



深圳市星源创科技有限公司

SHENZHEN Xingyuanchuang TECHNOLOGY CO., LTD

# 天线测试报告

Antenna Test Report

*TC: 昱科*

*MN: E238*

*RF: 刘磊确*


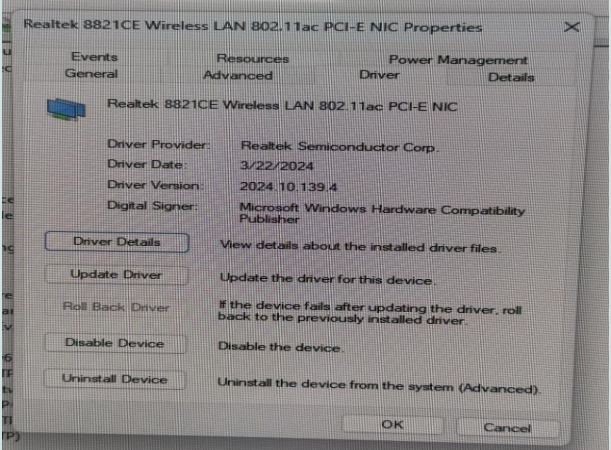
*MD: 黄清清*

*MP: 13005478517*

*Date: 2024. 6. 3*

*REV :V1. 0*

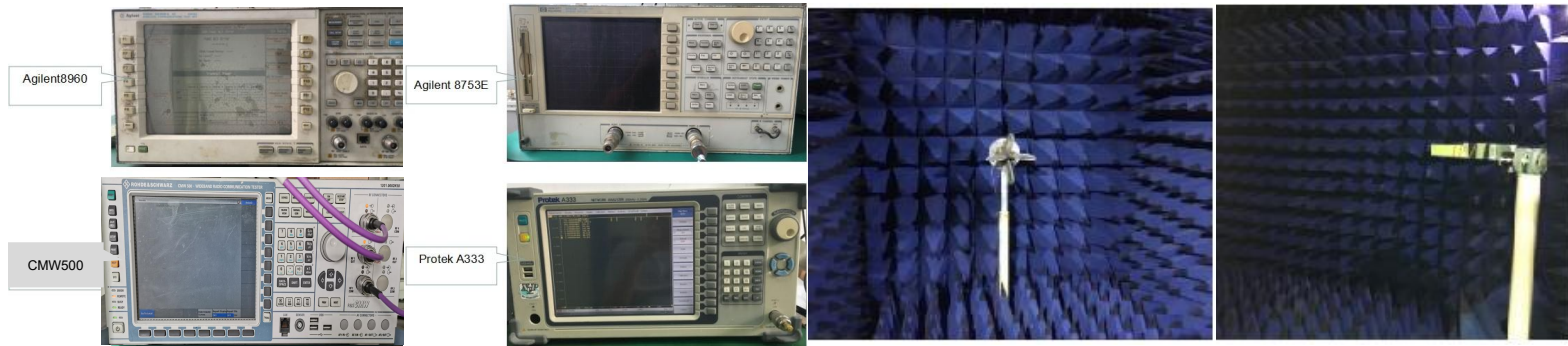
## 测试信息 Test information

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

## 测试环境

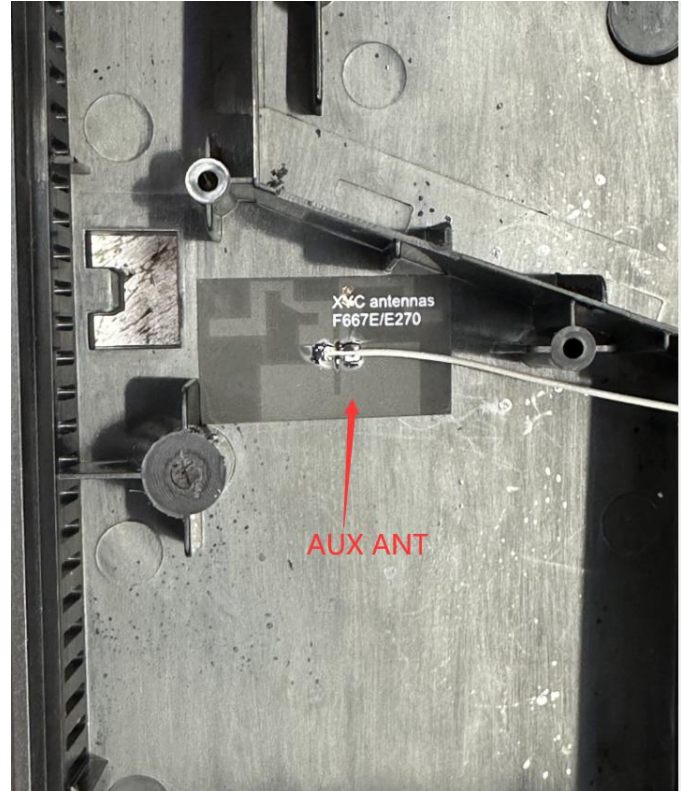
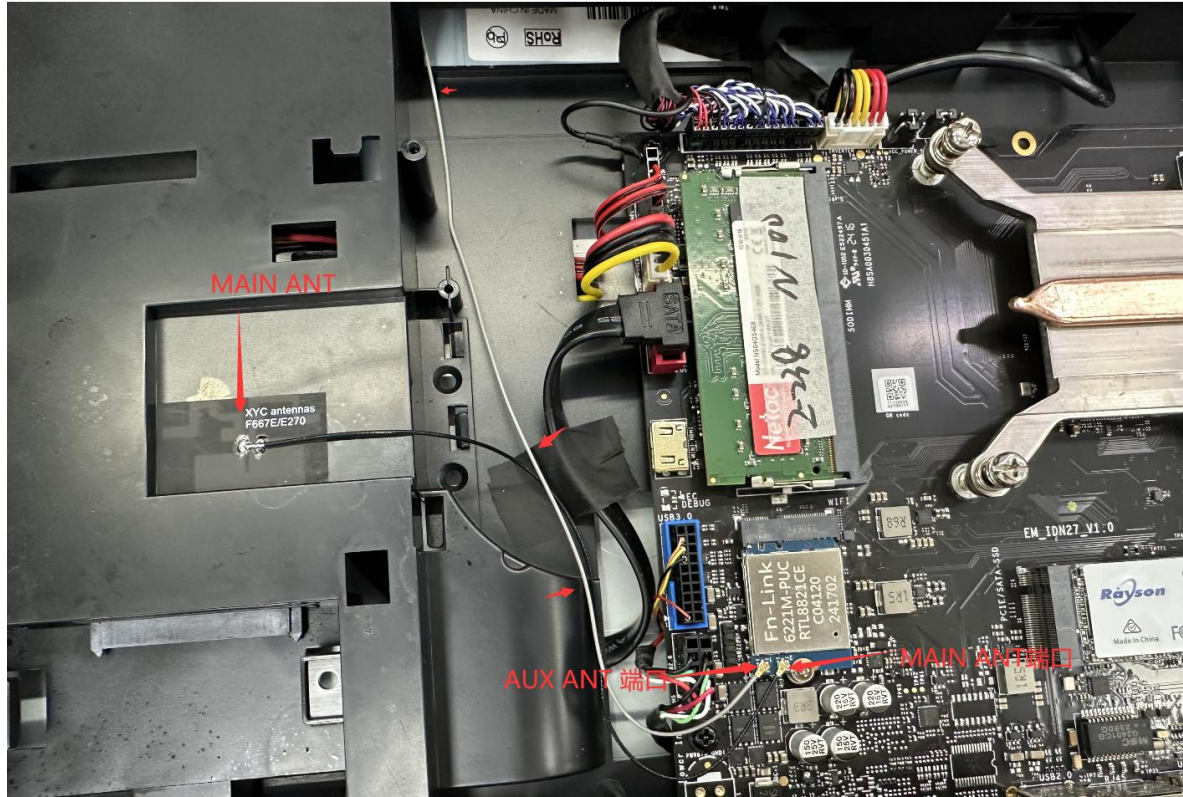
### Test environment

