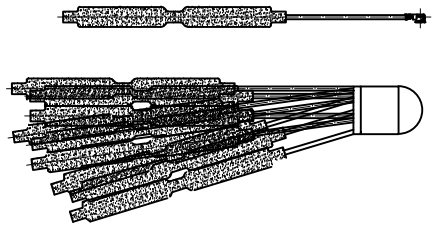
| No. | Items | Test Condition | Specifications |
|---|---|---|---|
| | | **GENERAL** | |
| 1 | Contact Resistance | Solder the receptacle connector to the test board and mate the plug connector together, then measure the contact resistance as shown in figure 1 by the four terminal method.<br>Open circuit voltage: 20mV MAX<br>Circuit current: 10mA MAX | Inner contact:<br>Initial: 20mΩ MAX<br>After: 25mΩ MAX<br>Ground contact:<br>Initial: 20mΩ MAX<br>After: 25mΩ MAX |
| 2 | Insulation Resistance | Mate the plug and receptacle connector Together,and then, apply DC 200 V Voltage between the inner contact and the ground contact in accordance with EIA 364-21F | Initial:<br>500 MΩ MIN<br>After:<br>100 MΩ MIN |
| 3 | Dielectric Withstanding Voltage | Mate the plug and receptacle connector together, and then apply AC 200 V between the inner contact and the ground contact in accordance with EIA 364-20F | No flashover,<br>No sparkover,<br>No excess leakage,<br>No breakdown |
| 4 | V.S.W.R | Measure V.S.W.R with a network analyzer from 0 to 6GHz(Install in plastic housing and test) | 1.8MAX. |
| | | **MECHANICAL** | |
| 5 | Un-mating Force | Solder the receptacle to the test board and mate the plug into it. Test the withdrawal force with an insertion-extraction force tester at a rate of 25 ± 3 mm/min | 1.Initial:4N MIN<br>2.After 30 Cycle:2N MIN |

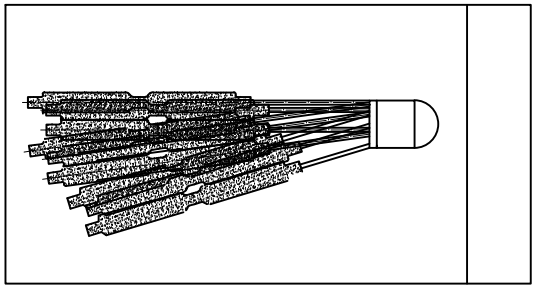
| | | | |
|---|---|---|---|
| 6 | Durability | Solder the receptacle onto the test board, interlock the male and female connectors using a mating tester for 30 cycles, and then test the parameters. | Appearance: No AbnormalityContact Resistance: Shall meet 3.4.1/2/3/4 |
| 7 | Cable retention | 1 It is considered qualified if a 1.30 kg weight is lifted vertically from the table along the central axis of the cable at a speed of approximately 25 ± 3 mm/min. | No detachment or looseness at the crimp joint between the wire and the connector. Shall meet 3.4.1/2/3/4 |
| **ENVIRONMENTAL** | | | |
| 8 | Humidity | Apply the following environment to themating connector in accordance with EIA364-31 Method III Test Condition B Temperature:25~65℃ Humidity : 90~95% R.H Duration: 96 hours | Appearance: No damage Contact Resistance: Shall meet 3.4.1 Insulation Resistance: Shall meet 3.4.2 Dielectric Withstanding Voltage: Shall meet 3.4.3 |
| 9 | High Tempera-ture Test | Apply the following environment to themating connector Temperature : 90±2℃ Duration : 96 hours | Appearance: No damage Contact Resistance: Shall meet 3.4.1 Insulation Resistance: Shall meet 3.4.2 Dielectric Withstanding Voltage: Shall meet 3.4.3 |
| 10 | Thermal Shock | Perform the following test conditions on mated connectors in accordance with Test Method III, Condition B of EIA-364-32: Temperature: -55°C to 85°C Transfer time: 5 min max. Number of cycles: 5 | Appearance: No damage Contact Resistance: Shall meet 3.4.1 Insulation Resistance: Shall meet 3.4.2 Dielectric Withstanding Voltage: Shall meet 3.4.3 |
| 11 | Salt Spray | EIA 364-26 Test Condition A Apply the following environment to the mating connector Temperature : 35±2℃ Relative Humidity : 90~98%R.H Salt water density: 5±1% Duration : 24 hours | Appearance: No damage Contact Resistance: Shall meet 3.4.1 |

