Antenna Specifications

Customer Name：瑞德智能

Antenna Name：WiFi Antenna

Part Number: HC-ANL-070096A

Shenzhen Huake Communication Co., LTD

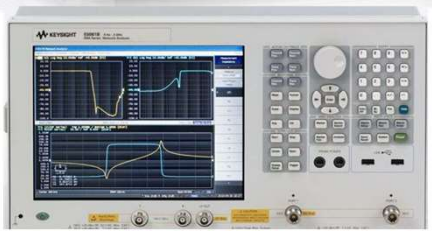
Room 401, Building A, No. 35, Haoye Road, Fuhai Sub-district, Bao 'an District, Shenzhen, China

RF Engineer：孙旭

Project leader：陈浪

Date: May 30, 2025

1.Test Projects and Equipment Systems



Test items	Test Parameters	Instrumentation
S-Parameter	VSWR，Return Loss	Agilent E5071C
OTA Chamber	Efficiency, Gain, Direction Pattern	OTA Lab(4*3*3m) 24 Probe Agilent E5071C
OTA Active Test	TRP,TIS	OTA Lab(4*3*3m) R&S CMW 500
EMC Interference search	Interference Electromagnetic Waves	OTA Lab(4*3*3m) KEYSIGHT N9020A

2.Explanation of terms

VSWR: short for voltage standing wave ratio, refers to the ratio of the reflected wave amplitude to the incident wave amplitude. Ideally, when the impedance is perfectly matched, the value of the standing wave ratio is 1. In actual engineering, reflections are bound to exist, and the standing wave ratio is greater than 1 at this time. The greater the reflection, the greater the standing wave ratio. Therefore, for the technical parameter of standing wave ratio, the lower the value and the closer it is to 1, the better.

