

Sample Approval Form

Customer Name:

Peninsula Medical

Project Name:

4001P-WIFI2458

Product Specification:

ZK-WIFI2458-V1.0 : 50mm in length

20mm wide, black line 1.13, 1st generation IPEX, L=140mm.

Customer P/N:

REV:

V1.0

Date:

2025-04-08

drawing	check	
Rao Gongze	Wu Xichun	Jiang Zhenhua

Customer Approve

Review check	approve Approved	admit approval

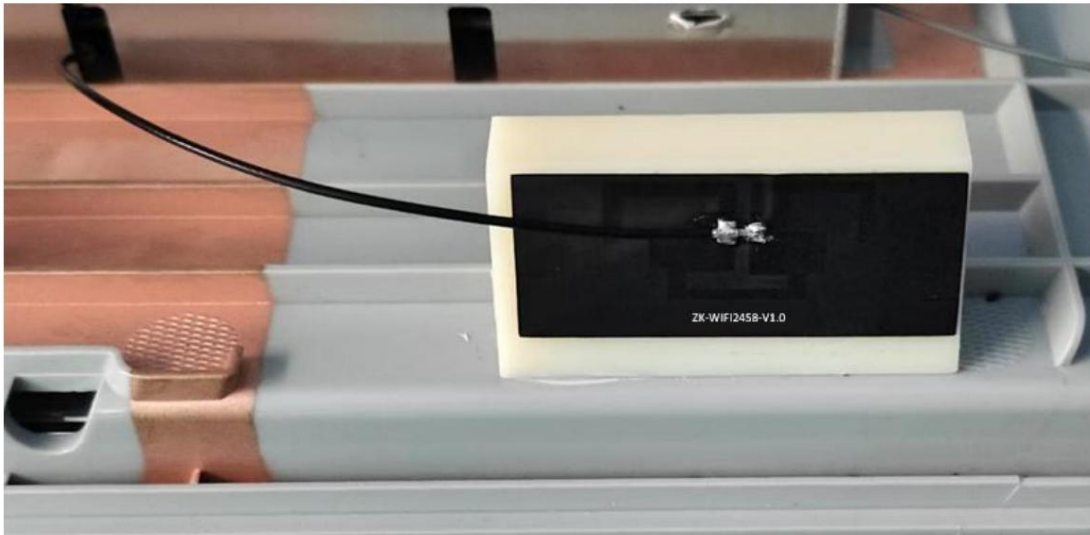


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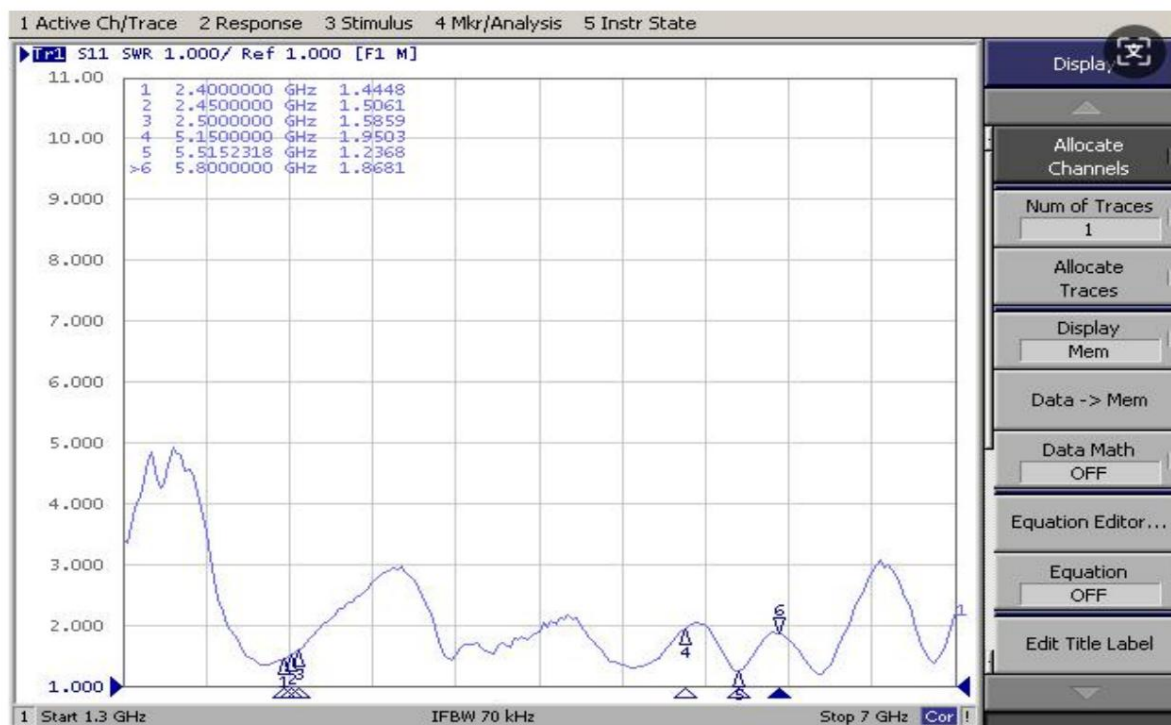
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1. Electrical Performance Index

Electrical performance indicators		Electrical Specifications	
Frequency range: 2400-2500 MHz, 5150-5800 MHz		2400-2500 5150-5800MHz	
Voltage Standing Wave Ratio	≤ 2.0	VSWR	≤ 2.0
Gain	≤ 6.82DBI	GAIN	≤ 6.82DBI
Radiation method	Omnidirectional	Radiation	OMNI
polarization mode	linear polarization	Polarization	LINEAR
Input impedance	50 Ω	Input Impedance	50 Ω
Mechanical performance indicators		Mechanical Specifications	
Interface	IPEX-1	Input connector	IPEX-1
Antenna material	FPC	Antenna material	FPC
Operating temperature	-30°C+80°C	Working Temperature	-30°C+80°C
Operating humidity	40-90%	Working Humidity	40-90%
Storage temperature	-30°C+70°C	storage temperature	-30°C+70°C
Actual product image			

2. Test report

2.1 Antenna Standing Wave Diagram:



Note: Antenna VSWR control is within 2.0.

2.2 2.4G Passive Data:

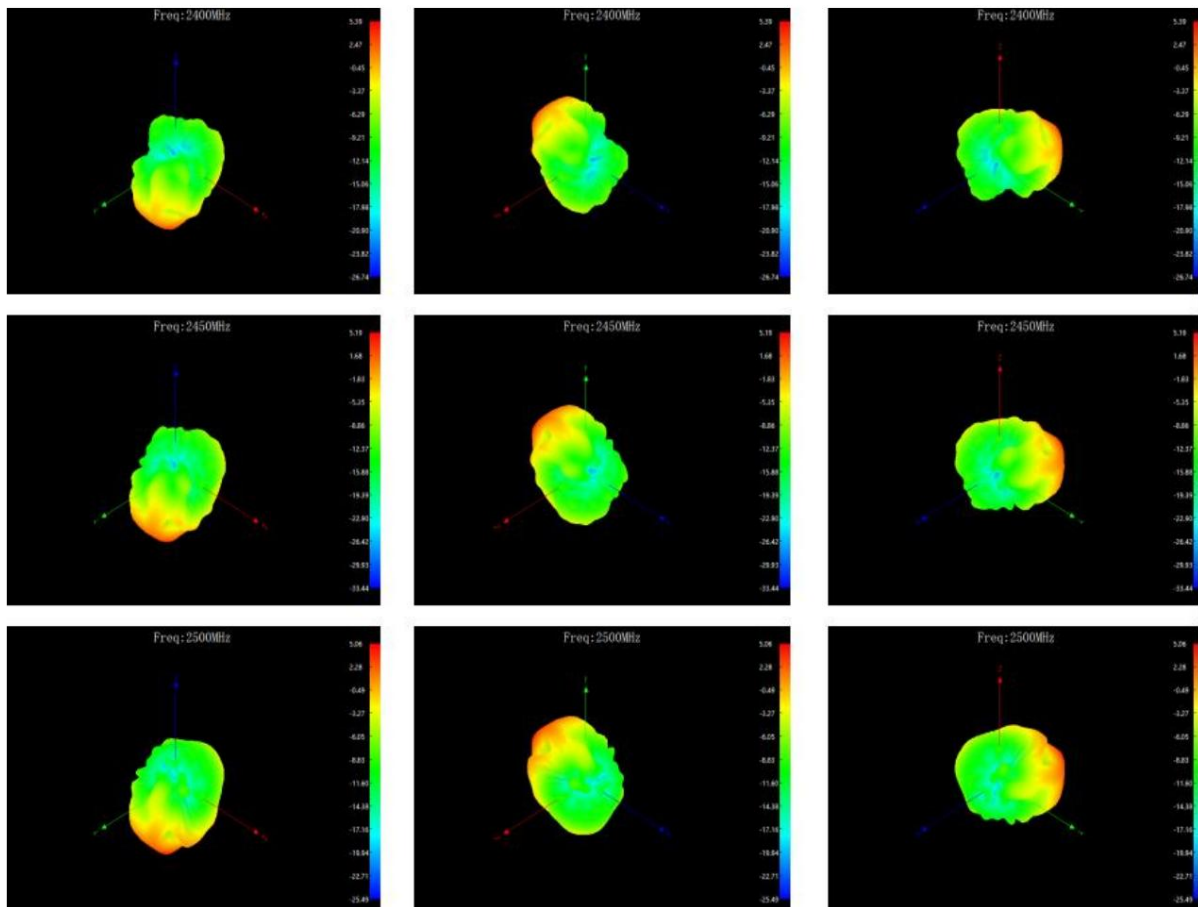
Frequency/MHz	Efficiency / %	MaxGain/dBi
2400	51.64	5.39
2410	54.45	5.53
2420	56.36	5.35
2430	58.21	5.25
2440	59.7	5.22
2450	59.98	5.19
2460	61.09	5.28
2470	61.24	5.33
2480	59.43	5.17
2490	59.16	5.21
2500	56.89	5.06

2.3 5.8G Passive Data:

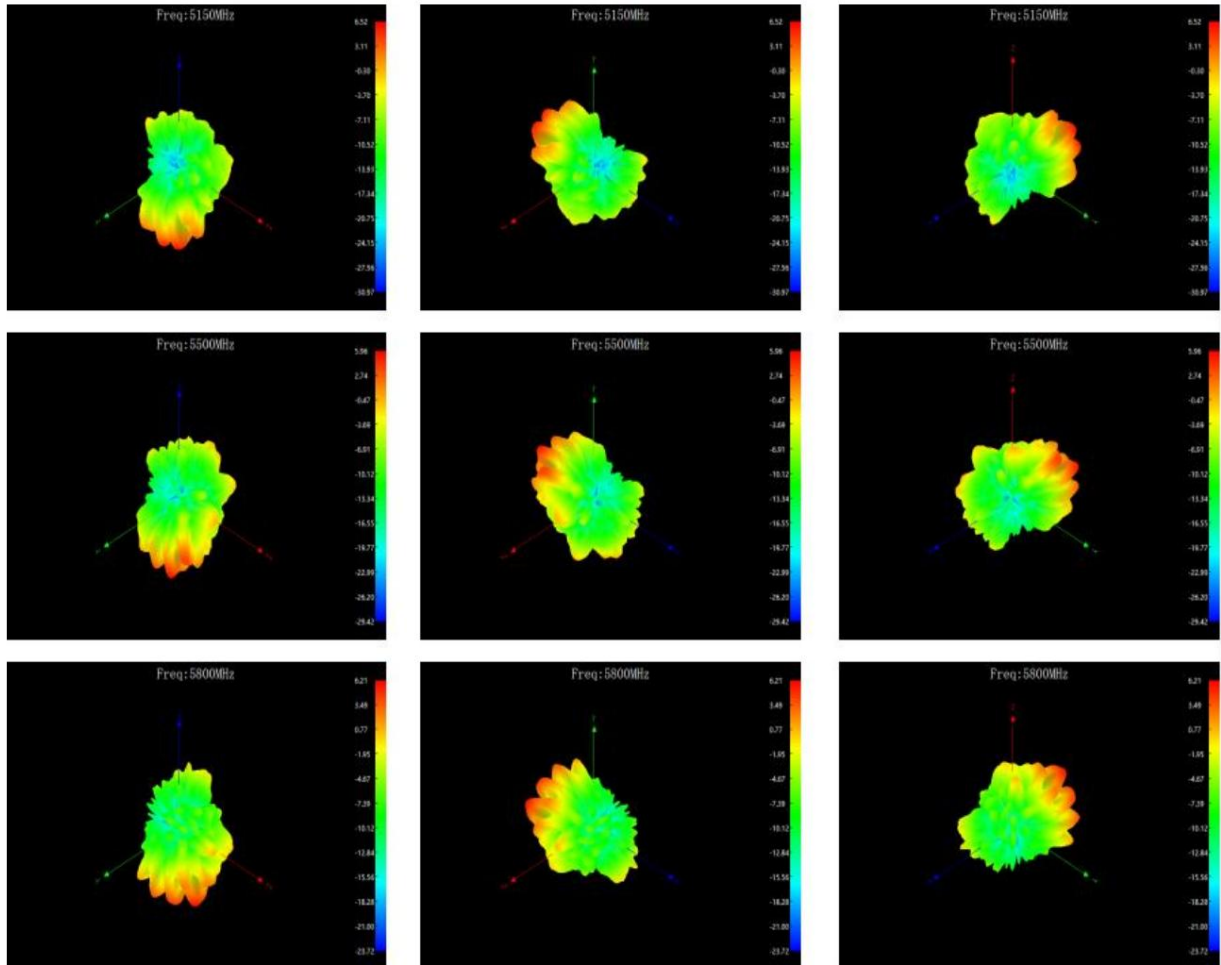
Frequency/MHz	Efficiency / %	MaxGain/dBi
5150	46.45	6.52
5200	44.67	6.28
5250	44.06	6.27
5300	44.87	6.82
5350	42.95	6.54
5400	42.66	5.99
5450	42.56	5.71
5500	44.26	5.96
5550	42.56	5.77
5600	40.08	5.05
5650	41.08	5.39
5700	40.55	5.64
5750	40.63	6
5800	40.09	6.21

Note: Antenna efficiency refers to the effective transmit and receive efficiency in all directions, and gain refers to the signal strength in a certain direction.

2.4G 3D Radiation Pattern:



2.5 5.8G 3D Radiation Pattern:



2.6 Source Data:

Item	Measurement	Standard	Band	Channel	Total
1	TRP	WIFI (AP)	WIFI_B (11M)	1	15.43
2	TRP	WIFI (AP)	WIFI_B (11M)	6	15.16
3	TRP	WIFI (AP)	WIFI_B (11M)	11	14.74
4	TIS(EIRP)	WIFI (AP)	WIFI_B (11M)	11	-69.78
5	TRP	WIFI (AP)	WIFI_A (54M)	36	13.74
6	TRP	WIFI (AP)	WIFI_A (54M)	64	15.21
7	TRP	WIFI (AP)	WIFI_A (54M)	165	14.75
8	TIS(EIRP)	WIFI (AP)	WIFI_A (54M)	165	-72.41

Note: Antenna TRP is the transmitted signal, and TIS is the received signal.

3. Testing Equipment and Principle

3.1 Test equipment:

Network Analyzers

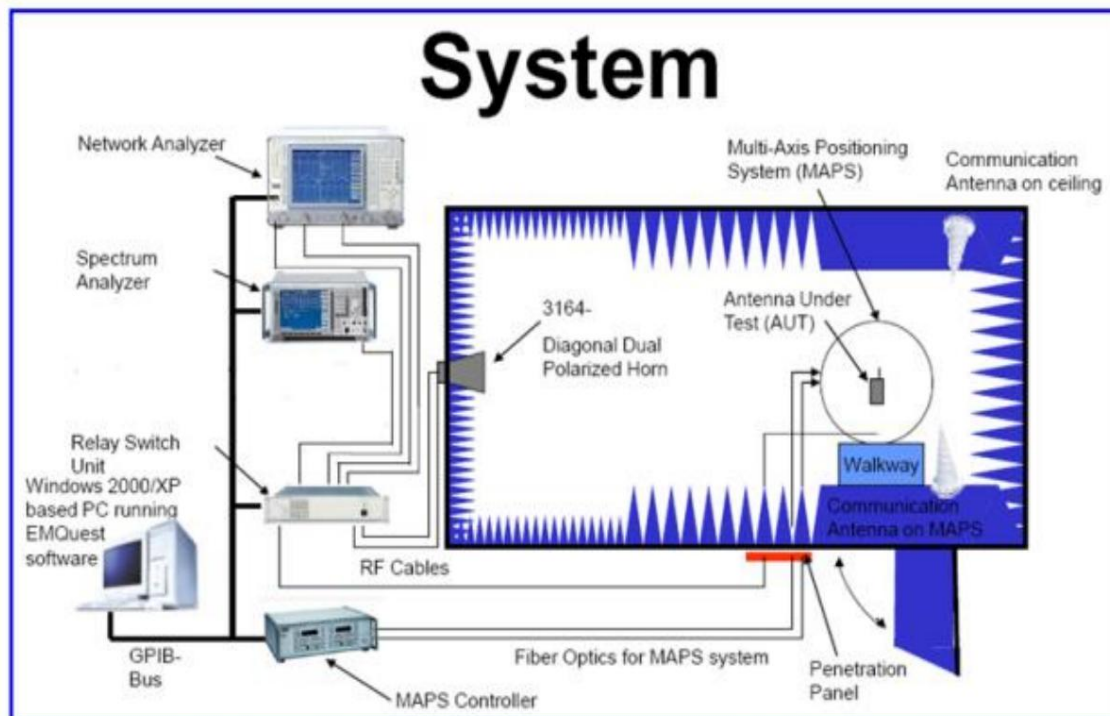
Agilent 8753D 5071B

Communications Test Set:

Agilent E5515C

3D Chamber Test System:

3.2 Test Principle:



A simplified explanation of the working principle of an OTA multi-probe testing system:

3.2.1 Signal Transmission and Reception:

- Transmission mode: The DUT acts as the transmitter, the signal is radiated through the antenna, and the probe array receives the signal at multiple angles.

Signals, measurements of radiated power, radiation patterns, EIRP (equivalent isotropic radiated power), etc.

- Receive mode: The probe array acts as the transmitter, sending test signals to the DUT to measure the DUT's receiving sensitivity.

Sensitivity (e.g., TRP, total radiated power).

3.2.2 Spatial Sampling and Multi-Angle Coverage:

- The probe array covers all azimuth and elevation angles through spatial distribution (such as uniform spherical sampling), combined with

The turntable rotates to achieve rapid full-space scanning.

3.2.3 Multi-probe switching technology:

- Rapid switching of activated probes via an electronic RF switch matrix reduces mechanical movement time and improves testing efficiency.

efficiency.

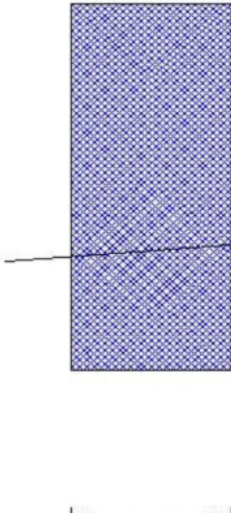
3.2.4 Data Processing and Algorithms:

- After acquiring data from multiple probes, the three-dimensional radiation pattern is reconstructed using a near-field to far-field transformation algorithm or spherical wave expansion.

Directional diagram.

- Evaluate the device's performance in complex multipath environments by combining MIMO channel models.

4. Product Drawings

	1	2	3	4	5	6	7	8									
	A	B	C	D	Serial number	change	Inside	Confirm to n>Date	Version	Remark							
The surface is coated with black paint, silkscreened with white, one and a half substrates, and the gold fingers require OSP.																	
A																	
B																	
C	Component material process description:				Material name												
	①	FPC	PI		ProductDescription		quantity										
		coaxial line	Black IPEX-1 RF4.1.13														
NOTES: 1 The green area represents the copper material. 2 The de-composition or damage the surface of the gold plating must be avoided during the soldering process. Blue is the adhesive area; 3 The surface must be free of dirt, scratches, black spots, cracks or peeling after gold plating. 4 Materials: FPC consists of PI (electrolytic copper) substrate + adhesive (3M 9471 0.05mm) + surface ink (Kaiyao/Tuli/Liuoda/Ligu (0.07mm)). S Reverse adhesive 3M 9471 300LSE (adhesion requires high and low temperature testing), test conditions: -30°C (60min) ~ +30°C (60min) ~ (conversion time 30min) ~ -30°C (60min)... repeat this for five cycles After 8 hours at room temperature, if there is no peeling, curling, ink loss, or blistering 6 The surface of the gold fingers must not show any oxidation (salt spray test required). 7 Mark as key dimensions.																	
D	Shenzhen Zhongke Wireless Technology Co., Ltd.				Model 4001P												
	Date: April 8, 2025	design		Product name ZK-WIFI12458-V1.0													
		review		Material number ---		Structure CEN											
		confirm		Material PI		RF RAO											
Location: 1 page in total Page 1					Unit mm		1:1 scale, Version A.0										

5. Reliability test report

Test Project		Test methods	Require	result
C1	VSWR electrical standing Bobby	Design network analyzer parameters for testing.	Compliant with antenna specifications	pass
M1	antenna gain	Antenna anechoic chamber parameters were tested.	Compliant with antenna specifications	pass
M2	Vibration	(GB/T2423.48-2008) Amplitude:0.03 inch (1.5mm); Freq: 20 to 80to 20 Hz3 directions; 2 hours for each Direction; Amplitude 1.5mm; Frequency 20-80-20Hz; 2H in each of the 3 directions	1. No Visual Damage 2. Frequency Tol. ≤ 5% No obvious appearance defects; frequency deviation ≤5%	pass
M6	Random Drop	(GB/T2423.8-1995) Single: Height: 1.0 Meter; 3 directions; 1 time for each Single antenna, 1m high; 1 antenna in each of the 3 directions.	1. No parts separated. fracture 2. Frequency Tol. ≤ 5% The product shows no signs of detachment or breakage; frequency deviation y 5%	pass
E3	Dimension; Inspection of dimension, color;	Material, packaging, surface process. Inspect. Size, color, material, packaging, surface treatment	Directive DUT specification Compliant with antenna specifications	pass
E4	Temperature and Humidity Chamber Constant temperature and humidity	GB/T 2423.3-2006 Temp: 80°C/ 12H; -40°C /12H RH: ≥ 90%; Time: 24H Temperature Test at 80°C for 12 hours, then at -40°C for 12 hours; humidity ≥ 90%; Time 24H	After 2 Hours Recovery 1. No Visual Damage 2. Frequency Tol. ≤ 5% After 2 hours of recovery, there were no obvious cosmetic defects. Frequency offset ≤5%	pass
E5	Thermal Shock (cold) thermal shock	GB/T 2423.22-2008-40°C (30 minutes) to + 80°C (30 minutes) Cycles: 24 - Test at 40°C for 30 minutes, then test at 80y for 30 minutes, this constitutes one week. Period; 24 cycles in total	After 2 Hours Recovery 1. No Visual Damage 2. Frequency Tol. ≤ 5% After 2 hours of recovery, there were no obvious cosmetic defects. Frequency offset ≤5%	pass
R1	Aging test	(GB/T 2423.2 - 2008): Temp: 80°C ;Time: 24 hours. hours Temperature 80°C test for 24 hours	After 2 Hours Recovery 1. No Visual Damage 2. Frequency Tol. ≤ 5% No obvious appearance defects; frequency deviation ≤5%	pass
M1	RoHS	With Reference to IEC 62321:2008 with flow chart Refer to IEC 62321 test procedure	RoHS Directive 2015/863/EU Compliant with RoHS 2015/863/EU standards	pass

6. Product Packaging Code

Product Name/Packaging Specifications

6.1 Labeling Requirements

Purchase order number	*****
Material coding	*****
Product Name and Specifications	*****
Quantity/Unit	*****
Remark	*****

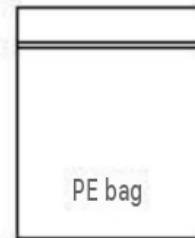
Purchase order number	*****
Material coding	*****
Product Name and Specifications	*****
Quantity/Unit	*****
Remark	*****

6.2 Packing Requirements

Assignment Instructions:

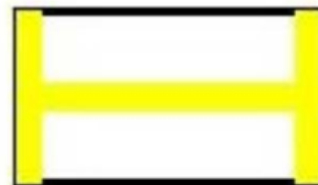
6.2.1 Inner Packaging:

Product 50 pieces per small bag



6.2.2 Outer Packaging:

Quantity/box determined based on actual quantity.



carton

Precautions:

(1) Should additional partitions or pearl cotton be installed?

(2) Labeling, such as RoHS;