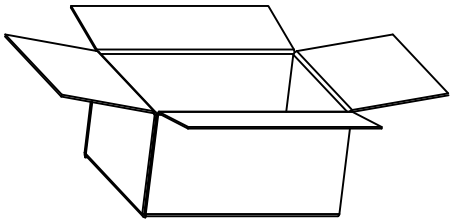
### 3.5 CHANGE LOG

| Revision | Release and Change Summary | Date | Tabulator | Checker | Approver |
|---|---|---|---|---|---|
| A | | 2026.08.11 | S.He | XIU HE | LFY |
| | | | | | |
| | | | | | |

| REV. | RELEASE AND CHANGE SUMMARY | DATE |
|---|---|---|
| A | // | 2025.02.19 |
| | | |
| | | |







Packaging specifications:

1. 50 pieces per bundle, secured with bubble wrap and rubber bands for terminals.
2. 10 packs per case, sealed after packaging in PE bags.
3. A material card/eco-label must be affixed to each PE bag containing 500PCS of product.
4. Paper spacer: 2 pieces per carton. Place one paper spacer at the bottom of the carton before packing, and another before sealing.
5. 5,000 pieces per carton, carton dimensions: 360*360*145, carton size can be adjusted according to material dimensions and quantity.
6. The sealing method adopts an "I"-shaped design, with identical configurations on both the top and bottom.
7. The material is insufficient to fill the carton, requiring the use of filler material.
8. Material card labels and month labels shall comply with the customer-specified standards.

| | | |
|---|---|---|
| GENERAL TOLERANCE:<br>UNLESS OTHERWISE SPECIFIED<br>LINEAR:<br>0.5 < L ≤ 6 ± 0.05<br>6 < L ≤ 30 ± 0.10<br>30 < L ≤ 120 ± 0.20<br>ANGULAR:<br>0 < L ≤ 10 ± 1°30'<br>10 < L ≤ 50 ± 1°00'<br>50 < L ≤ 120 ± 0°30' | FILE TYPE: 包装图<br>DRA./DATE: S.He 25.02.19<br>CHE./DATE:<br>APP./DATE:<br>FILE FORM: HJ-QR-E-03 22.09.01 | Dongguan HUANGJIE Communication Technology Co., Ltd.<br>东莞市皇捷通讯科技有限公司<br>TITLE: Packaging Specification<br>CODE: 3N0101BK-022<br>SIZE: A4 \| UNIT: mm \| PRO.: 3rd \| SCALE: 1:1 \| PAGE: 2/2 |

THIS DRAWING CONTAINS INFORMATION THAT IS PROPRIETARY TO HUANGJIE AND SHOULDN'T BE USED WITHOUT WRITTEN PERMISSION.

