



Sample acknowledgement

Project name:	S0923
Product name:	S0923_Three-in-One Antenna
Material number:	K5330000140LA
Material Description:	FPC thickness: 0.10mm - matte black - length 33.4mm - width 11.96mm
Supplier Product Model:	S0923_Three-in-One Antenna
TP FW mass production version TP FW	
Reminders:	Each of the above information needs to be complete and accurate, and it needs to be consistent with the material information in the order BOM.

Supplier signature (with company seal)

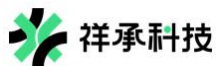
☒ ROHS material ROHS		☐ Non-ROHS materials NOT ROHS		
Department	☐ Producer	☐ Engineering Department	☐ Design Department	☐ Quality department
Signatory				
Signing date				
Supplier information				
Supplier name:	SUNNYWAY RF TECHNOLOGY(CHINA)CO., LTD			
Supplier address:	No. 99, Lane 215, Gaoguang Road, Qingpu District, Shanghai			
Supplier to contact	Ma ronglai-15921558333			
Recipient email address:	maronglai@sunnyway-iot.com			
Note: 1. Supplier information must be filled in correctly 2. Company seal required				

Customer review and signature

Recognition state	☐ Official recognition		☐ Conditional recognition		☐ Provisional limited recognition					
	☐ Conditional recognition Conditions to be met: _____									
	☐ Provisional limited recognition Limited Procurement_____K									
Reviewed and signed by the Department (with the seal of recognition)										
Department	☐ ID	☐ MD	☐ HW	☐ HWtest	☐ Packing	☐ NPI	☐ PM	☐ SPM	☐ PQM	☐ SQE
Signatory										
Signing date										
Check item	Appearance / Workmanship	Material / size / specification 规格		Specification/electrical performance	Material / size / specification	Process assembly/production yield	Specifications/customer needs	FW Version FW	Appearance / reliability	Appearance/manufacturing yield/drawing specification
Note注意: Before signing, the material information description, specification, drawing, dimension report, electrical performance test report, reliability test report, packaging specification and other information shall be carefully reviewed										

Catalog

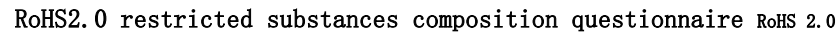
1	Bill of material	☒
2	RoHS restricted substances composition questionnaire	☒
3	Engineering drawings.	☒
4	Sample photos	☒
5	Full size measurement report	☒
6	Cpk Report	☒
7	Product specifications	☒
8	Process Flow Chart	☒
9	Electrical performance test report	☒
10	Reliability test report	☒
11	Material certificate / SGS report	☒
12	Packaging method	☒



Bill of material

■ ROHS2.0

Item	Part material number	Part name	Part description	Supplier	Supplier model	Number	Yes / no ROSH materiel	Remark
Notes: For BTB type materials such as screens, batteries, speakers, cameras, magnetic heads, NFC, FPC, coaxial cables, etc., the connector manufacturer, model, material, etc. must be filled in. Also, check to ensure that the connector model being used matches the one for assembly.								
1	K5330000140 LA	S0923_Three-in-One Antenna	FPC thickness: 0.10mm - matte black - length 33.4mm - width 11.96mm	SunnyWay	SH25287IB75-2	1	YES	
2	Base material	Half and half	Cu:18um, Pl:12.5um	Fubon	cathode copper	1	YES	
3	Adhesive backing	3M9471LSE	T=0.05mm	3M	3M9471LSE	1	YES	
4	Solder mask ink	Black ink	T=13-20um	Yuli	PSM-800	1	YES	
5	Text ink	White ink	T=10um	Yugu	ZSR-150WNY	1	YES	
6	clad layer	Gold plating	T=0.5u"	Jin Yuanxing	Au	1	YES	
7								
8								
9								
10								
11								
12								
13								
14								

[illegible]



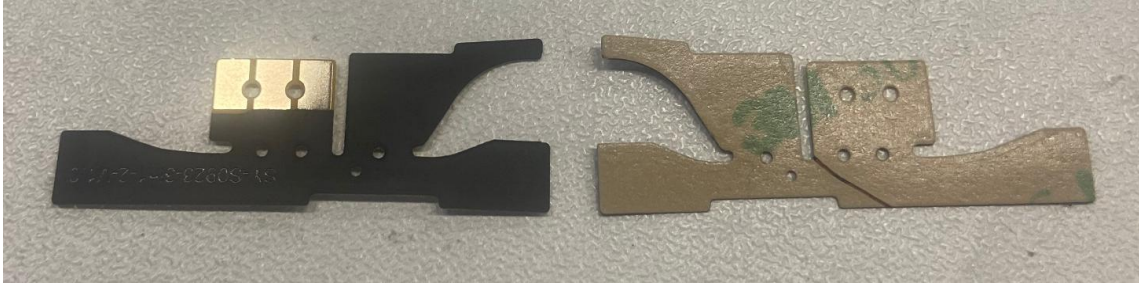
Reach test report

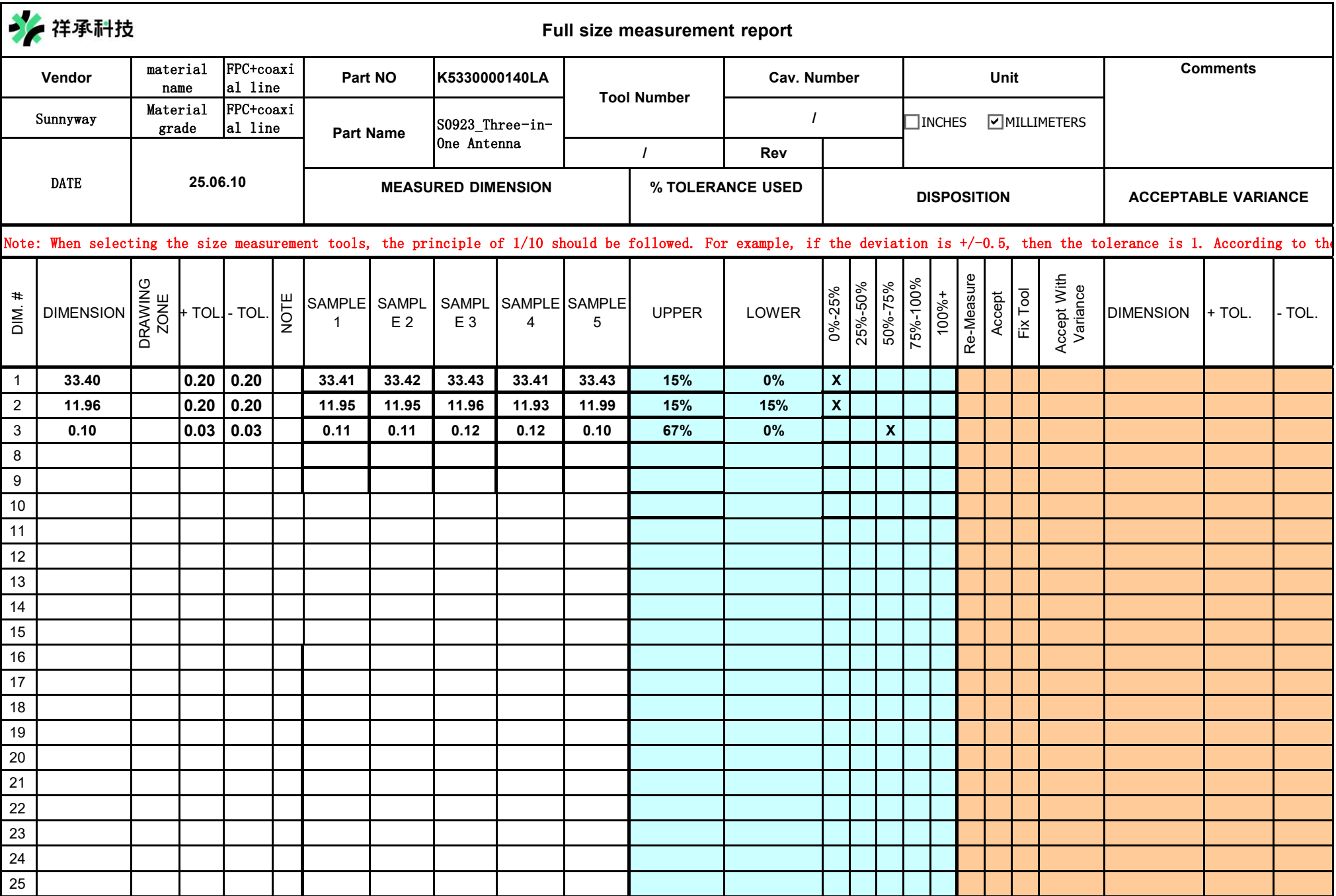
SALEABLE PART

Part material number	Part name / model	Supplier P/N	Name of manufacturer	Supplier green material identification method
K5330000140LA	S0923_Three-in-One Antenna	SH25287IB75-2	SunnyWay	ROHS
Remark	Required items; The third-party test report must be issued by a laboratory that has obtained the ISO17025 (general requirements for the competence of testing and calibration laboratories) certification and has been approved by the National Accreditation Board (CNAS) for RoHS testing (such as SGS, BV, Intertek, TUV, etc.). Otherwise, the relevant test report should be regarded as invalid.			

SUB-PART

[illegible]





 祥承科技 CPK Report					
Part Number	K5330000140LA		Vendor)	Sunnyway	
Description	S0923_Three-in-One Antenna		Inspected	Chen Xiaoping	
Tool Number	/		Inches/MM	MM	
Cavity	/	Material Name		FPC	
		Material Code		FPC	
Revision			Date	25.6.10	
Dim. Designator					
Nominal	33.40	11.96			
+ Tolerance	0.20	0.20			
- Tolerance	-0.20	-0.20			
Upper Limit	33.60	12.16	0.00	0.00	0.00
Lower Limit	33.20	11.76	0.00	0.00	0.00
1	33.38	11.93			
2	33.39	11.95			
3	33.41	11.94			
4	33.41	11.91			
5	33.45	11.97			
6	33.38	11.94			
7	33.43	11.96			
8	33.45	11.98			
9	33.41	11.91			
10	33.39	11.99			
11	33.41	11.92			
12	33.43	11.93			
13	33.41	11.91			
14	33.38	11.96			
15	33.43	12.01			
16	33.38	11.93			
17	33.39	11.95			
18	33.45	11.94			
19	33.43	11.92			
20	33.38	11.93			
21	33.41	11.95			
22	33.43	11.94			
23	33.45	11.91			
24	33.38	11.97			
25	33.39	11.94			
26	33.41	11.92			
27	33.43	11.98			
28	33.38	11.96			
29	33.38	11.99			
30	33.43	11.92			
31	33.41	11.93			
32	33.45	11.91			
MAX.	33.45	12.01	0.00	0.00	0.00
MIN.	33.38	11.91	0.00	0.00	0.00
AVERAGE	33.41	11.94	#DIV/0!	#DIV/0!	#DIV/0!
STDEV	0.03	0.03	#DIV/0!	#DIV/0!	#DIV/0!
CP	2.65	2.47	#DIV/0!	#DIV/0!	#DIV/0!
Cpk	2.51	2.27	#DIV/0!	#DIV/0!	#DIV/0!
TOOLING					
Note: When selecting the size measurement tools, the principle of 1/10 should be followed. For					
Tabulation::		Audit: (signature and company		Date:	

Part Number	K5330000140LA	Revised By	shaobing	Revised Date	25.06.10
Description	S0923_Three-in-One Antenna	Approved By	yujiang	Approved Date	25.06.10

No.	process	process specification	Quantity	Boarding	Operator	QA	Note
1	Process	Cut according to the drawing model and perform material					
2	Cutting the material	160 degrees for 30 minutes, baking based on SOP documents					
3	bake	Front film PF7200A1 OTL					
4	Exposure lines						
5	Development/etching/deposition	Parameters are based on SOP documents: minimum line widthcutting, parameters line spacing 0.25+/-0.0, 2mm,					
6	Automatic optical inspection	AOI detects open circuits and short circuits in the circuit					
7	Screen printing solder mask	Front side film : P7200A0 GTS Yuli Black					
8	bake	150° C 30min					
9	Screen-printed characters	Front film PF7200A1 CTO Whitecharacters					
10	bake	150° C 30min					
11	Electric gold	AU:>0.5U NI:80-240U"					
12	Adhesive tape Coating	Reverse side of the hole-punched full sheet of adhesive tape					
13	Weitbrechti	Apply the adhesive film on the front surface					
14	Drilling holes	Mold: P7200A0 Punching Steel Sheet					
15	Shape	Remove the thin mucous membrane					
16	Peeling the film	Full inspection in accordance with FPC inspection standards					
17	Final Quality Control Department	Full inspection is conducted in accordance with the FPC inspection standards.					
18	FQA	FQA					
19	Packaging	Single-piece shipment					
20	Note						

Part Number	K5330000140LA	Revised By	shaobing	Revised Date	25.6.10
Description1	S0923_Three-in-One Antenna	Approved By	yujiang	Approved Date	25.6.10

Built-in antenna environmental test report

Customer Name:		Project Name: S0923	Product Name: Antenna Finished	P/N:SH252871B75-2			
test time	test item	Test conditions and the calculation results	Then test equipment	test result			
25.9.8-25.9.9	low temperature test	Stored in a warming box (-40° C) for 24 hours, then placed at room temperature and humidity (20° C, 50% RH) for 2 hours to regain dryness before testing. The electrical performance (VSWR) and structural shape are both in good condition.	Standard temperature and humidity chamber	1	2	3	4
				-40℃	-40℃	-40℃	-40℃
				OK	OK	OK	OK
25.9.8-25.9.10	high temperature test	Stored in a incubator at 65° C for 24 hours, then left at room temperature and humidity (20° C, 50% RH) for 2 hours to regain dryness before testing. The electrical performance (VSWR) and structural shape are both in good condition.	Standard temperature and humidity chamber	1	2	3	4
				+70℃	+70℃	+70℃	+70℃
				OK	OK	OK	OK
25.9.8-25.9.11	Constant temperature test	The temperature is 65° , the humidity is 90% - 95% RH. After 48 hours, it is required that the structure remains intact and the electrical performance remains unchanged.	Standard temperature and humidity chamber	1	2	3	4
				25℃~55℃/95%	25℃~55℃/95%	25℃~55℃/95%	25℃~55℃/95%
				OK	OK	OK	OK
25.9.8-25.9.12	Thermal shock test	High temperature of 65° C, low temperature of -35° C for each 1 hour, 32 cycles. The structure must be intact and the electrical properties must remain unchanged.	Standard temperature and humidity chamber	1	2	3	4
				-40℃~70℃	-40℃~70℃	-40℃~70℃	-40℃~70℃
				OK	OK	OK	OK
25.9.8-25.9.13	Salt Spray Test	A 5% NaCl solution in salt spray was sprayed onto the antenna continuously for 48 hours at 35° . Then it was removed for cleaning and left to dry for 16 hours. The surface of the antenna should show no rust, discoloration, or peeling of the coating.	smoke sprayer	1	2	3	4
				35℃/5%	35℃/5%	35℃/5%	35℃/5%
				OK	OK	OK	OK

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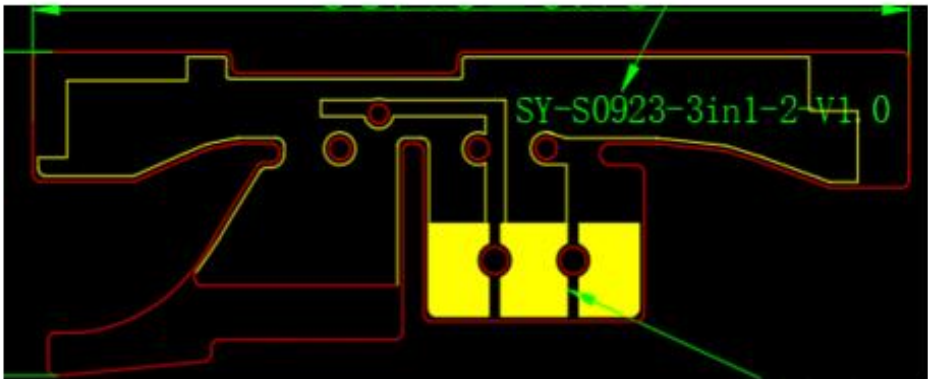
1. Project information

Machine information



Antenna information

	Antenna version
3-in-1 antenna	SY-S0923 3IN1 2 V1.0
Antenna type	PIFA

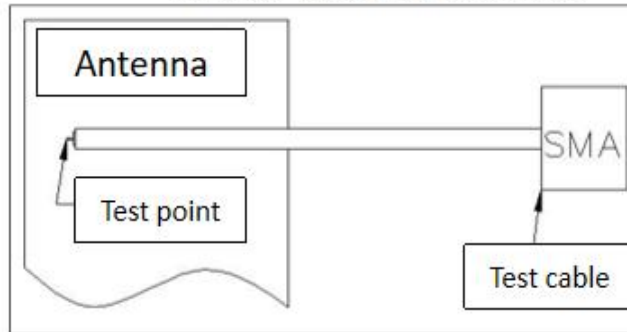


Note: The customer finally verified that the antenna performance prototype was retained in our company for at least one year, which is convenient for analysis and solution to abnormal situations in antenna mass production. Ensure antenna shipment quality.

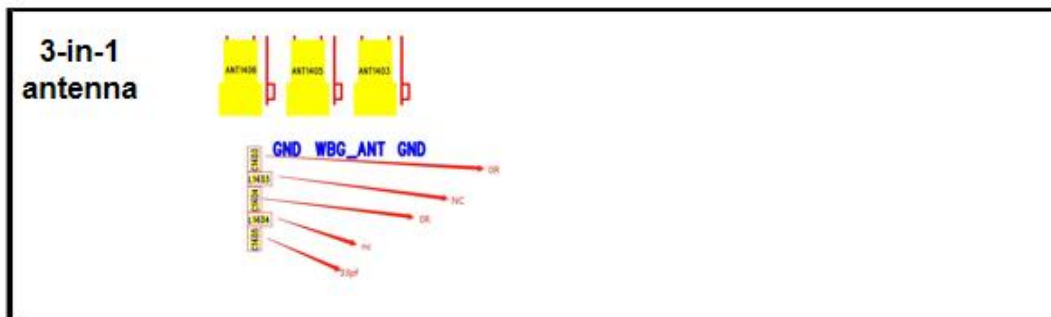
2. Test fixtures

Purpose: To test the passive parameters of the antenna as accurately as possible.

How to make: The prototyping mechanism is made of a 50 ohm coaxial cable, one end is connected to the test point at the back of the matching circuit of the prototype motherboard (the front of the RF test hole), and the other end is connected to the SMA connector. The schematic diagram is as follows:



3. Matching circuits



3-in-1 Antenna - Main Path			
E1	0Ω	C1403	O201
E2	3.9NH	L1403	O201
E3	0Ω	C1404	O201
E4	NA	L1404	O201
E5	0Ω	C1405	O201

4.1 S11 Test Method Description

Test method: A 50 ohm CABLE cable is derived from the instrument test port, and the SMA connector of the prototype is connected after calibration using the calibrator to record the return loss and standing wave ratio corresponding to the relevant frequency point.

The diagram illustrates the test setup. A Network Analyzer is connected to a Cable, which is then connected to Test fixtures. The Network Analyzer is represented by a box with a screen and several buttons. The Cable is a line connecting the Network Analyzer to the Test fixtures. The Test fixtures are represented by a box with a screen and several buttons.

4.2 S11 parameter

S11 Log Mag 5.000dB/ Ref 0.0000 dB [F1 N]

Point	Frequency (GHz)	Magnitude (dB)
1	1.5750000	-22.343
2	2.4800000	-13.773
3	2.5000000	-14.063
4	2.1000000	-23.252
5	3.0500000	-19.014

6 Start 500 MHz IFBW 10 kHz Points 501 Power 0 dBm Stop 6 GHz S11 [F1] [N] 10 dB

3IN1 antenna	
Frequency (MHz)	Log Mag
1575	-22.3
2400	-13.7
2500	-14.0
5150	-25.2
5850	-19.0

Test System: Shielded Anechoic Chamber

5.1 Passive test data

5.1.1 3-in-1 Antenna passive efficiency and gain

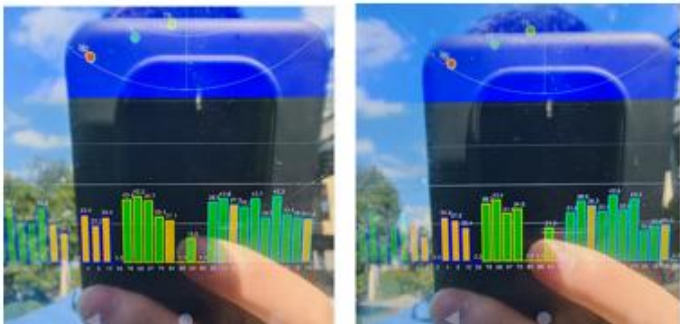
Fre/Mhz	Effi/dB	Effi/%	MaxGain /dBi	Fre/Mhz	Effi/dB	Effi/%	MaxGain /dBi
1550	-4.27	37.41	0.54	5150	-5.55	27.86	1.03
1555	-4.22	37.84	0.3	5200	-5.65	27.23	1.11
1560	-4.12	38.73	0.19	5250	-5.39	28.91	1.69
1565	-4.23	37.76	-0.22	5300	-5.84	26.06	1.47
1570	-4.3	37.15	-0.06	5350	-6.05	24.83	2.00
1575	-4.22	37.84	0.38	5400	-5.57	27.73	1.19
1580	-4.17	38.28	1.03	5450	-5.8	26.3	1.86
1585	-4.05	39.36	1.7	5500	-6.33	23.28	1.03
1590	-4.08	39.08	1.76	5550	-6.12	24.43	1.08
1595	-4.2	38.02	1.17	5600	-5.88	25.82	1.13
1600	-4.71	33.81	0.05	5650	-5.94	25.47	1.07
1605	-4.9	32.36	0.36	5700	-6.13	24.38	1.12
1610	-5.33	29.31	0.11	5750	-5.95	25.41	1.34
2400	-4.99	31.7	2.88	5800	-6.01	25.06	1.25
2410	-4.88	32.51	2.24	5850	-6.1	24.55	1.09
2420	-4.82	32.96	2.02				
2430	-4.81	33.04	2.23				
2440	-4.7	33.88	2.42				
2450	-4.71	33.81	2.35				
2460	-4.81	33.04	2.13				
2470	-4.82	32.96	3.00				
2480	-4.93	32.14	2.02				
2490	-4.93	32.14	2.36				
2500	-4.84	32.81	2.52				

5.2 Active test data

5.2.1 3-IN-1 Antenna Active Test Data(FreeSpace)

WIFI OTA test				
frequency	Channel	3#		Judging criteria
		TRP	TIS	
WIFI 11a (54M)	36	13.35		TRP:≥12dBm TIS:≤-70dBm
	149	12.37		
	165	12.61	-71.24	
WIFI 11b (11M)	1	14.95		TRP:≥14dBm TIS:≤-83dBm
	7	15.45		
	13	15.35	-83.07	
WIFI 11g (54M)	1	12.69		TRP:≥12dBm TIS:≤-70dBm
	7	13.11		
	13	12.93	-70.99	
WIFI 11n (65M)	1	10.21		TRP:≥10dBm TIS:≤-68dBm
	7	10.06		
	13	10.09	-68.06	

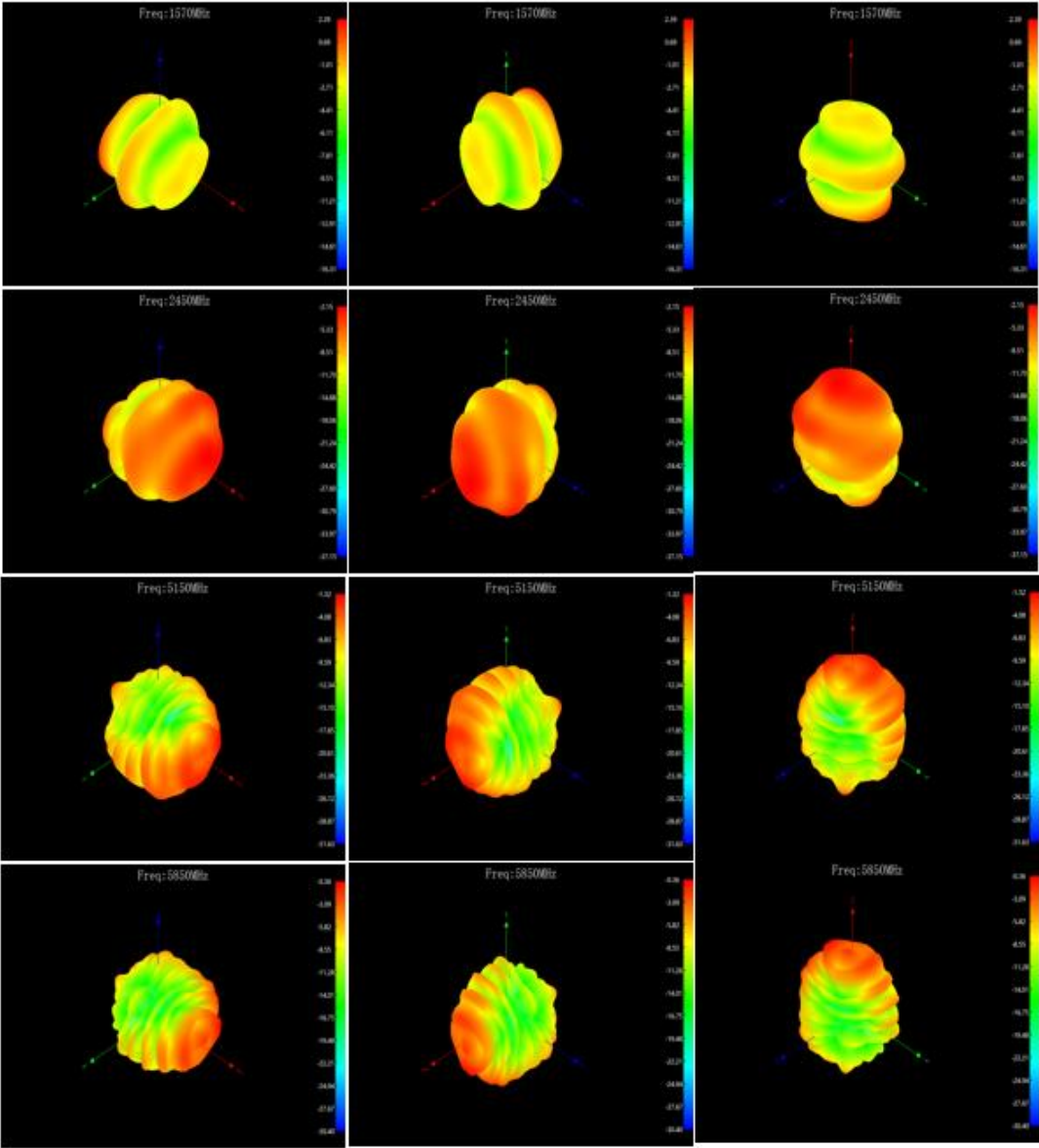
GPS OTA test (Focus on field test satellite search performance)

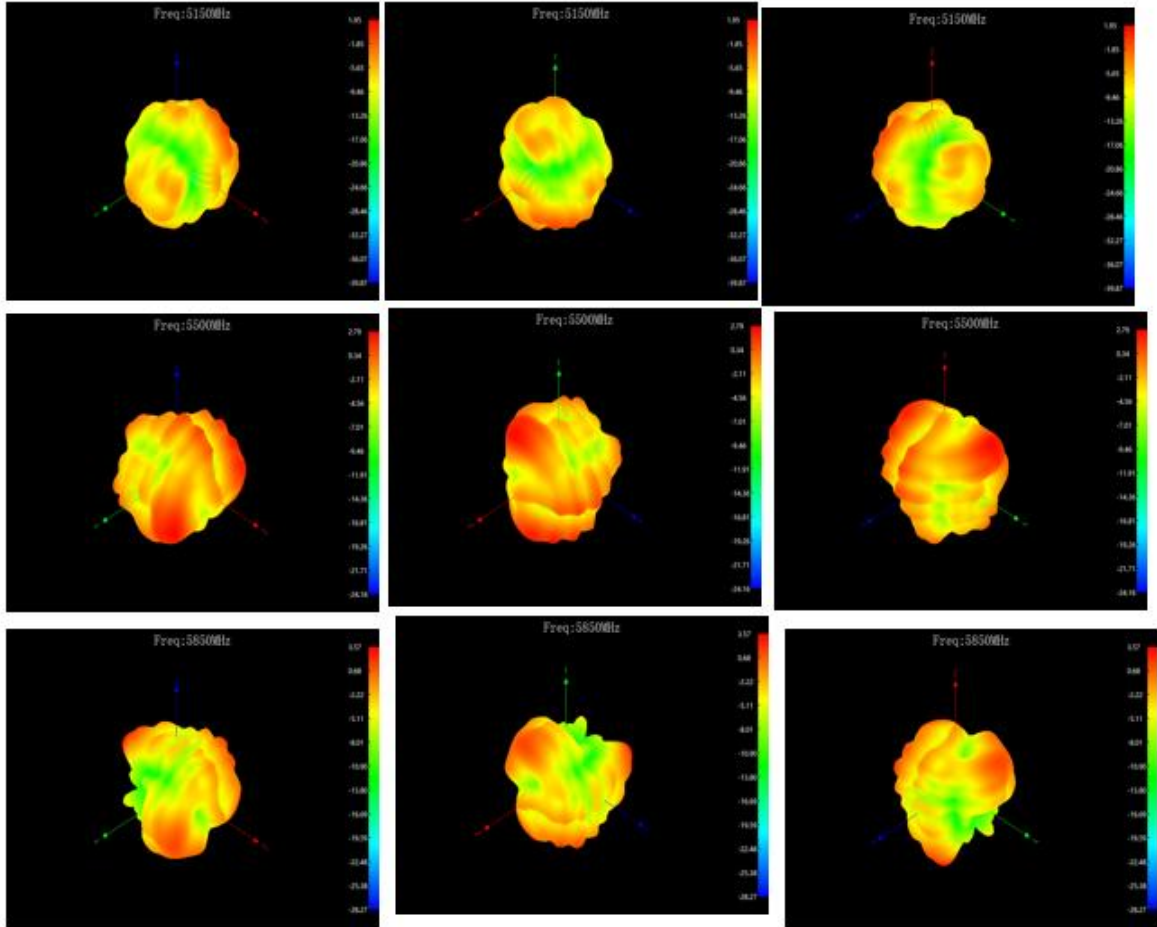


6 Antenna Pattern

6.1 3-IN-1 Antenna 2D & 3D Radiation Pattern

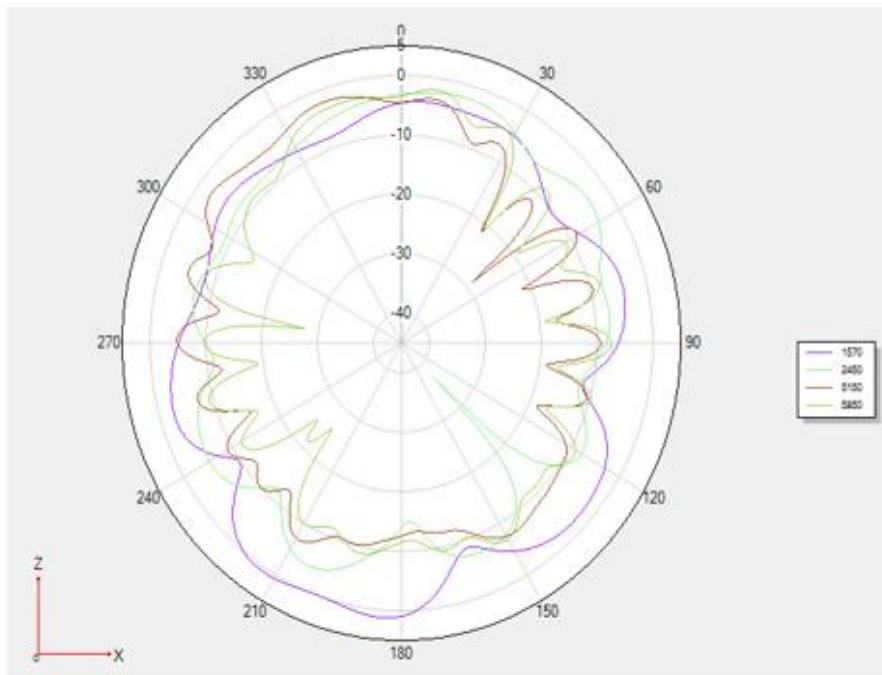
3D Radiation Pattern



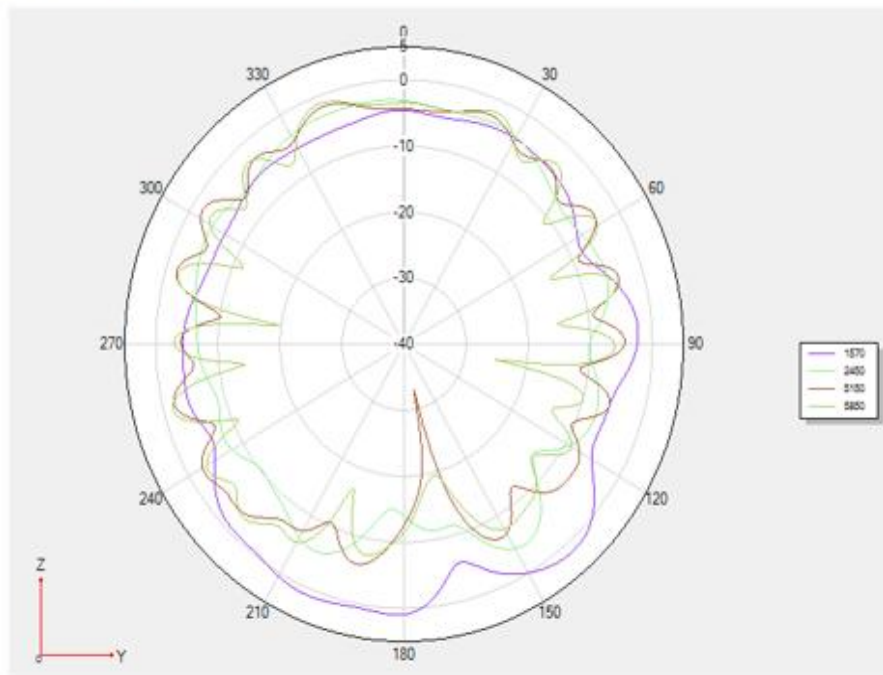


2D Radiation Pattern

Phi 0 2D

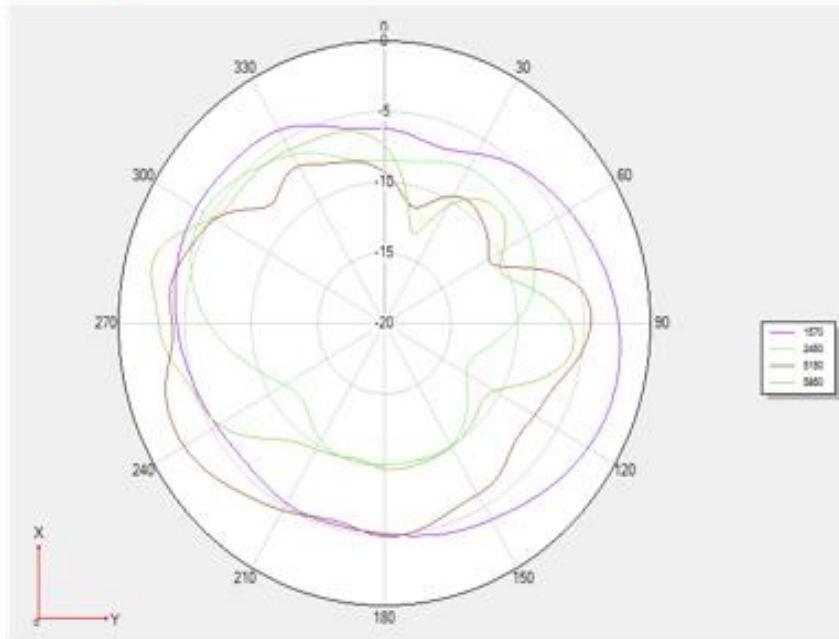


Phi 90 2D

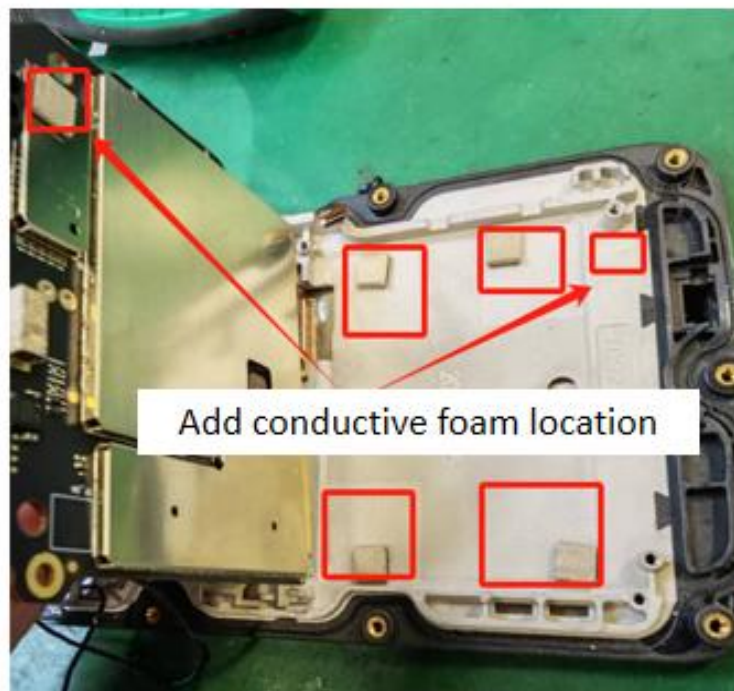


2D Radiation Pattern

Theta 90 2D



7. Sample Environmental Treatment

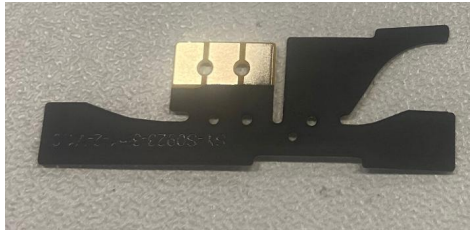
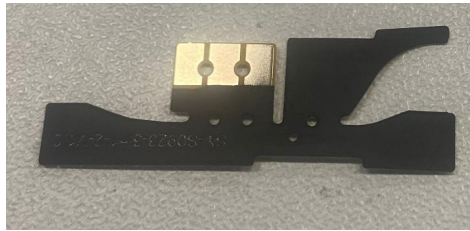


8. Mass production antenna indicators

VSWR shall be adopted as the production test standard for antennas. The criteria are specified below according to project differences:

Frequency (MHz)	Mass production standard
1550-1620MHz: 2400-2500MHz: 5150--5850MHz	VSWR (Mass production performance) <VSWR(Acknowledge performance)+1

Packaging method

1. Single product packaging photos or 2D drawings (for single packaged materials)	2. Single layer product packaging photos or 2D drawings (reflect the tidiness and reliability)	Product name	S0923_Three-in-One Antenna	
	reference picture 	Product number	K5330000140LA	
3. Photos of products placed in all layers of the box (reflecting the tightness and reliability)	4. Overall picture or 2D picture after the whole box is sealed (overall box sealing state)	Material Description	FPC thickness: 0.10mm - matte black - length 33.4mm - width 11.96mm	
		Packaging method Description or packaging material description	PE bag+4 bags of desiccant (2 bags of waterproof bags placed diagonally)+carton waterproof bag+upper and lower partition of carton+thickened carton (K=K reinforced core)	
5. Label of single package product (item no., product name, quantity, etc.)	6. Outer box label (material number, product name, quantity and other information)	Packing in box Number	Quantity of each layer or package	1000PCS
product label Customer: _____ P/N: <u>K5330000140LA</u> SUM: <u>1000PCS</u> material description: <u>FPC thickness: 0.10mm - Black matte finish - Length 33.4mm - Width 11.96mm</u> Production batch: <u>210805</u> purchase note: <u>3501-202108040001</u> supplier: <u>Sunnyway</u> plant code: _____  	product label Customer: _____ P/N: <u>K5330000140LA</u> SUM: <u>1000PCS</u> material description: <u>FPC thickness: 0.10mm - Black matte finish - Length 33.4mm - Width 11.96mm</u> Production batch: <u>210805</u> purchase note: <u>3501-202108040001</u> supplier: <u>Sunnyway</u> plant code: _____  	Number of layers or packages	5	
		Quantity per box	According to the actual	
		Remarks		
		1. Each small package and carton box shall be attached with a 1pcs shipping material label. The label format shall refer to the purchase definition. The right side of the carton box shipping label shall be attached with a 1pcs ROHS label; 2. It is not allowed to print the company name information (if there is manufacturer information, it needs to use kraft paper glue to cover it), and print upward, moisture-proof, stacking layers, anti-static ESD and other signs; 3. Cartoon box shall be sealed with I-shaped or Wang shaped. When the ratio of length to width of the carton box is less than 2 (length/width < 2), I-shaped sealing shall be used; When the length width ratio is greater than 2 (length/width ≥ 2), the box shall be sealed in king shape;		
		Supplier Sign	chenxiaoping	
		Date	25.6.10	