Kunshan Innowave Communication Technology Co., Ltd.

SPECIFICATION FOR APPROVAL

Customer Name: Hoymiles Power Electronics Inc.

Item Name: MIT-5000-8T External Antenna

Frequency band 2400~2500MHz, impedance 50ohm, gain 3.16dBi max, exposed wire length L=50mm, shell length L=50mm, cable RF1.13 black cable, first generation IPEX terminal -40℃~85℃

Vender P/N: F062F8109911000

Model/ **Customer P/N:** A6040457

Revision: A/1

Date: 2024.08.12

Signature

Audit	Confirmation	Approval
Peng Jin	Wang Liang	Peng Xin

Approval

Audit	Confirmation	Approval
Jiang Weiwei	Yang Xiaoyu,Zhou Rong	Wu Kailun

Kunshan Innowave Communication Technology Co., Ltd.

Tel: None.

Fax: None.

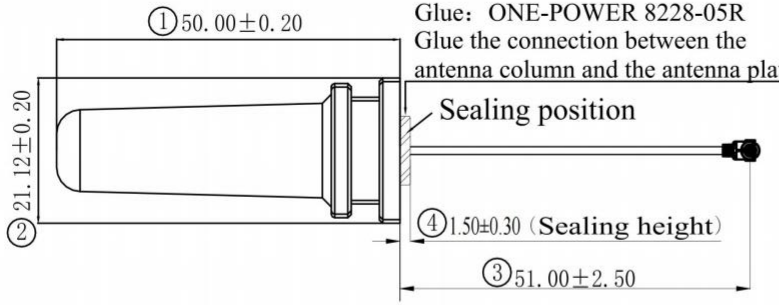
Add: Building H, Jindi Zhizao Park, Shengchuang Road, Yushan Town, Kunshan City, Suzhou City, Jiangsu Province.

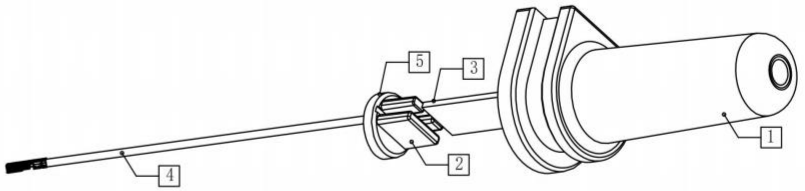
MODIFICATION RECORD SHEET				
Rev.	**Modification Date**	**Summary of modification content**	**Signature**	**Approval**
A/0	2024/05/27	First edition release	Peng Jin	Peng Xin
A/1	2024/08/12	1. The size of the antenna drawing ⑤ was changed from 4.10±0.05 to 4.10±0.08, and the version of the drawing was upgraded to A1; 2. Add Gain (MAX) and antenna type in the electrical test report; 3. the specification adds the antenna single radiation field pattern.	Peng Jin	Peng Xin

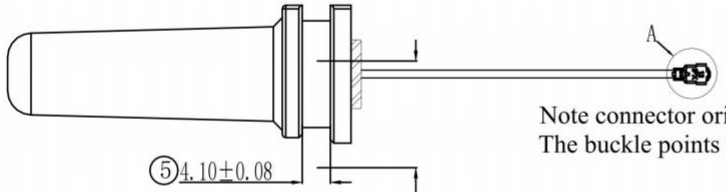
Catalogue

1. 2D Structure Diagram

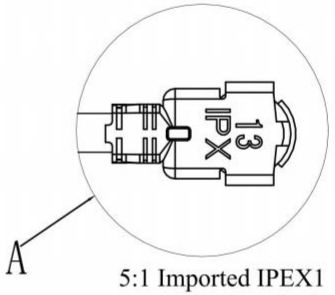
Version	Mark	Change content	Sign	Date
A/0		Initial release	Wu Li	2024.05.21
A/1		The size of No. 5 was changed from 4.10±0.05 to 4.10±0.08	Wu Li	2024.08.12



