



Shenzhen Foruo Technology Co., Ltd. SHENZHEN FROG TECHNOLOGY CO., LTD

Sample approval letter

No.: X12NFT-20231214

material code	FD. 68. X12NYE11	name of	diversity antenna	
Applicable model	X12NFT	Specificati on description	X12NFT/ Diversity antenna /FPC+ coaxial line/line length: 64mm/ silk screen: X12NFT-YST-DIV-V1.0	
Material category	☒ Structure, electronics, and packaging categories ☐ ☐			
Supplier		supplier	Renesola	
Recognize the	☐ New project ☐ New supplier ☐ cost reduction ☐ material change ☐ Planning change ☐			
Material validation	Structural Engineer and Product Manager (concurrently: ID, Engineer)			
	▽MD	☐ Recognition ☐ does not approve ☐ others	Confirm content	structure size
	▽ID	☐ Recognition ☐ does not approve ☐ others	Confirm content	1. Color difference
				2. Gloss
				3. Silk-printed LOGO
				4. Light transmittance
	▽ Attachment	☐ Material specification ☐ Structure full size report ☐ Others:		
	Structural Engineer (signature)		Product Manager (signatu	
	Device engineer			
	▽ electrical	☐ Recognition ☐ does not approve ☐ others	▽ESD	☐ Recognition ☐ does not approve ☐ others
	▽ function	☐ Recognition ☐ does not approve ☐ others		
	▽ Attachment	☐ Material specification ☐ Electrical test report ☐ Functional test report ☐ Others:		
	Device Engineer		examine and	
	Quality engineer			
	▽ reliability	☐ Recognition ☐ does not approve ☐ others	▽ function	☐ Recognition ☐ does not approve ☐ others
	▽ surface	☐ Recognition ☐ does not approve ☐ others		
	▽ Attachment	☐ Reliability test report ☐ Quality control plan (QC drawing) ☐ ROHS test report ☐ Cpk report / process yield report, etc		
	remarks			
	DQE, Engineer (signature)		examine and verify	
	project manager			
ensemble	☐ Recognition ☐ does not approve ☐ others	else	☐ Recognition ☐ does not approve ☐ others	
remarks				
Project Manager		exami ne		
comprehensive assessment:				
☐ Approval ☐ Limited approval (quantity:) ☐ Non-approval:				

X12NFT Project antenna material requirements specification

Customer name: Forog

Customer product name: X12NFT

Product name: the diversity antenna

Product specification: See the BOM table for more details

material code: FD.68.X12NYE11

Change Content CV:

order number	edition	state	Start and end date	person liable	page number	remarks
1	editio princeps	editio princeps	2024-02-24	Li Jieyi	9	

The Supplier acknowledges the signature of the following documents:

Responsible person / date		IQC/ date	Review / Date	Approval / Date
MD	Feng jiwu	Su guangfeng	Chen kehong	
RF	Xiao jinbao			

The demander acknowledges the signature (please send it back after the confirmation):

The demander's judgment result: ☐ qualified ☐ unqualified			
Development & Design Engineer / Date	SQE Engineer / Date	Purchasing Leader / Date	Development Manager approval / date

catalogue

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1. Overview

1.1 Scope of application

This requirement specifies the antenna technical requirements and material requirements specifications for X12NFT products.

This requirement is applicable to the antenna selection, testing and acceptance of X12NFT products.

1.2 Project basic information

Antenna name:	<u>X12NFT</u>
Antenna frequency:	2G: GSM850/900/1800/1900 3G: WCDMA B1/2/5/8 4G: LTE B2/3/4/5/7/8/17/28/38/66 GWB: 1575.42MHz/2.4G DRX : 1700MHz-2700MHz
Antenna material:	FPC+ coaxial cable

2. Technical index requirements

2.1 Introduction of test items and equipment

inventory	test item	equipment
S11 parameter	Standing wave ratio, echo loss	network analyzer
Active test	TRP,TIS	Integrated tester, microwave darkroom
Passive test	Gain, efficiency	network analyzer

2.2 Active Reporting

2.2.1 Test instructions

Test tools: Agilent8960 instrument, R & S CMW500, full wave far field ETS dark room, high precision positioning system and its controller and computer with automatic test program

Test environment: temperature $22^{\circ}\text{C} \pm 3^{\circ}\text{C}$, humidity $50\% \pm 15\%$

Test method: DUT is fixed in the center of the turntable with H plane, on the same horizontal line as the center of the horn antenna. The positioning system enables the DUT to rotate in the whole sphere to satisfy the high-precision 3 D positioning. Each RF instrument and turntable controller communicate with the PC with automatic test software through the GPIB interface

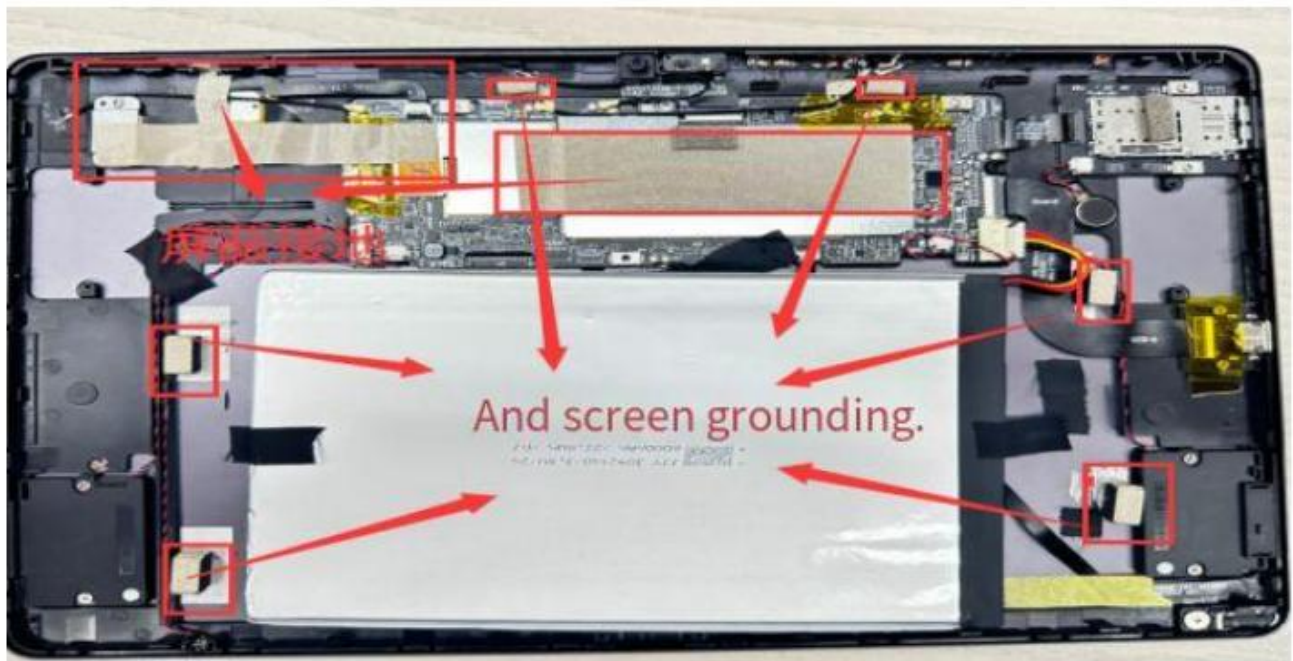
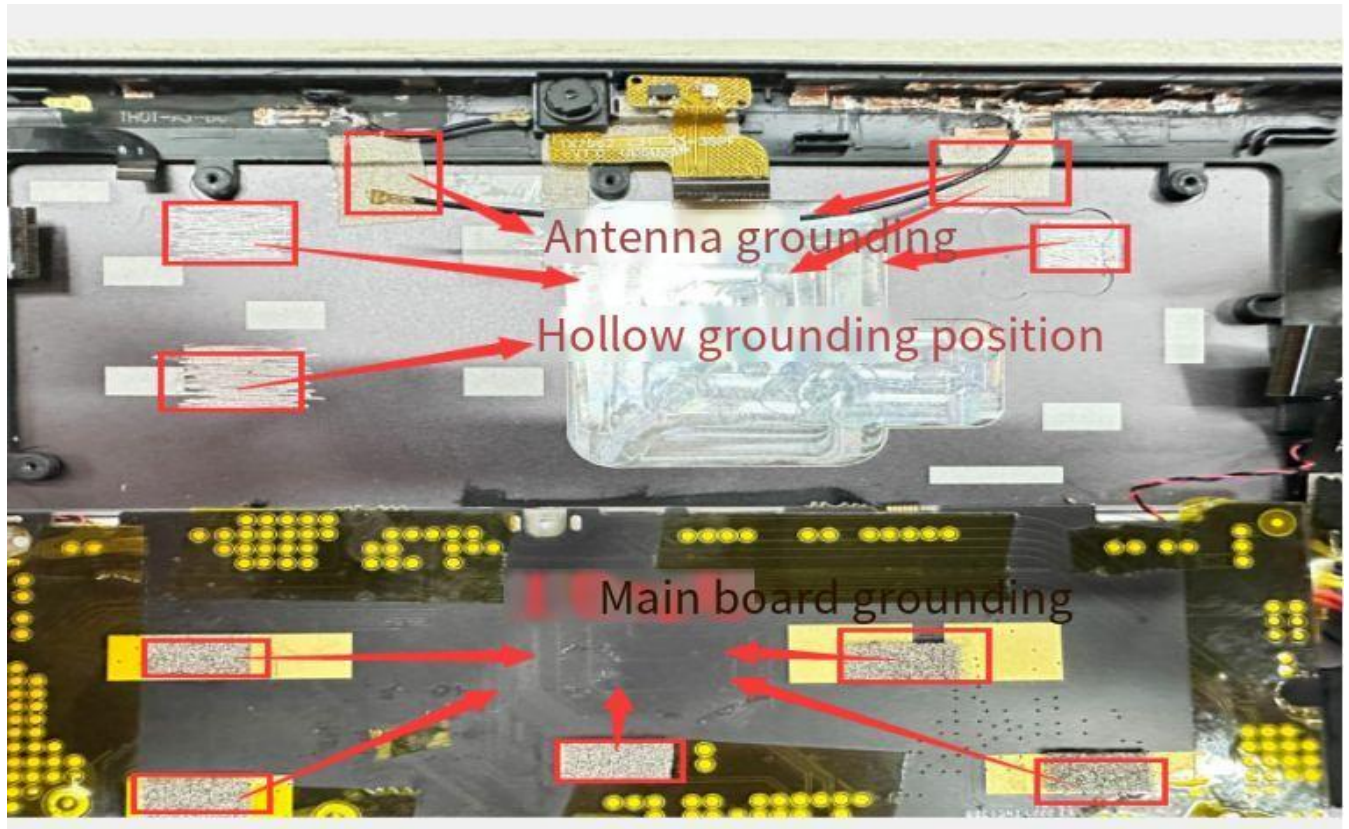
2.2.2 The diversity antenna efficiency

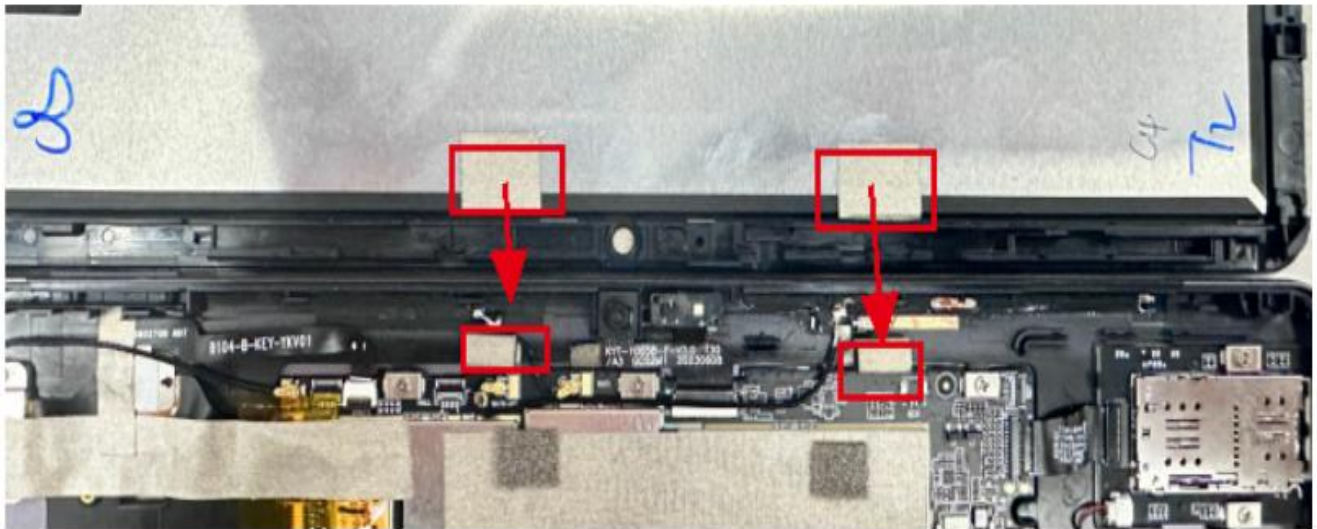
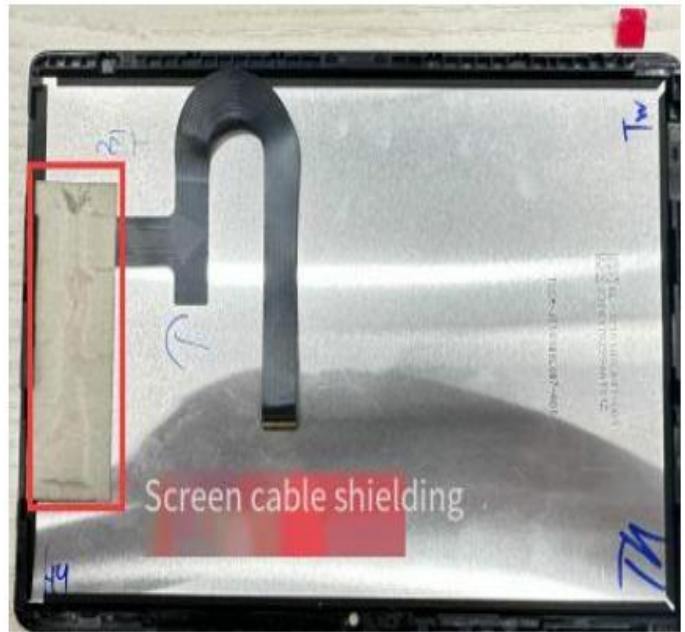
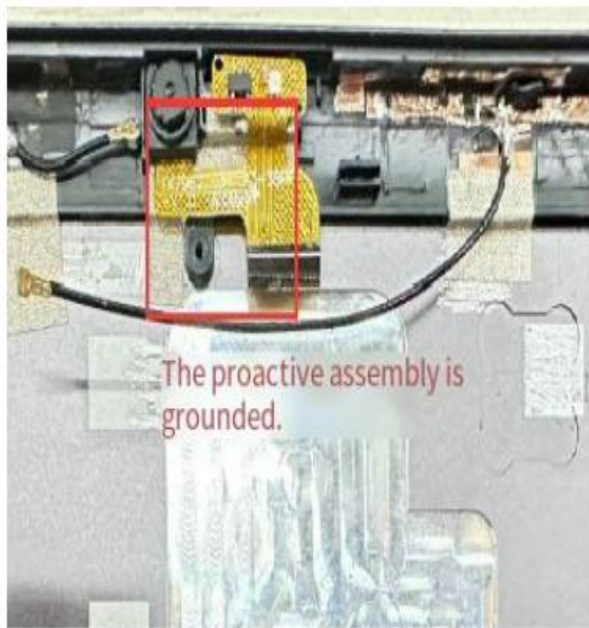
Freq (MHz)	Effi (%)	Freq (MHz)	Effi (%)
1700	22.4	2250	23.5
1750	23.7	2300	21.8
1800	25.3	2350	22.3
1850	27.2	2400	24.5
1900	28.1	2450	25.2
1950	26.5	2500	26.4
2000	24.2	2550	25.8
2050	23.8	2600	24.3
2100	23.0	2650	23.5
2150	22.5	2690	22.6
2200	23.1		

2.2.3 Antenna gain

Band	Gain (dBi)	Band	Gain (dBi)	Band	Gain (dBi)
GSM850	0.63	B2	1.26	2.4G	1.35
EGSM900	0.45	B4	1.18	5G	1.10
		B3	1.20		
DCS1800	1.22	B5	0.63	GPS	1.12
PCS1900	1.26	B7	1.08		
		B8	0.63		
W1	1.17	B17	0.52		
W2	1.26	B28ab	0.52		
W5	0.63	B38	1.08		
W8	0.45	B66	1.23		

2.2.4 Environmental treatment

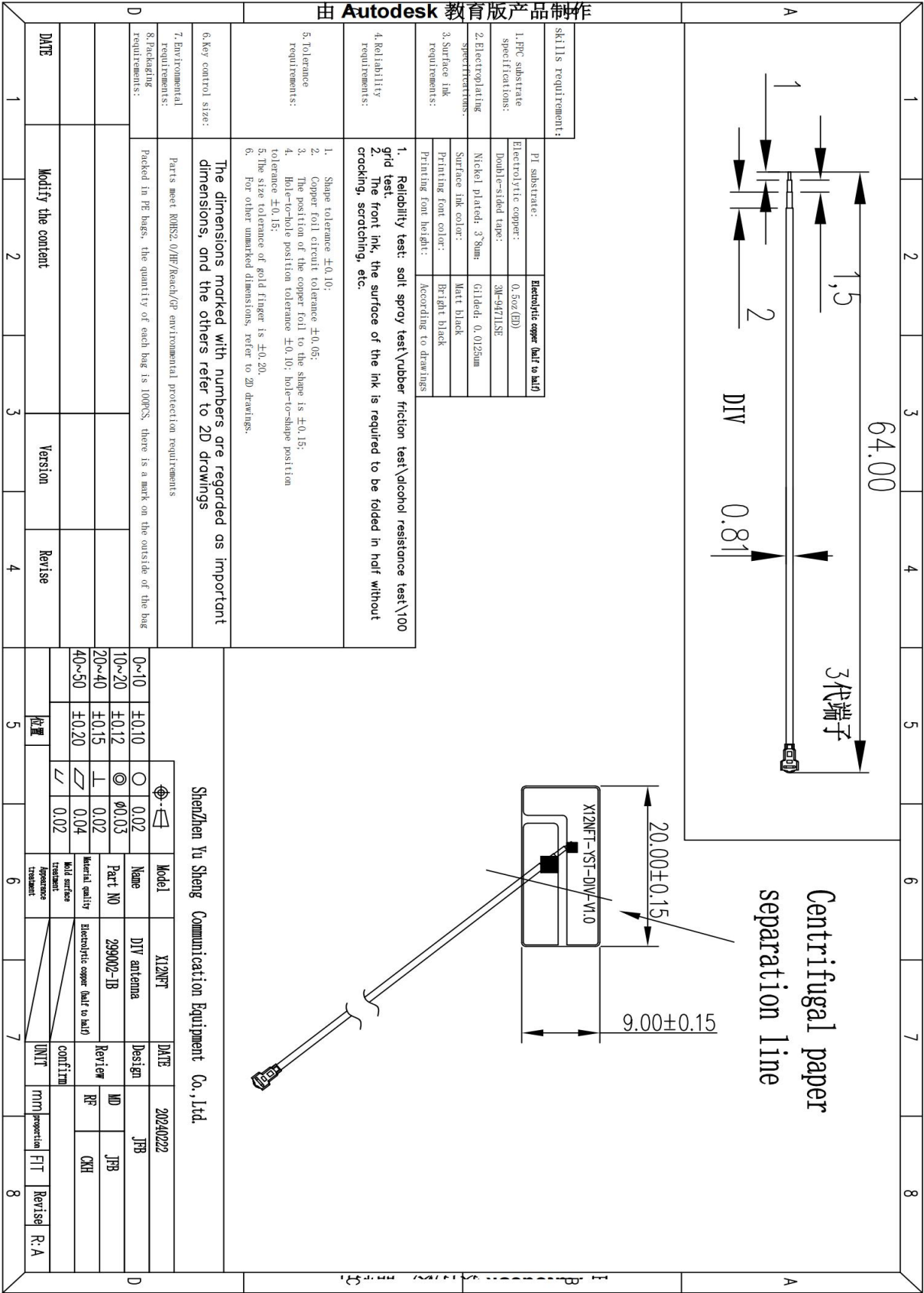




The edge of the screen increases the ground position of the antenna

3. Engineering drawings

DIV antenna



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4. List of materials

299002 (X12NFT) BOM

Edition: R:A

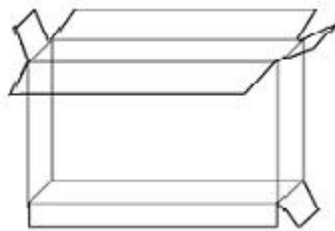
client:299

Model: 299002

date: 20240222

Item	Part No	Name	Types of	version	specification	colour	unit	Quantity	Craft
1	299002-IA-RA	GSM antenna		X12NFT	black GSM-FPC + CABLE	black	PCS	1	
1.1	299002-IA-01-RA	GSM -FPC		X12NFT	black GSM-FPC 71.02*12.50*0.12MM	black	PCS	1	
1.2	299002-IA-02-RA	GSM-CABLE		X12NFT	black 3代 0.81*68.00MM	black	PCS	1	
1.3	299002-IA-03-RA	6.8 NH 0402		X12NFT	6.8 NH 0402	black	PCS	1	
2	299002-IB-RA	DIV antenna		X12NFT	black DIV-FPC + CABLE	black	PCS	1	
2.1	299002-IB-01-RA	DIV -FPC		X12NFT	black DIV-FPC 20.00*9.00*0.12MM	black	PCS	1	
2.2	299002-IB-02-RA	DIV-CABLE		X12NFT	black 3代 0.81*64.00MM	black	PCS	1	
3	299002-IC-RA	BGW antenna		X12NFT	black BGW-FPC + CABLE	black	PCS	1	
3.1	299002-IC-01-RA	BGW -FPC		X12NFT	black BGW-FPC 20.00*9.00*0.12MM	black	PCS	1	
3.2	299002-IC-02-RA	BGW-CABLE		X12NFT	black 3代 0.81*23.00MM	black	PCS	1	
Confirmation:			Review:			Production: FJW			

5. Package schematic diagram

Packaging method diagram			
product name	FPC antenna		
P / N	299002		
Project model	X12NFT		
File details	Carton Size 1: 270*260*200MM Carton Size 2: 260*200*200MM Carton Size 3: Depending on the order quantity / volume		
	Boating method		Packaging by order quantity
	Total number of binning		Packaging by order quantity
labeling requirement	Tag Size 1: Universal use 100 * 100mm Tag Size 2: According to customer requirements		
matters need attention			
1. Due to the limitation of order quantity, the packing method of each material is the size of the box according to the total quantity of the order or the physical volume			
2. Storage temperature: room temperature			
3. Preservation conditions: store them in a cool and dry place			