

Boluke

样品承认书

Parts Approval Sheet

生产供应商:	NQI	物料名称:	BT -FPC-Antenna
Supplier		Parts Name	
适用项目:	B2	NQI 料号:	NQI-B2-BT-L-FB-V0
Type/Spec		Parts No	
品 牌:	NQI	客户料号:	
Brand		Quantity	
送样日期:	2024/08/08	文件编号:	NQI-RD-SPEC-20240803
Send out Date		Document No	
承认日期:		样品版本:	V0
Approve Date		Version	

Supplier		Customer	
Approved By	Prepared By	Engineering Dept	Quality Dept

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(Resume)

[illegible]



目录(catalogue)

一.NO.1.样品及说明(Sample picture and description)	4
二. NO. 2.测试设备及项目 (Test equipment anitems)	5-6
三. NO.3. 暗室 (chamber) 连接及坐标 (Chamber connection and coordinates)	6-7
四. NO. 4. 天线匹配网络 (Antenna matching network)	7
五. NO.5. 天线电性能测试数据 (Antenna electrical performance test data)	7-11
六.NO.6. 天线结构图纸 (Antenna structure drawing)	12
七. NO.7. 天线包装图纸 (Antenna package drawing)	13
八. NO.8. 重点尺寸检验报告 (Key dimension inspection report)	14
九. NO.9. 环境及可靠性试验 (Environment and reliability test)	15-16

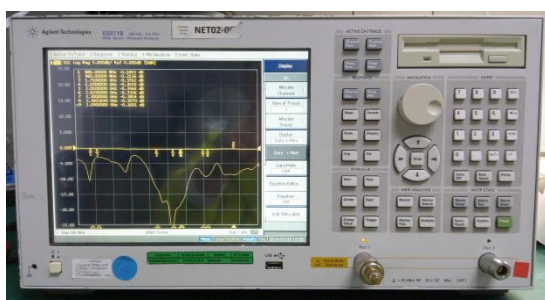
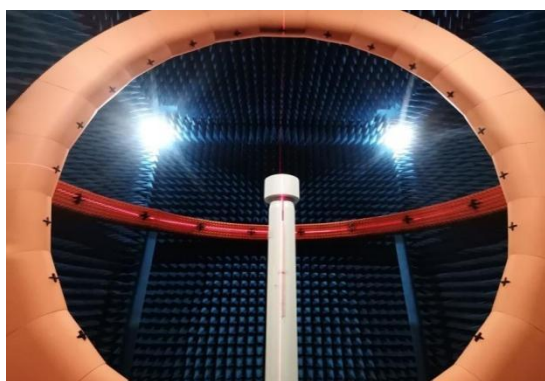
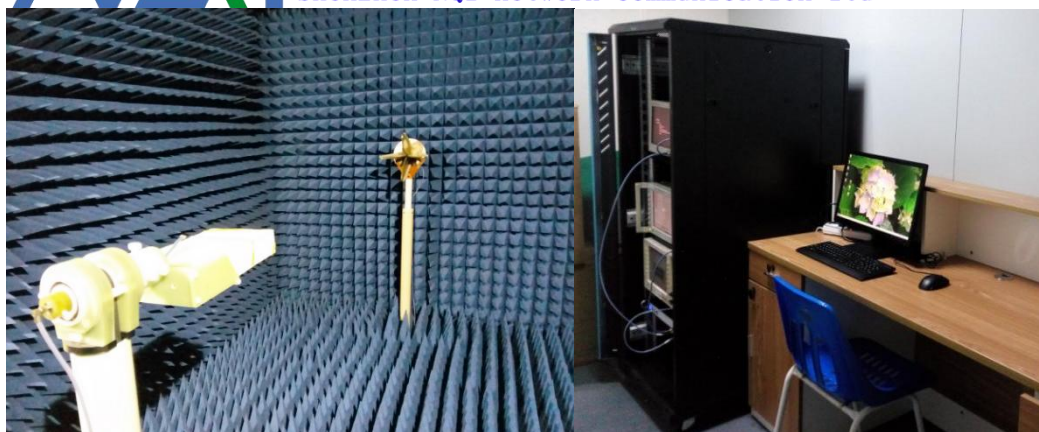
一. 样品图片及说明 (Sample picture and description) :



