APPROVAL SHEET
承认书

CUSTOMER NAME 客户名称	
CUSTOMER P/N 客户料号	360100463
PART NAME 品　　名	WIFI-0 黑色内置天线（L=110mm） WIFI-0 built-in antenna (L=110mm) 天線型態：FPC（适用机型：SMRF5L）
P/ N 料　　号	YJC-6N110-W03
APPROVAL REV. 版　　次	A0
DELIVERY DATE 送样日期	2024 年 11 月 18 日 November 18, 2024
PREPARED BY 承　　办	殷飞杰 Yin Feijie
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Customer Approved 客　户　承　认		
Prepared By 承　　办	Examine 审　　核	Approved By 核　　准

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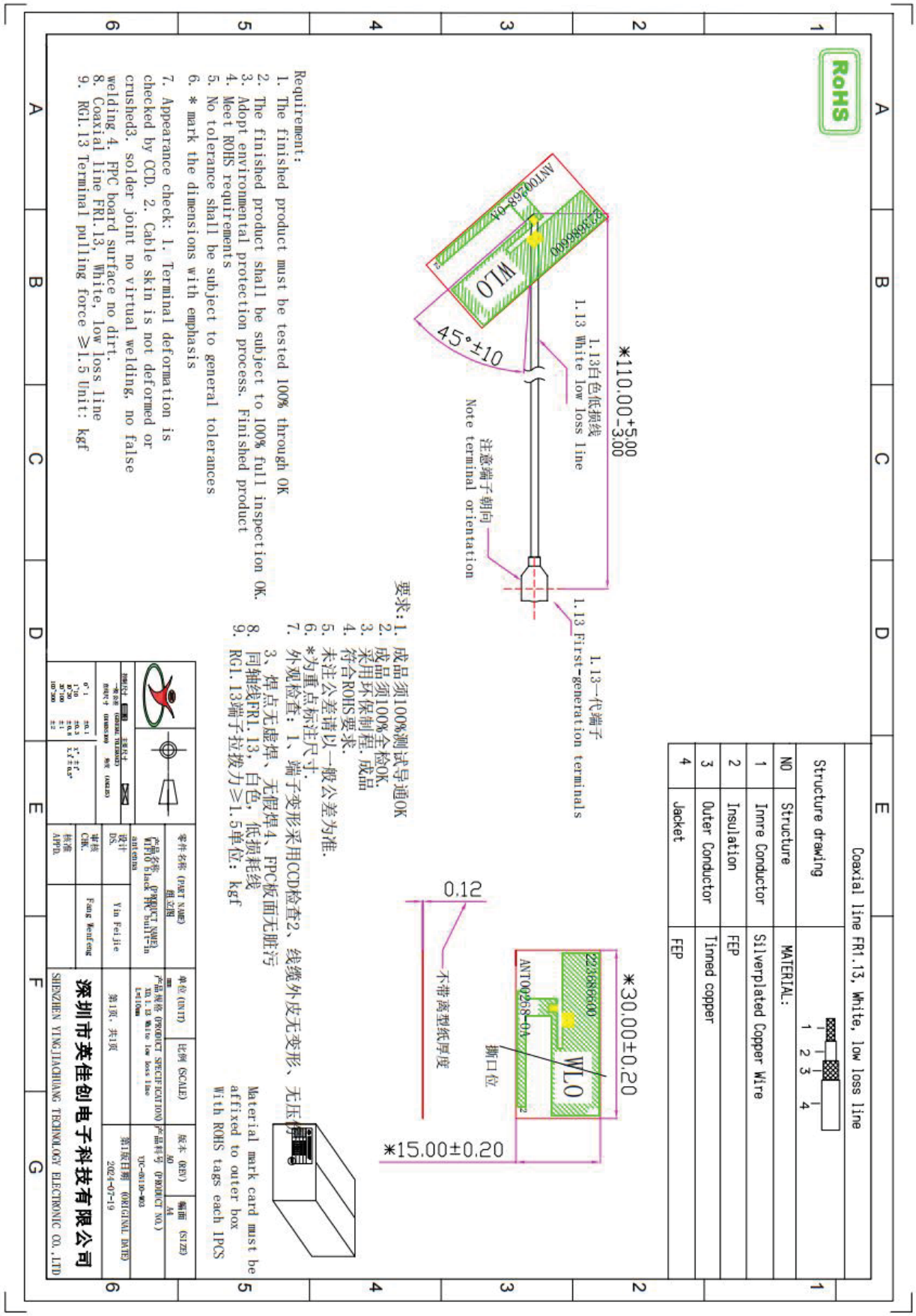
目录（Catalogue）

