



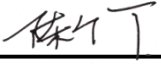
Antenna Sample Confirmation From

深圳健海通天线技术有限公司

广东健博通
证券代码: 831958

天线承认书

Antenna Sample Confirmation From

供应商名称 Vendor Name	深圳健海通天线技术有限公司 Shenzhen kenhaitong antenna technology co, ltd				
客户名称 Customer Name	深圳市蓝晨科技股份有限公司				
样品名称 Sample Name	N15LS6-WIFI-AUX-V05				
产品型号 Part Number	笔记本电脑				
样品规格 Specification	Black FPC 38.43*29.73 + Gray RF0.81CABLE IPEX4 L=155MM				
检验项目 Inspection Item	性能测试 Performance	外观检查 Total Appearance	结构 structure	审核 Audit	检验结果 Inspection Result
	OK	OK		OK	OK
备注 Remark					
品质审核 QA Audit		工程审核 Engineer Audit		业务确认 Sales Confirm	
以下由客户填写 The following are filled by Customer					
客户意见 Customer Evaluation					
客户签字/盖章 Signation/ Chapter by Customer	日期/date:				

地址: 深圳市宝安区航城街道鹤洲中科诺工业园一号楼西面 3 楼

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Antenna Test Report

测试单位: 深圳健海通天线技术有限公司 Test by: Shenzhen kenhaitong antenna technology co, ltd			
材料 Material	FPC+同轴线+IPEX		
天线类型 Antenna Type	PIFA	极化方式 Polarization mode	Linear
应用场景 Application			
工作频段 Band	2.4G/5.8G WIFI	VSWR	≤1.0
功率 Power	Max: 2W	阻抗 Impedance	50Ω
增益 dBi	2.4G: ≤1.07dBi、5.8G: ≤2.28dBi		
测试设备 Test Equipment	HPE5071C、Shielding Room、3D automatic turntable		
Antenna Description:: 1. Grounding processing and picture description: no 2. Need to change the motherboard to match: no ● Test voltage: 3.6V, check the antenna contact is good before testing. ● The RF cable of the integrated tester is kept in a natural state and can not be curled. Specification:test the specified power level, all indicators must conform to the specifications.			

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- 2、Antenna Matching Circuit
- 3、Darkroom Test Equipment And Methods
 - 3.1 S11 Parameter
- 4、Passive Test Data
- 5、Active Test OTA
- 6、Throughput
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- 8、Antenna Assembly Method
- 9、Structural Drawings
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- 11、Reliability Test Report
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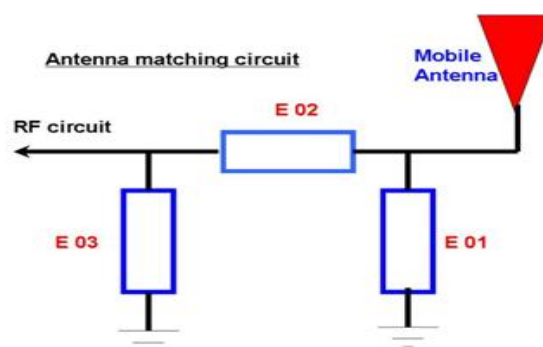
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1、Project Picture



Note: The customer finally verified that the antenna performance prototype is retained in our company for at least one year to analyze and solve the abnormal situation in the antenna mass production and ensure the antenna shipment quality.

2、Antenna Matching Circuit



Modify

E01	E02	E03
No	No	No

Remarks: Match No Modification

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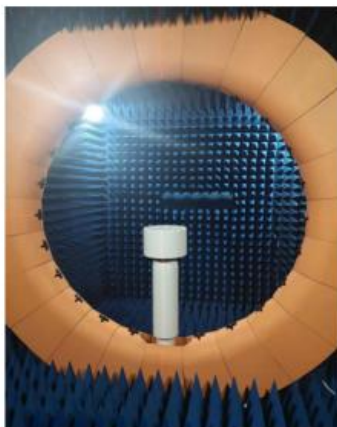


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3、Darkroom Test Equipment And Methods