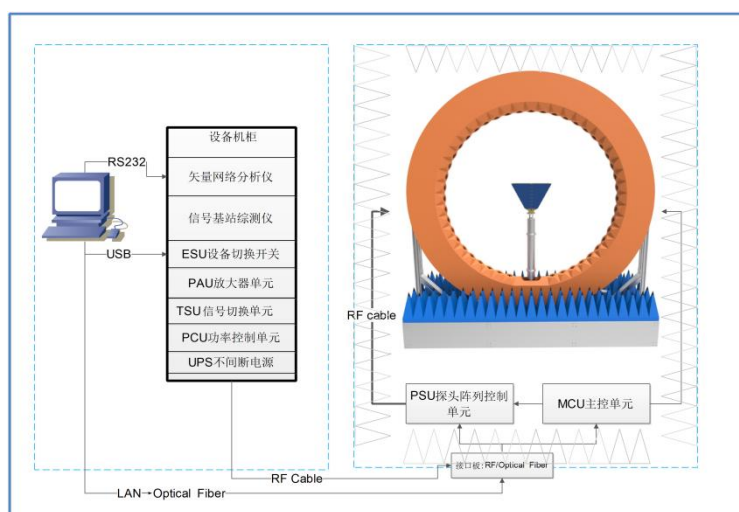
电气参数说明 (Electrical Specifications)	
频率范围 (Frequency range)	(2400-2500)MHz
特性阻抗 (impedance)	50 ohm
电压驻波比 (VSWR)	≤ 2
峰值增益 (Gain)	0.57dBi
极化形式 (Polarization)	level
辐射方向 (Radiation direction)	omnidirectional
连接方式说明 (Connection Mode Description)	
连接器 (connector)	/
线缆规格 (Cable specifications)	/
工作/储存温度 (Working/Storage temperature)	
工作温度 (Working temperature)	-30℃ ~ 65℃
储存温度 (Storage temperature)	-30℃ ~ 75℃

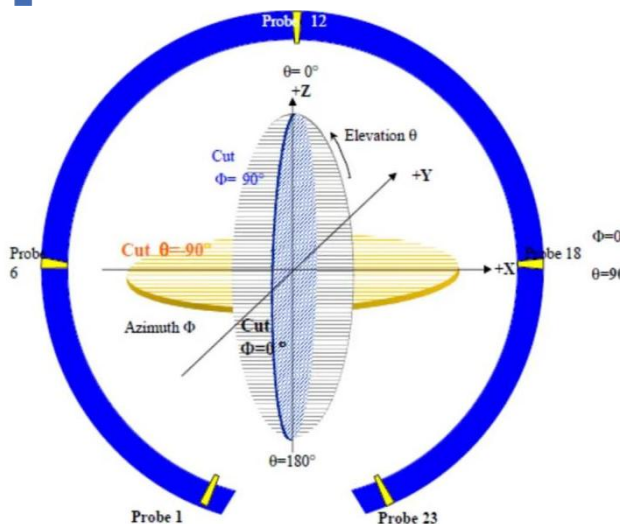
二. 测试设备及项目 (Test equipment and items) :

类别 (Class)	测试项目 (Test item)	设备 (Equipment)
1. S parameter	1. 回波损耗(RL) 2. 驻波比 (VSWR) 3. 斯密斯原图 (Smith chart)	网分 (VNA) : Agilent E5071B R&S ZVB8 Protek A333
2. 耦合测试 (Coupling testing)	1. 发射功率 (MAX Power) 2. 接收灵敏度 (MIN Sens)	1. 2G/3G Tester: Agilent 8960 2. The coupling box: TESCOM TC-5060A 3. 3D Chamber: ETS 3D Chamber (5x3x3)
3. 3D 无源测试 (Passive Test)	1. 效率 (Effeciency) 2. 增益 (Gain) 3. 辐射方向图 (Radiation pattern)	1. 3D Chamber: TEM24 3D Chamber (5x5x5) ETS 3D Chamber (5x3x3) 2. 网分 (VNA) : Agilent E5071B R&S ZVB8
4. 3D 有源测试 (Active Test)	1. 3D 功率 (TRP) 2. 3D 灵敏度 (TIS) 3. 吞吐率 (Throughput rate)	1. 3D Chamber: TEM24 3D Chamber (5x5x5) ETS 3D Chamber (5x3x3) 2. 2G/3G Tester: Agilent 8960 3. 4G Tester: MT8820C/CMW500 4. WIFI/BT/NB-iot Tester: CMW500 5. 5G Tester: SP9500-CTS 6. Head: HEAD-P10 (FACE-P10)