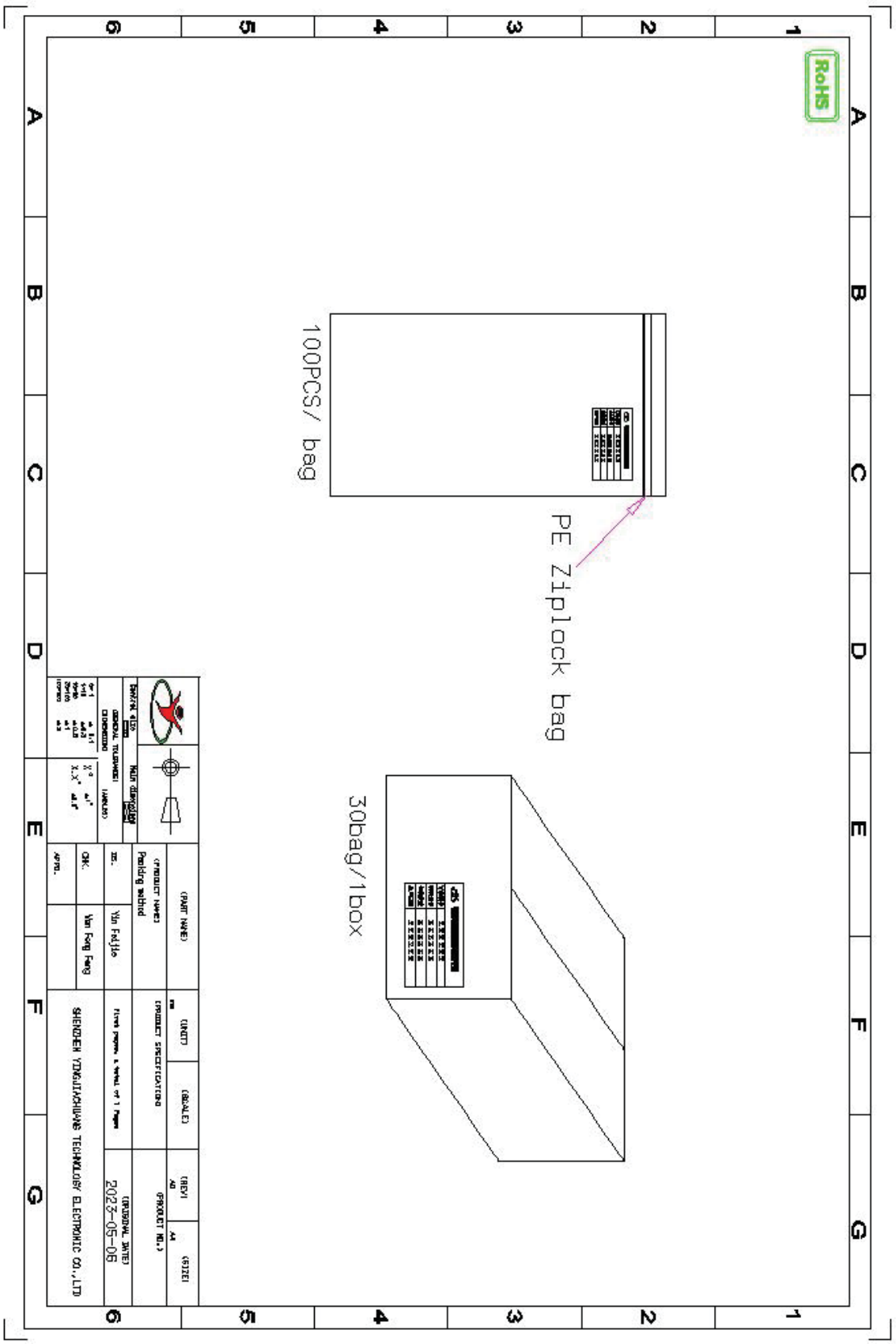
履历表(Resumer)：

版本 Version	变更内容及更改原因 Changes and reasons	发行 publish	发行 publish
A/0	初版发行（Issued）	2024 年 11 月 18 日 November 18, 2024	

产品平面图(Product plan)：



PE 袋标签（PE bag label）：



产品规格 Product Type	RF1.13 低损线 RF1.13 Low loss line
结构图 Structure Drawing	

结构特性 Structure Characteristics

结构 Structure	项目 Item	标准值 Standard Value
内导体 Inner Conductor	材质 Material	镀银铜线 Silverplated Copper Wire
	结构 Construction(mm)	7/0.083
	标称外径 Nom.Dia(mm)	0.249±0.02
绝缘层 Insulation	材质 Material	聚全氟乙丙烯 FEP Polyperfluorinated ethylene-propylene FEP
	标称外径 Nom.Dia(mm)	0.735±0.02
外导体 Outer Conductor	材质 Material	铜塑箔 Cu-Plastic Composite Tape
	标称外径 Nom.Dia(mm)	0.759±0.02
	材质 Material	镀银铜线 TC Wire 16*4/0.05
	标称外径 Nom.Dia(mm)	0.96±0.05
	编织覆盖率 Coverage Ratio(%)	90±5
护套 Jacket	材质 Material	聚全氟乙丙烯 FEP Polyperfluorinated ethylene-propylene FEP
	标称外径 Nom.Dia(mm)	1.15±0.05

电气性能 Electrical Characteristics

项目 Item	标准值 Standard Value	项目 Item	频率 Frequency	标准值 Standard Value
阻抗 Impedanc (Ω)	50±2	衰减 Attenuation@20℃ (dB/m)	1GHz	1.88
电容 Capacitance(pF/m)	98		2GHz	2.55
速率 Velocity(%)	70		3GHz	3.05
驻波比 VSWR	≤1.30@DC-6GHz		4GHz	3.52
最大工作电压 Max.Operating Voltage(V)	1000		5GHz	4.05
最大工作频率 Max.Operating Frequency(GHz)	8		6GHz	4.40

可靠性 Dependability

最小弯曲半径(单次)Min.Bending Radius/Single	mm	5
最小弯曲半径（重复）Min.Bending Radius/Repeated	mm	10
工作温度范围 Operating Temperature	℃	-55~+200

包装 Packing

包装方式 Packing Mode	纸盘 Papery Reel
包装长度 The Length of Each Reel(m)	1000
每盘接数 The Joints of Each Reel	≤5
最小段长 Min. Segment Length(m)	≥10

使用提示 Trips for Use

存储环境 Storage Environment	温度：30℃以下，湿度：20-65% Temperature: below 30℃, humidity: 20-65%
最佳保存周期 The Best Save Cycle	2个月，2个月以上上锡效果变差，但电性能不受影响，剥开高温高湿环境开剥后需尽快流转 After 2 months, the tinning effect becomes worse after 2 months, but the electrical properties are not affected, and it is necessary to transfer as soon as possible after opening and stripping in high temperature and humidity environment in summer
加工温度 Processing Temperature	可短时承受 260℃的高温，300℃以上易发生分解，400℃以上发生显著的热分解 It can withstand high temperature of 260℃ for a short time, decomposition is easy to occur above 300℃, and significant thermal decomposition occurs above 400℃
铁氟龙收缩 Teflon Shrink	材料的固有属性 绝缘 0.2mm 以下 护套 0.3mm 以下 Inherent properties of the material, insulation below 0.2mm, sheath below 0.3mm

ROHS 物料控制报告(ROHS Material control report)

兹证明向贵司交货的零组件、辅助材料所使用的原材料、以及生产工程中的添加剂等均符合 RoHS 限制使用有害物质指令的环保要求（RoHS 指令 2011/65/EC)
This is to certify that the components delivered to your company, the raw materials used for auxiliary materials, and the additives used in the production project all meet the environmental requirements of the RoHS directive on limiting the use of hazardous substances . （RoHS 指令 2011/65/EC)

关于零组件、辅助材料所使用的原材料、包装材料以及和产过程中使用的添加剂等的构成成份报告如下：
The report on the composition of raw materials, packaging materials, and additives used in the manufacturing process for component auxiliary materials is as follows

