

APPROVAL SHEET

PCB Antenna

2.4 ~ 2.5 GHz Working Frequency

P/N: RFPCA320808IMAB301

Customer : 喬陽電子股份有限公司

Customer 's Part No. :

Approval No. :

Issue Date :

品名：RFPCA320808IMAB301

History List

[illegible]

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UNLESS OTHER SPECIFIED TOLERANCES ON :
X = N/A X.X = N/A X.XX = N/A
ANGLES = N/A HOLEDIA = N/A



INPAQ TECHNOLOGY CO., LTD.

SCALE : N/A

UNIT : mm

DRAWN BY : 詹惠雯

CHECKED BY : 詹惠雯

DESIGNED BY : 黃瑞郎

APPROVED BY : 陳振榮

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TITLE : RFPCA320808IMAB301

DOCUMENT
NO.

ENS070025760-000803719416

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1.Explanation of part number :

RF	PCA	3208	08	I	M	a	B	3	01
Type Code	Product Code	PCB Dimension (Unit: mm)	Cable Length (unit: cm)	Connector Brand	Type of Connector	Application	Project status	Wire Diameter	Project
Walsin RF Device	PCB Antenna	Per 2 digits of length, width e.g.: 3208 Length 32.0mm, Width 8.5mm	2 digits for cable length e.g.: 08 Cable Length 8.0cm	A: N C: MCX D: IPEX III E: IPEX IV F: IPEX A13 H: Hirose I: IPEX M: MMCX S: SMA T: TNC U: MURATA N: None	A: Reverse Female B: Reverse Male F: Female M: Male N: None	0: 0GHz 3: 3GHz 6: 6GHz 5: 5GHz A: 2.4GHz ISM band B: GSM 900/1800 dual band G: GPS band L: 2.4/5.2/5.8 GHz tri-band N: NFC T: LTE band W: WCDMA band	B: MP T: During Test X: Pile Run	0: None 1: $\varnothing$ 0.81 2: $\varnothing$ 1.32 3: $\varnothing$ 1.13 4: Low Loss $\varnothing$ 1.13 5: $\varnothing$ 0.5 6: RG316 7: $\varnothing$ 1.37 8: RG178 9: Low Loss $\varnothing$ 1.37	01~99 series number

2.Electrical Specification :

Item	Specification
Working Frequency Range	2.4 ~ 2.5 GHz
Peak Gain	2.50 dBi
Return Loss	-10 dB
VSWR	2 max.
Polarization	Linear Vertical
Radiation Pattern	Directional
Impedance	50 Ω
Operation Temperature	-20 $^{\circ}$ C ~ +65 $^{\circ}$ C

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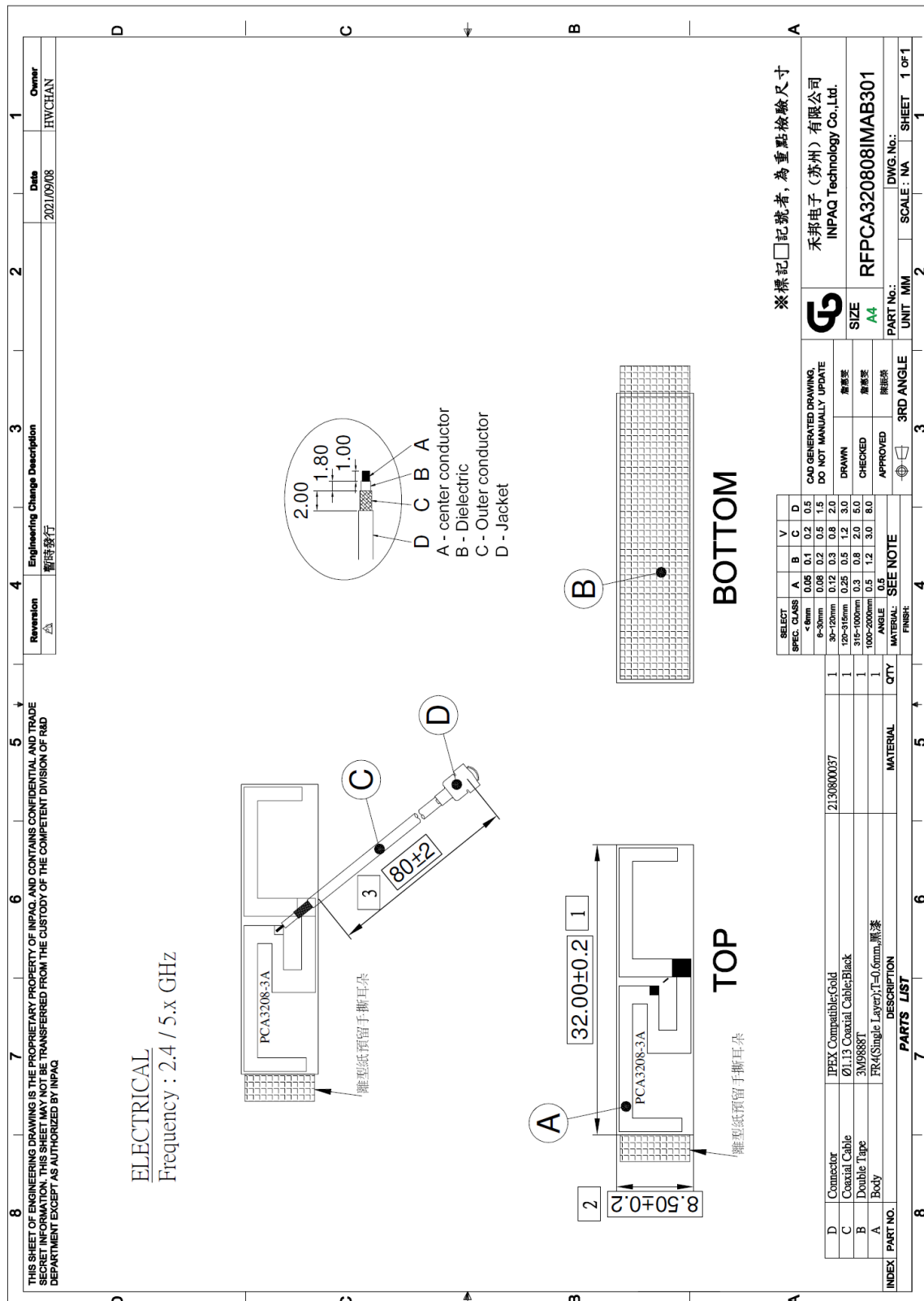
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3. Antenna Drawing :



