

5.0 x 2.0 x 0.6 (mm) WiFi/Bluetooth Ceramic Chip Antenna (YF500A) Engineering Specification

1. Product Number

YF 5020 H1 R 2G4502

1 2 3 4 5



(1)Product Type	Chip Antenna
(2) Size Code	5.0x2.0mm
(3) Type Code	H1
(4) Packing	Tape and reel
(5) Frequency	2.45GHz



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SHEN ZHEN YINGFENG ANTENNA TECHNOLOYCO., LTD

Prepared by : **harry**

Designed by : **andy**

Checked by : **andy**

Approved by : **oliver**

TITLE : 5.0 x2.0 x 0.6mm) WiFi/Bluetooth Ceramic Chip
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2. Features

- *Stable and reliable in performances
- *Low temperature coefficient of frequency
- *Low profile, compact size
- *RoHS compliance
- *SMT processes compatible

3. Applications

- *Bluetooth earphone systems
- *Hand-held devices when WiFi /Bluetooth functions are needed, e.g., Smart phone.
- *IEEE802.11 b/g/n
- *ZigBee
- *Wireless PCMCIA cards or USB dongle

4. Description

Ying feng chip antenna series are specially designed for WiFi/Bluetooth applications. Based on yingfeng proprietary design and processes, this chip antenna has excellent stability and sensitivity to consistently provide high signal reception efficiency.

5. Electrical Specifications (40 x 40 mm² ground plane)

5-1. Electrical Table

Characteristics		Specifications	Unit
Outline Dimensions		5.0x2.0x0.6	mm
Working Frequency		2400~2500	MHz
VSWR		2 Max.	
Impedance		50	Ω
Polarization		Linear Polarization	
Gain	Peak	2 (typical)	dBi
	Efficiency	75 (typical)	%

5-2. Return Loss & VSWR



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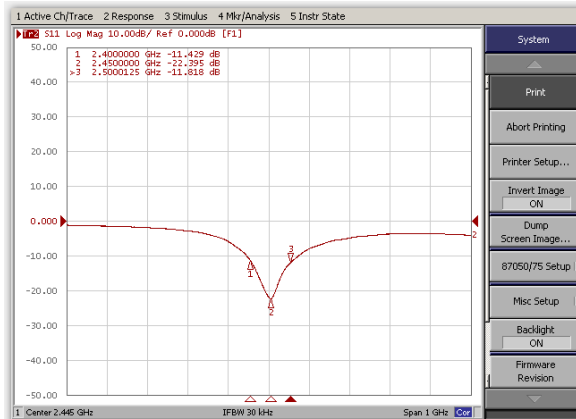
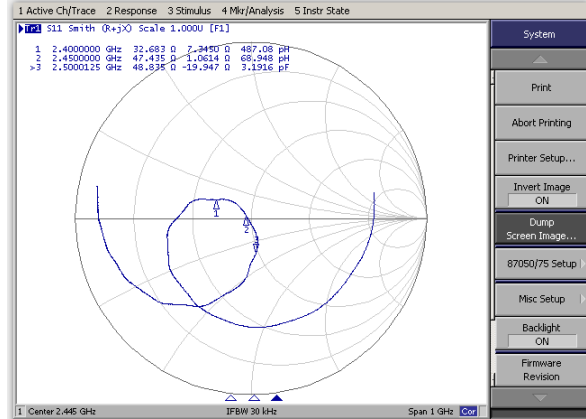
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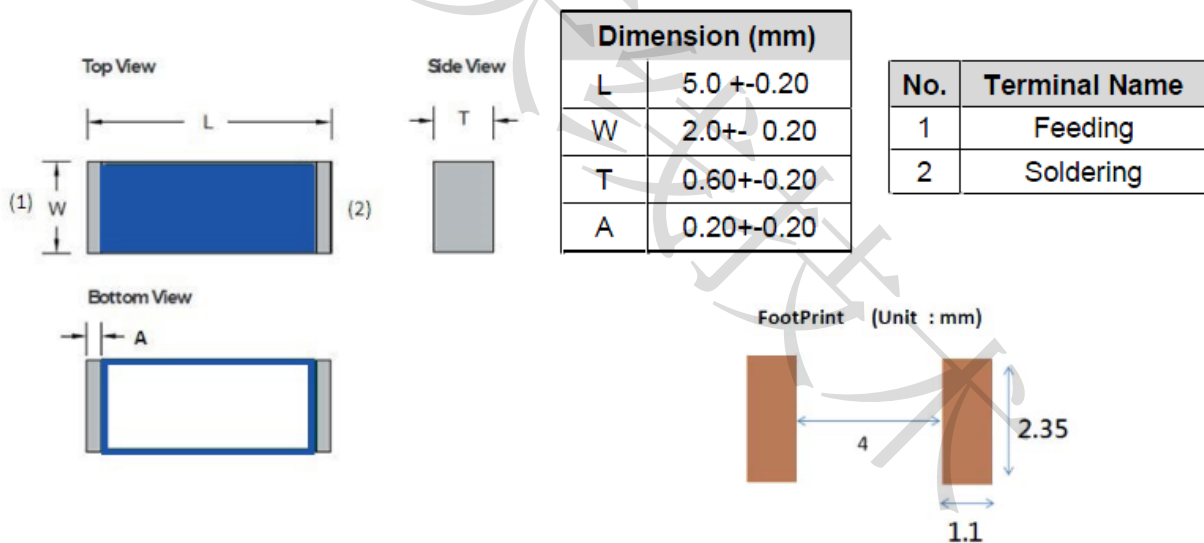
Return Loss (S_{11})Smith Chart(S_{11})

6 Outline Dimensions of Antenna & Evaluation Board (unit: mm)

6-1. Antenna Dimensions

Configuration and Dimensions:

Dimension and Terminal Configuration



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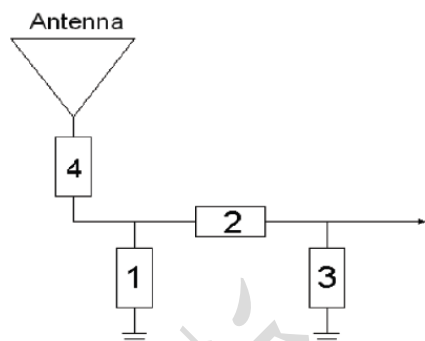
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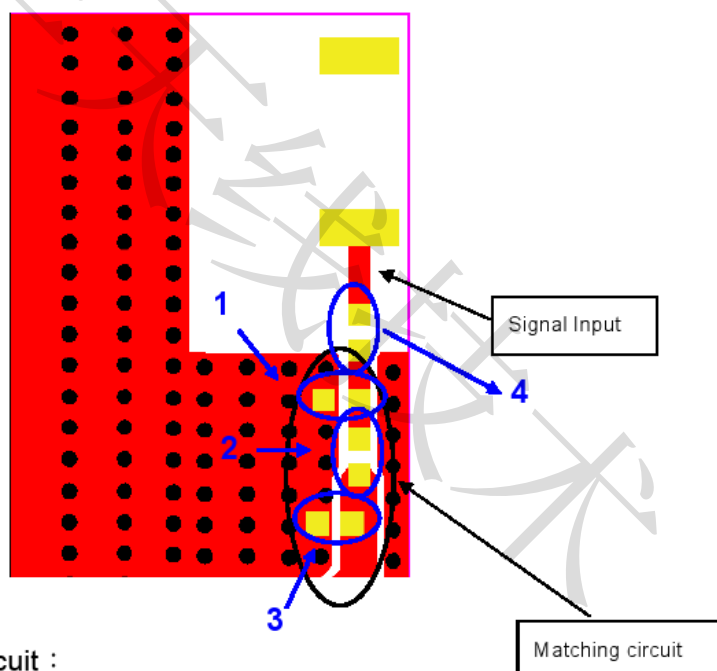
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6-2-2. Matching Circuit:

With the following recommended values of matching and tuning components, the center frequencies will be about 2450 MHz at our standard 40x40 mm² evaluation board. However, these are reference values, may need to be changed when the circuit boards or part vendors are different.



System Matching Circuit Component		
Location	Description	Vendor
1	N/A*	-
2	3.3nH, (0402)	DARFON
3	1.5pF, (0402)	MURATA
4	0Ω, (0402)	-



8-2. Matching circuit :



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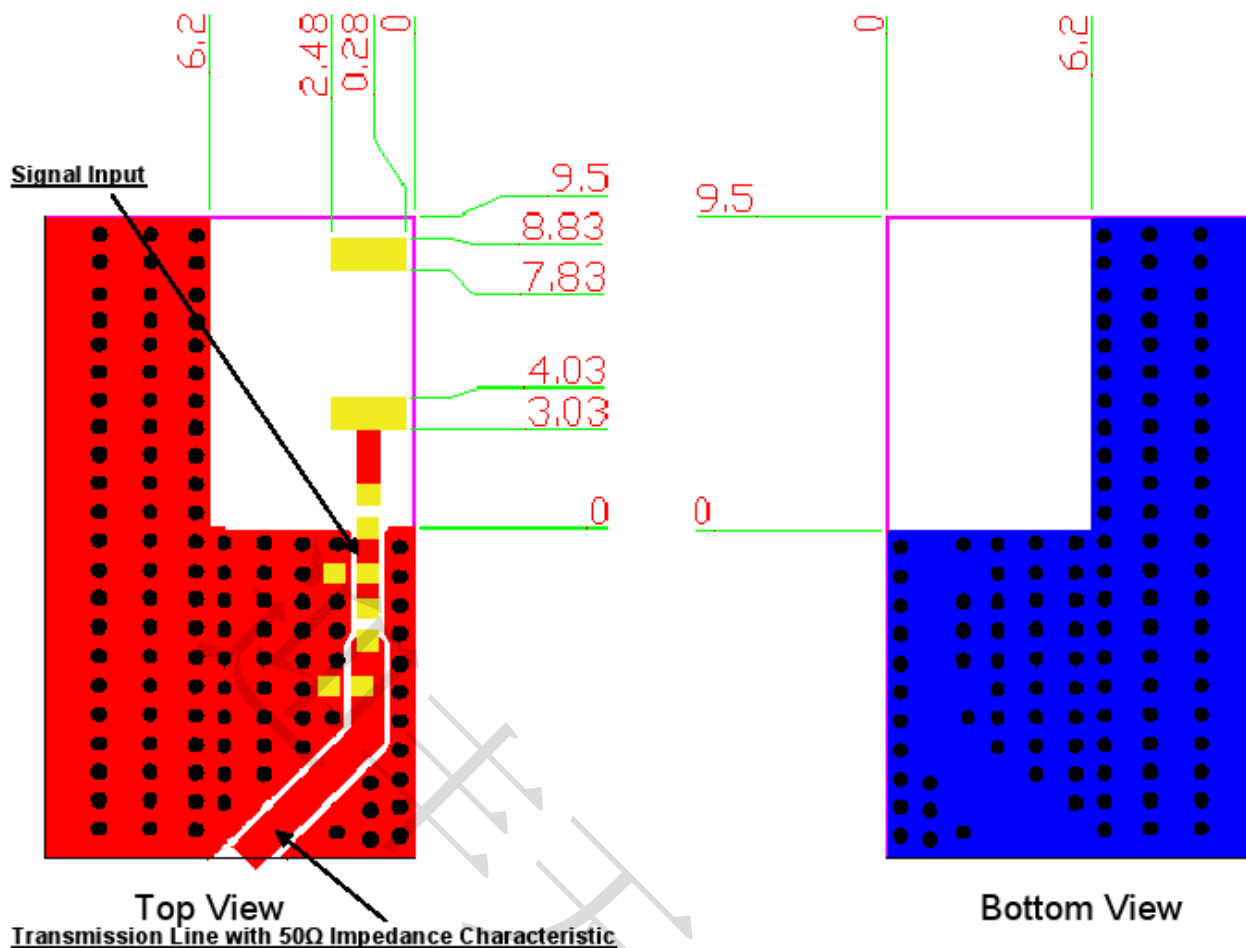
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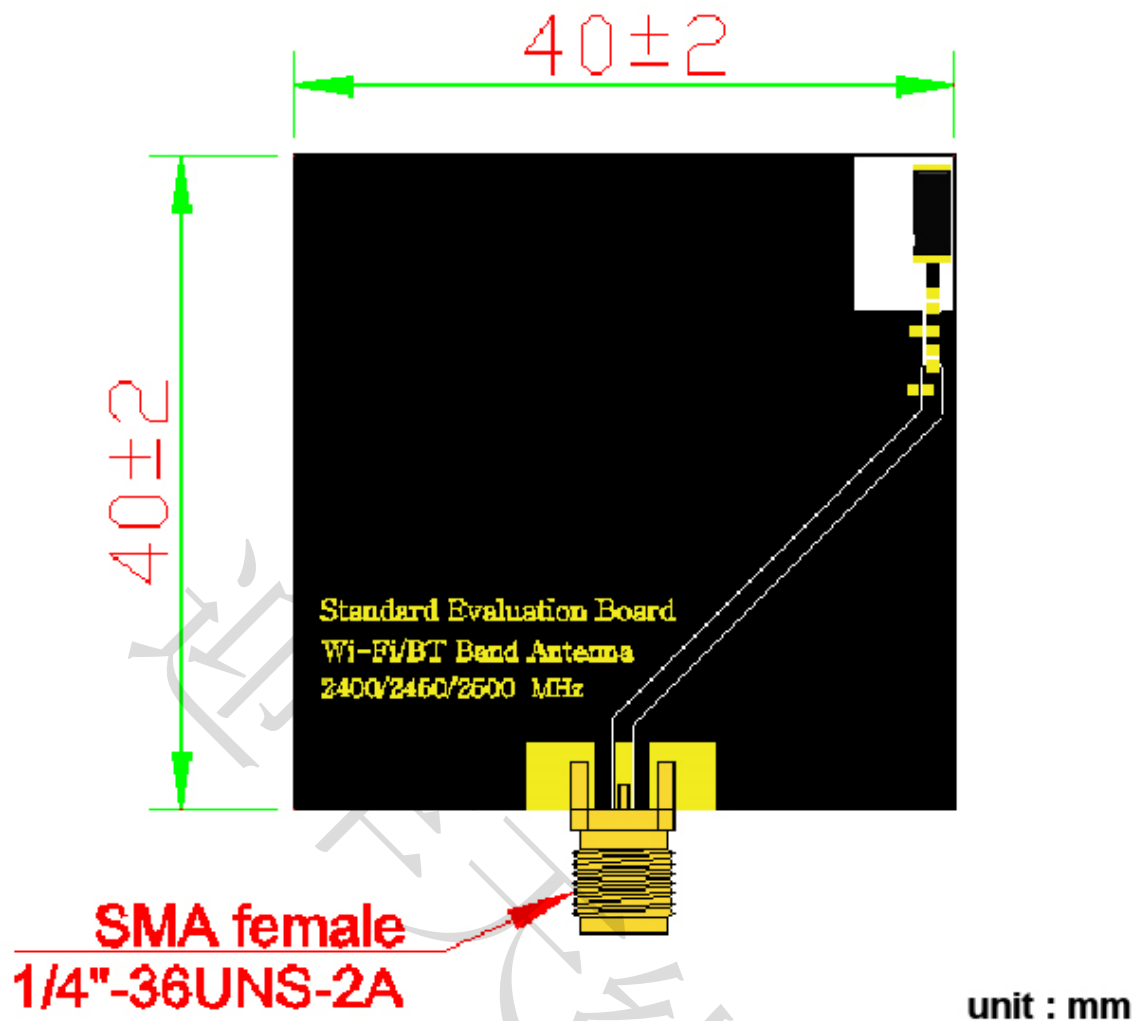
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7.Radiation Pattern (40x 40 mm² ground plane)

7-1. 3D Gain Pattern @ 2450 MHz



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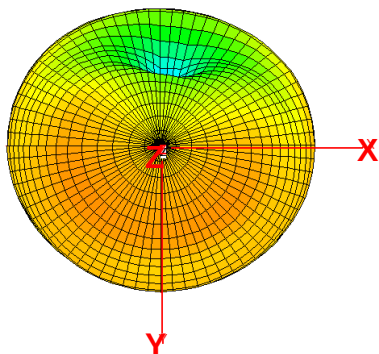
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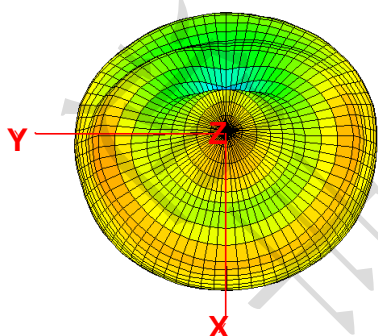
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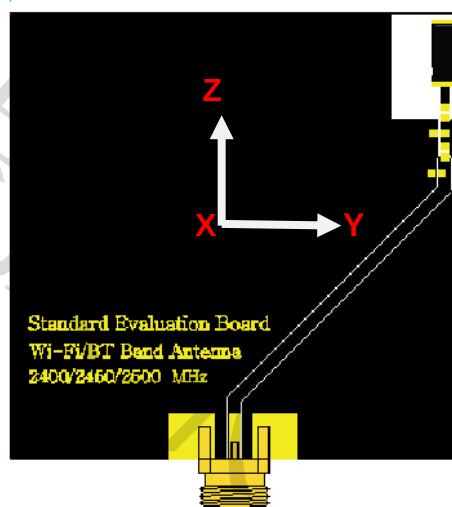
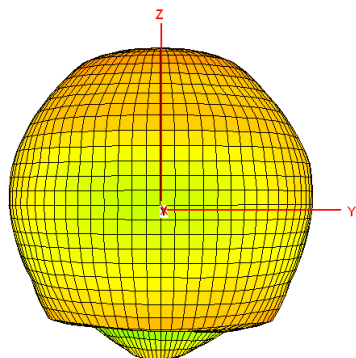
Azimuth = -180.0
 Elevation = 0.0
 Roll = 0.0



Azimuth = -180.0
 Elevation = -5.1
 Roll = 180.0



Azimuth = 0.0
 Elevation = -90.0
 Roll = 180.0



7-2. 3D Efficiency Table



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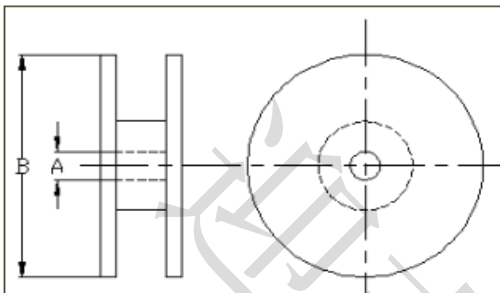
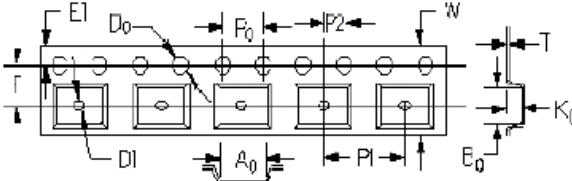
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Frequency(MHz)	2400	2410	2420	2430	2442	2450	2460	2470	2480	2490	2500
Efficiency (dB)	-1.4	-1.0	-0.9	-0.7	-0.7	-0.8	-0.9	-1.1	-1.2	-1.3	-1.4
Efficiency (%)	70.8	71.7	72.3	74.4	74.5	75.0	74.0	73.6	72.1	71.6	70.5
Peak Gain (dBi)	1.9	2.1	2.3	2.4	2.5	2.5	2.4	2.3	2.2	2.1	1.8

Taping Specifications

Reel	Taping Blister Tape																																													
																																														
<table><tr><th>Checking note</th><th>Index</th><th>Spec (mm)</th></tr><tr><td>Internal diameter of reel</td><td>A</td><td>60.20 ± 0.50</td></tr><tr><td>External diameter of reel</td><td>B</td><td>178 ± 1.00</td></tr></table>	Checking note	Index	Spec (mm)	Internal diameter of reel	A	60.20 ± 0.50	External diameter of reel	B	178 ± 1.00	<table><tr><th>Checking note</th><th>Index</th><th>Spec (mm)</th></tr><tr><td>Sprocket hole</td><td>D0</td><td>1.50 +0.10/-0.00</td></tr><tr><td>Distance sprocket hole to outside</td><td>E1</td><td>1.75 ± 0.10</td></tr><tr><td>Distance sprocket hole to pocket</td><td>F</td><td>5.50 ± 0.05</td></tr><tr><td>Distance sprocket hole to sprocket hole</td><td>P0</td><td>4.00 ± 0.10</td></tr><tr><td>Distance pocket to pocket</td><td>P1</td><td>4.00 ± 0.10</td></tr><tr><td>Distance sprocket hole to pocket</td><td>P2</td><td>2.00 ± 0.05</td></tr><tr><td>Tape width</td><td>W</td><td>12.00 +0.30/-0.10</td></tr><tr><td>Pocket width nominal clearance</td><td>A0</td><td>2.28 ± 0.13</td></tr><tr><td>Pocket length nominal clearance</td><td>B0</td><td>5.70 ± 0.13</td></tr><tr><td>Pocket depth minimum clearance</td><td>K0</td><td>1.58 ± 0.10</td></tr><tr><td>Thickness of tape</td><td>T</td><td>0.23 ± 0.02</td></tr></table>	Checking note	Index	Spec (mm)	Sprocket hole	D0	1.50 +0.10/-0.00	Distance sprocket hole to outside	E1	1.75 ± 0.10	Distance sprocket hole to pocket	F	5.50 ± 0.05	Distance sprocket hole to sprocket hole	P0	4.00 ± 0.10	Distance pocket to pocket	P1	4.00 ± 0.10	Distance sprocket hole to pocket	P2	2.00 ± 0.05	Tape width	W	12.00 +0.30/-0.10	Pocket width nominal clearance	A0	2.28 ± 0.13	Pocket length nominal clearance	B0	5.70 ± 0.13	Pocket depth minimum clearance	K0	1.58 ± 0.10	Thickness of tape	T	0.23 ± 0.02
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Reliability Table

Test Item	Procedure	Requirements Ceramic Type	Remark (Reference)
Electrical Characterization		Fulfill the electrical specification	User Spec.
Thermal Shock	1. Preconditioning: 50 ± 10°C / 1 hr, then keep for 24 ± 1 hrs at room temp. 2. Initial measure: Spec: refer Initial spec. 3. Rapid change of temperature test: -30°C to +85°C; 100 cycles; 15 minutes at Lower category temperature; 15 minutes at Upper category temperature.	No Visible Damage. Fulfill the electrical specification.	MIL-STD-202 107
Temperature Cycling	1. Initial measure: Spec: refer Initial spec. 2. 100 Cycles (-30°C to +85°C), Soak Mode=1 (2 Cycle/hours). 3. Measurement at 24 ± 2Hours after test condition.	No Visible Damage. Fulfill the electrical specification.	JESD22 JA104
High Temperature Exposure	1. Initial measure: Spec: refer Initial spec. 2. Unpowered; 500hours @ T=+85°C. 3. Measurement at 24 ± 2 hours after test.	No Visible Damage. Fulfill the electrical specification.	MIL-STD-202 108
Low Temperature Storage	1. Initial measure: Spec: refer Initial spec. 2. Unpowered; 500hours @ T= -30°C. 3. Measurement at 24 ± 2 hours after test.	No Visible Damage. Fulfill the electrical specification.	MIL-STD-202 108
Solderability (SMD Bottom Side)	Dipping method: a. Temperature: 235 ± 5°C b. Dipping time: 3 ± 0.5s	The solder should cover over 95% of the critical area of bottom side.	IEC 60384-21/22 4.10
Soldering Heat Resistance (RSH)	Preheating temperature: 150 ± 10°C. Preheating time: 1~2 min. Solder temperature: 260 ± 5°C. Dipping time: 5 ± 0.5s	No Visible Damage.	IEC 60384-21/22 4.10
Vibration	5g's for 20 min., 12 cycles each of 3 orientations Note: Use 8"x5" PCB .031" thick 7 secure points on, one long side and 2 secure points at corners of opposite sides. Parts mounted within 2" from any secure point. Test from 10-2000 Hz	No Visible Damage.	MIL-STD-202 Method 204
Mechanical Shock	Three shocks in each direction shall be applied along the three mutually perpendicular axes of the test specimen (18 shocks) Peak value: 1,500g's Duration: 0.5ms Velocity change: 15.4 ft/s Waveform: Half-sine	No Visible Damage.	MIL-STD-202 Method 213
Humidity Bias	1. Humidity: 85% R.H., Temperature: 85 ± 2 °C. 2. Time: 500 ± 24 hours. 3. Measurement at 24 ± 2hrs after test condition.	No Visible Damage. Fulfill the electrical specification.	MIL-STD-202 Method 106



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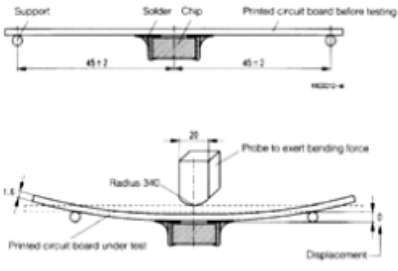
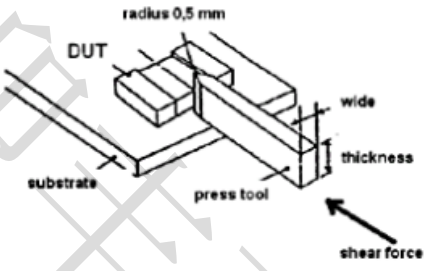
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Board Flex (SMD)	1. Mounting method: IR-Reflow. PCB Size (L:100 × W:40 × T:1.6mm) 2. Apply the load in direction of the arrow until bending reaches 2 mm. 	No Visible Damage.	AEC-Q200 005
Adhesion	Force of 1.8Kg for 60 seconds. 	No Visible Damage Magnification of 20X or greater may be employed for inspection of the mechanical integrity of the device body/terminals and body/terminal junction.	AEC-Q200 006
Physical Dimension	Any applicable method using x10 magnification, micrometers, calipers, gauges, contour projectors, or other measuring equipment, capable of determining the actual specimen dimensions.	In accordance with specification.	JESD22 JB100



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深圳市千目通讯科技有限公司

Shenzhen Qianmu Communication Technology Co., Ltd.

专注天线方案、设计与生产

客 户：动力慷
项 目：M860
日 期：2023. 5. 15
射 频：SHEN ZHUANG



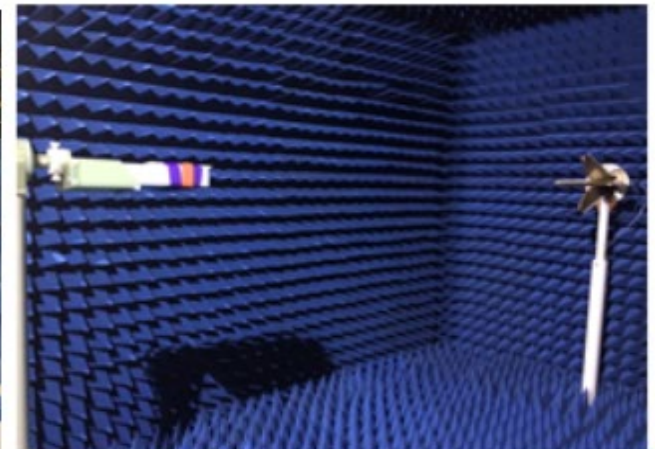
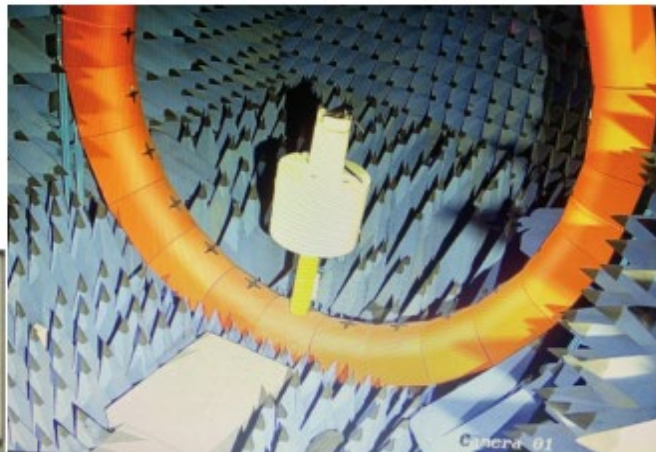
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10. 总结



测试环境

	测试项目	设备
1. S参数 (S-parameter)	1. 回波损耗 (Return Loss) 2. 电压驻波比 (VSWR)	网络分析仪: Agilent E5071B ×2 HP 8753D PROTEK A338
2. 有源测试 (Active)	1. 发射功率 (TRP) 2. 接收灵敏度 (TIS) 3. 频率误差 4. 屏灭、屏亮	1. 暗室: 飞图 7x4x3 m (24探头 3D) Chamber ETS 5x3x3 m (3D) Chamber 2. 综合测试仪: Agilent 8960 ×2 CMW500 ×3/CMU200
3. 无源测试 (Passive)	1. 天线增益 (Gain) 2. 天线效率 (Efficiency)	1. 暗室: 飞图 7x4x3 m (24探头 3D) Chamber ETS 5x3x3 m (3D) Chamber 2. 网络分析仪: Agilent E5071B





历次调试记录说明

日期	版本	主板编号	调试记录说明
2023-5-15	A		铜箔样，调试机器

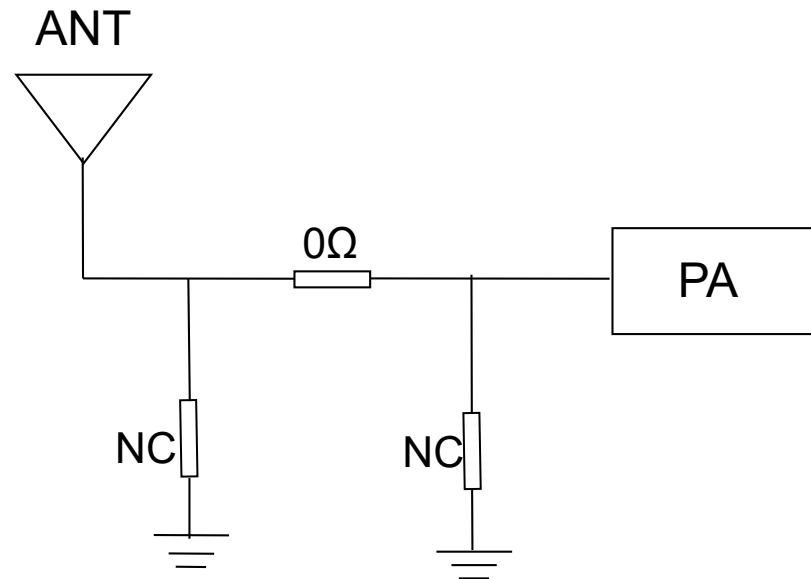


整机调试说明

版型	主板						
天线概况	主天线	天线状态		天线状态	天线形式	设计区域	匹配改动
		WIFI	2.4GHz/2.5GHz	铜箔样	PIFA	壳底	无
	其它天线						
样机状态	调试样机			环境处理	多处		



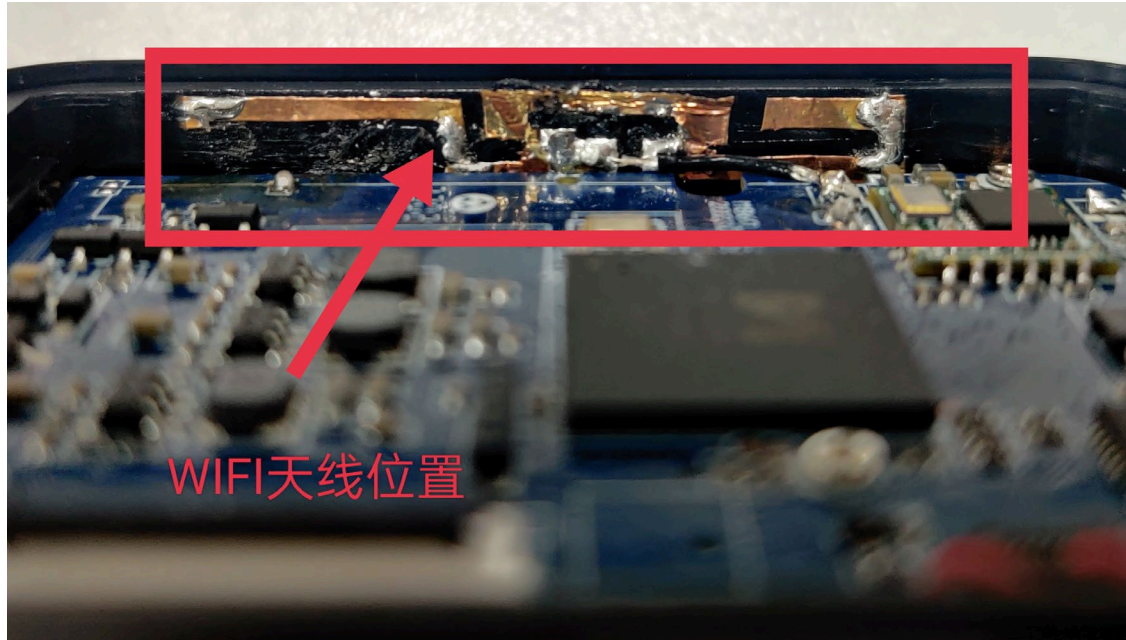
匹配电路GSM天线



贵司原始匹配电路未做任何更改



天线摆放位置

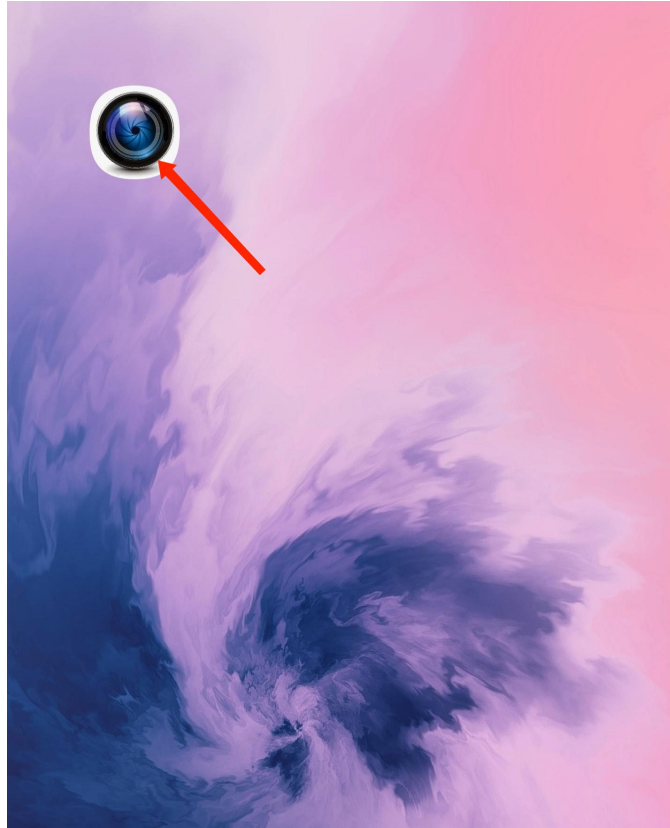


WIFI天线位置

天线摆放位置



环境处理说明



测试APP

实测性能:

1.WIFI天线1：9米内测试WIFI信号画面清晰、信号强度比较高、信号流畅无断续.

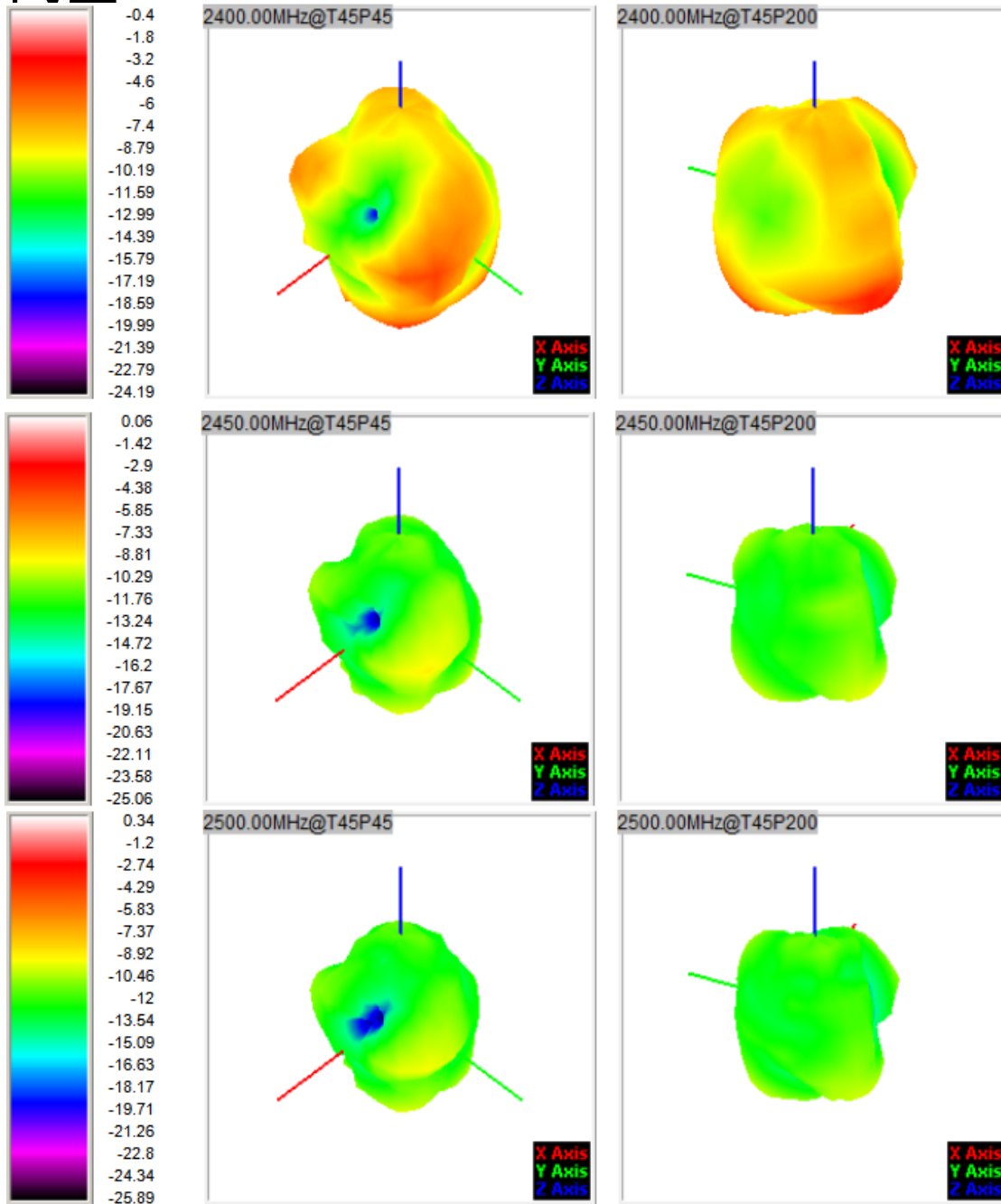


天线效率及增益

FEITUKEJI											
Frequency ID	1	2	3	4	5	6	7	8	9	10	11
Frequency (MHz)	2400.0	2410.0	2420.0	2430.0	2440.0	2450.0	2460.0	2470.0	2480.0	2490.0	2500.0
Point Values											
Ant. Port Input Pwr. (dBm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tot. Rad. Pwr. (dBm)	-6.71	-6.73	-6.81	-6.63	-6.88	-6.63	-6.95	-7.16	-7.26	-7.11	-7.27
Peak EIRP (dBm)	-0.40	-0.35	-0.49	-0.42	-0.62	0.06	0.19	0.33	0.35	0.52	0.34
Directivity (dBi)	6.31	6.38	6.32	6.21	6.26	6.69	7.14	7.48	7.61	7.63	7.61
Efficiency (dB)	-6.71	-6.73	-6.81	-6.63	-6.88	-6.63	-6.95	-7.16	-7.26	-7.11	-7.27
Efficiency (%)	21.30	21.30	20.90	21.70	20.50	21.70	20.20	19.30	18.80	19.50	18.80
Peak Gain (dBi)	-0.40	-0.35	-0.49	-0.42	-0.62	0.06	0.19	0.33	0.35	0.52	0.34
NHPRP $\pm$ Pi/4 (dBm)	-8.46	-8.46	-8.55	-8.38	-8.69	-8.47	-8.82	-9.04	-9.15	-8.98	-9.10
NHPRP $\pm$ Pi/6 (dBm)	-10.10	-10.08	-10.18	-10.04	-10.37	-10.18	-10.53	-10.76	-10.86	-10.68	-10.76
NHPRP $\pm$ Pi/8 (dBm)	-11.42	-11.38	-11.46	-11.34	-11.69	-11.51	-11.85	-12.08	-12.17	-11.97	-12.03
Upper Hem. PRP (dBm)	-10.79	-10.80	-10.85	-10.69	-10.97	-10.73	-11.06	-11.25	-11.33	-11.16	-11.27
Lower Hem. PRP (dBm)	-8.86	-8.88	-8.98	-8.79	-9.03	-8.77	-9.08	-9.30	-9.41	-9.28	-9.47
Upper Hem. PRP (%)	8.34	8.33	8.22	8.54	8.01	8.45	7.84	7.49	7.37	7.66	7.47
Lower Hem. PRP (%)	13.00	12.93	12.64	13.21	12.51	13.28	12.36	11.76	11.45	11.79	11.30

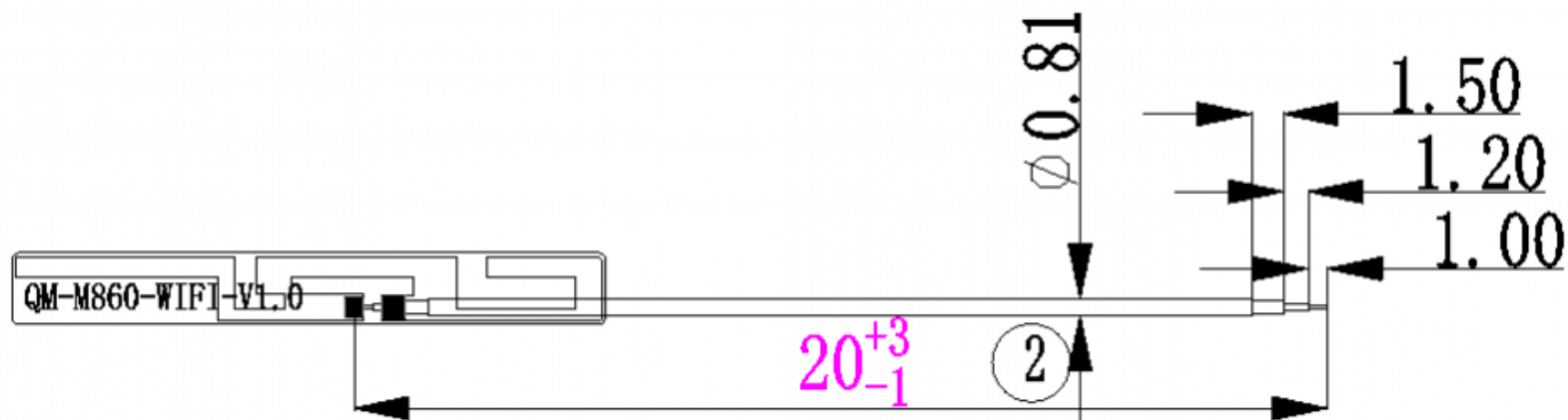


天线方向图





天线尺寸图纸





提示说明

提示：

- 一、此数据只针对客户提供样机所产生的数据，不代表客户最终量产状态；
- 二、请客户仔细确认我司报告中，匹配电路修改及环境处理说明；
- 三、量产前请配合提供试产样机来我司二次验证；如有更换物料、更新软件及环境处理等，请提前告知；
- 四、如客户需要第三方复测，或者送客户测试，请到我司验证后再送样机；防止机器与调试机有差异；
- 五：我司不接受，我们调试以外的机器数据和其它暗室测试的数据，但可以参考，认证暗室除外，如数据有差异，一切以调试机为准去找原因



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