组成物料名称 Component /Part Name	组成材料 Material Composition	ICP 报告编号 ICP report #	测试机构 Test Org.	测试时间 Test Date	有害物质含量(ppm)						是否合格? PASS?
					Cd	Pb	Hg	Cr $^{6+}$	PBB	PBDE	PASS
线材(wire rod)	同轴线缆 coaxial cable	CANEC24002746206	SGS	24/02/23	ND	ND	ND	ND	ND	ND	PASS
锡条(tin rod)	环保锡丝 Green solder wire	SHAEC24006459102	SGS	24/04/10	ND	78	ND	ND	ND	ND	PASS
端子（terminal）	磷青铜 Phosphor bronze	CANEC24000977302	SGS	24/01/22	ND	6	ND	ND	ND	ND	PASS
	金镀层 Gold coating	A2240410234101001E	CTI	24/07/16	ND	ND	ND	ND	ND	ND	PASS
	胶芯 Rubber core	A2240126395101003E	CTI	24/03/16	ND	ND	ND	ND	ND	ND	PASS
FPC	油墨 Printing	ETR24902229M01	SGS	24/09/23	ND	ND	ND	ND	ND	ND	PASS
	3M9471LE	SHAEC23021627701	SGS	23/12/27	ND	ND	ND	ND	ND	ND	PASS
	铜箔 Copper foil	A2240082746101006E	CTI	24/03/01	ND	ND	ND	ND	ND	ND	PASS

MSDS：

惠州市富邦电子科技有限公司

MATERIAL SAFETY DATA SHEET

物质安全资料表

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION 产品和公司资料

PRODUCT NAME: Halogen-free flame-resistant type polyimide film based flexible copper clad laminates
（FB）
产品名称：无卤阻燃型聚酰亚胺薄膜挠性覆铜板（FB 系列）
PRODUCT USE: Flexible printed circuit Boards.
用途：用于挠性印制电路板。
NAME OF COMPANY AND ADDRESS: fubang electronic technology co., LTD
No. 8, Joint District 37, Shuikou Town, Huicheng District, Huizhou City,
公司名称及地址：惠州市富邦电子科技有限公司;
中国 广东省惠州市惠城区水口办事处联合 37 区 8 号厂房
FOR MORE INFORMATION CALL: IN CASE OF EMERGENCY CALL:
紧急联络电话：(Monday-Friday, 8:00am-5:00pm) (24 Hours/Day, 7 Days/Week)
(0752)2398520

2. HAZARDS IDENTIFICATION 危害性资料

EMERGENCY OVERVIEW:
紧急情况概述：
A nonflammable, sheet material. Dust, when machined or punched may cause skin or eye irritation. Fumes, if
decomposed may irritate eyes, nose, and throat.
是一种难燃的层压板。当使用或打孔时可能产生粉末，可能使皮肤或眼睛感到刺激。当分解时产生的气体
会刺激眼睛、鼻和咽喉。
POTENTIAL HEALTH HAZARDS:
潜在的危害健康的危险品：
SKIN: Dust may cause moderate skin irritation.
皮肤：粉末可能导致中等程度皮肤过敏。
EYES: Dust may cause moderate eye irritation. Fumes may irritate eyes.
眼睛：粉末可能导致中等程度眼睛过敏。
INHALATION: T race of chemical solvents may be vapourized and diffused to air in the processes of
varnish preparation and coating production.
吸入物： 在涂覆生产过程时，会有很少量化学溶剂挥发出来。
INGESTION: Not determined.
摄食：没有参考值。

3. COMPOSITION/INFORMATION ON INGREDIENTS 组成成份资料

INGREDIENT NAME CAS # WEIGHT %
成分名称 化学文摘号 重量比
Polyimide film (25038-81-7) 2-38
聚酰亚胺薄膜
Copper foil (7440-50-8) 51-94
铜箔
Halogen-free adhesive of epoxy resin Trade secret 4-16
无卤环氧胶粘剂

组份	含量	CAS NO
环氧树脂	1.81-6.45	25036-25-3
阻燃剂	0.76-3.36	225789-38-8
橡胶	1.23-4.9	9003-18-3
固化剂	0.2-1.29	80-08-0

4. FIRST AID MEASURES 首要援助措施

SKIN: Wash in flowing water or shower. Remove contaminated clothing.
皮肤：脱下已污染衣服，用流动水冲洗。
EYE: Irrigate with flowing water for 15 minutes. If irritation persists, consult a physician.
眼睛：用流动水冲洗 15 分钟，如过敏现象持续发生，请求助于医生。
INHALATION: If overcome by dust or smoke, move to fresh air. If not breathing, give mouth-to-mouth
resuscitation. Call physician.
吸入：如粉末烟尘太多请转移到有新鲜空气的地方，如没有呼吸，请进行人工呼吸。并致电医生。
INGESTION: If large amounts are ingested, consult physician.
摄食：如吸入大量，请致电医生。
ADVICE TO PHYSICIAN: Treatsymptomatically
建议医生：处理出现的症状。

5. FIRE FIGHTING MEASURES 火灾测试

FLAMMABLE PROPERTIES: N/A
易燃烧性：不适用
FLASH POINT: N/A
闪点：不适用
FLASH POINT METHOD: N/A
闪点方式：不适用
AUTOIGNITION TEMPERATURE: Not determined
自燃点温度：无规定
UPPER FLAME LIMIT (Volume % in air): N/A
燃烧上限：不适用
LOWER FLAME LIMIT (Volume % in air): N/A
燃烧下限：不适用
FLAME PROPAGATION RATE (Solids): UL94 V-0
燃烧等级：UL94 V-0
OSHA FLAMMABILITY CLASS: N/A
OSHA 燃烧级别：不适用
EXTINGUISHING MEDIA: Water, CO 2 and dry chemical

灭火介质：水、CO 2 及干化学品
SPECIAL FIREFIGHTING PRECAUTIONS/INSTRUCTIONS:
特别火灾指导：
Firemen should wear proper protective equipment and positive pressure self-contained breathing apparatus.
消防员须身穿保护装置及正压呼吸设施。

6. ACCIDENTAL RELEASE MEASURES 意外事故的应变措施

IN CASE OF SPILL OR OTHER RELEASE: (Always wear recommended personal protection equipment)
： 如有泄漏或其他释放：（通常身穿所推荐的保护设施）
Not applicable, material is an article.
不适用于固体材料。
Spills and releases may have to be reported to local authorities.
有关泄漏应报告当地政府。

7. HANDLING AND STORAGE 仓贮指南

NORMAL HANDLING: (Always wear recommended personal protective equipment.)
规范指南：（建议穿戴个人防护设施）
The primary exposure route is inhalation of dust when machine/punched or from fumes or vapors when heated.
主要是预防暴露部位吸入当机器打孔时或冒烟、气化液体受热时所产生的粉尘。
STORAGE RECOMMENDATIONS: N/A
贮存建议：不适用。

8. EXPOSURE CONTROLS/PERSONAL PROTECTION 泄漏控制/ 个人保护

ENGINEERING CONTROLS: Use local exhaust ventilation to control dust.