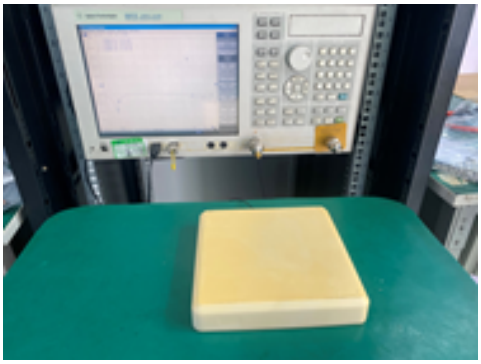
0 10 20

皇捷通讯
COMMUNDIAECORNCE

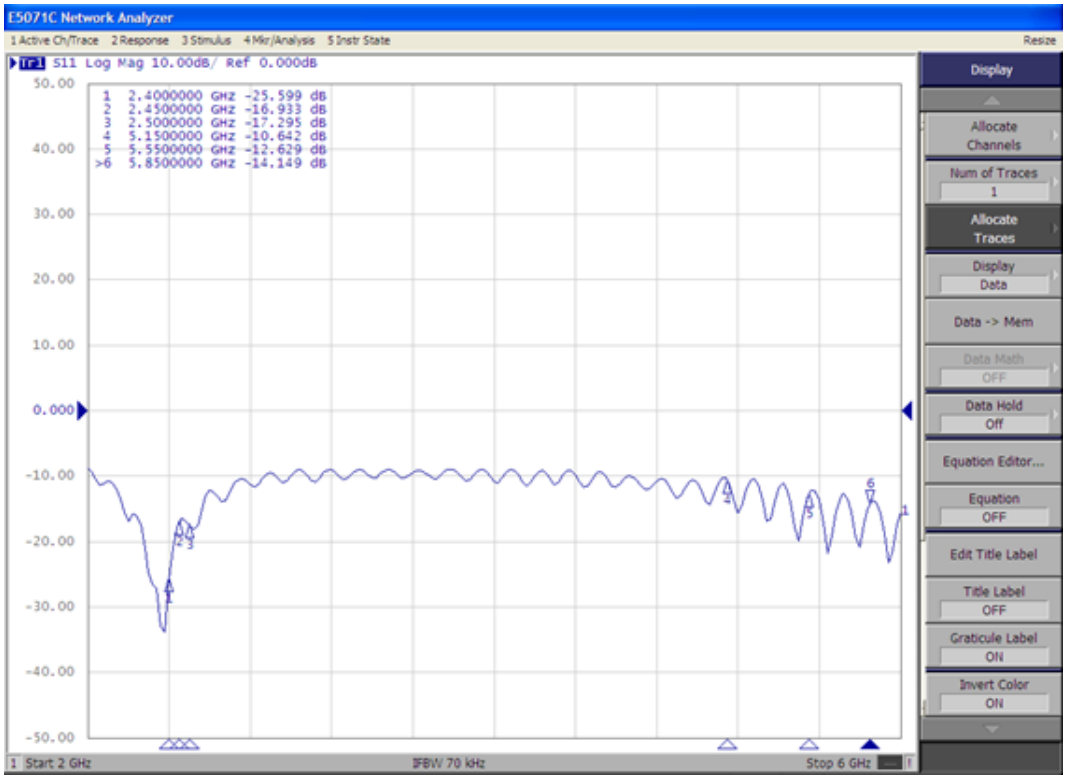
# Antenna Electrical Characteristic Test Report

DOC NO.:HJ-QR-Q-22 Rev:A0

| Part Number: | 3N0101BK-022 | Item | Spec | Judge |
|---|---|---|---|---|
| Part Name: | Built in antenna OD1.13 Cable, P1 copper tube, P2 MHF-1-PLUG, product length L=730mm | VSWR | ≤1.8 | pass |
| Test Equipment | Agilent E5071C/OTA Chamber | Characteristic impedance | 50Ω | pass |
| Quantity | 5pcs | | | |
| Test Date | 2026/8/11 | | | |



1 RETURN LOSS




**Checker: XIU HE** **Tester: S.He**

DONGGUAN HUANGJIE COMMUNICATION TECHNOLOGY CO., LTD.

