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DONGGUAN HUANGJIE COMMUNICATION TECHNOLOGY CO., LTD.

SPECFICATION FOR APPROVAL

CUSTOMER	
CUS. CODE	
CUS. MODEL	
HJ-Tech CODE	3E0605BK-014
PRO. NAME	RF ANTENNA COMPONENT
SPECIFICATION DESCRIPTION	4G Antenna, Dual PCB + Copper Tube, RG1.13 Cable with IPEX Length L=80mm
DATE	2026/8/24

SUPPLIER		
PREPARER	CHECKER	APPROVER
S.He	XIU HE	LFY

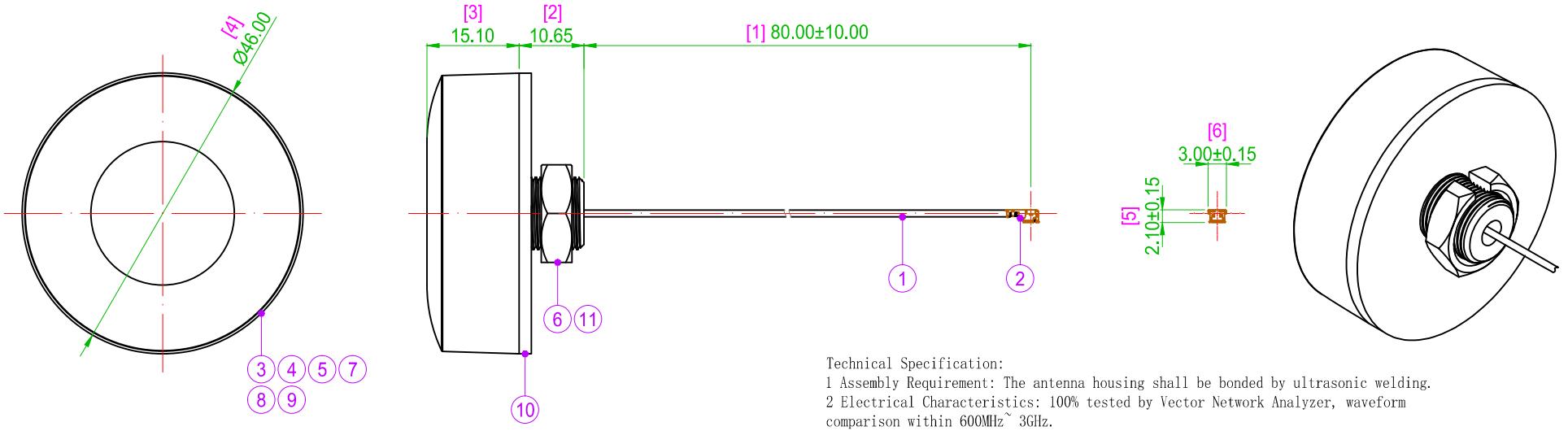
CUSTOMER		
TRANSCTOR	CHECKER	APPROVER

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H545	REV.	RELEASE AND CHANGE SUMMARY	DATE
	A	FIRST ISSUE	2025.03.27



Technical Specification:
1 Assembly Requirement: The antenna housing shall be bonded by ultrasonic welding.
2 Electrical Characteristics: 100% tested by Vector Network Analyzer, waveform comparison within 600MHz~ 3GHz.
Characteristic Impedance: 50Ω; Operating Frequency Bands: 824~960MHz; 1710~1990MHz; 2300~2690MHz.
3 Cable Retention: Minimum pull force between cable and connector: 1.30 kgf.
4 Dimension Inspection: [F] = FAI First Article Inspection; I] = Key In-process Inspection; [O] = Outgoing Inspection: [Cpk, [SPC]=Statistical Control Items.
5 Visual Inspection: 100% visual inspection. No scratches, damage or contamination; no oxidation on metal parts. Refer to SIP for details.
6 Packaging Specification: //.
7 Environmental Requirement All materials used in the product and manufacturing process shall comply with EU RoHS and REACH directives.