工程 控制：使用当地除尘通风设施。
PERSONAL PROTECTIVE EQUIPMENT:
个人保护措施：
SKIN PROTECTION: For brief contact to dust, no precautions other than clean body-covering clothing
should needed. Use gloves and aprons when prolonged or frequently repeated contact occurs.
皮肤保护：对于短暂性的接触粉尘，需要时清洗身体或衣服，无预防措施。对于长期性的接触，要配带手
套和围裙
EYE PROTECTION: Use appropriate eye protection when machining material.
眼睛保护：当加工材料时使用眼睛保护装置。
RESPIRATORY PROTECTION: When respiratory protection is required for certain operations, use a
NIOSH-approved dust respirator.
呼吸保护：当进行产生大量粉尘的操作时使用规范的粉尘防毒面罩。
ADDITIONAL RECOMMENDATIONS: N/A
其它建议：不适用

9. PHYSICAL AND CHEMICAL PROPERTIES 物理化学性能

APPEARANCE: Yellow to amber sheets
外观：黄色
PHYSICAL STATE: Solid
物理形态：固体
ODOR: None, unless heated
气味：无味，除非加热
SPECIFIC GRAVITY: (Water = 1.0) 4.5 +/- 1.5
： 比重：（水=1.0）4.5+/-1.5
SOLUBILITY IN WATER: (Weight %) Negligible in water
： 水溶性：（重量%）在水中可忽略

10. STABILITY AND REACTIVITY 稳定性及反应性

NORMALLY STABLE: (conditions to avoid) Stable
通常稳定：稳定INCOMPATIBILITIES:
Not determined 不兼容性：不确定
HAZARDOUS DECOMPOSITION PRODUCTS: CO, CO 2 , Oxides of nitrogen if heated in excess of 300
deg. C. Laser drilling or cutting may result in copper metal
fume.
危险的腐化产品：CO, CO 2 , NO X （当加热超过 300℃），激光打孔或切割时会产生铜金属烟尘。
HAZARDOUS POLYMERIZATION? None
危险聚合物：无

11. TOXICOLOGICAL INFORMATION 毒物学的资料

IMMEDIATE (ACUTE) EFFECTS: Dust may cause moderate eye, skin and respiratory irritation
.
敏感反应：灰尘将导致眼、皮肤中度过敏。

12. ECOLOGICAL INFORMATION 生态学资料

Not Biodegradable
非生物降解。

13. DISPOSAL CONSIDERATIONS 处置问题

Is the unused product a hazardous waste substances list of country hazardous waste if discarded?
No
列入国家危险废物名录的危险废物不能够再利用时是否被丢弃？ 不
OTHER DISPOSAL CONSIDERATIONS: Disposal must be made in accordance with all applicable Local
regulations. Copper should be recycled.
其它处置问题：处置必须遵循当地的法律法规。铜箔是可以再利用的。

Suggestion method after products will be discarded:
1. Separate reuse method: crush products into powder then separate the valued copper, recycling left plastic
powder as a filler.
2. Incineration method: incinerate the unused products, this method may produce some organic compound
gas.
3. Bury into deep earth.
产品报废之后有以下几种处置方法：
1. 分离法，将产品粉碎，将铜箔回收利用，剩余物可作填充料；
2. 焚烧法，焚烧过程中可能产生有机化合物气体；
3. 填埋法。

14. TRANSPORT INFORMATION 运输资料

For additional information on shipping regulations affecting this material, contact the information number found on
the first page.
附带资料是当运输规则影响到物料时，请和第一页所提供的联系方式联系。

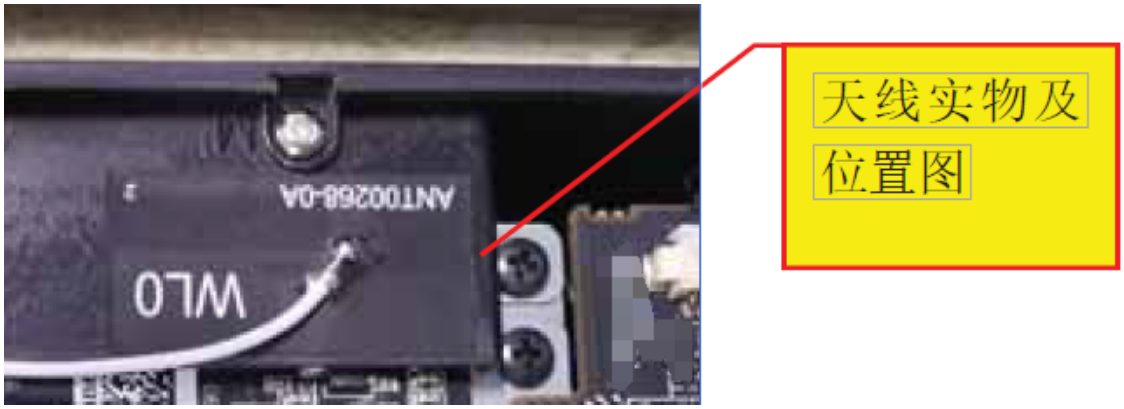
15. REGULATORY INFORMATION 法规资料

HAZARDOUS WASTE SUBSTANCES LIST OF COUNTRY: 国家危险废物名录
The resin system components listed in the hazardous waste substances list of country （ HW13）.
环氧化合物类被列入国家危险废物名录当中（HW13）。
ADDITIONAL REGULATORY INFORMATION:
附加法规资料:
fubang electronic technology co., LTD does not use polybromide-biphenyls or polybromide-biphenyloxides as a
fire retardant in any of our epoxy resin systems.
富邦电子科技有限公司没有采用多溴联苯或多溴联苯醚作为阻燃剂在产品的环氧树脂体系当中。

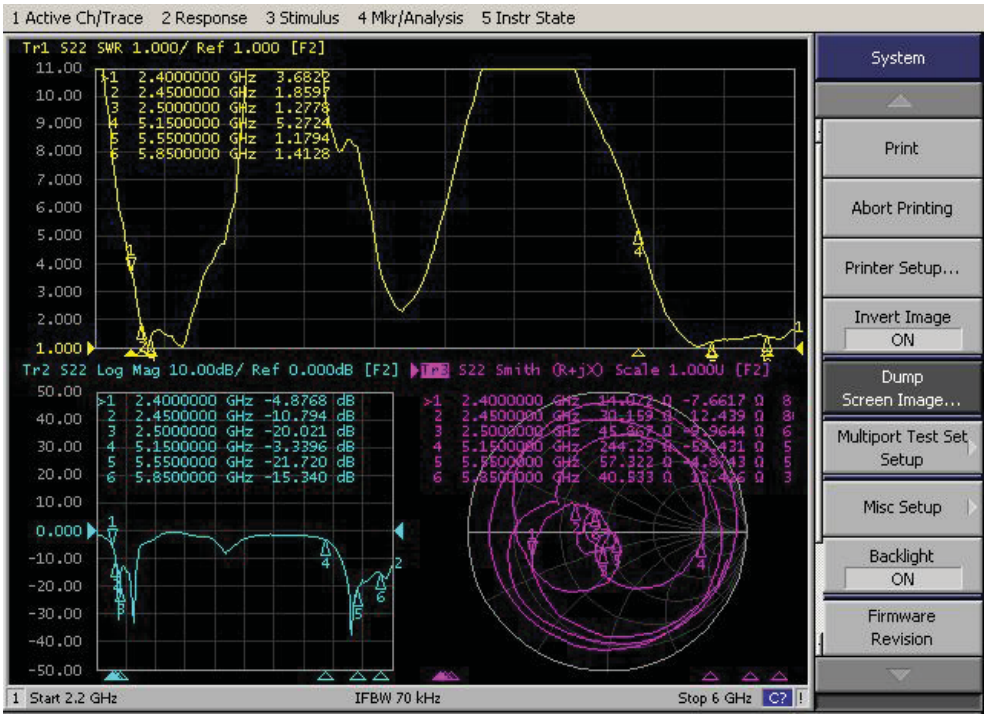
16. OTHER INFORMATION 其它资料

CURRENT ISSUE DATE:08/04/2022
现在版本日期：08/04/2022
CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING：
1. Due to the increase in product specifications, modify the weight ratio of the ingredients.
2. The permutation order of second and third has been replaced by each other.
变更 MSDS 基于以下原因：
1. 因产品规格增加，修改成分重量比范围。
2. 调换第 2 项和 3 项的排列顺序。

天线实物图与位置图：Antenna physical diagram and location diagram

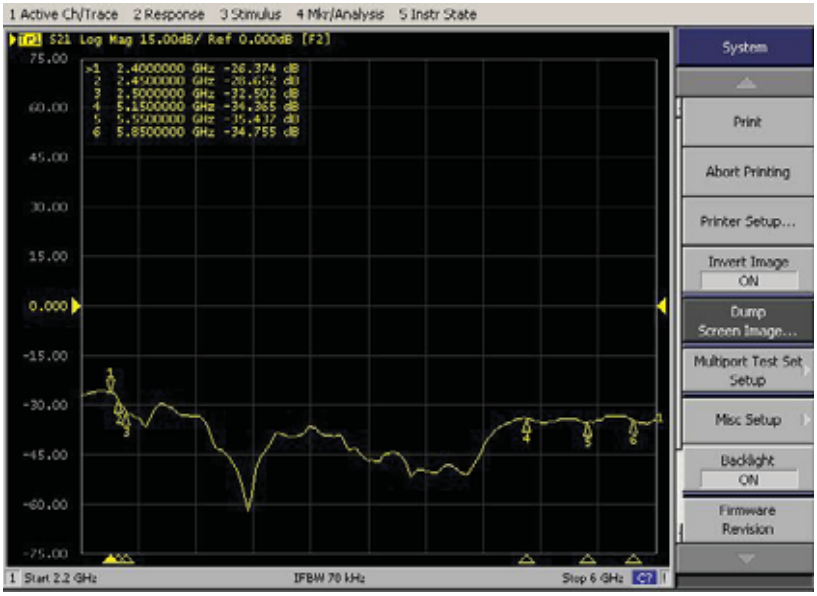


天线性能测试图:Antenna performance test diagram



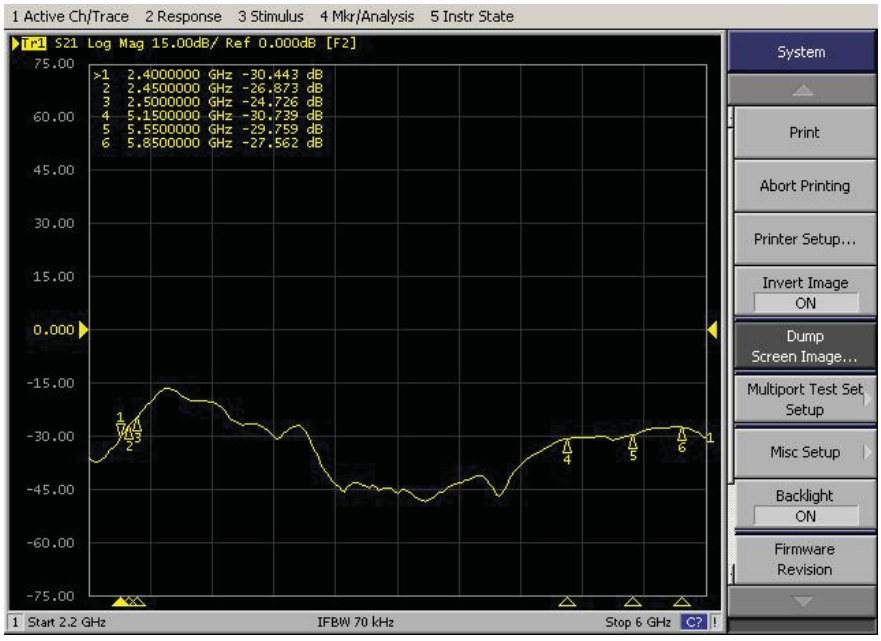
Freq/GHz	2.4	2.45	2.5	5.15	5.5	5.85
VSWR	3.6	1.8	1.2	5.2	1.1	1.4

隔离度测试图 Wi-Fi Ant-0 & BT (Isolation test chart)



Freq/GHz	2.4	2.45	2.5	5.15	5.5	5.85
S21/ dB	-26	-28	-32	-34	-35	-34

隔离度测试图 Wi-Fi Ant-0 & Wi-Fi Ant-1 (Isolation test chart)

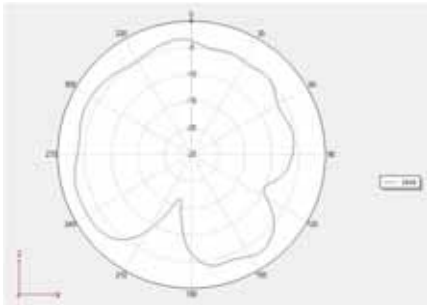


Freq/GHz	2.4	2.45	2.5	5.15	5.5	5.85
S21/ dB	-30	-26	-24	-30	-29	-27

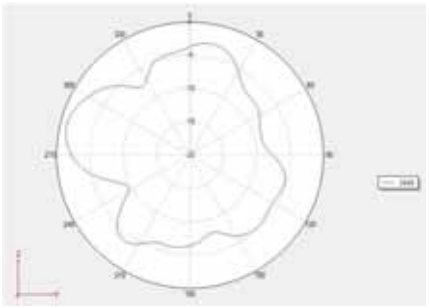
2D、3D 测试数据(2.4G/5G)：2D and 3D test data (2.4G/5G) :