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3.1 S11 Parameter



Frequency (MHz)	2400	2450	2500	5200		5800
VSWR	1.3	1.3	1.1	1.9		1.3

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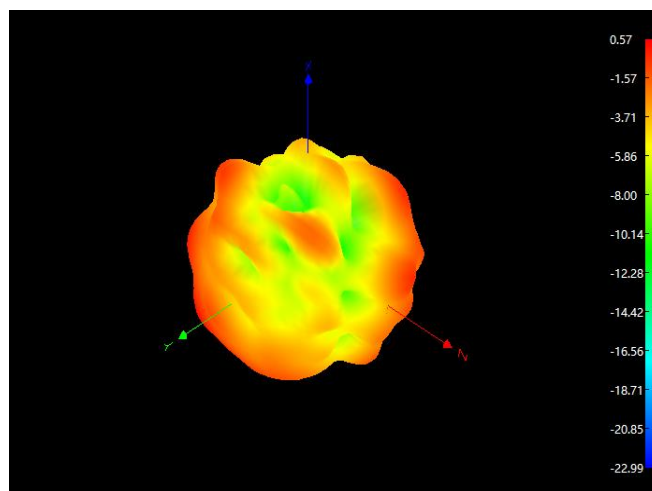
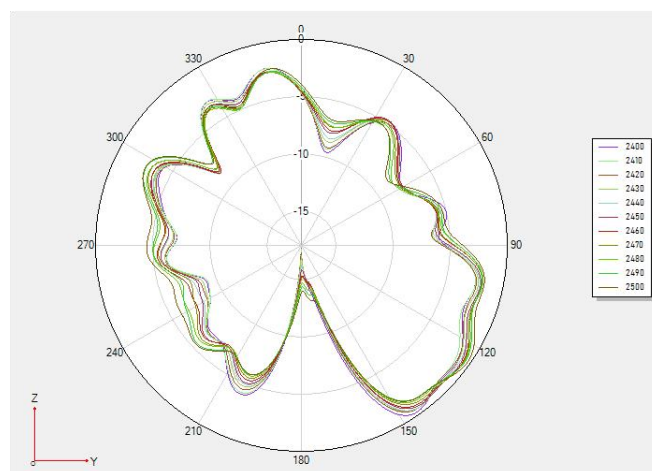


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4、Passive Test Data

2.4G

Frequency / MHz	Efficiency / %	Gain/ dB
2400	38.56	0.57
2410	36.88	0.77
2420	36.88	0.86
2430	35.81	0.87
2440	36.34	0.81
2450	35.81	0.88
2460	35.96	0.85
2470	34.99	0.95
2480	34.99	0.83
2490	34.77	0.95
2500	35.73	1.07





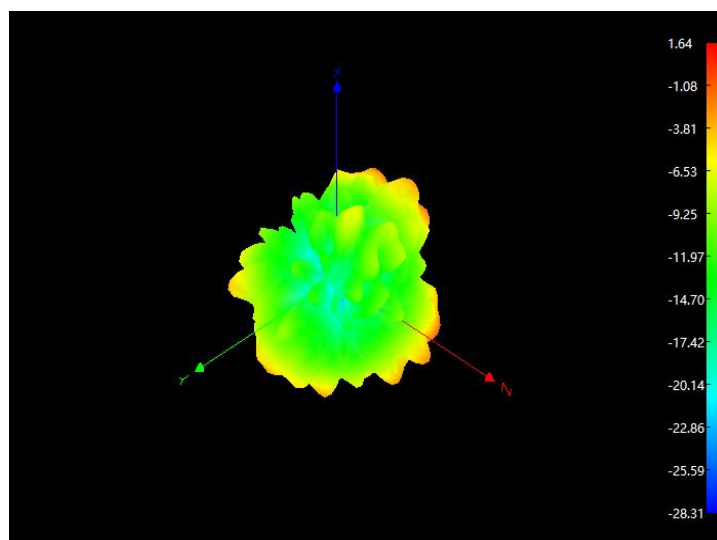
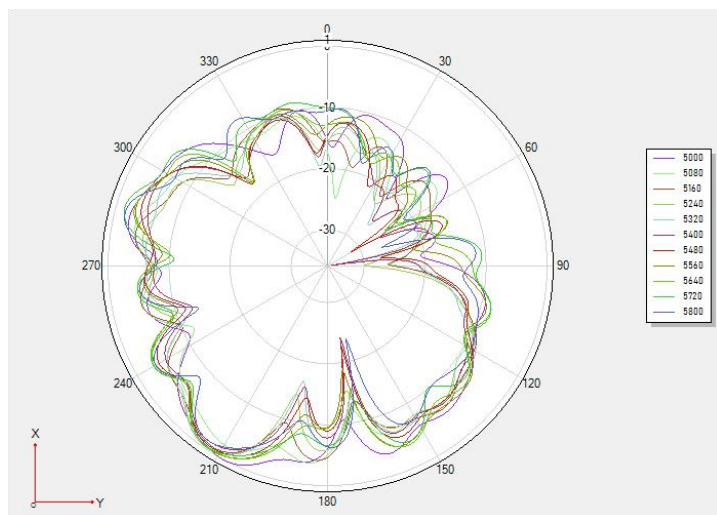
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5.8G