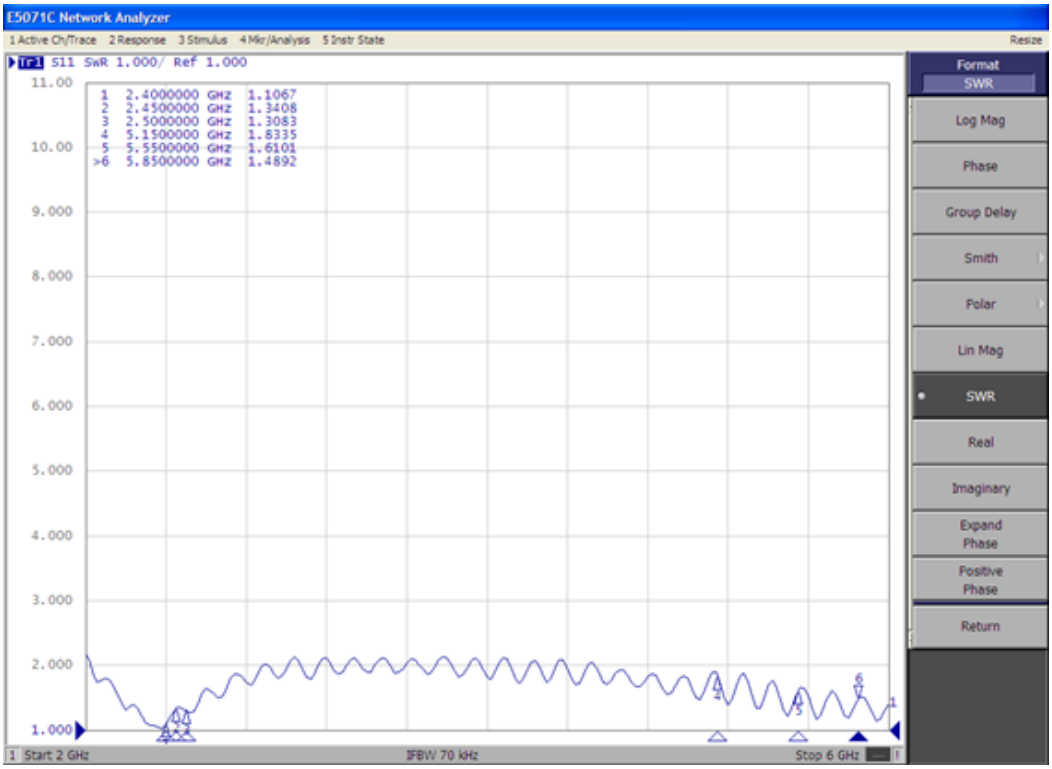
皇捷通讯
COMMUNDAECORNCE

# Antenna Electrical Characteristic Test Report

DOC NO.:HJ-QR-Q-22 Rev:A0

| Part Number: | 3N0101BK-022 | Item | Spec | Judge |
|---|---|---|---|---|
| Part Name: | Built in antenna OD1.13 Cable, P1 copper tube, P2 MHF-1-PLUG, product length L=730mm | VSWR | ≤1.8 | pass |
| Test Equipment | Agilent E5071C/OTA Chamber | Characteristic impedance | 50Ω | pass |
| Quantity | 5pcs | | | |
| Test Date | 2026/8/11 | | | |

2 VSWR




**Checker: XIU HE** **Tester: S.He**

DONGGUAN HUANGJIE COMMUNICATION TECHNOLOGY CO., LTD.