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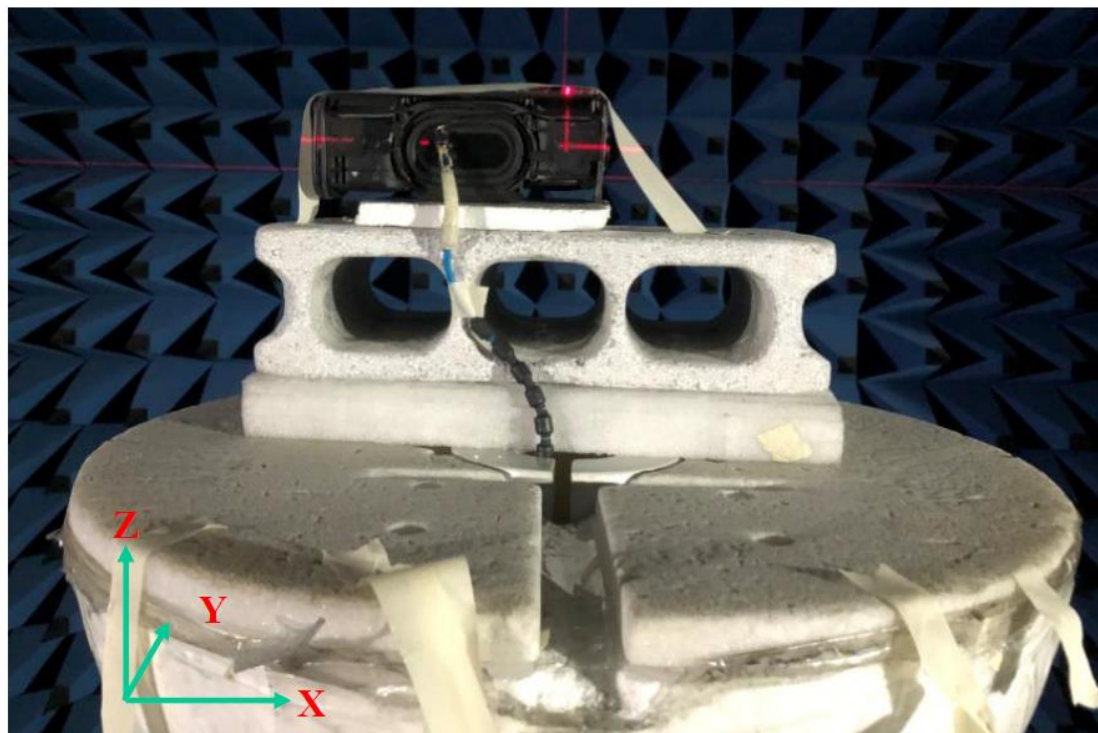
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4. Performance Report :