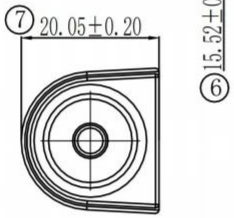




Note connector orientation
The buckle points to the back of the PCB board



5:1 Imported IPEX1 generation terminals



NO.	Name		(P/N)	Describe	Vendor code	Dosage
1	Micro inverse SR type external antenna column		M06227721910002	PC black fine grain	VEN00591	1
2	Micro inverse SR external antenna plate base		M06227722910001	PC black fine grain	VEN00591	1
3	Antenna PCB		M062F8136911000	FR-4 plate thickness1mm Copper thickness18um black	VEN00806	1
4	Cable	Ordinary black wire	S062F8102911000	Ordinary black wire Wire diameter φ1.13mm L=70mm	VEN00222	1
		Imported IPEX1 generation terminals		RF1.13 One end is a tin wire、One end is a first-generation IPEX terminal	VEN00160	1
5	Sealant (shared)		M06227726990002	ONE-POWER 8228-05R	VEN00608	1

Technical requirements:
1. "★" size is the key size, "()" is the actual size, "△X" is the design change;
2. The solder joint is required to be smooth without bumps, no virtual welding, tin stacking, short circuit and other phenomena;
3. The drawing size is used to test the shape function and assembly.
4. Meet the salt spray test/adhesion test and other related reliability tests, According to our internal RX-WI-QAC-014 reliability test standard, All materials are in accordance with our RX-WI-QAC-008 Product environmental substances prohibited management standards.
5. Terminal riveting tension greater than 1.2kg;
6. Packing according to the packaging requirements provided by Ruixiang engineering;
7. Environmental protection should meet the requirements of RoHS2.0&Reach& halogen-free;
8. Prepare 2PCS free spare parts separately for each batch of materials and send them with the goods.

MACHINE	WF81		DESIGN	Wu Li	DATE	2024.08.12
NAME	WF81- Finished external antenna		RF	Peng Xin	DATE	2024.08.12
(P/N)	F062F8109911000		CHECK	Wang Liang	DATE	2024.08.12
VERSION	A/1	FRAME A4				
RATIO	FIT	Third angle				
UNIT	mm					

INNOWAVE
Kunshan Innowave Communication Technology Co., Ltd.

2. Electrical Performance Report

2.1 Electrical test report

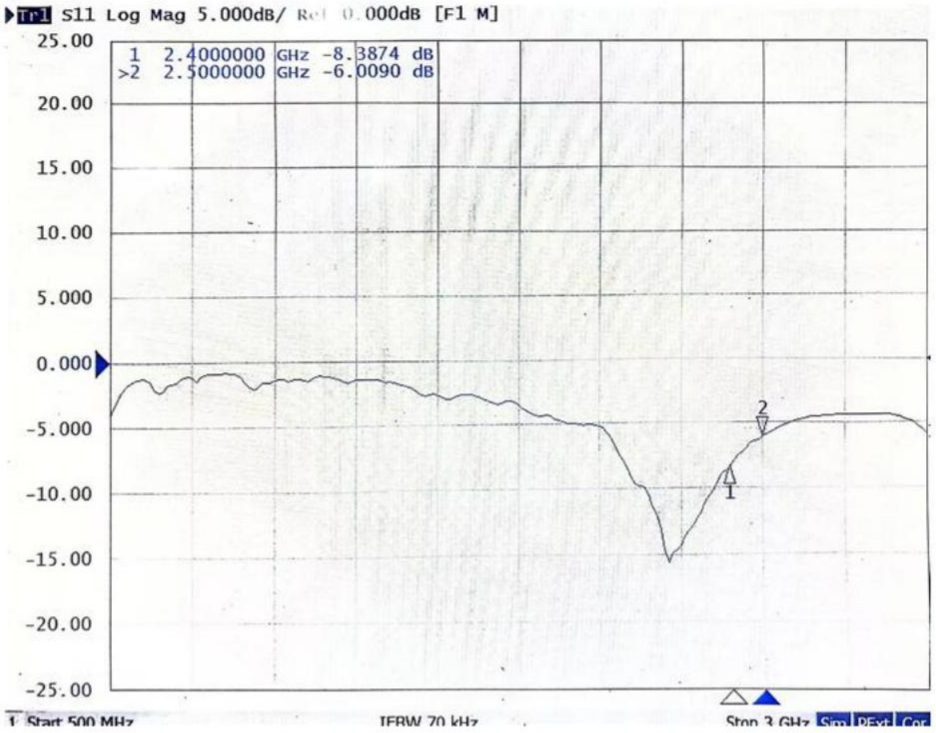
Test Reports

Electrical Properties	
Frequency	2400MHz~2500MHz
Antenna Type	Whip Antenna
Impedance	50 Ohm Nominal
V.S.W.R	＜4.5
Return Loss	＜-4.0dB
Gain （Max）	3.16dBi
Radiation	Omni-directional
Polarization	Linear,Vertical
Admitted Power	1W
Connector	IPEX 1
Physical Properties	
Antenna Material	Phosphor Copper
Cable Type	φ1.13mm Cable
Operating Temp	-40~+85℃
Storage Temp.	-40~+85℃