	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



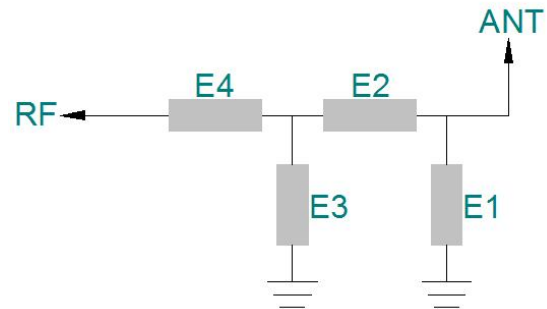


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匹配电路  
Matching circuit



匹配电路原理图&位号图

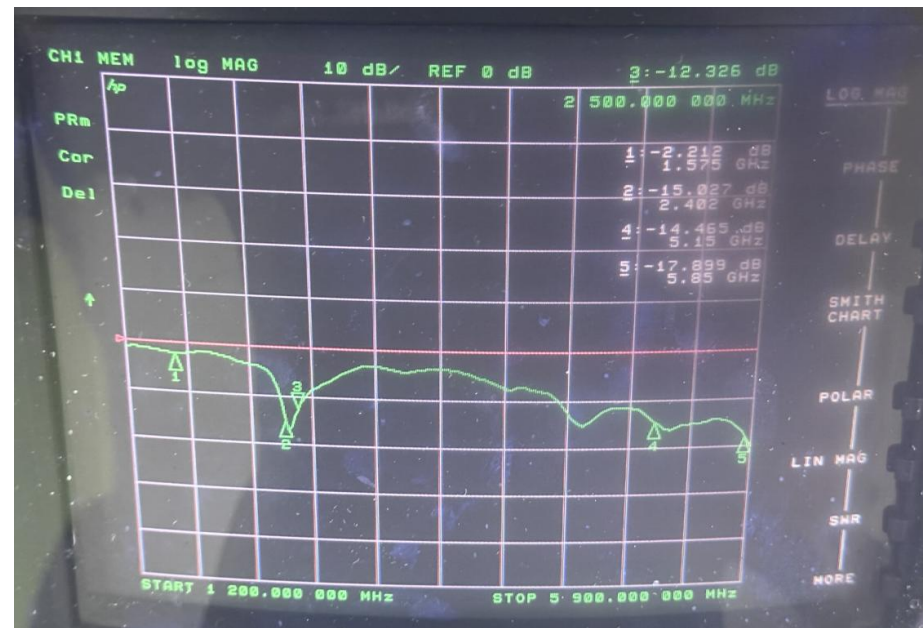
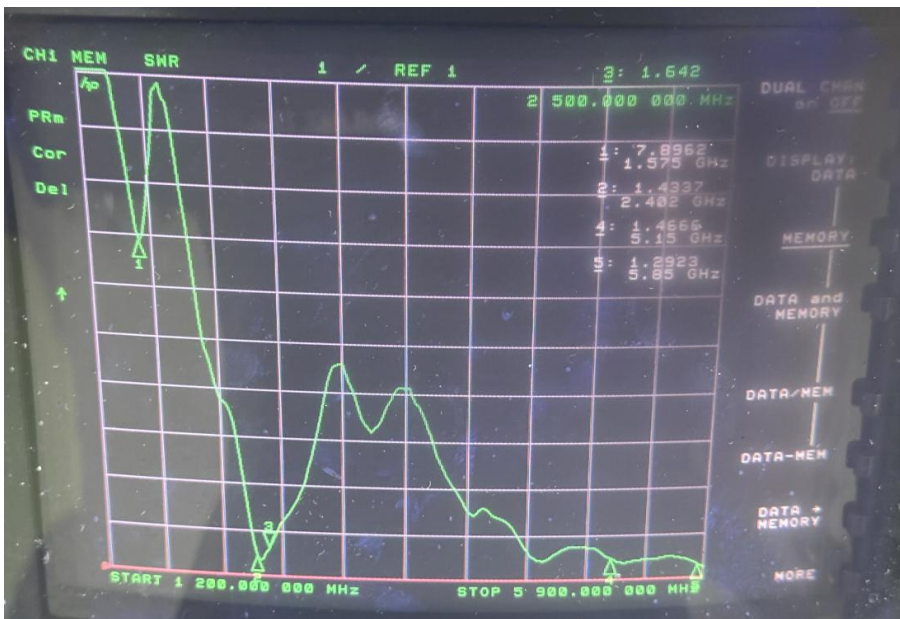
	电容 (PF)	电感 (NH)
E1(0402)		
E2(0402)		
E3(0402)		
E4(0402)		



无源测试数据

Passive test data

## ANT1 S11-VSWR&Return Loss



Frequency (MHZ)	2400	2500	5150	5850
VSWR	1.43	1.64	1.46	1.29
Return Loss (DB)	-15.02	-12.32	-14.46	-17.89



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无源测试数据

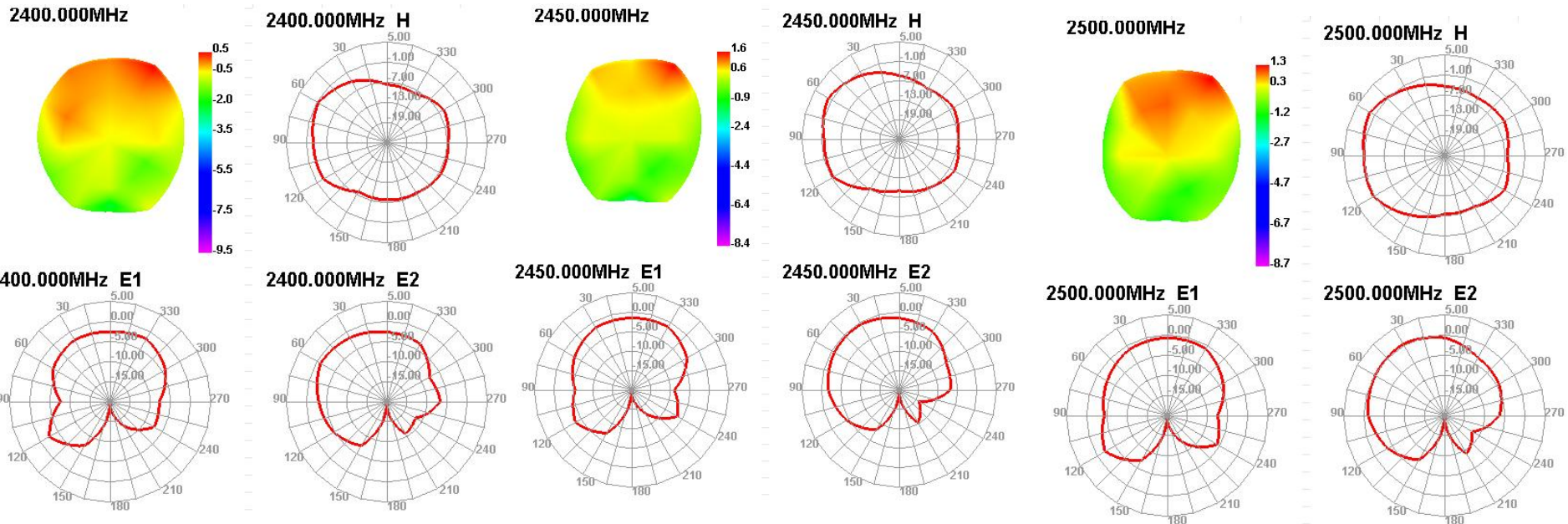
Passive test data

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	36.23	-4.41	0.54	-1.61	23.512	12.715	0.54	-29.62
2410	36.33	-4.4	0.74	-1.41	23.719	12.606	0.74	-26.23
2420	39.11	-4.08	1.09	-1.06	25.785	13.327	1.09	-24.18
2430	39.46	-4.04	1.26	-0.89	26.263	13.193	1.26	-23.51
2440	40.46	-3.93	1.35	-0.8	27.009	13.454	1.35	-23.17
2450	41.97	-3.77	1.6	-0.55	28.123	13.848	1.6	-24.34
2460	43.98	-3.57	1.73	-0.42	29.478	14.501	1.73	-25.97
2470	45.67	-3.4	1.64	-0.51	30.612	15.053	1.64	-26.89
2480	46.57	-3.32	1.54	-0.61	31.151	15.422	1.54	-25.53
2490	46.15	-3.36	1.26	-0.89	30.709	15.439	1.26	-23.01
2500	46.28	-3.35	1.28	-0.87	30.856	15.421	1.28	-21.06

## 无源测试数据 Passive test data

### ANT1 Direction of figure (2.4/BT)





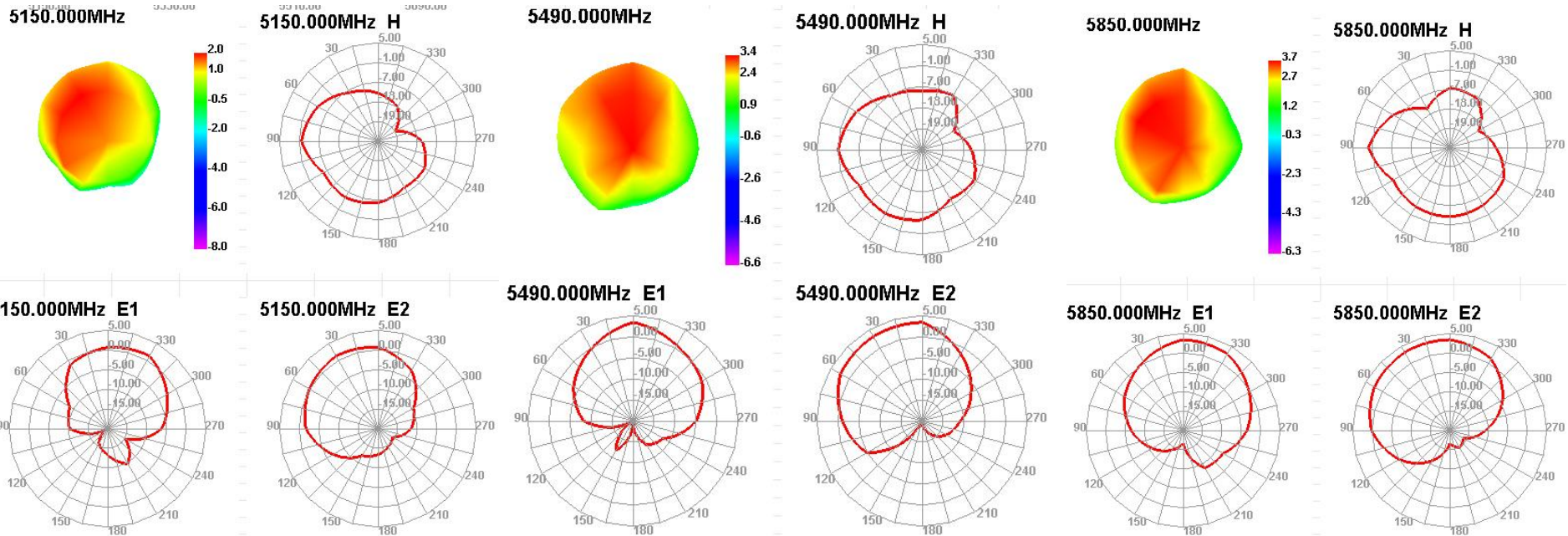
## 无源测试数据 Passive test data

### ANT1 GAIN&Efficiency-WIFI 5G

Passive Test For WIFI5G								
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHIS (%)	Max (dB)	Min (dB)
5150	31.93	-5.03	2.03	-0.12	26.563	4.863	2.03	-23.81
5170	35.28	-4.52	2.51	0.36	29.952	5.329	2.51	-24.44
5190	34.24	-4.65	2.45	0.3	29.034	5.209	2.45	-22.09
5210	40.43	-3.93	3.25	1.1	34.27	6.159	3.25	-19.91
5230	36.91	-4.33	2.73	0.58	31.495	5.416	2.73	-22.07
5250	42.9	-3.68	3.36	1.21	36.751	6.152	3.36	-19.91
5270	41.84	-3.78	3.31	1.16	35.9	5.944	3.31	-22.98
5290	46.83	-3.3	3.84	1.69	40.1	6.725	3.84	-21.39
5310	41.59	-3.81	3.36	1.21	35.759	5.833	3.36	-21.51
5330	43.81	-3.58	3.59	1.44	37.847	5.966	3.59	-23.88
5350	43.38	-3.63	3.49	1.34	37.49	5.895	3.49	-22.62
5370	43.85	-3.58	3.58	1.43	37.864	5.989	3.58	-20.68
5390	39.63	-4.02	3.12	0.97	34.201	5.425	3.12	-22.98
5410	49	-3.1	3.96	1.81	42.28	6.717	3.96	-23.51
5430	42.78	-3.69	3.25	1.1	36.854	5.929	3.25	-21.64
5450	46.92	-3.29	3.55	1.4	40.345	6.579	3.55	-21.86
5470	43.31	-3.63	3.17	1.02	37.258	6.05	3.17	-23.71
5490	43.43	-3.62	3.4	1.25	37.374	6.056	3.4	-24.45
5510	46.19	-3.35	3.58	1.43	39.597	6.593	3.58	-21.96
5530	46.31	-3.34	3.6	1.45	39.584	6.727	3.6	-21.69
5550	51.37	-2.89	4.1	1.95	43.904	7.466	4.1	-21.12
5570	44.95	-3.47	3.59	1.44	38.381	6.566	3.59	-21.59
5590	48.62	-3.13	3.79	1.64	41.426	7.196	3.79	-21.5
5610	42.63	-3.7	2.93	0.78	36.291	6.342	2.93	-23.63
5630	49.06	-3.09	3.63	1.48	41.806	7.249	3.63	-24.53
5650	44.08	-3.56	3.27	1.12	37.539	6.539	3.27	-23.02
5670	47.37	-3.24	3.71	1.56	40.354	7.017	3.71	-21.47
5690	45.33	-3.44	3.25	1.1	38.556	6.777	3.25	-21.58
5710	43.95	-3.57	3.13	0.98	37.441	6.512	3.13	-22.77
5730	49.39	-3.06	3.73	1.58	42.054	7.338	3.73	-21.97
5750	43.27	-3.64	3.2	1.05	36.854	6.417	3.2	-20.71
5770	48.78	-3.12	3.52	1.37	41.393	7.389	3.52	-17.48
5790	43.87	-3.58	2.96	0.81	37.125	6.75	2.96	-19.16
5810	47.8	-3.21	3.23	1.08	40.431	7.367	3.23	-17.75
5830	47.22	-3.26	3.34	1.19	40.043	7.178	3.34	-20.71
5850	51.92	-2.85	3.7	1.55	43.83	8.088	3.7	-19.94

## 无源测试数据 Passive test data

### ANT1 Direction of figure (5G)

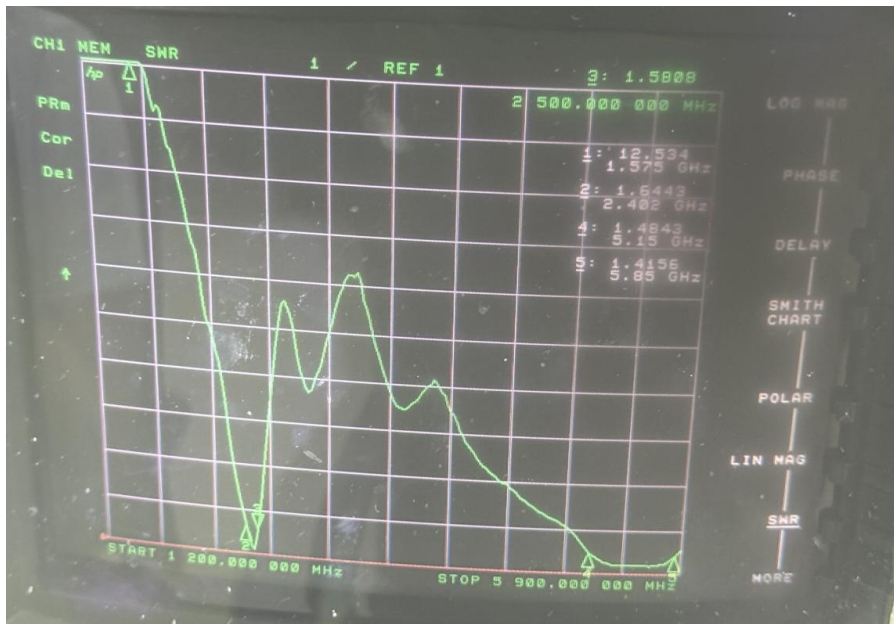




无源测试数据

Passive test data

## ANT2 S11-VSWR&Return Loss



Frequency (MHZ)	2400	2500	5150	5850
VSWR	1.64	1.58	1.48	1.41
Return Loss (DB)	-12.37	-13.45	-14.2	-15.29



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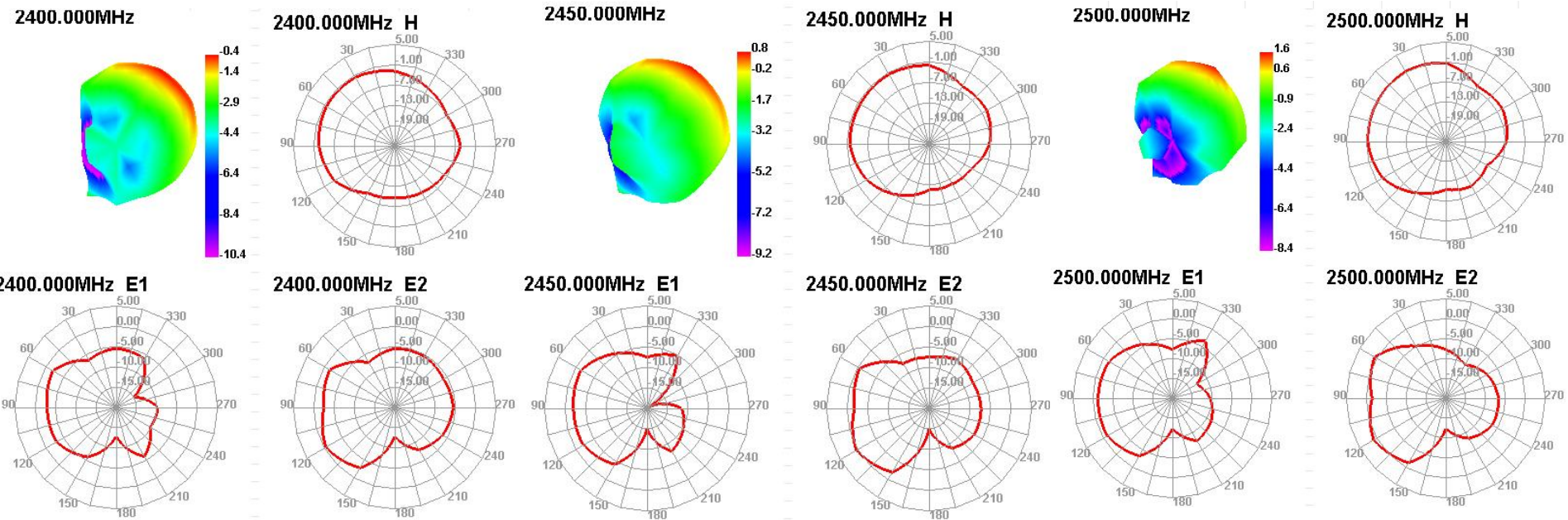
无源测试数据  
Passive test data

ANT2 GAIN&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	33.49	-4.75	-0.45	-2.6	16.583	16.903	-0.45	-15.08
2410	33.62	-4.73	-0.31	-2.46	16.383	17.233	-0.31	-16.52
2420	35.84	-4.46	0.11	-2.04	17.291	18.548	0.11	-18.85
2430	36	-4.44	0.25	-1.9	17.293	18.707	0.25	-21.32
2440	36.92	-4.33	0.53	-1.62	17.562	19.355	0.53	-22.09
2450	38.41	-4.16	0.76	-1.39	18.041	20.373	0.76	-20.16
2460	40.58	-3.92	1.16	-0.99	18.824	21.761	1.16	-17.8
2470	42	-3.77	1.38	-0.77	19.282	22.719	1.38	-15.76
2480	43.51	-3.61	1.47	-0.68	19.831	23.683	1.47	-14.45
2490	45.02	-3.47	1.58	-0.57	20.401	24.623	1.58	-13.53
2500	44.82	-3.48	1.58	-0.57	20.262	24.562	1.58	-13.73

## 无源测试数据 Passive test data

### ANT2 Direction of figure (2.4/BT)



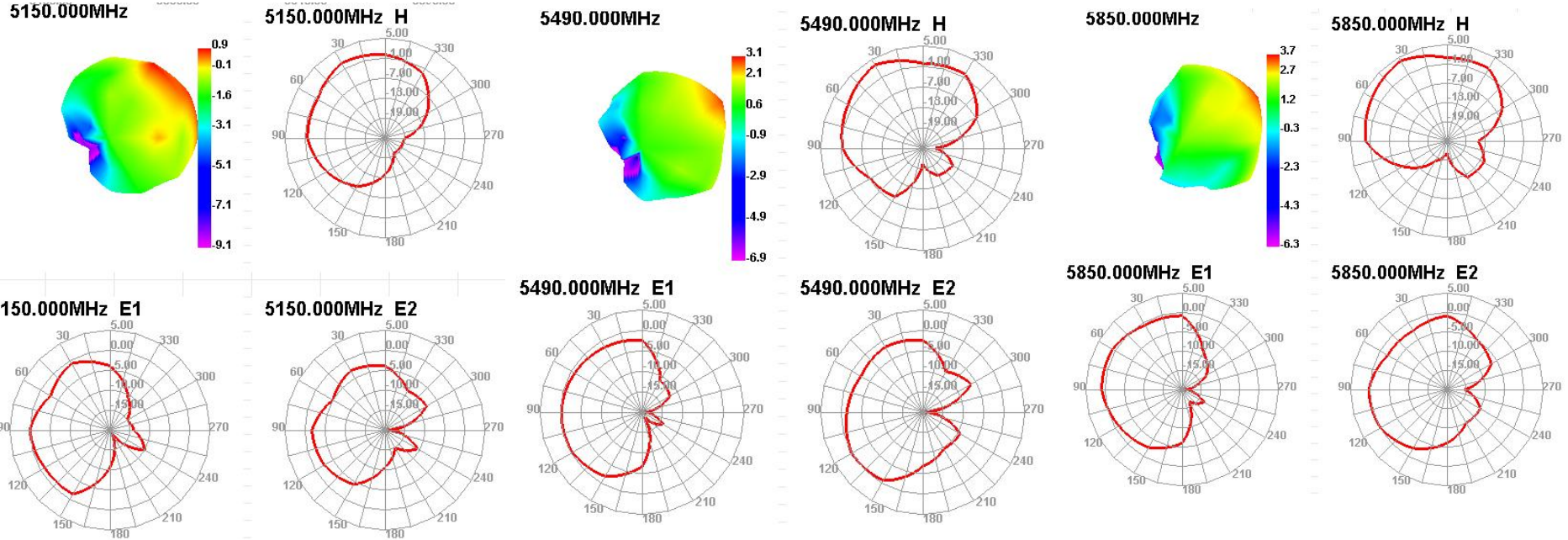
## 无源测试数据 Passive test data

### ANT2 GAIN&Efficiency-WIFI 5G

Passive Test For WIFI5G								
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHIS (%)	Max (dB)	Min (dB)
5150	36.36	-4.39	0.87	-1.28	17.798	18.563	0.87	-23.25
5170	39.08	-4.08	1.29	-0.86	19.219	19.862	1.29	-22.52
5190	39.62	-4.02	1.52	-0.63	19.481	20.138	1.52	-27
5210	44.78	-3.49	2.18	0.03	21.953	22.822	2.18	-24.38
5230	41.68	-3.8	1.89	-0.26	20.575	21.107	1.89	-23.08
5250	48.53	-3.14	2.64	0.49	23.978	24.549	2.64	-23.48
5270	46.89	-3.29	2.72	0.57	23.242	23.647	2.72	-24.03
5290	52.57	-2.79	3.22	1.07	26.128	26.437	3.22	-21.74
5310	46.21	-3.35	2.68	0.53	22.961	23.245	2.68	-22.33
5330	48.73	-3.12	2.97	0.82	24.348	24.378	2.97	-21.55
5350	47.23	-3.26	2.97	0.82	23.561	23.665	2.97	-22.19
5370	47.41	-3.24	3.09	0.94	23.746	23.659	3.09	-19.69
5390	42.52	-3.71	2.49	0.34	21.414	21.11	2.49	-19.91
5410	52.43	-2.8	3.45	1.3	26.694	25.731	3.45	-18.02
5430	44.63	-3.5	2.88	0.73	22.644	21.987	2.88	-21.34
5450	49.03	-3.1	3.39	1.24	24.734	24.3	3.39	-23.71
5470	45.08	-3.46	2.97	0.82	22.587	22.494	2.97	-20.57
5490	46.41	-3.33	3.12	0.97	23.303	23.107	3.12	-21.2
5510	48.38	-3.15	3.54	1.39	24.209	24.173	3.54	-20.4
5530	49.26	-3.07	3.71	1.56	24.097	25.167	3.71	-21.99
5550	53.08	-2.75	4.02	1.87	25.611	27.473	4.02	-25.32
5570	48.98	-3.1	3.68	1.53	23.696	25.286	3.68	-22.13
5590	53.19	-2.74	4.16	2.01	25.712	27.483	4.16	-30.21
5610	47.01	-3.28	3.6	1.45	22.602	24.409	3.6	-21.68
5630	52.3	-2.82	3.98	1.83	25.14	27.158	3.98	-18.91
5650	48.33	-3.16	3.47	1.32	23.423	24.907	3.47	-21.16
5670	52.42	-2.81	3.9	1.75	25.67	26.748	3.9	-22.99
5690	49.75	-3.03	3.61	1.46	24.369	25.384	3.61	-25.12
5710	48.81	-3.11	3.39	1.24	23.951	24.861	3.39	-22.34
5730	53.47	-2.72	3.85	1.7	26.17	27.299	3.85	-20.12
5750	47.97	-3.19	3.49	1.34	23.681	24.286	3.49	-22.86
5770	51.51	-2.88	3.76	1.61	25.484	26.023	3.76	-28.32
5790	46.74	-3.3	3.33	1.18	23.077	23.664	3.33	-25.32
5810	49.47	-3.06	3.56	1.41	24.466	25.008	3.56	-24.18
5830	48.3	-3.16	3.53	1.38	24.17	24.126	3.53	-22.18
5850	50.97	-2.93	3.72	1.57	25.835	25.133	3.72	-21.21

无源测试数据  
Passive test data

ANT2 Direction of figure (5G)





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吞吐量测试  
Throughput test

2.4G wifi 吞吐量测试									
上行	88.9M			下行	122M				
图片	[388]	17.0-18.0 sec	10.9 MBytes	91.8 Mbits/sec	图片	[272]	17.0-18.0 sec	16.5 MBytes	139 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[388]	18.0-19.0 sec	10.6 MBytes	89.1 Mbits/sec		[272]	18.0-19.0 sec	16.4 MBytes	137 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[388]	19.0-20.0 sec	10.6 MBytes	89.1 Mbits/sec		[272]	19.0-20.0 sec	15.5 MBytes	130 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[388]	20.0-21.0 sec	10.9 MBytes	91.0 Mbits/sec		[272]	20.0-21.0 sec	17.6 MBytes	147 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[388]	21.0-22.0 sec	11.0 MBytes	92.3 Mbits/sec		[272]	21.0-22.0 sec	16.4 MBytes	138 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[388]	22.0-23.0 sec	10.7 MBytes	90.1 Mbits/sec		[272]	22.0-23.0 sec	16.4 MBytes	138 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[388]	23.0-24.0 sec	10.2 MBytes	85.8 Mbits/sec		[272]	23.0-24.0 sec	16.0 MBytes	134 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[388]	24.0-25.0 sec	10.5 MBytes	88.5 Mbits/sec		[272]	24.0-25.0 sec	16.1 MBytes	135 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[388]	25.0-26.0 sec	10.0 MBytes	84.0 Mbits/sec		[272]	25.0-26.0 sec	15.8 MBytes	133 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[388]	26.0-27.0 sec	10.8 MBytes	90.6 Mbits/sec		[272]	26.0-27.0 sec	14.3 MBytes	120 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[388]	27.0-28.0 sec	11.2 MBytes	93.7 Mbits/sec		[272]	27.0-28.0 sec	13.3 MBytes	112 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[388]	28.0-29.0 sec	10.8 MBytes	90.2 Mbits/sec		[272]	28.0-29.0 sec	12.6 MBytes	106 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[388]	29.0-30.0 sec	11.1 MBytes	93.0 Mbits/sec		[272]	29.0-30.0 sec	14.2 MBytes	119 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[388]	30.0-30.0 sec	318 MBytes	88.9 Mbits/sec		[272]	30.0-30.0 sec	439 MBytes	122 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
备注									





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吞吐量测试  
Throughput test

5G wifi 吞吐量测试									
上行	242M			下行	286M				
图片	[ID]	Interval	Transfer	Bandwidth	图片	[ID]	Interval	Transfer	Bandwidth
	[400]	17.0-18.0 sec	28.9 MBytes	242 Mbits/sec		[272]	17.0-18.0 sec	35.2 MBytes	296 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[400]	18.0-19.0 sec	29.5 MBytes	247 Mbits/sec		[272]	18.0-19.0 sec	28.7 MBytes	241 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[400]	19.0-20.0 sec	28.6 MBytes	240 Mbits/sec		[272]	19.0-20.0 sec	35.1 MBytes	295 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[400]	20.0-21.0 sec	28.3 MBytes	237 Mbits/sec		[272]	20.0-21.0 sec	35.7 MBytes	299 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[400]	21.0-22.0 sec	29.1 MBytes	244 Mbits/sec		[272]	21.0-22.0 sec	34.4 MBytes	289 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[400]	22.0-23.0 sec	29.4 MBytes	246 Mbits/sec		[272]	22.0-23.0 sec	35.2 MBytes	295 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[400]	23.0-24.0 sec	28.9 MBytes	242 Mbits/sec		[272]	23.0-24.0 sec	34.4 MBytes	289 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[400]	24.0-25.0 sec	29.4 MBytes	246 Mbits/sec		[272]	24.0-25.0 sec	33.1 MBytes	278 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[400]	25.0-26.0 sec	28.9 MBytes	243 Mbits/sec		[272]	25.0-26.0 sec	35.7 MBytes	300 Mbits/sec
	[ID]	Interval	Transfer	Bandwidth		[ID]	Interval	Transfer	Bandwidth
	[400]	26.0-27.0 sec	29.6 MBytes	248 Mbits/sec		[272]	26.0-27.0 sec	33.8 MBytes	283 Mbits/sec
[ID]	Interval	Transfer	Bandwidth	[ID]	Interval	Transfer	Bandwidth		
[400]	27.0-28.0 sec	28.6 MBytes	240 Mbits/sec	[272]	27.0-28.0 sec	36.0 MBytes	302 Mbits/sec		
[ID]	Interval	Transfer	Bandwidth	[ID]	Interval	Transfer	Bandwidth		
[400]	28.0-29.0 sec	29.5 MBytes	247 Mbits/sec	[272]	28.0-29.0 sec	36.0 MBytes	302 Mbits/sec		
[ID]	Interval	Transfer	Bandwidth	[ID]	Interval	Transfer	Bandwidth		
[400]	29.0-30.0 sec	29.4 MBytes	246 Mbits/sec	[272]	29.0-30.0 sec	34.4 MBytes	288 Mbits/sec		
[ID]	Interval	Transfer	Bandwidth	[ID]	Interval	Transfer	Bandwidth		
[400]	0.0-30.0 sec	866 MBytes	242 Mbits/sec	[272]	0.0-30.0 sec	1024 MBytes	286 Mbits/sec		
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。

合作 共赢