Frequency / MHz	Efficiency / %	Gain/ dB
5000	35.99	1.64
5100	32.74	1.46
5200	33.49	2.04
5300	31.29	1.64
5400	32.82	2.21
5500	31.44	1.18
5600	33.79	2
5700	34.54	2.28
5800	34.86	2.07
5900	35.51	1.69
6000	33.16	2.06



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5、Active Test OTA

Band	Channel	TRP	TIS
802.11b (11Mbps)	L	10.05	-78.38
	M	10.86	-79.48
	H	10.69	-81.16
802.11g (54Mbps)	L	10.77	-70.89
	M	11.27	-70.14
	H	10.89	-70.63
802.11n (MCS7-65Mbps)	L	10.65	-66.01
	M	11.25	-66.23
	H	10.89	-65.75
802.11n (65Mbps)	L	10.18	-69.27
	M	10.69	-71.38
	H	10.5	-68.97

6、Antenna throughput test data

(2.4G)

Rx(Mbps)				
Item	Azimuth(°)	Atten(dB)	Result	RSSI
1	0	0	210.31	210.31
2	45	0	171.66	171.66
3	90	0	104.44	104.44
4	135	0	192.13	192.13
5	180	0	222.34	222.34
6	225	0	195.41	195.41
7	270	0	213.11	213.11
8	315	0	126.87	126.87

Tx(Mbps)				
Item	Azimuth(°)	Atten(dB)	Result	RSSI
1	0	0	176.35	176.35
2	45	0	168.93	168.93
3	90	0	174.36	174.36
4	135	0	191.94	191.94
5	180	0	186.06	186.06
6	225	0	172.86	172.86
7	270	0	178.99	178.99
8	315	0	186.77	186.77



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(5.8G)

Rx(Mbps)				
Item	Azimuth(°)	Atten(dB)	Result	RSSI
1	0	0	344.65	344.65
2	45	0	342.45	342.45
3	90	0	345.63	345.63
4	135	0	345.03	345.03
5	180	0	345	345
6	225	0	327.89	327.89
7	270	0	315.85	315.85
8	315	0	345.06	345.06