Test Report

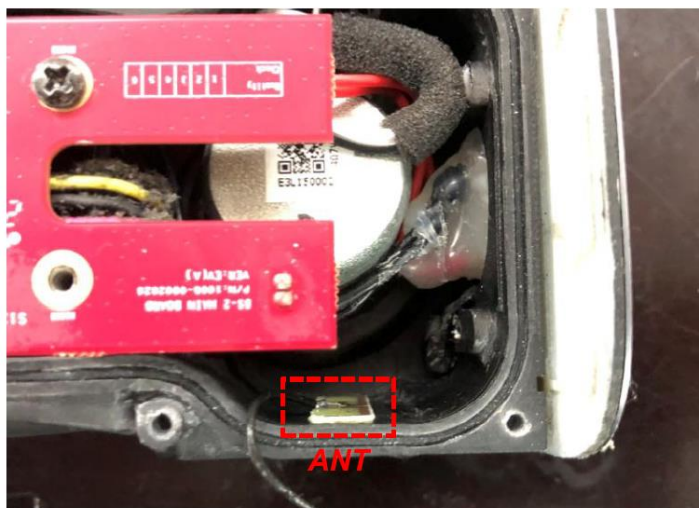
■ Experimental Setup

Experimental Setup



Antenna Solution Detail

ANTENNA SIZE : 32*8.5*0.6mm



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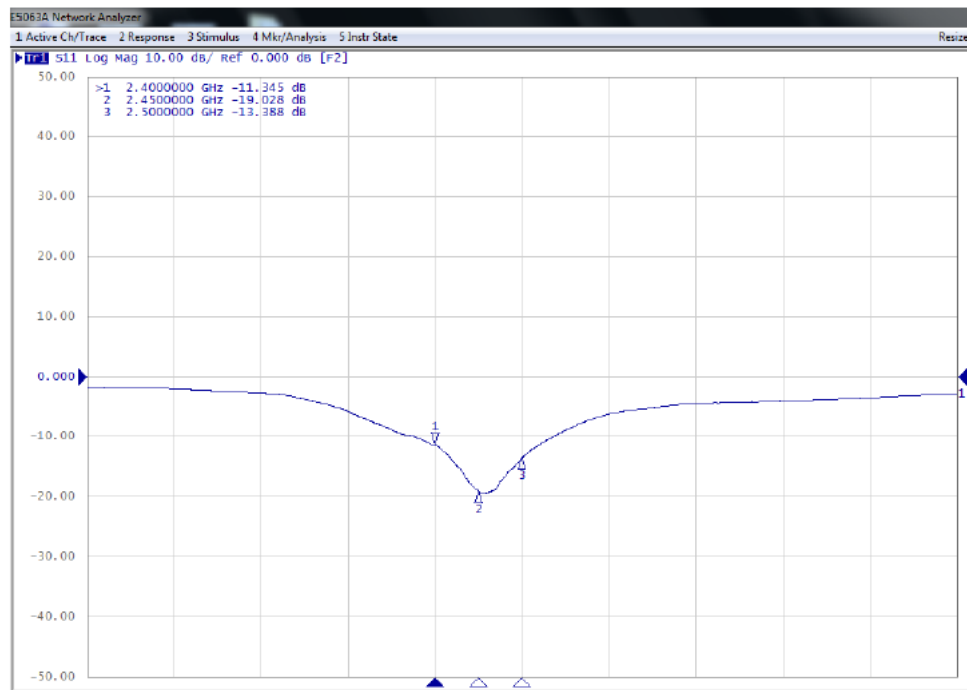
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ELECTRICAL CHARACTERISTICS

Return Loss



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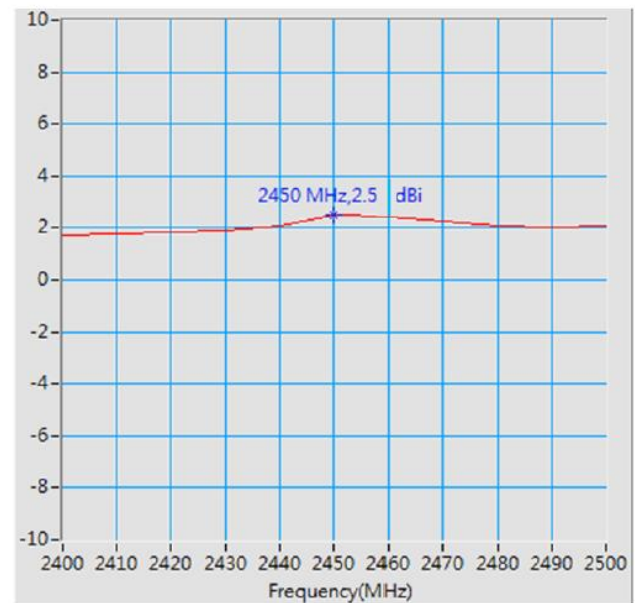
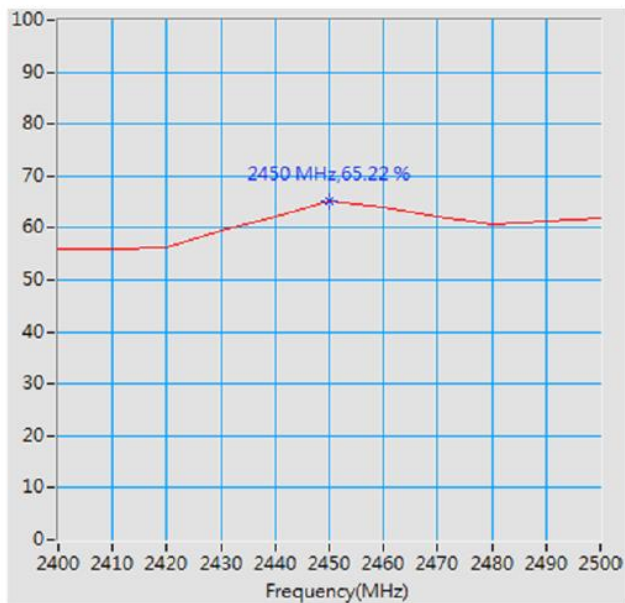
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■ Antenna Efficiency & Peak Gain