Frequency	Efficiency (%)	Gain.(dBi)
2400MHz	29.11	-0.89
2410MHz	31.41	-0.4
2420MHz	33.57	-0.01
2430MHz	37.24	0.38
2440MHz	38.11	0.21
2450MHz	40.36	0.37
2460MHz	40.74	0.15
2470MHz	43.45	0.35
2480MHz	40.83	-0.17
2490MHz	39.45	-0.18
2500MHz	36.39	-0.45
5150MHz	41.59	2.62
5250MHz	49.66	4.15
5350MHz	55.34	3.82
5450MHz	66.68	4.81
5550MHz	65.46	4.33
5650MHz	65.16	3.64
5750MHz	64.27	3.65
5850MHz	64.71	4.07

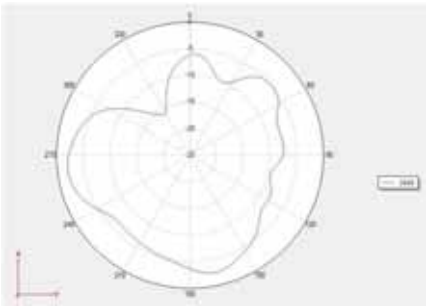
Phi =0 freq=2400MHz



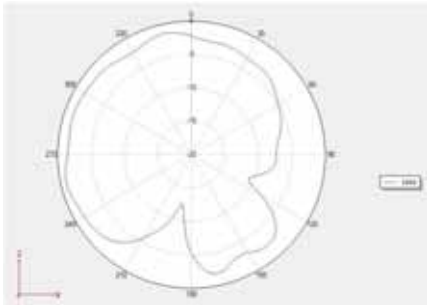
Phi =90 freq=2400MHz



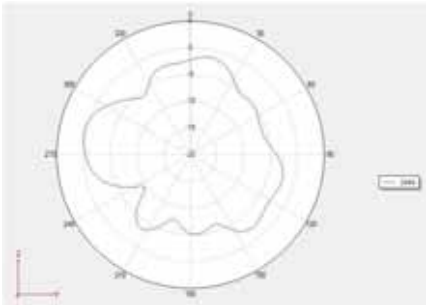
Theta =90 freq=2400MHz



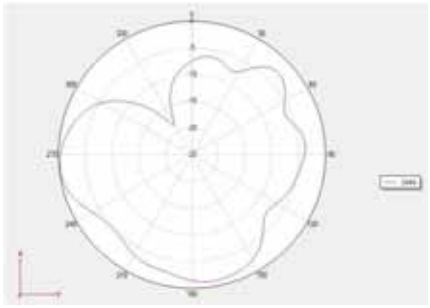
Phi =0 freq=2450MHz



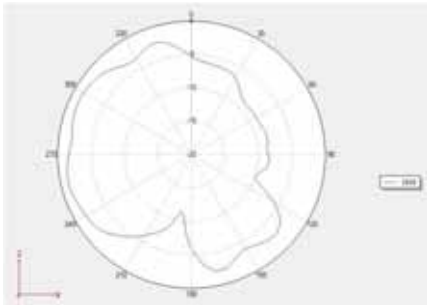
Phi =90 freq=2450MHz



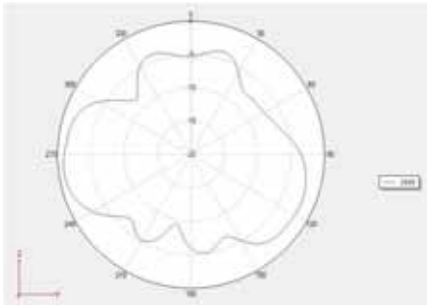