Return Loss: Return loss RL refers to the ratio of the power reflected from the RF input signal to the power of the input signal. It is expressed in dB and is a negative number. Ideally, the impedance of the antenna and the RF circuit are perfectly matched, and there is no reflected power at all. In this case, the return loss is infinitely small. However, in engineering, it is impossible to perfectly match the impedance, so reflected power must exist. The worst case is that the input power is completely reflected, and the return loss is 0. Therefore, for the technical parameter of return loss, the lower the value, the better the antenna performance.

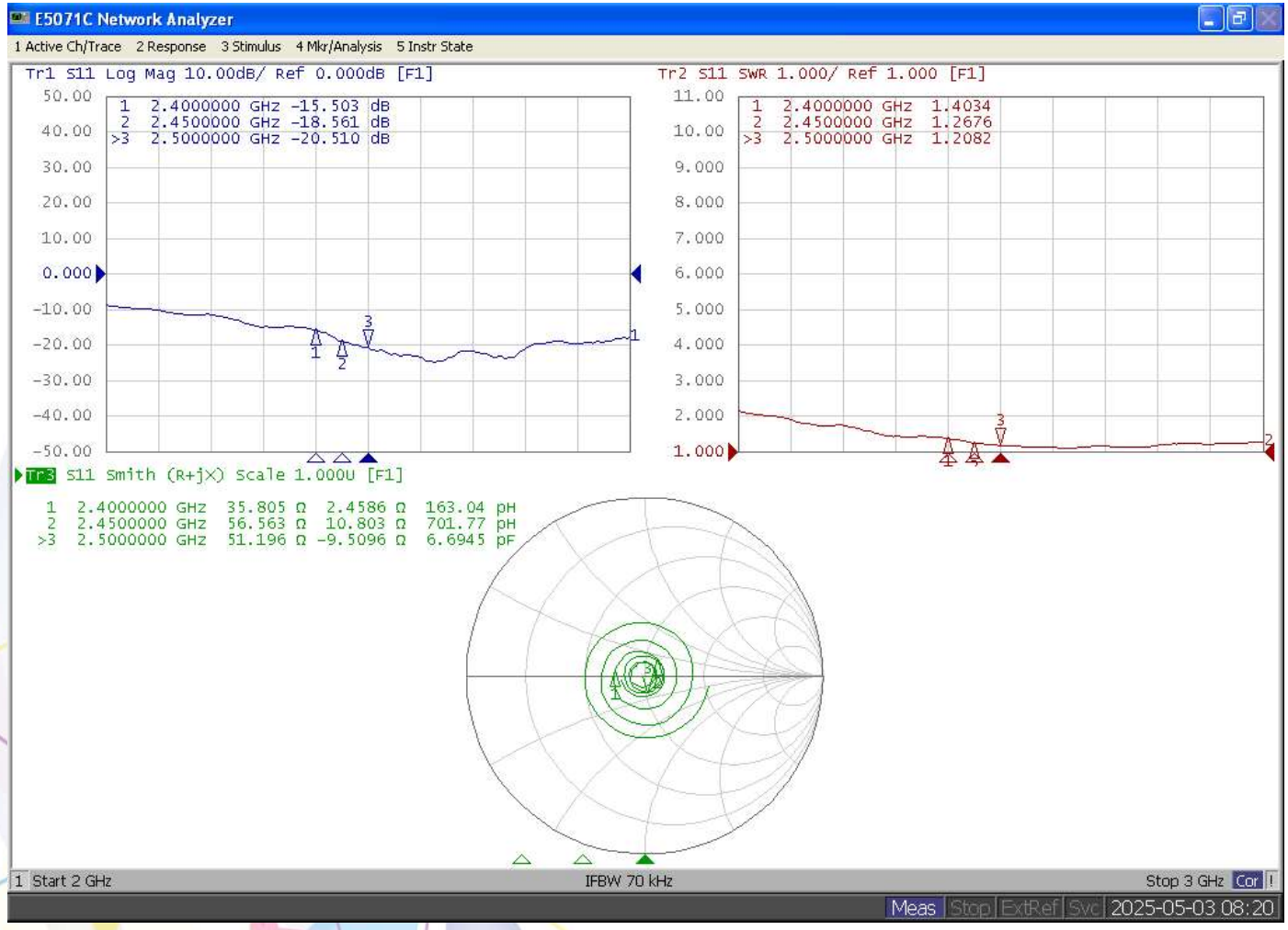
Efficiency: Efficiency refers to the ratio of the power radiated by the antenna (i.e. the power of the electromagnetic wave part that is effectively converted) to the power input to the antenna. It is a value that is always less than 100%.
Gain: Antenna gain refers to the ratio of the power density of the signal generated by the actual antenna and the ideal radiating unit at the same point in space under the condition of equal input power. It quantitatively describes the degree to which an antenna concentrates the input power for radiation. Usually in dBi.

