

# Zhejiang Haitong Communication Electronics Co., Ltd

## Acknowledgment

(LDS class)

Customer name: Hytera Communications Co., Ltd

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Applicable model: MD6

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Material code: 5121000061710A

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Product name: HT1585\_ I1 Bluetooth antenna assembly

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texture of material: Plastic particle

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Date: 2021. 04. 21

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No. :

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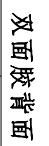
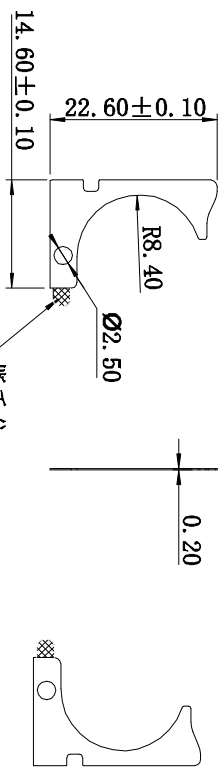
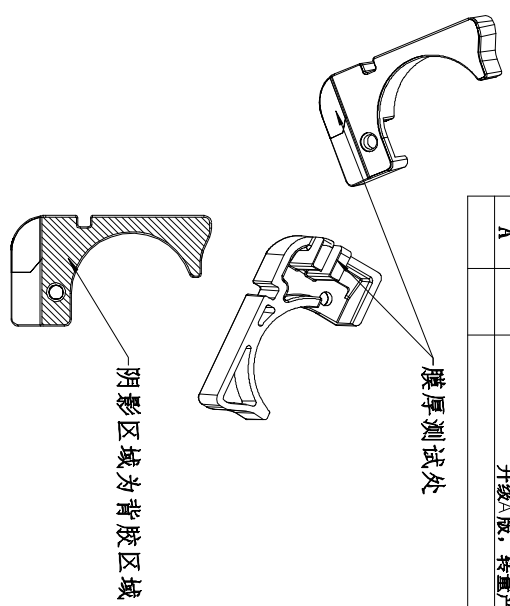
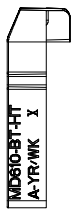
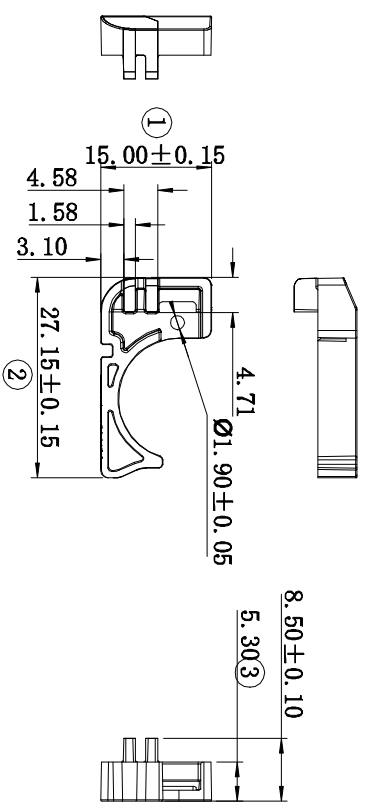
make	to examine	approval

Customer confirmation column		
Undertaker	to examine	approval

# catalogue

- I cover
- II catalogue
- III 2D drawing
- IV Full size measurement report (FAI)
- V **Cpk report**
- VI QC Engineering Drawing
- VII Reliability test report
- VIII Antenna performance test report
- IX Material Compositio
- X Restricted substanc

REVISION	ECOH	REVISION NOTE	AUTHOR	DATE
A		升级A版, 转量产。	ZCX	14/04/21



字符说明:  
 1. 内容“YR/MR”表示生产日期(年/周, 如1903)  
 2. 内容“X”表示生产机台号1, 2, 3,.....9  
 10以后用字母A、B、C.....代替