Theta =90 freq=2450MHz



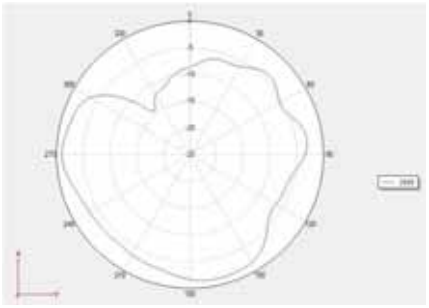
Phi =0 freq=2500MHz



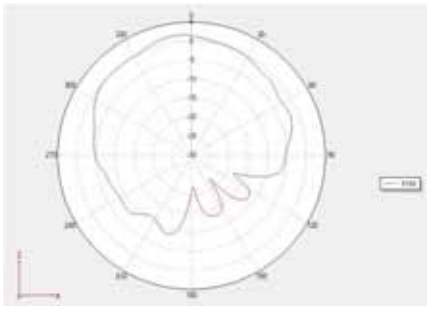
Phi =90 freq=2500MHz



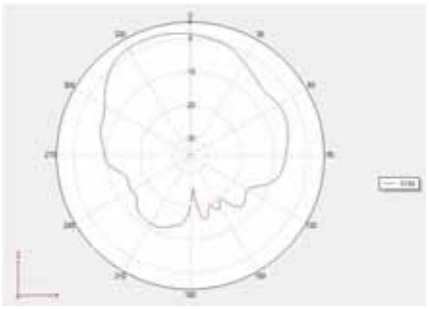
Theta =90 freq=2500MHz



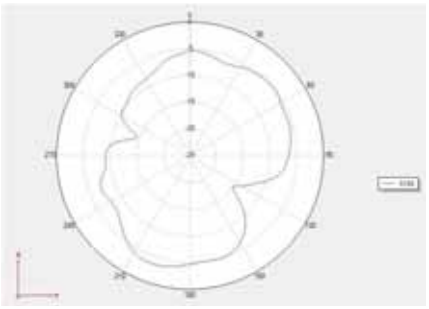
Phi =0 freq=5150MHz



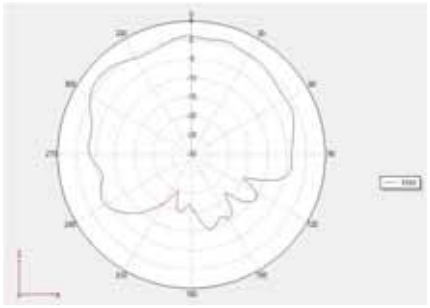
Phi =90 freq=5150MHz



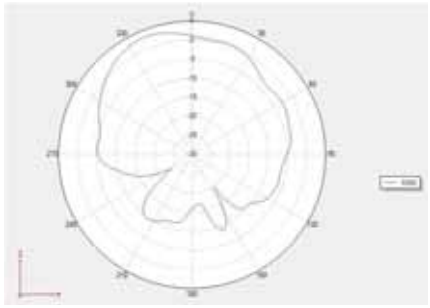
Theta =90 freq=5150MHz



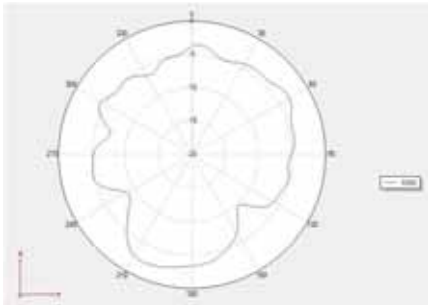
Phi =0 freq=5350MHz



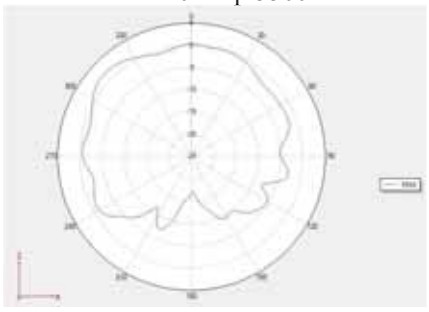
Phi =90 freq=5350MHz



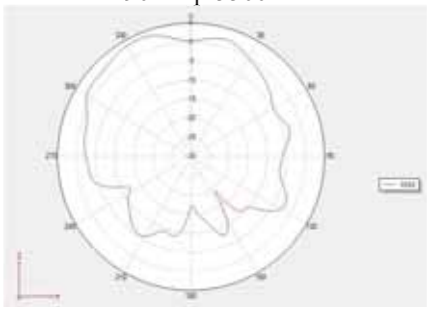
Theta =90 freq=5350MHz



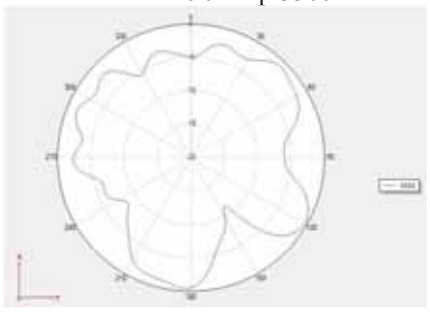
Phi =0 freq=5500MHz



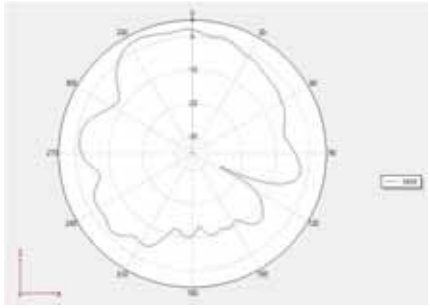
Phi =90 freq=5500MHz



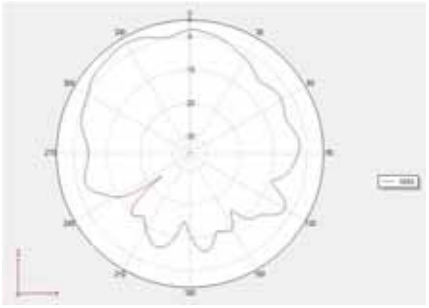