No.	PART NUMBER	PART NAME AND DESCRIPTION	Q'TY
11	2FZ801	UV Adhesive: VS-8806 TDS, Boxiang	1
10	2MH078	Foam: Ø45.60*T2.00, Black EVA with Double-sided Adhesive, Yellow Release Liner	1
9	2MH030	Foam: L10.00*W15.00*T9.00, EVA with Double-sided Adhesive, Black	1
8	2SBKG3910	Mushroom Base Cover: Ø44.70*H12.70, UV Resistant, Black, With M12 Stud	1
7	2SBKG3900	Mushroom Housing: Ø46.00*H15.10, UV Resistant, Black	1
6	2LC00S-3106	M12 Nut: HEX.16.00*T4.70, Brass, Raw Material	1
5	2YG085	Copper Tube: Ø4.00*L10.00*Ø3.20, Brass, Raw Material	1
4	2YP087	PCB: Ø41.20*T0.60, FR-4, Green Solder Mask on Top, 3M Adhesive Tape on Bottom	1
3	2YP086	PCB: Ø41.20*T0.60, FR-4, Green Solder Mask on Top	1
2	2LM10P113210	RF Connector: MHF-1-PLUG FOR OD1.13 CABLE	1
1	2C5M11312BK1	Micro Coaxial Cable: OD1.13,50Ω, Twin 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 25.03.27
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: 4G Small Mushroom Antenna
OD1.13 Black Twin Tinned Cable, P1 end soldered to PCB, P2 end crimped with MHF-1-PLUG, Cable Length L=80mm

CODE: 3E0605BK-014

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

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Sf? Antenna

1 SCOPE

1.1 CONTENTS

This Product Specification covers the mechanical, electrical and environmental performances specification for 4G 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	VSWR	Peak Gain	Operating Temperature
4G	50Ω	5.0MAX.	3.5dBi	-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. Open circuit voltage: 20mV MAX Circuit current: 10mA MAX	Inner contact: Initial: 20mΩ MAX After: 25mΩ MAX Ground contact: Initial: 20mΩ MAX 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: 500 MΩ MIN After: 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, No sparkover, No excess leakage, 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)	5.0MAX.
		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 2.After 30 Cycle:2N MIN

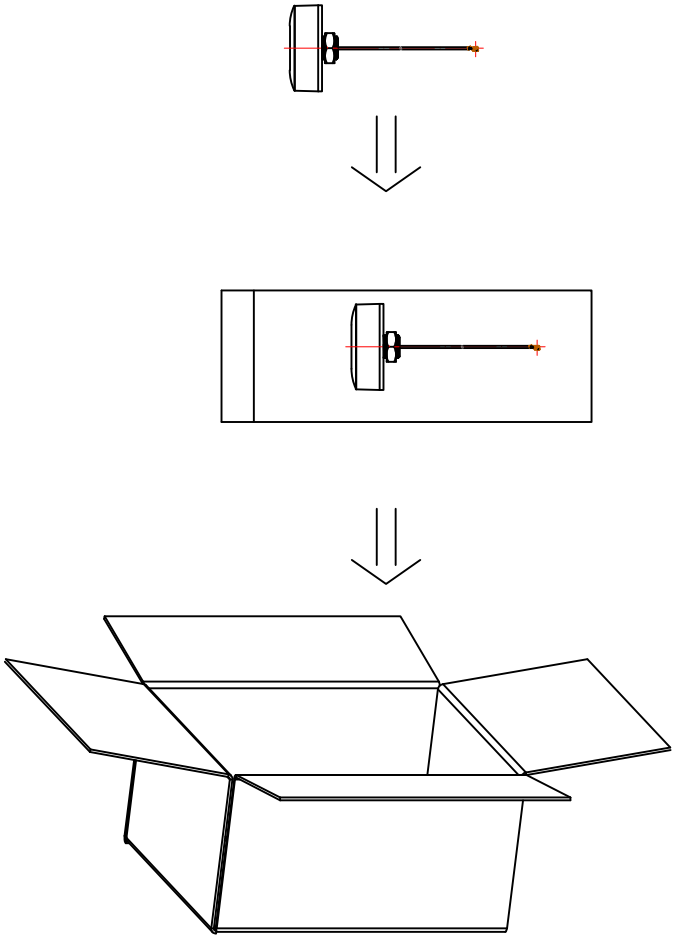
6	Durability	Solder the receptacle onto the test board, interlock the male and female connectors using a mating tester for 30 cycles, and then test the parameters.	Appearance: No AbnormalityContact Resistance: Shall meet 3.4.1/2/3/4
7	Cable retention	1 It is considered qualified if a 1.30 kg weight is 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		2026.08.24	S.He	XIU HE	LFY