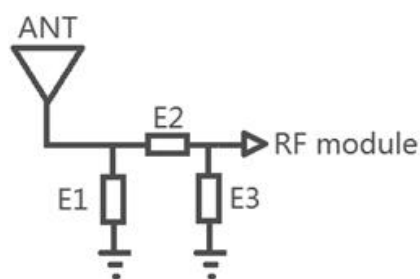


三. 暗室连接及坐标 (Chamber connection and coordinates) :





四. 天线匹配网络 (Antenna matching network) :

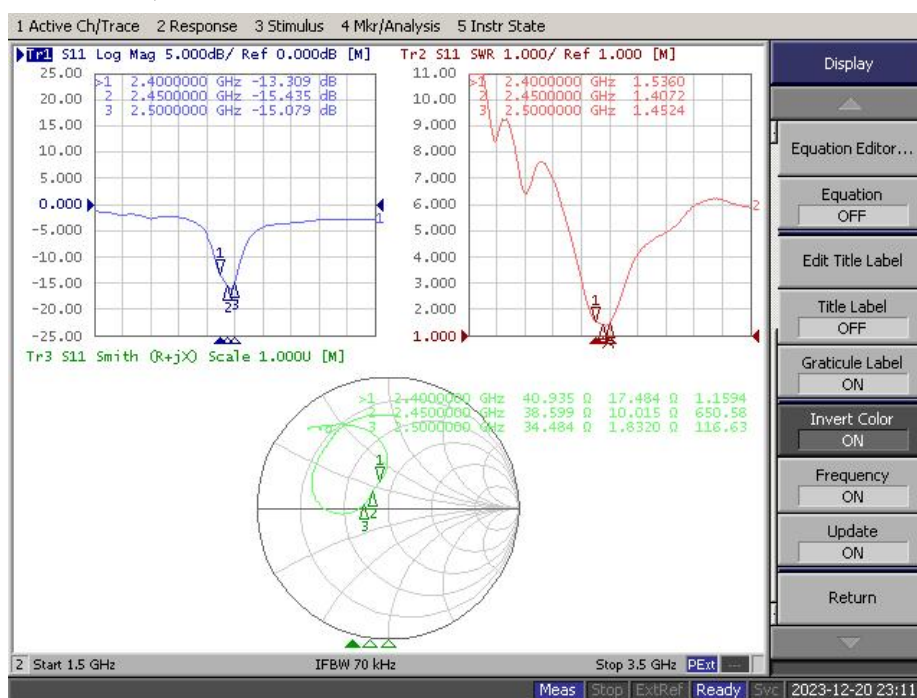


Element	(Value)
E1(0201)	NC
E2(0201)	0 Ω
E3(0201)	NC

五. 天线电性能测试数据 (Antenna electrical performance test data) :

5. 1. 天线无源参数 (Antenna passive parameters)

5.1.1. 天线回波损耗/驻波比/史密斯圆图 (RL/VSWR/Smith Chart)





5.1.2. 天线效率/增益/方向图 (Efficiency/Gain/Radiation pattern)

5.1.3 自由空间效率以及增益 (Free space efficiency and gain)

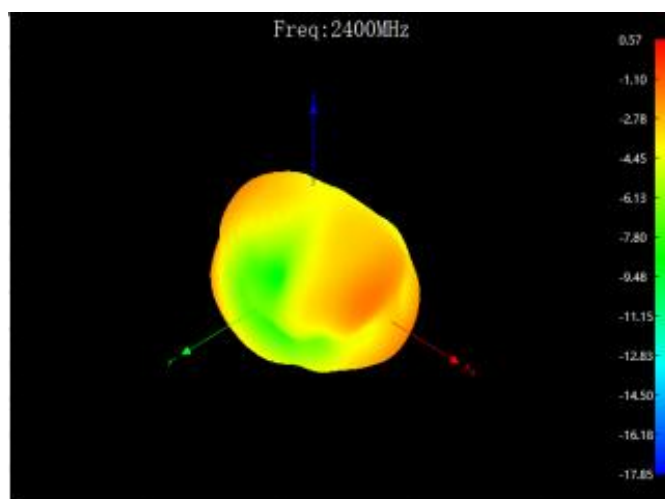
Freq (MHz)	Effi (%)	Gain (dBi)
2400	21.3	0.57
2450	19.25	-1.8
2500	17.43	-2.81

5.1.4 头模效率以及增益 (Head mode efficiency and gain)

Freq (MHz)	Effi (%)	Gain (dBi)
2400	4.69	-4.53
2450	4.18	-6.46
2500	3.76	-6.52

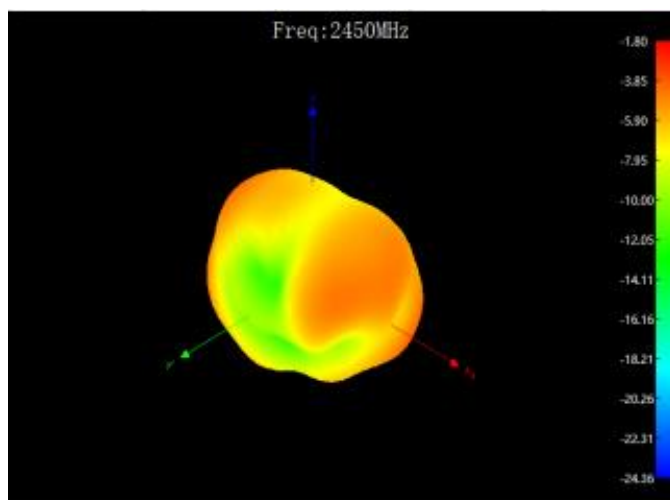
5.2. 自由空间辐射方向图及苹果场强图 (Free space radiation direction diagram and Apple field intensity diagram)

2400MHz



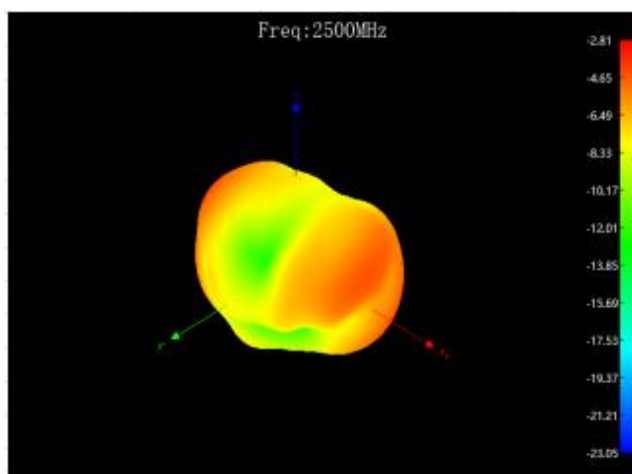
Peak gain: 0.57 dBi

2450MHz



Peak gain: -1.8 dBi

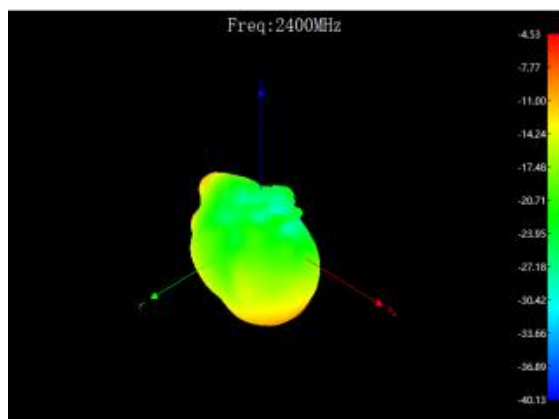
2500MHz



Peak gain: -2.81 dBi

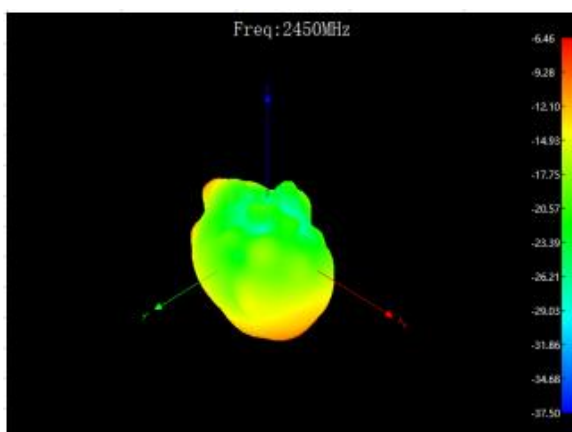
5.2.1 头模辐射方向图及苹果场强图 (Head mode radiation direction diagram and apple field intensity diagram)

2400MHz



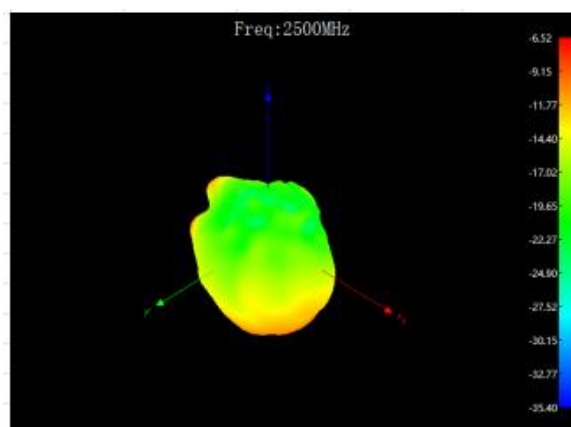
Peak gain: -4.53 dBi

2450MHz



Peak gain: -6.46 dBi

2500MHz



Peak gain: -6.52 dBi



5.3. 天线有源参数 (Antenna Active parameter)

5.3.1. TRP/TIS

NQI ANT TRP&TIS parameter Summary of B2					
Free state		Test	Bluetooth TRP&TIS		
		Result	0	39	78
	L	TRP (dBm)	3.17	2.1	1.43
		TIS (dBm)	-84.91	-84.67	-84.4
Head mode		Test	Bluetooth TRP&TIS		
		Result	0	39	78
	L	TRP (dBm)	-3.86	-4.19	-4.78
		TIS (dBm)	-80.72	-79.67	-79.09

5.3.2. 场测数据 (Field test data)

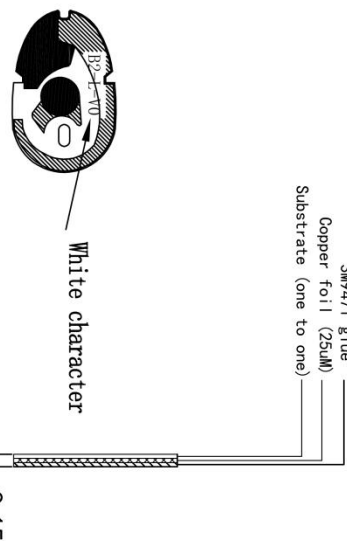
Headphone field test result (耳机场测结果)		
Test site (测试场地): Vacant lot outside the company gate (国质信门口空地)		
Cell-phone (测试手机): Iphone6		
The teser (测试员): LUO		
Height of mobile phone stand (手机支架高度): 1.2m		
Test methods and criteria (测试方法及判定标准): The headset is tested with its back to the phone, Up and down, left and right 180° rotation without stuck. (耳机背向手机, 上下, 左右 180° 旋转无卡顿)		
Test Result		
	L/R	Actual test distance (实测测试距离)
	The left ear (左耳)	16M
备注Note:		

六. 天线结构图纸 (Antenna structure drawing) :

1 环保要求: ☒ ROHS ☐ REACH ☐ 无	2 	3 	4 	5 	6
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Technical requirements:

- 1, Φ is the required size and key size, copper foil line all dimensional tolerances do not exceed ± 0.05 , mold out of the shape of the dimensional tolerance does not exceed ± 0.1 , the size of the figure shall prevail.
- 2, substrate 35 μ m, copper pool 25 μ m, gold plated 1U; The surface of the cable surface is black except for the welding disc.
- 3, reliability test; salt spray test (24H) \ rubber friction test \ alcohol resistance test \ constant temperature and humidity test \ hot and cold shock test \ gold bond guide foot flexibility test.
- 4, release film shipment.

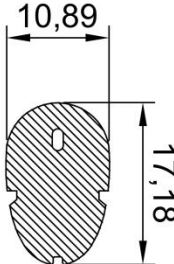


3M9471 glue
Copper foil (25um)
Substrate (one to one)

White character

Front line

0.15



The diagonal area is backed with glue

1 记号	2 更改日期	更改单号	更改人	备注	3 	4 	5 	6
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深圳市国质信网络通讯有限公司
 Shenzhen WZJ network communication Ltd

No tolerance standard is specified		Type of material		The name of a process	
0-10	± 0.05		0.02	B2	BT-L
10-18	± 0.06		$\phi 0.03$	NQ1-B2-BT-L-FB-V0	MD
18-30	± 0.08		0.02	Materials	RF
30-40	± 0.09		0.04	P1+Cu	colour
40-	± 0.10	Angle	$\pm 0.5^\circ$	共 1 页	Document No
First perspective					unit
				mm	scale
				Fit	edition
				V0	



七. 天线包装图纸 (Antenna package drawing) :

Section name: PCS inspection package		Product Number: B2		Effective time: 2024.08.08		edition: A																																																																													
Product name: BT antenna		document number: /		Pages: page 1 of 1																																																																															
Figure 1: FPC inspection packaging shipment sample:		<table><tr><th colspan="6">spent material:</th></tr><tr><th>NO</th><th>PARTNUMBER</th><th>PART</th><th>NAME</th><th>QTY</th><th>VENDOR</th><th>NOTE</th></tr><tr><td>1</td><td>/</td><td>BT</td><td>antenna</td><td>230</td><td>VO</td><td>/</td></tr><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr></table>						spent material:						NO	PARTNUMBER	PART	NAME	QTY	VENDOR	NOTE	1	/	BT	antenna	230	VO	/																																																								
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Figure 2: Pac met		<table><tr><th colspan="6">Use of tools and equipment:</th></tr><tr><td colspan="6">finger stall</td></tr><tr><td colspan="6">operating steps:</td></tr><tr><td colspan="6">1: Check whether the appearance of the product is smooth, whether there is dirty, scratches, copper leakage, poor printing and other bad phenomena. 2: Key dimension inspection (see the engineering drawing)</td></tr><tr><td colspan="6">3: The products shall be discharged in PE bags according to the rules: if any defective product is found, the defective products shall be removed. 4: the mass production shall be packed and the outer box label shall be consistent</td></tr><tr><td colspan="6">matters need attention:</td></tr><tr><td colspan="6">1: No ase, fracture, copper leakage, poor gold plating, serious size problems during appearance inspection; 2: The corresponding material number and quantity of each product shall be marked clearly:</td></tr></table>						Use of tools and equipment:						finger stall						operating steps:						1: Check whether the appearance of the product is smooth, whether there is dirty, scratches, copper leakage, poor printing and other bad phenomena. 2: Key dimension inspection (see the engineering drawing)						3: The products shall be discharged in PE bags according to the rules: if any defective product is found, the defective products shall be removed. 4: the mass production shall be packed and the outer box label shall be consistent						matters need attention:						1: No ase, fracture, copper leakage, poor gold plating, serious size problems during appearance inspection; 2: The corresponding material number and quantity of each product shall be marked clearly:																																							
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八. 重点尺寸检验报告 (Key dimension inspection report) :

a note of the scale in gongchepu cun check up examine report inform									
client	Bo lu ke		project			B2			
material quality	FPC		☒ environment ☐ protection material Non-environmental materials						
Appearance inspection items	☐ holiday ☐ breakage ☐ short ☐ scoring ☐ smirch ☐ dehiscence								
	Bad number: 0 Minor ☒ serious ☒ causing death Appearance determination results: Qualified or unqualified								
Functional or dimensional inspection records									
NO	Check serial number	dimensional tolerance	inspection result					detecting instrument	judge
			1	2	3	4	5		
FPC	1	17.18±0.2	17.16	17.20	17.25	17.21	17.23	DN	OK
	2	1.18±0.2	1.20	1.22	1.17	1.15	1.24	DN	OK
	3	10.89±0.2	10.96	10.88	10.95	10.93	10.91	DN	OK
	4	2.35±0.2	2.38	2.33	2.39	2.35	2.37	DN	OK
Overall judgment ☒ qualified ☐ unqualified			Treatment-treatment methods ☐ do poorly done work over again Special use						
Description of measuring instrument code: projector-PP plug gauge-PG height gauge-HG Angle gauge-AG vernier caliper-N digital video caliper-DN outer diameter micrometer-M									
Other test method code: Three blocks-3D thread gauge-SG special treatment tool-SE Visual-E									
remarks:									
Determination person: Xiong Minghua									
Shenzhen Guoxin Credit Network Communication Co., LTD									



九. 环境及可靠性试验 (Environment and reliability test) :

9.1.盐雾测试报告 (Salt spray test report)

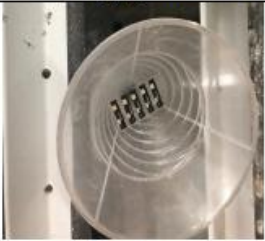
ShenZhen NQI network communication ltd					
Salt spray test report					
产品名称 Product name	B2-BTantenna	样品数量 Sample Q'ty	4PCS	测试日期 Test date	2024/8/6
客户名称 Customer	Boluke	产品料号 Part/No.	NQI-B2-BT-95-V0	产品规格 Product spec.	FPC
试验时间 Test time	≤8H ≤12H ≤24H ≤48H ✓ ≤72H				
测试项目 Test Item	盐水喷雾试验 Salt spray test				
测试要求 Test Requirement					
条件项目 Condition items		设置 Setting		参考标准 Reference	
盐水浓度 Concentration of salt solution		5±1%		GB/T10125-1997	
PH值 PH of salt solution		6.5-7.2			
试验室温度 Test room Temperature		35±2℃			
盐水桶温度 Salt solution barrel temperature		35±2℃			
饱和压力桶温度 Saturated air barrel temperature		47±1℃			
试验室相对湿度 Test room relative humidity		85±2%RH			
压缩空气压力 Pressure of compressed air		1.00±0.01KG/CM²			
样品放置角度 Sample place angle		15-30°			
盐雾收集量 Collected volume of salt spray		1.0-2.0ml(80cm²/H)			
试验结果 Result of measurement					
1. 测试图示方法 Test diagram & test method					
Pretest template		Post-test template		Result determination	
				合格 不合格 待采	
受控表单: NQI-ST-01					
制作 Producer: 熊明华	审核 Checked: 李博	核准 Approval:	牛兴刚		



9.2.低温储存试验 (Cryogenic storage test)

ShenZhen NQI network communication ltd			
Low temperature storage test report			
Report date 2022年01月15日		Report number: 20220115-1	
产品名称	BT antenna	料号	NQI-S2-BT-R-PS-V0
PART NAME ATION		CUSTOMER P/N	
客户	Boluke	试验数量	SPCS
CUSTOMER		CHECK QTY	
测试标准	Enterprise standard	测试时间	2024/08/6 2024/08/8
TEST STANDARD		THE TEST OF TIME	
一. 试验条件/方法 (Test conditions/methods) It was placed at $-40 \pm 3^{\circ}\text{C}$ for 48 hours. After taking out the sample, place it at room temperature for 2 hours to check and determine.			
二. 判定标准 (criterion) After the test, meet the following requirements, that is qualified: 1. The appearance of FPC has no discoloration, foaming, ink shedding, deformation, and the viscosity is unchanged; 2. Voltage standing wave ratio (VSWR) test qualified			
三. 试验结果 (Test result) Test result description 1. The overall appearance of the sample is good, and the FPC appearance has no discoloration, foaming, coating shedding or deformation; 2. The test waveform is consistent with the sealing sample.			
最终判定	☒ 合格		☐ 不合格
FINAL RESULT	PASS		REJECT
检验员	赖明华	审核	李博
INSPECTOR		CHECKED BY	

表单编号: WI-QC-036/B01/A0

四. 试验照片 (Test photograph)				
1. 试验前样品 (Pretest sample)	2. 试验照片 (Test photograph)			
				
3. 试验图示 (Test pattern)	4. 试验后样品图示 (Sample illustration after test)			
				
五. 试验涉及设备信息 (The test involves equipment information)				
Serial number	Device name	Specification and model	Calibration date	Next calibration time
1	Programmable constant temperature and humidity box	LX-150G	2024.1.20	2025.1.20

Report completion