



# Antenna Specification

*TC: 长城*

*MN: W14198*

*RF: 刘磊确*

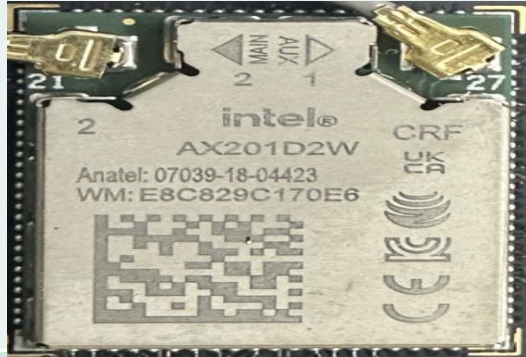
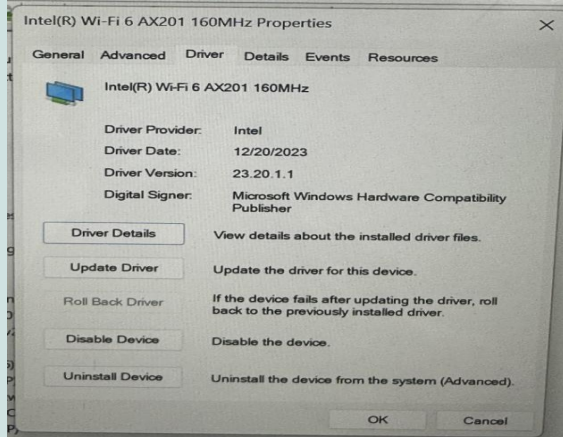
*MD: 黄清清*

*MP: 13005478517*

*Date: 2024. 5. 9*

*REV :V1. 0*

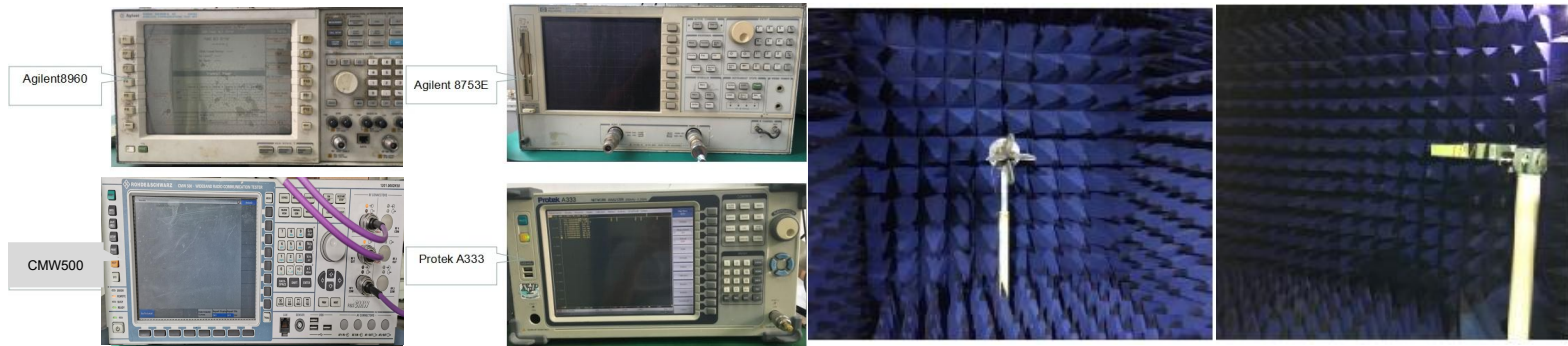
测试信息  
Test information

WIFI ANT Test information		
Frequency	2. 4G (2402~2483) Mhz	5G (5150~5850) Mhz
Module information		
Driver version information		

## 测试环境

### Test environment

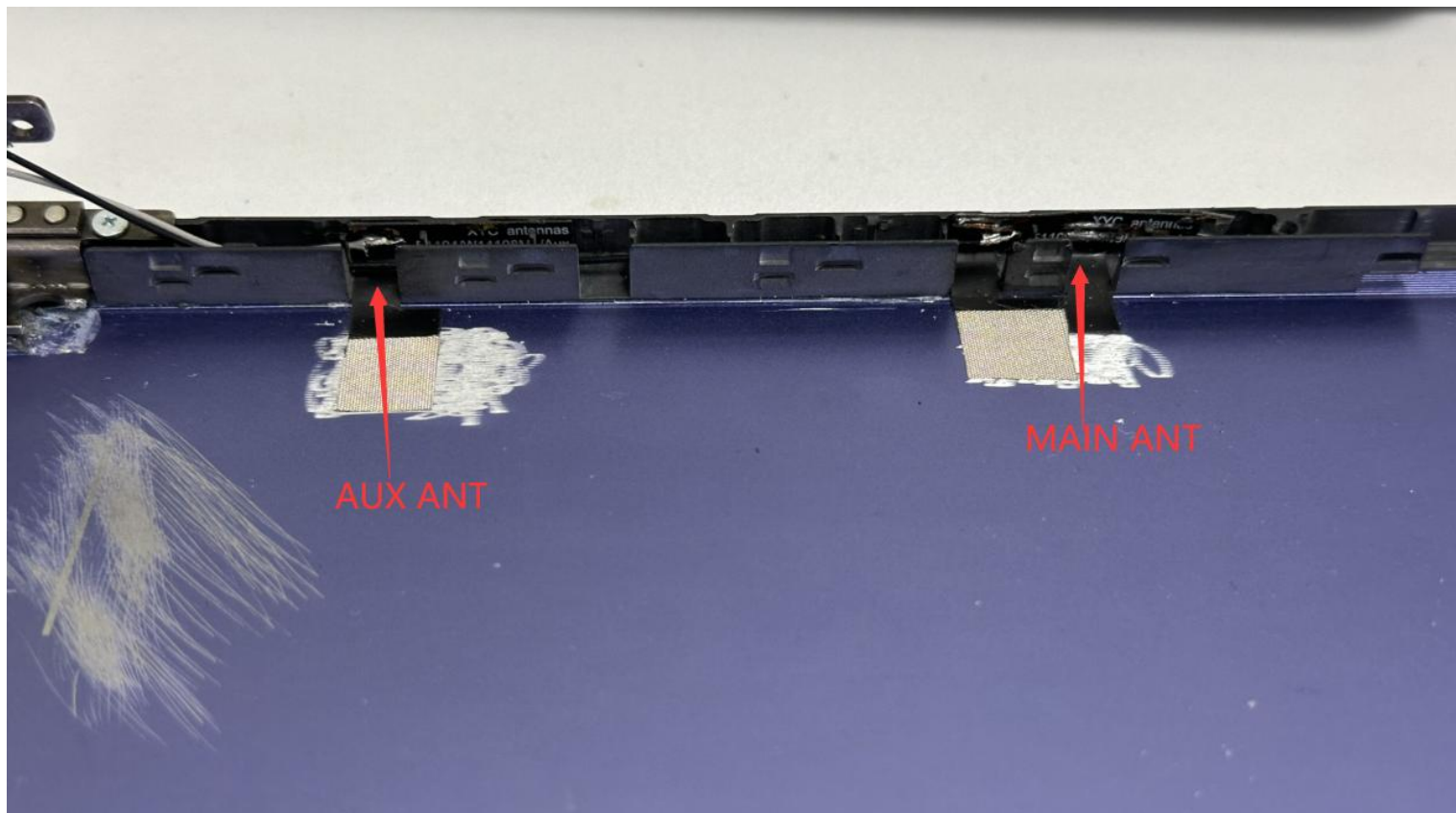
	测试项目	测试设备
S参数 (S-parameter)	1. 电压驻波比 (VSWR) 2. 回波损耗 (Rrtun Loss)	网络分析仪: Agilent8753ES
2. 有源测试 (Active)	1. 发射功率 (TRP) 2. 接收灵敏度 (TIS) 3. 屏灭/屏亮	1. 暗室: 5*3*3m (3D) Chamber 2. 综测仪: Agilent8960 CMW500
3. 无源测试 (Passive)	1. 天线增益 (Gain) 2. 天线效率 (Efficiency)	1. 暗室: 5*3*3m (3D) Chamber 2. 网络分析仪: Agilent 8753ES





## 天线位置

Antenna position



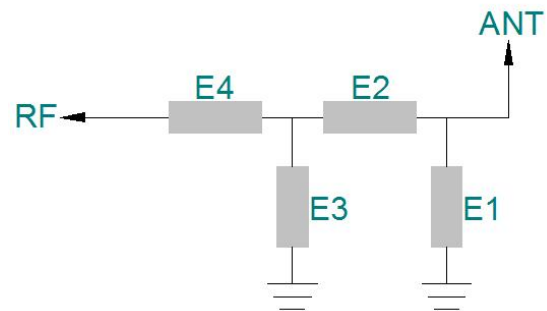


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匹配电路  
Matching circuit



	电容 (PF)	电感 (NH)
E1(0402)		
E2(0402)		
E3(0402)		
E4(0402)		

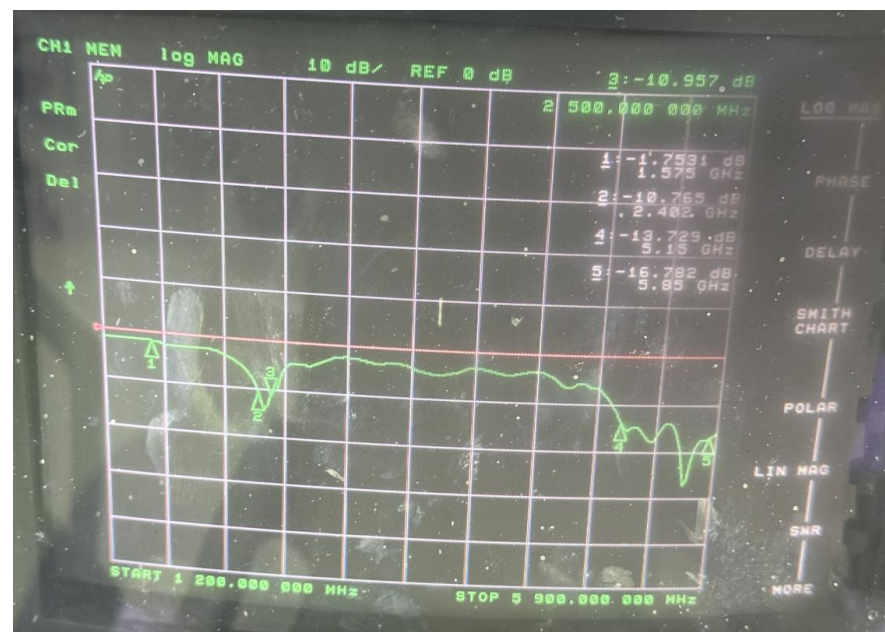
匹配电路原理图&位号图



无源测试数据

Passive test data

## ANT1 S11-VSWR&Return Loss



Frequency (MHZ)	2400	2500	5150	5850
VSWR	1.82	1.79	1.51	1.33
Return Loss (DB)	-10.76	-10.95	-13.72	-16.78



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无源测试数据

Passive test data

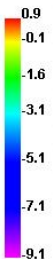
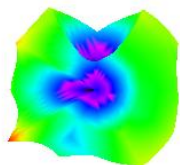
ANT1 GAIN&amp;Efficiency-WIFI2.4G/BT

Passive Test For WIFI2.4								
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHS (%)	Max (dB)	Min (dB)
2400	26.35	-5.79	0.91	-1.24	17.66	8.692	0.91	-21.96
2410	25.51	-5.93	0.6	-1.55	17.063	8.447	0.6	-23.03
2420	27.51	-5.61	1.3	-0.85	18.386	9.121	1.3	-22.11
2430	26.37	-5.79	1.15	-1	17.608	8.758	1.15	-19.91
2440	27.1	-5.67	1.29	-0.86	17.886	9.215	1.29	-17.58
2450	29.17	-5.35	1.38	-0.77	19.066	10.099	1.38	-15.68
2460	28.48	-5.45	1.2	-0.95	18.474	10.01	1.2	-14.74
2470	27	-5.69	0.91	-1.24	17.481	9.518	0.91	-14.67
2480	27.54	-5.6	1.04	-1.11	17.876	9.661	1.04	-15.97
2490	29.18	-5.35	1.06	-1.09	18.718	10.459	1.06	-15.66
2500	24.03	-6.19	-0.06	-2.21	15.294	8.736	-0.06	-15.12

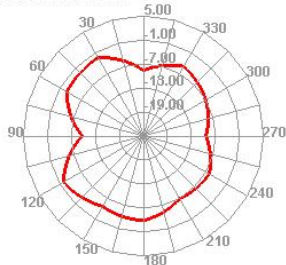
无源测试数据  
Passive test data

ANT1 Direction of figure(2.4/BT)

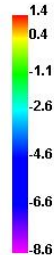
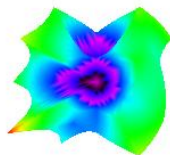
2400.000MHz



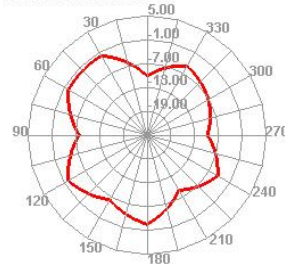
2400.000MHz H



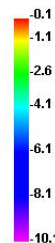
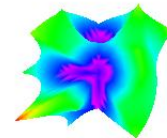
2450.000MHz



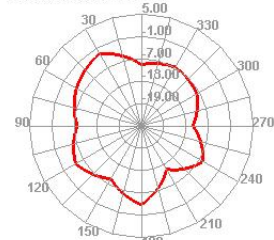
2450.000MHz H



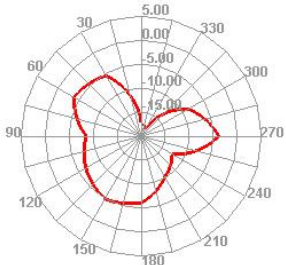
2500.000MHz



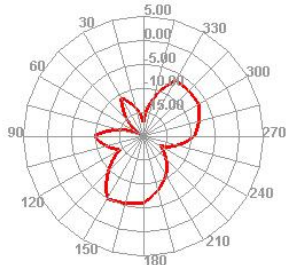
2500.000MHz H



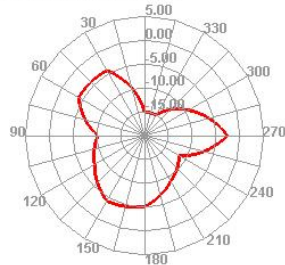
2400.000MHz E1



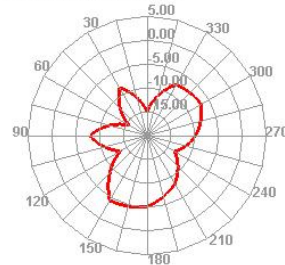
2400.000MHz E2



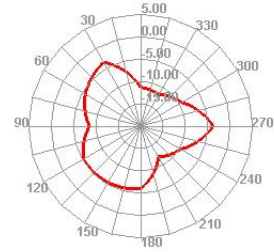
2450.000MHz E1



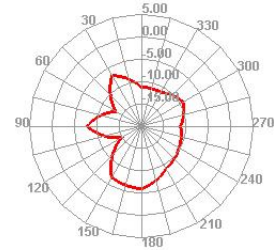
2450.000MHz E2



2500.000MHz E1



2500.000MHz E2





## 无源测试数据 Passive test data

### ANT1 GAIN&Efficiency-WIFI 5G

Passive Test For WIFI5G								
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dEd)	UHS (%)	DHIS (%)	Max (dB)	Min (dB)
5150	19.23	-7.16	1.94	-0.21	10.59	8.641	1.94	-15.82
5170	22.95	-6.39	2.33	0.18	12.524	10.427	2.33	-14.74
5190	21.96	-6.58	2.05	-0.1	11.632	10.331	2.05	-13.88
5210	27.25	-5.65	2.67	0.52	14.001	13.251	2.67	-14.4
5230	24.8	-6.06	1.93	-0.22	12.676	12.125	1.93	-17.08
5250	29.3	-5.33	2.43	0.28	15.077	14.223	2.43	-16.37
5270	28.95	-5.38	2.18	0.03	14.924	14.029	2.18	-15.02
5290	32.01	-4.95	2.78	0.63	16.401	15.608	2.78	-14.12
5310	29.56	-5.29	2.19	0.04	15.043	14.518	2.19	-14.92
5330	30.42	-5.17	2.06	-0.09	15.494	14.923	2.06	-15.06
5350	31.27	-5.05	2.1	-0.05	15.89	15.382	2.1	-15.33
5370	31.03	-5.08	1.94	-0.21	15.714	15.318	1.94	-16.62
5390	29.12	-5.36	1.72	-0.43	14.84	14.279	1.72	-17.77
5410	34.28	-4.65	2.93	0.78	17.61	16.667	2.93	-17.55
5430	32.81	-4.84	3.18	1.03	17.006	15.807	3.18	-19.79
5450	35.19	-4.54	3.85	1.7	18.51	16.677	3.85	-20.31
5470	34.5	-4.62	4.04	1.89	18.602	15.894	4.04	-21.26
5490	32.92	-4.83	3.83	1.68	18.16	14.756	3.83	-22.94
5510	33.98	-4.69	4.08	1.93	19.033	14.944	4.08	-19.37
5530	33.19	-4.79	4.16	2.01	18.759	14.434	4.16	-17.12
5550	36.61	-4.36	4.62	2.47	20.534	16.077	4.62	-16.34
5570	31.78	-4.98	3.96	1.81	17.639	14.137	3.96	-17.66
5590	33.74	-4.72	3.96	1.81	18.622	15.117	3.96	-18.6
5610	28	-5.53	2.94	0.79	15.438	12.564	2.94	-19.25
5630	33.93	-4.69	3.74	1.59	18.467	15.467	3.74	-22.74
5650	26.45	-5.78	2.57	0.42	14.217	12.234	2.57	-28.14
5670	33.4	-4.76	3.29	1.14	17.705	15.699	3.29	-22.69
5690	26.93	-5.7	2.32	0.17	14.11	12.823	2.32	-18.67
5710	33.28	-4.78	3.51	1.36	17.56	15.718	3.51	-16.45
5730	31.23	-5.05	3.51	1.36	16.569	14.663	3.51	-18.31
5750	31.27	-5.05	3.41	1.26	16.774	14.498	3.41	-20.77
5770	30.86	-5.11	2.97	0.82	16.776	14.087	2.97	-17.28
5790	29.15	-5.35	2.19	0.04	16.077	13.072	2.19	-18.86
5810	27.38	-5.63	1.15	-1	15.276	12.106	1.15	-19.45
5830	25.65	-5.91	1.2	-0.95	14.468	11.18	1.2	-23.86
5850	24.19	-6.16	1.49	-0.66	13.705	10.489	1.49	-25.3



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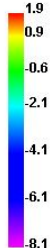
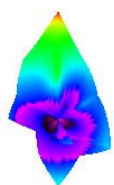
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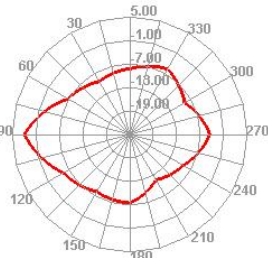
无源测试数据  
Passive test data

ANT1 Direction of figure (5G)

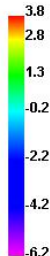
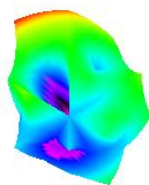
5150.000MHz



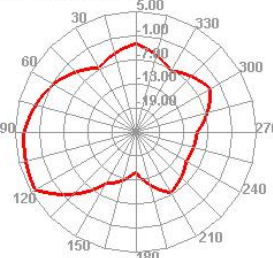
5150.000MHz H



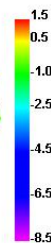
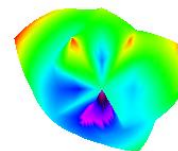
5490.000MHz



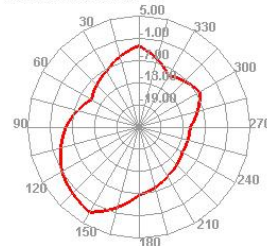
5490.000MHz H



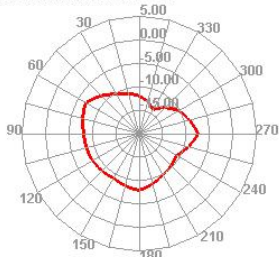
5850.000MHz



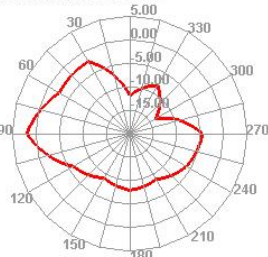
5850.000MHz H



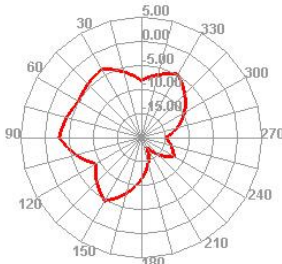
5150.000MHz E1



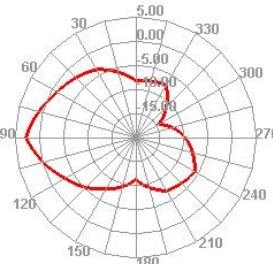
5150.000MHz E2



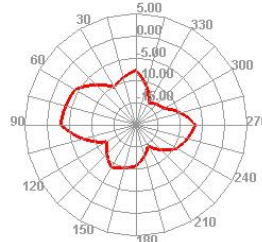
5490.000MHz E1



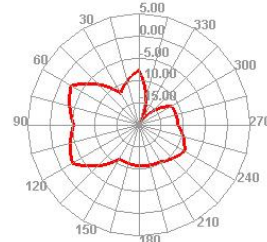
5490.000MHz E2



5850.000MHz E1



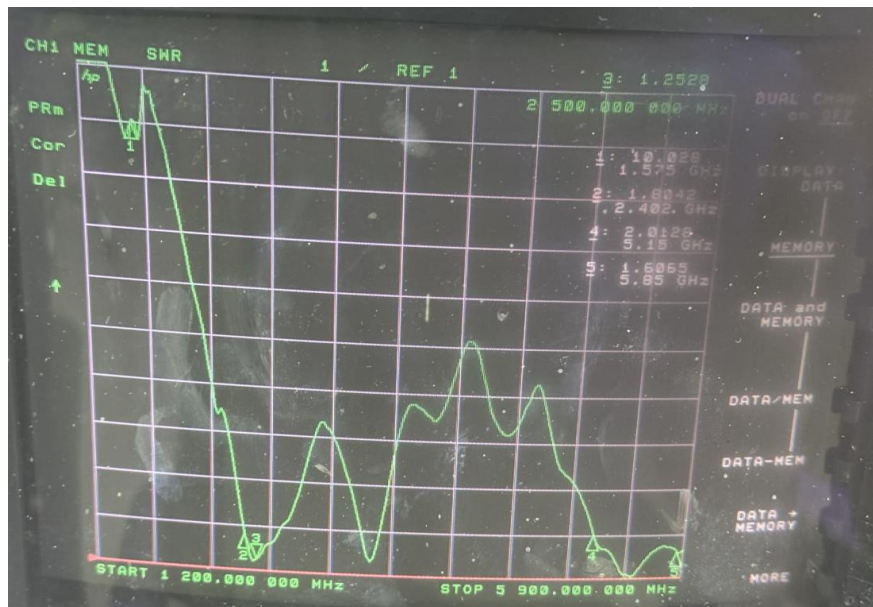
5850.000MHz E2





## 无源测试数据 Passive test data

### ANT2 S11-VSWR&Return Loss



Frequency (MHZ)	2400	2500	5150	5850
VSWR	1.8	1.25	2.01	1.6
Return Loss (DB)	-10.93	-19.06	-9.47	-12.66



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无源测试数据

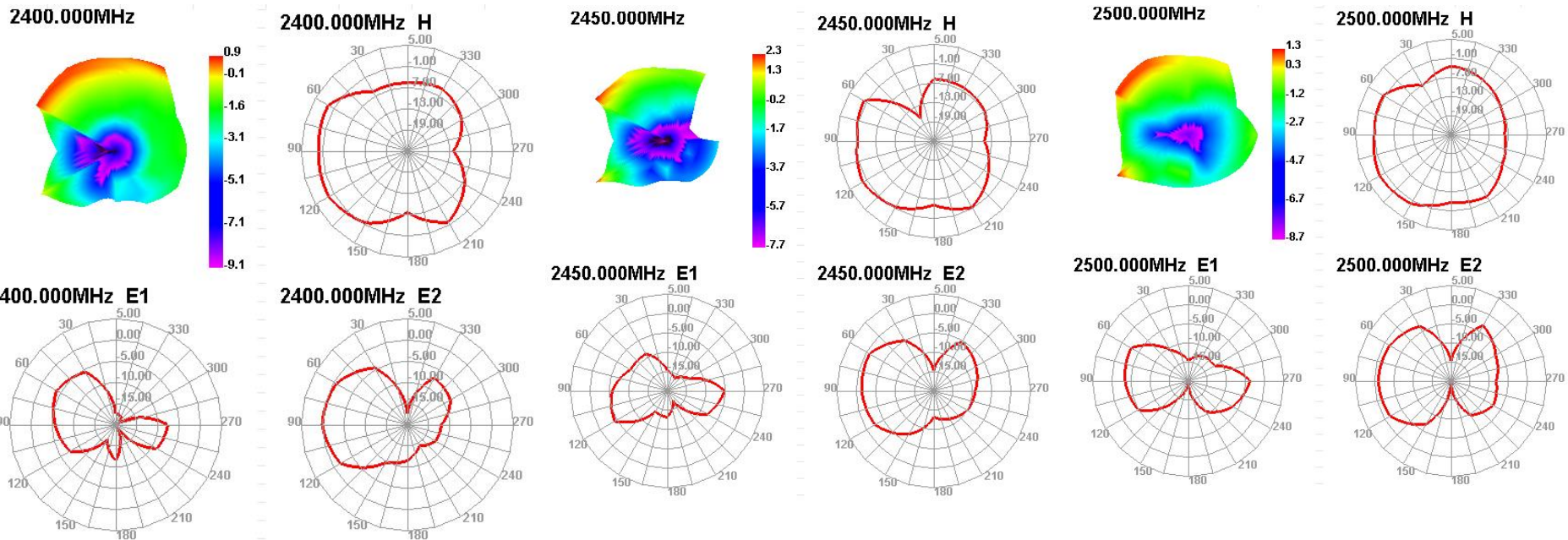
Passive test data

ANT2 GAIN&amp;Efficiency-WIFI2.4G/BT

Passive Test For WIFI2.4								
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHS (%)	Max (dB)	Min (dB)
2400	32.87	-4.83	0.86	-1.29	20.366	12.499	0.86	-20.96
2410	32.25	-4.91	1.01	-1.14	19.934	12.317	1.01	-21.81
2420	31.85	-4.97	1.34	-0.81	19.573	12.28	1.34	-22.77
2430	30.55	-5.15	1.48	-0.67	18.901	11.649	1.48	-23.42
2440	32.76	-4.85	1.96	-0.19	20.09	12.668	1.96	-20.27
2450	34.32	-4.64	2.35	0.2	20.892	13.433	2.35	-17.09
2460	33.77	-4.71	2.28	0.13	20.367	13.407	2.28	-18.5
2470	34.62	-4.61	2.14	-0.01	20.724	13.896	2.14	-18.38
2480	37.3	-4.28	2.04	-0.11	22.097	15.205	2.04	-18.11
2490	40.65	-3.91	1.88	-0.27	23.766	16.881	1.88	-18.78
2500	39.21	-4.07	1.28	-0.87	22.715	16.498	1.28	-20.91

无源测试数据  
Passive test data

ANT2 Direction of figure(2.4/BT)



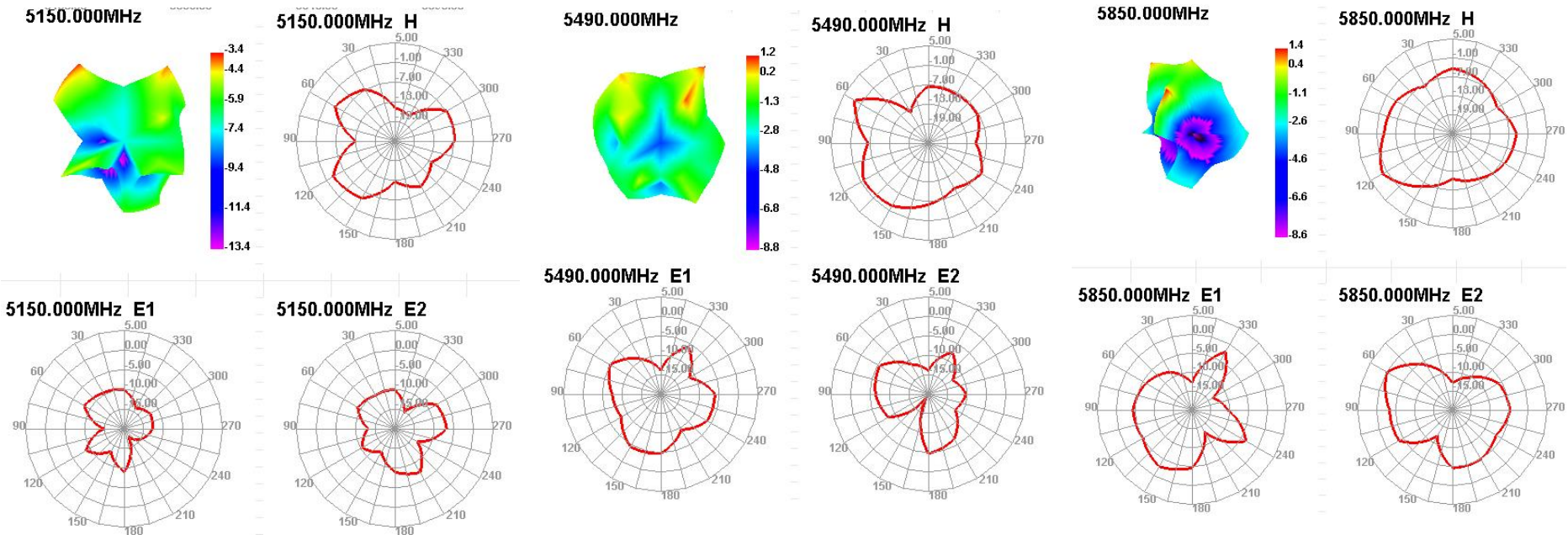
## 无源测试数据 Passive test data

### ANT2 GAIN&Efficiency-WIFI 5G

Passive Test For WIFI5G								
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dEd)	UHS (%)	DHIS (%)	Max (dB)	Min (dB)
5150	14.51	-8.38	-3.41	-5.56	8.03	6.482	-3.41	-20.52
5170	14.01	-8.54	-3.6	-5.75	7.882	6.129	-3.6	-20.5
5190	17.4	-7.6	-2.96	-5.11	9.855	7.542	-2.96	-19.36
5210	17.93	-7.46	-3.04	-5.19	10.097	7.83	-3.04	-19.42
5230	20.81	-6.82	-2.05	-4.2	11.515	9.293	-2.05	-19.76
5250	22.99	-6.38	-1.03	-3.18	12.57	10.42	-1.03	-18.67
5270	27.48	-5.61	0.04	-2.11	14.962	12.517	0.04	-16.67
5290	28.04	-5.52	0.49	-1.66	15.211	12.829	0.49	-15.21
5310	27.89	-5.55	0.98	-1.17	15.085	12.804	0.98	-17.84
5330	28.88	-5.39	1.63	-0.52	15.641	13.234	1.63	-16.5
5350	31.11	-5.07	2.14	-0.01	17.179	13.929	2.14	-15.46
5370	30.57	-5.15	1.91	-0.24	16.985	13.588	1.91	-16.54
5390	28.77	-5.41	1.41	-0.74	15.655	13.112	1.41	-16.99
5410	32.18	-4.92	1.72	-0.43	17.375	14.805	1.72	-16.9
5430	30.77	-5.12	1.19	-0.96	16.911	13.861	1.19	-20.06
5450	31.06	-5.08	0.9	-1.25	17.521	13.541	0.9	-21.51
5470	31.17	-5.06	1.06	-1.09	17.729	13.438	1.06	-24.38
5490	28.86	-5.4	1.17	-0.98	16.332	12.529	1.17	-26.02
5510	30.31	-5.18	1.46	-0.69	17.346	12.961	1.46	-24.16
5530	28.93	-5.39	1.02	-1.13	16.702	12.223	1.02	-24.71
5550	32.34	-4.9	1.52	-0.63	18.575	13.765	1.52	-21.07
5570	26.38	-5.79	1.15	-1	14.846	11.529	1.15	-22.46
5590	27.85	-5.55	1.88	-0.27	15.295	12.551	1.88	-18.45
5610	23.9	-6.22	1.33	-0.82	12.901	11	1.33	-19.24
5630	30.24	-5.19	2.05	-0.1	15.987	14.255	2.05	-18.57
5650	26.81	-5.72	2.11	-0.04	14.038	12.772	2.11	-20.87
5670	28.98	-5.38	3.47	1.32	15.234	13.747	3.47	-25.25
5690	24.59	-6.09	3.14	0.99	12.973	11.616	3.14	-29.23
5710	23.72	-6.25	2.91	0.76	12.573	11.151	2.91	-24.75
5730	24.51	-6.11	3	0.85	13.05	11.465	3	-23.41
5750	20.83	-6.81	2.06	-0.09	11.127	9.701	2.06	-22.13
5770	22.85	-6.41	1.93	-0.22	12.14	10.709	1.93	-19.26
5790	21.24	-6.73	1.07	-1.08	11.193	10.048	1.07	-17.24
5810	23.59	-6.27	0.86	-1.29	12.483	11.111	0.86	-16.8
5830	24.34	-6.14	0.77	-1.38	12.91	11.434	0.77	-17.28
5850	28.1	-5.51	1.4	-0.75	14.701	13.397	1.4	-15.81

## 无源测试数据 Passive test data

### ANT2 Direction of figure (5G)





## 有源测试数据 Active test data

802.11b	Frequency	TRP		TIS	
	2412	CH1 11Mbps	8.42	CH1 11Mbps	-78.92
2437	CH6 11Mbps	10.62	CH6 11Mbps	-80.14	
2467	CH11 11Mbps	10.24	CH11 11Mbps	-80.06	
802.11a		TRP		TIS	
	5180	CH36 6Mbps	10.06	CH36 54Mbps	-69.56
	5300	CH60 6Mbps	10.9	CH60 54Mbps	-69.28
	5805	CH161 6Mbps	8.92	CH161 54Mbps	-67.67





## 吞吐量测试 Throughput test

2.4G wifi 天吐量测试			
上行	276M	下行	286M
图片	<pre> [384] Transfer      Transfer      Bandwidth       7.0- 8.0 sec 19.4 MBytes 163 Mbits/sec [ ID] Interval      Transfer      Bandwidth [384] 8.0- 9.0 sec 27.2 MBytes 228 Mbits/sec [ ID] Interval      Transfer      Bandwidth [384] 9.0-10.0 sec 32.2 MBytes 270 Mbits/sec [ ID] Interval      Transfer      Bandwidth [384] 10.0-11.0 sec 38.0 MBytes 319 Mbits/sec [ ID] Interval      Transfer      Bandwidth [384] 11.0-12.0 sec 33.2 MBytes 279 Mbits/sec [ ID] Interval      Transfer      Bandwidth [384] 12.0-13.0 sec 33.2 MBytes 279 Mbits/sec [ ID] Interval      Transfer      Bandwidth [384] 13.0-14.0 sec 38.7 MBytes 324 Mbits/sec [ ID] Interval      Transfer      Bandwidth [384] 14.0-15.0 sec 36.1 MBytes 303 Mbits/sec [ ID] Interval      Transfer      Bandwidth [384] 15.0-16.0 sec 37.0 MBytes 310 Mbits/sec [ ID] Interval      Transfer      Bandwidth [384] 16.0-17.0 sec 32.5 MBytes 273 Mbits/sec [ ID] Interval      Transfer      Bandwidth [384] 17.0-18.0 sec 34.0 MBytes 285 Mbits/sec [ ID] Interval      Transfer      Bandwidth [384] 18.0-19.0 sec 29.7 MBytes 249 Mbits/sec [ ID] Interval      Transfer      Bandwidth [384] 19.0-20.0 sec 22.2 MBytes 186 Mbits/sec [ ID] Interval      Transfer      Bandwidth [384] 0.0-20.0 sec 658 MBytes 276 Mbits/sec </pre>	图片	<pre> [272] Transfer      Transfer      Bandwidth       17.0-18.0 sec 36.8 MBytes 309 Mbits/sec [ ID] Interval      Transfer      Bandwidth [272] 18.0-19.0 sec 38.0 MBytes 319 Mbits/sec [ ID] Interval      Transfer      Bandwidth [272] 19.0-20.0 sec 34.3 MBytes 288 Mbits/sec [ ID] Interval      Transfer      Bandwidth [272] 20.0-21.0 sec 36.6 MBytes 307 Mbits/sec [ ID] Interval      Transfer      Bandwidth [272] 21.0-22.0 sec 36.5 MBytes 306 Mbits/sec [ ID] Interval      Transfer      Bandwidth [272] 22.0-23.0 sec 36.2 MBytes 304 Mbits/sec [ ID] Interval      Transfer      Bandwidth [272] 23.0-24.0 sec 37.1 MBytes 311 Mbits/sec [ ID] Interval      Transfer      Bandwidth [272] 24.0-25.0 sec 37.2 MBytes 312 Mbits/sec [ ID] Interval      Transfer      Bandwidth [272] 25.0-26.0 sec 37.8 MBytes 317 Mbits/sec [ ID] Interval      Transfer      Bandwidth [272] 26.0-27.0 sec 34.0 MBytes 286 Mbits/sec [ ID] Interval      Transfer      Bandwidth [272] 27.0-28.0 sec 36.1 MBytes 303 Mbits/sec [ ID] Interval      Transfer      Bandwidth [272] 28.0-29.0 sec 37.3 MBytes 313 Mbits/sec [ ID] Interval      Transfer      Bandwidth [272] 29.0-30.0 sec 36.0 MBytes 302 Mbits/sec [ ID] Interval      Transfer      Bandwidth [272] 0.0-30.0 sec 1021 MBytes 286 Mbits/sec </pre>
备注			

## 吞吐量测试 Throughput test

5G wifi 吞吐量测试						
上行	742M		下行	834M		
图片	<pre> [388] 17.0-18.0 sec 88.9 MBytes 746 Mbits/sec [ ID] Interval Transfer Bandwidth [388] 18.0-19.0 sec 91.6 MBytes 768 Mbits/sec [ ID] Interval Transfer Bandwidth [388] 19.0-20.0 sec 89.4 MBytes 750 Mbits/sec [ ID] Interval Transfer Bandwidth [388] 20.0-21.0 sec 88.8 MBytes 745 Mbits/sec [ ID] Interval Transfer Bandwidth [388] 21.0-22.0 sec 85.5 MBytes 717 Mbits/sec [ ID] Interval Transfer Bandwidth [388] 22.0-23.0 sec 92.2 MBytes 773 Mbits/sec [ ID] Interval Transfer Bandwidth [388] 23.0-24.0 sec 87.3 MBytes 732 Mbits/sec [ ID] Interval Transfer Bandwidth [388] 24.0-25.0 sec 89.3 MBytes 749 Mbits/sec [ ID] Interval Transfer Bandwidth [388] 25.0-26.0 sec 88.4 MBytes 741 Mbits/sec [ ID] Interval Transfer Bandwidth [388] 26.0-27.0 sec 89.1 MBytes 748 Mbits/sec [ ID] Interval Transfer Bandwidth [388] 27.0-28.0 sec 89.8 MBytes 753 Mbits/sec [ ID] Interval Transfer Bandwidth [388] 28.0-29.0 sec 86.8 MBytes 728 Mbits/sec [ ID] Interval Transfer Bandwidth [388] 29.0-30.0 sec 90.8 MBytes 761 Mbits/sec [ ID] Interval Transfer Bandwidth [388] 0.0-30.0 sec 2.59 GBytes 742 Mbits/sec           </pre>	图片	<pre> [272] 17.0-18.0 sec 88.0 MBytes 739 Mbits/sec [ ID] Interval Transfer Bandwidth [272] 18.0-19.0 sec 104 MBytes 876 Mbits/sec [ ID] Interval Transfer Bandwidth [272] 19.0-20.0 sec 91.6 MBytes 769 Mbits/sec [ ID] Interval Transfer Bandwidth [272] 20.0-21.0 sec 98.0 MBytes 822 Mbits/sec [ ID] Interval Transfer Bandwidth [272] 21.0-22.0 sec 99.5 MBytes 835 Mbits/sec [ ID] Interval Transfer Bandwidth [272] 22.0-23.0 sec 107 MBytes 894 Mbits/sec [ ID] Interval Transfer Bandwidth [272] 23.0-24.0 sec 106 MBytes 885 Mbits/sec [ ID] Interval Transfer Bandwidth [272] 24.0-25.0 sec 107 MBytes 894 Mbits/sec [ ID] Interval Transfer Bandwidth [272] 25.0-26.0 sec 105 MBytes 880 Mbits/sec [ ID] Interval Transfer Bandwidth [272] 26.0-27.0 sec 86.9 MBytes 729 Mbits/sec [ ID] Interval Transfer Bandwidth [272] 27.0-28.0 sec 106 MBytes 890 Mbits/sec [ ID] Interval Transfer Bandwidth [272] 28.0-29.0 sec 105 MBytes 881 Mbits/sec [ ID] Interval Transfer Bandwidth [272] 29.0-30.0 sec 101 MBytes 847 Mbits/sec [ ID] Interval Transfer Bandwidth [272] 0.0-30.0 sec 2.91 GBytes 834 Mbits/sec           </pre>			
备注						



ANTENNA

深圳市星源创科技有限公司

SHENZHEN Xingyuanchuang TECHNOLOGY CO., LTD

BT天线实测  
BT Antenna test

测试环境：开放空间(通道)

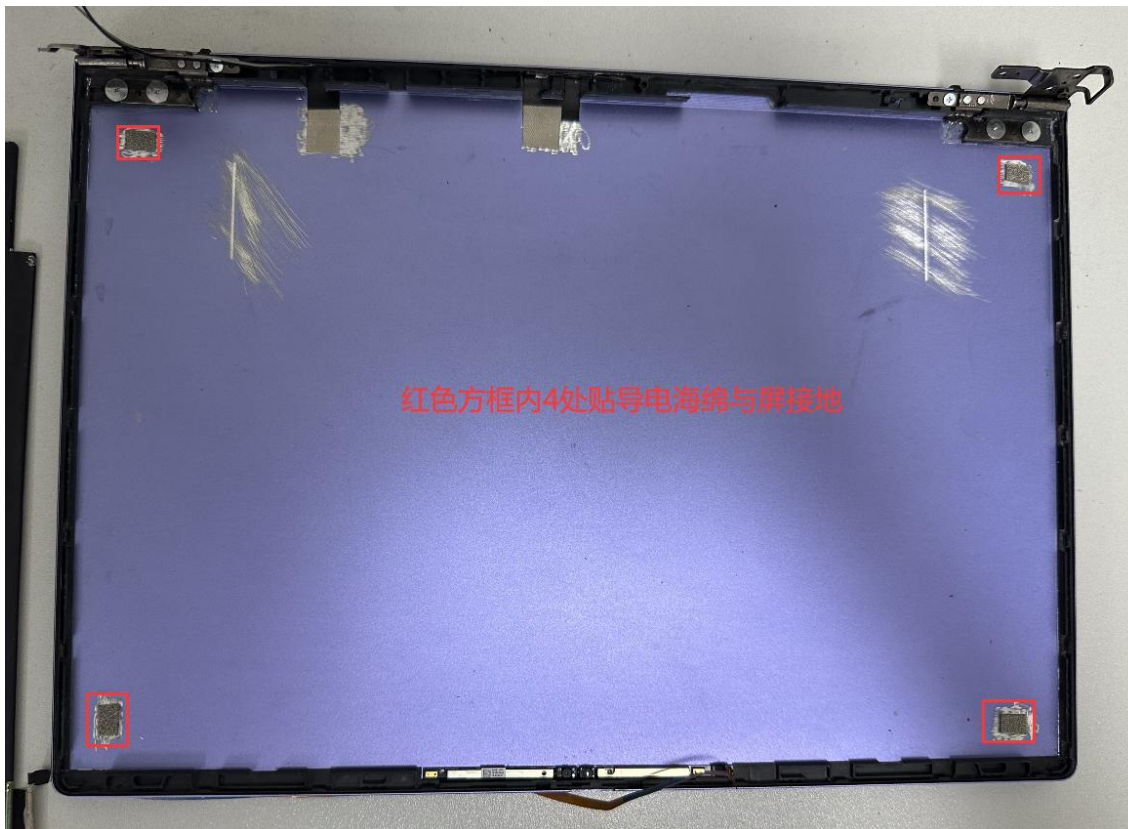
测试工具：蓝牙音响

测试距离：10/m

结果：播放音乐流畅，无杂音。

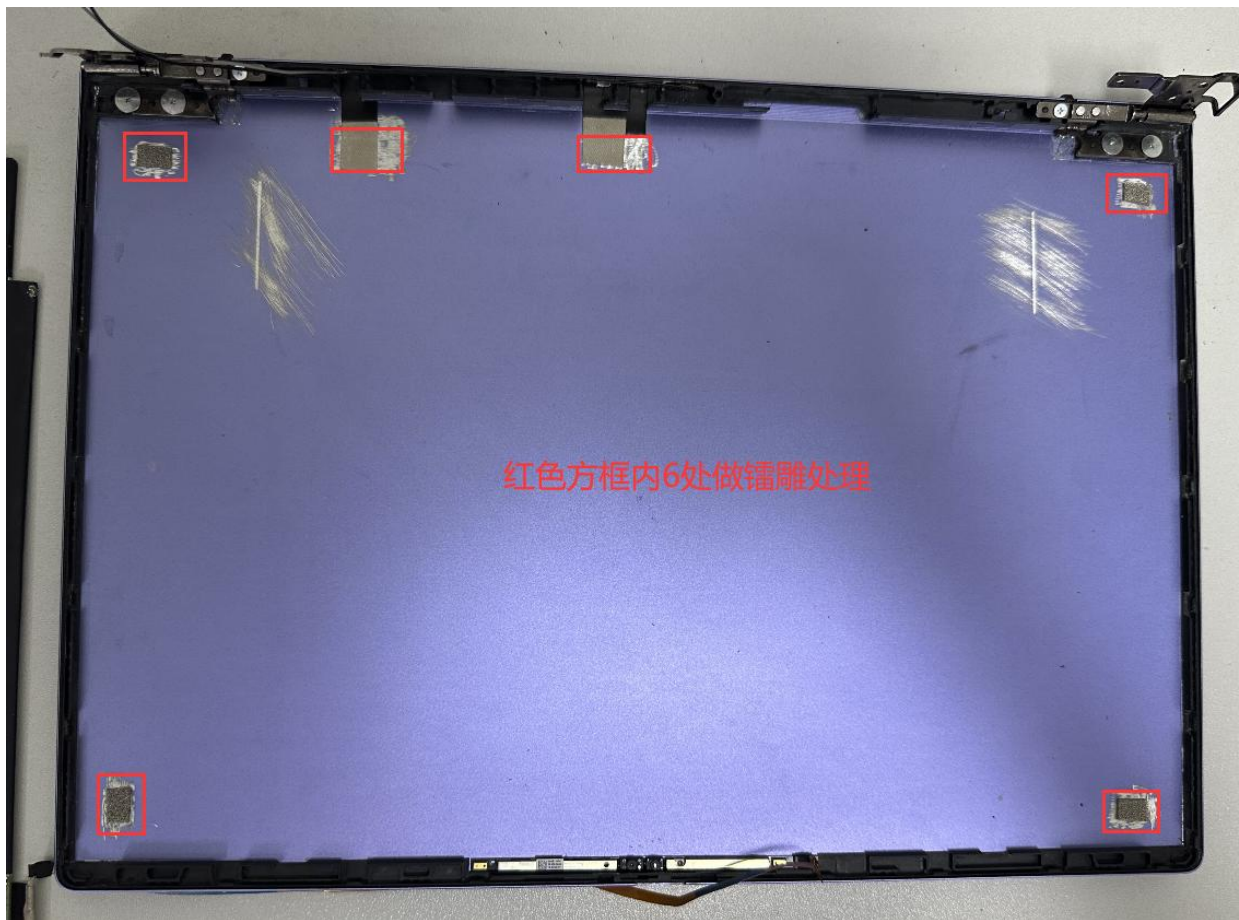
## 环境处理

Environmental treatment



## 环境处理

Environmental treatment



合作 共赢