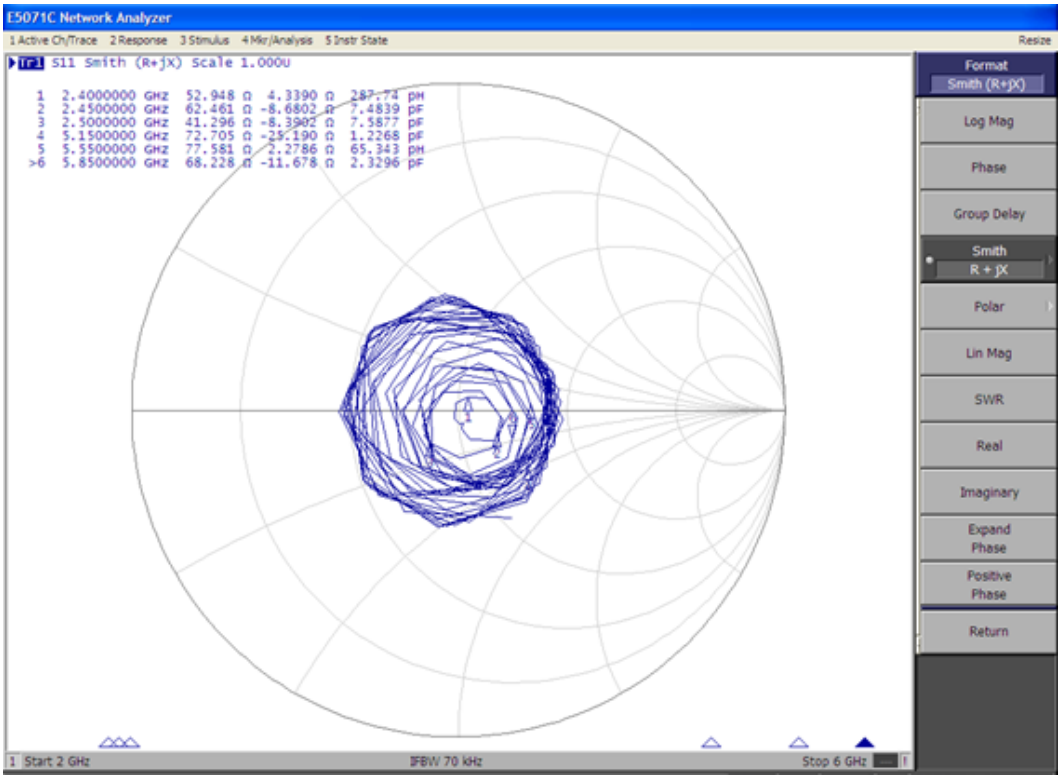
皇捷通讯
COMMUNDAECORNCE

# Antenna Electrical Characteristic Test Report

DOC NO.:HJ-QR-Q-22 Rev:A0

| Part Number: | 3N0101BK-022 | Item | Spec | Judge |
|---|---|---|---|---|
| Part Name: | Built in antenna OD1.13 Cable, P1 copper tube, P2 MHF-1-PLUG, product length L=730mm | VSWR | ≤1.8 | pass |
| Test Equipment | Agilent E5071C/OTA Chamber | Characteristic impedance | 50Ω | pass |
| Quantity | 5pcs | | | |
| Test Date | 2026/8/11 | | | |

3 SMITH(R+JX)



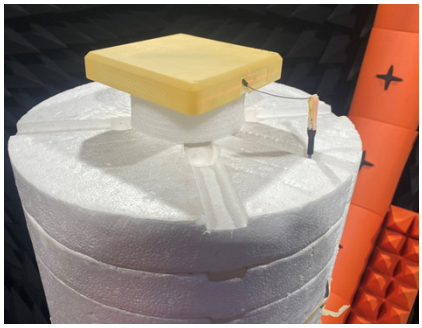

**Checker: XIU HE** **Tester: S.He**

皇捷通讯
COMMUNDAECORNCE

# Antenna Electrical Characteristic Test Report

DOC NO.:HJ-QR-Q-22 Rev:A0

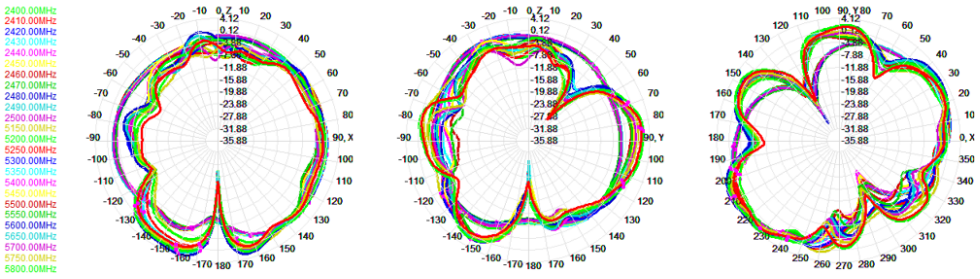
| Part Number: | 3N0101BK-022 | Item | Spec | Judge |
|---|---|---|---|---|
| Part Name: | Built in antenna OD1.13 Cable, P1 copper tube, P2 MHF-1-PLUG, product length L=730mm | Gain | 3DBI | pass |
| Test Equipment | Agilent E5071C/OTA Chamber | Characteristic impedance | 50Ω | pass |
| Quantity | 5pcs | | | |
| Test Date | 2026/8/11 | | | |



4 2D/3D RADIATION PATTERN

| 序号 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 频率(MHz) | 2400.0 | 2410.0 | 2420.0 | 2430.0 | 2440.0 | 2450.0 | 2460.0 | 2470.0 | 2480.0 | 2490.0 | 2500.0 |
| 效率 (dBi) | -1.84 | -1.95 | -2.08 | -2.02 | -2.12 | -2.20 | -2.17 | -2.38 | -2.25 | -2.08 | -2.11 |
| 增益 (dBi) | 2.48 | 2.28 | 2.03 | 1.75 | 1.36 | 1.54 | 1.45 | 1.21 | 1.64 | 1.81 | 1.54 |
| 效率 (%) | 65.41 | 63.89 | 61.90 | 62.84 | 61.33 | 60.30 | 60.70 | 57.86 | 59.61 | 61.96 | 61.47 |
| 方向性(dB) | 4.32 | 4.22 | 4.11 | 3.76 | 3.49 | 3.74 | 3.61 | 3.59 | 3.88 | 3.89 | 3.66 |