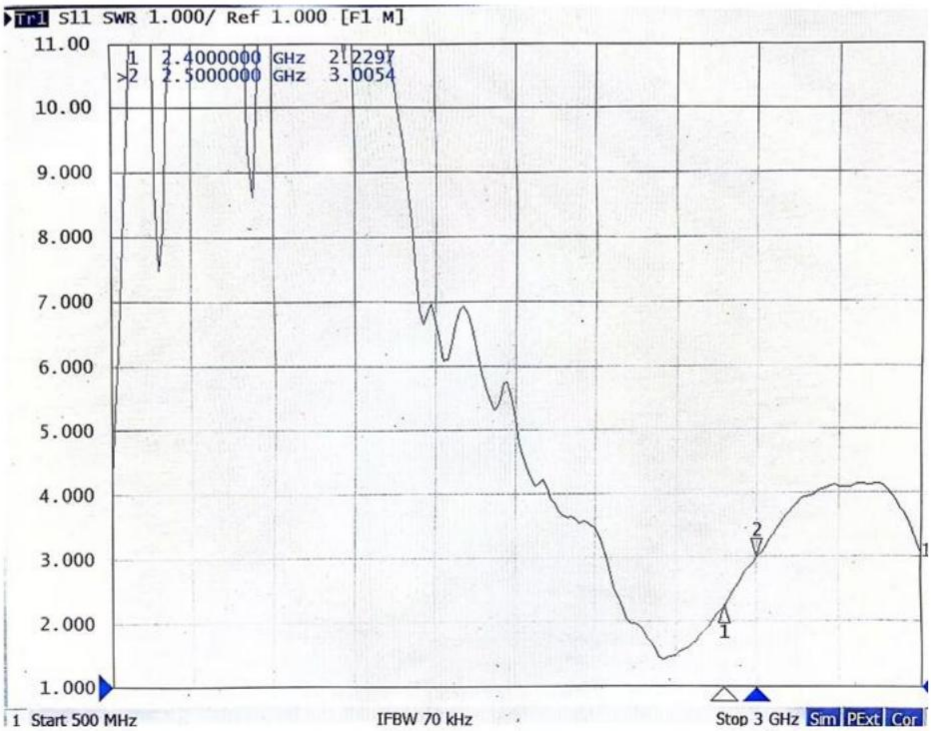
2.2 Returnloss

Testing instrument：KEYSIGHTE5071C

S11:



SWR:



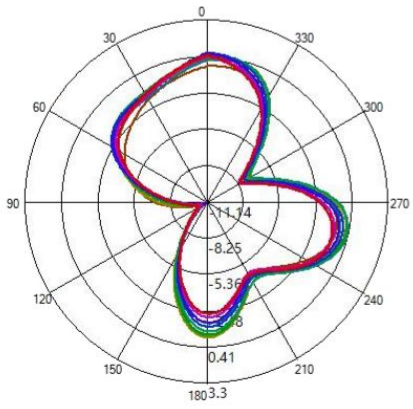
2.3 Passive Test Data

Testing instrument:GTS RayZone 1800

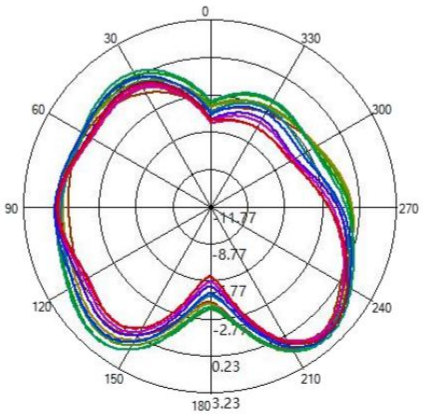
Frequency(MHz)	Efficiency(db)	Efficiency(%)	Gain(dBi)
2400	-2.51	56.09	2.19
2410	-2.16	60.88	2.50
2420	-2.02	62.79	2.84
2430	-1.80	66.07	3.14
2440	-1.68	67.91	3.16
2450	-2.23	59.88	2.57
2460	-2.14	61.03	2.55
2470	-2.62	54.75	2.00
2480	-2.85	51.92	1.68
2490	-3.05	49.58	1.37
2500	-2.85	51.93	1.48

2.4 2D Pattern：

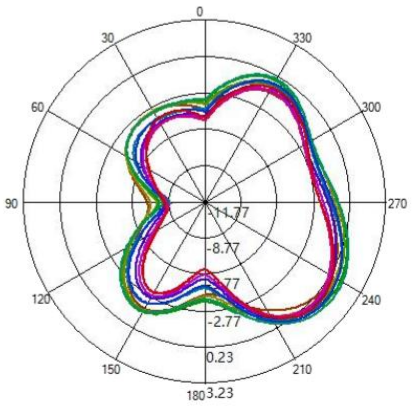
Theta=90° ：



Phi=0° ：

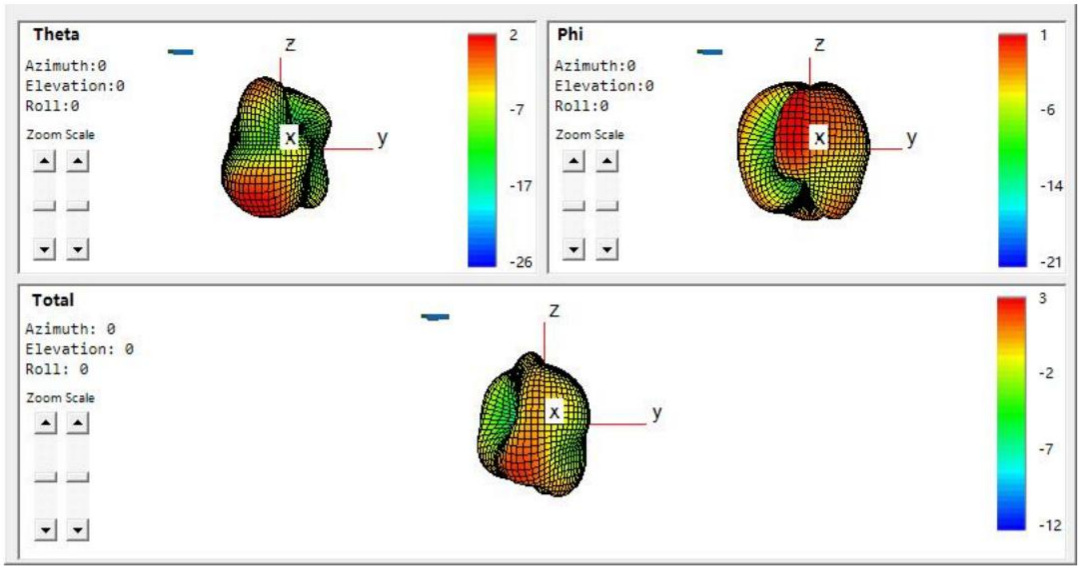


Phi=90° ：

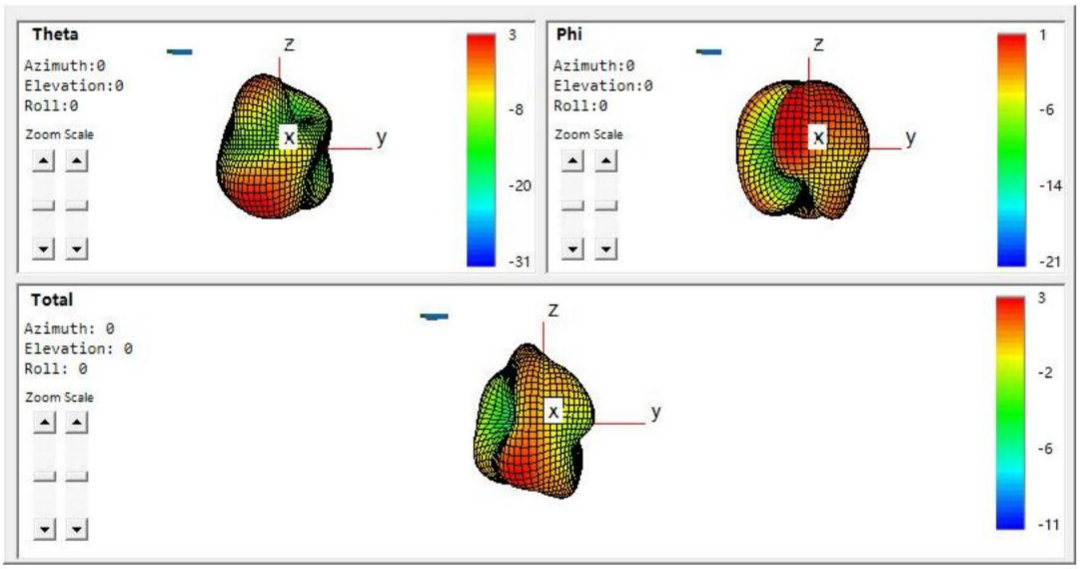


2.5 3D Pattern：

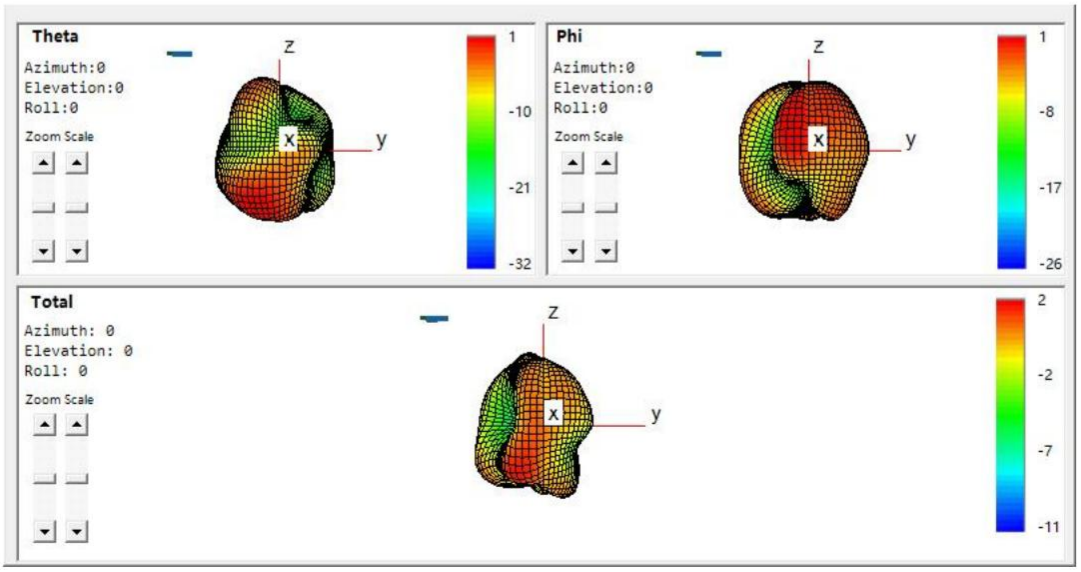
2400MHz：



2450MHz：



2500MHz：



2.6 Fixture picture：

2.7 Antenna diagram：

3. Reliability Test Report

Kunshan Innowave Communication Technology Co., Ltd.				
WF81 External Antenna Reliability Test Report				
Experimental report number: 202405240001				
Item Name: WF81 External Antenna				
Colour: Black				
Production date: 2024.05.24				
Experimenter: FuMeifeng		Confirmed:Yan Wulin		Review: Yang Jin
No.	**Item**	**Sample quantity**	**Result**	**Remark**
1	Salt Spray Test	3PCS	OK	
2	Hygrothermal Cycle	3PCS	OK	
3	High Temperature Test	3PCS	OK	
4	Low Temperature Test	3PCS	OK	
Preservation Department: Quality Department			Form number: RX-FR-QAC-068 A0	

Salt Spray Test			
Project	WF81 External Antenna	**Date**	2024/05/24
Product Name	MIT-5000-8T	**Experimental Purpose**	Test the product for corrosion resistance
Colour	Black	**Experimenter**	Fu Meifeng
Sample Quantity	3PCS	**Test Date**	2024/05/24

Test Equipment

a. Salt spray tester;
b. brine solution with 5% concentration (prepared with NaCl and deionized water, PH adjusted to 6.5~7.2);
c. Compressed air pressure 1.0±0.1kg/cm^2; Laboratory relative humidity above 85%;
d. Laboratory temperature 35℃±1℃; Pressure barrel temperature 47℃±1℃;
e. Brine drum temperature 35℃±1℃.

Test Method

The samples were subjected to neutral salt spray test. In a closed environment of 35 ±1 ° C, with humidity > 85% and PH value within the range of 6.5-7.2, 5% ± 1% NaCL solution was used for 48h continuous saline spray and placed at room temperature for 2h to check the appearance and function of the products.

Result Determination

No oxidation, rust, corrosion, stolen goods, scratches, scratches, lack of materials and other undesirable phenomena on the surface of the product; The function is normal.