H431

REV.	RELEASE AND CHANGE SUMMARY	DATE
A	FIRST ISSUE	2024.01.12



Packaging specifications:
1. 1 piece per bag.
2. 200 pieces/box, carton specifications: 290*280*240, carton dimensions can be adjusted according to material size and quantity.
3. Paper separator: 2 pieces per carton. Place one paper separator at the bottom of the carton before packing, and another before sealing.
4. The sealing method adopts an "I"-shaped design, with identical upper and lower sections.
5. The material is insufficient to fill the carton, requiring the use of filler material.
6. Material card labels and month labels shall comply with the specifications as per customer requirements.

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: //
DRA./DATE: S.He 26.06.13
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: Packaging Specification

CODE: 3E0605BK-014

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

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Antenna Electrical Characteristic Test Report

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

Part Number:	3E0605BK-014	Item	Spec	Judge
Part Name:	4G Antenna, Dual PCB + Copper Tube,RG1.13 Cable with IPEX Length L=80mm	VSWR	5.0MAX.	pass
Test Equipment	Agilent E5071C/OTA Chamber	Characteristic impedance	50Ω	pass
Quantity	5pcs			
Test Date	2026/8/11			



1 RETURN LOSS



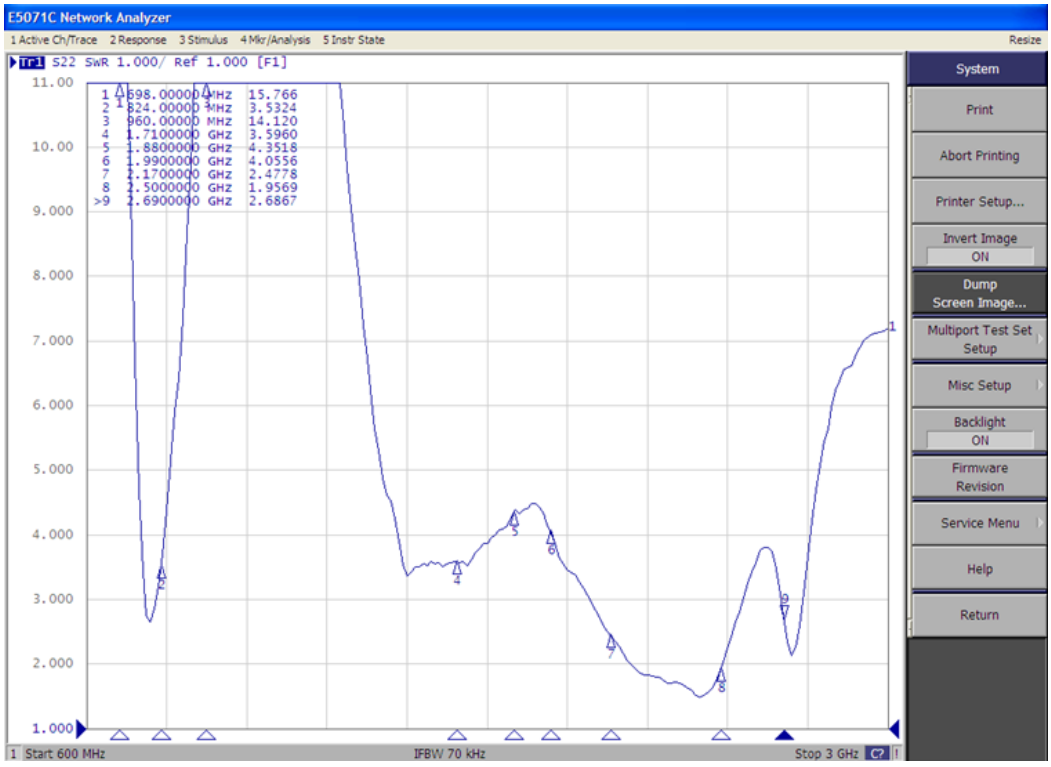
Checker: XIU HE **Tester: S.He**

Antenna Electrical Characteristic Test Report

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

Part Number:	3E0605BK-014	Item	Spec	Judge
Part Name:	4G Antenna, Dual PCB + Copper Tube,RG1.13 Cable with IPEX Length L=80mm	VSWR	5.0MAX.	pass
Test Equipment	Agilent E5071C/OTA Chamber	Characteristic impedance	50Ω	pass
Quantity	5pcs			
Test Date	2026/8/24			

2 VSWR



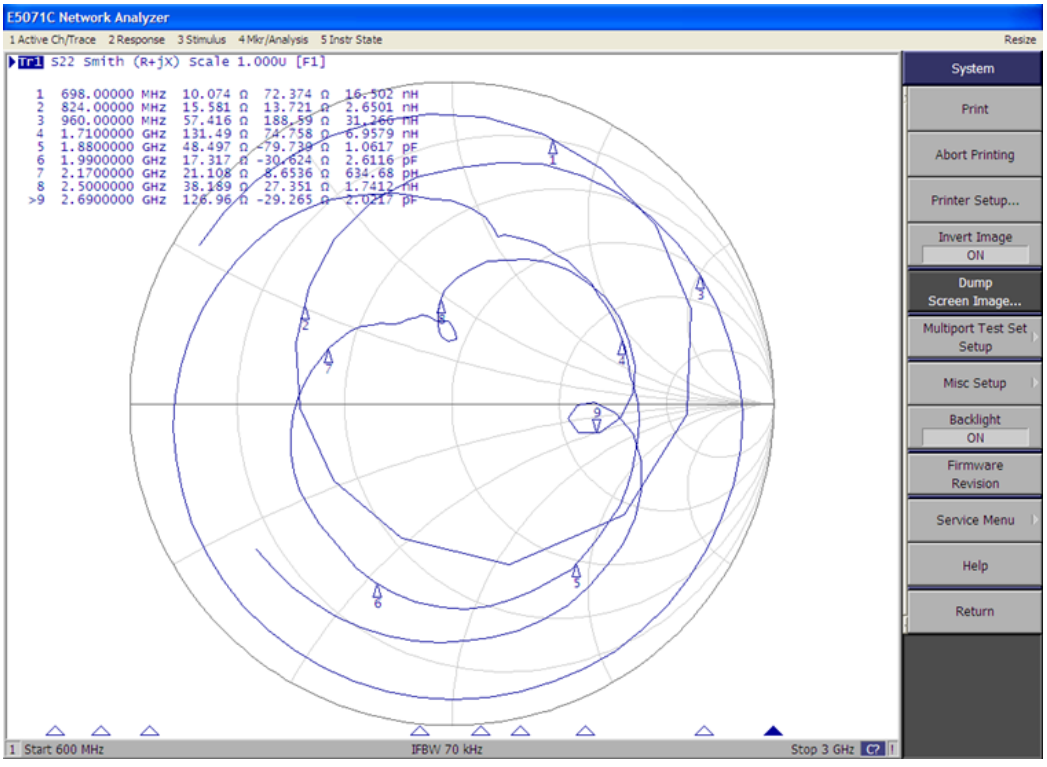
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Antenna Electrical Characteristic Test Report

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

Part Number:	3E0605BK-014	Item	Spec	Judge
Part Name:	4G Antenna, Dual PCB + Copper Tube,RG1.13 Cable with IPEX Length L=80mm	VSWR	5.0MAX.	pass
Test Equipment	Agilent E5071C/OTA Chamber	Characteristic impedance	50Ω	pass
Quantity	5pcs			
Test Date	2026/8/24			