Smith diagram: The impedance circle diagram refers to a trajectory diagram that uses the one-to-one correspondence between normalized impedance and reflection coefficient to represent the normalized impedance on the complex plane of the reflection coefficient.

TRP: Total Radiated Power, is the integral value (spherical average) of the effective radiated power EIRP of the mobile station in three-dimensional space. It reflects the transmission characteristics of the mobile station in all directions.

TIS: Total Isotropic Sensitivity is the integral value (spherical average) of the effective radiation reception sensitivity EIS of the mobile station in three-dimensional space. It reflects the receiving characteristics of the mobile station in all directions.

3. VSWR

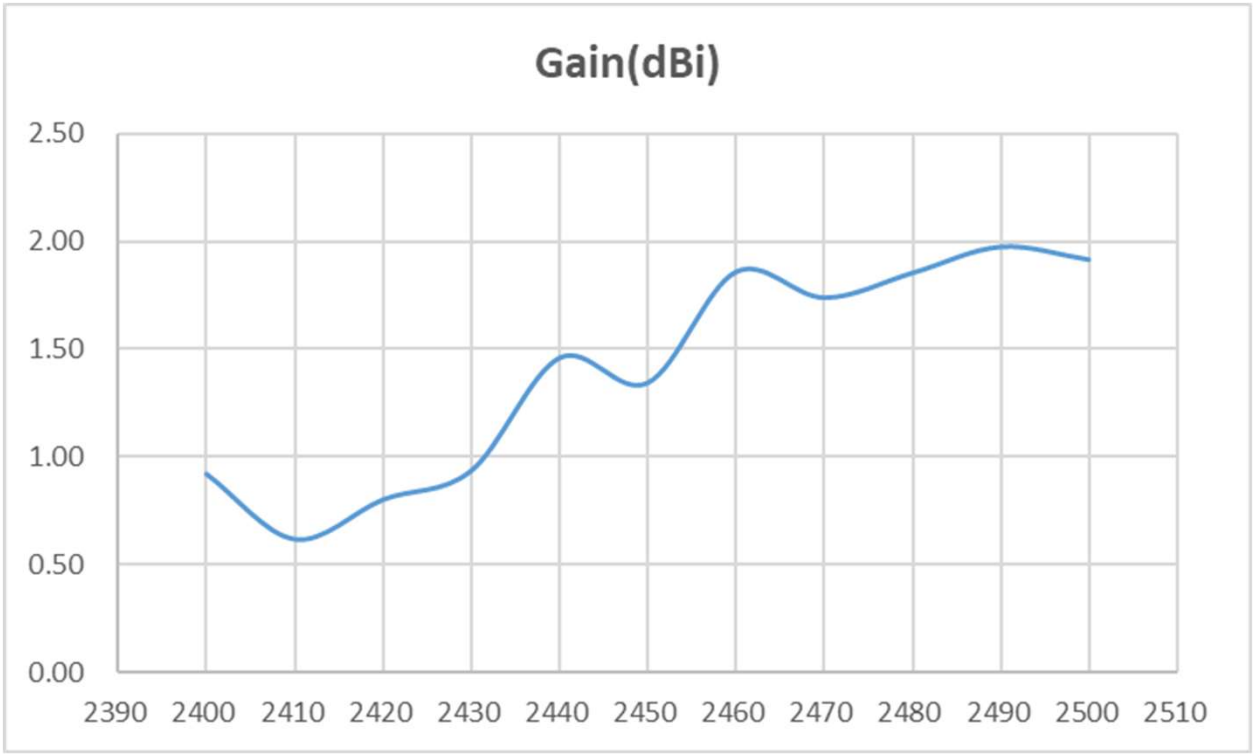


The parameters are based on an ABS plastic panel with a length and width of 30*20mm and a thickness of 3mm.