Test Result Photos	
Test Results	OK
Remarks	Form number: RX-FR-QAC-068 A0

Hygrothermal Cycle			
Project	WF81 External Antenna	**Date**	2024/05/24
Product Name	MIT-5000-8T	**Experimental Purpose**	Performance and appearance tolerance under certain temperature and humidity changes
Colour	Black	**Experimenter**	Fu Meifeng
Sample Quantity	3PCS	**Test Date**	2024/05/24
Test Equipment			
Constant temperature and humidity box			
Test Method			
1. Room temperature: the temperature is (25±2) ℃, the humidity is below 65%; 2. Limit temperature and humidity: temperature (85±2) ℃, humidity 85%~90%; 3. Limit temperature and humidity holding time: 1h each; 4. Cycle times: 12 cycles, a total of 24h; 5. After the test, place the antenna at room temperature for 2 hours and check the appearance of the antenna.			
Result Determination			
1. The overall appearance of the antenna is good, and the non-metallic part should not be discolored, cracked, deformed, etc.; 2. The metal surface coating should not be spalling, cracking, separation and other phenomena.			
Test Result Photos			
Test Results	OK		
Remarks	Form number: RX-FR-QAC-068 A0		

High Temperature Test			
Project	WF81 External Antenna	**Date**	2024/05/24
Product Name	MIT-5000-8T	**Experimental Purpose**	Performance and appearance tolerance at high temperatures
Colour	Black	**Experimenter**	Fu Meifeng
Sample Quantity	3PCS	**Test Date**	2024/05/24
Test Equipment			
Constant temperature and humidity box			
Test Method			
1. Check the appearance and performance of the product before testing; 2. Place in a test chamber with a temperature of 85±2℃ for 48h; 3. After the experiment, take out the product and place it at room temperature for 2 hours to check the appearance and performance.			
Result Determination			
1. No oxidation, deformation or cracking of the sample; 2. No stratification of the sample; 3. The performance meets the specifications.			
Test Result Photos			
Test Results	OK		
Remarks	Form number: RX-FR-QAC-068 A0		

Low Temperature Test			
Project	WF81 External Antenna	**Date**	2024/05/24
Product Name	MIT-5000-8T	**Experimental Purpose**	Performance and appearance tolerance at low temperatures
Colour	Black	**Experimenter**	Fu Meifeng
Sample Quantity	3PCS	**Test Date**	2024/05/24
Test Equipment			
Constant temperature and humidity box			
Test Method			
1. Check the appearance and performance of the product before testing; 2. Place in a test chamber with a temperature of -40±2℃ for 48h; 3. After the completion of the experiment, take out the product and place it at room temperature for 2 hours, without water vapor on the surface of the product, and check the appearance and performance.			
Result Determination			
1. No oxidation, deformation or cracking of the sample; 2. No stratification of the sample; 3. The performance meets the specifications.			
Test Result Photos			
Test Results	OK		
Remarks	Form number: RX-FR-QAC-068 A0		

4. Packing

<table>
<tr><td>Part Number</td><td>F062F8109911000</td><td>Product Name</td><td>WF81 External Antenna</td></tr>
<tr><td>Product Specification</td><td>MIT-5000-8T</td><td>Packaging Material</td><td>Ziplock bag/carton</td></tr>
<tr><td>Packing Quantity/Bag</td><td>Ziplock bag/100pcs</td><td rowspan="2">Packing Method</td><td rowspan="2">Ziplock bag</td></tr>
<tr><td>Packing Quantity/Box</td><td>500pcs</td></tr>
<tr><td colspan="2">Figure 1: Single or other forms of packaging</td><td colspan="2">Figure 2: Zip-lock bag packing method</td></tr>
<tr><td colspan="2">  </td><td colspan="2">  </td></tr>
<tr><td colspan="2">Figure 3: Box view</td><td colspan="2">Figure 4: Box view (front, side, top)</td></tr>
<tr><td colspan="2">  </td><td colspan="2"> 
</td></tr>
<tr><td colspan="4">Note:
1.10pcs in one bag, 10 small bags in one big bag with a total of 100pcs, 5 large bags in one box with a total of 500pcs,
2. Subject to the actual shipment quantity,
3. Storage environment 15°c to +28°c, humidity below 85%,
4. Valid for 3 years,
5. ROHS label and material label shall be affixed to the outer box.</td></tr>
<tr><td colspan="2">Written by: Li Jinxin</td><td colspan="2">Reviewed: Chen Qingliang</td></tr>
<tr><td colspan="4">Form number: RX-FR-XM-030 A0</td></tr>
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