3 SMITH(R+JX)

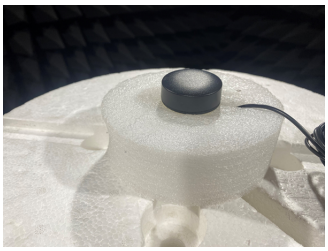


Checker: XIU HE **Tester: S.He**

Antenna Electrical Characteristic Test Report

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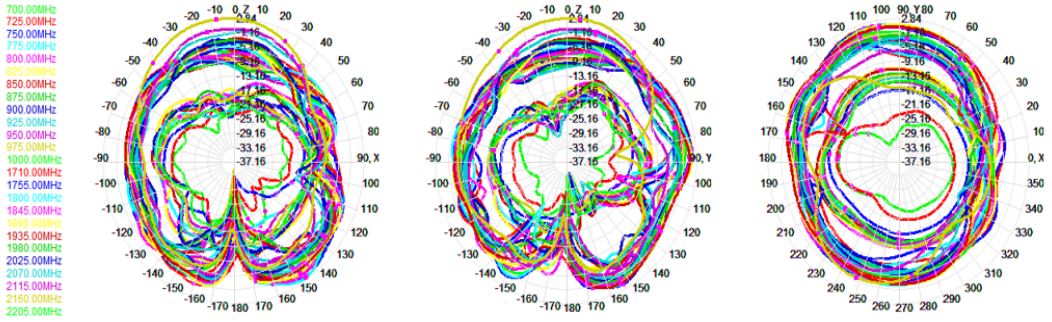
Part Number:	3E0605BK-014	Item	Spec	Judge
Part Name:	4G Antenna, Dual PCB + Copper Tube,RG1.13 Cable with IPEX Length L=80mm	Gain	3. 5dBi	pass
Test Equipment	Agilent E5071C/OTA Chamber	Characteristic impedance	50Ω	pass
Quantity	5pcs			
Test Date	2026/8/24			



4 2D/3D RADIATION PATTERN

序号	1	2	3	4	5	6	7	8	9	10	11	12	13
频率(MHz)	700.0	725.0	750.0	775.0	800.0	825.0	850.0	875.0	900.0	925.0	950.0	975.0	1000.0
效率 (dBi)	-19.67	-19.26	-16.26	-13.35	-11.15	-10.49	-11.87	-12.15	-13.33	-14.00	-15.52	-15.58	-15.77
增益 (dBi)	-16.18	-15.23	-14.21	-12.77	-10.69	-10.66	-9.24	-9.95	-9.94	-11.74	-13.54	-12.64	-13.23
效率 (%)	1.08	1.19	2.37	4.62	7.68	8.94	6.50	6.09	4.65	3.98	2.81	2.77	2.65
方向性(dB)	3.49	4.03	2.04	0.58	0.46	-0.17	2.62	2.20	3.39	2.25	1.97	2.95	2.54

14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
1710.0	1755.0	1800.0	1845.0	1890.0	1935.0	1980.0	2025.0	2070.0	2115.0	2160.0	2205.0	2250.0	2295.0	2340.0	2385.0	2430.0	2475.0	2520.0	2565.0	2610.0	2655.0	2700.0
-3.49	-3.81	-4.04	-3.70	-4.08	-4.30	-4.37	-4.21	-3.50	-3.13	-2.75	-2.39	-1.91	-2.00	-2.09	-2.29	-2.69	-2.73	-3.82	-4.00	-4.01	-5.10	-3.73
1.97	1.65	1.81	2.46	1.62	-0.70	-0.74	-1.43	-2.12	-0.42	0.48	0.91	2.02	2.77	2.53	2.02	2.54	1.85	0.35	0.01	0.14	0.18	2.98
44.78	41.60	39.49	42.67	39.11	37.18	36.55	37.95	44.65	48.66	53.04	57.66	64.37	63.09	61.81	59.06	53.83	53.34	41.52	39.84	39.75	30.90	42.34
5.46	5.46	5.84	6.16	5.70	3.59	3.63	2.78	1.38	2.71	3.24	3.30	3.93	4.77	4.62	4.30	5.23	4.58	4.16	4.01	4.15	5.28	6.71



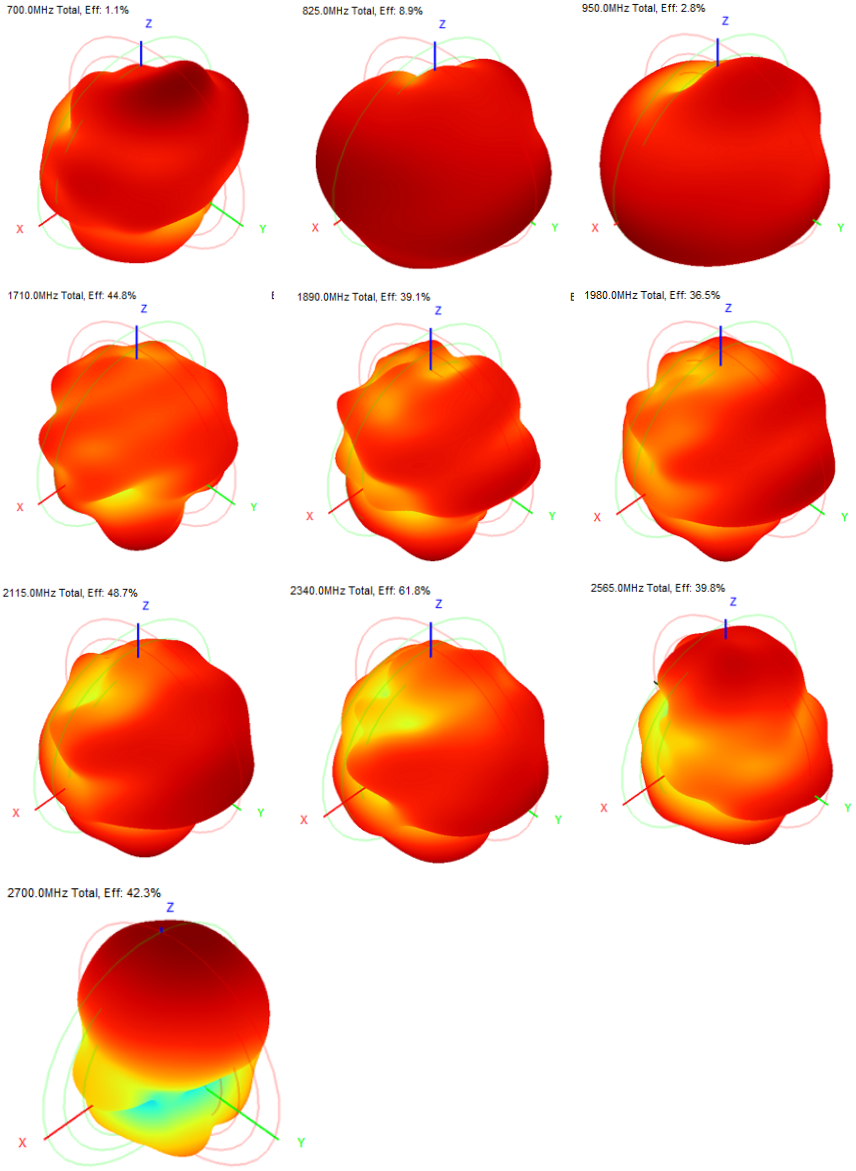
Checker: XIU HE **Tester: S.He**

Antenna Electrical Characteristic Test Report

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

Part Number:	3E0605BK-014	Item	Spec	Judge
Part Name:	4G Antenna, Dual PCB + Copper Tube,RG1.13 Cable with IPEX Length L=80mm	Gain	3.5dBi	pass
Test Equipment	Agilent E5071C/OTA Chamber	Characteristic impedance	50Ω	pass
Quantity	5pcs			
Test Date	2026/8/24			

4 2D/3D RADIATION PATTERN



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