Tx(Mbps)				
Item	Azimuth(°)	Atten(dB)	Result	RSSI
1	0	0	311.66	311.66
2	45	0	279.26	279.26
3	90	0	308.61	308.61
4	135	0	312.64	312.64
5	180	0	301.96	301.96
6	225	0	313.99	313.99
7	270	0	318.41	318.41
8	315	0	202.35	202.35

```
Administrator: C:\WINDOWS\system32\cmd.exe
iperf Done.
C:\Users\Administrator\Desktop>iperf-3.1.2-win64>iperf3 -c 192.168.50.68 -t 60 -i 10 -w 5
Connecting to host 192.168.50.68, port 5201
[ 4] local 192.168.50.185 port 61204 connected to 192.168.50.68 port 5201
[ ID] Interval      Transfer    Bandwidth
[ 4] 0.00-10.01 sec  1.04 KBytes  851 bits/sec
[ 4] 10.01-20.01 sec  1.04 KBytes  847 bits/sec
[ 4] 20.01-30.01 sec  1.04 KBytes  848 bits/sec
[ 4] 30.01-40.00 sec  1.04 KBytes  849 bits/sec
[ 4] 40.00-50.00 sec  1.03 KBytes  844 bits/sec
[ 4] 50.00-60.01 sec  1.03 KBytes  844 bits/sec
-----
[ ID] Interval      Transfer    Bandwidth
[ 4] 0.00-60.01 sec  6.21 KBytes  847 bits/sec
[ 4] 0.00-60.01 sec  6.20 KBytes  847 bits/sec
iperf Done.
C:\Users\Administrator\Desktop>iperf-3.1.2-win64>
```

```
C:\WINDOWS\system32\cmd.exe - iperf3 -s
[ 5] 39.01-40.00 sec  110 Bytes  890 bits/sec
[ 5] 40.00-41.01 sec  105 Bytes  830 bits/sec
[ 5] 41.01-42.02 sec  105 Bytes  838 bits/sec
[ 5] 42.02-43.00 sec  105 Bytes  851 bits/sec
[ 5] 43.00-44.01 sec  110 Bytes  877 bits/sec
[ 5] 44.01-45.01 sec  105 Bytes  837 bits/sec
[ 5] 45.01-46.01 sec  100 Bytes  800 bits/sec
[ 5] 46.01-47.02 sec  105 Bytes  836 bits/sec
[ 5] 47.02-48.01 sec  105 Bytes  846 bits/sec
[ 5] 48.01-49.01 sec  110 Bytes  879 bits/sec
[ 5] 49.01-50.00 sec  105 Bytes  845 bits/sec
[ 5] 50.00-51.01 sec  105 Bytes  837 bits/sec
[ 5] 51.01-52.01 sec  105 Bytes  840 bits/sec
[ 5] 52.01-53.01 sec  105 Bytes  839 bits/sec
[ 5] 53.01-54.01 sec  110 Bytes  877 bits/sec
[ 5] 54.01-55.00 sec  105 Bytes  848 bits/sec
[ 5] 55.00-56.00 sec  105 Bytes  838 bits/sec
[ 5] 56.00-57.01 sec  105 Bytes  838 bits/sec
[ 5] 57.01-58.01 sec  105 Bytes  840 bits/sec
[ 5] 58.01-59.01 sec  100 Bytes  799 bits/sec
[ 5] 59.01-60.01 sec  105 Bytes  840 bits/sec
[ 5] 60.01-60.01 sec  0.00 Bytes  0.00 bits/sec
-----
[ ID] Interval      Transfer    Bandwidth
[ 5] 0.00-60.01 sec  0.00 Bytes  0.00 bits/sec
sender
receiver
```

```
360安全浏览器 360浏览器... m-center... 深圳健海通 Q7H (QM... AnyDesk hackrf_spe... m-center... Bin
C:\WINDOWS\system32\cmd.exe - iperf3 -s
[ 5] 38.01-39.01 sec  105 Bytes  837 bits/sec
[ 5] 39.01-40.01 sec  105 Bytes  837 bits/sec
[ 5] 40.01-41.00 sec  110 Bytes  891 bits/sec
[ 5] 41.00-42.01 sec  105 Bytes  830 bits/sec
[ 5] 42.01-43.00 sec  105 Bytes  848 bits/sec
[ 5] 43.00-44.00 sec  105 Bytes  839 bits/sec
[ 5] 44.00-45.01 sec  105 Bytes  835 bits/sec
[ 5] 45.01-46.01 sec  105 Bytes  843 bits/sec
[ 5] 46.01-47.01 sec  105 Bytes  839 bits/sec
[ 5] 47.01-48.01 sec  105 Bytes  840 bits/sec
[ 5] 48.01-49.01 sec  105 Bytes  839 bits/sec
[ 5] 49.01-50.01 sec  105 Bytes  838 bits/sec
[ 5] 50.01-51.01 sec  105 Bytes  846 bits/sec
[ 5] 51.01-52.01 sec  105 Bytes  836 bits/sec
[ 5] 52.01-53.00 sec  105 Bytes  846 bits/sec
[ 5] 53.00-54.01 sec  105 Bytes  837 bits/sec
[ 5] 54.01-55.00 sec  110 Bytes  885 bits/sec
[ 5] 55.00-56.00 sec  105 Bytes  841 bits/sec
[ 5] 56.00-57.00 sec  105 Bytes  840 bits/sec
[ 5] 57.00-58.00 sec  105 Bytes  840 bits/sec
[ 5] 58.00-59.01 sec  105 Bytes  834 bits/sec
[ 5] 59.01-60.01 sec  105 Bytes  835 bits/sec
-----
[ ID] Interval      Transfer    Bandwidth
[ 5] 0.00-60.01 sec  0.00 Bytes  0.00 bits/sec
[ 5] 0.00-60.01 sec  6.20 KBytes  846 bits/sec
sender
receiver
Server listening on 5201
```

```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows [版本 10.0.18363.1556]
(c) 2019 Microsoft Corporation. 保留所有权利。
C:\Users\jht>cd\Users\jht\Desktop>iperf-3.1.2-win64
C:\Users\jht\Desktop>iperf-3.1.2-win64>iperf3 -c 192.168.50.185 -t 60 -i 10 -w 5
iperf3: error - unable to connect to server: Connection timed out
C:\Users\jht\Desktop>iperf-3.1.2-win64>iperf3 -c 192.168.50.185 -t 60 -i 10 -w 5
Connecting to host 192.168.50.185, port 5201
[ 4] local 192.168.50.68 port 54345 connected to 192.168.50.185 port 5201
[ ID] Interval      Transfer    Bandwidth
[ 4] 0.00-10.00 sec  970 Bytes  776 bits/sec
[ 4] 10.00-20.01 sec  1005 Bytes  804 bits/sec
[ 4] 20.01-30.00 sec  1.03 KBytes  841 bits/sec
[ 4] 30.00-40.01 sec  1.04 KBytes  851 bits/sec
[ 4] 40.01-50.00 sec  1.03 KBytes  845 bits/sec
[ 4] 50.00-60.00 sec  1.03 KBytes  844 bits/sec
-----
[ ID] Interval      Transfer    Bandwidth
[ 4] 0.00-60.00 sec  6.05 KBytes  827 bits/sec
[ 4] 0.00-60.00 sec  6.04 KBytes  825 bits/sec
sender
receiver
iperf Done.
C:\Users\jht\Desktop>iperf-3.1.2-win64>
```