技术要求:  
 1. 材料: PC (Sabic DX11355), 材料必须为100%原料;  
 2. 颜色: 黑色;  
 3. 表面处理: LDS, 膜厚: CU 6-10um, Ni:2-5um;  
 4. 外观要求:  
 a) 外观: 缩水、夹水、胶痕、脱花、毛刺、裂纹等外观要求参考Hytera标准;  
 b) 外观: 夹线、防水、防水胶阶内胶缝每处差≤0.05mm; 针不可凸出产品表面, 凹陷不超过0.1mm;  
 c) 日期: 日期等字不能有明显的油污、破损等缺陷, 天线来料时, 双面胶需贴好;  
 d) 腔体: 腔体未做拔模角不超过1.0°, 未注圆角R0.2mm, 未注尺寸以3D数据为准, 未注尺寸公差按公司标准;  
 e) 图中标识①②③: 为关键点为管控尺寸, 首次来料需提供FAI报告;  
 7. 所用材料及加工工艺必须符合“RoHS”标准要求及REACH法规, 来货在外包装箱上打上“RoHS”标识, 禁止使用海能达管理规定之有害物质。

GENERAL TOLERANCE TABLE

LINEAR	TOLERANCE	ANGULAR	TOLERANCE
0-10	±0.05	0-5°	±0.5°
0-50	±0.10	5-20°	±1°
50-80	±0.15	20-90°	±1.5°
>80	±0.2		

精度公差属性 of  
 halting precision technology.  
 精度公差属性 not be copied,  
 updated and taken out  
 company/unless be allowed

TEM	PART NAME	P/N	MATERIAL	Q'TY	REMARK
	HT1585-11	B.1.03.L.0017			

**NHATT** 浙江海通通讯股份有限公司  
 ZHEJIANG HANTONG COMMUNICATION ELECTRONICS CO.,LTD.

TITLE: HT1585 (蓝牙天线组件)

SCALE: FULL PAGE: 1 of 1 REV: A

1. 材料: PC (Sabic DX11355), 材料必须为100%原料;  
 2. 颜色: 黑色;  
 3. 表面处理: LDS, 膜厚: CU 6-10um, Ni:2-5um;  
 4. 外观要求:  
 a) 外观: 缩水、夹水、胶痕、脱花、毛刺、裂纹等外观要求参考Hytera标准;  
 b) 外观: 夹线、防水、防水胶阶内胶缝每处差≤0.05mm; 针不可凸出产品表面, 凹陷不超过0.1mm;  
 c) 日期: 日期等字不能有明显的油污、破损等缺陷, 天线来料时, 双面胶需贴好;  
 d) 腔体: 腔体未做拔模角不超过1.0°, 未注圆角R0.2mm, 未注尺寸以3D数据为准, 未注尺寸公差按公司标准;  
 e) 图中标识①②③: 为关键点为管控尺寸, 首次来料需提供FAI报告;  
 7. 所用材料及加工工艺必须符合“RoHS”标准要求及REACH法规, 来货在外包装箱上打上“RoHS”标识, 禁止使用海能达管理规定之有害物质。