2G



Maximum Efficiency at 2450MHz : 65.22%

Maximum Peak Gain at 2450MHz : 2.5 dBi

Antenna Efficiency and Peak Gain

Frequency (GHz)	Efficiency (%)	Peak gain (dBi)
2.4	55.90	1.72
2.45	65.22	2.50
2.5	61.93	2.06

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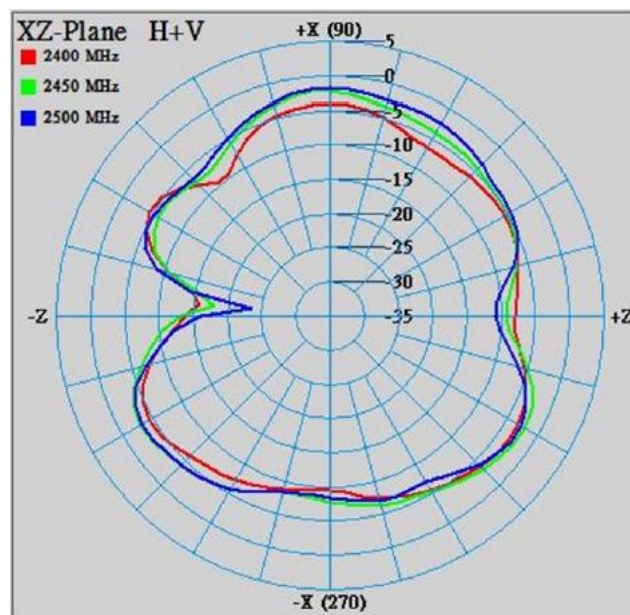
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RADIATION PATTERN

2G**X-Z Plane****Phi=0.00deg****Gain . dB**

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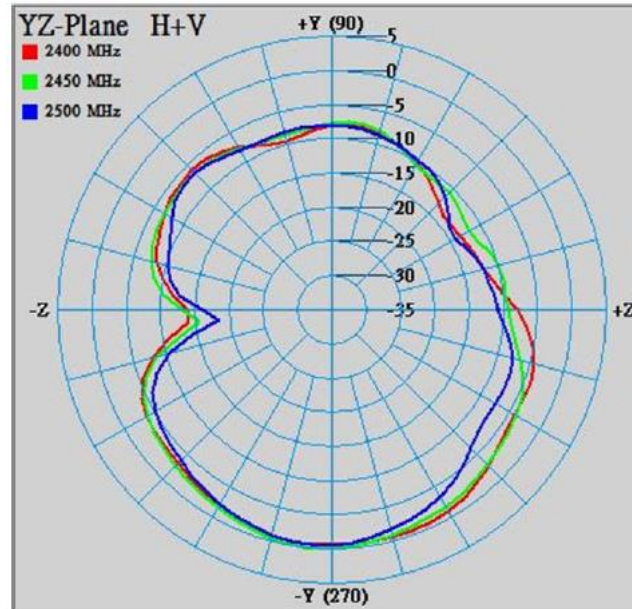
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Y-Z Plane

Phi=90.00deg

Gain . dB



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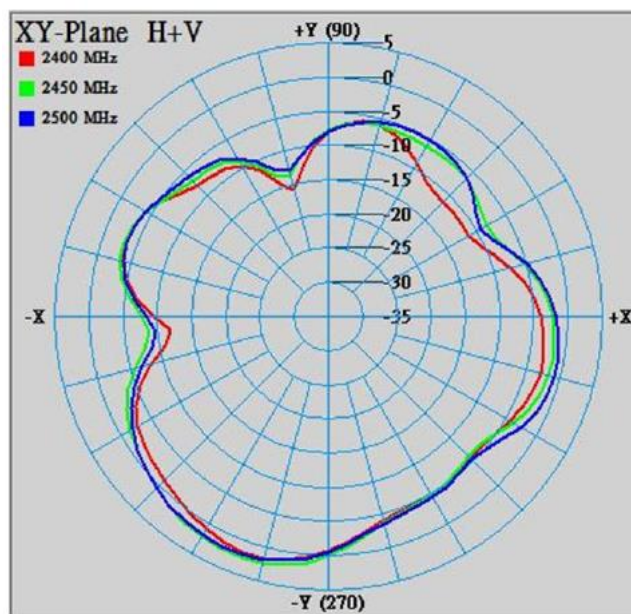
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X-Y Plane

Theta=90.00deg

Gain . dB



Frequency [MHz]	ZX plane		ZY plane		XY plane	
	Max Value [dB]	Average [dB]	Max Value [dB]	Average [dB]	Max Value [dB]	Average [dB]
2400	-3.23	-6.20	-0.64	-4.85	1.64	-4.15
2450	-2.15	-5.18	0.02	-4.78	2.50	-3.10
2500	-1.87	-5.10	-0.49	-5.86	2.05	-3.10

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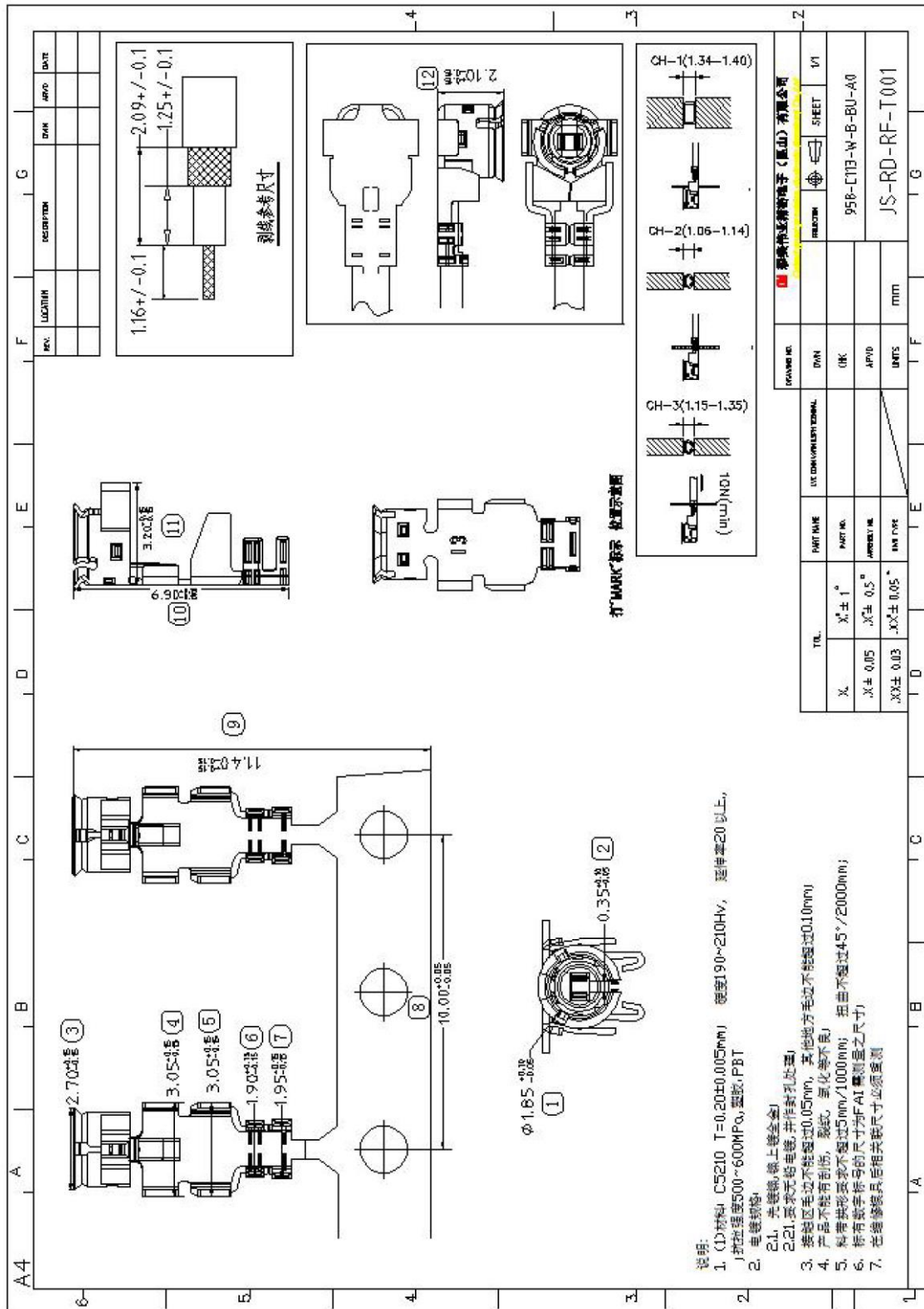
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Connector Specification



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Cable Specification

型号 Type	RF-1.13/50	料号 P/N	SY113/50-001(Black)	
结构图 Structure drawing				
结构特性 Structure characteristics				
结构 Structure		项目 Item	标准值 Standard value	
①内导体 Inner conductor	材料 Material	镀银铜线 Silverplated copper wire		
	组成:总根数/单根外径(mm) Makeup:total / O.D. of every wire(mm)	7/0.08		
	(绞合)标称外径(mm) (Intertwist)NOM.O.D.(mm)	0.24±0.02		
②绝缘层 Insulation	材料 Material	聚全氟乙丙烯 FEP		
	颜色 Color	透明 Clarity		
	标称外径(mm) NOM.O.D.(mm)	0.7±0.03		
③外导体 Outer conductor	材料 Material	镀锡铜线 Tinned copper wire		
	组成:总根数/单根外径(mm) Makeup:total / O.D. of every wire(mm)	4/0.05		
	标称外径(mm) NOM.O.D.(mm)	0.92±0.05		
	覆盖率(%) Coverage ratio(%)	90±5(目数30)		
④护套层 Jacket	材料 Material	聚全氟乙丙烯 FEP		
	颜色 Color	黑 Black		
	标称外径(mm) NOM.O.D.(mm)	1.13±0.05		
电性能特性 Electrical characteristics				
项目 Item	标准值 Standard value	项目 Item	频率 Frequency	标准值 Standard value 单位 Unit:dB/m
电容(pF/m) Capacitance(pF/m)	98	衰减 Attenuation	1GHz	≤2.2
速率(%) Velocity(%)	70		2GHz	≤3.1
阻抗(Ω) Impedance(Ω)	50±2		3GHz	≤3.8
驻波比 Standing wave ratio	≤1.3@0-6GHz		4GHz	≤4.4
最大工作电压(V) Max.operating voltage(V)	1000		5GHz	≤4.9
最大工作频率(GHz) Max.operating frequency(GHz)	6		6GHz	≤5.4
可靠性 Dependability				
项目 Item	单位 Unit	标准值 Standard value		
最小弯曲半径(一次) Min.bending radius static	mm	4		
最小弯曲半径(重复) Min.bending radius repeated	mm	—		
工作温度范围 Operating temperature	℃	-55~+200		
包装 Packing				
项目 Item	单位 Unit	标准值 Standard value		
包装方式 Packing mode	/	纸盘 Papery plate		
每盘长度 The length of each plate	m	500		
每盘接头数 Each connector plate number	/	≤3		
每段最短长度 The shortest length of each root	m	≥10		
使用提示 Use tips				
存储环境 Storage environment	温度: 30℃以下; 湿度: 20%-65%			
最佳保存周期 The best save cycle	2个月; 2个月以上作业性下降, 如上锡效果变差, 但电性不受影响。夏季高温高湿环境开剥后需尽快流转			
加工温度 Processing temperature	260℃的极限情况下, 可短时间承受; 300℃以上分子通常带有的等端基会分解; 400℃以上发生显著的热分解			
铁氟龙收缩 Teflon Shrink	固有材料特性。绝缘: 0.2mm以下; 护套: 0.3mm以下			
护套窜动 Jacket traverse	加工长度(护套残留长度) 低于5cm易发生			
其他 Other				
特殊加工工艺, 请与供方协商后使用				

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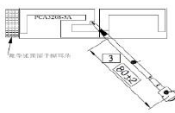
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5. Package

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RFPCA320808IMAB301包規			頁次： 1 之 1		
			版次： A0版		
			制修訂日期： 2022/6/15		
機密等級： ☐ 一般 ☒ 限閱 ☐ 機密 ☐ 極機密					
產品包裝圖示： 圖一  ⇒  ⇒  單pcs產品 PE袋 10pcs/扎, 200PCS/袋, PE袋需封口 圖二  ⇒  ⇒  珍珠棉 外箱 珍珠棉放入外箱 圖三  ⇒  ⇒  ⇒ 					
產品包裝規範： - 將每10pcs產品使用珍珠棉將端子端用白色橡皮筋包扎,然後裝入PE袋內, 每PE袋200pcs, PE袋需封口并粘貼製造標, 如圖示(一) - 將珍珠棉放入外箱中(如圖示二) - 將裝好的成品(如圖示三)放入外箱中, 每箱放4000pcs產品, 上下各放1片珍珠棉, 不滿整箱時需用填充物填充參考文件号 Y-W1-09-281將包裝好的外箱左上方貼標識, 封箱為“工”字型即六面封箱					
核准：	何耀輝	審核：	趙文豹	制定：	梅文芹