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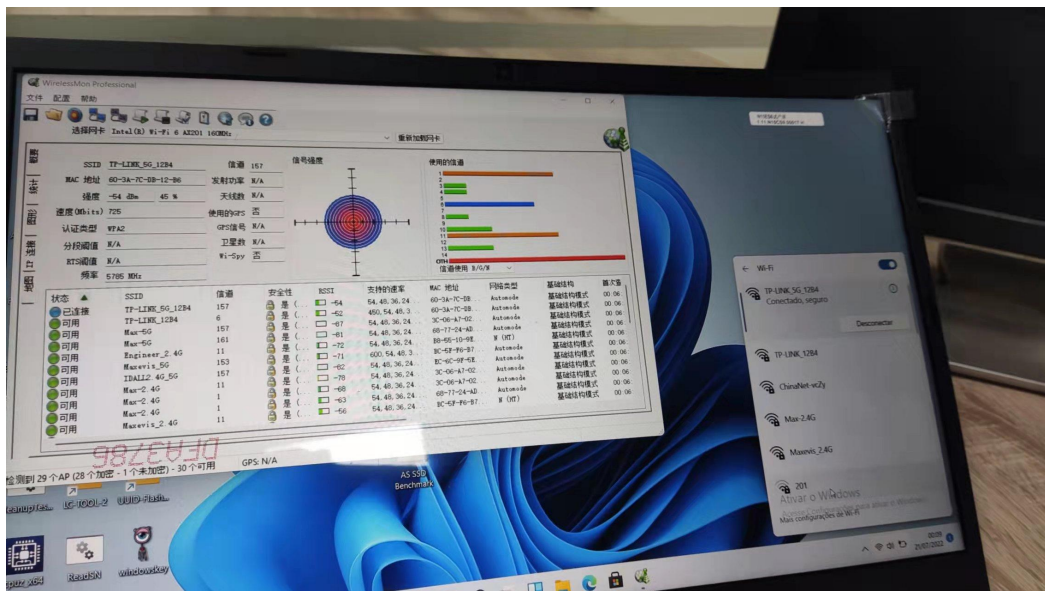
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广东健博通
证券代码: 831958

Actual measurement graph of WIFI signal intensity test

(office10-15M)

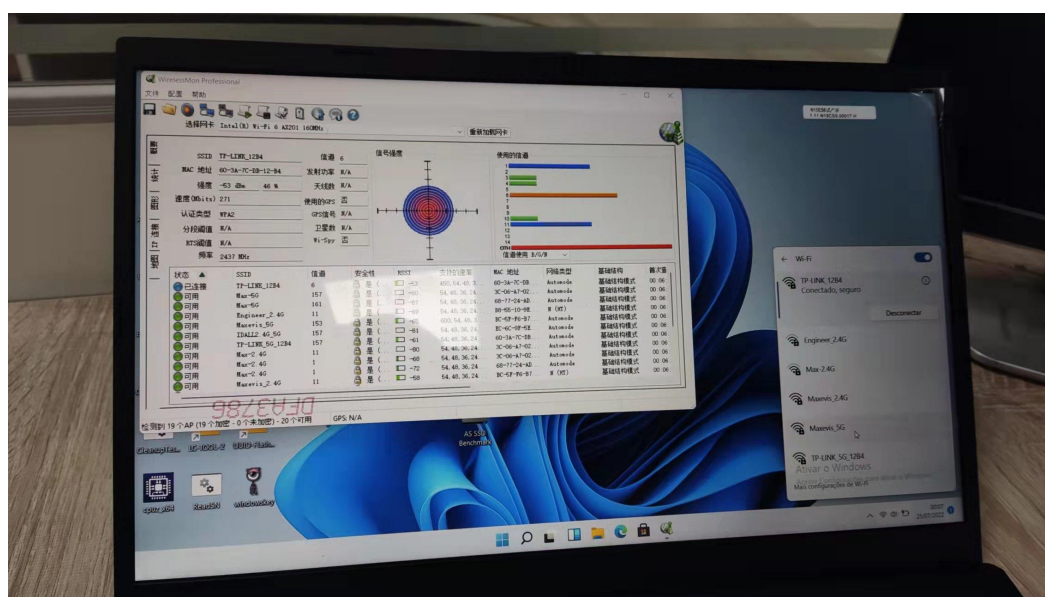
2.4G



Actual measurement graph of WIFI signal intensity test

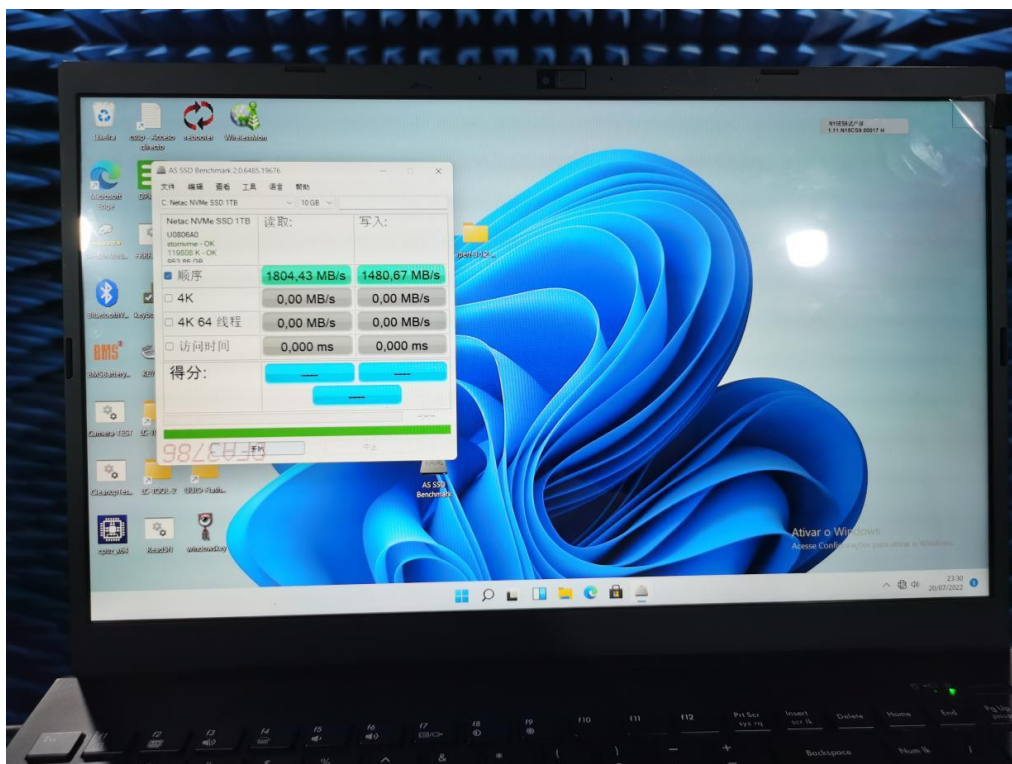
(office10-15M)

5.8G



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7、Antenna assembly position



天线装配图



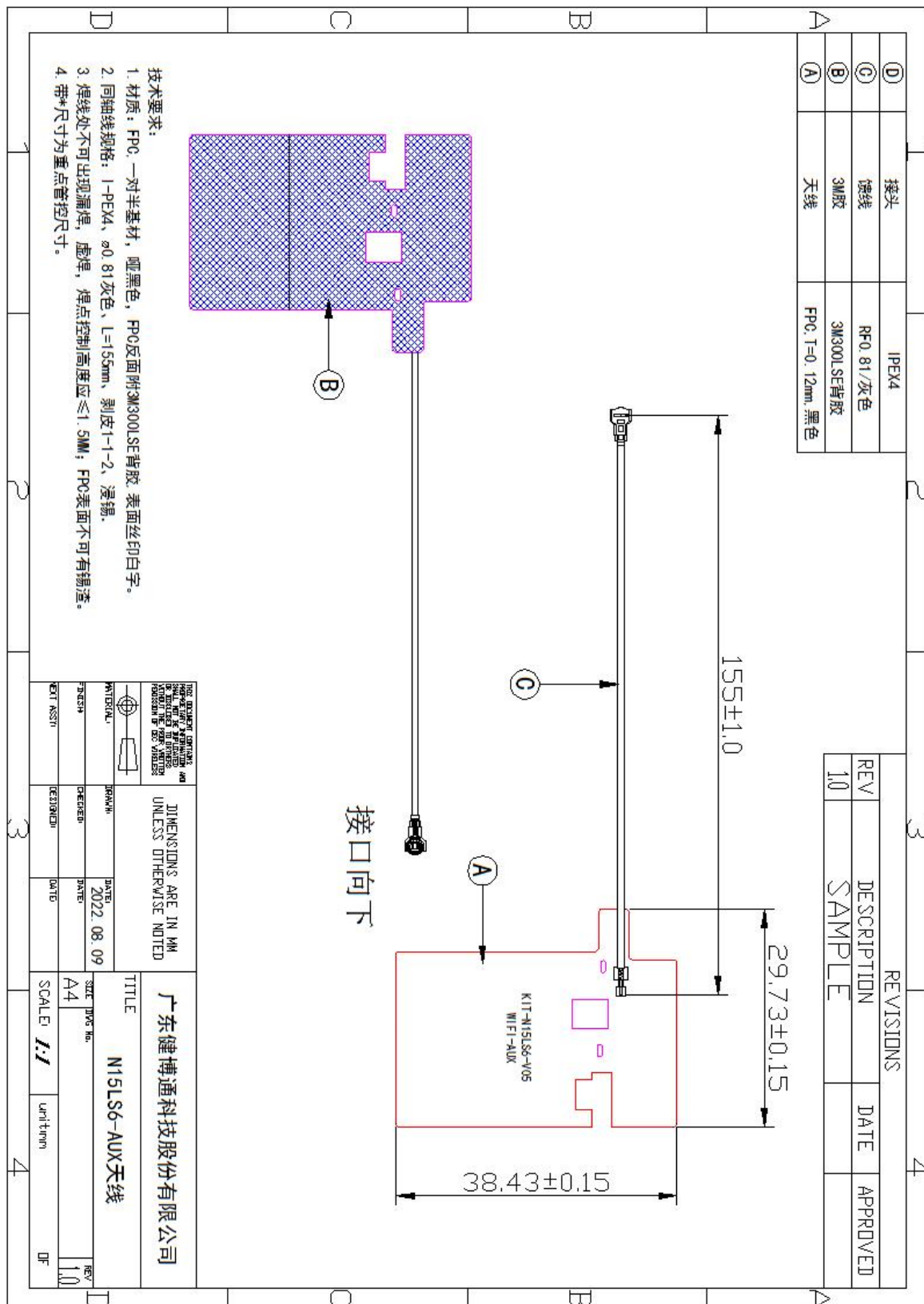
扣线方式如图

8、Antenna environment processing

Environmental treatment is not increased, keeping the machine environment unchanged.

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9、 Structural Drawings



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10、Sample size inspection report

Sample Size Inspection Report

Model: N15LS6-WIFI-AUX-V05

Date: 2022-08-16

Test Items		Standard	Sample inspection status (value)					Determine	Remarks
			1	2	3	4	5		
Antenna structure size	A1	29.73±0.15mm	29.75	29.68	29.70	29.75	29.76	合格	
	A2	38.43±0.15mm	38.40	38.43	38.42	38.45	38.40	合格	
	A3	155±1.0mm	155.12	155.32	154.85	155.10	154.88	合格	
	A4								
	A5								
	A1								
	A2								
	A3								
	A4								
	A5								
	A6								

核准: CZY

审核: CXM

测试: JXB

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11、Reliability Test Report

Salt spray test report

Number: 20220816002

Product name		N15LS6-WIFI-AUX-V05		Number of tests		5set	
Product item No				Test standard		GB2423.17	
Inspection date		2022.08.15		Material of goods		FPC+IPEX CABLE	
Test time: 2022.07.12-2022.02.13							
Test items	Required standards	Actual value	determine	Test items	Required standards	Actual value	determine
Test instrument	KD-60	KD-60	OK	Test time	48H	48H	OK
Salt spray test type	NSS neutral	NSS neutral	OK	Salt spray tank temperature	35℃	35℃	OK
PH value of brine	6.5-7.2	6.5-7.2	OK	Salt	1-2ml	1.8ml	OK
Spray mode	successive	successive	OK	Material of goods	FPC	FPC	OK
Brine composition	5%NaCl	5%NaCl	OK	Compressed air pressure	1±0.1KG/CM²	1	OK
Saturation temperature	47℃	47℃	OK	Specimen placement angle	45°	45°	OK
Test observation time	Observation phenomenon						
4H	No abnormality						
8H	No abnormality						
12H	No abnormality						
16H	No abnormality						
20H	No abnormality						
24H	No abnormality						
Judgment criteria: According to the national standard 5944-86 rating method, grade 9 or above is qualified							
Judgment result	Qualified						
Tester	CGL		Examine	CXM		Approval	JXB
Remarks: Common salt spray test methods include: NSS, AASS, CASS.							

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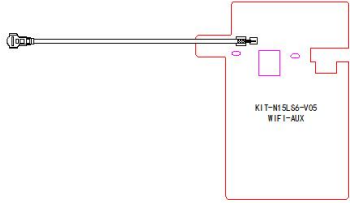
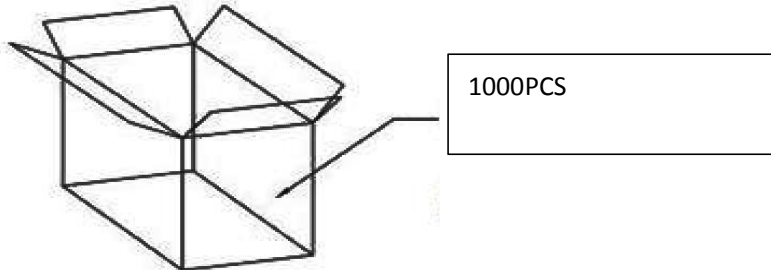


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12、Packaging Method

Packaging					
Customer Name: 蓝晨		Name: N15LS6-WIFI-AUX-V05		Code:	
Packaging details	Code	name	size	quantities	
	PE	PE bag	230*330*0.12	1/100	
	SYC-BZ-01	Paper box	270*250*130	1/10000	
job step	1. Prepare the required packaging materials and place them in favorable operation positions. 2. Carcarton / PE bags, packaging, 100PCS / bag, 100 bags, 10,000 P C S per box. 3. Put 100 bags in each box, totaling 10,000 P C S. After filling the box, seal the box with transparent tape. Graphic picture of packaging products				
					
Illustration					
remark					
compile		approval		MADE	
JSB		DS		LSY	
				DATE	
				2022/08/16	

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