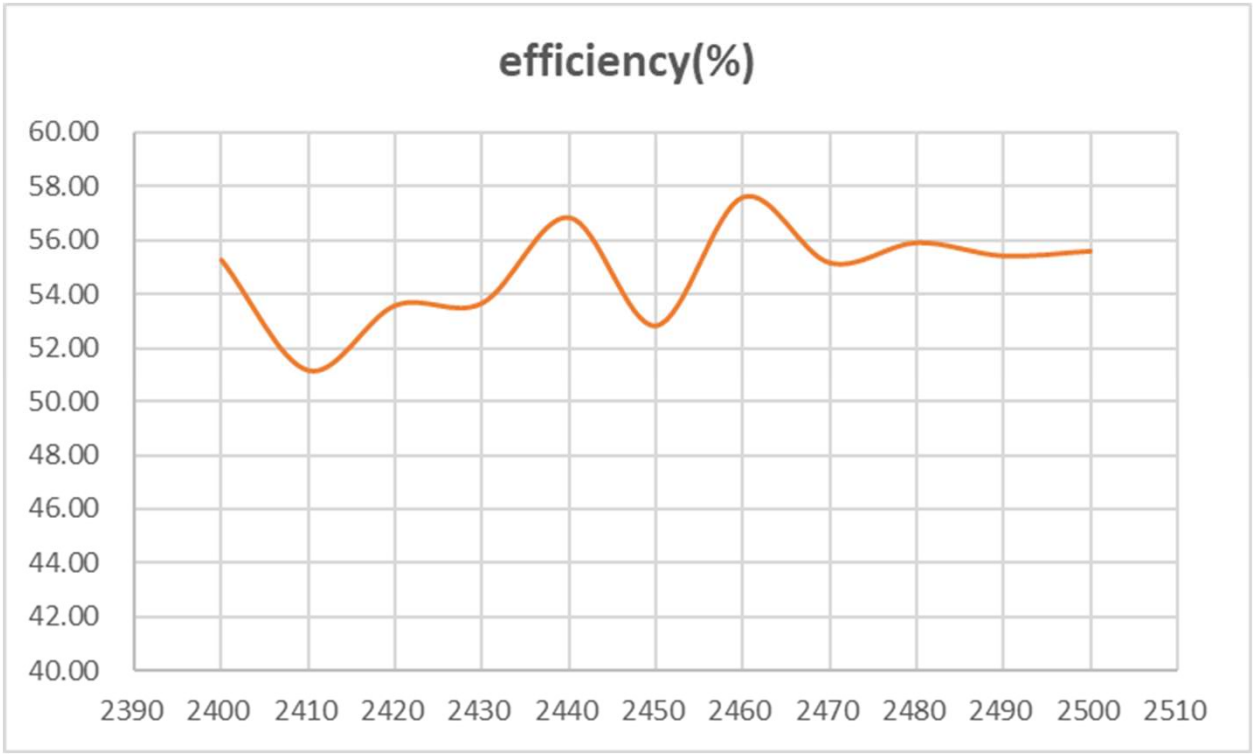
4. Gain 、 Efficiency

Item	Frequency (MHz)	Gain (dBi)	Efficiency (%)
1	2400.0	0.92	55.28
2	2410.0	0.62	51.20
3	2420.0	0.80	53.60
4	2430.0	0.94	53.69
5	2440.0	1.46	56.86
6	2450.0	1.34	52.85
7	2460.0	1.86	57.60
8	2470.0	1.74	55.18
9	2480.0	1.86	55.92
10	2490.0	1.98	55.43
11	2500.0	1.92	55.61

4.1 Gain

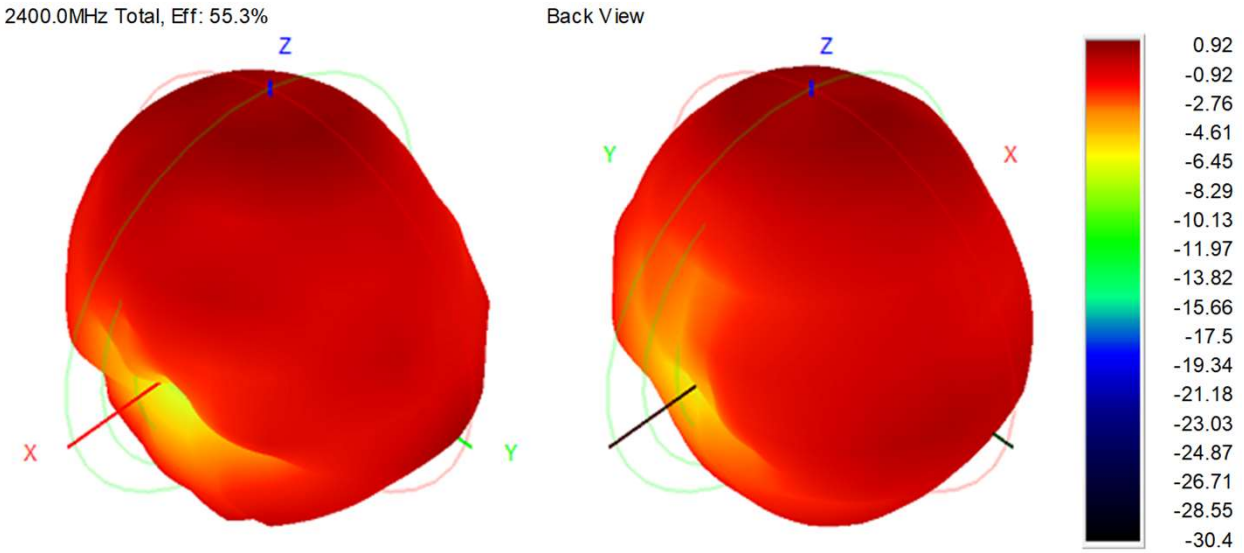

Gain(dBi)
2.50
2.00
1.50
1.00
0.50
0.00
2390
2400
2410
2420
2430
2440
2450
2460
2470
2480
2490
2500
2510

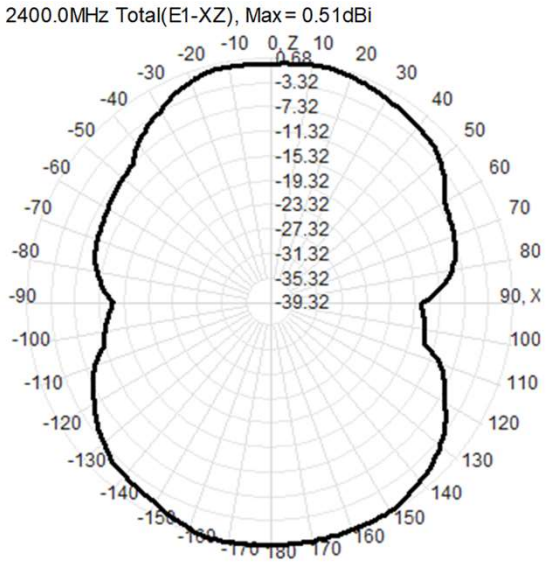
4.2. Efficiency

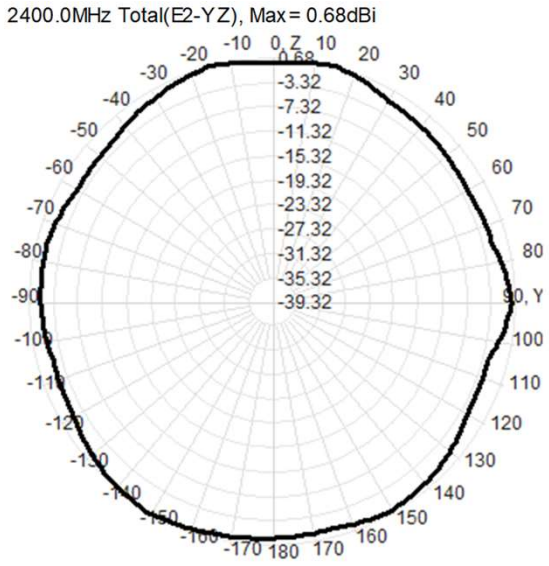


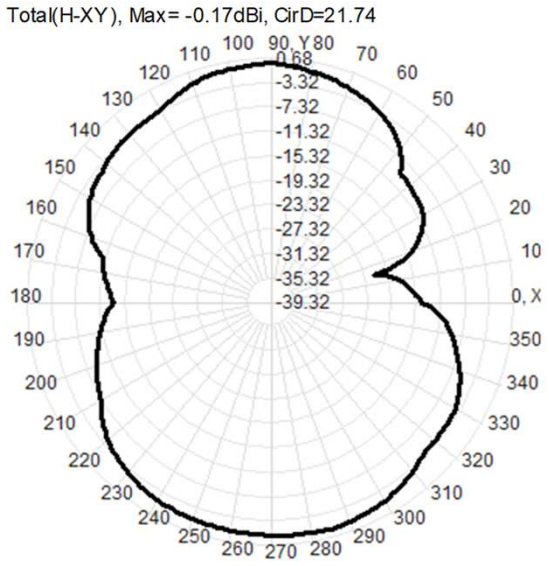
5. 2D&3D Radiation Pattern

5. 1 2D&3D Radiation Pattern For 2400MHz

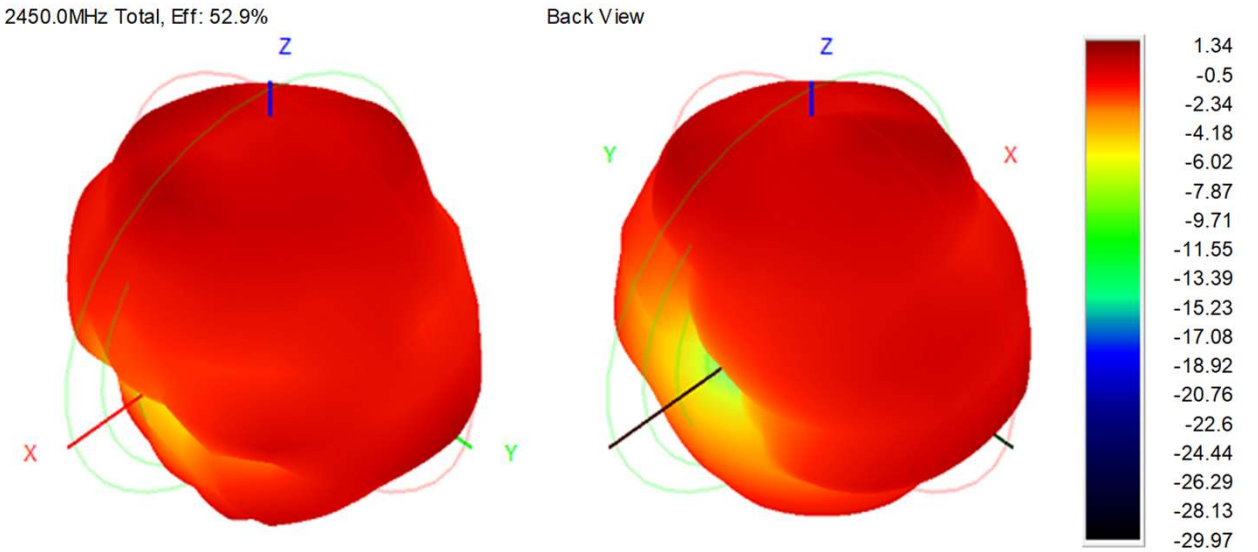


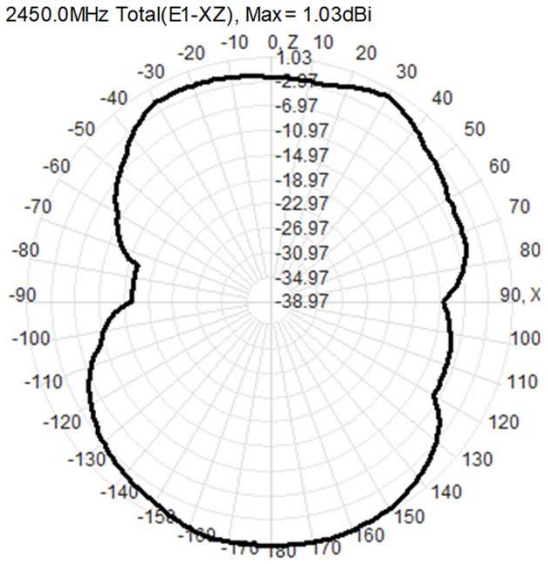


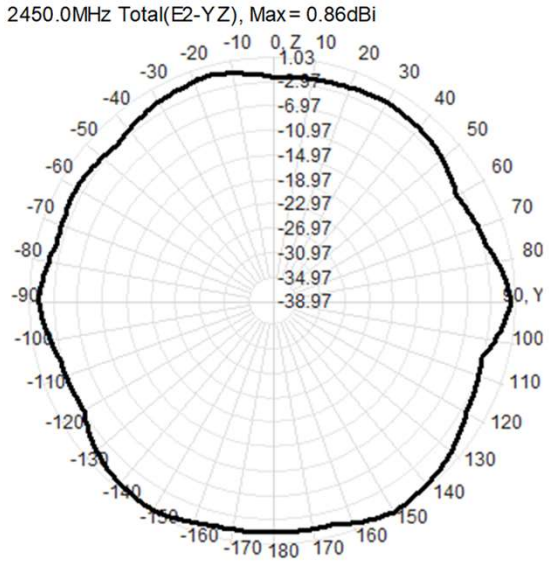


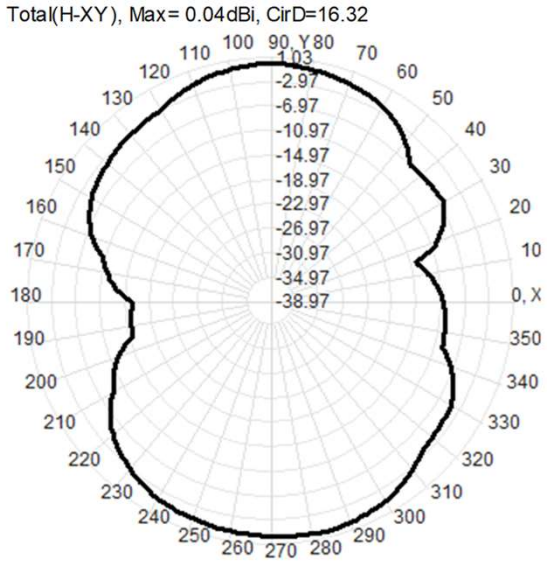


5. 2 2D&3D Radiation Pattern For 2450MHz

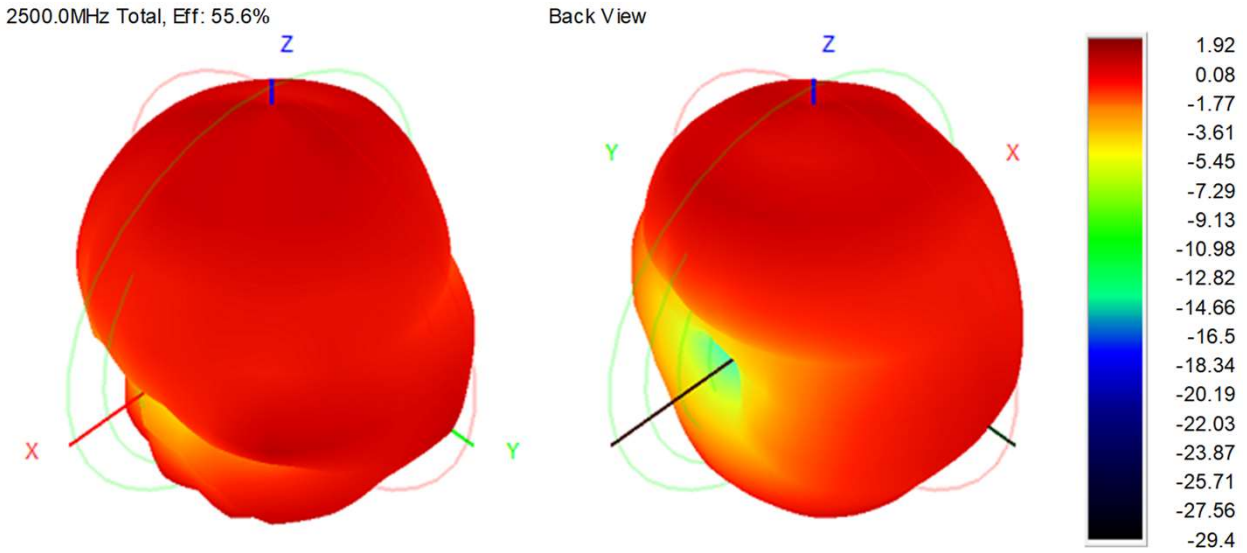


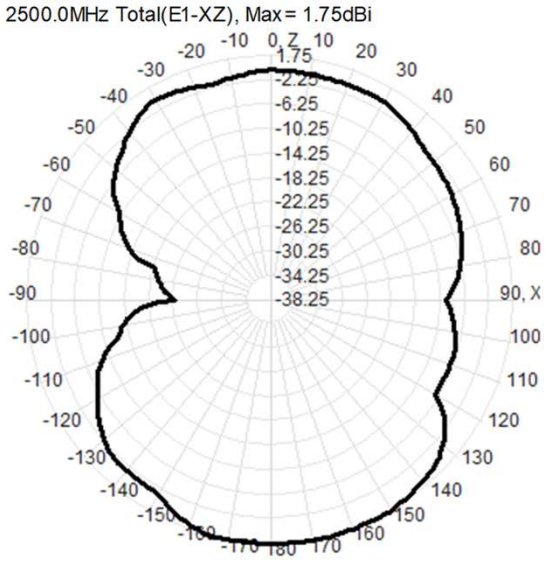


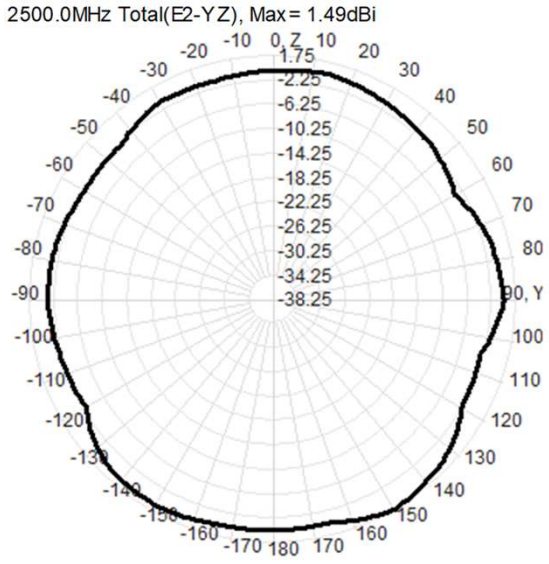


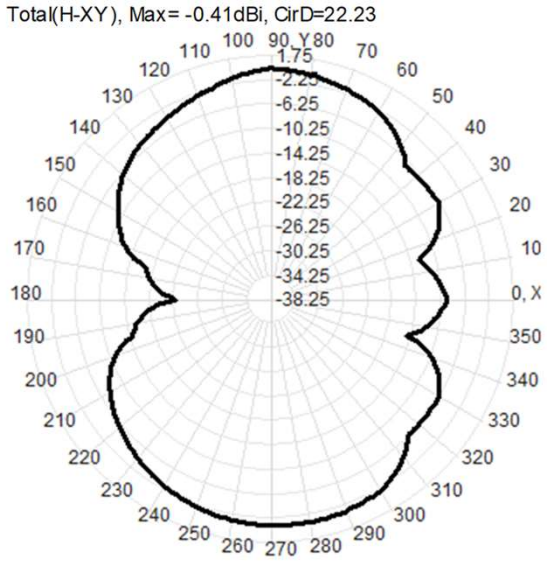


5. 3 2D&3D Radiation Pattern For 2500MHz









6. Test Results and Conclusions

1. 以上为HC-ANL-070096A天线的测试报告；

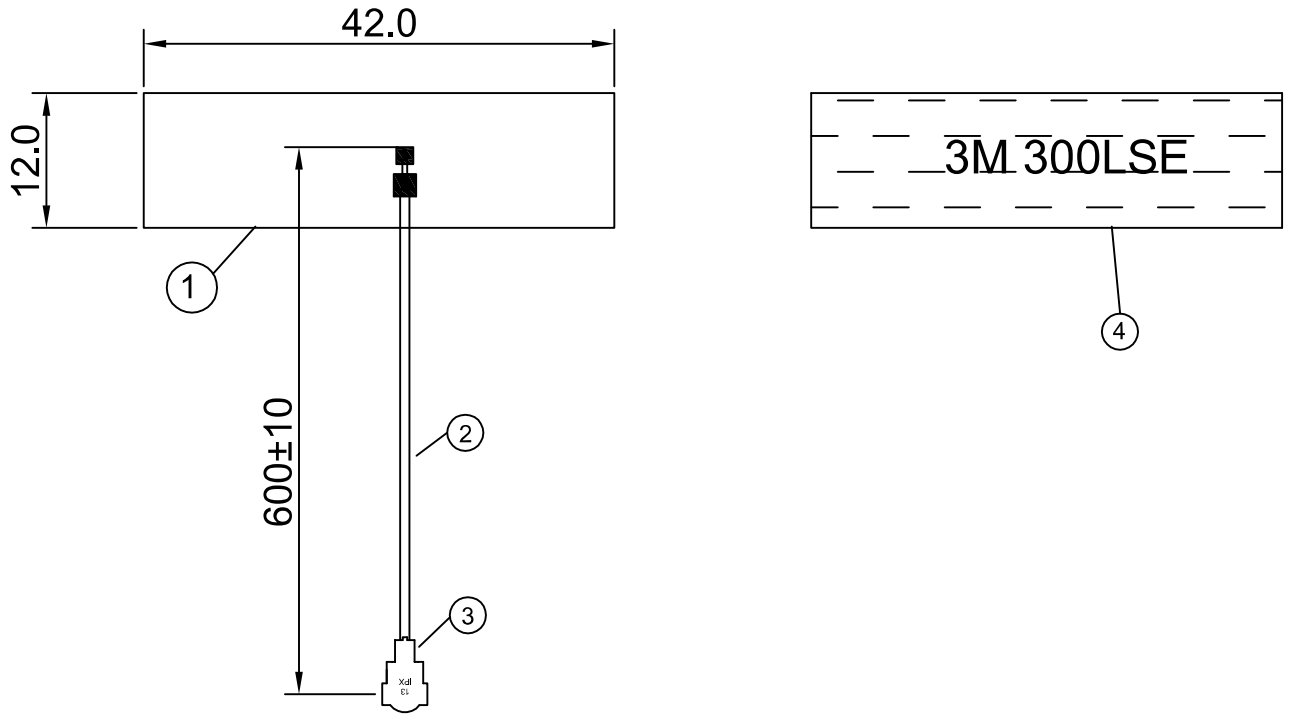
2. 天线的无源参数驻波，增益，效率较为理想，经过综合评估该天线可 以满足使用。

3. 请确保您的样机为最新版本，若您更换物料，元器件，更新软件，变更环境处理等等，可能会对天线和整机的通讯性能产生一定的影响，您需要与我们专业的射频工程师沟通评估，必要时需要重新匹配。

RevNo	Revision note	Date	Signature
V1.0	Sketch only	02/13/2025	BIN.LIU

Part No.	HC-ANL-070096A

Environment Protections: RoHS 2.0 Compliant.



Material & Finishing:
1. Antenna element : FPC
2. Cable: RG1.13 Black
3. Connector(choice): MHF-1/IPEX-1
4. Bottom:3M 300LSE

Electrical Data:
1. Impedance: 50 Ohms
2. Frequency: 2400-2500MHz
3. Salt spray test: 48h

Unless otherwise specified, tolerances as below: .X ±0.20 .XX ±0.10 .XXX ±0.05 Angle: ±2°	Material:	See Note	Weight	g	华科通讯 HUAKE	
	Finish:	See Note	Scale	1 : 1		
	Unit	mm	Page	1/1		
	REV.	V1.0	P/N	-	DWG NO.	13.02.252
Drawn	LIU	DATA:02/13/25	Projection		Cust P/N.	-
Checked	D.CANG	DATA:02/13/25	Title: WiFi/BT ANTENNA FOR FPC/1.13-IPEX-1			
Approved	SUN	DATA:02/13/25				