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原材料檢驗表

禾邦電子有限公司

進料檢驗報告

[illegible]

PS: 外觀檢驗和其他檢驗項目，若發現不良即填寫不良項目及實際不良的數量，若未發現不良，則不填寫內容。

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Y-FM-10-03

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進料檢驗報告														
檢驗狀態：■正常/N □加嚴/S □減量/R														
材料名稱	PCB板	材料規格	731306006501	批號	B0472207120007	廠商名稱	興海容							
進料數量	1000	進料日期	2022/10/6	檢驗日期	2022/10/7	生產日期	2022/11/2							
XRF報告編號	202207-2461	XRF檢測判定	OK	是否附出貨報告	膜厚	尺寸	出貨報告判定							
檢驗項目		檢驗記錄數據												
抽樣數量		判定結果												
外觀項目		OK												
尺寸(mm)		OK												
規格		OK												
規格下限		OK												
規格上限		OK												
1C		OK												
2C		OK												
3C		OK												
4C		OK												
硬度測試		OK												
軟板彎折		OK												
VSWR		OK												
拉力		OK												
粘膠測試		OK												
落球		OK												
冰醋酸		OK												
上錫		OK												
鹽霧		OK												
線材顏色		OK												

PS：外觀檢驗和其他檢驗項目，若發現不良則填寫不良項目及實際不良的數量，若未發現不良，則不填寫內容。

A1

Y-FM-10-03

UNLESS OTHER SPECIFIED TOLERANCES ON :
X=N/A X.X=N/A X.XX=N/A
ANGLES=N/A HOLEDIA=N/A



INPAQ TECHNOLOGY CO., LTD.

SCALE : N/A

UNIT : mm

DRAWN BY : 詹惠愛

CHECKED BY : 詹惠愛

DESIGNED BY : 黃瑞郎

APPROVED BY : 陳振榮

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TITLE : RFPCA320808IMAB301

DOCUMENT NO.

ENS070025760-000803719416

SPEC REV.
A0

材料成份表

MATERIAL COMPOSITION DECLARATION

材料成份表

Supplier name (供應商): 禾邦電子(蘇州)有限公司

Date (日期) : 2022/6/25

Part No. (料號) : RFPCA320808IMAB301

Product Picture :
(產品圖像)



Composition part	Material name	Material mass (mg)	Material mass (%)	Element name composition	CAS No.	Element % (by weight (以重量計))	材料供應商	ICP Test data																						
								REPORT No.	Cd	Pb	Hg	Cr+6	PBBs	PBDEs	DEHP	DIBP	BBP	DBP	Br	Cl										
構成部件	部件材質名	材質重量	材質重量百分比	構成之元素名稱	CAS 編號	元素百分比																								
銅絲	無鉛銅絲	36.32	5.04%	Sn	7440-31-5	99.270%	圣翰	SHAEC2119162904 SHAEC2119162908	ND	37	ND	ND	ND	ND	ND	ND	ND	ND	ND											
				Cu	7440-50-8	0.700%																								
				Ni	7440-02-0	0.030%																								
同轴电缆	导体	92.27	12.82%	Cu	7440-50-8	98.9950%	明星	A2220186128101ER1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND											
				Sn	7440-31-5	1.0000%																								
				Sb	7440-36-0	0.0005%																								
				As	7440-38-2	0.0005%																								
				Fe	7439-89-6	0.0005%																								
				Ni	7440-02-0	0.0005%																								
				S	7704-34-9	0.0010%																								
				Ag	7440-22-4	0.0020%																								
				絕緣	85.43	11.87%														FEP	25067-11-2	100.000%	DAIKIN	SHAEC2127178503	ND	ND	ND	ND	ND	ND
	編織	128.76	17.88%	Cu	7440-50-8	98.9950%	明星	A2220186128101ER1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND											
				Sn	7440-31-5	1.0000%																								
				Sb	7440-36-0	0.0005%																								
				As	7440-38-2	0.0005%																								
				Fe	7439-89-6	0.0005%																								
				Ni	7440-02-0	0.0005%																								
S	7704-34-9	0.0010%																												
Ag	7440-22-4	0.0020%																												
护套	54.27	7.54%	Perfluoro(ethylene-propene) copolymer	25067-11-2	100.000%	DAIKIN	SHAEC2200415803 SHAEC2200415801	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND												
護套色母	11.36	1.58%	Fluorinated-Ethylene-Propylene - FEP copolymer	25067-11-2	90%	Colorant	SHAEC2203756101 SHAEC2203753901	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND												
various heavy metal free organic and inorganic elements	/	10%																												
端子	Housing	18.07	2.51%	樹脂	30965-26-5	60%	SHINKONG	ETR21801381	ND	7.25	ND	ND	ND	ND	ND	ND	ND	ND	ND											
				被漆絕緣體	65997-17-3	30.0%																								
				顏料/染料	/	5%																								
				添加劑	/	5.0%																								
	CONTACT	21.67	3.01%	Cu	7440-50-8	90.00%	ZUIN	CANEC2201952007	ND	5	ND	ND	ND	ND	ND	ND	ND	ND	ND											
				Sn	7440-31-5	9.00%																								
				P	7723-14-0	0.35%																								
				Zn	7440-66-6	0.23%																								
				Pb	7439-92-1	0.02%																								
				Fe	7439-89-6	0.20%																								
				Ni	7440-02-0	0.14%																								
				Al	7429-90-5	0.02%																								
				Si	7440-21-3	0.04%																								
				Cu	7440-50-8	90.00%														ZUIN	CANEC2201952007	ND	5	ND	ND	ND	ND	ND	ND	ND
				Sn	7440-31-5	9.00%																								
				P	7723-14-0	0.35%																								
	Zn	7440-66-6	0.23%																											
	Pb	7439-92-1	0.02%																											
	Fe	7439-89-6	0.20%																											
	Ni	7440-02-0	0.14%																											
	Al	7429-90-5	0.02%																											
	Si	7440-21-3	0.04%																											
	Plating Ni	2.88	0.40%	Ni	7440-02-0	99.70%	YTOP	A2210394436101002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND											
		其它	/	0.30%																										
Plating Au	2.92	0.41%	Au	7440-57-5	99.70%	YTOP	A2210394436101001	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND												
板材	NY3150	160.05	22.23%	玻璃布	65997-17-3	30.0000%	南亚	SHAEC2124681012 (中)	ND	7.00	ND	ND	ND	ND	ND	ND	ND	ND	161.00											
				銅箔	7440-50-8	30.0000%																								
				固化樹脂環氧樹脂	29690-82-2	35.0000%																								
阻焊油墨	KSM-S6189	6.21	0.86%	填料	/	5.0000%	广信	CANML2119103106	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	172.00											
				半固化片環氧改性環氧樹脂	/	48.0000%																								
				光引發劑(TX)	5495-84-1	1.0000%																								
				高沸點溶劑 (DBE)	95481-62-2	5.0000%																								
				顏料(碳黑)	1333-86-4	1.0000%																								
				亞胺類	7727-43-7	31.0000%																								
				表面助劑 (庚二甲氧基硅烷)	9010-90-6	1.0000%																								
				无机填料 (二氯化硅)	14464-46-1	1.3000%																								
				三聚氰胺	108-78-1	1.8000%																								
				DPM	34590-94-8	2.0000%																								
				四甲苯	64742-94-5	3.3000%																								
				光引發劑907	71868-10-5	4.0000%																								
				黏料	64-19-7	12.0000%																								
				苯并菲酮	51-17-2	1.0000%																								
				甲胺	64-18-6	6.0000%																								
表面处理 (OSP)	SA903	24.21	3.36%	錫粉	6046-93-1	1.0000%	賽可特	A2220193377101004C	ND	ND	ND	ND	ND	ND	ND	ND	ND	475.00												
				水	7732-18-5	80.0000%																								
				无卤素邻甲酚酚環氧樹脂	29690-82-2	18.0000%																								
文字油墨	KSM-388W-HF	5.29	0.74%	无卤素邻苯 A 环氧樹脂	25068-38-6	22.0000%	广信	CANMC2123484902 CANMC2123484904	ND	ND	ND	ND	ND	ND	ND	ND	ND	744.00												
				高沸點溶劑(BE)	95481-62-2	21.0000%																								
				无机填料 (SiO2)	14464-46-1	3.0000%																								
				顏料	3463-67-7	28.0000%																								
				固化促進劑	461-58-5	6.0000%																								
背膠	3M9888T	45.33	6.30%	表面助劑	63148-62-9	2.0000%	3M	ETR22102434	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND												
				NONWOVEN CARRIER	/	55.0%																								
				ACRYLIC ADHESIVE	/	35.0%																								
		720	100.00%	SILICONE COATED RELEASE PAPER	/	10.0%																								

Approved by (核准): 何耀輝

Reviewed by (審查): 趙文灼

Initiated by (制作人): 孫夢祺

UNLESS OTHER SPECIFIED TOLERANCES ON :

X=N/A

X.X=N/A

X.XX=N/A

ANGLES=N/A

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SCALE : N/A

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DRAWN BY : 詹惠零

CHECKED BY : 詹惠零

DESIGNED BY : 董瑞郎

APPROVED BY : 陳振榮

TITLE : RFPCA320808IMAB301

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