Theta =90 freq=5500MHz



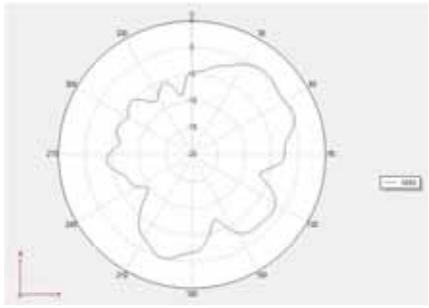
Phi =0 freq=5850MHz



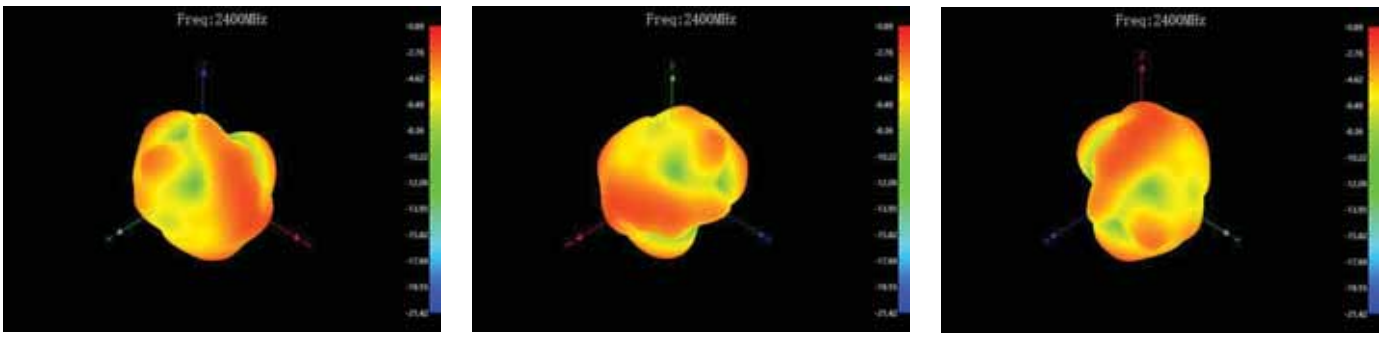
Phi =90 freq=5850MHz



Theta =90 freq=5850MHz



3D 2400：



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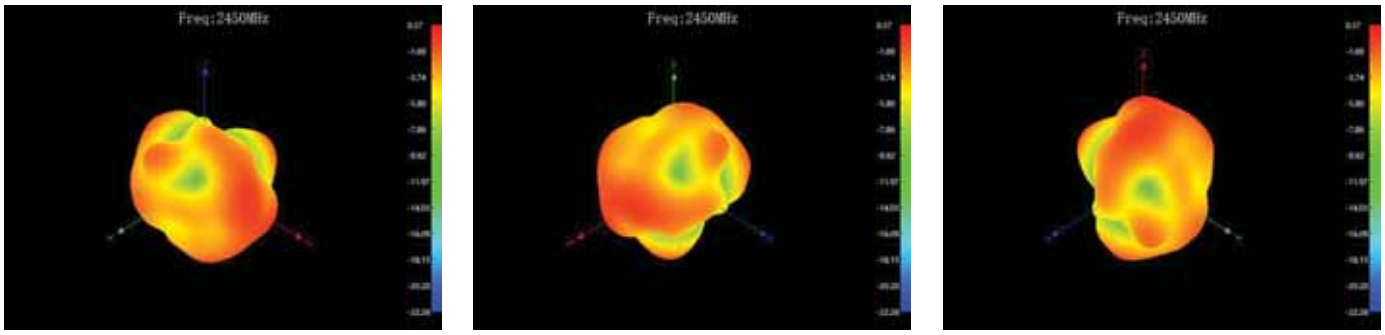
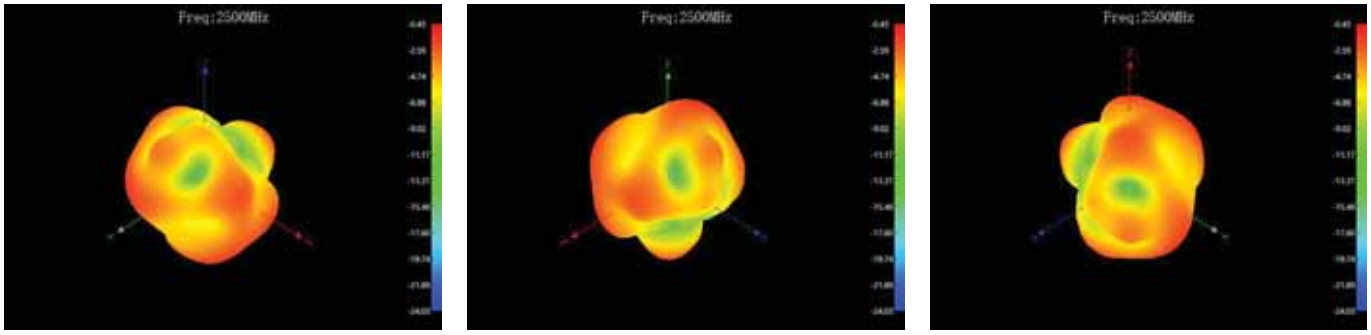


3D 2500：



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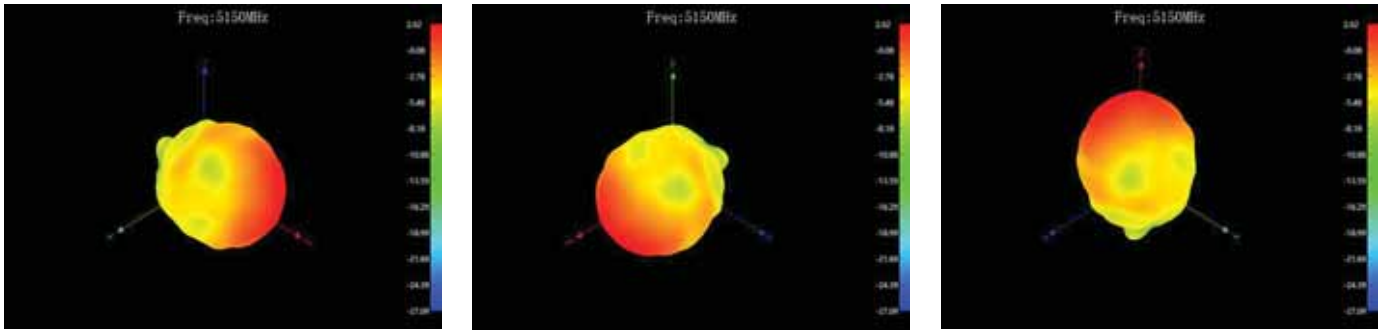
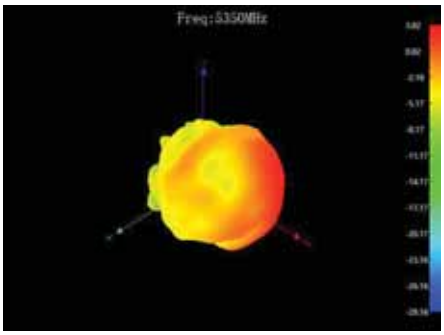
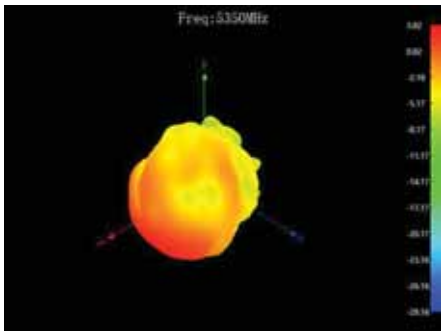
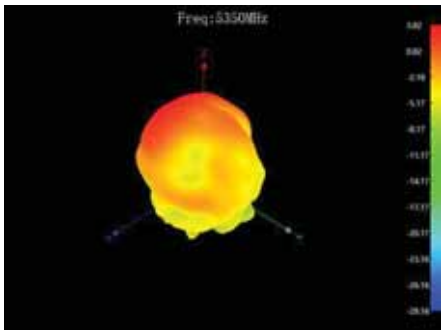


3D 5350：







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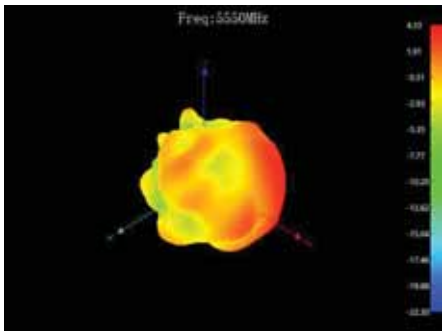

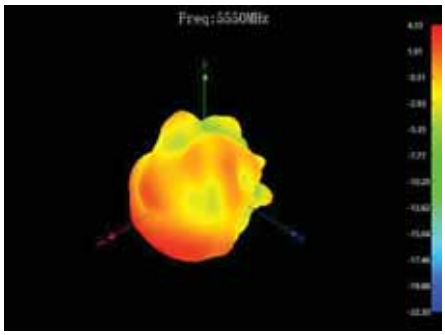

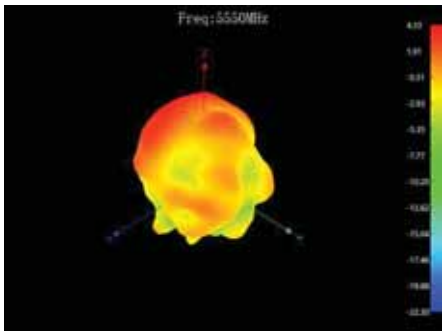

3D 5850: