

Essential information

Date	version	version	Modified	Change Reason	Changes
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Specification For Approval

CUSTOMER NAME: Xingmai Innovation Technology (Suzhou) Co.,Ltd

CUSTOMER P/N: XM030327-0002

PRODUCT SPEC: 2.4/5.8GHz, RG178 wire with 4.5mm TPU outer diameter, total
length 640mm, SR molding, connected to the first generation IPEX

SUPPLIER P/N: NB2450-08P002IX

REV: 1.0

DATE: 2024/08/29

DRAWING	CHECK	APPROVED
FENG	ZHU	FENG



CUSTOMER APPROVE:

DATE	CHECK	APPROVED

PRODUCTION COMPANY:

Dongguan Chungmung Electronics Co., Ltd.

E-mail: Chungmung@163.com

Http: [//www.Chungmung.com](http://www.Chungmung.com)

Address: 1618, Building 1, No. 433 Zhen'an East Road, Chang'an Town, Dongguan City

Contact phone number: 0769-85388271 +86 13925511731

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1. Revision History

Revision	Date	Change Notification	Description
1.0	2024.08.29	First edition	

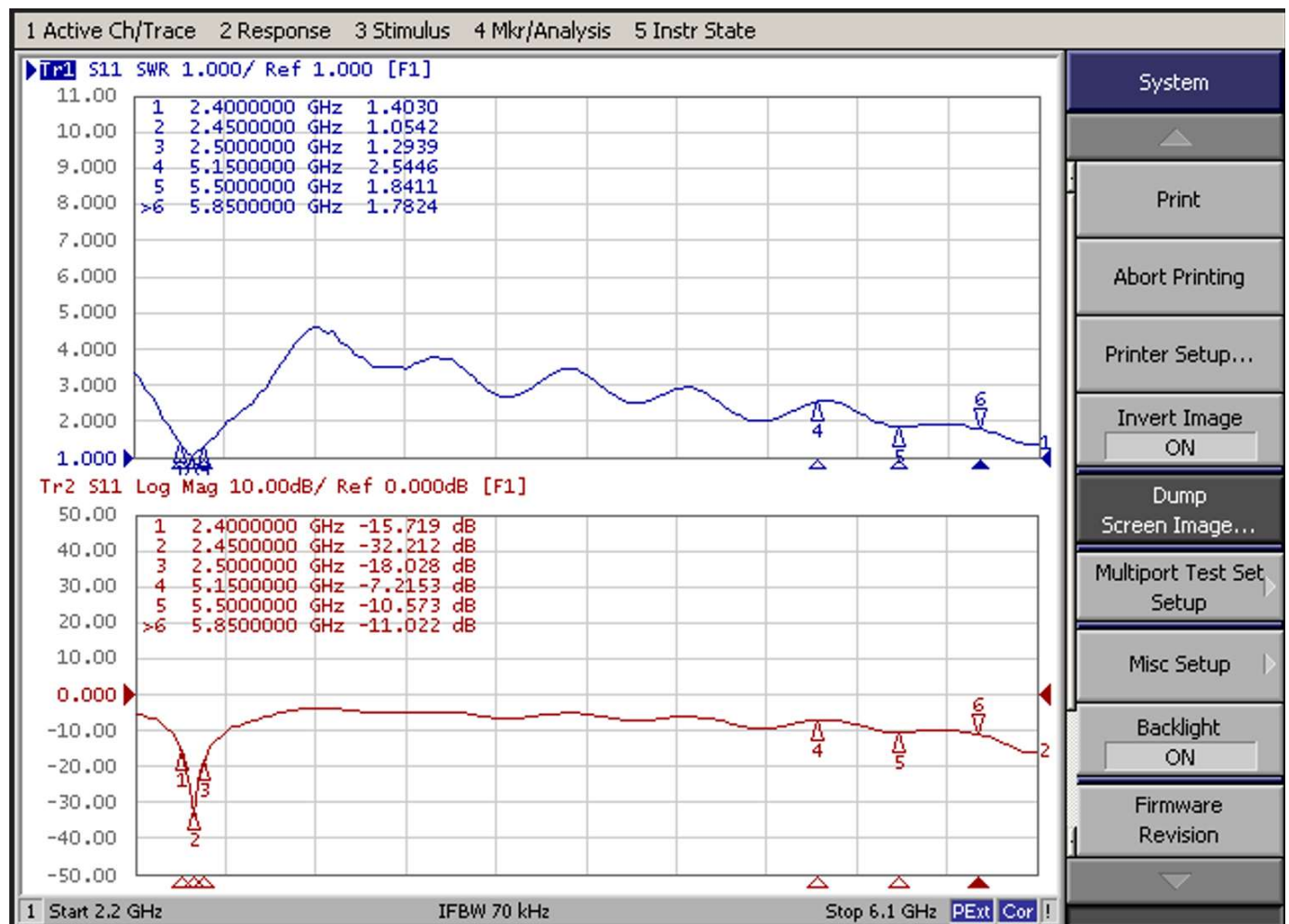
2. Specification

Sample Photo	
	
A. Electrical Characteristics	
Frequency	2400 ~ 2500 MHz 5150 ~ 5850 MHz
V.S.W.R.	≤ 2.0
Antenna Gain	2400 ~ 2500 MHz 4.46dBi 5150 ~ 5850 MHz 7.16dBi
Efficiency	2400 ~ 2500 MHz 57.6% 5150 ~ 5850 MHz 45.1%
Polarization	Linear
Impedance	50 Ohm
B. Material & Mechanical Characteristics	
Material of Radiator	PCB
Cable Type	O.D. 1.78/4.5mm
C. Environmental	
Operation Temperature	- 40 °C ~ + 65 °C
Storage Temperature	- 40 °C ~ + 80 °C

3. Characteristics and Reliability Test

Test Items		Test Condition and Procedure	Requirements
C1	S.W.R.	Set DUT on Network Analyzer; make individual calibration to test	Directive DUT specification
C2	Antenna Gain	Set DUT on Antenna Chamber; make individual calibration to test	Directive DUT specification
M1	Vibration	GB / T2423 . 48-1997 Amplitude: 0.03 inch (1.5mm); Freq: 20 to 80 to 20 Hz3 directions; 2 hours for each direction	1. No Visual Damage 2. Frequency Tol.<= 5%
M2	Random Drop	GB / T2423.8-1995 Height: 1.0 Meter; 3 directions; 1 time for each direction	1. No parts separated 2. Frequency Tol.<= 5%
M3	Solderability	GB 2423 . 28- 82 Solder iron: 260±5°C; Duration: 5 seconds	1. Mounted on PCB 2. No Visual Damage
M4	Terminal- Pull Test	Holding with individual specification; force applied to axis of terminal	1. Directive DUT specification 2. Frequency Tol.<= 5%
M5	Terminal- Torque Test	Holding with individual specification; applied clockwise and counterclockwise to the axis of terminal	1. Directive DUT specification 2. Frequency Tol.<= 5%
M6	Dimension	Inspection of dimension, color, material, package, surface process	Directive DUT specification
E1	Salt Spray	GB / T 2423 . 17- 93 Temp: 35°C; RH: >= 95%; NaCl solution: >= 5%; Time: 24 hours	After 2 Hours Recovery 1. No Visual Damage 2. Frequency Tol.<= 5%
E2	Humidity	GB / T 2423 . 4 - 93 Temp: 80°C / 12 H; -40°C / 12H RH: >= 90%; Time: 24 hours	After 2 Hours Recovery 1. No Visual Damage 2. Frequency Tol.<= 5%
E3	Thermal Shock	GB / T 2423 . 22 - 87 1 Cycle: - 40°C (30 minutes) to + 80°C (30 minutes) Cycles: 24	After 2 Hours Recovery 1. No Visual Damage 2. Frequency Tol.<= 5%
E4	Life (High Temp.)	GB / T 2423 . 2 - 89 Temp: 80°C; Time: 24 hours	After 2 Hours Recovery 1. No Visual Damage 2. Frequency Tol.<= 5%
R1	RoHS	With Reference to IEC 62321:2008 with flow chart	Directive RoHS 2002/95/EC

4. Antenna - S Parameter Test Data



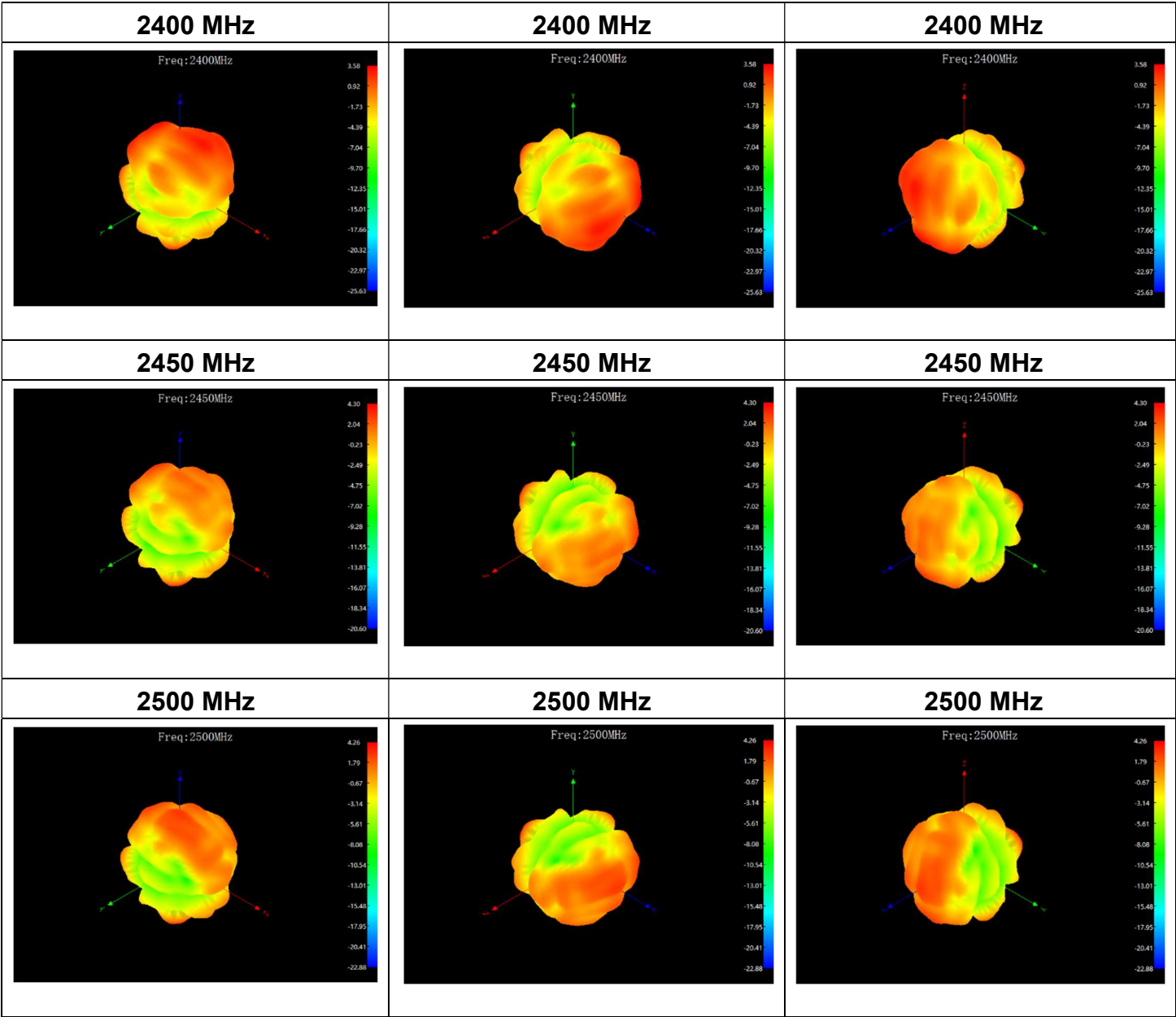
5. 1 Antenna - Radiation Pattern Test Data

Frequency/MHz	MaxGain/dBi	AvgGain/dBi
2400	3.58	-2.49
2410	3.7	-2.45
2420	3.68	-2.47
2430	3.95	-2.49
2440	4.19	-2.45
2450	4.3	-2.46
2460	4.41	-2.41
2470	4.46	-2.33
2480	4.4	-2.27
2490	4.39	-2.25
2500	4.26	-2.28
5150	4.81	-3.57
5200	5.37	-3.59
5250	5.93	-3.66
5300	6.56	-3.45
5350	6.98	-3.48
5400	6.86	-3.45
5450	6.99	-3.38
5500	6.48	-3.33
5550	6.38	-3.37
5600	6.68	-3.5
5650	6.87	-3.25
5700	7.16	-3.33
5750	6.95	-3.49
5800	6.99	-3.39
5850	6.61	-3.62

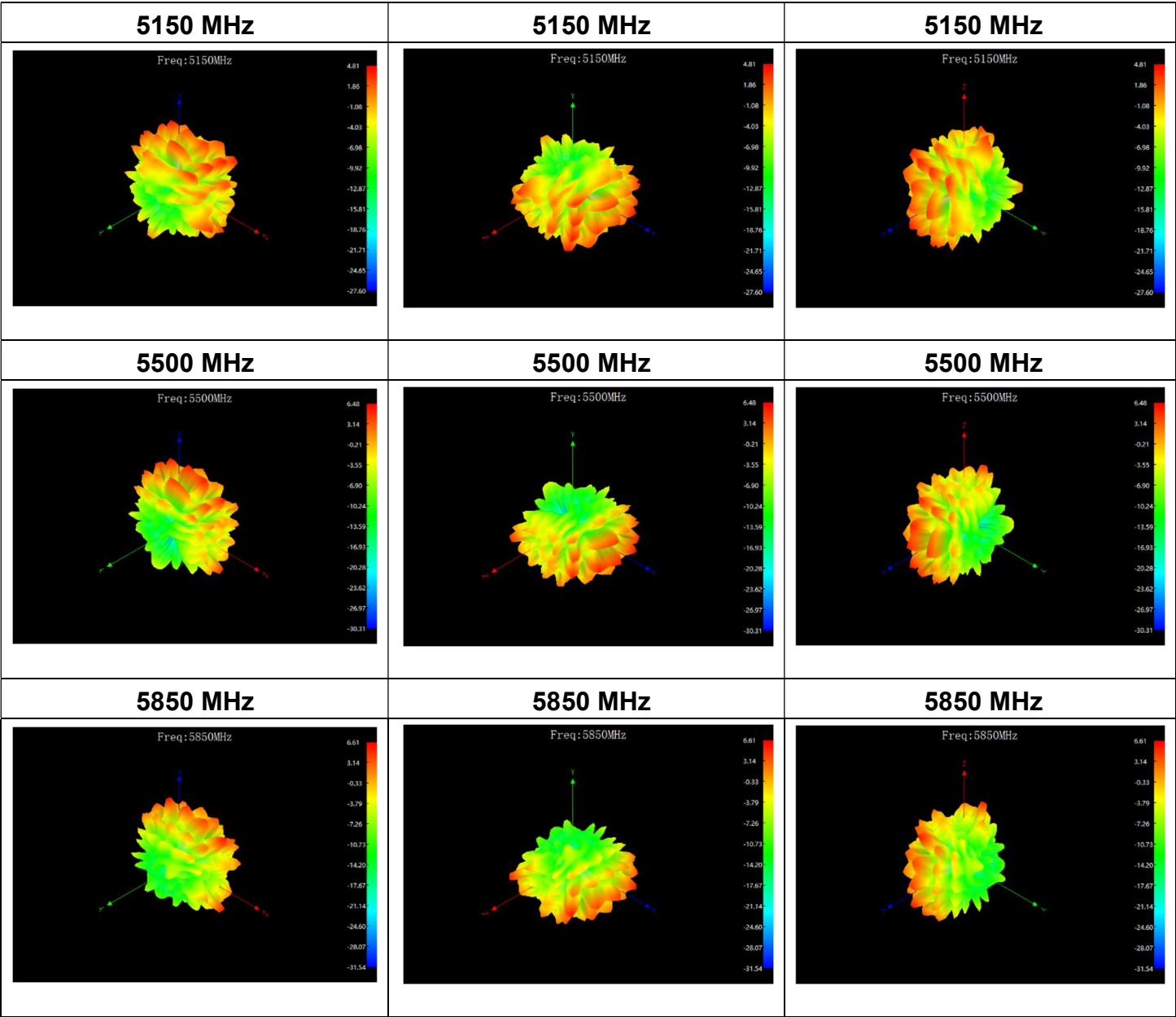
5. 2 Antenna - Radiation Pattern Test Data

Frequency/Mhz	Efficiency / dB	Efficiency / %
2400	-2.49	56.36
2410	-2.45	56.89
2420	-2.47	56.62
2430	-2.49	56.36
2440	-2.45	56.89
2450	-2.46	56.75
2460	-2.41	57.41
2470	-2.33	58.48
2480	-2.27	59.29
2490	-2.25	59.57
2500	-2.28	59.16
5150	-3.57	43.95
5200	-3.59	43.75
5250	-3.66	43.05
5300	-3.45	45.19
5350	-3.48	44.87
5400	-3.45	45.19
5450	-3.38	45.92
5500	-3.33	46.45
5550	-3.37	46.03
5600	-3.5	44.67
5650	-3.25	47.32
5700	-3.33	46.45
5750	-3.49	44.77
5800	-3.39	45.81
5850	-3.62	43.45

5. 3 Antenna - Radiation Pattern Test Data



5. 4 Antenna - Radiation Pattern Test Data





5. 5Antenna - OTA test data

Item	Measurement	Azimuths	Elevations	Standard	Band	Channel	Frequency	Max	Min	Total
1	TRP	Every30	Every30	WIFI (AP)	WIFI_B (11M)	1	2412	21.76	2.37	18.61
2	TRP	Every30	Every30	WIFI (AP)	WIFI_B (11M)	6	2437	22.15	3.64	18.94
3	TRP	Every30	Every30	WIFI (AP)	WIFI_B (11M)	11	2462	20.78	2.67	17.47
4	TIS(EIRP)	Every30	Every30	WIFI (AP)	WIFI_B (11M)	1	2412	-73.64	-93.16	-89.98
5	TIS(EIRP)	Every30	Every30	WIFI (AP)	WIFI_B (11M)	6	2437	-74.09	-92.62	-89.41
6	TIS(EIRP)	Every30	Every30	WIFI (AP)	WIFI_B (11M)	11	2462	-74.61	-92.69	-89.37
7	TRP	Every30	Every30	WIFI (AP)	WIFI_A (54M)	36	5180	14.44	-9.78	9.28
8	TRP	Every30	Every30	WIFI (AP)	WIFI_A (54M)	100	5500	10.99	-11.93	6.69
9	TRP	Every30	Every30	WIFI (AP)	WIFI_A (54M)	165	5825	18.04	-0.43	13.59
10	TIS(EIRP)	Every30	Every30	WIFI (AP)	WIFI_A (54M)	36	5180	-53.95	-78.13	-72.98
11	TIS(EIRP)	Every30	Every30	WIFI (AP)	WIFI_A (54M)	100	5500	-54.32	-77.28	-73
12	TIS(EIRP)	Every30	Every30	WIFI (AP)	WIFI_A (54M)	165	5825	-56.12	-74.46	-70.01

6. Testing Equipment and Principle

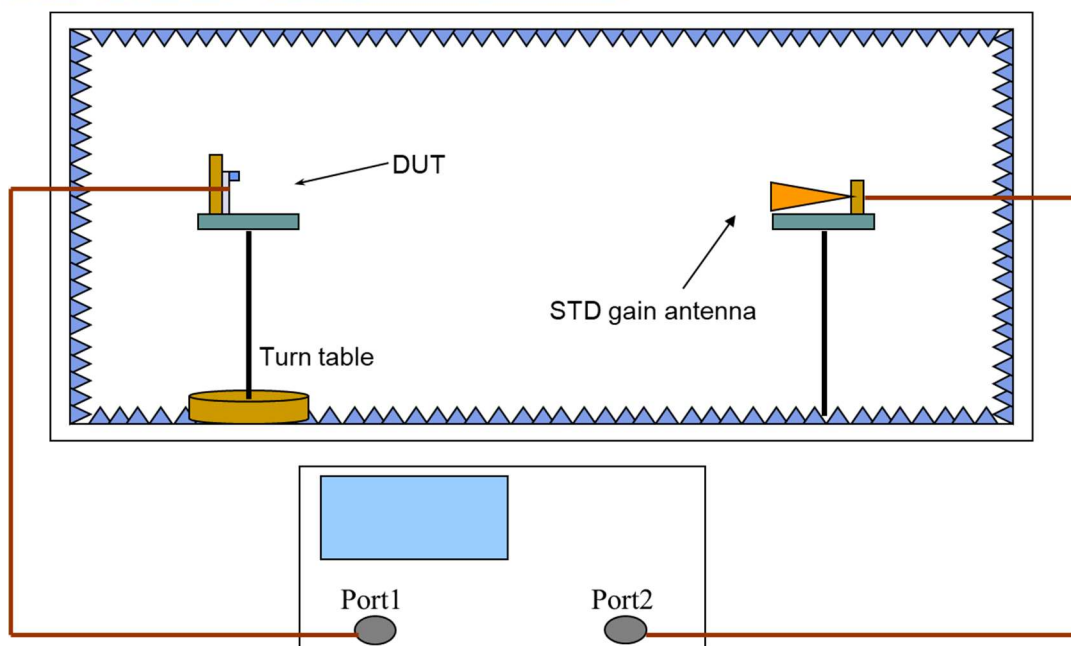
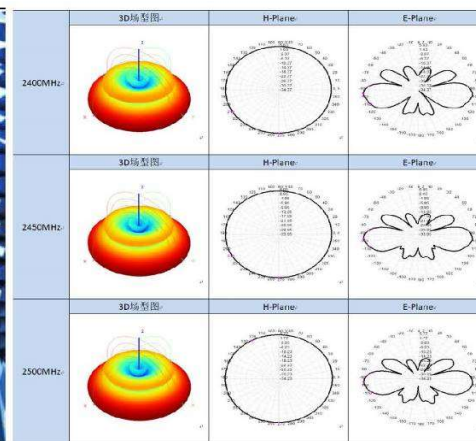
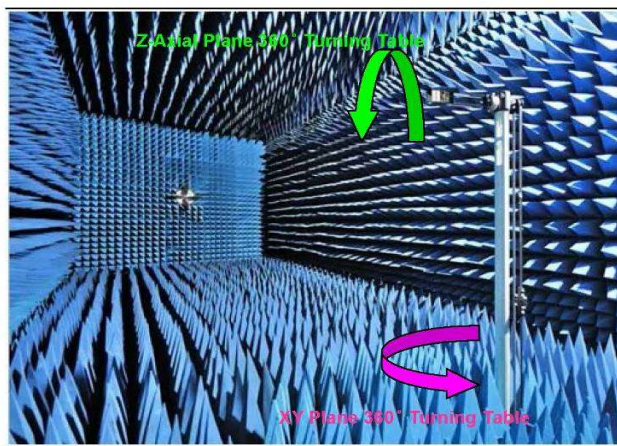
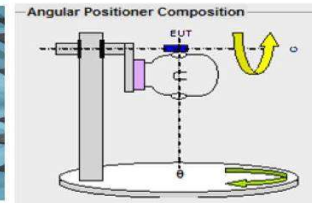
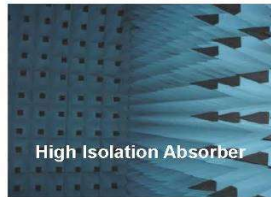
1. Testing equipment::

Network Analyzers :Agilent 8753D 5071B

Communications Test Set:Agilent E5515C

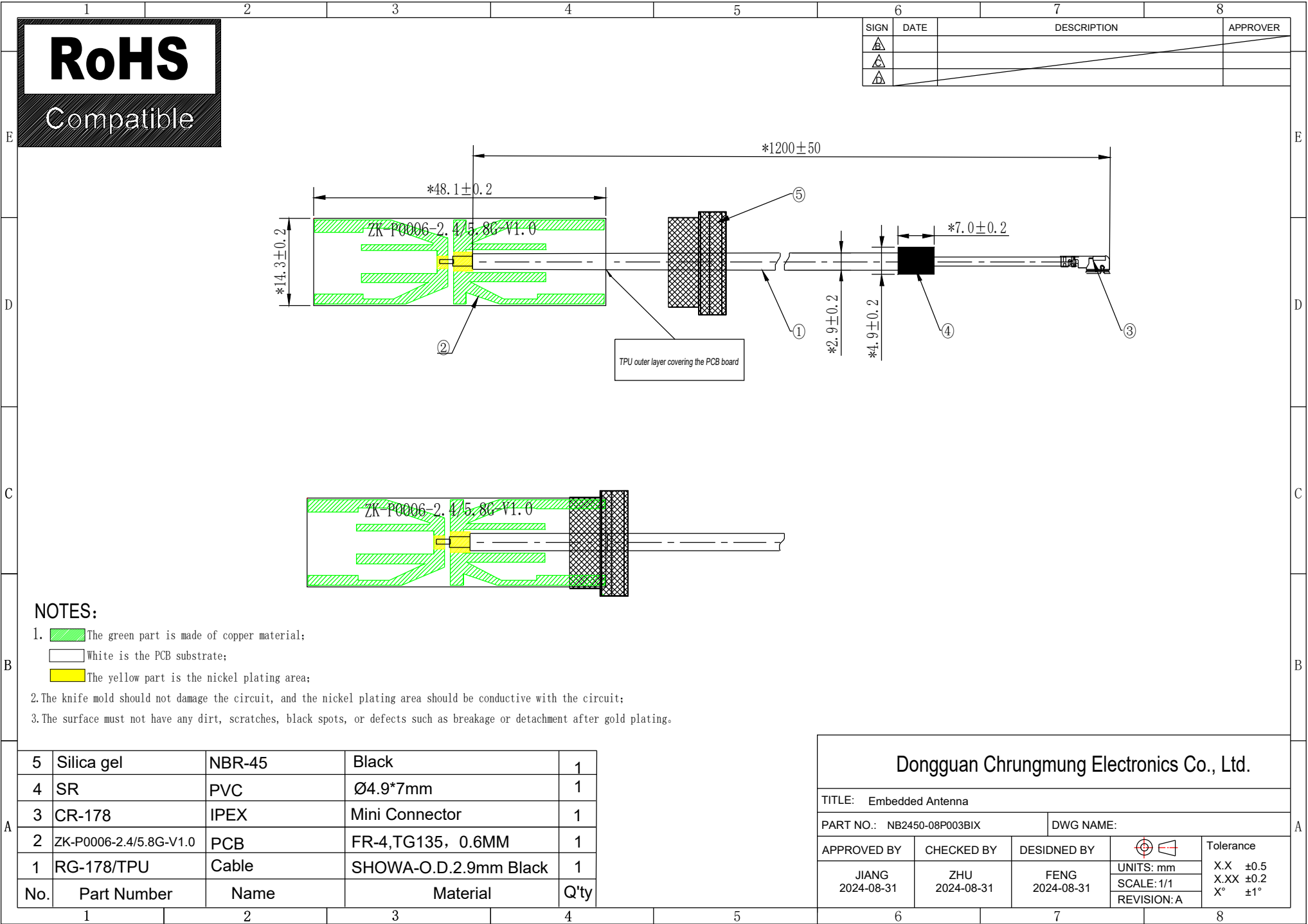
3D Chamber Test System:

.Chamber Size: 9 x 5 x 4 m³
.Freq. Range: 0.4 ~ 18.0 GHz
.Double Ridge Horn Antenna
.VNA: Agilent E5071C
.3D Turning Table and Positioner
.ADT Solution 3D Testing Software



7. Mechanical Drawing See attached files

	1	2	3	4	5	6	7	8	
E	RoHS Compatible					SIGN	DATE	DESCRIPTION	APPROVER
D									
C									
B	*1200±50 *48.1±0.2 *14.3±0.2 ZK-P0006-2.4/5.8G-V1.0 (2) TPU outer layer covering the PCB board (5) (1) *2.9±0.2 *4.9±0.2 *7.0±0.2 (4) (3)								
A									
	NOTES: 1. The green part is made of copper material; White is the PCB substrate; The yellow part is the nickel plating area; 2.The knife mold should not damage the circuit, and the nickel plating area should be conductive with the circuit; 3.The surface must not have any dirt, scratches, black spots, or defects such as breakage or detachment after gold plating。								
	5	Silica gel	NBR-45	Black	1	Dongguan Chungmung Electronics Co., Ltd. TITLE: Embedded Antenna PART NO.: NB2450-08P003BIX DWG NAME: APPROVED BY: JIANG 2024-08-31 CHECKED BY: ZHU 2024-08-31 DESIGNED BY: FENG 2024-08-31 UNITS: mm SCALE: 1/1 REVISION: A Tolerance X.X ±0.5 X.XX ±0.2 X° ±1°			
	4	SR	PVC	Ø4.9*7mm	1				
	3	CR-178	IPEX	Mini Connector	1				
	2	ZK-P0006-2.4/5.8G-V1.0	PCB	FR-4,TG135, 0.6MM	1				
	1	RG-178/TPU	Cable	SHOWA-O.D.2.9mm Black	1				
	No.	Part Number	Name	Material	Q'ty				
	1		2	3	4	6	7	8	



E

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RoHS
Compatible

SIGN	DATE	DESCRIPTION	APPROVER

ZK P0006-2.4/5.8G V1.0

*1200 $\pm$ 50

*48.1 $\pm$ 0.2

*7.0 $\pm$ 0.2

*14.3 $\pm$ 0.2

*2.9 $\pm$ 0.2

*4.9 $\pm$ 0.2

(⑤)

(①)

(④)

(③)

TPU outer layer covering the PCB board

NOTES:

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5	Silica gel	NBR-45	Black	1
4	SR	PVC	Ø4.9*7mm	1
3	CR-178	IPEX	Mini Connector	1
2	ZK-P0006-2.4/5.8G-V1.0	PCB	FR-4,TG135, 0.6MM	1
1	RG-178/TPU	Cable	SHOWA-O.D.2.9mm Black	1
No.	Part Number	Name	Material	Q'ty

Dongguan Chungmung Electronics Co., Ltd.

TITLE: Embedded Antenna

PART NO.: NB2450-08P003BIXDWG NAME:

APPROVED BYJIANG2024-08-31CHECKED BYZHU2024-08-31DESIGNED BYFENG2024-08-31

UNITS: mmSCALE: 1/1REVISION:A

ToleranceX.X ±0.5X.XX ±0.2X° ±1°

E

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- [illegible]

RoHS

Compatible

SIGN	DATE	DESCRIPTION	APPROVER

The technical drawing illustrates the assembly of an embedded antenna. The main view shows a PCB with a green copper pattern labeled "ZK-P0006-2.4/5.8G-V1.0". A yellow nickel plating area is visible at the connection point. Dimensions include a total length of *1200±50, a distance of *48.1±0.2 from the left edge to the start of the cable, and a width of *14.3±0.2. Callouts ① through ⑤ identify various parts: ① points to the TPU outer layer covering the PCB board; ② points to the nickel plating area; ③ points to the cable connector; ④ points to the cable body; and ⑤ points to the cable jacket. Cross-sectional views show the internal layers of the cable and the connection to the PCB.

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4	SR	PVC	Ø4.9*7mm	1
3	CR-178	IPEX	Mini Connector	1
2	ZK-P0006-2.4/5.8G-V1.0	PCB	FR-4,TG135, 0.6MM	1
1	RG-178/TPU	Cable	SHOWA-O.D.2.9mm Black	1
No.	Part Number	Name	Material	Q'ty

Dongguan Chungmung Electronics Co., Ltd.

TITLE: Embedded Antenna

PART NO.: NB2450-08P003BIXDWG NAME:

APPROVED BYJIANG
2024-08-31

CHECKED BYZHU
2024-08-31

DESIGNED BYFENG
2024-08-31

UNITS: mm
SCALE: 1/1
REVISION: A

Tolerance
X.X ±0.5
X.XX ±0.2
X° ±1°

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RoHSCompatible

SIGN △ △ △	DATE	DESCRIPTION	APPROVER

ZK-P0006-2.4/5.8G-V1.0

TPU outer layer covering the PCB board

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1	RG-178/TPU	Cable	SHOWA-O.D.2.9mm Black	1
No.	Part Number	Name	Material	Q'ty

Dongguan Chungmung Electronics Co., Ltd.

TITLE: Embedded Antenna

PART NO.: NB2450-08P003BIX DWG NAME:

APPROVED BYJIANGLIANG2024-08-31

CHECKED BYZHUYANLI2024-08-31

DESIGNED BYFENGCHUNYUAN2024-08-31

UNITSCALE: 1/1REVISION:A

ToleranceX.X ±0.5X.XX ±0.2X° ±1°

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RoHS

Compatible

SIGN	DATE	DESCRIPTION	APPROVER

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1	RG-178/TPU	Cable	SHOWA-O.D.2.9mm Black	1
No.	Part Number	Name	Material	Q'ty

Dongguan Chungmung Electronics Co., Ltd.			
TITLE: Embedded Antenna			
PART NO.: NB2450-08P003BIX		DWG NAME:	
APPROVED BY	CHECKED BY	DESIGNED BY	Tolerance
JIANG 2024-08-31	ZHU 2024-08-31	FENG 2024-08-31	 UNITS: mm SCALE: 1/1 REVISION: A
			X.X ±0.5 X.XX ±0.2 X° ±1°

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RoHSCompatible

SIGN	DATE	DESCRIPTION	APPROVER
△			
△			
△			

*1200±50

*48.1±0.2

*7.0±0.2

*14.3±0.2

ZK-P0006-2.4/5.8G-V1.0

(2)

(⑤)

(①)

(④)

(③)

TPU outer layer covering the PCB board

*2.9±0.2

*4.9±0.2

ZK-P0006-2.4/5.8G-V1.0

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1	RG-178/TPU	Cable	SHOWA-O.D.2.9mm Black	1
No.	Part Number	Name	Material	Q'ty

Dongguan Chungmung Electronics Co., Ltd.

TITLE: Embedded Antenna

PART NO.: NB2450-08P003BIXDWG NAME:

APPROVED BY	CHECKED BY	DESIGNED BY		Tolerance
JIAN 2024-08-31	ZHU 2024-08-31	FENG 2024-08-31	UNITS: mm SCALE: 1/1 REVISION: A	X.X ±0.5 X.XX ±0.2 X° ±1°

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RoHS

Compatible

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1	RG-178/TPU	Cable	SHOWA-O.D.2.9mm Black	1
No.	Part Number	Name	Material	Q'ty

Dongguan Chungmung Electronics Co., Ltd.

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PART NO.: NB2450-08P003BIX

DWG NAME:

APPROVED BY: JIANG 2024-08-31

CHECKED BY: ZHU 2024-08-31

DESIGNED BY: FENG 2024-08-31

UNITS: mm

SCALE: 1/1

REVISION: A

Tolerance: X.X ±0.5, X.XX ±0.2, X° ±1°

[illegible]

RoHS

Compatible

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3	CR-178	IPEX	Mini Connector	1
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No.	Part Number	Name	Material	Q'ty

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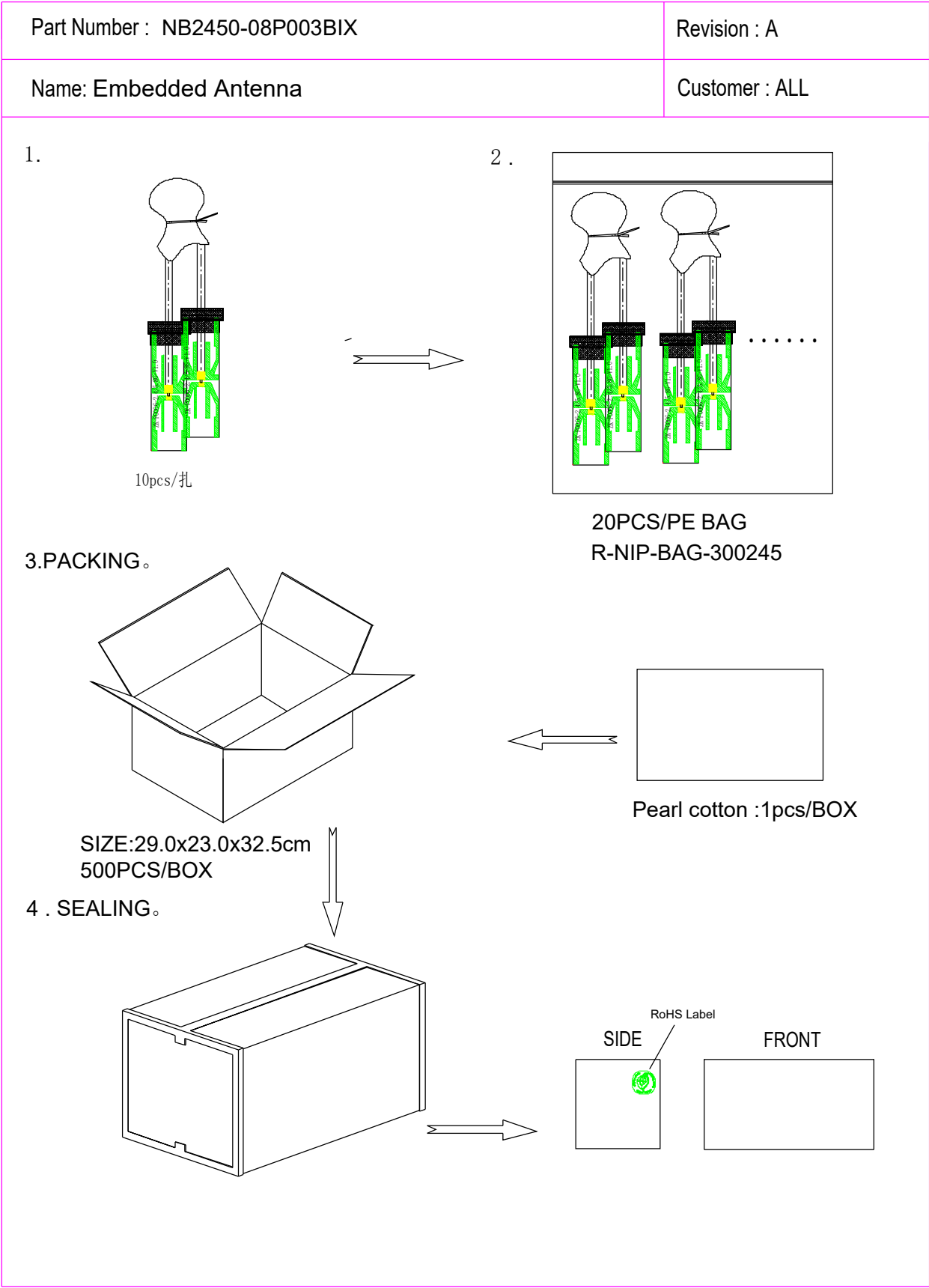
APPROVED BY	CHECKED BY	DESIGNED BY		Tolerance
JIANG 2024-08-31	ZHU 2024-08-31	FENG 2024-08-31	UNITS: mm SCALE: 1/1 REVISION: A	X.X ±0.5 X.XX ±0.2 X° ±1°

[illegible]

PACKING CRITERION

Date: 2024.08.31

Page: 1 of 1



APPROVED BY: LIQIANG

CHECKED BY:

DESIGNED BY: DJC