## DIMENSION TEXT REPORT

Part name:		IT1585_I1 Bluetooth antenna assembl DWG. No.:				B. 1. 03. L. 0017				TYPE:		Finished antenna				
Quantity:		5				Client DWG. No.:				/		Machine:		/		
Drawing Rev.:		A				Dept/Vendor:				/		Page:		1 of 1		
Environment:		Temp 22 °C				Humidity:				55 %RH		Test date:		2021. 4. 20		
Subject to be evaluated:											Item class:			SC=Significant Char KCC=Key Control Char KC=Key Control Item NOR=Reference Item		
<b>Full dimension</b>																
No.	Spec.	Control tolerance		Class	Instr. measuring tool	1#	2#	3#	4#	5#	Result	Remark	Engineering Comments			
		upper	lower								OK/NG					
1	15.00	0.15	0.15	KC	c	14.90	14.93	14.92	14.90	14.91	OK					
2	27.15	0.15	0.15	KC	c	27.15	27.16	27.09	27.13	27.11	OK					
3	5.30	0.05	0.05	KC	c	5.31	5.33	5.33	5.32	5.31	OK					
4	4.58	0.05	0.05	NOR	c	4.56	4.59	4.59	4.58	4.59	OK					
5	1.58	0.05	0.05	NOR	c	1.59	1.61	1.62	1.60	1.61	OK					
6	3.10	0.05	0.05	NOR	c	3.09	3.08	3.08	3.09	3.08	OK					
7	4.70	0.05	0.05	NOR	c	4.66	4.66	4.67	4.66	4.66	OK					
8	1.90	0.05	0.05	NOR	c	1.88	1.90	1.89	1.89	1.90	OK					
9	8.50	0.10	0.10	NOR	c	8.53	8.48	8.54	8.53	8.51	OK					
10	14.60	0.10	0.10	NOR	c	14.55	14.58	14.64	14.57	14.62	OK					
11	22.60	0.10	0.10	NOR	c	22.60	22.63	22.57	22.58	22.60	OK					
12	8.40	0.05	0.05	NOR	c	8.37	8.40	8.39	8.41	8.38	OK					
13	2.50	0.05	0.05	NOR	c	2.54	2.52	2.55	2.54	2.55	OK					
14	0.20	0.05	0.05	NOR	c	0.16	0.18	0.17	0.16	0.18	OK					
appearance		1. Plastic parts: no appearance shrinkage, air lines, weld lines, scratches, deformation, flash and other defects; 2. FPC: no appearance impurities, discoloration spots, scratches, crushing, creases, gold finger oxidation, surface damage and other defects; 3. LDS: no defects such as missing engraving, pinhole, laser engraving fracture, laser engraving deformation, scratch, oil stain, etc; 4. Electroplating: no defects such as missing plating, over plating, scratches, dents, deformation, etc.										OK		/		
Instruments:		C														
A: Handy push pull gauge (meter card)		B: Digital caliper			C: Video measuring system				D: Salt spray tester							
E: Temperature and humidity		F: Toolmaker's microscope			G: Network analyzer				H: Pin gauge							
I: Knife Tool		J: Flat plate			K: Soldering spot											

Prepared by: Yang Du

Approved by: Tan Liqing



Haitong communication

## CPK Report

Form No. : HZHT-FM-PZ051 Version No. : A/1





Product name	HT1585_ I1 Bluetooth antenna assembly		supplier	Huizhou Haitong Communication Electronics Co., Ltd	
Item No	B. 1. 03. L. 0017		Confirmed by	Tan Liqing	
Module No	/		Inches/mm	mm	
Acupoint number	/		Material name	/	
edition	A		date	2021.4.20	
Dimension No	<b>1</b>	<b>2</b>	<b>3</b>		
Nominal size	<b>15.00</b>	<b>27.15</b>	<b>5.30</b>		
Positive tolerance	<b>0.15</b>	<b>0.15</b>	<b>0.05</b>		
Negative tolerance	<b>-0.15</b>	<b>-0.15</b>	<b>-0.05</b>		
Upper specification limit	<b>15.15</b>	<b>27.30</b>	<b>5.35</b>		
Lower specification limit	<b>14.85</b>	<b>27.00</b>	<b>5.25</b>		
1	14.92	27.15	5.31		
2	14.90	27.16	5.30		
3	14.90	27.10	5.31		
4	14.91	27.09	5.32		
5	14.90	27.13	5.31		
6	14.92	27.10	5.30		
7	14.93	27.08	5.30		
8	14.91	27.09	5.32		
9	14.92	27.14	5.31		
10	14.90	27.13	5.32		
11	14.93	27.14	5.31		
12	14.94	27.15	5.32		
13	14.92	27.12	5.33		
14	14.93	27.13	5.32		
15	14.94	27.14	5.31		
16	14.93	27.16	5.30		
17	14.92	27.15	5.32		
18	14.90	27.14	5.32		
19	14.92	27.11	5.31		
20	14.91	27.14	5.33		
21	14.93	27.15	5.32		
22	14.90	27.09	5.31		
23	14.92	27.14	5.32		
24	14.93	27.12	5.31		
25	14.94	27.13	5.30		
26	14.90	27.15	5.33		
27	14.89	27.10	5.32		
28	14.92	27.11	5.31		
29	14.93	27.12	5.30		
30	14.91	27.14	5.32		
31	14.90	27.12	5.31		
32	14.90	27.11	5.32		
33	14.89	27.13	5.31		
34	14.91	27.15	5.32		
35	14.90	27.13	5.30		
MAX.	<b>14.94</b>	<b>27.16</b>	<b>5.33</b>		
MIN.	<b>14.89</b>	<b>27.08</b>	<b>5.30</b>		
AVERAGE	<b>14.91</b>	<b>27.13</b>	<b>5.31</b>		
STDEV	<b>0.01</b>	<b>0.02</b>	<b>0.01</b>		
CP	<b>3.42</b>	<b>2.29</b>	<b>1.84</b>		
Cpk	<b>1.48</b>	<b>1.94</b>	<b>1.35</b>		
Measuring tools	<b>pixiv</b>	<b>pixiv</b>	<b>pixiv</b>		

Reviewed by: Tan Liqing

Prepared by: Yang Du

Product range	HT1585_MD610			Document No	210420-01			primary contact	Zeng Qingping		Telephone	0752-5319982			make	to examine		Approved	
Process covered	LDS, chemical plating, auxiliary materials, inspection and packaging			Date of preparation	2021.4.20			Revision Date	2021.4.20		edition	V.A			Yang Zhangmao		/		Zeng Qingping
Process status	<input type="checkbox"/> Sample <input type="checkbox"/> Trial production <input checked="" type="checkbox"/> Mass			characteristic			Management method (calculation and measurement)						Exception handling						
flow chart	s P s r o N c o e	project name	Measuring machine, fixture and tool	number	Management (process) characteristics	Quality (product) characteristics	Classification of special characteristics	Management specifications (product/process specifications/tolerances)	Confirmation method	Confirmation frequency	Control method	Person in charge	Responsible person	Disposal	record	Connection regulation	remarks		
	01	Temporary receipt of materials	Pound scale	01-1	Product name and quantity	Appearance and weight		The packaging of raw materials shall be free from damage and	visual	Times/batch	Spot check box	Raw material warehouse	executive director	return goods	Inspection Sheet	Warehouse management system			
	02	Incoming inspection	Caliper image measuring instrument thermostatic test chamber salt spray test chamber	02-1	Appearance, function and size	Appearance, material, high temperature and humidity resistance, corrosion resistance		Relevant quality characteristics meet the requirements of inspection specifications	Visual measurement	Times/batch	Sampling according to GB/T2828-2012 general Grade II, AQL cr=0.01 maj=0.4/min=1.0	IQC	Quality Supervisor	Return Special Purchase	Inspection Sheet Incoming Material Inspection Record Nonconformity Review Sheet	Incoming inspection specification			
	03	Warehousing	Temperature and humidity meter	03-1	Product name and quantity	Appearance, weight, temperature and humidity		The packaging of raw materials shall be free from damage and moisture. Packaging requirements shall conform to specifications. The weight conforms to the delivery note. Temperature: 15 °C ~ 30	Visual measurement	Minimum package	Full inspection	Raw material warehouse	executive director	correct	Temperature and Humidity Record of Warehousing Sheet	Warehouse management system			
	04	Collect	visual	04-1	Product name and quantity	Product name and quantity		The collected materials are consistent with the BOM and order requirements.	visual	Minimum package	Full inspection	Material clerk	executive director	correct	Material requisition	/			
	05	IPQC inspection	visual	05-1	Appearance, function and size	appearance		The appearance meets the requirements of the inspection specification for the enclosure series products	visual	2H/first article	Spot check 5PCS	IPQC	Quality Department	Special mining and discarding	First inspection record Patrol inspection record	Process inspection specification			
Caliper projector	05-2		size	★		Dimensions meet the requirements of product part drawings	measure	2H/first article											
/	05-3		function			Functions meet the requirements of product drawings	measure	2H/first article											


06	LDS	CCD	06-1	Appearance and size	Appearance and size		The size shall meet the requirements of the product part drawing, and there shall be no leakage, line offset, etc	Visual measurement	2H/first article	Sampling according to GB/T2828-2012 general Grade II, AQL cr=0.01 maj=0.4/min=1.0	IPQC	Quality Department	Special mining and discarding	First inspection record Patrol inspection record	Process inspection specification	
07	Chemical plating	CCD	07-1	Appearance, size and function	Appearance, size and function		The size shall meet the requirements of the product part drawing, and there shall be no leakage, overflow, line offset, etc	Visual measurement	IQC	Sampling according to GB/T2828-2012 general Grade II, AQL cr=0.01 maj=0.4/min=1.0	IQC	Quality Department	Special mining and discarding	Inspection Sheet Incoming Material Inspection Record Nonconformity Review Sheet	Incoming inspection specification	
08	RF test	Network analyzer	08-1	RF function	RF waveform		RF waveform must conform to the required parameters	Automatic judgment	100%	Total	operator	Production Department	Scrap	Daily production report	Finished product inspection specification	
9	Adhesive backing	Hand fitting	9-1	Fit effect	Appearance and identification		The appearance meets the requirements of the inspection specification for antenna assembly series products. The foam is pasted in place according to the requirements of the drawings, without warning.	visual	100%	Total	operator	Production Department	correct	Daily production report	Finished product inspection specification	
10	Full inspection	visual	10-1	appearance	Appearance and adhesion		The appearance meets the requirements of the inspection specification for antenna assembly series products. The FPC shall be pasted in place according to the requirements of the drawings without warning.	visual	100%	Full inspection	Operator /IQC	Production Department	Special mining and discarding	Daily production report	Finished product inspection specification	
11	packing	visual	11-1	Quantity and	Quantity and		Packaging specification	visual	100%	Total	Packaging	Production	correct	Receipt Doc	Packaging specification	
12	IPQC spot check	Caliper visual projector	12-1	Appearance, function and size	Appearance and size	★	The appearance meets the requirements of the inspection specification for antenna assembly series products. The dimensions shall meet the requirements of product part drawings. The functions meet the functional standards of antenna assembly series. The packaging direction, product structure and material number conform to the customer's sealed	Measurement visual inspection	Spot check	Sampling according to GB/T2828-2012 general Grade II, AQL cr=0.01 maj=0.4/min=1.0	IPQC	Quality Department	Special mining and discarding	FQC Inspection Record	Finished product inspection specification	

   	13	Warehousing	visual	13-1	Product name and quantity	Appearance, temperature and humidity		The package shall be free from damage and moisture, and the packaging requirements shall meet the specifications. Temperature: 15 °C~ 30	Visual measurement	Per box	Full inspection	Finished product warehouse	executive director	correct	Temperature and Humidity Record of Warehousing Sheet	Finished product warehouse management specification	
	14	Material preparation for shipment	visual	14-1	Product name and quantity	Product name and quantity		The material preparation shall conform to the requirements of the delivery note and the order.	visual	Per box	Full inspection	Finished product warehouse	executive director	correct	Delivery note	/	
	15	OQC spot check	visual	15-1	Appearance and mark	Product name, material number, quantity, identification and appearance		The appearance meets the requirements of the inspection specification for antenna assembly series products. The packaging method and material identification shall meet the requirements of the delivery note and order.	visual	Spot check	Sampling according to GB/T2828-2012 general Grade II, AQL cr=0.01 maj=0.4/min=1.0	OQC	Quality Department	Special mining and discarding	Shipping report	Outgoing inspection specification	
	16	Shipment	visual	16-1	Product name and quantity	Product name, quantity and mark		The product name, quantity and mark are consistent with the requirements of the delivery note and the order.	visual	Per box	Full inspection	Finished product warehouse	executive director	correct	Delivery note	/	
<b>g</b> <b>e</b> <b>H</b> <b>i</b> <b>s</b>	<b>propose</b>		<b>confirm</b>		<b>specific date</b>	<b>edition</b>	<b>Revision</b>										
	Yang Zhangmao		Zeng Qingping		2021.04.20	V. A	Improve QC engineering drawing and quality control schedule										

Symbol description: ▽: Receiving △: Shipping ○: Operation ◇: Inspection



## Baige test report

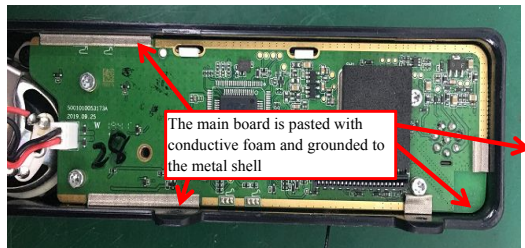
Test date: April 20, 2021		Experiment code: 20210420001			
Real sample	Product Name	HT1585_ II Bluetooth antenna assembly	Plating	Cu	Ni
	Item No	B.1.03.L.0017	thickness	6-10um	2-5um
ASTM grade: 4B and above			ISO Grade: Grade 1		
Inspection tools	Art knife/Baige knife, brush, eraser, 3M610 tape				
Inspection method	<ol style="list-style-type: none"> <li>1. Draw 10x10 (100) 1mm × 1mm small grids on the surface of the test sample with a grid knife, and each line shall be deep enough to reach the bottom layer of the coating;</li> <li>2. Clean the debris in the test area with a brush;</li> <li>3. Firmly stick the small grid to be tested with 3M610 tape, and wipe the tape with an eraser to increase the contact area and strength between the tape and the tested area;</li> <li>4. Grasp one end of the tape by hand and quickly pull it down in the vertical direction (90 °);</li> <li>5. Observe the damaged area of the coating for judgment.</li> </ol>				
Criteria	<ol style="list-style-type: none"> <li>1. If there is a small piece of peeling at the intersection of the cut, it is qualified if the actual damage (peeling) area in the grid area is <math>\leq 5\%</math>, and it is unqualified if it is <math>&gt; 5\%</math>.</li> <li>2. Refer to the evaluation standard of coating adhesion cross cut test (GB/T9286-88)</li> </ol>				
experiment Description	After the product test, the surface coating shall not fall off.				
Pictures or samples after test					
conclusion	<input checked="" type="checkbox"/> Qualified <input type="checkbox"/> Unqualified				

Approved by: Zeng Qingping Reviewed by: Tan Liqing Tested by: Yang Du

Antenna Engineer	Zheng Youqiang			
Test Engineer	Zhu Wei			
Review	Zhou Zhenbang			
testing environment	temperature	22°C	humidity	65%
	Mainboard version	moulding machine with complete accessories		
Machine status	PA match	ANT switch-matching-PA		
	Antenna version			
	Antenna matching	Unchanged		
	Software version			
	other	BT antenna: 2.4-2.5Ghz		

Picture of the whole machine status

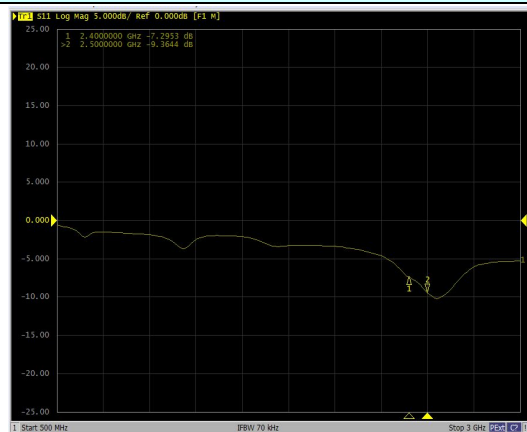
Picture of the whole machine status (processing picture)



Reflection loss test results

Test equipment	VNA (Agilent E5071C)
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Passive parameters of BT antenna - S11

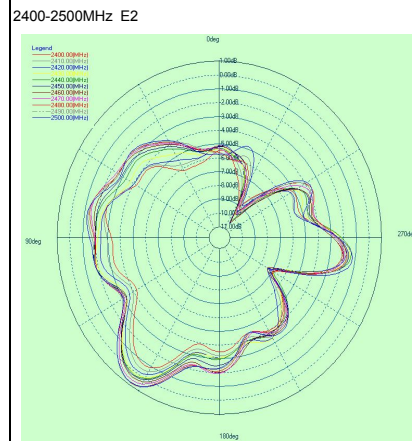
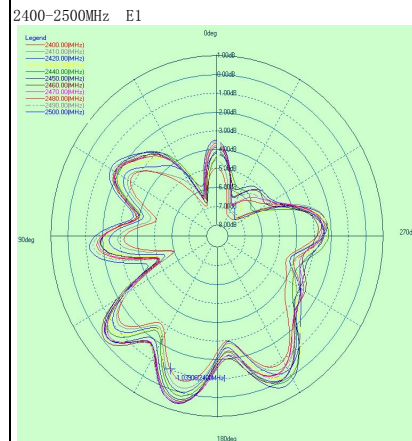
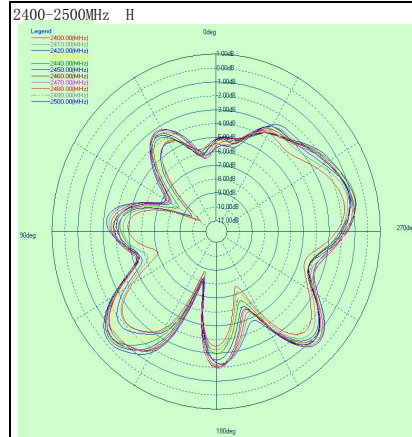


Efficiency test results

Test equipment	Satimo SG24+R&X-ZVL	
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Frequency (MHz)	Efficiency	Peak Gain (dBi)
2400	38%	-0.98
2410	41%	-0.55
2420	43%	-0.25
2430	44%	0.20
2440	46%	0.22
2450	48%	0.23
2460	48%	0.24
2470	48%	0.26
2480	49%	0.55
2490	49%	0.72
2500	50%	0.92
AVE	46%	0.1

Pattern





## RoHS Questionnaire

Supplier (agent):

Customer Code: customerSubpart No		Material name/model Subpart Name/model		Supplier Subpart No			Manufacturer						Green logo				
5001010053173A		HT1585_I1 Bluetooth antenna assembly		B.1.03.L.0017			Zhejiang Haitong Communication Electronics Co., Ltd. Huizhou Branch						HSF2.0 (RoHS+HF)				
Item	Material Name	Material No	Raw Material Manufactur er Name	Third Party Test Report		Restricted Substances Concentration in Homogeneous Material (UoM: ppm)										Exemptions	
				Test Date (YY- MM-DD)	No. Test Report No	Lead (Pb)	Cadmium (Cd)	Mercury (Hg)	Hexavalent chromium (Cr6+)	Polybromin ated biphenyls (PBB)	Polybromin ated diphenyl ethers (PBDE)	Di (2- ethylhexyl) phthalate (DEHP)	Tolyl butyl phthalate (BBP)	Dibutyl phthalate (DBP)	Diisobutyl phthalate (DIBP)		
1	Plastic parts	B.2.01.L.0047	haitong	2021-1-7	/	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
2	coating	B.2.01.L.0045	xuanyu	2020-12-04	SZXEC2002961801	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
3	le faced adhesive	3M9495LE	3M	20-12-29	ETR20C05996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
4																	
5																	
6																	
7																	

Filled byHuang Xiaoting

Filled by Company/DepaQuality Department

Seal:

## Restricted substance composition questionnaire

Supplier (agent):

Customer Code: customerSubpart No		Material name/model Subpart Name/model		Supplier Subpart No		Manufacturer										Green logo		
5001010053173A		HT1585_I1 Bluetooth antenna assembly		B.1.03.L.0017		Zhejiang Haitong Communication Electronics Co., Ltd. Huizhou Branch										HSF2.0 (RoHS+HF)		
Item	Material Name	Material No	Raw Material Manufacturer Name	Third Party Test Report		Restricted Substances Concentration in Homogeneous Material (UoM: ppm)										Remark		
				Test Date (YY-MM-DD)	No. Test Report No	Bromine (Br)	Chlorine (Cl)	Phosphorus	Phthalates 7P (Phthalates)	Polyvinyl chloride (PVC)	Antimony (Sb)	Beryllium (Be)	Polycyclic aromatic hydrocarbons	Nickel	Arsenic (As)		SCCP	
1	Bracket	B.2.01.L.0047	haitong	2021-3-10	/	ND	ND											
2	coating	B.2.01.L.0045	xuanyu	2020-12-04	SZXEC2002961802	ND	ND											
3	faceted adhes	3M9495LE	3M	2020-12-29	ETR20C05996	ND	144											
4																		
5																		
6																		
7																		
8																		

Note :

1. Restricted substances include halogen-free substances and special requirements of customers. Please fill in the content of hazardous restricted substances according to the test results of a third party, and do not fill in any content for untested items.
2. Halogen free requirements: Br<900ppm, Cl<900ppm and Br+Cl<1500ppm.
3. This form shall be completed and sealed by the supplier; The supplier here refers to the direct trading party of Midi. (Provide stamped paper or scanned PDF document)
4. If the limited use substance exceeds the standard but meets the exemption provisions, please explain in the remarks.
5. The validity period of the third-party test report is one year, and the validity period of the new report should be more than 3 months. One month before the report expires, a new report shall be submitted for updating.

Filled by: Huang Xiaoting

Filled by Company/Department: Quality Department

Seal: