DONGGUAN HUANGJIE COMMUNICATION TECHNOLOGY CO., LTD.

SPECFICATION FOR APPROVAL

CUSTOMER	
CUS. CODE	
CUS. MODEL	
HJ-Tech CODE	3D4001BK00-001
PRO. NAME	RF ANTENNA ASSEMBLY
SPECIFICATION DESCRIPTION	WiFi 2.4G&5G EXTERNAL ANTENNA, HOUSING BLACK, RG178 CABLE+SMA PLUG, OD10*L68mm
DATE	2026.09.02

SUPPLIER		
PREPARER	CHECKER	APPROVER
S.He	XIU HE	LFY

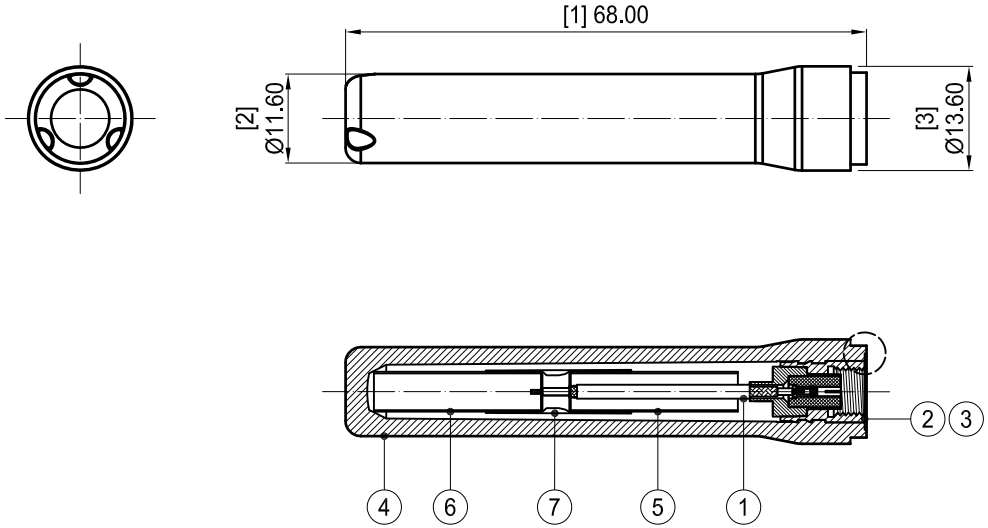
CUSTOMER		
TRANSCTOR	CHECKER	APPROVER

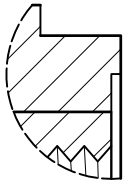
DONGGUAN HUANGJIE COMMUNICATION TECHNOLOGY CO.,LTD.
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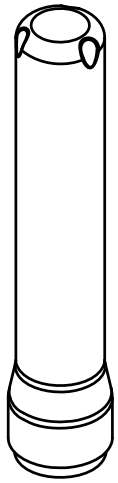
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REV.	RELEASE AND CHANGE SUMMARY	DATE
A	First Release	2021.04.23
B	Ultra thin heat shrinkable tubing changed to standard heat shrinkable tubing	2022.12.07
C	Update dimension control marks	2025.10.08







Technical Requirements
1. Electrical Characteristics:
Characteristic Impedance: 50Ω; Gain: 2 dBiApplicable Frequency Range:2.4GHz-2.5 GHz, VSWR: 2.0 MAX;5.15 GHz-5.85 GHz, VSWR: 2.0 MAX.
2. Dimension Inspection:tems.
TF]-FAI First Article Inspection; []-Key Item for In-process Inspection; (O]-Outgoing Inspection; (CPK]/ [SPC-Statistical Control
3. Visual Inspection: 100% visual inspection. No scratches, damage or dirt on product surface; plating shall be bright and uniform without oxidation.
4. Packaging Specification: 50 PCS per bag.
5. Environmental Requirement: The product and all materials used in the manufacturing process shall comply with EU RoHs directive requirements.

No.	PART NUMBER	PART NAME AND DESCRIPTION	Q'TY
7	2TA050BK1-020	Heat shrinkable Tubing: Ø5.0*L20.00 mm, Halogen free Flame Retardant, 125H2 Standard Type, Black	1
6	2YG099	Copper Tube: Ø5.20*Ø0.80*L22.00 mm, Dual band Signal Copper Tube	1
5	2YG098	Copper Tube: Ø5.20*Ø1.55*L22.00 mm, Dual band Signal Copper Tube	1
4	2SBKG4000	Short Antenna Sleeve with Internal Hexagon: Ø13.60*L68.00 mm, TPEE, Black	1
3	2LC15PF804-5	SMA Female Contact: Ø1.50*L6.20, Gold plated	1
2	2LC15PM034-8	SMA Plug: H8.00*L15.00 mm, Body Nickel plated	1
1	2C5R17811BN1	Micro coaxial Cable, RG178, Silver tinned Conductor, Brown	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 21.04.23
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
2dBi WiFi Dual band Antenna, RG178 Cable + SMA Plug with Female Contact, G40, Black Sleeve, OD:13.6 × L68 mm
CODE: 3D4001BK00-001

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

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WIFI 2.4G&5.8G EXTERNAL ANTENNA

1 SCOPE

1.1 CONTENTS

This specification covers the performance, tests and acceptance criteria for the EXTERNAL 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
2.4~2.5G,5.15~5.85G	50Ω	2.0 MAX.	4dBi	-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

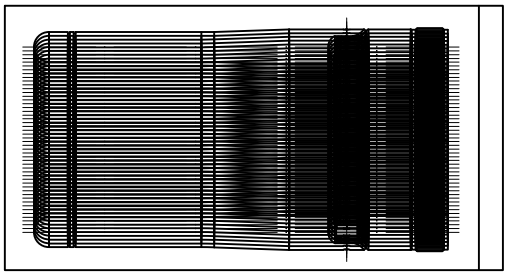
No.	Items	Test Condition	Specifications
		GENERAL	
1	Contact Resistance	Solder the receptacle connector to the test board and mate the plug connector together, then measure the contact resistance as shown in figure 1 by the four terminal method. Open circuit voltage: 20mV MAX Circuit current: 10mA MAX	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 300 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	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	>10kgf
6	Durability	Solder the receptacle onto the test board, interlock the male and female connectors using a mating tester for 500 cycles, and then test the parameters.	Appearance: No AbnormalityConta

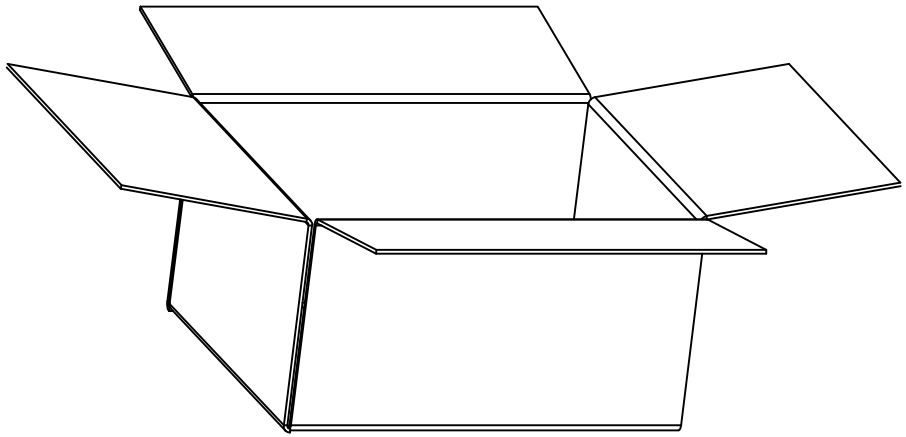
			ct Resistance: Shall meet 3.4.1/2/3/4
7	Bending test	1 he antenna should have a good rhythm, when it was bended。 2.When the antenna was fixed ,turn it to 45° angle ,and the antenna didn't slide free。 3.After 200 bending cycles from 45° to 90°, there shall be no powder residue on the fixed base, and no damage to the antenna body.	After testing, the antenna shall maintain good elasticity and be able to hold its position at a 45° angle. Shall meet 3.4.1/2/3/4
ENVIRONMENTAL 环境性能			
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 : 48 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	FIRST ISSUE	2024.02.28





PACKAGING SPECIFICATION：
1. 50PCS/BAG.
2. ATTACH MATERIAL CARD/ENVIRONMENTAL LABEL TO EACH PE BAG.
3. 1000PCS/BOX(360*360*145),CHOOSE THE APPROPRIATE SIZE OF CARDBOARD BOX ACCORDING TO THE QUANTITY OF MATERIALS.
4. CARTON SEALING TREATMENT.

GENERAL TOLERANCE:
UNLESS OTHERWISE SPECIFIED
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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: PACKING DRAWING
DRA./DATE: *S.He 24.02.28*
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: 3D4001BK00-001

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

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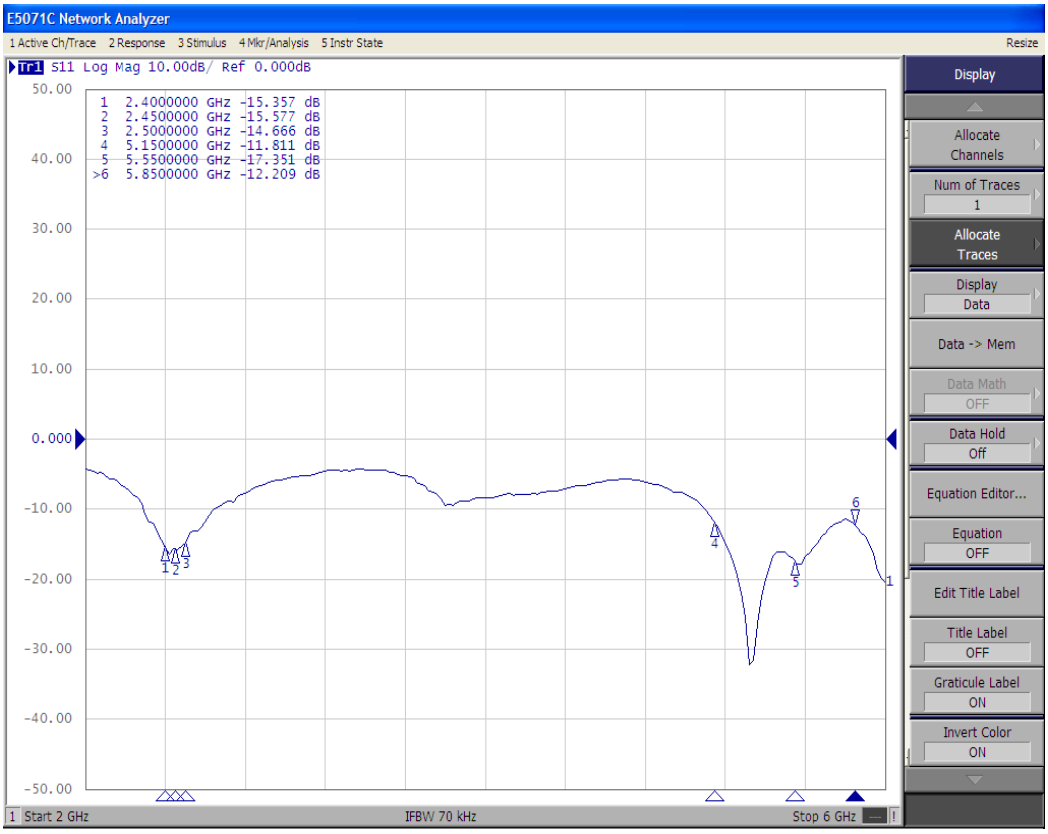
Antenna Electrical Characteristic Test Report

文件编号:HJ-QR-Q-22 Rev:A0

Part Number:	3D4001BK00-001	Item	Spec	Judge
Part Name:	WiFi 2.4G&5G EXTERNAL ANTENNA,HOUSING BLACK,RG178 CABLE+SMA PLUG,OD10*L68mm	VSWR	≤2.0	pass
Test Equipment	Agilent E5071C/OTA Chamber	Characteristic impedance	50Ω	pass
Quantity	5pcs			
Test Date	2026/9/2			



1 RETURN LOSS



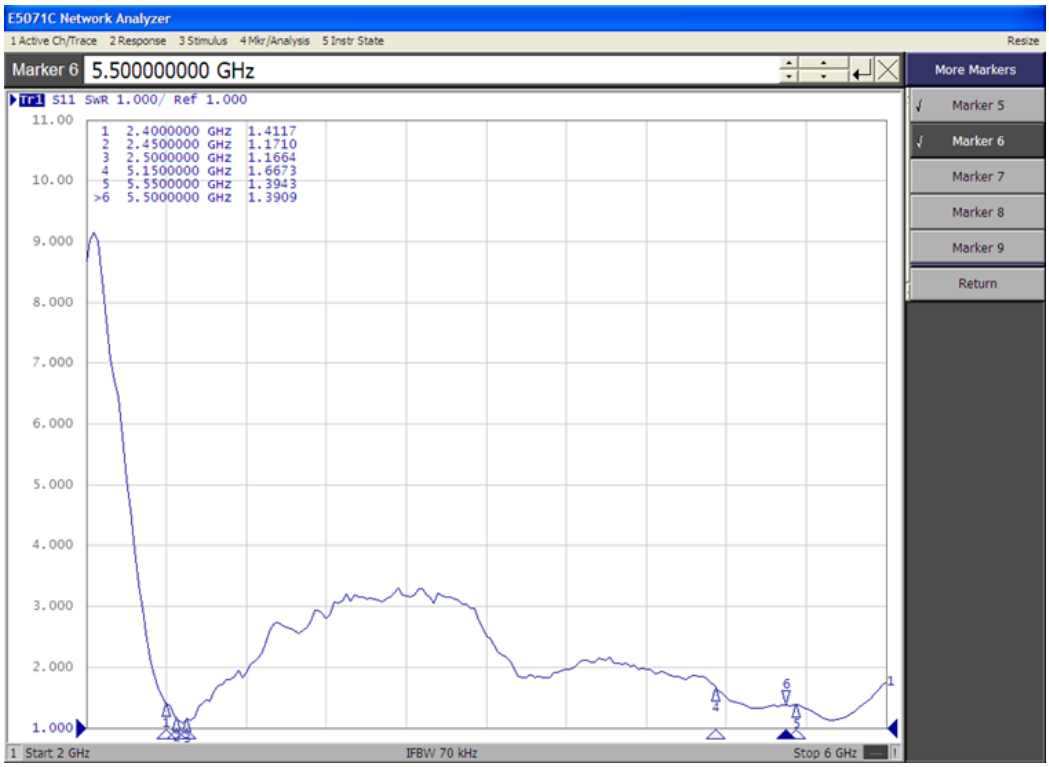
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Antenna Electrical Characteristic Test Report

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Test Equipment	Agilent E5071C/OTA Chamber	Characteristic impedance	50Ω	pass
Quantity	5pcs			
Test Date	2026/9/2			

2 VSWR



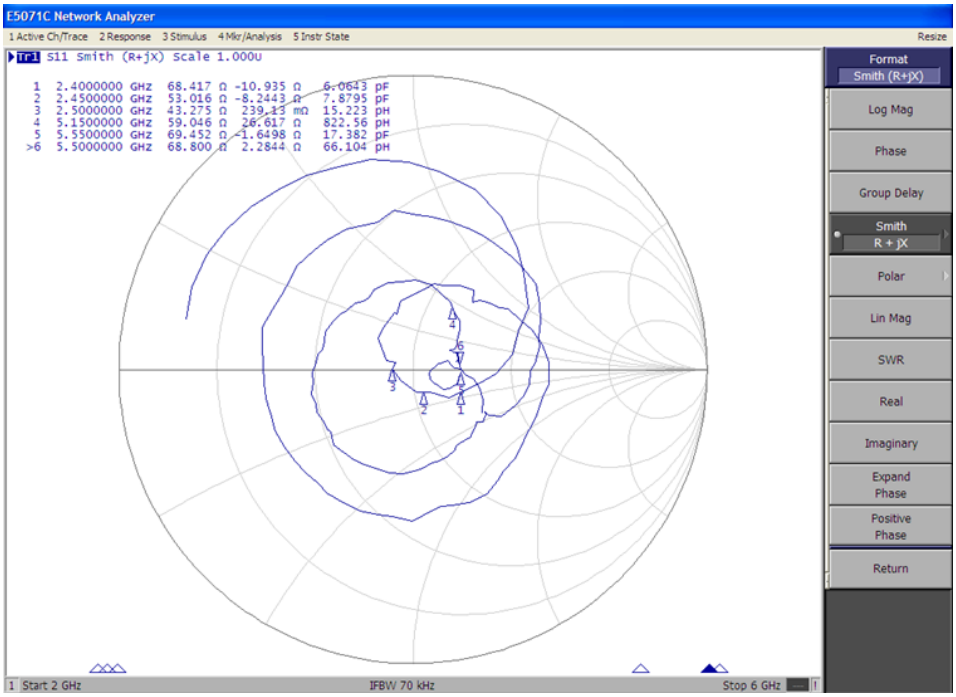
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3 SMITH(R+JX)



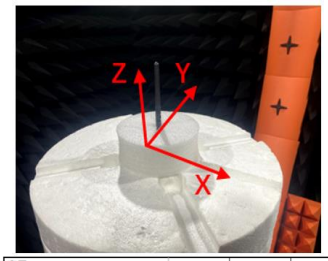
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Antenna Electrical Characteristic Test Report

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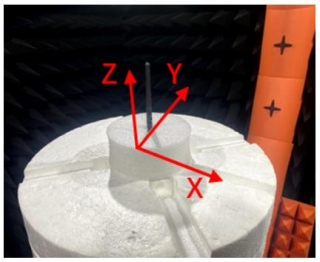
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Part Name:	WiFi 2.4G&5G EXTERNAL ANTENNA,HOUSING BLACK,RG178 CABLE+SMA PLUG,OD10*L68mm	Gian	4DBI	pass
Test Equipment	Agilent E5071C/OTA Chamber	Characteristic impedance	50Ω	pass
Quantity	5pcs			
Test Date	2026/9/2			

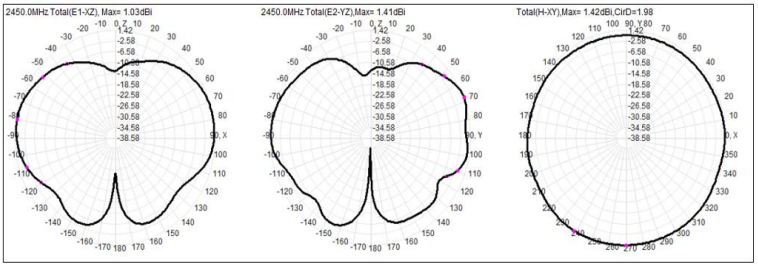
4 2D/3D RADIATION PATTERN

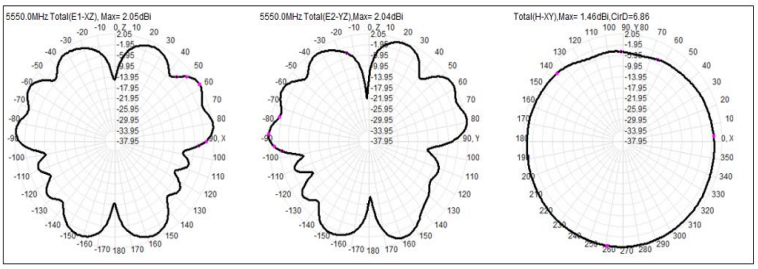


序号	1	2	3	4	5	6	7	8	9	10	11
频率(MHz)	2400.0	2410.0	2420.0	2430.0	2440.0	2450.0	2460.0	2470.0	2480.0	2490.0	2500.0
效率 (dBi)	-1.91	-1.76	-1.63	-1.45	-1.34	-1.36	-1.39	-1.48	-1.52	-1.51	-1.52
增益 (dBi)	1.58	1.68	1.61	1.69	1.67	1.60	1.60	1.35	1.46	1.30	1.27
效率 (%)	64.47	66.70	68.71	71.59	73.48	73.08	72.66	71.17	70.48	70.62	70.44
方向性(dB)	3.49	3.44	3.24	3.14	3.01	2.96	2.99	2.82	2.98	2.81	2.80
最大增益位置(theta)	85.00	86.00	85.00	85.00	86.00	85.00	86.00	86.00	86.00	86.00	86.00
最大增益位置(Phi)	239.00	239.00	237.00	235.00	236.00	235.00	235.00	235.00	234.00	233.00	233.00
水平极化效率(%)	62.06	64.29	66.43	69.35	71.25	70.97	70.69	69.26	68.64	68.80	68.67
垂直极化效率(%)	2.41	2.41	2.28	2.25	2.22	2.10	1.97	1.91	1.84	1.82	1.77
上半球效率 (%)	38.95	40.03	41.60	43.52	44.14	44.47	44.04	42.76	42.76	42.15	42.11
下半球效率 (%)	25.52	26.67	27.11	28.07	29.33	28.61	28.62	28.40	27.72	28.47	28.33

序号	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
频率(MHz)	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
效率 (dBi)	-1.97	-2.05	-1.93	-1.69	-1.89	-1.58	-1.70	-1.88	-2.01	-1.83	-1.79	-1.78	-1.59	-1.83	-1.86
增益 (dBi)	1.92	2.40	2.55	2.96	2.65	2.83	3.21	2.80	2.23	2.47	2.81	3.27	3.92	3.28	3.92
效率 (%)	63.60	62.36	64.14	67.71	64.65	69.45	67.60	64.90	63.00	65.56	66.26	66.42	69.29	65.61	65.15
方向性(dB)	3.88	4.45	4.48	4.66	4.54	4.41	4.91	4.68	4.24	4.31	4.60	5.05	5.51	5.11	5.78
最大增益位置(theta)	76.00	75.00	76.00	76.00	76.00	76.00	77.00	77.00	59.00	157.00	156.00	157.00	157.00	158.00	158.00
最大增益位置(Phi)	97.00	97.00	97.00	97.00	95.00	95.00	94.00	94.00	344.00	46.00	47.00	47.00	48.00	50.00	51.00
水平极化效率(%)	62.65	61.48	63.20	66.76	63.68	68.42	66.54	63.78	61.62	63.97	64.42	64.25	66.74	62.96	62.30
垂直极化效率(%)	0.95	0.88	0.93	0.95	0.98	1.03	1.06	1.11	1.38	1.58	1.84	2.16	2.55	2.65	2.85
上半球效率 (%)	38.06	39.33	41.70	45.63	45.57	50.67	51.48	49.18	46.65	45.19	43.26	40.76	39.21	36.53	34.43
下半球效率 (%)	25.54	23.03	22.43	22.07	19.09	18.78	16.12	15.72	16.35	20.37	23.00	25.66	30.08	29.08	30.72







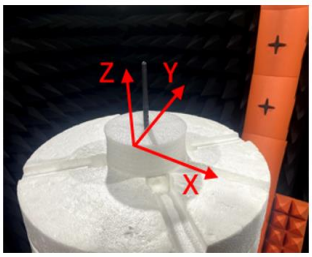
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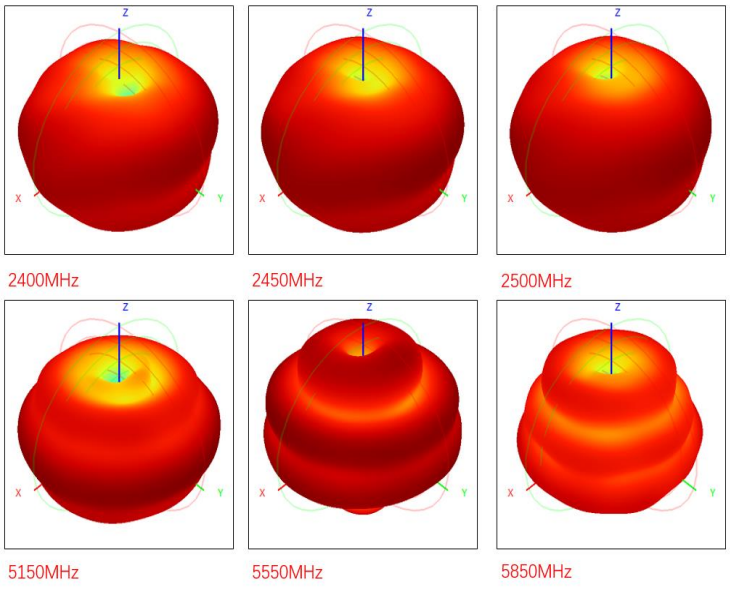
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Test Equipment	Agilent E5071C/OTA Chamber	Characteristic impedance	50Ω	pass
Quantity	5pcs			
Test Date	2026/9/2			

4 2D/3D RADIATION PATTERN





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