| 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5150.0 | 5200.0 | 5250.0 | 5300.0 | 5350.0 | 5400.0 | 5450.0 | 5500.0 | 5550.0 | 5600.0 | 5650.0 | 5700.0 | 5750.0 | 5800.0 | 5850.0 |
| -3.11 | -3.85 | -3.16 | -2.70 | -3.22 | -2.85 | -2.23 | -2.98 | -3.14 | -1.91 | -2.34 | -3.10 | -2.56 | -1.89 | -2.44 |
| 2.40 | 2.01 | 2.75 | 3.48 | 3.00 | 3.16 | 3.72 | 2.65 | 3.27 | 4.96 | 4.52 | 3.75 | 3.29 | 4.32 | 3.12 |
| 48.85 | 41.18 | 48.26 | 53.75 | 47.66 | 51.85 | 59.87 | 50.33 | 48.53 | 64.42 | 58.30 | 48.94 | 55.40 | 64.65 | 57.02 |
| 5.52 | 5.86 | 5.91 | 6.18 | 6.22 | 6.02 | 5.95 | 5.63 | 6.41 | 6.87 | 6.86 | 6.86 | 5.86 | 6.22 | 5.56 |



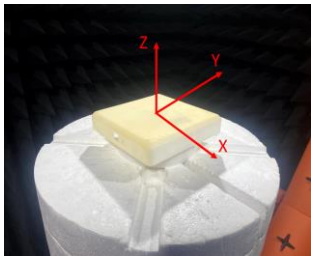
**Checker: XIU HE** **Tester: S.He**

皇捷通讯
COMMUNDAECORNCE

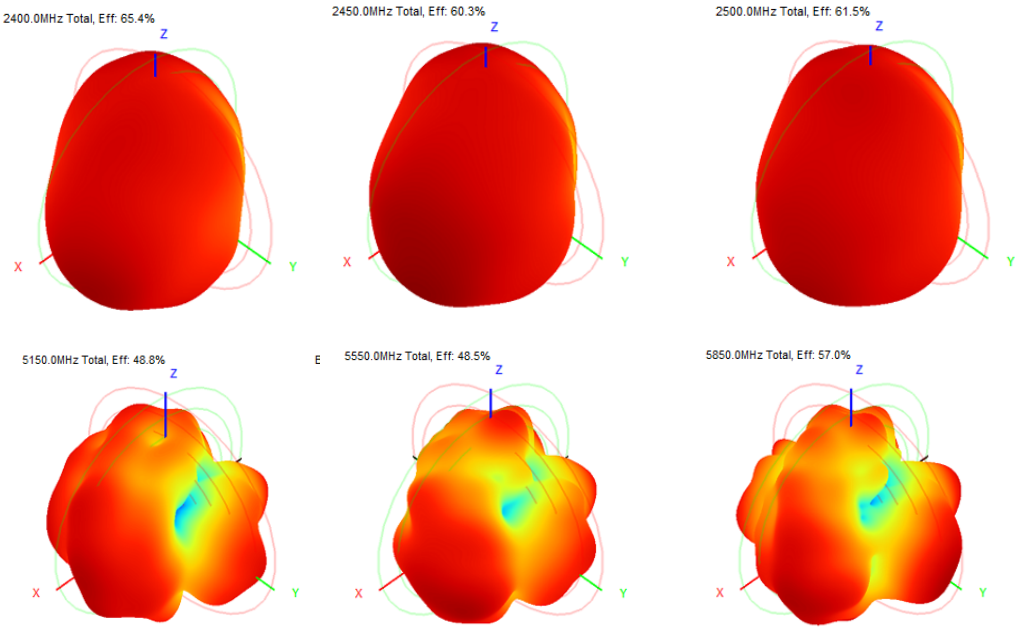
# Antenna Electrical Characteristic Test Report

DOC NO.:HJ-QR-Q-22 Rev:A0

| Part Number: | 3N0101BK-022 | Item | Spec | Judge |
|---|---|---|---|---|
| Part Name: | Built in antenna OD1.13 Cable, P1 copper tube, P2 MHF-1-PLUG, product length L=730mm | Gain | 3dbi | pass |
| Test Equipment | Agilent E5071C/OTA Chamber | Characteristic impedance | 50Ω | pass |
| Quantity | 5pcs | | | |
| Test Date | 2026/8/11 | | | |




4 2D/3D RADIATION PATTERN




**Checker: XIU HE** **Tester: S.He**